

# Racial Discrimination and the Stress Process

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The unique and combined effects of chronic and daily racial discrimination on psychological distress were examined in a sample of 174 African American doctoral students and graduates. Using a daily process design, 5 models of the stress process were tested. Multilevel random coefficient modeling analyses revealed that chronic exposure to racial discrimination predicted greater daily discrimination and psychological distress. Further, results show that differences in daily discrimination and negative events accounted for meaningful variation in daily distress responses. Finally, findings indicate that daily discrimination and negative events mediated the relationship between chronic discrimination and psychological distress. The study provides support for the need to measure chronic strains as distinctive from daily stressors in the lives of African Americans.

*Keywords:* African American, chronic stress, daily stress, racial discrimination

A central tenet of contemporary stress research is that among the stressors that contribute to persistent inequalities in mental and physical health are those that extend or are repeatedly experienced across the life course (Pearlin, Schieman, Fazio, & Meersman, 2005). A voluminous literature attests to the validity of this proposition (for reviews, see Aneshensel, 1992; Pearlin, 1999; R. Turner, Wheaton, & Lloyd, 1995). Indeed, some of the most compelling demonstrations of the ways in which stressors can exert a powerful, disruptive effect on people's lives derive from studies that chart the life-course experiences of vulnerable populations over considerable spans of time (see George & Lynch, 2003; Phelan, Link, Diez Roux, Kawachi, & Levin, 2004).

Salient among the stressors that may be chronically experienced from youth through old age and that are capable of negatively affecting the health and well-being of African Americans are those that involve discriminatory experiences on the basis of race (for a review, see Mays, Cochran, & Barnes, 2007). The evidence amassed from a large number of studies using a variety of methods reflects a general consensus that racial discrimination adversely affects the mental health of African Americans (Jackson et al., 1996; Klonoff, Landrine, & Ullman, 1999; Sellers & Shelton, 2003; Utsey, Ponterotto, Reynolds, & Cancelli, 2000; Williams & Williams Morris, 2000). Despite this growing body of research, however, few studies have examined the underlying mechanisms that link racial discrimination to negative mental health outcomes. In a recent review of the literature on racial discrimination and health, Williams, Neighbors, and Jackson (2003) noted, "A major challenge in future research is to think more carefully

about the models by which perceived discrimination might adversely affect health status, including focusing more explicit attention on the plausible pathways by which these effects occur" (p. 205).

Using the *stress process* framework (Bolger & Zuckerman, 1995; Pearlin, 1989), the present study examined the mechanisms through which racial discrimination contributes to broad-based mental health morbidity among African Americans. On the basis of prior empirical research, we explored five models that examine the direct, mediated, and moderated relations between chronic and daily racial discrimination, negative life events, and psychological distress.

## Racial Discrimination and Mental Health

*Racial discrimination*, defined as unfair, differential treatment on the basis of race, is a relatively common occurrence for racial minorities in the United States, particularly for African Americans (for a review, see Williams & Williams Morris, 2000). In a large-scale national survey, Kessler, Mickelson, and Williams (1999) found that nearly 49% of Black respondents reported encountering some form of discrimination (e.g., not given a promotion, hassled by police, denied/received inferior service) in their lifetime. Of these respondents, the vast majority (89.7%) reported race/ethnicity as a reason for their discrimination. Research with adolescents has corroborated findings obtained with adults. Fisher, Wallace, and Fenton (2000), for example, found that 36% of African American adolescents reported having been called a racially insulting name, 46% believed that racial discrimination resulted in their receiving a lower grade than they deserved, and a full 75% reported having been hassled by store personnel because of their race. Likewise, Sellers, Copeland-Linder, Martin, and Lewis (2006) found that 70% or more of African American adolescents reported occurrences of affronting racialized experiences involving others perceiving them as a threat (e.g., being treated suspiciously) or incompetent (e.g., being talked down to). These findings dovetail with recent longitudinal research that suggested Black adolescents report increasingly more discrimination by peers and adults over time (Greene, Way, & Pahl, 2006). Taken

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together, these prior investigations indicate that racial discrimination is a ubiquitous experience in the lives of African Americans.

There is growing scientific interest not only in documenting the prevalence of discrimination, but also in examining how racial discrimination, both actual and perceived, may be consequential for mental health (Landrine, Klonoff, Corral, Fernandez, & Roesch, 2006; Ryff, Keyes, & Hughes, 2003). Data from nationally representative samples have revealed that the links between lifetime discrimination and a variety of mental health outcomes, such as major depression and generalized anxiety disorder, are comparable in magnitude to those found in studies of the effects of traumatic life events, such as sexual assault and combat exposure (cf. Kessler, Davis, & Kendler, 1997; Kessler et al., 1999). Similarly, in a recent review of 32 population-based studies, Williams et al. (2003) found that all but one study reported a positive association between perceptions of racial discrimination and mental illness.

### *Racial Discrimination as Chronic Stress*

Given the documented robust associations between racial discrimination and psychological distress, some have suggested that racism represents a distinct source of chronic life stress for African Americans (Pieterse & Carter, 2007). Indeed, there are compelling reasons to believe that chronic exposure to racial discrimination can have wide-ranging effects on the mental and physical health of African Americans. For example, African Americans who are chronically exposed to racial discrimination are more likely to report greater numbers of stressful life events (Harrell, 2000; Pieterse & Carter, 2007); to appraise stressful situations as threats rather than challenges (Sellers, Caldwell, Schmeelk-Cone, & Zimmerman, 2003; Thompson, 2006); and to engage in maladaptive coping behaviors, thus increasing the probability of negative affective responses (Martin, Tuch, & Roman, 2003; Utsey et al., 2000). Finally, chronic exposure to racial discrimination may, over time, be etiologically implicated in the development of cardiovascular disease (for reviews, see Brondolo, Rieppi, Kelly, & Gerin, 2003; Mays et al., 2007). The foregoing studies have documented the deleterious influence of racial discrimination on the psychological and physical health of African Americans. Yet researchers are only beginning to examine the mechanisms that underlie the adverse effects occasioned by chronic racial discrimination (for a discussion, see Williams et al., 2003; Williams & Williams Morris, 2000).

### *Racial Discrimination as Daily Stress*

Unlike chronic stressors, which are characterized by enduring or recurrent life difficulties whose effects persist over an extended period of time (Baum, Cohen, & Hall, 1993; Lepore, 1997), daily stressors signify time-limited daily stressful encounters that have a discrete onset and conclusion (Almeida, 2005; Wheaton, 1999). Though there has been interest in understanding the role of everyday discrimination in the lives of African Americans, only a few studies have systematically examined the association between day-to-day racial discrimination and mental health. In one of the few longitudinal studies in the area, Sellers and Shelton (2003) found that the repeated encounters with everyday racial hassles increased the likelihood that African American adults would experience

psychological distress. These findings align with recent qualitative accounts of the effects of daily racial discrimination. For example, Swim, Hyers, Cohen, Fitzgerald, and Bylsma (2003) investigated the frequency of everyday racist incidents experienced by African American students attending a predominantly White public university. They found that over a 2-week period, the most common type of racial discrimination reported was being stared at with suspicion. In addition, anger was the most frequently reported emotional response to daily racial discrimination. On a similar note, in a study of how everyday racial discrimination affects the educational experience of African American students attending elite, predominantly White universities, Solorzano, Ceja, and Yosso (2000) found that the cumulative effects of racial discrimination resulted in emotions of discouragement, self-doubt, and isolation on the part of African American students. Although far from definitive, the available evidence suggests that experiencing daily racial discrimination can have detrimental consequences for mental health.

### Applying the Stress Process Model to Studying Racial Discrimination

Although a number of researchers have begun to conceptualize racial discrimination within a stress and coping framework (e.g., Feldman-Barrett & Swim, 1998; Harrell, 2000; Landrine & Klonoff, 1996; Pieterse & Carter, 2007; Sellers & Shelton, 2003), conceptual models that may account for the intricate connections between chronic and daily racial discrimination, everyday life events, and psychological distress have not been examined. The matter is of considerable importance, for even among people facing similar chronic life difficulties, there can be substantial variation in the array of daily stressors to which they are exposed (Serido, Almeida, & Wethington, 2004; Zautra, Smith, Affleck, & Tennen, 2001). Crucially needed, therefore, are empirical investigations of conceptual models that can capture and further elucidate the dynamic character of the stress process among African Americans.

Underlying the above discussion is the assumption that differences in the association between racial discrimination and health-related processes can be understood within the conceptual framework of the stress process (Bolger & Zuckerman, 1995; Pearlin, 1999). In their study of emotional reactions to daily stress, Bolger and Zuckerman (1995) identified two fundamental mechanisms through which stress may operate to affect mental health, including individual differences in *exposure* and *reactivity* to stressful life events. According to the differential-exposure hypothesis, people in disadvantaged statuses are at greatest risk for psychological distress because they are more likely to be exposed to health-related stressors. In contrast, the differential-reactivity hypothesis posits that lower status individuals are more vulnerable because they are more likely to show heightened reactivity to stress. Indeed, it is thought that differential stress exposure and reactivity represent two general pathways that underlie a wide range of health phenomena, linking differences in people's health to differences in their status locations within systems of inequality (for reviews, see Almeida, 2005; Pearlin et al., 2005).

A third key feature of the stress process that has been identified in previous work is the concept of *stress proliferation*, the tendency for serious stressors to expand and generate additional

stressors, which in turn lead to psychological distress (Pearlin, Aneshensel, & LeBlanc, 1997). According to Pearlin (1999), the stress proliferation process is driven by two types of stressors. The first, *primary stressors*, are rooted in the strains and hardships whose effects are under study. Unlike primary stressors, *secondary stressors* represent the constellation of events and strains that result from primary stressors. Critical to understanding the distinction between primary and secondary stressors is the assumption that important life challenges, whether in the form of chronic difficulties or acute stressors, do not exist in isolation. Thus, one event may lead to another, as when involuntary job loss may result in marital conflict (Pearlin, Menaghan, Lieberman, & Mullan, 1981) or when divorce necessitates a residential move (Wertlieb, 1991) or when the loss of a spouse leads to social isolation (Bodnar & Kiecolt-Glaser, 1994). Together, both primary and secondary stressors are hypothesized to operate in cumulative fashion to increase psychological distress.

Building on the stress process framework (Bolger & Zuckerman, 1995; Pearlin, 1989), the present study explored five possible models for understanding the links between chronic and daily racial discrimination, negative life events, and their associations with psychological distress in African Americans.

*Primary Stress Models*

On the basis of past theory and research, three models can be used to illustrate how exposure to primary stressors in the form of racial discrimination can have effects on mental health. These models appear in the left panel of Figure 1.

Model 1 posits that chronic and daily racial discrimination represent unique predictors of psychological distress. The larger literature on stress assessment points to important distinctions between chronic strains and daily stressors. Studies in this area have typically found that quotidian stressors or “daily hassles”

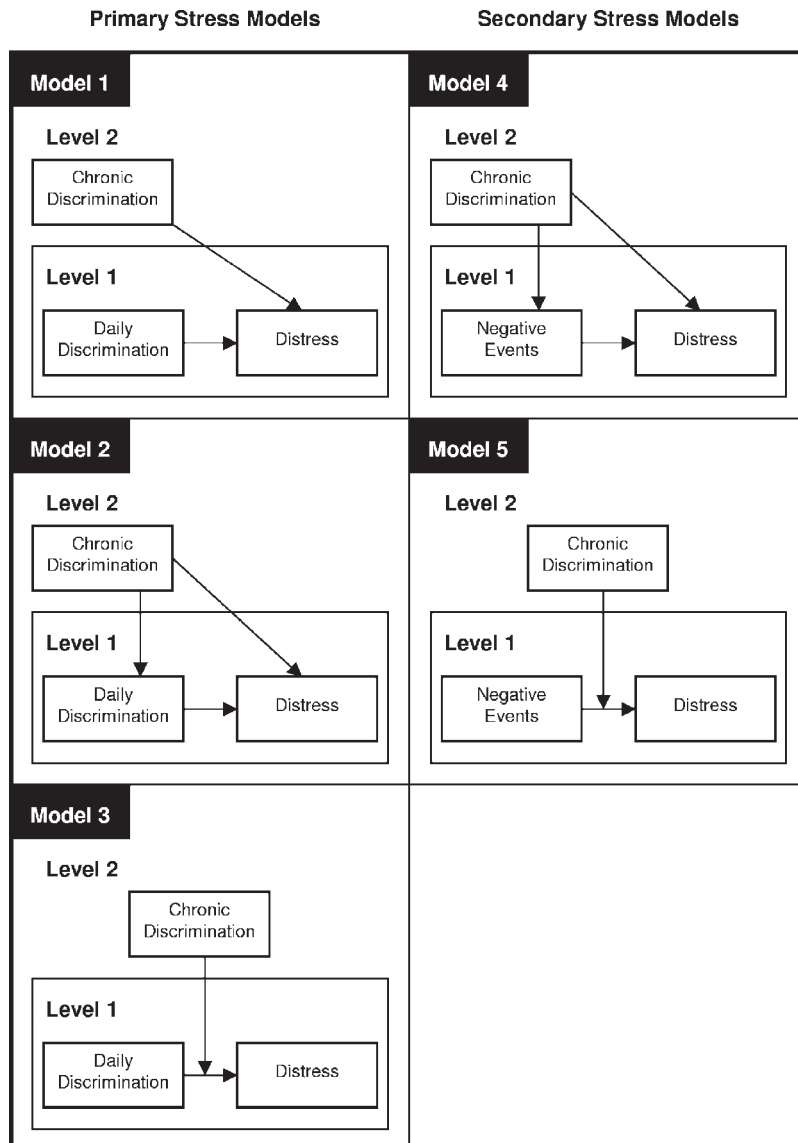


Figure 1. Five models of the stress process.

account for a greater portion of the variance in psychological distress than is explained by the occurrence of chronic or recurring stressors (e.g., Eckenrode, 1984; Lazarus, 1984). There has been little effort, however, to develop psychological hypotheses that could help differentiate the relative impact of chronic and daily racial discrimination within African American samples. What distinctive roles do exposure to chronic and daily racial discrimination play in the stress process?

A second model in which daily discrimination is postulated to mediate the impact of chronic discrimination on distress is depicted in Model 2. Stress researchers have suggested that daily stressors may constitute an important pathway linking major life events and chronic strains to psychological distress (e.g., Pillow, Zautra, & Sandler, 1996; Zautra, Reich, & Guarnaccia, 1990). If chronic exposure to racial discrimination is associated with adverse mental health outcomes among African Americans, does exposure to daily discrimination represent a critical mechanism that governs vulnerability?

Model 3 explores the possibility that chronic discrimination exacerbates the impact of daily discrimination on distress. A number of cross-sectional and daily diary studies have demonstrated that chronic stressors of a variety of sorts can magnify the effects of daily stress on psychological distress (e.g., Repetti, McGrath, & Ishikawa, 1999; Serido et al., 2004). Other investigators have suggested that daily stressors may intensify or potentiate the impact of chronic stress (e.g., Caspi, Bolger, & Eckenrode, 1987; Lepore, Palsane, & Evans, 1991). Regardless of the interpretation, there is general agreement that chronic and daily stressors may act in concert to adversely affect well-being.

### Secondary Stress Models

Two models can be specified to represent the manner in which secondary stressors in the form of everyday negative events can have effects on psychological distress. These models appear in the right panel of Figure 1. Of particular interest are negative events that precipitate and maintain stress not only through their direct effect on daily adaptation, but also through their indirect exacerbation of the chronic strains associated with racial discrimination (Pearlin et al., 2005).

In Model 4, exposure to chronic discrimination is hypothesized to influence psychological outcomes by affecting the individual's pattern of daily negative events. That is, the impact of chronic discrimination is seen as being mediated by the presence or extent of exposure to negative events. General support for Model 4 comes from studies suggesting that chronic stressors may proliferate and give rise to additional stress exposure, which in turn may lead to psychological distress (e.g., Pearlin et al., 1997, 2005).

The final model, depicted in Model 5, predicts that prior exposure to chronic discrimination can lead to a more negative appraisal of subsequent stressors in other life domains. Some research suggests that chronic and daily work and family stressors may combine in synergistic fashion to produce spillover effects (e.g., Bolger, DeLongis, Kessler, & Wethington, 1989, 1990). Model 5, thus, predicts that the joint occurrence of chronic discrimination and secondary stressors (negative events) is associated with greater distress than would be expected on the basis of an additive model.

### Summary and Overview

In the present study, five models derived from theories of the stress process were tested in an effort to extend understanding of how individuals adapt to discrimination over time. Specifically, we focused on experiences of racial discrimination among African Americans and probed the ways in which such experiences exert a direct influence on psychological distress and an indirect influence through daily stressors (i.e., daily racial discrimination and negative events). Drawing from the stress process framework (Bolger & Zuckerman, 1995; Pearlin, 1989), we tested the following five hypotheses, which are directly derived from the five models presented in Figure 1.

*Hypothesis 1:* Chronic and daily exposure to racial discrimination will increase distress.

*Hypothesis 2:* The association between chronic racial discrimination and distress will be mediated by daily racial discrimination.

*Hypothesis 3:* The presence of chronic racial discrimination will result in increased reactivity to daily racial discrimination.

*Hypothesis 4:* The association between chronic racial discrimination and distress will be mediated by daily negative events.

*Hypothesis 5:* The presence of chronic racial discrimination will result in heightened reactivity to daily negative events.

### Method

#### Participants

Study participants were 174 African American doctoral students and graduates (141 women, 33 men) from over 70 different U.S. colleges and universities. Participants' ages ranged from 22 to 67 years ( $M = 31.84$ ,  $SD = 7.74$ ). The majority were never married (65%). The remainder were married (28%), divorced (6%), or widowed (1%). Thirty-two percent of the participants had earned their doctorate, and the remaining 68% were enrolled in a doctoral program.

Of the 214 individuals who initially enrolled into the study, 40 did not complete the daily diary procedure to criterion (i.e., they did not turn in a minimum of 7/14 diary records), resulting in a survey response rate of 81.3% ( $N = 174$ ). These 174 participants were representative of the larger group of individuals who started the study. Comparisons between the group of 174 participants and those omitted from analysis for incomplete data showed no differences in baseline demographics of gender, age, marital status, or level of educational attainment.

#### Procedure

Participants were recruited from national academic fellowship programs, associations, and organizations supporting African American doctoral students and recent graduates (e.g., minority fellowship programs and Black graduate student listservs). Data for the study were collected via a secure Internet Web site, and

participants were told how to access the Web site and provide their responses. Prior to beginning the daily diary portion of the study, participants completed a baseline questionnaire that assessed chronic exposure to racial discrimination and background characteristics. Following completion of the baseline questionnaire, participants commenced the daily diary portion of the study. During daily data collection, participants received an e-mail message each day reminding them to access the diary pages. To minimize variation in reporting times, participants could only log on to the Web site between the hours of 7:00 p.m. and 12:00 midnight. For 14 consecutive days, participants completed measures assessing their daily life events, stressors, and mood. After satisfactory completion of the diary portion of the study, participants were compensated up to \$25 for their time: \$1 dollar for each diary completed, with an \$11 bonus if they completed all 14 diaries. Of a possible 2,436 person days, participants logged on and completed the time-stamped diary on 1,791 days (74%).

### Measures

**Chronic racial discrimination.** The Daily Life Experience (DLE) subscale of the Racism and Life Experience Scale (Harrell, 1994) was used to assess chronic exposure to racial discrimination. The DLE is a self-report measure that assesses the frequency and impact of experiencing 20 racism-related events (see Utsey, 1998, for a review of scale properties). The measure is based conceptually on Lazarus and Folkman's (1984) model of stress and coping and has been used in a number of studies involving perceptions of racial discrimination (e.g., Sellers et al., 2006; Sellers & Shelton, 2003). Participants are asked to respond to 20 items in terms of (a) how frequently they experience each race-related stressor and (b) how much they were bothered by each stressor. The frequency of racial discrimination was assessed using a 6-point scale with the following labels: 0 = *never happened*, 1 = *less than once a year*, 2 = *a few times a year*, 3 = *about once a month*, 4 = *a few times a month*, and 5 = *once a week or more*. Sample items include, "Others expecting your work to be inferior" and "Being treated as if you were stupid or being talked down to." Participants answered how bothered they were by each event using a 5-point Likert-type scale with the following labels: 1 = *did not bother me at all*, 2 = *bothered me a little*, 3 = *bothered me somewhat*, 4 = *bothered me a lot*, and 5 = *bothered me extremely*.

In the current study, an index of chronic exposure to racial discrimination was calculated by averaging across the 20 items ( $\alpha = .90$ ). This approach is consistent with the broad view of chronic stress proposed by Lepore (1997) in that it importantly captures the persistent and ongoing nature of stressor exposure absent from traditional life event checklist measures. We decided not to use the severity ratings of racial discrimination for two reasons: First, because we were interested in assessing the relative persistence of racial discrimination over time, we chose the frequency dimension of the DLE as a more appropriate indicator of chronic stress. As others have noted (e.g., Eckenrode, 1984), the dimension that distinguishes chronic stressors from other types of stressors is the frequency with which they occur. Second, we note that the use of retrospective subjective appraisals of stressfulness are notorious for confounding stress exposure and the outcome of interest (for a review, see Dohrenwend, 2006). Thus, our decision not to examine the stress severity ratings was guided by our desire

to assess the unique impact of chronic racial discrimination in a way that would avoid the problem of confounded measures.

**Daily racial discrimination.** Daily racial discrimination was assessed with a modified version of the DLE subscale. Specifically, the instructions for the 20-item scale and the individual items were reworded to refer to whether the event had occurred that day (e.g., "Today, I was ignored, overlooked, or not given service"). A respondent was given a score of 1 if they had experienced a racial discrimination event on a particular day and a score of 0 if they had not. This approach to measuring daily racial discrimination is consistent with research that distinguishes daily events from ongoing activities by defining them as changes from day-to-day occurrences (for a discussion, see Eckenrode & Bolger, 1997). To estimate reliability, test-retest correlations were computed across weeks, yielding a week-to-week correlation of .61.<sup>1</sup>

**Negative events.** Items from the Inventory of Small Life Events (Zautra, Guarnaccia, & Dohrenwend, 1986) were used to assess the frequency of 37 discrete daily negative life events. Participants indicated whether each of 37 negative events had occurred on that day. The Inventory of Small Life Events assesses a wide coverage of everyday negative events in both interpersonal (spouse or significant others, family members, friends) and non-interpersonal (health and finance) life domains. Sample items include "I was criticized by my spouse/partner" and "A friend/acquaintance did not return my call." We took as an index of daily negative events a mean score of the number of domains in which a participant reported experiencing at least one negative event on a given day. Higher scores thus reflect a greater accumulation of daily negative life events across multiple domains. The week-to-week test-retest correlation was .73.

**Negative affect.** Daily negative affect was measured by asking participants to rate how they felt during the day using a circumplex model (Feldman Barrett & Russell, 1998) as a basis for these ratings. Each day participants rated how guilty, nervous, afraid, angry, ashamed, embarrassed, upset, and disgusted they felt (negative activation). They also rated how sluggish, sad, tired, and bored they felt (negative deactivation). Participants responded using a 5-point Likert-type scale, ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). Within-person estimates of reliability were computed using three-level models in which items were nested within days, which were nested within participants (Bryk & Raudenbush, 1992, pp. 191-196). Using this procedure, the estimated day-level reliability of the 12-item negative affect scale was .71.

**Anxiety and depression.** Daily anxiety and depressive symptoms were assessed with a modified version of the Mental Health Inventory (Veit & Ware, 1983). Specifically, the instructions for the scale and the individual items were reworded to refer to whether participants had experienced a range of anxiety and de-

<sup>1</sup> Internal consistency reliability of the daily racial discrimination items was not computed because the experience of one event does not necessarily increase the likelihood of another (see Bollen & Lennox, 1991). Similarly, internal consistency reliability was not computed on the Inventory of Small Life Events items because the scale was designed to capture nonoverlapping domains of everyday stressful life events, such that stress in one domain is not necessarily indicative of stress in other domains (see Zautra et al., 1986).

pressive symptoms on a daily basis. Anxiety and depressive symptoms were assessed using the nine-item anxiety and four-item depression subscales of the Mental Health Inventory. Example items assessing anxiety included "Today, I was a very nervous person," and "I had difficulty trying to calm down." Example items measuring depression included "Today, I felt downhearted and blue," and "Today, I had low or very low spirits." Reliability analyses of the nine items measuring depression and the four items measuring anxiety indicated that these daily measures were reliable (.83 and .82, respectively).

## Results

### Descriptive Findings

We began by examining descriptive statistics and correlations among the person- and day-level variables. We used all observations for the variables that were measured daily and used significance tests with the number of participants to adjust for the within-person dependence across days. Table 1 displays the results of these analyses. Daily reports of negative affect, anxiety, and depression were averaged across 14 days. Because individual reports of daily discrimination were coded as either reporting an encounter (coded 1) or not reporting an encounter (coded 0), the mean level of daily discrimination shown in Table 1 can be interpreted as the proportion of days on which a participant reported at least one racial discrimination encounter. As shown in Table 1, individuals experienced, on average, at least one racial discrimination event on 26% of the study days. In addition, chronic discrimination was positively related to daily reports of discrimination ( $r = .48, p < .01$ ),<sup>2</sup> negative events ( $r = .27, p < .01$ ), negative affect ( $r = .30, p < .01$ ), anxiety ( $r = .31, p < .01$ ), and depression ( $r = .25, p < .01$ ). Finally, daily discrimination, negative events, negative affect, anxiety, and depression were all positively correlated with each other.

### Overview of Multilevel Modeling Analyses

We tested our hypotheses using multilevel random coefficient modeling (MRCM; Raudenbush & Bryk, 2002). The flexibility of MRCM provides a number of advantages. First, MRCM is appropriate for diary data. In the current study, the data have a hierarchical structure with up to 14 daily observations nested within each of 174 participants. Second, MRCM does not require that all individuals be measured at all occasions. We can use the data from participants who entered the study after it began and from participants who have missing data for some occasions of the study. Third, in MRCM, more reliable units of observation contribute more to the estimation of parameters than do less reliable units, a process known as precision weighting (for a discussion, see Bryk & Raudenbush, 1992, pp. 32–57). Finally, a multilevel modeling approach allows for the simultaneous estimation of within- and between-person effects. Level 1 or within-person analyses address the question of *when*. For example, when individuals encounter racial discrimination, do they also report high levels of depression? Level 2 or between-person equations address the question of *who*. They take the following form: Do people who report more chronic racial discrimination also have higher depression?

### Hypothesis 1: Chronic Racial Discrimination, Daily Racial Discrimination, and Daily Distress

To test the hypothesis that chronic and daily exposure to racial discrimination predicted daily distress, individual differences in the average levels of daily distress were probed through analyses at Level 1 and Level 2. In particular, both within- and between-person effects of racial discrimination on distress were examined. A number of background variables were also included in the model to adjust for their known association with daily distress. These included age (Mroczek & Almeida, 2004), gender (Almeida & Kessler, 1998), marital status (Almeida, McGonagle, Cate, Kessler, & Wethington, 2003), and level of educational attainment (Grzywacz, Almeida, Neupert, & Ettner, 2004). Finally, day was included as a Level 1 variable to control for artifacts in data collection due to time-related linear trends in daily distress reports (Zautra et al., 2001).<sup>3</sup>

As depicted in Model 1, we predicted that for each daily distress measure, we would find a significant main effect for chronic racial discrimination. Step 1 in Table 2 shows that in each analysis there was a significant main effect of chronic discrimination on daily distress. Individuals reporting more chronic discrimination also reported higher levels of daily negative affect ( $\beta = .11, SE = .04, p < .05$ ), anxiety ( $\beta = .98, SE = .32, p < .01$ ), and depression ( $\beta = .29, SE = .12, p < .05$ ). The strength of these relationships was examined by comparing random parameter estimates, and strength was operationalized as the between-person variance in distress accounted for by chronic discrimination, a procedure discussed in Bryk and Raudenbush (1992, p. 65). The residual variance of  $\beta_{0j}$  (mean negative affect) from an analysis in which chronic discrimination was not included at the person level was .115, and the residual variance from a second analysis in which chronic discrimination was included was .106, a reduction of 8%. This corresponds to an effect size correlation of .28 between chronic discrimination and negative affect. For anxiety, the corresponding figures were 4.94, 4.37, and 12%, and for depression, the corresponding figures were .82, .78, and 5%. These reductions correspond to effect size correlations of .35 between daily anxiety and chronic discrimination and .22 between daily depression and chronic discrimination.<sup>4</sup>

In addition, we predicted that although our measures of chronic and daily discrimination would be closely linked to health, each would have independent associations with psychological distress.

<sup>2</sup> As described in Nezlek (2001), validity coefficients can be estimated by determining the random variance in a mean day-level measure accounted for by the corresponding person-level measure. For daily racial discrimination, the residual variance of  $\beta_{0j}$  ( $u_{0j}$ ) from the first analysis in which chronic racial discrimination was not included at the person level was .044, and the residual variance from the second analysis in which chronic racial discrimination was included was .031, a reduction of 30%. The validity coefficient for daily racial discrimination (.55), thus, was defined as the square root of this percentage.

<sup>3</sup> Our multilevel modeling analyses of daily distress revealed a downward trend in negative affect, anxiety, and depression that we controlled for in our Level 1 models.

<sup>4</sup> It is important to note that such effect size correlations are adjusted for differences in sample sizes, means, and reliability of measurement across units of analysis (see Bryk & Raudenbush, 1992).

Table 1  
Means, Standard Deviations, and Correlations Among Study Variables

| Variable                         | 1    | 2   | 3    | 4    | 5    | 6    |
|----------------------------------|------|-----|------|------|------|------|
| 1. Chronic racial discrimination | —    | .48 | .28  | .30  | .31  | .25  |
| 2. Daily racial discrimination   |      | —   | .52  | .20  | .25  | .26  |
| 3. Negative events               |      |     | —    | .32  | .31  | .31  |
| 4. Negative affect               |      |     |      | —    | .74  | .74  |
| 5. Anxiety                       |      |     |      |      | —    | .62  |
| 6. Depression                    |      |     |      |      |      | —    |
| <i>M</i>                         | 2.54 | .26 | 1.58 | 1.49 | 1.86 | .96  |
| <i>SD</i>                        | .76  | .44 | 1.37 | .54  | 3.48 | 1.77 |

Note. All correlations are significant;  $p < .01$ , two-tailed. Significance tests for the number of participants were used instead of the number of observations to adjust for within-person dependency.

Table 2 shows that reports of daily discrimination were positively associated with daily distress, even after controlling for the effects of chronic discrimination and background variables. Consistent with Model 1, Step 2 shows that the main effect for daily discrimination was significant, suggesting that on days when individuals encountered at least one racial discrimination event, they reported higher levels of negative affect ( $\beta = .10$ ,  $SE = .04$ ,  $p < .01$ ), anxiety ( $\beta = .55$ ,  $SE = .23$ ,  $p < .05$ ), and depression ( $\beta = .48$ ,  $SE = .14$ ,  $p < .01$ ). Examination of the random parameter estimates indicated that inclusion of daily racial discrimination resulted in a 12% reduction of within-person variance in negative affect. This corresponds to a correlation of .35 (the square root of .12) between daily racial discrimination and negative affect. For anxiety and depression, the within-person variance reductions were 29% and 21%, respectively. These reductions correspond to effect size correlations of .54 between daily anxiety and daily discrimination and .46 between daily depression and daily discrimination. Figure 2 illustrates these findings by comparing the average daily distress ratings provided by participants on days in which

at least one racial discrimination event occurred (discrimination days) and no discrimination occurred (nondiscrimination days). Daily distress ratings were standardized across all days and all participants ( $M = 0$ ,  $SD = 1$ ). As portrayed in Figure 2, there were above-average ratings of negative affect ( $M = .09$ ), anxiety ( $M = .51$ ), and depression ( $M = .39$ ) on discrimination days and below-average ratings of these distress measures ( $M_s = -.03$ ,  $-.16$ , and  $-.13$  for negative affect, anxiety, and depression, respectively) on nondiscrimination days. Taken as a whole, the findings revealed clear support for Hypothesis 1, demonstrating that chronic and daily exposure to discrimination significantly predicted daily distress.

*Hypothesis 2: Daily Racial Discrimination Mediates the Chronic Racial Discrimination–Distress Relationship*

Our second hypothesis stated that daily racial discrimination would mediate the effect of chronic racial discrimination on daily distress. The statistical analysis framework suggested by Kenny,

Table 2  
Multilevel Model Estimates for Negative Affect, Anxiety, and Depression

| Variable                 | Step 1 <i>B</i> ( <i>SE</i> ) | Step 2 <i>B</i> ( <i>SE</i> ) | Step 3 <i>B</i> ( <i>SE</i> ) | Step 4 <i>B</i> ( <i>SE</i> ) |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Daily negative affect    |                               |                               |                               |                               |
| Chronic RD               | .111 (.044)*                  | .099 (.044)*                  | .077 (.050)                   | .085 (.067)                   |
| Daily RD                 | —                             | .096 (.036)**                 | .047 (.034)                   | .051 (.033)                   |
| Negative events          | —                             | —                             | .084 (.013)***                | .085 (.013)***                |
| Daily RD × Chronic RD    | —                             | —                             | —                             | -.029 (.056)                  |
| Neg. Events × Chronic RD | —                             | —                             | —                             | .001 (.018)                   |
| Daily anxiety            |                               |                               |                               |                               |
| Chronic RD               | .977 (.318)**                 | .891 (.320)**                 | .693 (.358)                   | .551 (.531)                   |
| Daily RD                 | —                             | .547 (.234)*                  | .277 (.219)                   | .272 (.209)                   |
| Negative events          | —                             | —                             | .442 (.084)***                | .448 (.086)***                |
| Daily RD × Chronic RD    | —                             | —                             | —                             | -.159 (.414)                  |
| Neg. Events × Chronic RD | —                             | —                             | —                             | .139 (.168)                   |
| Daily depression         |                               |                               |                               |                               |
| Chronic RD               | .286 (.120)*                  | .205 (.121)                   | .142 (.130)                   | .061 (.176)                   |
| Daily RD                 | —                             | .476 (.140)**                 | .235 (.126)                   | .209 (.124)                   |
| Negative events          | —                             | —                             | .301 (.045)***                | .298 (.045)***                |
| Daily RD × Chronic RD    | —                             | —                             | —                             | .139 (.208)                   |
| Neg. Events × Chronic RD | —                             | —                             | —                             | .052 (.067)                   |

Note. Models adjust for day, age, gender, marital status, and level of educational attainment. Chronic racial discrimination is grand mean centered. RD = racial discrimination; neg. = negative.  
\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

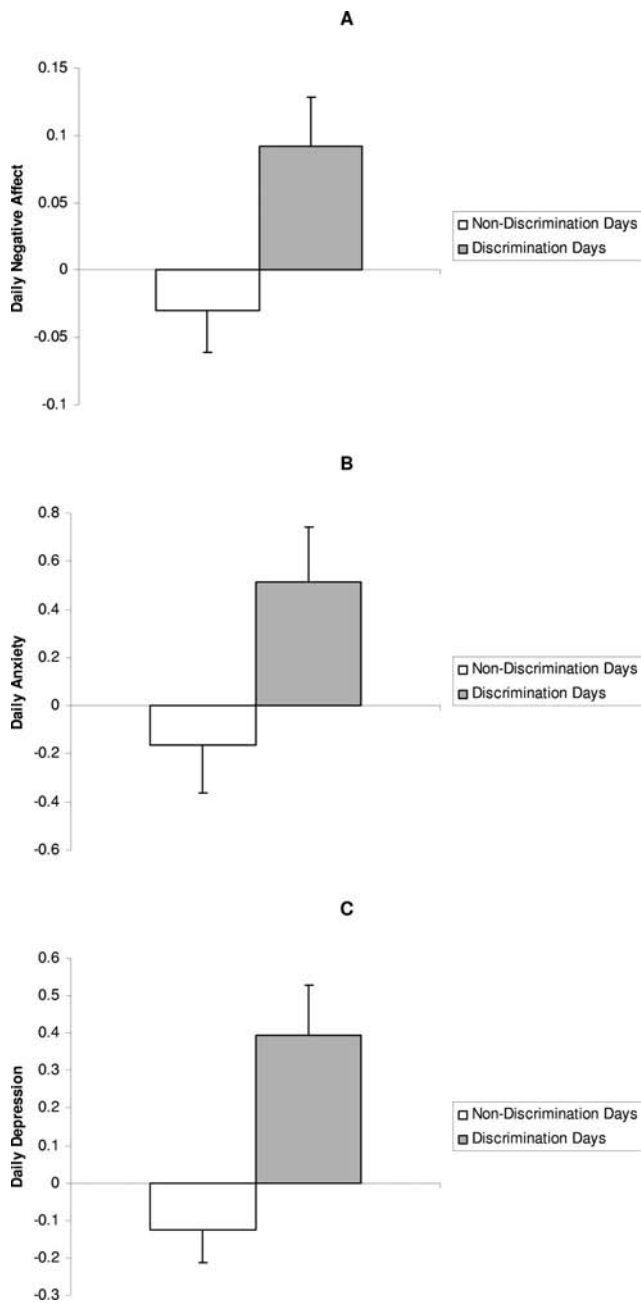


Figure 2. Average distress ratings of (A) negative affect, (B) anxiety, and (C) depression on discrimination and nondiscrimination days.

Kashy, and Bolger (1998) was used to test for mediation effects. This entailed estimating three separate equations. Steps 1 to 3 investigated whether there were independent main effects for both chronic stressors and daily stressors on psychological distress. Comparison of Steps 2 and 3 of the analysis tested for the possible mediating effect of daily racial discrimination. Table 2 shows that daily racial discrimination mediated the relationship between chronic racial discrimination and depressive symptoms. As indicated by the nonsignificant coefficient for chronic discrimination,

daily racial discrimination fully mediated the relationship between chronic racial discrimination and depressive symptoms.

### *Hypothesis 3: Chronic Racial Discrimination Exacerbates the Impact of Daily Racial Discrimination on Distress*

Our third hypothesis examined the interaction of daily and chronic stressor variables on psychological distress. The results did not support our hypothesis. Table 2 shows that the interaction between daily and chronic racial discrimination was not significant, thereby providing little support for the moderation effects predicted by Model 3. Individuals high in chronic racial discrimination did not report greater distress on days characterized by increased racial discrimination. These findings suggest that although chronic and daily racial discrimination are rooted in a common etiology (i.e., race), each has unique and additive effects on psychological distress (Eckenrode, 1984).

### *Hypothesis 4: Daily Negative Events Mediates the Chronic Racial Discrimination–Distress Relationship*

Our fourth hypothesis stated that daily negative events would account for the chronic racial discrimination differences in daily distress. Again, Kenny, Kashy, and Bolger's (1998) statistical analysis framework was used to test for mediation effects. Consistent with Step 1, we found a significant association between the predictor (chronic racial discrimination) and the outcome (distress), which was demonstrated by Hypothesis 1. Consistent with Step 3, we found a significant main effect of negative events on distress. Specifically, on days in which individuals encountered stressors across multiple life domains (e.g., spouse or significant others, family members, friends), they reported higher levels of daily negative affect ( $\beta = .08, SE = .01, p < .001$ ), anxiety ( $\beta = .44, SE = .08, p < .001$ ), and depression ( $\beta = .30, SE = .05, p < .001$ ).<sup>5</sup> Examination of the random parameter estimates indicated that inclusion of daily negative events resulted in a 7% reduction of within-person variance in negative affect. This corresponds to a correlation of .26 between daily negative events and negative affect. For anxiety and depression, the within-person variance reductions were 23% and 18%, respectively. These reductions correspond to effect size correlations of .48 between daily anxiety and daily negative events and .42 between daily depression and daily negative events. Finally, Table 2 shows that daily negative events mediated some of the zero-order relationships between chronic racial discrimination and daily distress. As indicated by the nonsignificant coefficients for chronic discrimination, negative events fully mediated not only the relationship between chronic discrimination and negative affect, but also the association between chronic discrimination and anxiety. Moreover, there was considerable partial mediation. The extent of mediation in each

<sup>5</sup> We note that daily negative events scores were group mean centered, with group defined as the individual participant. In comparison, because our daily racial discrimination scores were calculated by assigning respondents a score of 1 if they experienced racial discrimination on a particular day and a 0 if they did not, we chose not to center daily racial discrimination. Our decision was guided by the fact that "0" has a clear empirical interpretation here. That is, when the daily racial discrimination variable is uncentered, the intercept appropriately reflects the expected score of distress on days in which no racial discrimination is reported.



case was estimated using the Sobel test (Sobel, 1982). Table 3 shows Sobel Z values and significance levels (Sobel, 1982) for each indirect effect. These statistics illustrate that for each mediator, the indirect effects of chronic discrimination on each of the daily outcomes was significant. Taken together, the results provide strong support for Models 2 and 4, suggesting that there are two distinct mediation paths (daily racial discrimination and negative events) that serve to link chronic racial discrimination to daily distress.

*Hypothesis 5: Chronic Racial Discrimination Will Exacerbate Reactivity to Daily Negative Events*

Our final hypothesis examined the potential exacerbating role that chronic racial discrimination plays between daily racial discrimination and psychological distress. Table 2 shows that none of the interactions between daily and chronic stressor variables in Step 4 were significant, thus providing little support for the moderation effects predicted by Model 5. Higher levels of chronic discrimination did not exacerbate the impact of daily negative events on psychological distress.

Discussion

The starting point for our analysis was the underlying assumption that persistent disparities in mental health are anchored in life hardships that are repeatedly experienced across the life course, such as enduring discriminatory experiences on the basis of race. Empirical research leaves no doubt about the damaging effects on well-being of racial discrimination, particularly for African Americans (Klonoff et al., 1999; Sellers et al., 2003; Utsey et al., 2000). What remains to be explicated are the proximal mechanisms that explain how chronic exposure to racial discrimination places African Americans at risk for mental health problems. In seeking to address this issue, our analysis was guided by the stress process framework (Bolger & Zuckerman, 1995; Pearlin, 1989). Our results support several key predictions that derive from the framework.

First, our findings join with past research in demonstrating that racial discrimination can have inimical effects on health and well-being and that these effects are reliably evident across a variety of psychological outcomes (Williams et al., 2003; Williams & Williams Morris, 2000). Second, our results add to accumulating evidence suggesting that stress proliferation—the tendency of stressors to multiply and create other stressors—is a critical, but vastly overlooked, feature of the stress process (Pearlin et al.,

1997, 2005). In the current study, stress proliferation was shown to operate in two forms, both linked to the distinction between primary and secondary stressors. The first was the expansion of primary stressors, reflected in the effects of chronic racial discrimination on greater levels of exposure to daily racial discrimination. The second form of proliferation concerned the generation of secondary stressors, as evidenced by the greater number of daily negative events reported by individuals high in chronic racial discrimination. Finally, our analysis of proliferated stressors, as depicted in Models 2 and 4, importantly uncovered two distinct mediation pathways (daily racial discrimination and negative events) that serve to link chronic racial discrimination to daily psychological distress (Williams & Williams Morris, 2000). That these relationships held, even after controlling for background variables thought to influence these daily processes, is noteworthy.

The present findings have a range of implications. First, although chronic exposure to racial discrimination can have serious consequences for mental health, not everyone exposed is equally affected. A number investigators have examined factors that may moderate the impact of racial discrimination on well-being (Bynum, Thomaseo, & Best, 2007; Pieterse & Carter, 2007; Sellers & Shelton, 2003). Our results, however, suggest that part of the variability may also be explained by the fact that African Americans who are exposed to the same chronic stressor (i.e., racial discrimination) may be exposed to very different configurations of primary (i.e., daily racial discrimination) and secondary (i.e., negative events) stressors. Recently, Sue et al. (2007) called attention to racial microaggressions as everyday racist acts that may potentially have a detrimental impact on minority mental health. Findings from the current study add to this small, but growing body of empirical work (Solorzano et al., 2000; Swim et al., 2003) demonstrating the adverse mental health consequences of daily racial discrimination for African Americans.

Second, our findings indicate that the same chronic life conditions that contribute to the creation of primary stressors (daily racial discrimination) may also contribute to a cascade of secondary stressors (negative events). Although our study did not probe the effects of specific daily negative events, our results indicate that chronic exposure to racial discrimination may lead to an accumulation or bundling of daily negative events across multiple life domains (e.g., family, friends, finances, health). These findings link up with prior research that documents stress spillover effects in domains such as caregiving (Pearlin et al., 1997), involuntary job loss (Pearlin et al., 1981), divorce (Wertlieb, 1991), and family conflict (Bolger, DeLongis, Kessler, & Wethington, 1989). In addition, our analysis of proliferated stressors echoes recent renewed attention to differential stress exposure as an important determinant of mental health status (George & Lynch, 2003; H. A. Turner & Turner, 2005; R. Turner & Avison, 2003). These ideas are broadened in the current study to encompass daily stressors that are a distinct part of the daily experiences of African Americans and that may be rooted in enduring discriminatory experiences on the basis of race.

Third, the pattern of our mediation results was somewhat different across the three measures of psychological distress: anxiety, negative affect, and depression. First, despite the strength of the relationships between chronic discrimination and racial discrimination and between chronic discrimination and negative events, neither daily discrimination nor negative events mediated any of

Table 3  
*Sobel Statistics for Negative Affect, Anxiety, and Depression*

| Outcome variable      | Mediator                    |      |                       |      |
|-----------------------|-----------------------------|------|-----------------------|------|
|                       | Daily racial discrimination |      | Daily negative events |      |
|                       | Sobel Z                     | p    | Sobel Z               | p    |
| Daily negative affect | 2.50                        | .012 | 3.12                  | .002 |
| Daily anxiety         | 2.23                        | .026 | 2.95                  | .003 |
| Daily depression      | 3.08                        | .002 | 3.15                  | .002 |

the relationships between chronic discrimination and anxiety. It should be noted that in both cases, although coefficients between chronic discrimination and anxiety decreased meaningfully (suggesting partial mediation), they remained significant, so these cases do not meet the formal criteria for full mediation. Results for negative affect were somewhat different than were those for anxiety. Specifically, the zero-order relationships between chronic discrimination and negative affect were much weaker than they were between chronic discrimination and anxiety. Moreover, it appears that negative events mediated whatever relationships existed between chronic discrimination and negative affect. After negative events was entered in the model predicting negative affect, the coefficient between chronic discrimination and negative affect became nonsignificant. Results for depression indicated that both daily discrimination and negative events mediated the association between chronic discrimination and depression. Collectively, the present results provide additional empirical footing for the distinction between chronic and day-to-day forms of racial discrimination and their unique effects on psychological distress (Kessler et al., 1999; Williams, Spencer, & Jackson, 1999). Although there was some shared variance between the two types of constructs, there was ample independent covariation to justify the inclusion of both types of measures in the current study (cf. Eckenrode, 1984; Wheaton, 1996). Moreover, our results suggest that discernment of stressors can be further enhanced by distinguishing primary and secondary stressors (Pearlin, 1999), as each was shown to uniquely govern the effects of chronic racial discrimination on psychological distress.

Finally, chronic racial discrimination did not exacerbate the impact of either daily racial discrimination or negative events on distress. This finding runs counter to previous studies that have found support for chronic stressors as moderators of the association between daily events and mental health (Caspi et al., 1987; Serido et al., 2004). One possible explanation for the disparate results is differences in the conceptualization and measurement of chronic and daily stress. For example, Serido et al. (2004) used a stimulus-based definition of chronic stress (e.g., being part of a work environment that lacks trust and mutual respect) and daily hassles (e.g., having an isolated conflict with a supervisor). They found that chronic home stressors interacted with the daily hassles (both in the home and work domains) to predict increased psychological distress. In contrast, we relied exclusively on a temporal-based definition to differentiate between chronic and daily race-related stressors. Thus, it may be that moderating effects are limited to psychological responses that were not tapped by our measures of racial discrimination. Another possibility is that for some individuals, repeated exposure to chronic stressors may lead to a pattern of emotional habituation. Caspi, Bolger, and Eckenrode (1987) have argued that individual differences in stress habituation may result from the effective mobilization of coping resources (e.g., supportive relationships). Bolger, DeLongis, Kessler, and Schilling (1989) have suggested the possibility that chronic and daily stressors may combine to influence mood, such that under conditions of chronic stress, the sensitivity threshold for daily stressors to produce detectable changes in mood increases exponentially. Wheaton (1990) has emphasized more generally the importance of considering the personal meaning that prior chronic stressors may have in peoples' appraisals of subsequent stressors. Because relatively few studies have empirically assessed the rela-

tionship between chronic and daily forms of racial discrimination among African Americans (Jackson et al., 1996; Williams et al., 2003), there is virtually no empirical basis for reconciling these various interpretations.

There are limitations in the present study that should be addressed in future research. First, the study made use of unidimensional measures of chronic and daily racial discrimination. In a review of the literature, Williams and Williams-Morris (2000) called for more systematic research characterizing the multiple dimensions of racism (e.g., residential segregation and institutional discrimination). Similarly, Sue et al. (2007) recently described a taxonomy of racial microaggressions that included microassaults, microinsults, and microinvalidations. Future studies should, therefore, employ more detailed, multidimensional assessments of chronic and daily racial discrimination in an effort to probe their potential unique underlying processes.

Second, the current study focused on the pathways through which chronic racial discrimination can influence the stress process. The findings clearly indicate that daily discrimination and negative life events are prime mechanisms behind the expansion of chronic discrimination. Nevertheless, we underscore that it will be important for future research to examine in greater detail the role of moderating resources. Recent studies have suggested that having a strong racial identity may buffer the effects of discrimination (Sellers et al., 2003; Sellers & Shelton, 2003). Much of this research, however, focuses on the direct effect of moderators on outcomes. Our findings suggest that moderators may also have indirect effects by shaping the expansion of proliferated stressors (Pearlin et al., 1997). Of particular interest for future research is the potential of moderating resources (e.g., racial identity) to limit the emergence and diffusion of primary (i.e., daily racial discrimination) and secondary (i.e., negative life events) stressors, thereby disrupting the proliferation process.

Third, characteristics of our sample raise some caveats in interpreting results. The sample was restricted to African American doctoral students and recent graduates. Thus, we have suggested that the present sample faces conditions similar to those faced by other African American college students. This assertion has yet to be tested, as does the assumption that the results would be similar in other settings with similar conditions. Finally, a number of variables known to have an influence on how individuals experience daily stress were not examined in the present research. In particular, we did not assess stressor appraisal (cf. Cohen, Kamarck, & Mermelstein, 1983; Monroe & Kelley, 1995) as a possible source of between-person differences affecting daily psychological distress. Available data suggest that individual differences in appraisal processes (e.g., perceived threat and lack of control) are associated with more intense and prolonged mood responses to daily stressors (van Eck, Berkhof, Nicolson, & Sulon, 1996; van Eck, Nicolson, & Berkhof, 1998). Appraisal processes have, however, received surprisingly little attention in studies of racial discrimination among African Americans. An exception is a recent study by Pieterse and Carter (2007) that found racial discrimination had incremental effects on both distress and well-being, above and beyond the effects of global perceived stress. Additional studies are needed to determine whether appraisal processes and race-related stressors operate in independent fashion across different daily life settings.

Against these noted limitations, we juxtapose the strengths of the current study. It is one of the first studies to systematically examine the major pathways from chronic racial discrimination through daily racial discrimination and negative events to daily mental health among a sample of African Americans. Second, our use of the stress process model as a theoretical framework uncovered important underlying mechanisms by which chronic racial discrimination can lead to changes in mental health. Finally, our multilevel assessment of between- and within-person factors revealed complex connections between chronic strains and daily stressors that provide directions for future theory development and intervention research.

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