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Does Cigarette Smoking Mediate The Relationship Between Racial  
Discrimination And Depression For African Americans Participating In The  
National Survey Of American Life?

A dissertation submitted in partial satisfaction of the  
requirements for the degree Doctor of Philosophy

in

Clinical Psychology

by

Norval Joseph Hickman III

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Professor John Elder

2008

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2008

## DEDICATION

I dedicate the dissertation manuscript to my beloved mother. Mrs. Betty Jean Sanders-Hickman (1947 – 2005), who taught me to think critically, to persevere in educational endeavors, to respect people, to remain grounded and spiritual, and that love does conquer all.

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Fernandez, S., Hickman, N., Landrine, H., Klonoff, L., Kashima, K., Parekh, B., Thomas, K., Brouillard, C., Zolezzi, M., Jensen, J., & Weslowski, Z. (2005). Cigarette advertising in magazines for Latinas, White women, and men, 1998-2002. *Journal of Community Health, 30* (2), 141-151.

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ABSTRACT OF THE DISSERTATION

Does Cigarette Smoking Mediate The Relationship Between Racial  
Discrimination And Depression For African Americans Participating In The  
National Survey of American Life?

By

Norval Joseph Hickman III

Doctor of Philosophy in Clinical Psychology

University of California, San Diego, 2008  
San Diego State University, 2008

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Cigarette smoking contributes to the higher rates of morbidity and mortality among African Americans compared to Caucasians. African Americans report that one of the functions of cigarette smoking is to alleviate stress. A unique stressor experienced by African Americans and reported to be very distressing is racial discrimination. Studies show that discrimination is positively related to depression, that discrimination is associated with an increased risk of cigarette smoking, and that being a cigarette smoker predicts more depression symptoms. Lazarus and Folkman's (1984) stress and coping theoretical model would suggest that poor coping to stress from discrimination should be



associated with more depression; however, that is not the case for African Americans. African Americans have lower rates of major depression than Caucasians at similar socioeconomic levels. To date, there is no explanation for why the increased stress from discrimination is not associated with a similar increase in depression for African Americans. One explanation is that cigarette smoking plays a mediating role between the effects of racial discrimination and depression. This assertion was evaluated using the Baron and Kenny (1986) procedures for testing mediation effects. The sample consisted of 1,412 African American adults who participated in the National Survey of American Life. Racial discrimination was measured using the 10-item Every Day Discrimination scale (Williams, Yu, Jackson, & Anderson, 1997). Cigarette smoking was measured by asking participants whether they have smoked 100 cigarettes in their lifetime and smoke now; participants who responded “yes” to both questions were categorized as “smokers” and those who responded “no” to both questions were categorized as nonsmokers. Depression symptoms were measured using the 12-item Center for Epidemiologic Studies Depression scale (Radloff, 1977). Regression analyses were conducted separately for men and women because they significantly differed in smoking prevalence, frequency of discrimination, and depression symptoms. Results showed that cigarette smoking did not significantly reduce the relationship between discrimination and depression for men or women, suggesting no mediation effect by cigarette smoking. Findings are discussed in terms of methodological weaknesses of the study and factors that have been found to mediate the discrimination-depression and discrimination-smoking relationship in other studies.

## INTRODUCTION

Heart disease, cancer, stroke, pulmonary disease, unintentional injuries, influenza and pneumonia, diabetes, HIV/AIDS, suicide, and cirrhosis of the liver are the top ten leading causes of death among all Americans (National Center for Health Statistics [NCHS], 1998). Findings from the 2003 Behavioral Risk Factor Surveillance System (BRFSS) show that health behaviors contribute to mortality in that tobacco use, unhealthy dietary intake, physical inactivity, excessive alcohol consumption, risky sexual behaviors, illicit drug use, automobile accidents, and handgun violence underlie the leading health behaviors which contribute to death in the U.S. (Mokdad, Marks, Stroup, & Gerberding, 2004). Among these, cigarette smoking poses the greatest health risk. Cigarette smoking is considered the leading preventable cause of death in that it is directly responsible for one in five deaths (438,000 people) in the U.S. each year (Centers for Disease Control [CDC], 2002, 2005; NCHS, 2004). Additionally, the Surgeon General has warned Americans since 1967 that cigarette smoking causes cancer and cardiovascular disease (U.S. Department of Health and Human Services [U.S.DHHS], 1983; U.S.DHHS, 2006). Moreover, the U.S. government estimates that taxpayers spend 75 billion dollars in smoking-related medical costs each year (CDC, 2002).

In response to smoking morbidity, mortality and health costs, the Healthy People 2010 (HP 2010) objectives were developed to increase quality and years of healthy life for all Americans and eliminate racial/ethnic disparities in health outcomes (U.S.DHHS, 2000). In order to achieve these objectives, two goals were established, among the multiple priorities for national research: to reduce cigarette smoking among adults to 12% and to eliminate racial/ethnic disparities in health outcomes by 2010 (Objective 27-1a).

However, results from the 2006 National Health Interview Survey (NHIS) (CDC, 2007) revealed that overall, cigarette smoking is 23.0% for African Americans and 21.9% for Caucasians; additionally, smoking by gender prevalence are (27.6 % vs. 24.3%, respectively) for African American vs. Caucasian men and (19.2% vs. 19.7%, respectively) for African American vs. Caucasian women. In summary, these data show that smoking rates exceed the HP 2010 goals and suggest that there are no ethnic differences in smoking rates within gender. Conversely, findings from the 2001 – 2002 Racial and Ethnic Approaches to Community Health (REACH) survey suggest that a single smoking rate may not adequately capture the range of smoking among African Americans. REACH showed that the 2001 – 2002 smoking rates across 21 minority communities ranged from 21.7% to 54.2% for African American men and 13.3% to 32% for African American women (Liao, Tucker, Okoro, Giles, Mokdad, & Harris, 2004). For example, smoking rates were 54.2% for men and 30.2% for women in Chicago, 30.4% for men and 24.6% for women in New York City, 28% for men and 17.3% for women in Nashville, and 21.7% for men and 20.4% for women in San Diego.

Data from the NCHS (1998) highlight ethnic disparities in health outcomes. Results show that African Americans are disproportionately more likely to die from heart disease, stroke, diabetes, HIV/AIDS, flu and pneumonia, unintentional injuries, and cirrhosis of the liver than same-aged Caucasians (NCHS, 1998; Williams, 1999). For example, mortality from heart disease per 100,000 deaths is 364.3 for African American men vs. 282.9 for Caucasian men, and 253.8 for African American women vs. 185.4 for Caucasian women (NCHS, 2005). Additionally, national statistics show that ethnic health disparities exist in that African Americans have a higher incidence and mortality from

cancer compared to Caucasians, Latinos, Asians, and Native Americans (U.S. Cancer Statistics Working Group, 2005). Moreover, lung and bronchus cancer are responsible for the most African American cancer deaths (American Cancer Society, 2007); whereas, prostate and breast cancer have the highest incidence for African American men and women, respectively (American Cancer Society, 2007). Altogether, these findings suggest that African Americans suffer more from adverse health consequences that have been associated with cigarette smoking than other ethnic groups.

Despite the greater health impact, there is evidence that African Americans smoke fewer cigarettes per day than Caucasians (Sanchez-Johnsen, Fitzgibbon, Ahluwalia, & Spring, 2005; Sanchez-Johnsen, Spring, Sommerfeld, & Fitzgibbon, 2005). For example, according to the National Health Interview Survey (NHIS) data, 62.5% of African Americans smoke fewer than 15 cigarettes per day, whereas only 35.3% of Caucasians smoke at this rate (64.7% of Caucasians smoke 15 or more cigarettes per day) (U.S.DHHS, 1998). Part of the reason for the higher incidence of adverse health outcomes, even though African Americans may be considered “light” smokers, has to do with ethnic differences in cigarette preference and metabolism. In terms of personal choice, three out of four African Americans prefer mentholated cigarettes, whereas one out of four Caucasians share this preference (U.S.DHHS, 1998). There is evidence that mentholated cigarettes may lead to a greater absorption of the carcinogenic constituents in cigarettes, making them more harmful than conventional cigarettes. Biological factors may also play a role in that African Americans metabolize nicotine slower and thus have higher serum cotinine concentrations compared to Caucasians and Mexican Americans who consume the same number of cigarettes (Caraballo, 1998). Furthermore, the nicotine

intake per cigarette has been shown to be 30% higher for African Americans compared to levels for Caucasians (Perez-Stable, Herrera, Jacob, & Benowitz, 1998). Altogether these factors help to explain why African Americans “bear the greatest health burden” from cigarette smoking (U.S.DHHS, 1998). African American smoking topography helps to explain the worse impact of smoking on health compared to Caucasians.

African American cigarette smoking is also affected by socioeconomic and psychosocial factors. Studies have shown that African Americans who are older and less educated are more likely to smoke (Elizabeth, Graham, & Swanson, 2006; Klonoff & Landrine, 1999; Lee Turner, Burns, & Lee, 2007). Additionally, having positive attitudes towards tobacco commercials and frequent exposure to secondhand smoke have been found to significantly predict tobacco use among African Americans (Lee et al., 2007).

Cigarette smoking in response to stress deserves closer attention. One randomized controlled trial testing the efficacy of a culturally-tailored smoking cessation intervention found that African American smokers who reported higher stress levels at week six and month six were significantly less likely to be abstinent compared to successful abstainers (Manning, Catley, Harris, Mayo, & Ahluwalia, 2005). Another study found that African Americans and Caucasians were equally likely to report tension reduction and pleasurable relaxation as reasons for smoking (Sanchez-Johnsen, Ahluwalia, Fitzgibbon, & Spring, 2006). In short, African Americans have difficulty quitting when under duress and experience tension reduction from smoking. These findings suggest that African American smoking may occur in response to stress.

The relationship between stress and health has been evaluated using the stress and coping theoretical model (Lazarus 1966; Lazarus & Launier, 1978; Lazarus & Folkman,

1984). In this model, stress is viewed as any perceived harm, threat, or challenge, which varies in quality and magnitude by person. Stress occurs because there is a stimulus and a transaction between the person and the environment that is often accompanied by an aversive physiological response. Coping is considered the consequence of stressful stimuli and is theorized to affect behavior, emotional, and physiological responses. Lazarus and Folkman (1984) found that the frequency and intensity of stressors explained the variance in psychological and somatic health better than life events. Moreover, studies have used the stress and coping theoretical approach to link stressors to African American physical health problems and depression symptoms (Barbarin, 1983; Jang, Borenstein, & Chiriboga, 2005). In summary, the theory that stress is followed by a compensatory coping response has been empirically supported.

Racial discrimination is defined as negative treatment, attitudes, and an ideology of inferiority about out-group ethnic minorities by in-group individuals and public institutions (Williams, Spencer, & Jackson, 1999). Racial discrimination results in unfair treatment, racist institutional policies, racist classification systems, biased scientific evidence, as well as Caucasian-centered social norms, morals, and laws that in their form and function disadvantage ethnic minority groups and serve as reminders of the dominant group's perceived superiority (Johnson, 2006; Jones, 1997). In addition, there is evidence that racial discrimination is a unique stressor for African Americans; a concept that has been recently formulated by health researchers (Brondolo, Kelly, Coakley, Gordon, Thompson, Levy, et al., 2005; Clark, Anderson, Clark, & Williams, 1999; Meyers, 2003; Utsey, 1998). For example, African Americans report significantly more frequent experiences with racial discrimination than Caucasians (Krieger, Smith, Naishadham,

Hartman, & Barbeau, 2005; Landrine, Klonoff, Corral, Fernandez, & Roesch, 2006; Williams & Neighbors, 2001) and appraise racial discrimination as being more stressful than Caucasians (Landrine et al., 2006; Thompson, 2002). Additionally, investigators have proposed that the stress and coping theoretical framework can be used to conceptualize racial discrimination (as a social-level stressor) in studies on the health effects of racism (Brondolo et al., 2005; Clark et al., 1999; Outlaw, 1993).

Experiences with racial discrimination have been found to predict a variety of physical and mental health problems. First, the effect of racial discrimination on blood pressure level has been empirically investigated. Several studies have found a positive association between experiences with discrimination and high blood pressure levels in African Americans, indicating that frequent discriminatory events are associated with higher blood pressure (Din-Dzietham, Nembhard, Clark, Collins & Davis, 2004; Krieger, 1990; Krieger & Sidney, 1996; Steffen, McNeilly, Anderson, & Sherwood, 2003). Furthermore, investigations have shown that African Americans who actively cope (i.e., utilized social support network or confronted the source) after experiencing discrimination had significantly lower blood pressure levels compared to those who remained quiet (Clark, 2006; Krieger, 1990; Krieger & Sidney, 1996). In summary, the negative impact of racial discrimination on blood pressure may be tempered or exacerbated depending on the type of coping mechanism employed.

Second, the effects of racial discrimination on psychiatric symptoms among African Americans have been investigated. For African Americans, studies have found a positive association between experiences with racial discrimination and psychiatric symptoms (Kessler, Mickelson, & Williams, 1999; Krieger et al., 2005; Kwate,

Valdimarsdottir, Guevarra, & Bovbjerg, 2003; Ren, Amick, & Williams, 1999; Williams, Yu, Jackson, & Anderson, 1997; Williams and Chung, 1997a). Additionally, research has shown that racial discrimination is positively related to depression, anxiety, obsessive-compulsive, somatic, and general stress-related symptoms, as well as with feelings of inadequacy and low self-esteem (Landrine & Klonoff, 1996). Moreover, there is evidence that racial discrimination impacts mental health even if it is implicit in nature. For example, a study found that covert occurrences of discrimination were positively associated with lifetime depression (Brown, 2001). Additionally, there are gender differences in psychiatric symptoms. Studies have found that African American women are significantly more likely than African American men to experience symptoms of anxiety, depression, and somatization (Russo & Green, 1993; Russo & Sobel, 1981). Briefly, racial discrimination is associated with psychiatric symptoms, but there are gender differences in psychiatric symptoms that also must be considered. In summary, these findings support the argument for a link between discrimination and psychiatric symptoms.

Third, relationships between racial discrimination and cigarette smoking have been evaluated. Among African American adults, one study revealed that the frequency of racist events was significantly higher for smokers compared to nonsmokers (Landrine & Klonoff, 1996). When a similar relationship was reevaluated in a separate Black sample, frequent exposure to discrimination over the lifetime was found to be the strongest predictor of smoking compared to those infrequently exposed to racism and compared to socioeconomic factors (Landrine et al., 2006). The same study also showed that men and those older in age were more likely to smoke. Moreover, among African



American college students, reports of frequent race-based harassment significantly predicted more tobacco use in the past 30 days (Bennett, Wolin, Robinson, Fowler, & Edwards, 2005). Another study tested the discrimination-smoking relationship for African American adolescent girls (Guthrie, Young, Williams, Boyd, & Kintner, 2002). Results showed that there was a significant positive correlation between experiences with racial discrimination and ever smoking cigarettes, demonstrating that the negative impact of racism on health begins at an early age. Additionally, socioeconomic variations in smoking have been found in that African Americans who were older and with fewer years of education were more likely to smoke compared to their younger and more highly educated counterparts (Klonoff & Landrine, 1999). Finally, a study conducted on a sample of African American women from a Harlem community evaluated the effects from racist experiences on cigarette smoking (Kwate et al., 2003). Again, findings revealed that past year racism was positively associated with the number of cigarettes smoked. In summary, recent and lifetime racial discrimination have been found to affect African Americans' recent smoking, smoking during adolescence, been used to identify current smoking status, but effects vary by gender, age, and education level.

Fourth, there is evidence supporting a link between cigarette smoking and depression. For example, one study found that regular daily smokers endorsed more depression symptoms than nonsmokers (Hu, Davies, & Kandel, 2006). Additionally, a study of African American students attending a Historically Black University found that male ever-smokers (i.e., current smoker or former smoker) were four times more likely to be depressed than male nonsmokers; however, the depression-smoking relationship was

not significant for women (Wang, Browne, Storr, & Wagner, 2005). In summary, these findings support the argument for a cigarette smoking-depression relationship.

A difficulty with evaluating and comparing studies that examine relationships between racial discrimination and health has to do with the measurement of racism. The majority of studies measure discrimination using a cross-sectional self-report method. Racial/ethnic discrimination studies tend to collect data on discriminatory events occurring either within the past 30 days, 1-year, 3-years, or over the lifetime. Several investigations measure discrimination using a single item (e.g., Call, McAlpine, Johnson, Beebe, McRae, & Song, 2006; Bennett et al., 2005; Brown, 2001). Other studies measure discrimination using two or more questions to create categories of discrimination or discriminatory situations (e.g., Bhui, Stansfeld, McKenzie, Karlsen, Nazroo, & Weich, 2005; Guyll, Mathews, & Bromberger, 2001; Harris, Tobias, Jeffreys, Waldegrave, & Karlsen, 2006; Minior, Galea, Stuber, Ahern, & Ompad, 2003). Other studies have used either unidimensional or multidimensional scales to measure racial/ethnic discrimination (e.g., Brondolo et al., 2005; Krieger et al., 2005; Landrine & Klonoff, 1996; Landrine et al., 2006; McNeilly, Anderson, Armstead, Clark, Corbett, & Robinson, 1996; Utsey & Ponterotto, 1996; Vines, McNeilly, Stevens, Hertz-Picciotto, Bohlig, & Baird, 2001). There is not a consensus on which discrimination assessment strategy constitutes a “gold standard.” Several studies when conducting validation tests have included health outcomes, psychological symptoms, or health behaviors and showed that racial discrimination scales can appropriately distinguish depressed mood from non-depressed mood and smokers from nonsmokers (Landrine & Klonoff, 1996; Landrine et al., 2006;

Krieger et al., 2005). Additionally, the discrimination-health relationships were supported for all ethnic groups in these studies.

Although racial discrimination has been shown to be associated with psychiatric symptoms for African Americans, there are racial differences in the prevalence of mental disorders. The Surgeon General reports that African Americans have relatively low levels of mental health problems relative to Caucasians (U.S.DHHS, 2001). Nationally-representative data from the Epidemiologic Catchment Area study (Robins & Regier, 1991; Zhang & Snowden, 1999) and the National Comorbidity Survey (Kessler, Nelson, McGonagle, Liu, Swartz, & Blazer, 1996) showed that compared to Caucasians, African Americans have significantly lower rates of major depression, dysthymia, and panic disorder. Moreover, findings from the National Comorbidity Survey Replication using a diagnostic interview found that African Americans were significantly less likely than Caucasians to have a lifetime prevalence of panic disorder, generalized anxiety disorder, any anxiety symptoms, major depression, bipolar disorder, any depression symptoms, alcohol abuse or dependence, and any illicit drug abuse or dependence (Breslau, Aguilar-Gaxiola, Kendler, Su, Williams, & Kessler, 2005). Additionally, findings from the Midlife Development in the United States (MIDUS) survey, a national population survey, showed that the prevalence of depression and anxiety symptoms were significantly lower for African Americans than Caucasians (Kessler et al., 1999). However, this literature review has shown that racial discrimination is associated with more psychiatric symptoms and also that racial discrimination is associated with more cigarette smoking for African Americans. To date, there is not an explanation for why the increased stress from racial discrimination is not associated with a similar increase in psychiatric

symptoms for African Americans. One possible explanation is that cigarette smoking plays a mediating role between the effects of racial discrimination and psychiatric symptoms. In other words, it is possible that African Americans who frequently experience racial discrimination use cigarette smoking as a coping mechanism which buffers the mental health consequences of this stressor. Alternatively, it is possible that those who experience a high level of discrimination, but do not smoke experience more mental health problems. These relationships, however, have never been empirically tested. Therefore, it is hypothesized that cigarette smoking will mediate the relationship between racial discrimination and psychiatric symptoms.

## METHODS

### Participants

Data for this investigation come from the 2002 National Survey of American Life (NSAL; Alegria, Jackson, Kessler, & Takeuchi, 2007). The National Survey of American Life was a cross-sectional study conducted to collect data on the prevalence, severity, and impairment of mental and physical health problems, as well as the prevalence of social, economic, and environmental factors among a national household probability sample of African Americans and Afro Caribbeans (Jackson, Torres, Caldwell, Neighbors, Nesse, Taylor et al., 2004b). The NSAL included 6,082 adults 18 years of age and older residing in households within the 48 contiguous United States. In the NSAL study, data were collected for 3,570 non-Hispanic African Americans, 1,438 Afro-Caribbeans, 891 non-Hispanic Caucasians, and 183 Hispanics (Alegria et al., 2007).

Racial group membership is based on participants' self-report. To ascertain racial group membership, participants were asked, "Which do you feel best describes your racial background? Black or African American, White, American Indian or Alaska Native, Asian, or Pacific Islander?" (NSAL variable H24). Participants could then select one or multiple racial groups. If more than one racial group was selected, then a follow-up question was asked, "Which one best describes your race?" (NSAL variable H24b). There were 3,570 participants who self-identified as African American or Black.

Foreign-born African Americans were excluded from analyses because the rates of cigarette smoking and psychiatric disorders have been found to differ according to country of birth. For instance, Caribbean- and African-born African Americans are less likely to be current smokers compared to U.S.-born African Americans (Bennett, Wolin,

Okechukwu, Arthur, Askew, Sorensen, et al., in press; King, Polednak, Bendel, & Hovey, 1999). Additionally, among U.S.-born African Americans, cigarette smoking prevalence tends to decrease with increasing education and income, which has not been found among foreign-born African Americans (King et al., 1999). Furthermore, Caribbean and African-born women are less likely to meet the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; American Psychiatric Association [APA], 2000) criteria for major depression compared to U.S.-born African Americans (Miranda, Siddique, Belin, & Kohn-Wood, 2005). Also, Caribbean-born African American men and women are less likely to meet criteria for any mood or anxiety disorder over the past 12 months compared to their U.S.-born counterparts (Williams, Gonzalez, Neighbors, Nesse, Abelson, Sweetman et al., 2007). These findings support the argument that foreign-born African Americans differ from U.S.-born African Americans in terms of beliefs, behavior, and expressions of emotions (Williams & Jackson, 2000). Because of the heterogeneity in smoking and psychiatric disorders, foreign-born African Americans were excluded from analyses.

To ascertain country of birth, participants were asked, “Where were you born?” (NSAL variable H2) and then freely reported their county of birth, which was later coded into a dichotomous variable as either born in the United States or born in a foreign country (Alegria et al., 2007). There were 3,464 Africans Americans born in the U.S. and 106 foreign-born African Americans, of which 50 were born in Africa and 56 were born in an unspecified country. Therefore, 106 Blacks were excluded because they were born in a foreign country.

An additional group of African Americans were excluded because of missing data on the discrimination, smoking, and depression measures. There were 1,754 Blacks missing data on the discrimination measure, 621 Blacks missing data on cigarette smoking, and 126 Blacks missing data on the depression measure. There were 1,412 African Americans with data on the discrimination, smoking, and depression measures, which constituted the sample for analyses.

### Sampling Procedures

Eligible households were selected through a four-step national area probability random sampling procedure (Heeringa, Wagner, Torres, Duan, Adams, & Berglund, 2004). In the first step, probability estimates of ethnic group membership from the 2000 U.S. census were applied to U.S. Metropolitan Statistical Areas (MSAs). MSAs were the primary focus of sampling procedures at step one. An MSA constituted a single county or geographically contiguous counties with small populations. The second step consisted of identifying contiguous census blocks, within MSAs, to form 50 to 100 housing units, called area segments. Area segments were the primary focus of sampling procedures at step two. Probability data of ethnic group membership from census data were then applied to area segments to provide estimates of racial group membership. The probability estimate of racial group membership constituted the target recruitment goals for interviewers in the field. For the third step, housing units were the focus of sampling procedures, in that research staff applied publicly-available household listing information to designated housing units. After compiling addresses for household units, the projected sampling rate was calculated so that an equal probability of African Americans and Afro

Caribbeans were selected across housing units (See Heeringa et al., 2004 for selection equations). Using this procedure, on average, one household per 3.5 households contacted was found to be eligible for the study (Jackson et al., 2004b).

For the fourth, and final step, interviewers selected one eligible adult participant living in a selected household. Households were the focus of sampling procedures at step four. If more than one African American adult lived in a household, then Kish (1949; 1965) procedures were used to select a single participant. Kish procedures were as follows: interviewers listed eligible African Americans according to their relationship to the head of the household on a form. The gender and age of each adult were recorded in the second and third columns, respectively. A number was then assigned to each adult from oldest to youngest and men first followed by women. For example, the oldest man in the home would be assigned one and the youngest woman would be assigned the highest number. The interviewer then consulted a selection table (See Kish, 1949; 1965), which identified the number representing the adult to be interviewed.

#### Procedures

The NSAL interview was administered between February 2001 and June 2003 (Pennell, Bowers, Carr, Chardoul, Cheung, Dinkelman, et al., 2004). Eighty-six percent of interviews were conducted face-to-face, in participants' homes using the Blaise computer-assisted personal interviewing software installed on laptop computers (Jackson, 2004b; Pennell et al., 2004). Blaise is a programming language, which permits complex manipulation of data (e.g., skip procedures) in the field and has been widely used by the World Health Organization (WHO) in population-level mental health survey research



(WHO World Mental Health Survey Consortium, 2004). Blaise was beneficial for the NSAL study because it quickly calculated whether endorsed DSM-IV psychiatric symptoms met criteria for a diagnosis or not. The remaining 14% of interviews were conducted on the telephone because either the participant resided in a difficult to reach rural area, was unavailable at first encounter or was unavailable in-person after completing a portion of the interview (Alegria et al., 2007).

Interviews were completed over multiple encounters for participants' reporting fatigue (Jackson et al., 2004b). On average, it took 7.4 contacts (range unavailable) to complete an interview (Pennell et al., 2004). During the screening interview, interviewers obtained information on each household members' age, gender, ability to speak English, race and Hispanic and Caribbean ancestry (data unavailable). Among households screened, 3,788 were found to contain one or more African Americans eligible to participate in the NSAL (Heeringa et al., 2004).

One adult aged 18 years or older per selected household was allowed to participate in the NSAL. On average, African Americans completed the interview in two hours and 20 minutes. Participants were compensated \$50 at time of completion. The response rate for African Americans was 70.9% (Heeringa et al., 2004). Response rates were based on the number of completed interviews divided by the number of eligible households (American Association for Public Opinion Research, Response Rate Formula 3, 2004).

Interviewers were recruited and trained by staff at the Program for Research on Black Americans in the Institute for Social Research at the University of Michigan (Jackson et al., 2004b). Over the course of the study, more than 300 interviewers

administered the NSAL. Particular effort was used to match the ethnicity of participants and interviewers, resulting in 61.9% of African American interviewers in the field.

## Measures

### Predictor Variable

Experiences with racial discrimination were measured using the Every Day Discrimination questionnaire (EDD; Williams et al., 1997b). The EDD scale contains 10 items which “attempt to measure more chronic, routine, and relatively minor experiences of unfair treatment” that occur in day-to-day life (Williams et al., 1997b). The instrument was developed for a study evaluating the effects of racial discrimination on mental and physical health of Blacks in Detroit (Williams et al., 1997b; Williams et al., 1999). The EDD scale has been used in studies evaluating the effects of racial discrimination on depression symptoms among African Americans (Barnes, Mendes de Leon, Wilson, Bienias, Bennett, & Evans, 2004; Taylor & Turner, 2002), the relationship between discrimination and cigarette smoking among African American adolescent girls (Guthrie et al., 2002), and in a study to cross-validate another racial discrimination measure (Krieger et al., 2005).

To assess experiences with discrimination participants were asked, “In your day-to-day life how often have any of the following things happened to you?” (NSAL variable G18): “you are treated with less courtesy than other people” (NSAL variable G18a); “you are treated with less respect than other people” (NSAL variable G18b); and “you receive poorer service than other people at restaurants or stores” (NSAL variable G18c). See Appendix for the remaining seven EDD items (NSAL variables G18d to

G18j). Participants were then instructed to rate each of the 10 items on a six-point scale, indicating whether discrimination occurred “almost everyday (5),” “at least once a week (4),” “a few times a month (3),” “a few times a year (2),” “less than once a year (1),” or “never (0).” Participants who endorsed that any of these events occurred at least once were then asked one question, which was applied to all the situations: “What do you think was the main reason for this/these experience(s)? Would you say....?” (NSAL variable G20). Response choices were “your ancestry or national origins,” “your gender,” “your race,” “your age,” “your height or weight,” “your shade of skin color,” and “other.” Experiences of discrimination were included in the analyses for participants indicating that he/she believed that his/her racial group membership was the reason for the discrimination.

The alpha coefficient (Cronbach, 1951) for the African American sample participating in the NSAL was 0.83, indicating good internal consistency reliability. Studies using the EDD measure have reported alpha coefficients ranging from 0.54 to 0.88 (Guthrie et al., 2002; Williams et al., 1997b; Williams et al., 1999). Because the internal consistency reliability is good, items were summed to yield an EDD summary score, which ranged from zero to 50 for the NSAL sample. The variables were coded so that high scores indicate more frequent occurrences of racial discrimination. Furthermore, the practice of summing the number of situations for which participants reported having experienced racial discrimination is considered the conventional scoring method for the EDD (Krieger et al., 2005; Williams et al., 1997b).

Criterion Variables

## Center for Epidemiologic Studies Depression Questionnaire

The Center for Epidemiologic Studies (CESD; Radloff, 1977) 12-item questionnaire was used to measure depressed mood. The CESD assesses symptoms of depressed mood that have occurred over the past week. The 20-item CESD has been used as a screening measure of depressed mood (McQuaid, Stein, McCahill, Laffaye, & Ramel, 2000; Munoz, McQuaid, Gonzalez, Dimas, & Rosales, 1999). The 12-item CESD, although less frequently reported, was used in a study comparing depression symptoms among African Americans, Mexican Americans and Caucasians (Roberts & Sobhan, 1992). Also, the 12-item CESD measure was administered to African American adolescents ages 12 to 17 years who participated in the National Household Survey on Drugs Abuse in 1985 (National Institute on Drug Abuse, 1994). Furthermore, a study comparing the 20-item CESD with multiple shortened forms found that “the briefer forms tap the same symptom dimensions as does the original CESD” with little reduction in precision as indicated by reliability statistics (Kohout, Berkman, Evans, & Cornoni-Huntley, 1993).

In order to assess for depressed mood, participants were read the following: “I would like to ask you about ways you might have felt or behaved. Please tell me how often you have felt this way during the past week” (NSAL variable NSD1). Participants then responded to the statements, “I felt that I was just as good as other people” (NSAL variable NSD1a); “I had trouble keeping my mind on what I was doing” (NSAL variable NSD1b); and “I felt depressed” (NSAL variable NSD1c). See Appendix for the remaining nine CESD items (NSAL variables NSD1d to NSD1l). Participants then rated each item on a 4-point scale. Response choices were “rarely or none of the time (less than

one day),” “some or a little of the time (one to two days),” “occasionally or a moderate amount of the time (three to four days),” and “most or all of the time (five to seven days).”

Four CESD items were reverse scored (i.e., felt as good as others, felt hopeful about the future, was happy, and enjoyed life) so that higher values represented more depressed mood. The alpha coefficient for the NSAL African American sample was 0.77, indicating good internal consistency reliability. Another study using the 12-item CESD reported an alpha coefficient of 0.70 for the African American sample (Roberts & Sobhan, 1992). Therefore, items were summed to yield a CESD summary score, which ranged from zero to 33 for the NSAL sample. The summary score represents the number of current depression symptoms endorsed with higher values coinciding with more reported depression symptoms.

### Mediating Variable

#### Cigarette Smoking

Studies have demonstrated that cigarette smoking is related to racial discrimination and depression. For example, studies have found that smoking is positively associated with racial discrimination among African Americans (Bennett et al., 2005; Guthrie et al., 2002; Landrine & Klonoff, 1996, 2000a; Landrine et al., 2006). Furthermore, daily and nicotine dependent smokers report more depression symptoms than their nonsmoking counterparts (Hu et al., 2006). Another study found that African American men who smoke cigarettes reported more depression symptoms compared to their nonsmoking counterparts; however, this effect did not hold for African American

women (Wang, Browne, Storr, & Wagner, 2005). Because of these findings and in order to test the main hypothesis for the study, cigarette smoking was entered into analyses as a mediating variable.

Cigarette smoking status was ascertained by asking participants two questions. First, participants were asked, "Have you ever smoked more than 100 cigarettes in your lifetime (NSAL variable TB1). If participants responded "Yes," they were then asked, "Do you currently smoke?" (NSAL variable TB3). Those who responded "Yes" to both were classified "current smokers" and those who responded "No" to both questions were classified "nonsmokers" in a new cigarette smoking status variable. The strategy of creating a binary smoking variable that combines the amount of cigarette use and time of last use has been applied in other survey research (Bennett, et al., in press; CDC, 2007). Cigarette smoking status was coded such that zero represented nonsmokers and one represented smokers.

## Covarying Variables

### Gender

Studies have shown that gender is related to discrimination, cigarette smoking, depression, and anxiety symptoms. National studies have shown that women are more likely to be diagnosed with major depression disorder and generalized anxiety disorder compared to men (Kessler, Berglund, Demler, Jin, Koretz, Merikangas, et al., 2003; Wang, Berglund, & Kessler, 2000). Among African Americans, women are significantly more likely to be diagnosed with lifetime major depression disorder than men (Brown, 2001; Williams et al., 2007). Additionally, studies have found that African American men

are more likely to report experiences with racial discrimination compared to African American women (Bennett et al., 2005; Landrine et al., 2006). Furthermore, a study revealed that African American women are more likely to be current and past smokers compared to African American men (Bennett, et al., in press). Because gender plays a role in experiences with discrimination, cigarette smoking and depression symptoms, it was considered to be an intervening variable in analyses.

Gender was ascertained during the NSAL interview by the interviewers' visual determination of biological sex, which was later coded as male or female (NSAL variable SEX). The gender variable was recoded such that zero represented men and one represented women.

#### Age

Studies have found relationships between age and racial discrimination, as well as between age and depression. For example, age has been shown to be inversely related to racial discrimination (Barnes, Mendes de Leon, Wilson, Bienias, Bennett, & Evans, 2004). Also, among African Americans, age has been found to be inversely related to past year depression (Brown, Williams, Jackson, Neighbors, Torres, Sellers et al., 2000). Because of these findings, age was entered into analyses as a covariate. Age was assessed by first asking participants, "What is your date of birth?" (NSAL variable H1), which was then calculated into a continuous age variable (NSAL variable AGE). Age was entered in analyses as a continuous variable.

#### Income

Studies have found that income is associated with discrimination and symptoms of depression and anxiety. Income has been found to be inversely associated with the number of experiences with racial discrimination for African Americans (Watson, Scarinci, Klesges, Slawson, & Beech, 2002). Additionally, a national study revealed that income is inversely associated with the rates of major depression disorder and generalized anxiety disorder (Wang et al., 2000). Because of these findings, income was entered into analyses as a covariate. Income was assessed by asking participants, “What was your total income from all sources (including your job) in the past year?” (NSAL variable H43). Income was entered into analyses as a continuous variable.

#### Education

Studies have found relationships between educational attainment and cigarette smoking, as well as between education and depression and anxiety symptoms. For instance, findings from a national study revealed that education is inversely related to cigarette smoking prevalence, in that persons with less than a high school diploma smoke considerably more than college graduates (Substance Abuse and Mental Health Services Administration, 2007). In terms of psychiatric symptoms, another national study found that fewer years of completed education was associated with higher rates of major depression disorder (Kessler et al., 2003). Among African Americans, education level has been found to be inversely related to depression and anxiety symptoms (Brown et al., 2000; Wang et al., 2000). Because of these findings, education was entered into analyses as a covariate.



Education was assessed by asking participants, “How many years of school did you finish?” (NSAL variable H13). Participants then freely reported the number of years of education completed, which was categorized into four groups, including zero to 11 years, 12 years, 13 to 15 years, and 16 or more years. This four-group categorizing method of education has been applied in other studies of mental health among African Americans (Williams et al., 1997b; Williams et al., 1999).

### Marital Status

Studies show relationships between marital status and psychiatric symptoms, as well as between marital status and cigarette smoking. For example, a national epidemiological study revealed that married men and women are more likely to be daily smokers during their lifetime compared to their counterparts who are single (Hu et al., 2006). Among a national sample, one study revealed that divorced, separated, and widowed participants are more likely to have a lifetime diagnosis of major depression disorder compared to their married counterparts (Kessler et al., 2003). Moreover, studies support the notion that married African American men and women are less likely to meet criteria for a major depression disorder and any anxiety disorder compared to their widowed, separated, divorced or never married counterparts (Williams, Takeuchi, & Adair, 1992; Williams et al., 2007). Because of these findings, marital status was entered into analyses as a covariate. Marital status was assessed by asking participants, “Are you currently married, living with a partner, separated, divorced, widowed or have you never been married?” (NSAL variable E13), which was categorized into three levels consisting

of “married or living with a partner,” “separated, divorced, or widowed,” and “never married.”

### Data Analytic Strategy

The percentages of responses to the discrimination and depression measures were calculated. Pearson Chi-Square analyses and Independent Samples T-Tests were conducted to evaluate gender differences in smoking, discrimination, depression, and socioeconomic status. Independent Samples T-Tests were conducted to evaluate differences in racial discrimination and depression symptoms by cigarette smoking status. In order to demonstrate the mediation of the discrimination-depression relationship by cigarette smoking status using the Baron and Kenny (1986) method, four conditions must be satisfied. Condition one, discrimination must significantly predict depression symptoms after controlling for covariates, which is represented by path c in Figure 1. Condition two, discrimination must significantly predict smoking after controlling for covariates, which is represented by path a in Figure 1. Condition three, smoking must significantly predict depression symptoms, after controlling for covariates, which is represented by path b in Figure 1. Condition four, after controlling for covariates and smoking, the discrimination-depression relationship (path c) is not statistically significant if complete mediation is present or, alternatively, path c is smaller (compared to Condition one) if partial mediation is present (Baron & Kenny, 1986; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Conditions one and two were tested using separate hierarchical multiple regressions. Conditions three and four were tested in the

same hierarchical multiple regression. Mediation analyses were conducted predicting depression using the CESD summary score.

Covariates were entered into the regression models at the first step. Marital status was coded differently for hierarchical multiple regression and logistic regression analyses. For hierarchical multiple regressions, marital status was dummy-coded such that three variables represented comparisons between groups. The first variable represented the comparison between the married (reference group) and divorced, separated, or widowed group, the second variable represented the comparison between the married (reference group) and never married group, and the third variable represented the comparison between the divorced, separated, or widowed group (reference group) and never married group. For logistic regressions, marital status (0 = never married, 1 = divorced, separated, or widowed, 2 = married) was entered as a single variable on the first step and those who were never married constituted the reference group. Finally, Chi-Square analyses and Independent Samples T-Tests were conducted to evaluate the effects of missing data on smoking and depression symptoms.

## RESULTS

### Responses to Measures of Discrimination and Depression

The percentages of African Americans responding to the discrimination measure were examined first. In terms of responses on the discrimination measure (Table 3), the situations most likely to occur “almost everyday” and “at least once a week” were “people act as if they are better than you” (16.8% of the sample for everyday and 9.7% for once a week), and “people act as if they think you are not smart” (8.6% of the sample for everyday and 7.4% for once a week); situations most likely to occur “a few times a month” were “people act as if they are better than you” (18.7% of the sample) and “you are treated with less courtesy than other people” (15% of the sample); situations most likely to occur “a few times a year” were “you receive poorer service than other people at restaurants or stores” (36.2% of the sample) and “you are treated with less courtesy than other people” (34% of the sample); and finally, situations most likely to occur “less than once a year” and “never” were “you are threatened or harassed” (34.7% of the sample for less than once a year and 52.7% for never) and “you are called names” (32.5% for less than once a year and 43.4% for never).

The percentages of African Americans responding to the depression measure were examined second. Responses on the depression measure (Table 4) showed that symptoms most likely to occur “most or all of the time” were “I felt that everything I did was an effort” (25.9% of the sample) and “I was hopeless about the future” (16.1% of the sample); symptoms most likely to occur “occasionally or a moderate amount of the time” were “I was hopeless about the future” (11.8% of the sample) and “I had trouble keeping

my mind on what I was doing” (12% of the sample); symptoms most likely to occur “some or a little of the time” were “I had trouble keeping my mind on what I was doing” (23.3% of the sample) and “my sleep was restless” (23.5% of the sample); and finally, symptoms most likely to occur “rarely or none of the time” were “I have not enjoyed life” (79.7% of the sample) and “I had crying spells” (79.8% of the sample).

#### Gender Differences in Discrimination, Smoking, and Depression Symptoms

Gender differences in cigarette smoking, racial discrimination, and depression symptoms were examined. Results from a Pearson Chi-Square test ( $\chi^2(1, N = 1,412) = 14.27, p < .001$ ; Table 5) revealed that African American men (41.2%) were significantly more likely to be smokers compared to African American women (31.2%). Results from Independent Samples T-Tests (Table 4) revealed that African American men ( $M = 17.18, SD = 8.95$ ) reported significantly ( $t(1,410) = 4.71, p < .001$ ) more discrimination experiences than women ( $M = 15.02, SD = 7.89$ ); African American women ( $M = 7.71, SD = 6.52$ ) reported significantly ( $t(1,410) = -3.55, p < .001$ ) more depression symptoms than men ( $M = 6.52, SD = 5.19$ ). Because gender differences were found in discrimination, smoking, and depression symptoms, mediation analyses were conducted separately for men and women. Therefore, mediation analyses were conducted for men when the criterion variable is the CESD depression symptom score (conducted first) and for women when the criterion variable is the CESD depression symptom score (conducted second).

#### Gender Differences in Age, Income, Education, and Marital Status

Gender differences in age, income level, education level, and marital status were also examined. An Independent Samples T-Test was conducted to evaluate gender differences in income level. Results (Table 6) showed that men ( $M = \$39,355$ ,  $SD = \$34,684$ ) had a significantly ( $t(1,410) = 5.57$ ,  $p < .001$ ) higher annual income level than women ( $M = \$30,249$ ,  $SD = \$26,219$ ). An Independent Samples T-Test was also conducted to evaluate gender differences in age. Results showed no gender differences in the mean age of African American men and women ( $t(1,410) = .28$ ,  $p = .78$ ). Pearson Chi-Square analysis was conducted to test for gender differences in marital status. Results (Table 6) revealed significant gender differences in marital status in that men were more likely to be married than women (41.2% vs. 30.8%, respectively), whereas women were more likely to be divorced compared to men (32.4% vs. 23.1%, respectively). Pearson Chi-Square analysis also showed no gender differences in education level ( $X^2(1, N = 1,412) = 3.32$ ,  $p = .35$ ; Table 6). In summary, African American men have a higher annual salary and are more likely to be married than African American women, who are more likely to be divorced and make less money.

#### Relationship between Racial Discrimination, Depression Symptoms

Pearson correlations were conducted for African American men and women separately to evaluate the extent to which discrimination, depression symptoms, and anxiety symptoms are interrelated. The results for African American men revealed that discrimination was significantly positively related to depression symptoms ( $r(630) = .28$ ,  $p < .001$ ) and anxiety symptoms ( $r(441) = .32$ ,  $p < .001$ ). The results for African

American women revealed that discrimination was positively related to depression symptoms ( $r(1028) = .34, p < .001$ ) and anxiety symptoms ( $r(1067) = .27, p < .001$ ). In summary, racial discrimination was positively related to depression and anxiety symptoms for African Americans.

#### Differences in Discrimination and Depression Symptoms by Cigarette Smoking Status

Independent Samples T-Tests were conducted for African American men and women separately to evaluate the extent to which cigarette smoking status was related to discrimination and depression symptoms. The results (Table 7) for African American men revealed that smokers experienced significantly ( $t(513) = -3.08, p = .002$ ) more racial discrimination than nonsmokers ( $M = 18.62, SD = 10.00$  vs.  $M = 16.17, SD = 7.99$ , respectively). Smokers also reported significantly ( $t(513) = -3.35, p = .001$ ) more depression symptoms than nonsmokers ( $M = 7.43, SD = 5.60$  vs.  $M = 5.89, SD = 4.78$ , respectively). In summary, African American male smokers experienced more discrimination and depression than their nonsmoking counterparts. For African American women, results (Table 8) from Independent Samples T-Tests showed that there were no differences in reports of racial discrimination by smoking status ( $t(895) = -1.46, p = .145$ ). In contrast, female smokers reported significantly ( $t(895) = -3.45, p = .001$ ) more depression symptoms than nonsmokers ( $M = 8.82, SD = 7.19$  vs.  $M = 7.21, SD = 6.13$ , respectively). In summary, African American female smokers experience more depression than their nonsmoking counterparts.

## Evaluating Mediation of Smoking for African American Men when Predicting Depression

For condition one of the mediation analyses (path c in Figure 1) to be satisfied, discrimination must significantly predict depression symptoms. In order to evaluate condition one, a hierarchical multiple regression was conducted with age, income level, education level, and marital status entered on the first step and discrimination entered on the second step. Results (Table 9) showed that the overall model was statistically significant,  $F(6, 508) = 11.71, p < .001$  and accounted for a significant proportion of variance in depression at step two,  $R^2 = .12$ . Unstandardized regression coefficients are reported using the symbol  $B$ . Discrimination was found to significantly predict depression,  $B = .16, t(508) = 6.51, p < .001$ , and discrimination accounted for a significant increase in the explained variance of depression symptoms,  $\Delta R^2 = .073, \Delta F(1, 508) = 42.35, p < .001$ . Education was significantly related to depression at step two,  $B = -.91, t(508) = -3.85, p < .001$ , which indicates an inverse relationship between education level and depression symptoms. In summary, condition one (path c) was met for African American men.

For condition two of the mediation analyses to be satisfied, discrimination must significantly predict cigarette smoking status (path a in Figure 1). In order to evaluate condition two, a hierarchical logistic regression was conducted predicting smoking (0 = nonsmoker and 1 = smoker) from age, income, education level (reference group has 16 or more years of education) and marital status (reference group has never been married) entered on step one and discrimination entered on step two. The results (Table 10) showed that age, education, marital status, and discrimination were statistically



significant. Smokers were more likely to experience discrimination, be older in age, have fewer years of education, and be divorced, separated, or widowed compared to nonsmokers. Because discrimination significantly predicted smoking status, condition two (path a) was met for African American men.

For condition three of the mediation analyses to be satisfied, smoking status must significantly predict depression symptoms (path b in Figure 1). In order to evaluate condition three, a hierarchical multiple regression was conducted with age, income, education and marital status entered on the first step and smoking status entered on the second step. Results (Table 11) showed that the overall model was statistically significant,  $F(6, 508) = 5.10$ ,  $p < .001$  and smoking status accounted for a significant proportion of variance in depression symptoms at step two,  $\Delta R^2 = .009$ ,  $\Delta F(1, 508) = 4.64$ ,  $p = .03$ . Therefore, condition three was met. For condition four of the mediation analyses to be satisfied, the discrimination-depression relationship (path c) must either be non-significant (for complete mediation) or weaker (for partial mediation) when smoking is in the regression model than when smoking is free to vary.

Condition four was evaluated by entering the discrimination variable on step three of the same hierarchical regression used to evaluate condition three. Results (Table 11) showed that the overall model was statistically significant,  $F(7, 507) = 10.31$ ,  $p < .001$ . Discrimination was found to significantly predict depression at step three,  $B = .15$ ,  $t(507) = 6.27$ ,  $p < .001$ , and discrimination accounted for a significant increase in the explained variance of depression symptoms,  $\Delta R^2 = .068$ ,  $\Delta F(1, 507) = 39.25$ ,  $p < .001$ . Education level was also found to significantly relate to depression at step three,  $B = -.85$ ,  $t(507) = -3.51$ ,  $p < .001$ , which indicates an inverse relationship between education level and

depression. In terms of evaluating the presence of mediation effects, the common practice is to subtract the value of the regression coefficient when the mediator is in the model from the regression coefficient when the mediator is not in the model (i.e., path c from condition one minus path c from condition four) (Judd & Kenny, 1981; MacKinnon et al., 2002). In terms of evaluating condition four for this study, the difference between the unstandardized regression coefficient from condition four ( $B = .15$ ) and the coefficient from condition one ( $B = .16$ ) is .01, which, supports the argument for a partial mediation effect of smoking status on the discrimination-depression relationship for African American men.

The Sobel (1982) test was conducted to determine whether the partial mediation effect of smoking on the discrimination-depression relationship is statistically significant. The Sobel test is used to evaluate the statistical significance of a partial mediation effect. In order to run the Sobel test, one enters path a, the standard error for path a, path b, and the standard error for path b into equation:  $z\text{-statistic} = a*b$  divided by the Square Root of  $(b^2*s_a^2 + a^2*s_b^2 + s_a^2*s_b^2)$  (See Sobel [1982] and Preacher and Hayes [2004] for detailed instructions). Procedures for calculating the Sobel test electronically are also located at <http://www.people.ku.edu/~preacher/sobel/sobel.htm> (Preacher & Leonardelli, 2006). For the mediation effect of smoking,  $B$  for path a was .033 (from condition two), the standard error for path a was .011, the  $B$  for path b was 1.034 (from condition three), and the standard error for path b was .480. After conducting the Sobel test, one has a critical ratio  $z\text{-statistic}$ , which tests whether the indirect effect of the predictor on the criterion through the mediator is significantly different from zero (Preacher & Leonardelli, 2006). In terms of the partial mediation of smoking on the relationship between discrimination and

depression, the Sobel *z*-statistic was 1.75 and the *p*-value was .08, which indicates that the partial mediation effect of smoking is marginally significant for African American men.

#### Evaluating Mediation of Smoking for African American Women when Predicting Depression

The mediation effect of smoking status on the discrimination and depression relationship was evaluated for African American women in the same manner as for African American men. In order to evaluate condition one for women (path c), a hierarchical multiple regression was conducted with age, income, education and marital status entered on the first step and discrimination entered on the second step. Results (Table 12) showed that the overall model was statistically significant,  $F(6, 890) = 39.77$ ,  $p < .001$  and accounted for a significant proportion of variance in depression at step two,  $R^2 = .21$ . Discrimination significantly predicted depression,  $B = .26$ ,  $t(890) = 10.48$ ,  $p < .001$ , and accounted for a significant increase in the explained variance of depression symptoms,  $\Delta R^2 = .097$ ,  $\Delta F(1, 890) = 109.72$ ,  $p < .001$ . In terms of the covariates, education level ( $B = -1.33$ ,  $t(890) = -5.96$ ,  $p < .001$ ), and income level ( $B = -.000040$ ,  $t(890) = -4.16$ ,  $p < .001$ ) were significantly related to depression at step two, indicating inverse relationships between education level and depression, as well as between income level and depression. In summary, condition one (path c) was met for African American women.

Condition two of the mediation analyses was evaluated by testing whether discrimination significantly predicts smoking status (path a). In order to evaluate

condition two, a hierarchical logistic regression was conducted predicting smoking (0 = nonsmoker and 1 = smoker) from age, income, education level (reference group has 16 or more years of education) and marital status (reference group has never been married) entered on step one and discrimination entered on step two. Results (Table 13) showed that education level was statistically significant. Smokers had fewer years of education compared to nonsmokers. However, discrimination did not significantly predict smoking status, which means condition two (path a) was not met for African American women. According to Baron and Kenny (1986), mediation analyses are to be stopped if a condition is not satisfied. Therefore, a mediation effect of smoking status on the discrimination and depression relationship was not supported for African American women.

## DISCUSSION

The purpose of this study was to evaluate the hypothesis that cigarette smoking mediates the relationship between racial discrimination and depression symptoms for African American men and women. Mediation effects were evaluated using the Baron and Kenny (1986) method, which consists of four conditions that must be satisfied for one to state that mediation has occurred: discrimination must predict depression symptoms (condition one), discrimination must predict smoking (condition two), smoking must predict depression symptoms (three), and the discrimination-depression relationship must be weaker (for partial mediation to have occurred), or not significant (for complete mediation to have occurred) when smoking is in the regression model compared to when smoking is not in the model (condition four). Hierarchical multiple and logistic regressions were conducted to evaluate the relationships specified in the four conditions. Analyses were conducted separately for men and women because of gender differences in smoking, discrimination, and depression symptoms. Overall, the results from this study did not support the mediation by smoking hypothesis for African Americans. Stated another way, including cigarette smoking in the regression models did not significantly reduce the discrimination-depression relationship for men or women. However, a small reduction of the unstandardized regression coefficient ( $B$ ) representing the discrimination-depression relationship was found for Black men, which is discussed in more detail in the next paragraph.

Results showed a small reduction in the  $B$  representing the discrimination-depression relationship for Black men; specifically, the  $B$  representing the discrimination-

depression relationship was .16 in condition one when smoking was not in the model and decreased to .15 when smoking was included in the model. One could argue that a decrease of .01 in the  $B$  between conditions one and four represents a partial mediation effect by smoking, but this argument should be evaluated statistically. Since Baron and Kenny (1986) do not give guidelines for the amount of decrease in the  $B$  (between condition one and condition four) that constitutes a meaningful partial mediation effect, the Sobel (1982) test was conducted to determine whether a  $B$  decrease of .01 was statistically significant. Results showed that the  $z$ -statistic for the Sobel test was 1.75 and the  $p$ -value was .08, which could be considered marginal significance for a partial mediation effect; however, it could also be argued that a .01 reduction of the  $B$  when smoking is in the model is not practically meaningful or may have occurred by chance (a statistical artifact). In support of the latter arguments, Baron and Kenny state that the relationship between predictor and criterion must not be significant when the mediator is in the regression model (condition four). However, in this study, the discrimination-depression relationship was statistically significant when smoking was in the model; furthermore, the  $R^2$  value representing the discrimination-depression effect at condition four ( $R^2 = 6.8\%$ ) was almost the same as the  $R^2$  value at condition one ( $R^2 = 6.7\%$ ), which provides more evidence that smoking had little effect on the discrimination-depression relationship for Black men.

There are a number of possible reasons why smoking did not mediate the relationship between discrimination and depression. First, the relationship between discrimination and smoking in the current study may be different from the same relationship in other studies. Second, there are problems with the discrimination measure.

Third, there are additional factors related to smoking and depression that may mediate the discrimination-smoking and discrimination-depression relationships. Fourth, missing data may have affected relationships between discrimination-smoking and discrimination-depression. Fifth, there are limitations of the study design which may have reduced the ability of regression analyses to detect a mediation effect by smoking on the discrimination-depression relationship.

#### Variations in the Discrimination-Smoking Relationship for Blacks Participating in the NSAL compared to Other Studies of Black Health

Gender differences in the relationship between discrimination and smoking occurred in the study, which may be inconsistent with findings from other studies. In this study, discrimination did not significantly predict smoking for Black women, but a one-unit increase in the discrimination score was associated with a 1.03 increased odds (95% Confidence Interval was 1.01 to 1.06) of being a smoker for Black men. Furthermore, preliminary analyses revealed that Black female smokers did not differ from nonsmokers on discrimination scores. In contrast, a study by Guthrie and colleagues (2002) found that a “one point increase in the every day discrimination scale was associated with a 37% greater likelihood of smoking” among African American females. Another study showed that racial discrimination was associated with a 2.01 increased odds (95% Confidence Interval was 1.94 to 2.08) of being a daily cigarette smoker, among a sample of African American men and women in North Carolina (Bennett et al., 2005). Finally, results from the Coronary Artery Risk Development in Young Adults study (Borrell, Jacobs, Williams, Pletcher, Houston, & Kiefe, 2007) found that experiencing racial

discrimination in three or more situations was associated with a 1.87 increased odds (95% Confidence Interval was 1.18 to 2.96) of being a smoker for African American men and women, after adjusting for age, marital status, income, education, social support, and having a social network. In summary, results from other studies support a discrimination-smoking relationship for Black women and a stronger discrimination-smoking relationship for Black men; a finding that is inconsistent from results found in this study. One reason why this occurred may have to do with the EDD scale.

#### Measurement Concerns of the Every Day Discrimination (EDD) Scale

One concern with using the EDD scale (Williams et al., 1997b) to measure racial discrimination is that it contains fewer items than other racial discrimination scales, which may influence the ability of the EDD scale to detect the discrimination-psychiatric symptoms and discrimination-cigarette smoking effects. The EDD scale (Williams et al., 1997b) contains questions assessing the frequency and severity of racial discrimination across 10 situations which are hypothesized to occur in the day-to-day life of many Blacks (e.g., received poorer service than others at a restaurant or store). Two other discrimination measures contain more items that may capture more dimensions of discrimination than the EDD scale. One such scale is the *Schedule of Racist Events* (SRE; Landrine & Klonoff, 1996) which assesses discrimination across 18 situations and also allows Blacks to appraise each discriminatory event. The SRE has been used to relate frequently occurring racial discrimination to depression (Klonoff, Landrine, & Ullman, 1999) and cigarette smoking (Landrine & Klonoff, 2000a). Another discrimination measure that may be appropriate to use is the Experiences of Discrimination scale (EOD;



Krieger et al., 2005), which is a 16-item scale that assesses discrimination across nine situations, the degree to which discriminatory events cause worry, global questions about social attitudes regarding racist events, and responses to unfair treatment. Frequently occurring racial discrimination assessed by the EOD was found to be associated with cigarette smoking and psychological distress for Blacks (Krieger et al., 2005). In summary, it is argued that the EDD scale may not yield enough variance to detect depression or smoking; in contrast, the SRE and EOD scales may perform better when detecting discrimination-smoking and discrimination-depression relationships.

## Factors Affecting Relationships between Discrimination, Smoking, and Depression

### Symptoms

#### Appraisal of Racist Events

The cognitive appraisal of discriminatory events may play an intervening role between discrimination and cigarette smoking. Lazarus and Folkman (1984) assert as part of their stress and coping model that “the appraisal process modifies the intensity and duration of the psychological response to a threat in the environment” (pg. 16). In support of this argument, one study found that Black smokers were significantly more likely to appraise racial discrimination experiences as being more stressful than Black nonsmokers (Landrine & Klonoff, 2000a). A study of discrimination and smoking among Black females found that daily hassles mediated the relationship between discrimination and smoking, which means that the extent to which Blacks experience stress in day-to-day life may increase or decrease smoking after experiencing discrimination (Guthrie et al., 2002). Another study using the *Brief Perceived Ethnic Discrimination Scale-Community*

*Version* (PEDS-CV; Brondolo et al., 2005) found that Blacks who perceived racial discrimination as threatening or harmful were more likely to become angry and use immediate or reflexive coping strategies than their counterparts who appraised the events as non-threatening. The study also found that including low mood in the model did not affect the discrimination-anger coping style relationship (Brondolo et al., 2005), which suggests that mood does not play an intervening role between experiencing discrimination and appraisal of the event. Applied to this study, African Americans who perceived racial discrimination as stressful may have had a different psychological response or coping response compared to their counterparts who appraised the discriminatory events as not stressful. Therefore, future studies should include a cognitive appraisal measure when evaluating the relationship between discrimination and cigarette smoking.

### Religiosity

Religiosity may influence the discrimination-smoking and discrimination-depression relationships for African Americans. Religiosity has been identified as a multidimensional construct that includes church service attendance, religious comfort, importance of religious faith, and the frequency of prayer (Jang et al., 2005). One study found that African Americans who scored low on church service attendance, religious comfort, importance of religious faith, and the frequency of prayer, reported more depression symptoms than their more religious counterparts (Jang et al., 2005); in contrast, the religiosity-depression relationship was not significant for Caucasians. The relationship between religiosity and cigarette smoking has also been evaluated. Data from

the third National Health and Nutrition Examination survey showed that African American female smokers who frequently attended religious services smoked significantly fewer cigarettes than less frequent attendees (Gillum, 2005). Another study on religious attendance and smoking showed that African American women who attended religious services less than once per month were significantly more likely to be a smoker than their counterparts who attended church one time a month or more frequently (Whooley, Boyd, Gardin, & Williams, 2002). Altogether, findings from studies suggest that more religious involvement may be a protective factor for smoking and depression for Blacks. Therefore, religiosity may have played a role in smoking and depression for Blacks in this study; specifically, high discrimination and high religiosity may be associated with different rates of smoking and depression than those low on discrimination and low on religiosity. Future studies should include a religiosity measure when testing links between discrimination-smoking and discrimination-depression for African Americans.

### Residential Segregation

Residential segregation may influence the relationship between racial discrimination and cigarette smoking for African Americans. Studies of residential segregation using the 2000 U.S. Census data have shown that 66% of Blacks would have to move into a neighborhood that contains members of different ethnic groups in order to achieve an even residential distribution with Caucasians (Adelman, 2004; Glaeser & Vigdor, 2001; Williams & Collins, 2001), which supports the argument that residential segregation is pervasive in the U.S. A study (Landrine & Klonoff, 2000b) evaluating

segregation and smoking found that African Americans living in highly segregated neighborhoods were 2.51 times (95% Confidence Interval was 1.07 to 5.89) more likely to smoke cigarettes than those living in an integrated neighborhood. Another study on segregation and smoking, using 2000 U.S. census data, found that pregnant Black women living in highly segregated urban neighborhoods were more likely to be smokers than their counterparts living in moderately segregated neighborhoods (Bell, Zimmerman, Mayer, Almgren, & Huebner, 2007). Therefore, it is possible that residential segregation may have played a role in the link between discrimination and smoking in this study; specifically, Blacks who frequently experienced racial discrimination and lived in highly segregated neighborhoods may smoke more than those who infrequently experienced discrimination and lived in low segregated neighborhoods. Future studies are needed to evaluate the effects of residential segregation on smoking and psychiatric problems for African Americans.

#### Alcohol & Drug Use

Alcohol and illicit drugs may be used to cope with racial discrimination by African Americans. Studies have shown that Blacks who frequently experience racial discrimination are more likely to be heavy drinkers (Borrell et al., 2007; Martin, Tuch, & Roman, 2003), encounter problems related to alcohol use (Martin et al., 2003), meet DSM-IV criteria for alcohol dependence (Yen, Ragland, Greiner, & Fisher, 1999), and frequently use marijuana and cocaine (Borrell et al., 2007). In summary, findings from studies suggest that some African Americans may deal with racism by drinking heavily or using illicit drugs, which may have affected the discrimination-smoking relationship in

this study. Future studies should consider the role of alcohol and illicit drug use when testing relationships between discrimination and psychiatric symptoms.

### Missing Data Issues

Large percentages of African Americans were missing data for discrimination, depression, and cigarette smoking. Briefly, 1,754 Blacks (49% of the original NSAL sample) were missing data on the discrimination measure, 621 Blacks (17% of the original NSAL sample) were missing data on cigarette smoking, and 126 Blacks (3.5% of the original NSAL sample) were missing data on the depression measure. Unfortunately, there are few explanations for why large amounts of data were missing for the sample. One reason for some of the missing data on the EDD scale was because participants gave reasons other than race for discriminatory events: unspecified “other” reason ( $n = 325$ ), skin color ( $n = 175$ ), gender ( $n = 110$ ), ancestry or national origin ( $n = 53$ ), height or weight ( $n = 35$ ); however, 1,460 Blacks participating in the NSAL were missing discrimination data without an explanation. There are four articles in which various aspects of the NSAL are discussed, however, no explanation was found for why large amounts of data are missing on discrimination, smoking, and depression (Heeringa et al., 2004; Jackson, Neighbors, Nesse, Trierweiler, & Torres, 2004a; Jackson et al., 2004b; Pennell, et al., 2004). Even though the mediation analyses did not support the hypothesis, it is possible that missing data made the true effects difficult to detect (Mackelprang, 1970). It is possible that the discrimination-depression and discrimination-smoking relationships may have been weaker or stronger had data been available for all African Americans.

## Limitations

One limitation of this study is that data were collected cross-sectionally, making it difficult to determine if discrimination caused cigarette smoking, if discrimination caused depression, or if smoking caused depression. It has been argued that mediation analyses have more power to detect effects when data have been collected over multiple time points (Shrout & Bolger, 2002). Because the NSAL data were collected at a single time point for each participant, one could argue that African Americans with preexisting depression were more likely to report racial discrimination or were more likely to smoke cigarettes. Since the direction of relationships between discrimination and mental health has been discussed in the literature, Brown and colleagues (2000) conducted a longitudinal study on a national sample of African Americans to determine if discrimination reported in 1987 caused depression or psychological distress measured in 1988 or if the opposite direction of effects were present (i.e., depression and psychological distress in 1987 caused more reports of discriminatory events in 1988). Their findings revealed that depression and psychological distress reported in 1987 were not related to racial discrimination in 1988, whereas, racial discrimination reported in 1987 was significantly related to psychological distress in 1988, but not to depression in 1988 (Brown et al., 2000). This study suggests that the discrimination-psychological distress link may be stronger than the discrimination-depression link. Additional longitudinal studies evaluating the causal direction of discrimination, smoking, and psychological distress are needed.

Another limitation of this study is that effect sizes, as measured by  $R^2$ , are small. The variance accounted for in the discrimination-depression relationship was 6.7% for Black men and 9.0% for Black women. Smoking status accounted for only 0.9% of the variance in depression symptoms for men, a finding that may be statistically significant because of the large sample size. Socioeconomic factors accounted for more variance in depression than did discrimination ( $R^2 = 12.2\%$  vs.  $R^2 = 9.0\%$ , respectively) for women. Future studies should include additional variables that account for more variance in reported depression symptoms for African Americans.

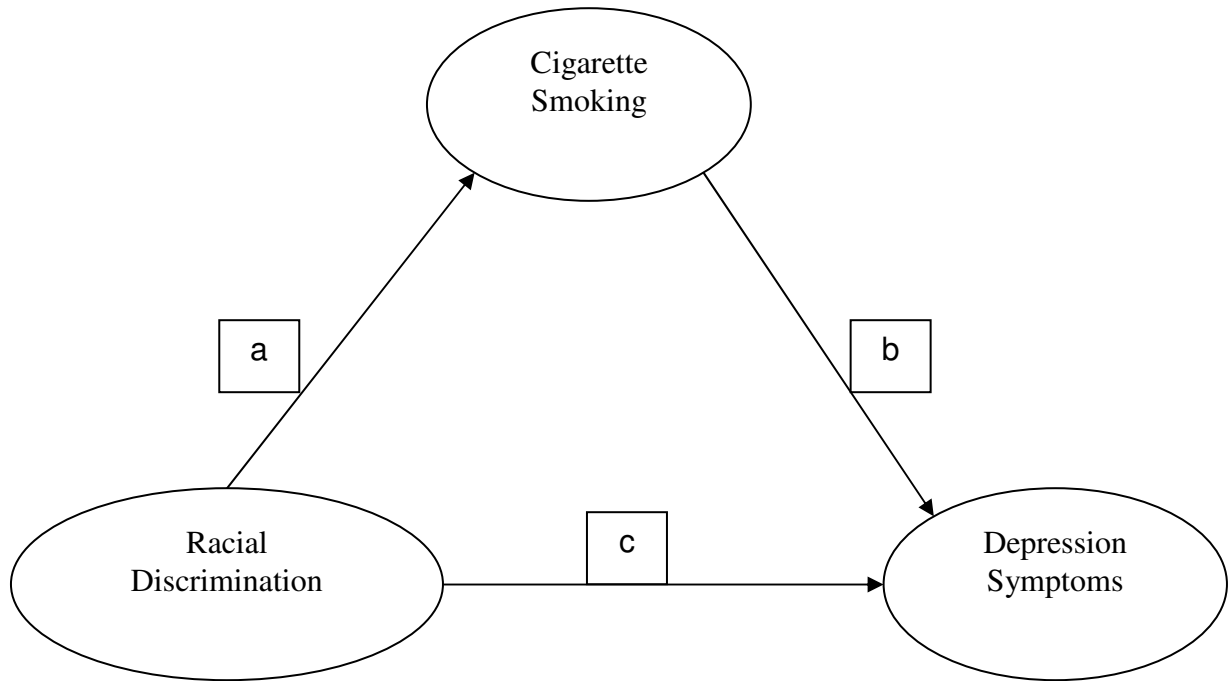
## Conclusion

Studies have shown that the stress from racial discrimination has a negative impact on the mental and physical health of African Americans. Lazarus and Folkman's (1984) stress and coping theoretical model has been used in studies of Black health to evaluate the impact of stress from racism on coping and mental health problems. This study aimed to examine one pathway, cigarette smoking, through which racism might exert influence on depression. A mediation effect by smoking was evaluated for men and women separately because they differed on discrimination experiences, cigarette smoking, and depression symptoms. Unfortunately, the results from this study did not support a mediation effect by cigarette smoking for the discrimination-depression relationship for Black men or Black women. The null findings in this study highlight the challenges of evaluating mediation effects using a national probability sample; specifically, the discrimination-smoking relationship was not significant for Black women, there were large amounts of unexplained missing data on the discrimination,

depression, and smoking measures, and there were methodological problems with the discrimination measure. However, the discrimination-psychiatric problems and discrimination-coping strategy relationships still deserve attention. Future studies should consider the mediating role of additional factors: cognitive appraisal, religiosity, residential segregation, and alcohol and illicit drug use, which have been related to psychiatric symptoms and cigarette smoking in other studies.



APPENDIX



**Figure 1:** Hypothesized Model of Cigarette Smoking Mediating the Relationship between Racial Discrimination and Depression Symptoms

Notes:

Condition 1: Depression Symptoms = path c\*discrimination + covariates + error

Condition 2: Cigarette Smoking = path a\*discrimination + covariates + error

Conditions 3 & 4: Depression Symptoms = path c\*discrimination + path b\*smoking + covariates + error

**Table 1:** The Every Day Discrimination Questionnaire  
(Williams, Yu, Jackson, & Anderson, 1997).

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<p>Interviewer Read: “In your day-to-day life how often have any of the following things happened to you?”</p>	<p>Response choices were:</p>	<p>Interviewer Read: “What do you think was the <u>main</u> reason for this/these experience(s)? Would you say...?”</p>
<p>1. You are treated with less courtesy than other people.</p>	<p>0. Never</p>	<p>1. Your ancestry or national origin</p>
<p>2. You are treated with less respect than other people.</p>	<p>1. Less than once a year</p>	<p>2. Your gender</p>
<p>3. You receive poorer service than other people at restaurants or stores.</p>	<p>2. A few times a year</p>	<p>3. Your race</p>
<p>4. People act as if they think you are not smart.</p>	<p>3. A few times a month</p>	<p>4. Your age</p>
<p>5. People act as if they are afraid of you.</p>	<p>4. At least once a week</p>	<p>5. Your height or weight</p>
<p>6. People act as if they think you are dishonest.</p>	<p>5. Almost everyday</p>	<p>6. Your shade of skin color</p>
<p>7. People act as if they’re better than you are.</p>		<p>7. Other: Please specify</p>
<p>8. You are called names or insulted.</p>		
<p>9. You are threatened or harassed.</p>		
<p>10. You are followed around in stores.</p>		

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**Table 2:** The Center for Epidemiologic Studies Depression Questionnaire  
(Radloff, 1977)

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Interviewer Read: “Please tell me how often you have felt this way during the past week.”	Response choices were:
1. I felt that I was just as good as other people.	0. Rarely or none of the time (less than 1 day)
2. I had trouble keeping my mind on what I was doing.	1. Some or a little of the time (1 – 2 days)
3. I felt depressed.	2. Occasionally or a moderate amount of the time (3 – 4 days)
4. I felt that everything I did was an effort.	3. Most or all of the time (5 – 7 days)
5. I felt hopeful about the future.	
6. My sleep was restless.	
7. I was happy.	
8. People were unfriendly.	
9. I enjoyed life.	
10. I had crying spells.	
11. I felt that people disliked me.	
12. I could not get “going.”	

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**Table 3:** Percentage of African Americans ( $N = 1,412$ ) Endorsing Items on the Every Day Discrimination Questionnaire (Williams, Yu, Jackson, & Anderson, 1997).

Item, Percent ( $n$ )	Almost Everyday	At Least Once a Week	A few Times a Month	A Few Times a Year	Less Than Once a Year	Never
1. Less Courtesy	4.2 (59)	7 (99)	15 (211)	34 (480)	28.7 (404)	11.1 (157)
2. Less Respect	3.7 (52)	6.4 (90)	13.1 (185)	33.8 (476)	29.2 (412)	13.8 (194)
3. Poorer Service	2.5 (35)	3.6 (51)	13 (184)	36.2 (510)	29.8 (420)	14.9 (210)
4. Treated as if not Smart	9 (127)	7.9 (111)	14.9 (209)	28.2 (396)	24.4 (343)	15.6 (220)
5. People Act as if Afraid of You	5.3 (74)	3.8 (54)	9.4 (132)	18.8 (265)	28.3 (398)	34.4 (483)
6. People treat you as if you are dishonest	4.8 (67)	3 (42)	8.7 (123)	19.2 (270)	31.5 (444)	32.9 (463)
7. People act as if they are better than you	16.8 (236)	9.7 (136)	18.7 (263)	29.5 (415)	14.2 (200)	11.2 (157)
8. Called names or insulted	3.5 (50)	2.8 (39)	5.3 (74)	12.6 (177)	32.5 (458)	43.4 (611)
9. Threatened or harassed	0.9 (13)	1.6 (22)	2.8 (39)	7.4 (104)	34.7 (490)	52.7 (744)
10. Followed in stores	5 (70)	4.1 (57)	14 (195)	24.2 (338)	23.5 (328)	29.2 (408)

**Table 4:** Percentage of African Americans ( $N = 1,412$ ) Endorsing Items on the Center for Epidemiologic Studies Depression Questionnaire (Radloff, 1977).

Item, Percent ( $n$ )	Most or all of the Time	Occasionally or a moderate Amount of the Time	Some or a Little of the Time	Rarely or none of the Time
1. Felt Worse Than Others	7.7 (108)	10.2 (144)	9.7 (137)	72.4 (1,021)
2. Trouble Keeping Mind on What I was Doing	5.9 (83)	12 (170)	23.3 (329)	58.8 (830)
3. Felt Depressed	5.9 (83)	7.9 (111)	20.5 (290)	65.7 (928)
4. Everything was an Effort	25.9 (365)	11.2 (158)	18.4 (260)	44.5 (627)
5. Hopeless about the Future	16.1 (227)	11.8 (166)	11.8 (166)	60.4 (852)
6. Sleep was Restless	11.4 (161)	10.8 (152)	23.5 (332)	54.3 (766)
7. Was Unhappy	5.2 (74)	14 (198)	13.3 (188)	67.4 (951)
8. People were Unfriendly	5.4 (76)	10.8 (152)	22 (310)	61.9 (873)
9. Did not Enjoy Life	2.7 (38)	8.8 (124)	8.8 (124)	79.7 (1,126)
10. Had Crying Spells	4.2 (60)	5.4 (76)	10.6 (149)	79.8 (1,127)
11. Felt that People Disliked Me	5.2 (74)	5.7 (80)	16.4 (232)	72.6 (1,025)
12. Could not get "Going"	4 (56)	6.8 (96)	20.5 (290)	68.7 (970)

**Table 5:** Pearson Chi-Square and Independent Samples T-Tests Comparing Racial Discrimination, Cigarette Smoking, and Depression Symptoms by Gender ( $N = 1,412$ ).

	Men	Women	Total
<sup>1</sup> Cigarette Smoking			
Percent (n)			
Smoker	41.2 (212)	31.2 (280)	34.8 (492)
Nonsmoker	58.8 (303)	68.8 (617)	65.2 (920)
<sup>2</sup> Every Day Discrimination			
Mean (SD)	17.18 (8.95)	15.02 (7.89)	15.81 (8.35)
<sup>3</sup> CESD			
Mean (SD)	6.52 (5.19)	7.71 (6.52)	7.28 (6.09)

Notes:

<sup>1</sup>Men vs. Women  $\chi^2(1, N = 1,412) = 14.27, p < .001$

<sup>2</sup>Men vs. Women  $t(1,410) = 4.71, p < .001$

<sup>3</sup>Men vs. Women  $t(1,410) = -3.55, p < .001$

**Table 6:** Pearson Chi-Square and Independent Samples T-Tests Comparing Age, Income, Education, and Marital Status by Gender ( $N = 1,412$ ).

	Men	Women	Total
<sup>5</sup> Age			
Mean (SD)	40.07 (14.65)	39.85 (13.84)	39.93 (14.13)
<sup>1</sup> Income			
Mean (SD)	\$39,355 (\$34,684)	\$30,249 (\$26,219)	\$33,570 (\$29,900)
<sup>6</sup> Education			
Percent (n)			
0 to 11 years	22.9 (118)	22.1 (198)	22.4 (316)
12 years	39.2 (202)	35.3 (317)	36.8 (519)
13 to 15 years	23.9 (123)	26.3 (236)	25.4 (359)
16 or more years	14 (72)	16.3 (146)	15.4 (218)
<sup>2,3,4</sup> Marital Status			
Percent (n)			
Married	41.2 (212)	30.8 (276)	34.6 (488)
Divorced/Separated/ Widowed	23.1 (119)	32.4 (291)	29 (410)
Never married	35.7 (184)	36.8 (330)	36.4 (514)

Notes:

<sup>1</sup>Men vs. Women  $t(1,410) = 5.57, p < .001$

<sup>2</sup>Men vs. Women by Married vs. Never Married  $\chi^2(1, N = 1,410) = -.40, p = .69$

<sup>3</sup>Men vs. Women by Married vs. Divorced  $\chi^2(1, N = 1,410) = -3.74, p < .001$

<sup>4</sup>Men vs. Women by Divorced vs. Never Married  $\chi^2(1, N = 1,410) = -.40, p = .69$

<sup>5</sup>Men vs. Women  $t(1,410) = .28, p = .78$

<sup>6</sup>Men vs. Women  $\chi^2(1, N = 1,412) = 3.32, p = .35$

**Table 7:** Independent Samples T-Tests Comparing Racial Discrimination and Depression Symptoms by Cigarette Smoking Status for African American Men ( $n = 515$ ).

	Smokers	Nonsmokers
<sup>1</sup> Racial Discrimination (Mean, SD)	18.62 (10.00)	16.17 (7.99)
<sup>2</sup> Depression Symptoms (Mean, SD)	7.43 (5.60)	5.89 (4.78)

Notes:

<sup>1</sup>  $t(513) = -3.08, p = .002$

<sup>2</sup>  $t(513) = -3.35, p = .001$



**Table 8:** Independent Samples T-Tests Comparing Racial Discrimination and Depression Symptoms by Cigarette Smoking Status for African American Women ( $n = 897$ ).

	Smokers	Nonsmokers
<sup>1</sup> Racial Discrimination (Mean, SD)	15.59 (8.56)	14.76 (7.56)
<sup>2</sup> Depression Symptoms (Mean, SD)	8.82 (7.19)	7.21 (6.13)

Notes:

<sup>1</sup> $t(895) = -1.46, p = .145$

<sup>2</sup> $t(895) = -3.45, p = .001$

**Table 9:** Hierarchical Multiple Regression of the Effects of Socioeconomic Status and Racial Discrimination on Depression Symptoms for African American Men ( $N = 515$ ) (Test of Condition One of a Mediation by Cigarette Smoking Analysis).

Step Entered & Predictor	B	SE	B/SE	95% CI	$F$ (df)	$\Delta F$ (df)	$R^2$	$\Delta R^2$
Step 1					(5, 509) 5.16***		.048	
Age	-.01	.02	.50	-.04, .03				
Income	-.0000076	0		0				
Education	-.91***	.24	3.79	-1.38, -.45				
<sup>1</sup> Married vs. Divorced	.57	.59	.97	-.60, 1.73				
<sup>2</sup> Divorced vs. Never Married	-.43	.54	.80	-1.49, .63				
Step 2					(6, 508) 11.71***	(1, 508) 42.35***	.121	.073
Discrimination	.16***	.02	8.00	.11, .21				

\*  $p < .05$ ; \*\* $p < .01$ ; \*\*\*  $p < .001$

<sup>1</sup>Married is the reference group

<sup>2</sup>Divorced is the reference group

**Table 10:** Hierarchical Logistic Regression Predicting Cigarette Smoking from Socioeconomic Status and Racial Discrimination for African American Men ( $N = 515$ )  
(Test of Condition Two of a Mediation by Cigarette Smoking Analysis).

Step Entered & Predictor	B	SE	B/SE	Odds Ratio	95% CI
Step 1					
Age	.02*	.01	2.00	1.02	1.01, 1.04
Income	0	0	0	1.00	1.00, 1.00
Education	Reference Group: 16 or More Years				
0 to 11 years	1.42***	.37	3.84	4.13	2.01, 8.49
12 years	.99**	.34	2.99	2.69	1.40, 5.19
13 to 15 years	.50	.36	1.39	1.65	.82, 3.31
Marital Status	Reference Group: Never Married				
Divorced	.69*	.30	2.30	1.99	1.11, 3.54
Married	.07	.24	.29	1.08	.67, 1.73
Step 2					
Discrimination	.03**	.01	3.00	1.03	1.01, 1.06

Notes:

\*  $p < .05$ ; \*\* $p < .01$ ; \*\*\*  $p < .001$

**Table 11:** Hierarchical Multiple Regression of the Effects of Socioeconomic Status, Cigarette Smoking, and Racial Discrimination on Depression Symptoms for African American Men ( $N = 515$ ) (Test of Conditions Three and Four of the Mediation by Cigarette Smoking Analysis).

Step Entered & Predictor	B	SE	B/SE	95% CI	$F$ (df)	$\Delta F$ (df)	$R^2$	$\Delta R^2$
Step 1					(5, 509) 5.16***		.048	
Age	-.01	.02	.50	-.04, .03				
Income	-.0000073	0		0				
Education	-.85***	.24	3.54	-1.32, -.37				
<sup>1</sup> Married vs. Divorced	.48	.60	.80	-.69, 1.65				
<sup>2</sup> Divorced vs. Never Married	-.42	.54	.78	-1.48, .64				
Step 2					(6, 508) 5.10***	(1, 508) 4.64***	.057	.009
Smoking	1.03*	.48	2.15	.09, 1.98				
Step 3					(7, 507) 10.31***	(1, 507) 39.25***	.125	.068
Discrimination	.15***	.03	5.00	.11, .20				

Notes:

\*  $p < .05$ ; \*\* $p < .01$ ; \*\*\*  $p < .001$

<sup>1</sup>Married is the reference group

<sup>2</sup>Divorced is the reference group

**Table 12:** Hierarchical Multiple Regression of the Effects of Socioeconomic Status and Racial Discrimination on Depression Symptoms for African American Women (N = 897) (Test of Condition One of the Mediation by Cigarette Smoking Analysis).

Step Entered & Predictor	B	SE	B/SE	95% CI	F (df)	$\Delta F$ (df)	R <sup>2</sup>	$\Delta R^2$
Step 1					(5, 891) 22.98***		.114	
Age	-.02	.02	1.0	-.05, .02				
Income	-.00004***	0		0				
Education	-1.33***	.22	6.05	-1.77, -.89				
<sup>1</sup> Married vs. Divorced	-.66	.55	1.2	-1.75, .42				
<sup>2</sup> Divorced vs. Never Married	-.96†	.53	1.81	-2.00, .07				
Step 2					(6, 890) 39.77***	(1, 890) 109.72***	.206	.097
Discrimination	.26***	.03	8.67	.21, .31				

†p < .10, \* p < .05; \*\*p < .01; \*\*\* p < .001

<sup>1</sup>Married is the reference group

<sup>2</sup>Divorced is the reference group

**Table 13:** Hierarchical Logistic Regression Predicting Cigarette Smoking from Socioeconomic Status and Racial Discrimination for African American Women ( $N = 897$ ) (Test of Condition Two of the Mediation by Cigarette Smoking Analysis).

Step Entered & Predictor	B	SE	B/SE	Odds Ratio	95% CI
Step 1					
Age	.01†	.01	1.00	1.01	.99, 1.02
Income	0	0	0	1.00	1.00, 1.00
Education	Reference Group: 16 or More Years				
0 to 11 years	1.14***	.30	3.80	3.12	1.73, 5.62
12 years	.69*	.27	2.56	2.00	1.17, 3.42
13 to 15 years	.71**	.28	2.54	2.04	1.18, 3.50
Marital Status	Reference Group: Never Married				
Married	.12	.21	.57	1.13	.75, 1.69
Divorced	.28	.21	1.33	1.32	.87, 1.98
Step 2					
Discrimination	.012	.009	1.33	1.01	.99, 1.03

Notes:

† $p < .10$ ; \*  $p < .05$ ; \*\* $p < .01$ ; \*\*\*  $p < .001$

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