

LONGITUDINAL IMPACT OF DISCRIMINATION ON HEALTH: MEDIATORS AND
MODERATORS AMONG AFRICAN AMERICAN YOUTH

by

SIERRA E. CARTER

(Under the Direction of Steven Beach, Ph.D.)

ABSTRACT

The primary goal of this study was to examine the role of change in negative affect as a mediator of the relationship between perceived discrimination and health expectations for African Americans as they go from late childhood to emerging adulthood (i.e., prediction over an 11-year period from age 10.5 to 21.5). A second goal was to examine the role of both individual factors (code of the street and negative emotionality) and contextual factors (harsh parenting, neighborhood disadvantage, and SES) as moderators that may amplify the impact of discrimination on negative affect, or the impact of negative affect on health. Using five waves of data, I found that perceived discrimination was associated with poorer health expectation, and that the association was significantly mediated by change in negative affective symptoms over time. Moderated mediational analyses revealed that code of the street and negative emotionality as well as neighborhood disadvantage and SES were significant moderators in specific pathways in the mediational model. The implications of the current findings for prevention are discussed.

Keywords: perceived discrimination, health, depression, anxiety, anger, negative affect, African Americans

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Overview

Perceived discrimination has consistently been found to relate to a variety of mental health difficulties (e.g., depression, anxiety, and psychological distress) and negative behavioral patterns that increase or exacerbate health risks such as cardiovascular disease, obesity, diabetes, and cancer, particularly for African American adults (Lee & Ahn, 2011; Paradies, 2006; Pascoe & Richman, 2009; Williams, Neighbors, & Jackson, 2003; Williams & Mohammed, 2009). Several researchers have developed culturally specific models to further understand the pathways from perceived discrimination to poor health status among African Americans (Anderson, McNeilly, & Myers, 1991; Clark et al., 1999; Harrell, Merritt, & Kalu, 1998). These conceptual models and research findings all address the psychological and physiological toll of perceived discrimination, a chronic stressor with the potential to negatively influence mental and physical health outcomes.

Research has shown that chronic stress from perceived discrimination can evoke physiological changes within body systems potentially leading to body dysregulation, premature illness, and mortality (Clark et al., 1999; Mays, Cochran, & Barnes, 2007). Lazarus and Folkman's (1984) transactional model of stress and other biopsychosocial models (Clark et al., 1999; Cohen et al., 1995) also emphasize that discrimination can lead to stress responses and appraisals that are detrimental to health. A meta-analysis by Pascoe and Richman (2009) identified 36 studies reporting a relationship between discrimination and indicators of physical health (e.g., self-reports of overall health status). As health outcomes linked to discrimination have been characterized as a reaction to stress (Clark et al., 1999), it is essential to understand the

pathways that the social stressor of discrimination can lead to dire physical health.

Although prior research indicates that chronic exposure to race-related chronic stressors leads to poor health (Clark et al., 1999; Mays et al., 2007), only recently has there been an emphasis on examining perceptions of discrimination over the life course (Gee, Walsemann, & Elizabeth Brondolo, 2012; Williams & Mohammed, 2009) with special attention to children's exposure. Indeed, recent meta-analytic reviews of the effect of perceived discrimination on psychological distress and well-being have found that the effect of perceived discrimination and racism on psychological distress is larger for children than for adults (Lee & Ahn, 2013; Schmitt et al., 2014). Additionally, research has indicated that discrimination can be stressful throughout the life course but may have enhanced harmful effects during adolescence (Gibbons, 2007), further underscoring the need to understand the way in which perceived discrimination influences the developmental trajectory of health outcomes.

Perceptions of health are predictive of changes in functional disability (Ferraro, Farmer, and Wybraniec 1997; Idler and Kasl 1995; Wilcox, Kasl, and Idler 1996) and mortality (Idler and Angel 1990; Idler and Kasl 1991), suggesting that these perceptions are a window into important health processes. A longitudinal study by Farmer & Ferraro (1997) revealed that a higher level of personal distress was significantly related to more negative health perceptions and that psychological condition and health status interacted in a cycle of health decline. Additionally research has shown that African Americans may have a heightened attention to the perceived threat of physical illness, due in part, to awareness that many physical illnesses are common among African Americans (i.e., diabetes, hypertension, and other cardiovascular diseases) and awareness of racial health disparities in the prevalence and morbidity of chronic illnesses (Bosworth et al., 2006; Hunter & Schmidt, 2010; Morenoff et al., 2007). Hunter and Schmidt

(2010) have suggested that this heightened attention to physical health may be reflected in the interpretation of psychological symptoms, such as anxiety, as physical illness. Furthermore, perceptions of health could reflect an individual's optimism or pessimism and so could have its own influence on subsequent health status. As perceived health measures have shown considerable predictive validity, these perceptions represent one avenue to further explore the mechanism and process by which health declines over the life course for African Americans. Particularly for studies that examine stress effects over the life course, examining how stress effects health expectations could provide a sensitive, valid, and proximal window on the impact of perceived discrimination on future negative health outcomes.

Mediation Hypothesis. Another under-researched component in the current literature is the role of possible mediators of the effect of discrimination on physical health. Mediators are particularly important as a way to explicate potential mechanisms by which discrimination affects health. One likely mediator is negative affect (i.e., anxiety, depression, and anger), and its accumulation over time, as this may function to increase the likelihood of negative health behavior as well as reflect an increase in physiological stress. Supporting this perspective, Gibbons et al. (2014) found that discrimination predicted increases in both externalizing and internalizing symptom reactions, which in turn, predicted subsequent problematic substance use and physical health status. Few other studies have examined the mediational influence of negative affect on the relationship of perceived discrimination to health status specifically for African Americans, and no studies have looked at this potential pathway over the life course.

Moderation. In attempting to understand the role of discrimination in a risk and resilience framework for susceptibility to poor health status over the life course, it is also important to consider the effects of context and individual characteristics (Harrell, 1999;

Semmes, 1995). At the individual level, there have been consistent findings of positive associations between discrimination and delinquency (Gibbons et al., 2004; Simons et al., 2003; Stewart & Simons, 2006), indicating that discrimination may also lead to a less trusting and more competitive view of life characterized by adopting the “code of the street” (Martin et al., 2011). This general view of relationships and the external environment may heighten perceived threat in response to discrimination, increasing psychological symptoms and possibly negative physical health status over time. Additionally, negative emotionality, or the temperamental tendency to become easily and intensely upset, may also be an influential factor as well. Murry and colleagues (2008) hypothesized that ongoing racial discrimination can induce negative emotionality and irritability that influence psychological functioning.

At the contextual level, socioeconomic status (SES) and neighborhood disadvantage have been linked to perceived discrimination but may exert influence on negative health status independently of perceived discrimination (Williams, Neighbors, & Jackson, 2003; Williams et al., 1997). In a review of the literature, Williams (1999) notes that both SES and concentrated neighborhood disadvantage have consistently been found to predict variation in health within African American and European American populations, accounting for a significant portion of the racial differences in health. Furthermore, researches have noted that racial/ethnic differences in childhood SES and early life economic and psychosocial adversity are likely to be important contributors to racial disparities in adult health (Williams & Mohammed, 2009). Further understanding of the unique influence of neighborhood disadvantage and SES could be insightful in efforts to understand pathways that lead to poor health for African Americans.

Research focused on the impact of harsh interactions with parents during childhood suggests that it may be a contributing factor to chronic diseases vulnerability later in life (Brody

et al., 2014; Repetti, Taylor, & Seeman, 2002; Shonkoff, Boyce, & McEwen, 2009), which suggests that parental interactions may contribute additively or may amplify the impact of other stressors such as discrimination. As findings show that growing up with harsh parenting has been found to increase vulnerability to the development of depressive symptoms across the life span (Heim & Nemeroff, 2001), it may be that harsh parenting moderates the impact of perceived discrimination on both psychological and physical health.

Given the negative influence of perceived discrimination on physical health for African Americans, the overarching goal of the present study is to investigate the mediational role of negative affect (i.e., anxiety, depression, anger) in the relationship between perceived discrimination and health expectations across the lifespan to emerging adulthood. Furthermore, this study examines individual (i.e., negative emotionality and adoption of “code of the street”) and contextual (i.e., harsh parenting and neighborhood disadvantage) factors as moderators of the strength of the mediated relationship. Below I review each of the hypothesized associations in greater detail before describing specific hypotheses.

Perceived Discrimination and Health

Researchers have conceptualized perceived discrimination as an individual’s perception of differential treatment or negative actions directed at a person or group because of their marginalized social status (Jones & Carter, 1996; Greene Way, Pahl, 2006; Williams & Williams-Morris, 2000). A considerable amount of research has been conducted on perceived discrimination as a stressor that can have deleterious effects on health outcomes particularly for African Americans (Williams, 2002; Williams, Neighbors, & Jackson, 2003; Williams & Mohammed, 2009). Perceived discrimination has been studied with regard to its impact on specific types of physical health problems, such as hypertension, self-reported poor health, and

breast cancer incidence, as well as potential risk factors for disease, such as obesity, high blood pressure, and substance use (Pascoe & Richman, 2009; Williams & Mohammed, 2009).

Additionally, research findings reveal that African Americans' response to discrimination can lead to greater severity and more rapid progression of disease, as well as higher levels of comorbidity and impairment (Williams & Mohammed, 2013). This pattern is consistent with research showing that African Americans disproportionately suffer from stress-related diseases and illnesses compared to their European American counterparts (Feldman & Fulwood, 1999; Williams, Neighbors, & Jackson, 2003).

Developmental considerations

Although many studies indicate that perceived discrimination harms adults, there is relatively little research on its effects on children or the way it may affect normal developmental processes. Nonetheless, racial status is said to be one of the first social categories that young children learn, preceded only by learning to distinguish sex (Quintana, & McKown, 2008). Children as young as the age of six have the ability to make attributions to discrimination and the process of racial cognitions continues to grow into adolescence (Brown and Bigler, 2005). Sellers et al. (2006) also found that African American children and adolescents report higher levels of perceived discrimination in comparison to other diverse groups. Not surprisingly, because awareness of discrimination begins early in life, researchers are increasingly finding that children (Brody et al., 2006; Gibbons et al., 2004; Simons et al., 2002) and adolescents (Berkel et al., 2009; Neblett et al. 2008; Seaton et al., 2011) report experiencing discrimination and that these experiences are associated with negative effects on their health and health behaviors.

It has also been posited that the experience of perceived discrimination could be cumulative in nature and the effects of this stressor operates throughout an African American's

life course (Williams, 2003; Williams & Neighbors, 2001). The “weathering hypothesis” (Geronimus, 1992) suggests that, beginning at the first experience of discrimination, continuous experience of psychosocial stressors begin to have erosive effects on the physical and mental health of African Americans throughout their lifetime. An understanding of the developmental significance of discrimination is important because perceptions of discrimination serves as a risk factor for potential negative and developmentally driven health outcomes. Further study of trajectories and processes of racial discrimination could provide insight into the effects of not only negative mental health outcomes but also physical health status.

Perceived Discrimination, Negative Affect, and Health

Culturally specific models have been developed to further understand the pathways of perceived discrimination that lead to poor health outcomes among African Americans (Anderson, McNeilly, & Myers, 1991; Clark et al., 1999; Cohen et al., 1995; Harrell, Merritt, & Kalu, 1998). These models emphasize that a probable pathway to harmful health status is the psychosocial stressor of perceived or actual discrimination leading to negative internalizing emotional states. This in turn leads to decreased well-being and increases in psychological symptoms such as anxiety, depression, and psychological distress. Further research proposes that the pathway to negative health status is not the stressor of perceived discrimination alone, but rather the appraisal and coping mechanisms an individual employs in response to their individualized perception of discrimination (Lazarus & Folkman, 1984; Cohen et al., 1995). Perceived discrimination has also been found to act as a stressor that prompts unhealthy coping behaviors such as anger outbursts, aggression, and violence (Brondolo, Gallo, & Myers 2009; Paradies, 2006). Pascoe and Richman’s (2009) meta-analytic review elucidates how chronic perceived discrimination can lead to persistent activation of stress responses, which can

eventually cause an individual to have a decreased capacity and self-control resources to cope with new stressors. Given that psychological responses to discrimination include symptoms and coping responses of hypervigilance, worry, rumination, sadness, internalized anger, general distress, and posttraumatic stress, it is important to further examine the process of African American's experiences of discrimination that can lead to significant internalizing disorders and emotional disturbances (Brosschot, Gerin, & Thayer, 2006; Carter, 2007; Kessler, 1999; Williams & Mohammed, 2009).

Several recent studies have examined the effects of perceived discrimination over the life course (Brody et al., 2006; Simons et al., 2003; Smith-Bynum et al., 2014), providing insights into developmental trajectories to poor health. Additionally these studies all suggest that, among African American youth, experiences of stress related to perceived discrimination and/or racism predict individual differences in the development of mental health symptoms. For example, Smith-Bynum et al. (2014) examined longitudinal trajectories of perceived discrimination for African Americans and found that African American adolescents who reported increasing levels of discrimination were four times more likely to be in an increasing depression trajectory than were African American youth that reported consistently low levels of discrimination. Additionally Green et al. (2006) examined trajectories of discrimination among African Americans, Asian Americans, and Latino Americans adolescents and found that African American adolescents reported a steeper increase over time in levels of perceived discrimination by peers and by adults than Latino American adolescents, which in turn was associated with decreased self-esteem and increased depressive symptoms.

Longitudinal studies have also provided evidence for the directionality of perceived discriminations relationship to psychological outcomes, finding that earlier perceived

discrimination predicts later internalizing symptoms but that earlier internalizing symptoms do not predict later perceived discrimination (Brody et al., 2006; Gibbons et al., 2004). Current research, however, seems primarily focused on internalizing and/or externalizing symptom outcomes rather than the potential psychological mechanisms that significantly influence the relationship of perceived discrimination to negative physical health status. In a recent longitudinal study by Gibbons et al. (2014), a differential mediation hypothesis was examined among African American adult women. Gibbons proposed that internalizing and externalizing symptoms in response to perceived discrimination was related to different health outcomes. These researchers found that changes in internalizing symptoms was associated with self-reported changes in physical health status, while changes in externalizing symptoms was associated with changes in substance use problems. This study was conducted with an adult sample but provides one of the first research examples that suggests that psychological symptoms are a significant mechanism that influences the relationship between perceived discrimination and health status.

Because there continues to be questions about whether perceived discrimination has cumulative effects, it is important that we examine the influence of perceived discrimination for African Americans health status not just in one age group (i.e., children or adults), but examining its potential influence throughout the life course from childhood to emerging adulthood. Furthermore, continued examination of the differential and cohesive influence of psychological symptoms (e.g., anxiety, depression, and anger) symptoms in response to perceived discrimination and its relationship to health status for African Americans will promote greater understanding of the process by which the stressor of perceived discrimination can lead to the presentation of negative health status in emerging adulthood.

Individual Characteristics- Code of the Street

With continued research devoted to understanding how perceived discrimination leads to mental and physical health difficulties, vital factors to further explore are the interplay of individual characteristics, culture, and neighborhood context. Anderson (1999) published ethnographic accounts of violence in disadvantaged neighborhood and formulated a theory known as “the code of the street” to provide cultural context to violence and victimization among African American youth. Anderson defines the code of the street as an informal system governing usage of violence. This theory emphasizes that an individual must maintain other’s respect through a violent and tough identity, and have a willingness to seek retribution in the event of disrespect so that others in the community will take note that this person should not be bothered. Anderson notes that adopting the street code could be perceived as a requirement in some disadvantaged neighborhood contexts in order to “discourage strangers from thinking about testing their manhood” and also “help build a reputation that works to prevent future challenges” (p. 92).

Adopting the code of the street has been studied primarily with regard to its relationship to aggression, conduct disorders, and delinquency (Gibbons et al., 2004; Martin, 2005; Simons et al., 2003; Stewart & Simons, 2006), and studies have generally found positive associations. A longitudinal study by Martin et al. (2011) however did not find significant associations between support for code of the street and general offending or violent delinquency. Researchers suggested that a potential reason for non-significant findings might be that the association between code of the street and general offending may be more short-lived when contrasted to the relationship between perceived discrimination and delinquency. This study suggests the importance of examining the interconnection of perceived discrimination with cultural and

contextual factors, such as code of the street, over the life course. Additionally, adopting the street code appears to have both risk and resilience components that might particularly have connection with perceptions of discrimination.

Perceiving discrimination can lead to experiences of negative emotions. In considering Bernard's Angry Aggression Theory (1990) situations that could lead to anger, such as perceived discrimination, coupled with an inability to respond to the actual source of that stress, increases a tendency to emote aggression to more available and immediately accessible targets. Perhaps adopting the street code could be a response to perceived discrimination that influences some types of negative affect, particularly anger, and, in turn, affects health status for African Americans. Furthermore, choosing not to adopt the street code within certain communities could lead to vulnerability. Choosing not to adopt to a street code could result in diminished neighborhood respect and higher levels of victimization. Therefore examining within-group differences among African American's adoption of the street code may shed light on differential effects of adopting to a street code in the relationship of perceived discrimination, negative affect, and health status.

Individual Characteristics- Negative Emotionality

Another consideration to explore is the complex process by which the individual characteristics of negative emotionality interact with psychosocial characteristic to predict health status. Temperament and personality dimensions have been studied in relation to negative health behaviors such as substance use (Caspi et al. 1997; Wills et al. 2000). For example Caspi et al. (1997) found that a constellation of adolescent personality traits that included negative emotionality and constraint, that originated in childhood, was linked to different health-risk behaviors (e.g. problematic alcohol use, violent crime, unprotected sex, and dangerous driving

habits) at age 21. Negative emotionality, or the tendency to become easily and intensely upset, could be a particular personality trait that could influence how one perceives stressors such as discrimination and also an individual's stress response.

Theoretically temperament characteristics could be protective or be a predisposition to experience negative health related outcomes. Trait negative affect is associated with elevated self-report of physical health symptoms (Watson & Pennebaker, 1989). Also personality traits such as high levels of neuroticism that is similar to negative emotionality in its association with emotion dysregulation has been associated with reports of somatic complaints (Costa & McCrae 1987) and chronic health conditions (Charles et al., 2008). Although not well addressed in the current literature, negative emotionality could be associated with heightened sensitivity to stressors that promotes a maladaptive stress response influencing psychological physiological symptoms. Piazza et al. (2014) found that greater affective reactivity to daily stressors was associated with increased risk of reporting chronic physical health conditions 10 years later in their longitudinal study. Examining the influence of negative emotionality could help with understanding differential reactions to stressors such as perceived discrimination and its relationship to psychological and physical health.

Contextual Factors- Neighborhood Disadvantage & SES

An additional source of potential influence on the impact of context on the interrelationship of perceived discrimination, negative affect, and health status is the degree to which individuals have to deal with life in a disadvantaged community. Socioeconomic status accounts for some, but not all, of the variability in mental and physical health disparities in the United States (Williams, 1999; Williams et al., 1997). Neighborhood socioeconomic context has been linked to a number of negative health outcomes (Robert 1998; Robert 1999; Schulz et al.

2000; Williams, 2013). Additionally economic hardship and poverty have been shown to have chronic effects on child development (Conger et al., 2002), and substantial poverty and socioeconomic status has been shown to place youth at risk for negative health effects across the life course as well as having shorter life expectancies (Braveman et al., 2010; Starfield, Roberson, & Riley, 2002).

In conceptualizing how perceived discrimination, SES, and neighborhood disadvantage are interconnected to influence health, researchers have examined the historical legacy and perpetuation of racism and poverty in the African American community (Williams, 1999). Researchers have found that individuals who live in low socioeconomic communities and/or areas that lack access to resources and health facilities may be at particular risk for negative health outcomes related to discrimination (Williams & Sternthal, 2010). Societal processes such as residential segregation and institutional discrimination have led to the consistency of disadvantage, particularly for certain African American communities. Exploring the impact of neighborhood disadvantage and SES within the relationship of perceived discrimination, negative affect, and health status could be an important step in advancing the understanding of how context matters in the implications of perceived discrimination for African American populations.

Family Factors- Harsh Parenting

Parental influence on individual's life course development has also been viewed as an important factor to consider when investigating health-related outcomes (Brody et al., 2001; Brody et al., 2014; Simons et al., 2006). Research suggests that generally childhood experiences of harsh parenting does not promote positive mental and physical health outcomes and leads to risk for later mental health disorders, chronic disease, and early mortality (McEwen, 1998;

Repetti et al., 2002). These findings are consistent with theories that poor health status during adulthood is linked to experiences earlier in life development.

Researchers have conceptualized harsh parenting as a set of parenting practices that may include a high level of control and vigilance, particularly in environments that could be dangerous, in order to protect children from delinquency and risky behaviors (Brody & Flor, 1997; Brody et al., 2001; Taylor Spencer & Baldwin, 2000). Research has shown that, over time, children who receive harsh parenting have difficulty regulating emotions, particularly negative affective states such as anger, and experience a heightened sensitivity and/or vigilance to for others expression of anger (Cicchetti & Rogosch, 2009; Dodge, Pettit, & Bates, 1994; Simons et al., 2011). Brody et al. (2014) researched harsh parenting practices and health status across preadolescence for African Americans and found that harsh parenting was linked to higher levels of anger across adolescence that in turn was related to depressive symptoms and self-reported health problems. In contrast, supportive parenting has shown to have protective effects (Brody et al., 2006; Simons et al., 2006). Simons and colleagues (2006) found that supportive parenting moderated the effects of discrimination on negative affect such as anger and hostility for adolescent African American males (Simons et al., 2006). Based on the accruing literature, parenting strategies appear to have a significant influence on an individual's development and could play a substantial role in influencing the relationship between perceived discrimination, negative affect, and health status.

Present Study

The overarching goal of this study was to investigate the role of negative affect (e.g., anxiety, depression, anger) in mediating the relationship between perceived discrimination in youth and health expectations in emerging adulthood for African Americans (i.e., prediction over

an 11-year period from age 10.5 to 21.5). In the current study, I build on previous research demonstrating a link between perceived discrimination and poor health status. Secondly, I examined the potential mediational role of negative affect factors (e.g., anxiety symptoms, depressive symptoms, and anger symptoms). Because these affects can all be characterized as “negative affect” but also have distinct characteristics in relation to discrimination, I examined them jointly as well as separately to identify patterns of association that are similar across all negative affects as well as those that may be unique to a particular negative affect. Furthermore, I examined the moderational role of both individual factors (code of the street and negative emotionality) contextual factors (neighborhood disadvantage and SES), and family factors (harsh parenting) as influential factors that may amplify the anticipated mediational pathways. The specific hypotheses are as follows:

- 1) Perceived discrimination will be related to health expectations such that greater perceived discrimination will be associated with poorer health expectations.
- 2) Mediating effect of Negative Affect.
 - a. Negative affect will mediate the relationship between perceived discrimination and health expectations such that perceived discrimination will predict negative affect, which in turn will predict poorer health expectations, fully or partially mediating the impact of discrimination on health expectations.
 - b. An exploratory analysis will be conducted to examine specific facets of negative affect separately.
- 3) Moderating effects of Individual Difference Variables
 - a. Negative emotionality and “code of the street” will moderate the relationship between perceived discrimination and negative affect such that the relationship

between perceived discrimination and negative affect will be greater among those with relatively higher levels of individual vulnerability.

- b. Negative emotionality and “code of the street” will also moderate the relationship between negative affect and health expectations such that the relationship between negative affect and health expectations will be greater among those with relatively higher levels of individual vulnerability.
- c. As a consequence, the association between perceived discrimination and health expectations will be amplified by presence of greater individual risk factors.

4) Moderating Effect of Contextual variables

- a. Neighborhood disadvantage and SES will moderate the relationship between perceived discrimination and negative affect such that the relationship between perceived discrimination and negative affect will be greater among those who endorse more difficult contexts.
- b. As a consequence of a, the association between perceived discrimination and health expectations will be amplified by more difficult contexts.

5) Moderating Effect of Harsh Parenting

- a. Harsh Parenting will moderate the relationship between perceived discrimination and negative affect such that the relationship between perceived discrimination and negative affect will be greater among those who endorse more difficult contexts.
- b. As a consequence of a, the association between perceived discrimination and health expectations will be amplified by more difficult contexts.

Methods

The hypotheses for the current study were tested using sample participants from the longitudinal Family and Community Health Study (FACHS), a multisite and non-clinical study of neighborhood and family effects on health and development. Participants were recruited from rural, suburban, and metropolitan communities. A total of 897 African American families, 475 in Iowa and 422 in Georgia, were recruited for participation in FACHS. Each family included a fifth-grade target youth who was 10 (52%), 11 (45%), or 12 (3%) years old at wave 1 with additional waves collected when youths were 12 to 14 (Wave 2), 15 to 16 (Wave 3), 17 to 20 (Wave 4), and 21 (Wave 5) years of age. Slightly more than half (54%) of the target youth were girls at wave 1. The data were collected in 1996, 1998, 2001, 2004, and 2007, respectively.

Among these families, most (84%) of the target youths' primary caregivers were their biological mothers, of whom 37% were married at wave 1. The rest were grandmothers (6%), biological fathers (5%), or other adults (5%). The caregivers' mean age at wave 1 was 37 years, ranging from 23 to 80 years. At wave 1, the primary caregivers' educational backgrounds ranged from less than a high school diploma (19%) to a bachelor's or advanced degree (10%); the majority (71%) were high school graduates. Their educational attainments changed little across the duration of the study. The mean family income across three waves of data collection was \$33,120; across the 5 years that separated the first and third waves, family income increased by an average of 12%. The families resided in a variety of settings, none of which could be characterized as a densely populated inner-city environment.

Recruitment

Families were recruited for FACHS from multiple sites that varied considerably in community characteristics, urban vs. rural settings, and economic level. Potential participants were chosen randomly from lists of families with fifth-grade youths who lived in neighborhoods in which at least 10% of the population was African American. The lists were compiled by community liaisons in Athens, Georgia and by school officials in Des Moines and Waterloo, Iowa. Each family received an introductory letter, followed by a recruitment phone call and a personal visit requesting the youth's and caregiver's participation in the study. The letter included a toll-free number through which families without home telephone service could contact the researchers. Complete data were gathered from 72% of the families on the recruitment lists. Most families who did not participate cited the amount of time the interviews would take as their reason for declining. (For further details about the FACHS sample and the recruitment process, see Brody et al., 2001; Cutrona et al., 2000; Gibbons et al., 2004; Simons et al., 2002; Wills, Gibbons, Gerrard, & Brody, 2000.) In general, the sample was representative of the African American populations of the communities from which participants were recruited. To enhance rapport and cultural understanding, African American university students and community members served as field researchers to collect data from the families in their homes. Before data collection, the researchers received 1 month of training in the administration of the self-report instruments. Two home visits, each of which lasted 2 hr, were made to each family within 7 days as the families' schedules allowed. During the first visit, informed consent was obtained; primary caregivers consented to their own and the youths' participation and the youths agreed to participate. At each home visit, the self-report questionnaires were administered to the primary caregiver and the target youth in an interview format. Each interview was conducted privately between one participant and one re-searcher, with no other family members present or able to

overhear the interview. The instruments were presented on laptop computers. Questions appeared in sequence on the computer screen, which both the researcher and the participant could see. The re-searcher researcher read each question aloud and entered the participant's response using the computer keypad. Caregivers received \$100 and youths received \$70 for their participation.

Measures

Perceived discrimination (T1). At the first wave of data collection, the target youths completed 13 items from a revised version of the Schedule of Racist Events (SRE; Landrine & Klonoff, 1996). The SRE was designed for adult respondents but was revised for youths in late childhood through adolescence. The revised scale, known as the Experiences of Discrimination Scale, has been used successfully in previous research (Brody, Chen, et al., 2006; Gibbons, Gerrard, Cleveland, Wills, & Brody, 2004; Simons et al., 2003, 2006). The revision process involved presentation of the revised scale to focus groups of African American primary caregivers and youths of the same age as those in the study population; the second step included psychometric and validity analyses. The validity of the revised scale was demonstrated through its association with variables that the literature suggests would be associated with perceived discriminatory experiences, such as anger, a hostile world view, depression, and conduct problems (Clark, Anderson, Clark, & Williams, 1999; Landrine & Klonoff, 1996), in contemporaneous (Simons et al., 2003), 2-year longitudinal (Gibbons et al., 2004), and 5-year longitudinal (Brody, Chen, et al., 2006; Simons et al., 2006) assessments. These associations remained robust when family income, financial stress, negative life events, and parental education were controlled. The items in the revised SRE assessed the frequency during the past year, ranging from 1 (never) to 4 (several times), with which the respondent perceived specific

discriminatory behaviors. These events include racially based slurs and insults, disrespectful treatment from community members, physical threats, and false accusations from business employees or law enforcement officials. Sample items include, “someone said something insulting to you because you are African American,” “a store owner or sales person working at a business treated you in a disrespectful way because you are African American,” “someone yelled a racial insult at you because you are African American,” and “you encountered Whites who didn’t expect you to do well because you are African American.” Cronbach’s alpha for the scale was .82.

Health Expectations (T5) was assessed with seven single item measures. The single-item measures included questions such as: 1) current overall health status: “In general, would you say your health is?” from 1 = excellent to 5 = poor; which has been shown to be a good predictor of both morbidity and mortality (Idler & Benyamini, 1997; Jylha, 2009; cf. Williams, Spencer, & Jackson, 1999). See Table 2 for a full list of item measures. Cronbach's alpha for this measure was .69.

Depressive Symptoms (T1-T3). At each wave, the target youths completed the Diagnostic Interview Schedule for Children-Version 4 (DISC-IV). The DISC was developed over a 15-year period of research on thousands of children and parents; it has demonstrated reliability and validity (Shaffer et al., 1993). Version IV became available in 1995 and represents a modest revision, based on findings from the MECA study (Shaffer et al., 1993), of the DISC-III. The DISC-IV generates both counts and diagnoses of symptoms; in the present study, only symptom counts were used because fewer than 5% of the youths in our sample met the criteria for clinical diagnoses. The symptoms that make up the 22-item Major Depression section include the frequency with which the respondent, during the previous year, felt sad, irritable, tired, restless,

or worthless; slept more or less than usual; experienced difficulty in focusing or making decisions; or thought about death or suicide. Cronbachs alpha for this measure exceeded .83 for each wave of data collected.

Anger (T1-T3). Anger was also measured using the DISC-IV, which includes measures for youth oppositional defiant disorder (American Psychiatric Association 1994). The items ask the respondent to report how often he or she loses his or her temper, feels grouchy or annoyed, gets mad, or feels unfairly treated. The possible range is 1 (less than once per week) to 4 (nearly every day). Cronbachs alphas for all waves was $> .79$.

Anxiety symptoms (T1-T3). Anxiety symptoms was also measured using the DISC-IV, and contained 12 items, e.g., “In the last year, was there a time when you... worried about whether other people liked you?” Cronbachs alphas for all waves was $> .79$.

Code of the street (T4). The measurement of code of the street was based on a 7-item street code scale that was developed by Stewart (Stewart & Simons 2010). This instrument asks respondents to indicate how much they agree (1=strongly disagree; 4=strongly agree) with statements such as: People do not respect a person who is afraid to fight for his/her rights; People tend to respect a person who is tough and aggressive; and, Being viewed as tough and aggressive is important for gaining respect. Cronbach's alpha for this measure was .78.

Harsh/inconsistent parenting (T1). A construct was formed by aggregating separately caregivers' and children's responses to questions on a scale used to assess care-givers' use of harsh and inconsistent discipline with their children. The scale included 11 items, which in prior research had prospectively predicted affiliation with deviant peers during adolescence (Conger & Reuter, 1996; Simons et al., 1996), that indexed discrepancy in the caregivers' disciplinary practices (e.g., punishing children for particular misbehaviors at one time but not punishing them

for the same misbehaviors at other times) and the caregivers' use of severe disciplinary techniques (e.g., shouting and hitting). Children also completed an 8-item hostility scale that assessed the extent to which their caregivers were angry, critical, and rejecting toward them (e.g., criticizing children, their ideas, or the ways in which they do things; insulting or swearing at children). Cronbach's alpha for this measure was .69.

Negative Emotionality (T1). A five item scale from the Emotionality, Activity and Sociability Inventory (EAS; Buss & Plomin, 1984) was utilized to measure negative emotionality. This scale had items such as “You often get irritated at things,” “You get upset easily,” and “You often feel frustrated.” Cronbach's alpha for this measure was .65.

Neighborhood Disadvantage (T1). The following census variables were used to form the construct of neighborhood disadvantage: proportion of households that were female-headed, proportion of persons on public assistance, proportion of households below the poverty level, proportion of persons unemployed, and proportion of persons who are African American. This construct reflected economic disadvantage in racially segregated African American neighborhoods. Previous studies have used some combination of these variables to assess community socioeconomic status (SES) (Baumer et al., 2003; Sampson, Raudenbush, and Earls, 1997). These variables are strongly correlated, and principal components and alpha factor analyses indicated that these variables loaded ($>.72$) on a single factor in the FACHS sample. The items were standardized and combined to form a measure of disadvantage. A constant (10) was added to the term that eliminated negative values. Cronbach's alpha for this measure was .63.

SES (T1). SES was assessed using the family's annual income and an index of the primary caregiver's educational level. The annual income measure was derived from primary caregivers' reports of income derived from employment, business ventures,

government assistance, and child support. The education index ranged from 1 (less than a high school diploma) to 10 (a graduate degree). The income and education items were standardized and combined. Cronbach's alpha for this measure was .73.

Results

Initial data cleaning, descriptive statistics, and characterization of intercorrelations were all conducted using SPSS version 23. In all model tests, except those directly examining SES as a moderator, gender and SES were entered as covariates. Gender was significantly related to perceived discrimination and health expectancies, while SES was marginally associated with perceived discrimination. All means, standard deviations, and intercorrelations for all measures are presented in Table 1. Several findings warrant further attention. Consistent with my first hypothesis, perceived discrimination was significantly correlated with health expectancies in the expected direction ($r = .15, p < .01$), such that African Americans who reported more perceived discrimination were more likely to endorse poorer future health expectations. In addition, respondents who endorsed experiencing more perceived discrimination were more likely to experience more symptoms of anxiety (Wave 1: $r = .10, p < .05$; Wave 2: $r = .22, p < .01$; Wave 3: $r = .10, p < .05$) and anger (Wave 1: $r = .22, p < .01$; Wave 2: $r = .14, p < .01$; Wave 3: $r = .12, p < .01$) at each assessed wave. Respondents who also endorsed experiencing more perceived discrimination were more likely to experience more depression at wave 1 ($r = .19, p < .01$) and wave 2 ($r = .17, p < .01$) but did not endorse significantly more symptoms at wave 3 ($r = .07, p = ns$).

Overview of Data Analyses

The primary hypothesis for this study was that negative affect acts as a mediator, accumulating over time, in the relationship between perceived discrimination and health expectations. As a preliminary step, I first examined the simple overall mediation hypothesis

(i.e., negative affect would mediate the relationship between perceived discrimination and health expectations) using a path analytic procedure in Mplus (Muthén & Muthén, 2010). Wave 3 negative affect was chosen as the mediator, as opposed to other waves of negative affect, in order to examine affect at a point in time later than the perceived experience of discrimination (Wave 1) but earlier than the assessment of health expectation impact (Wave 5). Wave 3 negative affect was a point intermediate between perceived discrimination and health expectations. To assess whether there were significant indirect effects I conducted bootstrapping analyses using Mplus to establish confidence intervals without relying on assumptions about the underlying distribution of the measures. Gender and SES were controlled for in these analyses. I created a composite measure of negative affect composed of symptoms of anxiety, depression, and anger. The three items were standardized and summed to form a composite measure of negative affect for the three assessed waves. Wave 3 negative affect was utilized for mediation analyses. Wave 3 symptoms of anxiety, depression, and anger were also used as the mediator variable to test the proposed exploratory analysis examining specific facets of negative affect separately.

To directly test the hypothesized mechanism of change in negative affect on the relationship between perceived discrimination and health expectations, I examined a model in which change in negative affect over time (T1-T3) mediated the relationship of perceived discrimination on health expectations. Examining change in negative affect over time is an important step to further understand the hypothesized accumulating effects of negative affect over time. Additionally, examining change in negative affect supports the developmental theory that the stress effects of perceived discrimination may have a cumulative effect on mental and physical health. Finally, examining change controls for baseline effects and so precludes reverse causation (negative affect leads to more perceived discrimination) and controls third variable

problems (an unmeasured factor that may be contributing to both negative affect and perceived discrimination). I further explored change in individual negative affect symptoms (e.g., anger, depressive symptoms, and anxiety symptoms) within a mediational framework. I used structural equation modeling (SEM) with full information maximum likelihood estimation (Mplus, Version 6; Muthén & Muthén, 2010) to evaluate hypothesized models.

Lastly, I examined the moderating effects of five variables (code of the street, negative emotionality, neighborhood disadvantage, SES, and harsh parenting) within a structural equation model framework. This allowed me to test potential differences in response to discrimination among those who were high vs. low on the proposed moderator to see if this affected other associations in the general mediational model (i.e., perceived discrimination to negative affect to health expectations). Single degree of freedom contrasts were created by constraining particular pathways to be the same for those high vs. low on a moderator. A significant chi-square difference statistic (i.e., $\Delta\chi^2_{(1)}$ above 3.84) would indicate that the moderator produces significantly different associations. A mean split was used to create a low and high group for each moderator. Because both reflect individual differences in cognitive appraisal and reactivity, the street and negative emotionality items were combined (i.e., items were standardized and summed to form a composite measure) to create one moderating variable. This variable was labeled “cognitive/individual difference.” Likewise, SES and neighborhood disadvantage items also had theoretical similarity and therefore were combined (i.e., items were standardized and summed to form a composite measure to create one moderating variable). This variable was labeled “contextual disadvantage.” Harsh parenting was the only family measure examined and so was not combined with any other moderators. I also examined each potential

moderator individually by contrasting low and high groups within the moderated mediation model (See Figure 1 for conceptual model).

Simple Mediation Analyses with Negative Affect as the Mediator

Results of the mediation model indicated that higher levels of perceived discrimination was associated significantly with higher levels of negative affect symptoms ($b = .018$, $SE = .005$, $t = 3.596$, $CI: .0009; .028$, $p < .001$). Furthermore, higher levels of negative affect symptoms were significantly associated with greater endorsement of poor health expectations ($b = .134$, $SE = .041$, $t = 3.298$, $CI: .057; .213$, $p = .001$). A bias corrected bootstrap-confidence interval (CI) was examined to assess the significance of the indirect effect of perceptions of discrimination on health expectations through negative affect symptoms. A confidence interval for the product of the indirect paths that does not include zero provides evidence of a significant indirect effect (Preacher & Hayes, 2008). Using Mplus with 1000 bootstrapped samples, a significant positive indirect effect was found of perceived discrimination on health expectations through negative affect symptoms ($p = .007$; 95% percentile $CI: .001; .005$). The indirect effect accounted for 28% of the total variance in poor health expectancies due to perceptions of discrimination (See Figure 2).

Follow-up Exploratory Mediation Analysis using Individual Negative Affects

I also examined the simple overall mediation hypothesis for individual facets of negative affect (i.e., depression, anxiety, and anger). Gender and SES were controlled for in these analyses. Results of the depression mediation model indicated that higher levels of perceived discrimination was associated significantly with higher levels of depressive symptoms ($b = .024$, $SE = .009$, $t = 2.733$, $CI: .008; .043$, $p = .006$). Furthermore, higher levels of depressive symptoms were significantly associated with greater endorsement of poor health expectations (b

= .078, SE = .025, $t = 3.090$, CI: .031; .133, $p = .002$). Using Mplus with 1000 bootstrapped samples, a significant positive indirect effect was found of perceived discrimination on health expectations through depressive symptoms ($p = .044$; 95% percentile CI: .001; .004). The indirect effect accounted for 22% of the total variance in poor health expectancies due to perceptions of discrimination (See Figure 3). Results of the anxiety mediation model indicated that higher levels of perceived discrimination was associated significantly with higher levels of anxiety symptoms ($b = .013$, SE = .006, $t = 2.207$, CI: .003; .027, $p = .027$). Furthermore, higher levels of anxiety symptoms were significantly associated with greater endorsement of poor health expectations ($b = .053$, SE = .026, $t = 2.034$, CI: -.004; .100, $p = .042$). Using Mplus with 1000 bootstrapped samples, a nonsignificant indirect effect was found from perceived discrimination to health expectations through anxiety symptoms ($p = ns$; 95% percentile CI: .000; .002) (See Figure 4). Results of the anger mediation model indicated that higher levels of perceived discrimination was associated significantly with higher levels of anger symptoms ($b = .053$, SE = .017, $t = 3.046$, CI: .020; .088, $p = .002$). Furthermore, higher levels of anger symptoms were significantly associated with greater endorsement of poor health expectations ($b = .024$, SE = .011, $t = 2.223$, CI: .004; .046, $p = .026$). Using Mplus with 1000 bootstrapped samples, a marginally significant positive indirect effect was found of perceived discrimination on health expectations through anger symptoms ($p = .083$; 95% percentile CI: .000; .003). The indirect effect accounted for 13% of the total variance in poor health expectancies due to perceptions of discrimination (See Figure 5).

Change in Negative Affect Overtime

As a goal for this research was to further understand the influence of negative affect on the relationship between perceived discrimination and health expectations over time, I examined

a model that could examine the pattern of change in negative affect. The resulting pattern of effects is portrayed in Figure 6. The hypothetical model was analyzed via SEM using Mplus software. The analyses resulted in a model that fit the data well, $\chi^2(1, N = 889) = .625, p > .40$. The model indicated that there was a significant pathway from discrimination to negative affect ($b = .015, p = .000$) as well as a significant pathway from negative affect to health expectations ($b = .149, p = .000$). Using a bootstrapping procedure to develop a distribution-free test of indirect effects (number of bootstrap samples = 1,000), there was a significant indirect effect from discrimination at time 1 to health expectations at wave 5 (11 years later) through their association with wave 3 negative affect (Indirect Effect p value = .004, .95% CI [.001, .005]).

I also examined the pattern of change for individual facets of negative affect (i.e., depression, anxiety, and anger). The analyses for the pattern of depression change resulted in a model that fit the data well, $\chi^2(1, N = 889) = 1.797, p = .18$. The resulting pattern of effects is portrayed in Figure 7. The model indicated that there was a significant pathway from discrimination to depression ($b = .023, p = .009$) as well as a significant pathway from depression to health expectations ($b = .085, p = .001$). Using a bootstrapping procedure to develop a distribution-free test of indirect effects (number of bootstrap samples = 1,000), there was a significant indirect effect from discrimination at time 1 to health expectations at wave 5 (11 years later) through their association with wave 3 depression (Indirect Effect p value = .038, .95% CI [.001, .004]). The analyses for the pattern of anxiety change resulted in a model that fit the data well, $\chi^2(1, N = 889) = 0.066, p > .70$. The resulting pattern of effects is portrayed in Figure 8. The model indicated that there was a marginally significant pathway from discrimination to anxiety ($b = .011, p = .088$) as well as a significant pathway from anxiety to health expectations ($b = .060, p = .018$). Using a bootstrapping procedure to develop a

distribution-free test of indirect effects (number of bootstrap samples = 1,000), there was a nonsignificant indirect effect from discrimination at time 1 to health expectations at wave 5 (11 years later) through their association with wave 3 anxiety (Indirect Effect p value = ns, .95% CI [.000, .002]). The analyses for the pattern of anger change resulted in a model that fit the data well, $\chi^2(1, N = 889) = 0.017, p > .80$. The resulting pattern of effects is portrayed in Figure 9. The model indicated that there was a significant pathway from discrimination to anger ($b = .041, p = .019$) as well as a significant pathway from anger to health expectations ($b = .027, p = .010$). Using a bootstrapping procedure to develop a distribution-free test of indirect effects (number of bootstrap samples = 1,000), there was a marginally significant indirect effect from discrimination at time 1 to health expectations at wave 5 (11 years later) through their association with wave 3 anger (Indirect Effect p value = .086, .95% CI [.000, .003]).

Moderated Mediation Models Analyses

Multigroup analyses were conducted to test whether there were differences in the hypothesized mediational pathways that were attributable to different effects for those high vs. low on the proposed mediator. Constraining pathways to be equivalent across groups, I compared the baseline model that constrained all paths to be equal between the two groups with an alternative model that allowed the groups to differ on the three theoretically interesting relationships, one at a time: the path from perceived discrimination to negative affect, negative affect to health expectations, and from discrimination directly to health expectations. By freeing the three paths one at a time, I could determine the extent to which each contributed to an improvement in model fit and whether the improvement in fit was explained by one or more of the paths. The results of this analysis are presented in Tables 1-7. For each of the three paths the table shows the coefficients and χ^2 for the model, the relationship is constrained to be equal for

the two groups, in contrast to the alternative model where it was allowed to differ. The table then reports the change in χ^2 and the p-value associated with this difference.

Cognitive/Individual Difference moderator

First, I examined the moderational impact of the combined measure of code of the street and negative emotionality (i.e., cognitive/individual difference). The table (Table 3) shows that freeing the path from perceived discrimination to change in negative affect produces a significant improvement in χ^2 ($\Delta\chi^2_{(1)} = 4.50, p = .034$); this finding suggest that the effects of perceived discrimination on change in negative affect are stronger for those who experience higher levels of cognitive/individual difference. No improvement in χ^2 was achieved by freeing either the path between change in negative affect and health expectations or between perceived discrimination and health expectations.

Contextual disadvantage moderator

Second, I examined the moderational impact of the combined measure of neighborhood disadvantage and SES (i.e., contextual disadvantage moderator). The table (Table 4) shows that no significant improvement in χ^2 was achieved for any of the proposed pathways. However, the freeing the pathway between perceived discrimination and negative affect resulted in a chi-square that approached significance χ^2 ($\Delta\chi^2_{(1)} = 3.50, p = .061$); suggesting that the effects of perceived discrimination on change in negative affect are stronger for those who experience higher levels of contextual disadvantage.

I also examined each moderator, as well as SES, individually, contrasting effects for low vs. high groups for each mediator.

Code of the street moderator

First, I examined code of the street. The table (Table 5) shows that freeing the path from perceived discrimination to change in negative affect produces a significant improvement in χ^2 ($\Delta\chi^2_{(1)} = 3.77, p = .052$); suggesting that the effect of perceived discrimination on change in negative affect was stronger for those who endorsed a view consistent with the code of the street. No improvement in χ^2 was achieved by freeing either the path between change in negative affect and health expectations or between perceived discrimination and health expectations.

Neighborhood disadvantage moderator

Second, I examined the moderational impact of neighborhood disadvantage. The table (Table 6) shows that freeing the path from perceived discrimination to health expectations produced a significant improvement in χ^2 ($\Delta\chi^2_{(1)} = 4.75, p = .029$); this finding suggest that the effects of perceived discrimination on health expectations were stronger for those who experienced more neighborhood disadvantage. Additionally, the table shows that freeing the path from change in negative affect to health expectations produced a significant improvement in χ^2 ($\Delta\chi^2_{(1)} = 4.33, p = .037$); this finding suggests that the effects of change in negative affect on health expectations were stronger for those who experienced more neighborhood disadvantage. No improvement in χ^2 was achieved by freeing the path between perceived discrimination and change in negative affect.

Negative Emotionality Moderator

Third, I examined the impact of negative emotionality. The table (Table 7) shows that freeing the path from perceived discrimination to change in negative affect produced a significant improvement in χ^2 ($\Delta\chi^2_{(1)} = 5.32, p = .021$); this finding suggest that the effects of perceived discrimination on change in negative affect was stronger for those who reported

greater negative emotionality. No improvement in χ^2 was achieved by freeing either the path between perceived discrimination and health expectations or between change in negative affect and health expectations.

Harsh Parenting Moderator

Fourth, I examined the impact of harsh parenting. The table (Table 8) shows that no improvement in χ^2 was achieved for any of the proposed pathways.

SES moderator

Lastly, I examined the moderational impact of SES. The table (Table 9) shows that freeing the path from perceived discrimination to negative affect produces a significant improvement in χ^2 ($\Delta\chi^2_{(1)} = 4.75, p = .029$); this finding suggest that the effects of perceived discrimination on change in negative affect are more strong for those who experience lower levels of SES. No improvement in χ^2 was achieved by freeing either the path between perceived discrimination and health expectations or between change in negative affect and health expectations.

Discussion

A main objective of this research was to examine whether an accumulation of negative affective symptoms over time might help explain the negative effect of discrimination on poor health expectations among African American youth. Consistent with the hypothesis, African Americans in the current sample who perceived more discrimination, beginning at the age of 10 to 11, also reported having poorer health expectations at the age of 21. This finding adds to the accumulating evidence that children and adolescents report experiencing varying amounts of discrimination (Brody et al., 2006; Gibbons et al., 2004; Neblett et al. 2008; Simons et al., 2002) and that these differences in experience can produce longer-term negative effects on health. This finding adds to the existing literature by providing evidence that the stress effects of perceived discrimination can have a significant impact on the health expectations of African Americans in emerging adulthood.

The current study findings also examined negative affect and change in negative affect as potential mediators of the association between perceived discrimination to poor health expectations. I expected that experiences of discrimination by youth would have its effect through an accumulation of negative affect that would be observable at later waves of assessment and would help explain the impact of discrimination on later health-related outcomes. Both later negative affect as well as change in negative affect served as mediators of the effect of discrimination on health expectations. Analyses using change in negative affect are of particular interest because they are, to the best of my knowledge, the first demonstrating that discrimination produces a change in negative affect and that change accounts for long-term outcomes beyond

the effect of wave 1 negative affect. At the same time, the current report adds to a growing literature that has examined the impact of perceived discrimination over time and identified significant effects on mental health, health behavior, and physical health (Brody et al., 2006; Brody et al. 2014; Gibbons et al., 2004; Gibbons et al., 2014).

The current research specifically examined mental health, in the form of specific negative affects, as the hypothesized mechanism accounting for the relationship between perceived discrimination and physical health expectations over time. This is an important step, particularly when placed in the context of health disparities for African Americans. The current findings are consistent with the conceptualization that poor health and health disparities during adulthood could result from stressful experiences earlier in life, such as perceived discrimination (Williams, 2003; Williams & Neighbors, 2001). Poor health expectations and health status has shown considerable predictive validity for future physical health outcomes and these research findings help to shed light on the process by which health declines over the life course for African Americans.

Previous researchers have criticized the available research for failing to fully examine specific mechanisms in the pathways by which perceived discrimination negatively affects health outcomes (Williams, Neighbors, & Jackson, 2003). The current findings provide insight into the underlying process by which perceived discrimination can lead to changes in health. In line with theories that examine stress effects on the body (Lazarus & Folkman, 1984; Mays et al., 2007), these findings suggest that when an African American individual perceives discrimination their appraisal and coping responses could be negative emotional states, and in turn, these negative emotional states can influence negative health expectations. Researchers that examine the effects of stress on health have noted that stressors seem to influence physical illness through causing

negative emotional states such as anxiety and depression (Cohen, Kessler, & Gordon, 1995). As mental health has been the most frequently studied outcome in the research literature on discrimination and health (Williams, Neighbors, & Jackson, 2003), an important future goal for research is to more explicitly examine negative emotional states as an intermediate stage between stress and physical disease processes.

Preliminary mediation analyses of individual facets of negative affect revealed that depression was the strongest mediator of the relationship between perceived discrimination and health expectations when the negative affects were examined separately. This could be the case, in part, because of its strong association with health expectations at multiple waves. Depressive symptoms might also show a strong effect if African Americans are more prone to pessimism as a result of discrimination (Boardman, 2004), and tend to self-report their health more negatively irrespective of actual health (Ferraro, 1993). If so, perhaps the perceived experience of discrimination that leads to depressive symptoms might also lead to feelings of helplessness and pessimism about physical health and wellness. Alternatively, it may be appropriate to consider the relatively measurement properties of the questionnaires used to measure each of the three negative affects. To the extent that depression has greater reliability it would also be expected to have stronger patterns of association with outcomes.

The association for perceived discrimination to health expectations that is mediated by amplification of negative affect symptoms over time is multi-determined. As a result, several moderators were examined as potential risk or protective factors that could influence change in negative affect's mediational role. It was somewhat surprising that harsh parenting did not moderate any of the examined pathways. Although harsh parenting seems to produce many

negative effects, it did not amplify the impact of discrimination on negative affect in the current study.

The combined index of code of the street and negative emotionality was found to significantly moderate change in negative affect's mediating role at the pathway from perceived discrimination to change in negative affect symptoms. This finding suggests that having high levels of code of the street and a temperament for negative emotionality could exacerbate the effect of perceived discrimination on negative affect over time. This appears to be consistent with current literature examining coping and appraisal processes after experiences of perceived discrimination. Negative emotionality and adopting the street code can both lead to heightened vigilance and perceptions of threat in one's environment, which in turn, should lead to an exaggerated response to threat and greater difficulty regulating the resulting negative feelings (Costa & McCrae 1987; Gibbons et al., 2004; Stewart & Simons, 2006). Additionally, the significance of this moderation at the pathway from perceived discrimination to change in negative affect could suggest that the stress effects of perceived discrimination during childhood and early adolescence (from age 10 to age 16) is an important time that can effect developmental trajectories to negative health outcomes, particularly for those individuals that may have a predisposition to negative emotionality and adopting the street code in certain environmental conditions. This could also denote that perceiving discrimination early in life while also having personality characteristics of heightened emotional reactivity to stressors can leads to significant psychological symptoms.

Researchers have examined code of the street as both a protective and risk factor for negative outcomes. In a study by Stewart and colleagues (2006), findings suggested that African American adolescents who adopted the street code showed a higher chance of being violently

victimized even after controlling for neighborhood danger and disorder. This is a notable finding in relation to the current findings because it could highlight the risky nature of adopting the street code in response to a stressor such as perceived discrimination. Possibly those who adopt the street code do so because they believe that it will protect them from harm, when in actuality it potentially exacerbates risk for cyclical victimization. In an effort to intervene in this cycle that could lead to poor health expectations as well as health outcomes, further examination into the risk of adopting the street code in relation to discrimination, negative affect, and health is warranted.

Although combining SES and neighborhood disadvantage did not lead to significant moderational effects, there were some interesting findings when they were examined as independent moderators. Neighborhood disadvantage was found to significantly moderate change in negative affect's mediating role at the pathway from perceived discrimination to health expectations and from change in negative affect to health expectations. Poor neighborhood conditions have consistently been found to be related to individual's mental and physical health (Schulz et al. 2000; Williams, 2013). Researchers have theorized that neighborhood disadvantage negatively affects individual's emotions because it leads to feelings of distress, fear, and powerlessness ((Ross, 2000; Ross, Mirowsky, & Pribesh, 2001). In the present study model, African Americans living in a highly disadvantaged neighborhoods had poorer future health expectation, which was found to be related to early distress from perceived discrimination leading to mental health symptoms. SES was also examined as an exploratory moderator and was found to significantly moderate change in negative affect's mediating role at the pathway from perceived discrimination to change in negative affect symptoms, a different pathway than neighborhood disadvantage. The findings indicate that for low SES individuals, the effect of

perceived discrimination on negative affect is stronger. The relationship of SES to perceived discrimination in the literature has been mixed, with some studies showing that African Americans with higher levels of SES reporting greater exposure to racial discrimination (Cole & Omari, 2003; Dawson, 1994; Forman, 2003). This study's findings show that African Americans who are low in SES experience more deleterious effects in response to perceiving discrimination at a young age. Examining the moderational role of both neighborhood disadvantage and SES highlights the importance of contextual and environmental factors in understanding the erosive effects of perceived discrimination for African Americans.

Race and SES are complex and often confounding factors in the context of health outcomes. Upchurch et al. (2015) found that the two demographic factors of being African American and lower income were predictive of higher discrimination. Studies examining the link between race, SES, and discrimination have emphasized that institutional/structural disadvantage and residential segregation are significant components that influence poor physical and mental health outcomes, particularly for African Americans (Williams & Sternthal, 2010; Williams & Williams-Morris, 2000). The current study findings build on previous research by demonstrating the significant negative health consequences of early life economic disadvantage for African Americans who perceive discrimination. This highlights the need for further investigation into the complex intersection of multiple dimensions of societal stratification in early life that can have long-term effects on health. In consideration of potential intervention approaches, Caputo (2003) conducted a study examining "sense of mastery over one's life" in relation to perceived discrimination, SES, and health status. This researcher found that only a sense of mastery over one's life buffered physical and mental health statuses for a U.S. cohort of youth. This researcher notes that an important effort of health care professionals, as a complement to interventions

designed to change the structural environment, is to stress self-determination and empowerment in order to enable individuals to enhance their own social functioning. Taking this research into consideration of the current findings, it seems that there may be a cognitive and structural component to the health disparities that we see for African Americans. Possibly an area of intervention could be early life interventions for youth aimed at building self-esteem, confidence, and emotion regulation skills to buffer the stress affects of perceived discrimination and the long term affects on mental and physical health.

Study Limitations and Future Directions

Although this study makes several contributions to the available literature, some potential limitations should be noted. First, the majority of the data in the study came from self-report. Although self-reported health status has shown to have great predictive validity (Ferraro & Farmer, 1996), it would be interesting to examine more objective measures of physical health as an outcome in this study. Additionally I examined self-reported symptoms of negative affect symptoms (i.e., anxiety, depression, anger) and not clinically diagnosed mental health disorders. It is possible that the current results would be different in a clinical sample such that populations with clinically significant levels of psychological symptoms may perceive more experiences of stress due to perceived discrimination. A second potential limitation involves the sample utilized for the study. This study focused on African American families living in towns and small cities and therefore it was not a nationally representative sample. As a third potential limitation, this study did not examine stress buffering processes such as racial identity, adaptive coping strategies, or racial socialization strategies that could serve as protective resources when African American youth encounter stressors like perceived discrimination Gaylord-Harden, Burrow, & Cunningham, 2012, Neblett et al., 2008). Lastly, SES was assessed at baseline wave 1 for this

study, so I could not determine if parent's annual income and parent's education level changed during different waves of assessment. Racial residential segregation is considered to be a fundamental societal discriminatory structure that significantly restricts mobility and socio-economic opportunity (Massey & Denton, 1993; Williams & Collins, 2001) and would be potentially compelling for future studies to examine this process more closely as it relates to perceived discrimination, negative affect, and health expectations over time.

Conclusion

The findings suggest that in addition to finding ways to reduce exposure to discrimination, it may be useful to directly target key moderators to reduce the negative impact of exposure to discrimination when it does occur. For example, preventive interventions designed to reduce adherence to code of the street and negative emotionality may help reduce the negative health effects of exposure to discrimination by decreasing the intensity of negative affective reactions. Likewise, attention to contextual moderators could lead to efforts and interventions aimed at addressing the economic, social, and political resources and policies that influence disadvantaged communities. Identifying ways to influence these moderators in a way that is culturally sensitive and effective is likely to prove challenging. However, there are a range of tools available and these may be worth exploring as we work to create a new generation of preventive interventions to reduce racial health disparities and improve the long-term health outcomes of African Americans.

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Table 1.

Zero-Order Correlations Among Measured Variables (n = 886).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Perceived Discrimination	1																
2. Health Expectations	.15**	1															
3. Depression Wave 1	.19**	.05	1														
4. Depression Wave 2	.17**	.22**	.24**	1													
5. Depression Wave 3	.06	.14**	.03	.08	1												
6. Anxiety Wave 1	.10*	.09 [#]	.35**	.15**	.06	1											
7. Anxiety Wave 2	.22**	.01	.07	.19**	.11*	.05	1										
8. Anxiety Wave 3	.10*	.15**	.07	.17**	.37**	.16**	.11*	1									
9. Anger Wave 1	.22**	.08 [#]	.18**	.03	.07	.13**	.19**	-.02	1								
10. Anger Wave 2	.14**	.13**	.13**	.17**	.08	-.02	.19**	.04	.21**	1							

11. Anger Wave 3	.12*	.15**	.11*	.09#	.23**	.04	.14**	.30**	.16**	.21**	1						
12. Negative Emotionality (W1)	.23**	.07	.08#	.02	.05	.11	.07	.09#	.26**	.15**	.14**	1					
13. Neighborhood Disadvantage (W1)	.32**	-.01	.02	-.02	-.01	.06	.14**	-.03	.10*	.11*	-.01	.07	1				
14. Code of the Street (W4)	.06	.11*	.08#	.07	.16**	.04	.04	.15**	-.00	.13**	.18**	.12*	-.02	1			
15. Harsh Parenting (W1)	.13**	-.03	-.03	-.03	-.07	-.03	.12*	-.01	.12**	.13**	.05	.24**	.07	.07	1		
16. Gender (M=1, F = 0)	-.11*	-.16**	-.03	-.12*	-.05	.02	.05	-.10*	.01	-.04	-.08	-.04	.01	.07	.08	1	
17. SES	.09#	.05	.05	.16**	-.08#	.10*	-.00	-.04	.08#	.05	-.01	.05	-.01	.04	-.03	-.01	1
Means	20.73	-.01	.21	.23	.30	.22	.20	.28	1.01	1.40	1.40	10.22	4.12	17.87	7.53	.41	.01
SD	6.39	.57	.85	.97	1.12	.67	.64	1.00	2.14	2.69	2.69	2.55	1.46	3.38	2.20	.49	1.69

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

Table 2.

We would like to ask you some questions about your health and your thoughts about health issues.

How would you describe your health right now?

- <1> Excellent
- <2> Very good
- <3> Good
- <4> Fair
- <5> Not very good

Do you ever worry about getting a disease like cancer?

- <1> No, never
- <2> Not very often
- <3> Sometimes
- <4> A lot

How likely do you think it is that you will get cancer some time in your life?

- <1> Not at all likely
- <2> Somewhat likely
- <3> Moderately likely
- <4> Very likely

Compared to other people your age, how likely is it that you will get cancer some time in your life?

- <1> Much less likely than others
- <2> Less likely than others
- <3> About the same as others
- <4> More likely than others
- <5> Much more likely than others

How healthy do you think you will be when you are 50?

- <1> Very healthy
- <2> Healthy
- <3> Not very healthy
- <4> Not at all healthy

Do you ever worry about getting heart disease?

- <1> No, never

- <2> Not very often
- <3> Sometimes
- <4> A lot

Have you ever had a bad experience with health professionals (i.e., doctors, nurses, etc.)?

- <1> No, never
- <2> Yes, once
- <3> Yes, more than once

Table 3. Comparison of the Paths for Low and High Cognitive/Individual Difference

<i>B</i>							
	Model	Low	High	χ^2	D.F.	$\Delta\chi^2_{(1)}$	P-Value for $\Delta\chi^2_{(1)}$
Discrimination to Health Expectations	<i>Bs</i> equal in both groups	.005	.005	8.30	5	--	--
	<i>Bs</i> free to differ	.002	.009	7.53	4	0.77	.380
Discrimination to Negative Affect	<i>Bs</i> equal in both groups	.007	.007	8.30	5	--	--
	<i>Bs</i> free to differ	.001	.020**	3.80	4	4.50	.034*
Negative Affect to Health Expectations	<i>Bs</i> equal in both groups	.143	.143	8.30	5	--	--
	<i>Bs</i> free to differ	.172	.127	7.86	4	0.44	.507

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

Table 4. Comparison of the Paths for Low and High Contextual Disadvantage

<i>B</i>							
	Model	Low	High	χ^2	D.F.	$\Delta\chi^2_{(1)}$	P-Value for $\Delta\chi^2_{(1)}$
Discrimination to Health Expectations	<i>Bs</i> equal in both groups	.011	.011	4.72	5	--	--
	<i>Bs</i> free to differ	.010	.012	4.64	4	0.08	.777
Discrimination to Negative Affect	<i>Bs</i> equal in both groups	.013	.013	4.72	5	--	--
	<i>Bs</i> free to differ	.023**	.006	1.22	4	3.50	.061 [#]
Negative Affect to Health	<i>Bs</i> equal in both groups	.163	.163	4.72	5	--	--
	<i>Bs</i> free to differ	.148	.190	4.41	4	0.31	.578

[#] $p < .10$. * $p < .05$. ** $p < .01$.

Table 5. Comparison of the Paths for Low and High Code of the Street

<i>B</i>							
	Model	Low	High	χ^2	D.F.	$\Delta\chi^2_{(1)}$	P-Value for $\Delta\chi^2_{(1)}$
Discrimination to Health Expectations	<i>Bs</i> equal in both groups	.005	.005	5.64	5	--	--
	<i>Bs</i> free to differ	.003	.007	5.29	4	0.35	.554
Discrimination to Negative Affect	<i>Bs</i> equal in both groups	.009	.009	5.64	5	--	--
	<i>Bs</i> free to differ	.003	.019**	1.87	4	3.77	.052 [#]
Negative Affect to Health Expectations	<i>Bs</i> equal in both groups	.139	.139	5.64	5	--	--
	<i>Bs</i> free to differ	.148	.136	5.61	4	0.03	.864

[#] $p < .10$. * $p < .05$. ** $p < .01$.

Table 6. Comparison of the Paths for Low and High Neighborhood Disadvantage

<i>B</i>							
	Model	Low	High	χ^2	D.F.	$\Delta\chi^2_{(1)}$	P-Value for $\Delta\chi^2_{(1)}$
Discrimination to Health Expectations	<i>Bs</i> equal in both groups	.008	.008	14.37	5	--	--
	<i>Bs</i> free to differ	.001	.017**	9.62	4	4.75	.029*
Discrimination to Negative Affect	<i>Bs</i> equal in both groups	.016	.016	14.37	5	--	--
	<i>Bs</i> free to differ	.020	.010	13.04	4	1.33	.2488
Negative Affect to Health Expectations	<i>Bs</i> equal in both groups	.146	.146	14.37	5	--	--
	<i>Bs</i> free to differ	.106** (p = .004)	.249** (p = .000)	10.04	4	4.33	.037*

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

Table 7. Comparison of the Paths for Low and High Negative Emotionality

<i>B</i>							
	Model	Low	High	χ^2	D.F.	$\Delta\chi^2_{(1)}$	P-Value for $\Delta\chi^2_{(1)}$
Discrimination to Health Expectations	<i>Bs</i> equal in both groups	.008	.008	8.17	5	--	--
	<i>Bs</i> free to differ	.006	.009	8.06	4	0.11	.740
Discrimination to Negative Affect	<i>Bs</i> equal in both groups	.011	.011	8.17	5	--	--
	<i>Bs</i> free to differ	.004	.023**	2.85	4	5.32	.021*
Negative Affect to Health Expectations	<i>Bs</i> equal in both groups	.138	.138	8.17	5	--	--
	<i>Bs</i> free to differ	.211	.117	6.02	4	2.15	.143

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

Table 8. Comparison of the Paths for Low and High Harsh Parenting

<i>B</i>							
	Model	Low	High	χ^2	D.F.	$\Delta\chi^2_{(1)}$	P-Value for $\Delta\chi^2_{(1)}$
Discrimination to Health Expectations	<i>Bs</i> equal in both groups	.007	.007	3.35	5	--	--
	<i>Bs</i> free to differ	.004	.012	1.78	4	1.57	.210
Discrimination to Negative Affect	<i>Bs</i> equal in both groups	.015	.015	3.35	5	--	--
	<i>Bs</i> free to differ	.012	.019	2.67	4	0.68	.410
Negative Affect to Health Expectations	<i>Bs</i> equal in both groups	.155	.155	3.35	5	--	--
	<i>Bs</i> free to differ	.155	.155	3.35	4	0.00	1

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

Table 9. Comparison of the Paths for Low and High SES

<i>B</i>							
	Model	Low	High	χ^2	D.F.	$\Delta\chi^2_{(1)}$	P-Value for $\Delta\chi^2_{(1)}$
Discrimination to Health Expectations	<i>Bs</i> equal in both groups	.011	.011	8.80	5	--	--
	<i>Bs</i> free to differ	.011	.010	8.74	4	0.06	.807
Discrimination on Negative Affect	<i>Bs</i> equal in both groups	.012	.012	8.80	5	--	--
	<i>Bs</i> free to differ	.022**	.003	4.05	4	4.75	.029*
Negative Affect on Health Expectations	<i>Bs</i> equal in both groups	.153	.153	8.80	5	--	--
	<i>Bs</i> free to differ	.147	.167	8.73	4	0.07	.791

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

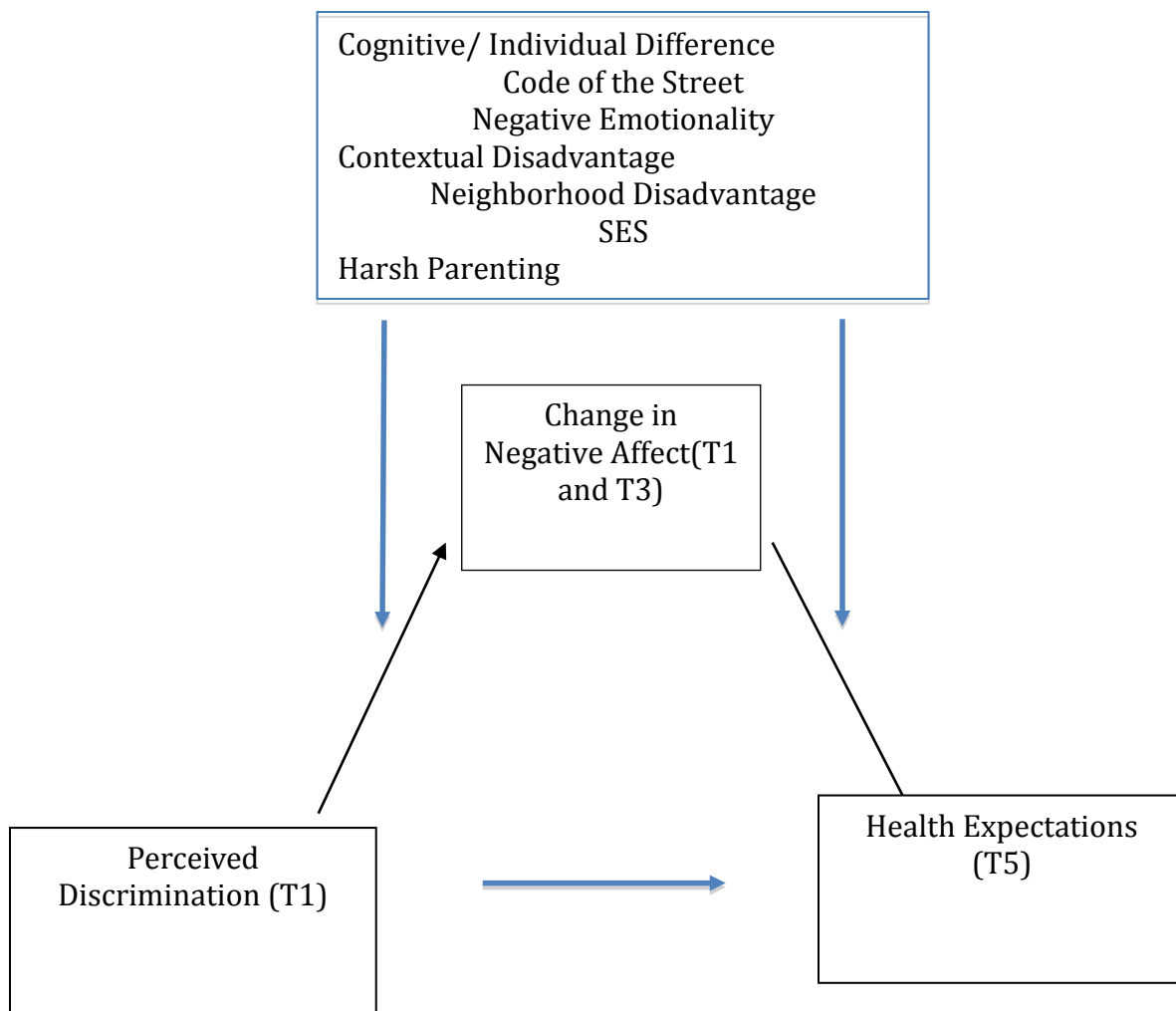


Figure 1: Conceptual Model of Moderated Mediation

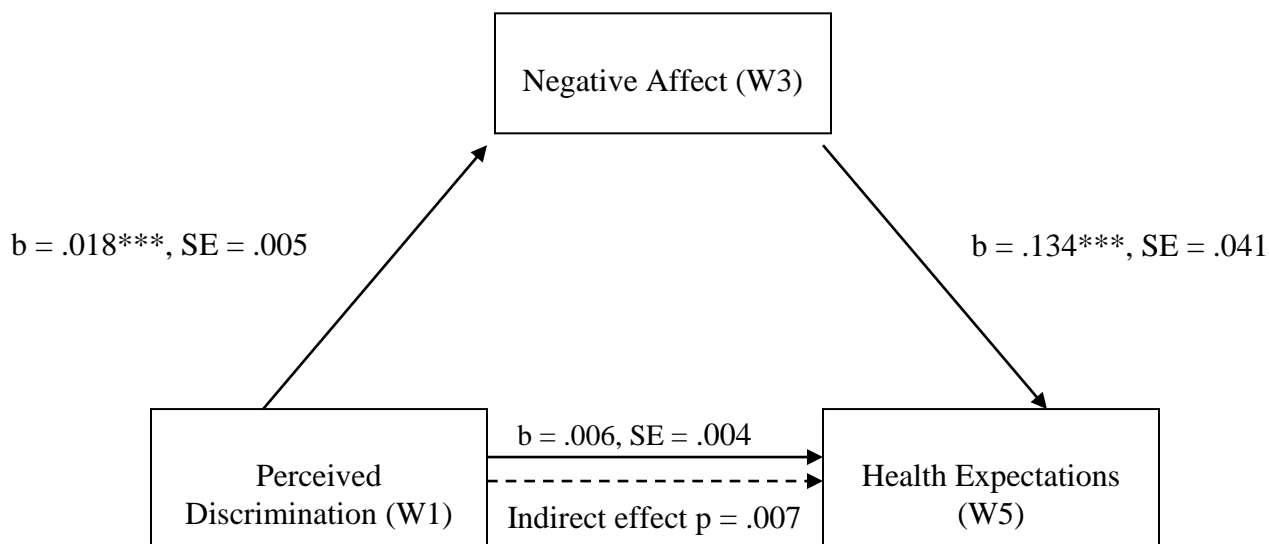


Figure 2: Simple Mediation Analyses with Negative Affect as the Mediator

Path coefficients for simple mediation analysis. Gender and SES controlled for in analyses. *Note.* Dotted lines denoted the indirect effect of perceived discrimination on health expectations when negative affective symptoms are controlled for.

$\#p < .10$. $*p < .05$. $**p < .01$. $***p < .001$.

Figure 3: Simple Mediation Analyses with Depression as the Mediator

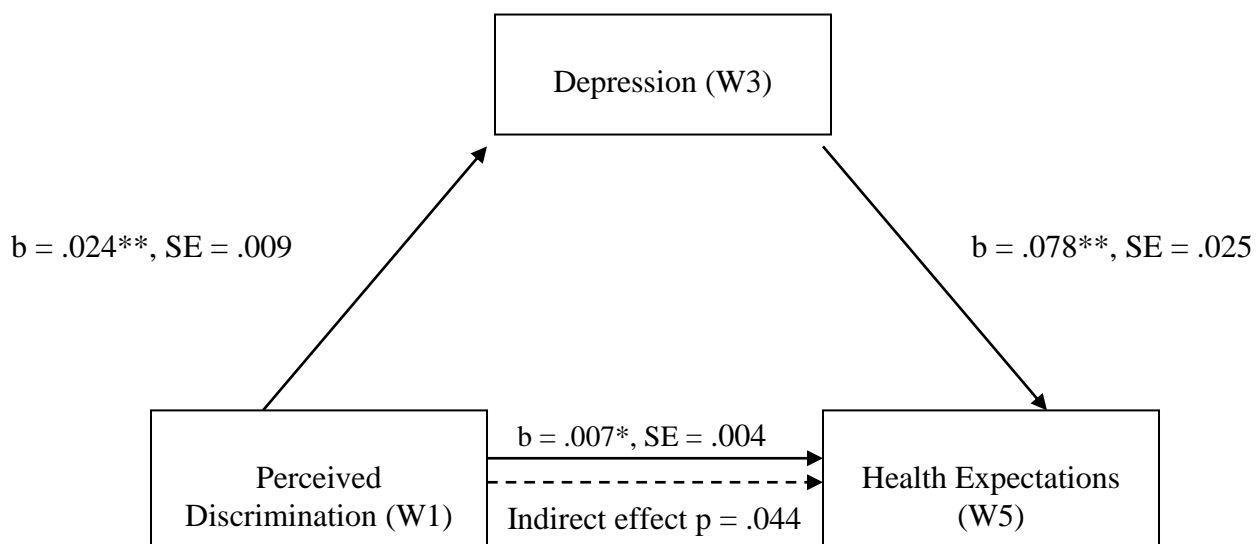


Figure 3: Simple Mediation Analyses with Depression as the Mediator

Path coefficients for simple mediation analysis. Gender and SES controlled for in analyses. *Note.* Dotted lines denoted the indirect effect of perceived discrimination on health expectations when depressive symptoms are controlled for.

[#] $p < .10$. $*p < .05$. $**p < .01$. $***p < .001$.

Figure 4: Simple Mediation Analyses with Anxiety as the Mediator

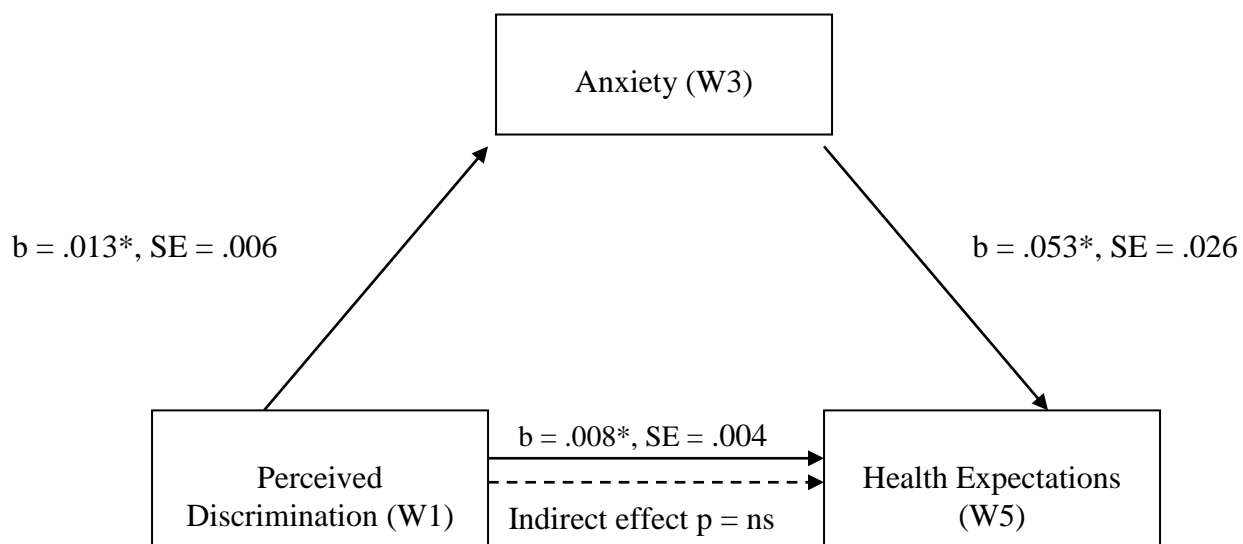


Figure 4: Simple Mediation Analyses with Anxiety as the Mediator

Path coefficients for simple mediation analysis. Gender and SES controlled for in analyses. *Note.* Dotted lines denoted the indirect effect of perceived discrimination on health expectations when anxiety symptoms are controlled for.

$p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 5: Simple Mediation Analyses with Anger as the Mediator

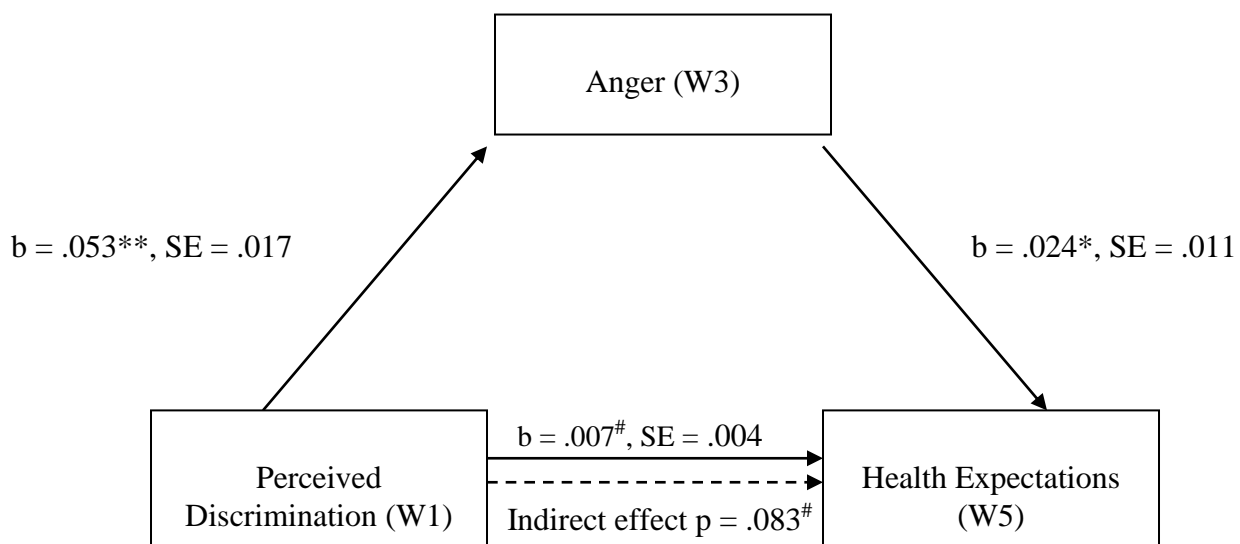


Figure 5: Simple Mediation Analyses with Anger as the Mediator

Path coefficients for simple mediation analysis. Gender and SES controlled for in analyses. *Note.* Dotted lines denoted the indirect effect of perceived discrimination on health expectations when anger symptoms are controlled for.

$^{\#}p < .10$. $*p < .05$. $**p < .01$. $***p < .001$.

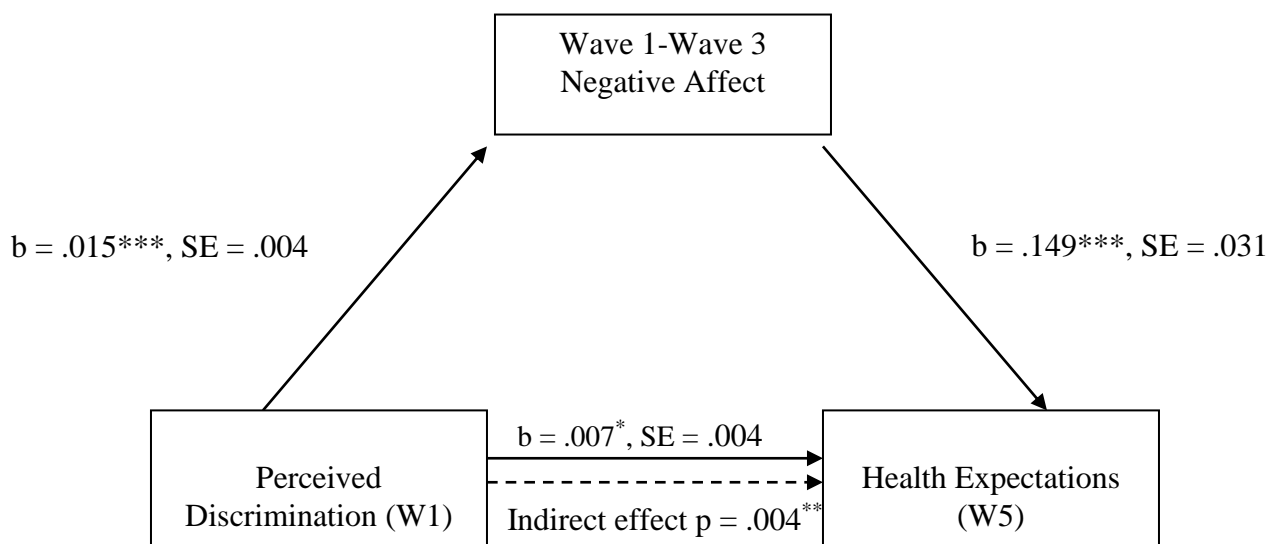


Figure 6: Change in Negative Affect Mediation Analyses

Path coefficients for change in negative affect mediation analysis.. *Note.* Dotted lines denoted the indirect effect of perceived discrimination on health expectations when change in negative affect is accounted for.

$p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

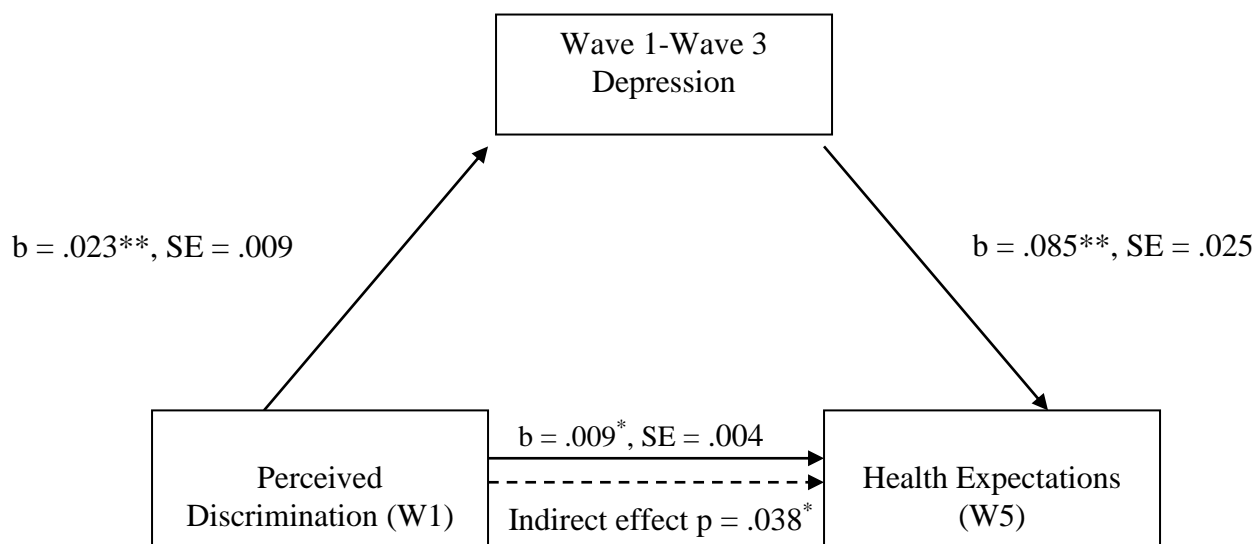


Figure 7: Change in Depression Mediation Analyses

Path coefficients for change in depression mediation analysis.. *Note.* Dotted lines denoted the indirect effect of perceived discrimination on health expectations when change in depression is accounted for.

$^{\#}p < .10$. $*p < .05$. $**p < .01$. $***p < .001$.

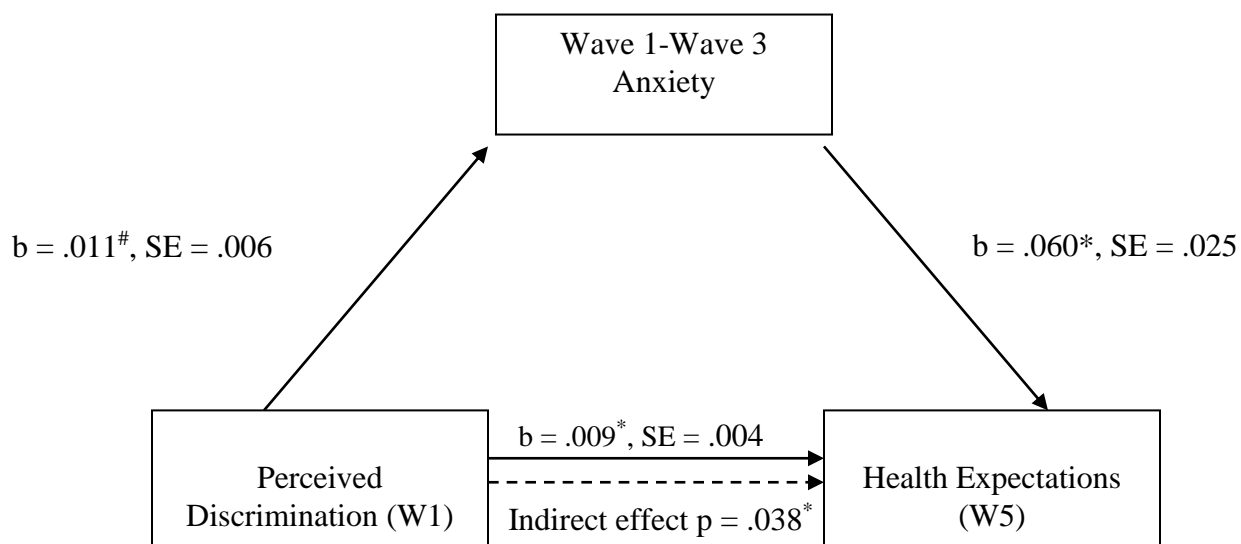


Figure 8: Change in Anxiety Mediation Analyses

Path coefficients for change in anxiety mediation analysis.. *Note.* Dotted lines denoted the indirect effect of perceived discrimination on health expectations when change in anxiety is accounted for.

$^{\#}p < .10$. $*p < .05$. $**p < .01$. $***p < .001$.

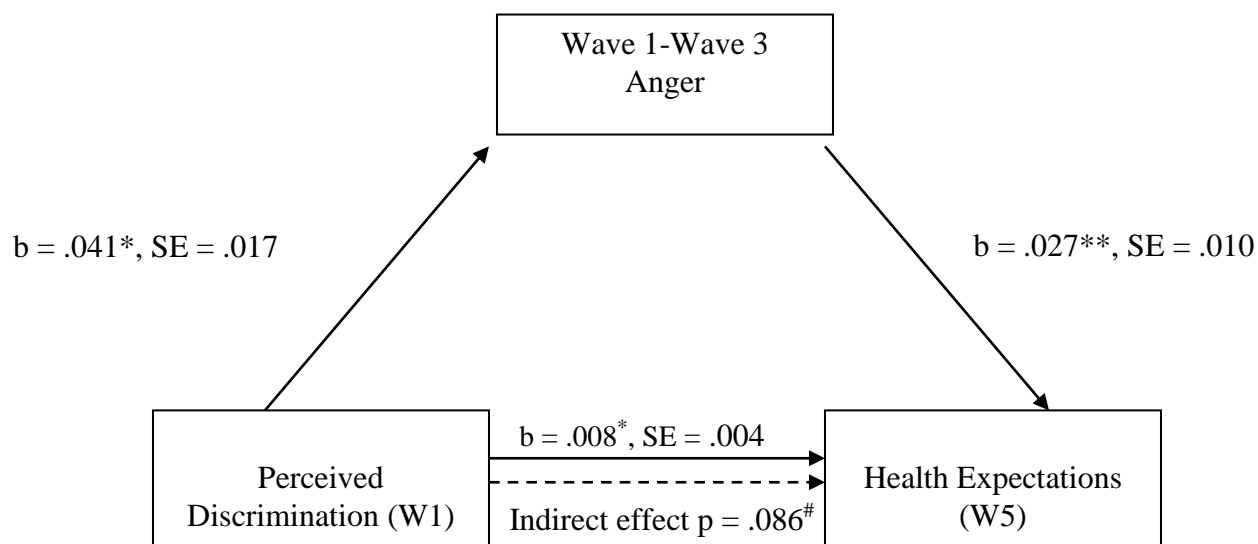


Figure 9: Change in Anger Mediation Analyses

Path coefficients for change in anger mediation analysis.. *Note.* Dotted lines denoted the indirect effect of perceived discrimination on health expectations when change in anger is accounted for. $^\#p < .10$. $*p < .05$. $**p < .01$. $***p < .001$.