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Effects of Perceived Racial Discrimination on Health Status and Health Behavior: A Differential Mediation Hypothesis

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Abstract

Objective—Prospective data tested a “differential mediation” hypothesis: The relations (found in previous research) between perceived racial discrimination and physical health status versus health-impairing behavior (problematic substance use) are mediated by two different types of affective reactions, internalizing and externalizing.

Methods—The sample included 680 African American women from the Family and Community Health Study (M age = 37 at Time 1; 45 at Time 4). Four waves of data were analyzed. Perceived discrimination was assessed, along with anxiety and depression (internalizing) and hostility / anger (externalizing) as mediators, and physical health status and problematic substance use (drinking) as outcomes.

Results—Structural equation modeling indicated that discrimination predicted increases in both externalizing and internalizing reactions. These affective responses, in turn, predicted subsequent problematic substance use and physical health status, respectively, also controlling for earlier reports. In each case, the indirect effects from discrimination through the affective mediator to the specific health outcome were significant and consistent with the differential mediation hypothesis.

Conclusion—Perceived racial discrimination is associated with increases in internalizing and externalizing reactions among Black women, but these reactions are related to different health outcomes. Changes in internalizing are associated with self-reported changes in physical health status, whereas changes in externalizing are associated with changes in substance use problems. Discussion focuses on the processes whereby discrimination affects health behavior and physical health status.

Keywords

Discrimination; Physical Health; Substance Use

Significant differences in health status between African Americans (Blacks) and European Americans (Whites) exist in the U.S., even when controlling for a variety of economic, environmental, and physiological factors (Dressler, Oths, & Gravlee, 2005). These differences have led a number of researchers to recommend that future studies pay more attention to psychosocial factors as contributors to health disparities in the U.S. and in other

countries; primary among these factors is perceived racial discrimination (Mays, Cochran, & Barnes, 2007; Williams & Mohammed, 2009). There have been three reviews of this expanding literature in the past 10 years (Paradies, 2006; Pascoe & Richman, 2009; Williams, Neighbors, & Jackson, 2003), and all of them have reached similar conclusions: Discrimination is associated with worse mental and physical health. These reviews provide the background for the current study, which examines the relations between discrimination and physical health status versus health-impairing behavior (i.e., problematic drinking).

Discrimination and Physical Health

The relation between discrimination and mental health is straightforward: Discrimination leads to an increase in negative affect, which can produce a decline in mental health. Self-reports of discrimination have been associated with elevated anxiety and depression (referred to here, collectively, as distress) (Bynum et al., 2007), as well as anger and hostility (Simons et al., 2006; Whitbeck, Hoyt, McMorris, Chen, & Stuben, 2001). Pascoe and Richman's meta-analysis identified 105 studies that included measures of discrimination and mental health status. They produced a weighted average correlation of $-.20$ between discrimination and mental health outcomes. Almost all of these studies were cross-sectional; however, Schulz et al. (2006) found that increases in self-reported discrimination predicted increases in depression and decreases in perceived overall general health. Pascoe and Richman also identified 36 studies reporting a relation (almost all synchronous) between discrimination and indicators of physical health (e.g., self-reports of overall health status). The average correlation in these studies was $-.13$.

Although the correlations between discrimination and mental vs. physical health were not significantly different, Pascoe and Richman suggest that the relation with mental health may be somewhat stronger. Others have reached the same conclusion, pointing out that the effect of discrimination on physical health may be robust, but it takes longer for discrimination to produce physical health problems than either distress or hostility (Paradies, 2006). The primary reason is that the former relation is mediated by the latter (discrimination $\rightarrow$ distress $\rightarrow$ morbidity), and, therefore, may not appear in cross-sectional analyses (Gee & Walsemann, 2009). In fact, both the first and second paths of the discrimination $\rightarrow$ distress $\rightarrow$ health problems linkage have been shown repeatedly, but almost always in separate studies.

Discrimination and Substance Use

Discrimination also affects health status through its effects on health-impairing behaviors. Pascoe and Richman identified 13 studies that linked discrimination with unhealthy behaviors, such as substance use, and found an average correlation of $.18$. Several of these studies included prospective data. Gibbons et al. (2004) found that discrimination assessed at age 10/11 predicted substance use five years later in a panel of Black adolescents in the Family and Community Health Study (FACHS). A similar relation between discrimination and problematic substance use was also found among the parents of these Black children. In fact, discrimination was the strongest predictor of problematic use of all of the factors that were assessed with the parents, including multiple types of stressors (social, financial, familial) and contextual factors (e.g., substance availability, neighborhood crime). In addition, analyses with both the parents and the adolescents found that the relation between discrimination and use was mediated by change in distress; in other words, discrimination at T1 predicted an increase in anxiety and depression from T1 to T2 (two years later), and this increase in distress was associated with an increase in self-reported use.

Mediation of the Relations between Discrimination and Substance Use

Anger vs. distress

A subsequent series of studies with the FACHS sample, using both survey and experimental methods (Gibbons et al., 2010), suggested that the discrimination → use relation may be more complex than originally thought. When anger (with the adolescents) and hostility (with the parents) were added to the models as mediators, discrimination predicted changes in both distress and anger, as expected. However, the path from distress to use was no longer significant; in essence, it was replaced by the path from hostility to use. More specifically, for the parents, discrimination at T1 was associated with an increase in hostility at T2, and this change predicted an increase in problematic use three years later. The same pattern appeared with the adolescents: T1 discrimination was associated with elevated anger and distress, but only anger predicted use five years later; there was no (apparent) effect of distress.

Experimental evidence

In a follow-up lab study (Gibbons et al., 2010, Study 2), a subsample of the FACHS adolescents (M age = 19 years) was asked to envision one of the following: a discriminatory experience, a stressful nondiscriminatory experience, or a neutral experience, and then their mood states and willingness to use drugs were assessed. Relative to the two nondiscriminatory scenarios, discrimination was associated with an elevation in both anger and depression, as well as drug willingness. However, anger, but not depression, was associated with drug willingness; consequently, only anger mediated the impact of discrimination on willingness. Similar results were reported by Stock, Gibbons, Peterson, and Gerrard (in press) who used the “Cyberball” paradigm as a way to manipulate perceived discrimination. In this case, Black young adults (M age = 21.5) who thought they had been excluded by Whites in the Cyberball game reported more perceived discrimination (cf. Goodwin, Williams, & Carter-Sowell, 2010) and more willingness to use substances, and the relation between the two of them was mediated by anger (and not depression).

Differential Mediation: Internalizing vs. Externalizing Reactions

There is precedent in the literature for the differential mediation hypothesis, i.e., anger / hostility is more strongly related to substance use, whereas distress is more strongly related to health problems, but the evidence is mostly indirect. First, distress is often associated with avoidance of risky behaviors (Maner & Schmidt, 2006; Mitte, 2007). In contrast, anger / externalizing behavior has generally been associated with risk-taking (Rydell et al., 2008), including substance use (Aklin, Moolchan, Luckenbaugh, & Ernst, 2009). Whitbeck et al. (2001) measured discrimination and affect among American Indian adolescents, and found that discrimination was associated with both internalizing and externalizing symptoms, but only the latter were related to substance use. Bardone et al. (1998) found that conduct disorder (externalizing) predicted health-risk behavior, including risky sex and alcohol and drug use, but not health problems. In contrast, anxiety predicted medical problems, but not substance use (Laukkanen et al., 2002, found similar results).

Overview

Most reviews of the discrimination / health literature have included a call for additional prospective studies of the relations among discrimination, negative affect, and health outcomes in order to determine why discrimination has pronounced effects on both physical and mental health. Literature reviews have also recommended examination of additional affective reactions as mediators of the relation between stress and physical health problems (Lerner et al., 2007; Miller, Chen, & Parker, 2011). The current research examined these

relations in a panel of Black women across four waves of data, spanning eight years. Analyses examined cumulative discrimination as a predictor of both health status and health-impairing behavior (problematic alcohol use), controlling for other types of stress (e.g., negative life events, financial hardship). The following differential mediation hypothesis was made: Perceived discrimination is associated with increases in both physical health problems and problematic substance use; however, the former relation is mediated by change in internalizing reactions (depression and anxiety), whereas the latter relation is mediated by change in externalizing reactions (hostility).

METHODS

Sample

FACHS is an ongoing study of psychosocial factors related to the mental and physical health of Black families. There were 889 families in the first wave (T1), half from Iowa and half from Georgia. Each family had an adolescent who was in 5th grade at T1 (M age = 10.5) and self-identified as African American or Black, and a primary caregiver (“parent”). Most of the parents (84%) were the biological mothers of the adolescents. Because there were so few male primary caregivers, the current study focused only on the women; 680 of whom answered enough items across the four waves to be included in the analyses. Retention across the four waves was > 80%. The women had a mean age of 37 years (SD = 8.2) at T1; 45 at T4. Their mean level of education was high school graduate. Approximately 65% of them were single mothers.

Recruitment and Procedure

Recruitment—Families were recruited from rural communities, suburbs, and small metropolitan areas, with mostly lower and middle class families, in Iowa and Georgia. Of those families contacted, 72% provided data (the vast majority of those who declined cited the amount of time the interviews took—see below). Median family income at T1 was \$20,803/year (\$31,370 in 2012 dollars); 33% of the families were below the poverty line. For further description of the FACHS sample and recruitment, see Cutrona et al. (2005); Simons et al. (2002).

Procedure—All interviewers were African Americans who had received extensive training. Interviews lasted about 3 hours and required two visits. They included a computer-assisted personal interview (CAPI) as well as a structured psychiatric diagnostic assessment (the U. of Michigan Composite International Diagnostic Interview [UM-CIDI]; Kessler, 1991). Participants received \$100 at T1 to T3 and \$125 at T4. Average time between waves was: T1–T2 = 22 months; T2–T3 and T3–T4 = 36 months. Informed Consent was obtained from all participants. The research was approved by the IRBs at each institution.

Measures

Time of assessment—Mediator variables (distress and hostility) were assessed at T1 and again at T3. Discrimination (lifetime) was measured at T2. The two health outcomes (health status and drinking) were assessed at T1 and then slightly different versions were assessed at T4. Covariates (see below) were all assessed at T1. Wave of measurement for each construct is noted below in parentheses.

Perceived racial discrimination (T2)—Participants completed a 13-item, modified version of the Schedule of Racist Events (Landrine & Klonoff, 1996). This measure, one of the most commonly used in the discrimination literature, describes various discriminatory events and asks how often respondents have experienced each type of event; e.g., “How

often has someone said something insulting to you just because you are African American?" (1 = never to 4 = several times; α s = .86 and .90). Lifetime measures like these appear to be more effective than daily measures at predicting health problems (Paradies, 2006; Williams et al., 2003). The 13 items were randomly parceled into three indicators of the latent construct.

Distress (T1, T3)—These items began: "During the past week, how much have you felt. "hopeless / depressed / discouraged / like a failure / worthless" for depression and "tense / uneasy / keyed up" for anxiety (Cutrona et al., 2005). Each item included a 3-point scale: 1 = not at all to 3 = extremely (all four α s for both waves > .79). The distress latent construct had these two indicators (depression and anxiety).

Hostility (T1, T3)—We used a definition of hostility, which is common in the health literature, that includes two components (cf. Kamarck, Manuck, & Jennings, 1990): behavior (aggression against others) and affect (anger). The UM-CIDI assessed seven types of anti-social behaviors (lifetime), four of which pertained to physical violence and harming others (e.g., "Have you threatened someone?" "Have you been in physical fights?"). There were several questions for each type of behavior. If the participant endorsed one or more items for a behavior, she was considered to have engaged in that category. The total number of categories was summed, resulting in a score of 0 to 4. Anger was assessed with a single item: "You don't get upset too easily" from 1 = strongly agree, to 4 = strongly disagree. Thus, once again, there were two indicators; in this case, one for aggression and one for anger.

Problematic alcohol use (T1, T4)—Our focus was on problematic (as opposed to "social") drinking. At T1 and T4, we used a question about amount of alcohol typically consumed at each sitting during the last year (light / heavy, coded as 0 = 0 – 2 drinks vs. 1 = 3 or more). We also used four questions from the UM-CIDI about experiencing problems (lifetime) due to alcohol use (yes/no): fighting, problems at work, being arrested (e.g., DUI), and being harmed while under the influence (α = .64). In addition, at T4, the interview included eight items regarding bad experiences in the past year due to alcohol use (e.g., family problems, trouble getting work done). Thus, for the problematic drinking latent construct, there were two indicators at T1 and three indicators at T4.

Health status (T1, T4) was assessed with two single items at T1 and T4, and a physical functioning scale assessed only at T4. The single-item measures were: a) 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); and b) "Have you had a serious illness or injury in the past year?" (no/yes). The scale comprised five items assessing the extent to which health status and/or pain interfered with physical functioning (e.g., limited climbing stairs, interfered with work) within the last 4 weeks; from 0 = No, not limited at all, to 2 = Yes, limited a lot (Ware, Kosinski, & Keller, 1996; α = .88).

Covariates (T1)—Five variables were included as covariates because they have been linked with physical health status and substance use in previous studies: age, SES (income and education), negative life events (22-item checklist; e.g., serious injury, relationship break-up), financial stress (6 items; e.g., ability to pay bills, buy clothing), neighborhood risk (6 items; e.g., drinking in public, gang violence). Covariates and exogenous (T1) constructs were allowed to correlate, and the relations between all of the covariates and the endogenous constructs were estimated.

RESULTS

Descriptives

Overall—More than 90% of the sample reported experiencing some discrimination; approximately 25% reported high amounts at each wave. Reports of alcohol problems were somewhat above the norm for women this age (Mulia et al., 2009), more so at T4 than at T1 (e.g., 12% reported at least one lifetime alcohol problem at T1; at T4, it was 19%). The most common physical functioning problems were pain interfering with activities (30%) and limitation of activities due to health problems (22%).

Change over time—To examine change, repeated measures ANOVAs were conducted on the four outcome constructs that were assessed at T1 and then again at T4. Overall health status declined, whereas problematic drinking increased (both p s < .0001). The other two items, amount of alcohol typically consumed and serious injury / illness in the past year, did not change significantly (p > .20).

Overall Effect of T2 Discrimination

Evidence of the effects of discrimination can be seen in the odds ratios involving T2 Discrimination and the T4 outcome measures. For (just) these analyses, the outcome measures were dichotomized (discrimination was continuous); e.g., alcohol problems and functional disability present (yes / no), overall health status (fair and poor vs. good, very good, and excellent). Controlling for the five covariates, the odds ratios were: Lifetime problematic alcohol use, OR = 1.88 (p < .001; Confidence Intervals = 1.36, 2.60); Overall health status, OR = 1.55 (p = .008; CI = 1.12, 2.13); Functional disability, OR = 1.50 (p = .006; CI = 1.22, 2.23).

Structural Equation Model (SEM)

The primary analysis involved SEM—In the model, paths were specified from T2 discrimination through the T3 mediators (distress and hostility), controlling for the T1 measures of each, to the T4 outcome measures of health status and problematic use, also controlling for their T1 measures.

Measurement model—A confirmatory factor analysis (CFA) was first conducted to test the fit of the measurement model. All constructs, except for covariates, were specified as latent variables, with the indicators mentioned above. The CFA provided a good fit to the data: χ^2 (214, N = 680) = 506.61; Comparative Fit Index (CFI) = .94; Tucker-Lewis Index (TLI) = .92; Root Mean Square Error of Approximation (RMSEA) = .045. Several zero-order correlations for the covariates and exogenous variables are worth noting. Four covariates (all but neighborhood risk) were correlated with health problems at T4: r s ranged from .15 for negative life events, to .25 for financial stress (all p s < .001). All five covariates were correlated with T4 problematic alcohol use (all p s < .05). Correlations among the latent constructs (taken from the measurement model) can be seen in Table 1. Consistent with previous research, (T2) Discrimination was related to both distress and hostility at T3 (p s < .001). More important, and consistent with expectations, T3 Hostility correlated more highly with drinking problems than with health problems (r = .32 vs. .04; difference for correlations: χ^2 [1] = 16.62, p < .001); whereas the reverse was true for T3 distress: r s = .34 with health problems vs .19 with drinking problems; χ^2 [1] = 9.58, p = .002.

Predicting change in distress and hostility—The structural model also fit the data well: χ^2 (229, N = 680) = 507.61, X^2 : df ratio = 2.22; CFI = .95, TLI = .92; RMSEA = .042 (see Fig. 1). Lagrange multipliers were used to detect any unspecified paths that could

improve the fit of the model (criterion: $\chi^2 [1] > 3.84$); there were none. Stability paths (from T1 to T3) for both Distress and Hostility were strong ($ps < .001$). In spite of the high stabilities, T2 Discrimination did have positive relations with change in (Δ) both Distress and Hostility at T3: $\beta_s = .20$ and $.27$, respectively (both $ps < .003$).

Predicting change in health problems and substance use—Together, the variables in the model explained 40% of the variance in T4 Health Problems and 59% of the variance in T4 Problematic Alcohol Use. These figures include the stabilities of the two outcomes, which were also very high over the eight year period ($ps < .001$). Nonetheless, Discrimination predicted change in both constructs, indirectly. First, for health status: T1–T3 (Δ) Distress predicted Δ Health Problems ($p < .001$); and, as expected, Discrimination had a positive indirect relation with Δ Health Problems through Δ Distress: $\beta = .04$ ($p < .004$). Regarding substance use: T1 to T3 (Δ) Hostility had a direct positive relation with T4 problematic alcohol use, controlling for T1 Use: $\beta = .20$ ($p = .01$). The anticipated indirect effect, in this case from T2 Discrimination through Δ Hostility to T4 Use, was also significant: $\beta = .03$ ($p < .04$).

Summary—Changes in distress were significantly associated with changes in physical health status, but not changes in problematic alcohol use; the opposite was true for changes in hostility.¹ Discrimination was associated with: a) increases in distress and hostility; b) a decline in physical health status, and that relation was indirect, through the increase in distress; and c) an increase in problematic alcohol use, and that relation was also indirect, through the relation between discrimination and hostility.

DISCUSSION

Discrimination and Negative Affect

Prospective relations—As in previous studies (Gibbons et al., 2004; 2010), discriminatory experiences were associated with more distress and more hostility; this was the case at T2 / T3, and all other waves as well (although these latter relations were not reported here). These prospective relations maintained controlling for a number of covariates or confounders, each of which was also related to distress and/or hostility. Together with experimental evidence showing the same basic pattern in controlled laboratory settings (Gibbons et al., 2010; Stock et al., 2011; in press), this suggests, as many have claimed or assumed in the past, that discriminatory experiences are responsible for increases in negative affect among Blacks. How that change in negative affect translates into health problems and health (risk) behaviors is a more interesting and more novel question also addressed by these data.

Distress vs. hostility—The relation with discrimination was significant for both types of negative affect. In previous studies with younger FACHS participants, that relation was much stronger with hostility than with either anxiety or depression². That was less the case with these Black women: Discrimination did correlate more highly with hostility than with distress, however, the relation with distress was fairly strong. This suggests that years of experience with discrimination may result in higher levels of depression (in addition to

¹The lack of significant modification indices in the SEM indicates that the distress $\rightarrow$ problematic use and the hostility $\rightarrow$ health problems paths would not be significant if specified. In fact, when the hypothesized distress $\rightarrow$ health problems path and the alternative distress $\rightarrow$ problematic use path were both estimated, the former was significant ($\beta = .30$, $p < .02$), whereas the latter was not ($\beta = -.18$, $p > .33$).

²In previous experimental studies with young Black adults, self-reports of anger were higher than depression after envisioning a discriminatory experience (Gibbons et al., 2010, Study 2) and after being excluded by a (bogus) group of White “players” in the Cyberball computer game (Stock et al., in press).

anger and hostility) in Black adults. Given its potential importance from both an etiological and intervention perspective, identifying factors that predict type of affective reaction to discrimination among Blacks and other minorities (e.g., ruminatory style; Nolen-Hoeksema et al., 2008) is worthy of future empirical attention. In this respect, these data support the contention of Lerner et al. (2007) that the relation between negative affect and health is both manifold and complex, and so is best understood by examining different kinds of emotional reactions separately.

Discrimination and Health Behavior vs. Health Status

Externalizing and substance use—The relations between distress vs. anger and change in problematic use adds to previous research (Gibbons et al., 2010a; Whitbeck et al., 2001) showing that it is externalizing more than internalizing reactions to discrimination that link these aversive experiences with substance use problems. The increase in hostility fully mediated the association between cumulative discrimination and change in problematic alcohol use. This suggests that the change in problematic use was a reaction to the anger produced by the discriminatory experiences. In fact, many of the women who acknowledged substance problems also reported high amounts of both discrimination and hostility at T2. Moreover, previous research with the children of these FACHS women (Gerrard et al., 2012) provided evidence that their substance use is reflective of a coping process: The discrimination → use relation was stronger (controlling for amount of previous use) for adolescents who endorsed the utility of substance use as a coping mechanism. Thus, substance use may reflect an effort by these women to mute the anger that comes from chronic exposure to discrimination.

Physical health—Previous analyses (Brown et al., 2000; Gibbons et al., 2004) have suggested that the nature of the discrimination / distress relation is as it was specified in the SEM: Perceived discrimination → distress, more than the inverse. What the current results add to that research is the prospective health component: reports of lifetime discrimination at T2 predicted change in distress, which then predicted change in health status three years later, controlling for negative life events, financial stress, and neighborhood risk, as well as age and SES-- all of which predicted health problems by themselves. This prospective relation provides further evidence of the important effect that discrimination can have on the physical as well as the mental health of Black women.

Future Directions

Immunocompetence and cortisol—Several relations in these data appear to be worthy of further empirical attention. Because the discrimination measure assessed lifetime experiences, the fact that it predicted change in health status is consistent with the belief that it is the cumulative effect of discriminatory experiences that has the greatest impact on health (Williams et al., 2003). Presumably, this impact involves the immune system—exposure to discrimination over time, and the reactions it produces, can lead to reduced immunocompetence (Clark, Anderson, Clark, & Williams, 1999; Djuric et al., 2008). This relation will be monitored in future waves of FACHS. Levels of cortisol secretion may also play a role in these relations. Internalizing after stressful events is associated with higher levels of cortisol (Adam, Hawkley, Kudielka, & Cacioppo, 2006; Lerner, Dahl, Hariri, & Taylor, 2007); and this tendency is exacerbated by rumination about the events (Denson, Spanovic, & Miller, 2009). Elevated cortisol levels over an extended period of time increase the risk for a variety of health problems, including weight gain, diabetes, and cardiovascular disease (Lundberg, 2005). Finally, previous studies have also found associations between discrimination and diseases, such as coronary heart disease (Lepore et al., 2006). That relation was not consistent in this data set (e.g., discrimination and high blood pressure were correlated at some waves, but not all of them); however, the prevalence of CHD was low,

most likely due to the age and gender of the sample. These relations among discrimination, rumination, and cortisol secretion are important and should be explored in future studies, both lab (experimental) and survey.

Substance use and physical health—Although their drinking was causing problems for some of these women, there is no clear evidence that this problematic use was having an effect on their physical health. In fact, the two were negatively correlated at T4, albeit weakly (zero-order correlations were positive, but also weak). Most likely, this will change over time for some of them—prolonged heavy use often leads to health problems (Han, Gfroerer, & Colliver, 2010)—but at this age ($M = 45$ at T4), it does not appear that the substance use was associated with any health problems, even for the women who experienced a lot of discrimination (cf. Jackson et al., 2010). One reason for this may be that alcohol and drugs mute negative affect (Hussong, Hicks, Levy, & Curran, 2001), and they can also inhibit self-focused rumination (Sarin & Nolen-Hoeksema, 2010), both of which can lead to health problems (Watkins, 2008). The long-term relations among substance use and physical health will also be tracked in future waves of FACHS.

Limitations

Several limitations of the study need to be acknowledged. First, the sample included only Black women, mostly middle-aged, living in Iowa or Georgia. Black men or other minorities may respond differently than Black women to discrimination. In fact, there is some evidence that men are more likely than women to respond to anger and hostility with substance use, which suggests the discrimination / use relation may be stronger for Black men (Cloninger, Sigvardsson, & Bohman, 1996). Second, all of the data came from self-reports. Self-reports of substance use have been shown to be valid and reliable (e.g., Calhoun et al., 2000), and self-reported morbidity has been shown to be a better predictor of mortality than is physician diagnosis, especially among African Americans (Ferraro & Farmer, 1996). Nevertheless, future studies should include both genders, as well as efforts to validate participants' responses to the kinds of (sensitive) measures used in this research. Third, the relation between distress and health status may be due partly to response style: those who report more negative affect are more likely to see their current health status in a negative light (Denollet & De Vries, 2006). The fact that both previous distress and health status (which were highly correlated at T1) were controlled mitigates this concern; still it must be considered. Fourth, the T3 Hostility and T4 Problematic Drinking constructs each contained a lifetime measure. Because the control for each was assessed at T1, there is the possibility that some of the change detected in the T3 hostility construct actually occurred before (T2) discrimination was assessed, and/or that some of the change in T4 problematic drinking occurred before T3 hostility was assessed. Thus, although the discrimination $\rightarrow$ anger $\rightarrow$ use relation has been shown in several previous studies (see Gibbons et al., 2010a, for a review), there is some uncertainty with regard to the temporal ordering of those constructs in these analyses. Finally, because the T1 and T4 outcome measures (health status and problematic use) were not identical, we cannot draw any conclusions about absolute changes in health status, other than the fact that overall perceived health status declined significantly. It is also worth noting that problematic drinking increased significantly ($p < .0001$). This is not surprising, given that it was a lifetime measure. However, the amount of increase (mean self-reported problems almost doubled from T1 to T4) is unusual during this period of life. More important, this increase in problematic drinking was strongly related to discrimination.

3

Conclusion

Perceived racial discrimination is associated with increases in internalizing and externalizing reactions among Black women. However, these two reactions appear to have different health

consequences. Increases in internalizing (anxiety and depression) are associated with deterioration in physical health status, including limits on functioning and increases in general morbidity. Increases in externalizing (hostility) are related to more substance use problems. Together, these relations affect overall mental and physical health and, in so doing, may contribute to the relative disparity in health status experienced by African Americans in the U.S.

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Figure 1.

Structural Equation Model of the effects of discrimination on health problems and problematic substance use

Note. Estimated path coefficients are completely standardized. Correlations are in italics.

Disc = perceived racial discrimination; Distress = anxiety and depression; Host = hostility;

HP = health problems; Prob. Use = problematic alcohol use; NLE = negative life events;

Fin. Str. = financial stress; Only significant correlation coefficients are shown among

exogenous variables. * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 1

Correlations among Latent Constructs

Variable	1	2	3	4	5	6	7	8	9
1 T2 Discrimination									
2 T1 Health Prob	.03								
3 T1 Hostility	.24***	.27*							
4 T1 Distress	.13**	.52***	.40***						
5 T1 Drinking Prob	-.15*	.06	.24*	.27***					
6 T3 Hostility	.33***	.16	.69***	.27**	.28*				
7 T3 Distress	.24***	.35***	.34***	.61***	-.01	.56***			
8 T4 Health Prob	.12*	.70***	.00	.24***	.14*	.04	.34***		
9 T4 Drinking Prob	-.02	.02	.22*	.22***	.72***	.32***	.19***	.03	

Note. Higher scores indicate more of the construct. Distress = anxiety and depression. Drinking prob = Problems attributed to drinking. Health Prob comprises: illness/injury and self-assessment of overall health at T1; and illness/injury, self-assessment of overall health, and functional disabilities at T4.

* p .05

** p .01

*** p .005