Comparing Measures of Racial/Ethnic Discrimination, Coping, and Associations with Health-Related Outcomes in a Diverse Sample

Maureen R. Benjamins

ABSTRACT *Discrimination is detrimental to health behaviors and outcomes, but little is known about which measures of discrimination are most strongly related to health, if relationships with health outcomes vary by race/ethnicity, and if coping responses moderate these associations. To explore these issues, the current study assessed race/ ethnic differences in five measures of race/ethnic discrimination, as well as emotional and behavioral coping responses, within a population-based sample of Whites, African Americans, Mexicans, and Puerto Ricans (n=1,699). Stratified adjusted logistic regression models were run to examine associations between the discrimination measures and mental, physical, and health behavior outcomes and to test the role of coping. Overall, 86 % of the sample reported discrimination. Puerto Ricans were more likely than Mexicans and Whites to report most types of discrimination but less likely than Blacks. Discrimination was most strongly related to depression and was less consistently (or not) associated with physical health and health behaviors. Differences by measure of discrimination and respondent race/ethnicity were apparent. No support was found to suggest that coping responses moderate the association between discrimination and health. More work is needed to understand the health effects of this widespread social problem. In addition, interventions attempting to reduce health disparities need to take into account the influence of discrimination.*

KEYWORDS *Discrimination, Racism, Race, Ethnicity, Coping, Mental health*

An increasing number of studies document the existence, and harmful impact, of discrimination on the lives and well-being of minorities in the US and elsewhere.[1–3] Discrimination, which can be defined as differential treatment on the basis of race or another inadequately justified factor that disadvantages members of a group,[4] is a likely contributor to the entrenched health disparities plaguing our country (and others). Although prevalence rates from studies using different measures are often compared, rarely does one study directly compare measures of discrimination and, correspondingly, which dimensions of discrimination are the most detrimental to health within a diverse sample.[2,5] Including multiple measures in one study would allow for a comparison of these constructs and would also enable researchers to gain a broader understanding of the possible health consequences of discrimination.

Furthermore, studies are just beginning to explore the important question of whether discrimination is differentially associated with health outcomes by race/ ethnic group. For example, several studies have found that discrimination is

Benjamins is with the Sinai Urban Health Institute, Chicago, IL, USA.

Correspondence: Maureen R. Benjamins, Sinai Urban Health Institute, Chicago, IL, USA. (E-mail: maureen.benjamins@sinai.org)

associated with worse mental health outcomes[6,7] and increased overall mortality[8] for Whites compared with Blacks. Ethnic differences have also been found within the US, specifically for the association of discrimination with health behaviors,[9,10] health-related quality of life,[11] and disability.[12] Race/ethnic differences in these relationships have also been documented internationally.[13,14] However, limitations in this nascent area of the literature are pervasive. For example, two of the studies on ethnic differences used the California Health Interview Survey and assessed global discrimination with a single-item measure,[10,11] and the other used a single measure among a sample of only Hispanics.[12]

Finally, theoretical work in this field has emphasized the need to focus on individuals' perceptions and interpretations of stressful events like discrimination,[15] given that the perception of a stressor is an important determinant of subsequent psychological (and physiological) responses in and of itself.[16–18] However, we do not know enough about how these appraisals of discrimination and responses to discrimination may influence its impact on disease processes.[19] One unknown issue is whether various types of discrimination motivate the use of different coping mechanisms. In addition, few studies have examined the use of coping mechanisms across diverse populations. Most importantly, empirical tests of the potential moderating role of coping mechanisms for different health outcomes are needed.

To build upon this literature, the current study uses a unique dataset to (1) assess five different measures of race/ethnic discrimination, (2) determine levels of both emotional and behavioral coping mechanisms, (3) analyze and compare relationships between the discrimination measures and a wide range of health-related outcomes, and (4) test the moderating role of coping behaviors. This will be done in a population-based sample of Whites, Blacks, Mexicans, and Puerto Ricans.

METHODS

Data
Data come from the Sinai Improving Community Health Survey, which was designed to document the health of six of Chicago's community areas.[20] The community areas surveyed were selected to reflect the racial/ethnic diversity of Chicago and included a substantial number of non-Hispanic Blacks, Mexicans, and Puerto Ricans in addition to non-Hispanic Whites. A stratified, three-stage probability sampling design was employed to obtain a representative sample from each community area. Eligibility for the survey was determined by age (18–75 years), ability to speak English or Spanish, residence in one of the six communities, and ability to participate. Overall, 87 % of those who screened as eligible completed the interview. A total of 1,699 adults were interviewed in their homes in 2003 by interviewers selected from the respective communities. A detailed methodology of the survey and socio-demographic description of the communities is provided elsewhere.[20,21] All participants signed an informed consent form, and the Sinai Health System IRB approved this study.

Measures
Perceived Discrimination. The first measure is the Experiences of Discrimination (EOD) scale.[22] Eight items from this scale were asked, including questions

about race/ethnic discrimination in the following settings: at school, getting a job, at work, getting housing, getting medical care, in a store, in public, and from the police. The response options were expanded from the original yes/no format to ask about the frequency of occurrence. Specifically, four response choices were never (0), rarely (1), sometimes (2), and often (3), similar to options recently validated by the scale's author.[22] Importantly, this scale (with one additional setting) has been psychometrically tested for African American and Hispanic individuals and was found to have high validity and reliability.[22] Likewise, in the current sample, the Cronbach's alpha (α) was 0.85 (0.77 for Whites, 0.86 for Blacks, 0.78 for Mexicans, and 0.86 for Puerto Ricans).

The second set of questions comes from Williams' Everyday Discrimination Scale (EDS).[6] A series of nine questions asked about treatment specifically based on one's race or ethnicity with one-stage attribution.[22] Examples of specific items include the following: "You were treated with less respect?"; "People act as if they think you are not smart?"; and "You are called names or insulted?" To each of these questions, respondents were given six response options ranging from never (0) to almost every day (5). Like the EOD, the EDS has been extensively used in the literature and has shown high levels of validity and reliability in diverse samples.[23–25] Cronbach's alpha for the scale was 0.88 within the full sample (0.88 for Whites, 0.88 for Blacks, 0.87 for Mexicans, and 0.82 for Puerto Ricans).

Several other questions were developed or adapted to assess levels of discrimination. First, respondents were asked a global measure of discrimination: "Have you ever had an unfair experience due to your race or ethnicity?" If the respondent had previously reported discrimination in any of the EOD items, they were placed in the affirmative category. Another question was asked of respondents about relative treatment. Specifically, they were asked: "During the past 6 months, would you say that on average you were treated better than people of other races or ethnicities, worse than people of other races or ethnicities, or the same as people of other races or ethnicities?" This was then asked specifically about treatment in the health care setting. ("Within the past 6 months, when you were getting health care, would you say you were treated …"). The responses were dichotomized to distinguish those who reported they were treated worse from those who reported similar or better treatment. These two latter questions are from the Reactions to Race module of the Behavioral Risk Factor Surveillance System (BRFSS), although the wording is slightly different (e.g., here the time frame is 6 months compared with 12 months in BRFSS).

Coping with Discrimination. Both emotional and behavioral coping responses were measured. Specifically, participants were asked: "Please think about the most recent unfair experience you have had due to your race or ethnicity. I am going to read a list of emotions. For each, please tell me if you felt this way not at all, a little, somewhat, or very much. (Emotion)? How much (emotion) did you feel? Would you say … not at all, a little, somewhat, or very much?" See Appendix 1 for all of the emotions included. The response frequencies were summed over all ten emotions (α=0.84). A count of how many emotions were reported (at any level) was also created. Behavioral coping responses were measured by asking respondents to reference their most recent experience of

discrimination in any setting and respond yes or no to ten possible coping responses to that event (see Appendix 1). Given the lack of clarity in the literature regarding categorization of the behavioral coping mechanisms, an exploratory factor analysis was run. This revealed two underlying constructs: problem-focused behaviors and emotion-focused behaviors. These groups correspond with similar categorizations made previously in the literature.[26] The model fit statistic was acceptable (Tucker–Lewis reliability coefficient=0.98).

Health Outcomes. Depression was measured using the ten-item Center for Epidemiologic Studies Depression scale.[27] Respondents with a score of 4 or higher were categorized as likely to be depressed.[28] The measure of hypertension indicates whether the respondent had ever been told by a physician that they had hypertension or high blood pressure. Activity limitations indicate respondents who reported that poor physical or mental health limited their activities in the past month. Self-rated health was measured with a question that asks individuals to rate their current health and was re-coded as excellent, very good, or good versus fair or poor. A current smoker was defined as a person who reported that they currently smoke cigarettes. Binge drinking is a dichotomous variable that indicates that the respondent had at least five alcoholic beverages in at least one sitting in the past month. The measure of physical inactivity, sedentary, compares individuals who reported any moderate or vigorous activities in the past week to those without such activity.

Covariates. The demographic variables included age, gender, race/ethnicity, and nativity. Race/ethnicity categories included non-Hispanic White, non-Hispanic African American, Mexican, and Puerto Rican. The socioeconomic variables included education (less than a high school degree versus high school degree or more), unemployment (currently employed full-time or part-time versus not employed), and health insurance (currently insured versus not insured).

Analysis
First, descriptive statistics were provided for all variables. Bivariate statistics were then examined to investigate relationships among discrimination and coping measures by race/ethnic group. Next, adjusted logistic regression models were run to assess relationships between the five discrimination measures, the coping behaviors, and selected health outcomes. All data were analyzed in SAS version 9.2. Weights were used to account for the complex sampling design (SAS Institute Inc., Cary, NC). Of the 1,699 respondents, 25 % (n=422) did not respond affirmatively to any items of the EOD scale and were not asked the coping questions accordingly. Smaller percentages were missing responses to the measures of discrimination or to the other variables of interest and were also excluded from the relevant analyses. Members of other race/ethnic groups (7.8 % of sample) and those missing race/ethnicity information (.6 %) were not shown in separate racial comparisons due to the small number, as well as to the difficulty of interpreting such findings.

TABLE 1   Participant characteristics

	No. (%) or mean (SD)[a]	
Demographics		
Female	1,012	(59.6)
Age (mean, years)	40.6	(15.0)
Race/ethnicity		
NH White	327	(19.4)
NH Black	755	(44.7)
Mexican	385	(22.8)
Puerto Rican	113	(6.8)
Other Hispanic	81	(4.8)
Other	50	(3.0)
Missing	10	(0.6)
US-born	1,244	(73.2)
Socioeconomic status		
High school degree or more	1,179	(70.2)
Unemployed	736	(43.5)
Health insurance	1,127	(68.7)
Health status		
Depressed	433	(25.9)
Hypertension	515	(30.4)
Any activity limitations	473	(27.9)
Self-rated health fair/poor	514	(30.3)
Health behaviors		
Drinks alcohol	986	(58.0)
Current smoker	493	(29.1)
Sedentary	291	(17.1)

Improving Community Health Survey, 2003 ($N=1,699$)

[a]The number of cases may vary slightly due to missing data

RESULTS

Participant Characteristics

The demographic and socioeconomic characteristics of the sample are presented in Table 1, along with the health-related outcomes.

Levels of Discrimination and Coping by Race/Ethnic Group

Perceived Discrimination. As seen in Table 2, levels of discrimination varied by both the measured used and by race/ethnic group. For all measures, discrimination was most frequently reported by Blacks. The next highest rates were generally seen for Puerto Ricans and then Mexicans. Based on the EOD scale, there were significant differences in levels of discrimination for all four race/ethnic groups. The EDS scale showed similar distinctions between groups, with the exception of Mexicans and

TABLE 2   Discrimination and coping measures by race/ethnicity in the Improving Community Health Survey

	Range	Overall mean or proportion	NH White	NH Black	Mexican	Puerto Rican	Differences
Perceived Discrimination							
Experiences of Discrimination							
EOD sum	0–24	5.10	1.86	6.90	3.87	5.45	a,b,c,d,e,f
Number of settings	0–8	2.89	1.23	3.85	2.26	2.86	a,b,c,d,e,f
Everyday Discrimination Scale							
EDS sum	0–45	8.27	4.56	9.07	6.40	6.60	a,b,c,d,e
Global							
Unfair experience due to race	0–1	0.75	0.60	0.83	0.72	0.73	a,b,c,d,e
Relative treatment							
Worse (in general)	0–1	0.07	0.01	0.11	0.03	0.07	a,c,d
Worse (while getting health care)	0–1	0.04	0.01	0.06	0.04	0.04	a
Coping with discrimination							
Emotional responses							
Sum	0–30	8.43	8.26	8.45	7.87	9.09	
Number of emotional responses	0–10	5.01	5.12	5.09	4.57	5.17	b,d
Behavioral responses							
Problem-focused behaviors	0–5	2.83	2.06	3.18	2.49	2.99	a,b,c,d,f
Emotion-focused behaviors	0–5	1.79	1.77	1.55	2.41	1.94	a,b,d,e,f
N		1,699 [g]	327	755	363	113	

[a]Difference between White and Black ($p < 0.05$)

[b]Difference between White and Mexican ($p < 0.05$)

[c]Difference between White and Puerto Rican ($p < 0.05$)

[d]Difference between Black and Mexican ($p < 0.05$)

[e]Difference between Black and Puerto Rican ($p < 0.05$)

[f]Difference between Mexican and Puerto Rican ($p < 0.05$)

[g]The number of cases may vary slightly due to missing data. Sample for coping responses is $n = 1,282$ because questions were asked only of individuals who reported any discrimination

Puerto Ricans who reported comparable levels. The global measure of discrimination showed that very high percentages of individuals have had an unfair experience due to their race (range 60 % to 83 %). In contrast, only a small percentage (7 %) felt that, overall, they were treated worse than members of other race/ethnic groups in the past 6 months, and an even smaller percentage reported worse treatment in a health care setting (4 %). All together, 86 % of the sample reported discrimination in at least one of the above measures.

Coping with Discrimination. On average, respondents reported having five different emotional responses. Mexicans reported fewer responses than Blacks

TABLE 3 Correlations among discrimination and coping measures in the Improving Community Health Survey

	EOD sum[a]	EDS sum[b]	Ever had unfair experience	Treated worse	Treated worse in HC	Sum of emotional responses	Problem-focused behaviors	Emotion-focused behaviors
EOD sum	—							
EDS sum	0.64 ***	—						
Global								
Unfair experience due to race	0.56 ***	0.42 ***	—					
Relative treatment								
Worse (in general)	0.34 ***	0.35 ***	0.14 ***	—				
Worse (while getting health care)	0.20 ***	0.17 ***	0.08 **	0.32 ***	—			
Coping responses								
Sum of emotional responses	0.34 ***	0.39 ***	—[c]	0.18 ***	0.11 ***	—		
Problem-focused behaviors	0.28 ***	0.24 ***	—[c]	0.08 **	0.08 **	0.26 ***	—	
Emotion-focused behaviors	−0.08 **	0.03	—[c]	−0.01	−0.03	0.06 *	−0.02	—

For discrimination questions, $n=1{,}661$; for coping responses, $n=1{,}276$

HC health care

[a]Krieger's Experiences of Discrimination Scale

[b]Williams' Everyday Discrimination Scale

[c]Respondents who answered negatively to this global measure of discrimination were not asked the coping questions

*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

or Whites. The behavioral coping responses also differed by race/ethnic group. The mean number of problem-focused coping strategies used was 2.83, while the average number of emotion-focused coping responses was 1.79. Blacks were more likely to use problem-focused strategies and less likely to use emotion-focused strategies compared with most other groups. Differences between the Hispanic subgroups showed that Puerto Ricans were more likely to use problem-focused responses while Mexicans were more likely to use emotion-focused strategies.

Associations between Discrimination Measures

Table 3 shows the correlation matrix for the discrimination and coping measures. As expected, a strong correlation was seen between the EOD and EDS measures ($r=0.64$, $p<0.001$). The EOD and EDS were also strongly associated with the global measure of unfair treatment. All measures of discrimination were associated with the use of emotional responses and problem-focused behavioral responses, with the scales showing higher correlations than the relative treatment measures. No substantial associations were seen between the discrimination measures and the emotion-focused behavioral responses.

Associations between Discrimination and Selected Health-Related Outcomes

To explore relationships between the various measures of discrimination and different dimensions of health, adjusted regression models were run, as seen in Table 4. These associations are presented for the total sample and by race/ethnicity. The measures of discrimination were most strongly related to depression, followed by activity limitations and self-rated health. More specifically, patterns showed that higher levels of reported discrimination were positively associated with probable depression, as well as having activity limitations and poor self-rated health. More discrimination was generally not associated with hypertension and health behaviors.

Of the five discrimination measures examined here, the two scales (the EOD and the EDS) were most consistently related to the various health outcomes. However, the single-item measure of unfair treatment often showed the largest associations with the health outcomes. For example, individuals who reported this type of discrimination had odds of reporting activity limitations that were 74 % higher than those without such discrimination (OR=1.74, CI, 1.23–2.44). Questions about relative treatment revealed much smaller (or no) relationships with the health-related outcomes. For example, discrimination in health care was only associated with depression (full sample) and smoking (full sample).

Within the stratified models, discrimination appeared to be most consistently related to the health outcomes for Whites and Blacks. For Blacks, at least one measure of discrimination was significantly associated with all of the health outcomes, except hypertension and smoking. More specifically, reporting discrimination was associated with being depressed, having at least one activity limitation, rating one's health as fair or poor, binge drinking, and being less sedentary. Although less consistent across outcomes, the relationships seen among White respondents were often more substantial than those seen for Blacks. For example, each unit increase in the EOD scale was associated with a

TABLE 4 Relationships between race/ethnic discrimination and selected health-related outcomes among the total sample and four racial/ethnic groups

	Total AOR (95 % CI)[a]	NH White AOR (95 % CI)	NH Black AOR (95 % CI)	Mexican AOR (95 % CI)	Puerto Rican AOR (95 % CI)
Outcome = Depression					
EOD sum	1.10 (1.07–1.14)	1.36 (1.15–1.60)	1.07 (1.02–1.11)	1.10 (1.01–1.19)	1.19 (1.04–1.35)
EDS sum	1.07 (1.05–1.09)	1.11 (1.06–1.17)	1.05 (1.02–1.08)	1.06 (1.02–1.11)	1.18 (1.04–1.33)
Any unfair treatment	1.61 (1.13–2.30)	3.28 (1.35–7.95)	1.38 (0.79–2.44)	1.16 (0.58–2.34)	3.30 (0.73–15.24)
Treated worse	1.91 (1.06–3.43)	–[b]	1.09 (0.56–2.10)	3.17 (0.42–24.08)	–
Treated worse in health care	2.21 (1.10–4.45)	–	1.97 (0.75–5.14)	1.86 (0.41–8.45)	4.21 (0.46–38.78)
Outcome = Hypertension					
EOD sum	1.05 (1.01–1.08)	1.08 (0.98–1.19)	1.01 (0.97–1.06)	1.09 (1.00–1.18)	1.08 (0.98–1.19)
EDS sum	1.01 (0.99–1.02)	1.02 (0.96–1.08)	0.99 (0.97–1.01)	0.99 (0.96–1.04)	1.04 (0.96–1.13)
Any unfair treatment	1.39 (0.92–2.11)	1.72 (0.78–3.76)	0.87 (0.41–1.85)	1.70 (0.62–4.64)	3.17 (0.84–11.94)
Treated worse	1.37 (0.76–2.31)	–	0.84 (0.50–1.42)	3.70 (0.69–19.78)	2.94 (0.65–13.04)
Treated worse in health care	1.05 (0.57–1.94)	–	0.88 (0.40–1.92)	0.32 (0.05–2.27)	5.24 (0.59–47.04)
Outcome = Activity limitations					
EOD sum	1.06 (1.03–1.09)	1.17 (1.06–1.30)	1.08 (1.04–1.13)	1.06 (1.01–1.11)	1.08 (0.99–1.17)
EDS sum	1.04 (1.02–1.06)	1.10 (1.03–1.17)	1.03 (1.01–1.06)	1.05 (1.00–1.09)	1.10 (1.02–1.18)
Any unfair treatment	1.74 (1.23–2.44)	2.34 (1.03–5.31)	1.97 (1.12–3.47)	2.83 (1.06–7.57)	1.50 (0.40–5.65)
Treated worse	1.23 (0.72–2.09)	–	1.23 (0.69–2.17)	1.52 (0.24–9.53)	1.33 (0.15–11.81)
Treated worse in health care	1.79 (0.89–3.60)	–	1.99 (0.80–4.91)	1.78 (0.25–12.48)	1.50 (0.12–19.22)
Outcome = Fair/poor self-rated health					
EOD sum	1.06 (1.02–1.09)	1.31 (1.12–1.53)	1.03 (0.98–1.08)	0.99 (0.92–1.07)	1.07 (0.95–1.20)
EDS sum	1.01 (1.02–1.06)	1.06 (0.99–1.14)	1.03 (1.00–1.06)	1.04 (0.99–1.08)	1.13 (1.04–1.23)
Any unfair treatment	1.38 (0.96–2.00)	6.90 (2.28–20.82)	1.19 (0.70–2.01)	0.72 (0.37–1.40)	1.49 (0.48–4.68)
Treated worse	0.71 (0.44–1.14)	–	0.73 (0.37–1.42)	0.29 (0.07–1.26)	1.14 (0.27–4.76)
Treated worse in health care	1.85 (0.99–3.47)	–	1.05 (0.40–2.77)	3.47 (0.78–15.41)	4.48 (0.70–28.67)

TABLE 4 *Continued*

	Total AOR (95 % CI)[a]	NH White AOR (95 % CI)	NH Black AOR (95 % CI)	Mexican AOR (95 % CI)	Puerto Rican AOR (95 % CI)
Outcome = Binge drinking					
EOD sum	0.99 (0.95–1.02)	1.13 (0.99–1.28)	1.02 (0.98–1.06)	1.01 (0.94–1.07)	0.94 (0.85–1.04)
EDS sum	1.01 (0.99–1.03)	1.02 (0.97–1.08)	1.03 (1.00–1.06)	1.02 (0.97–1.06)	1.01 (0.93–1.10)
Any unfair treatment	1.11 (0.79–1.57)	1.74 (0.91–3.35)	1.08 (0.62–1.88)	1.39 (0.59–3.29)	0.73 (0.21–2.50)
Treated worse	0.39 (0.19–0.78)	–	0.70 (0.35–1.43)	0.13 (0.01–2.01)	0.72 (0.09–5.68)
Treated worse in health care	0.81 (0.31–2.09)	–	0.86 (0.28–2.67)	1.68 (0.22–12.61)	0.46 (0.03–6.62)
Outcome = Smokes					
EOD sum	1.02 (0.99–1.05)	1.06 (0.93–1.20)	1.01 (0.97–1.04)	1.03 (0.96–1.10)	1.02 (0.92–1.13)
EDS sum	1.02 (1.00–1.04)	1.01 (0.97–1.06)	1.01 (0.99–1.03)	1.05 (0.99–1.11)	1.05 (0.97–1.14)
Any unfair treatment	0.95 (0.71–1.29)	0.96 (0.54–1.70)	0.92 (0.65–1.30)	0.63 (0.31–1.26)	0.98 (0.22–4.40)
Treated worse	1.13 (0.66–1.96)	–	0.88 (0.53–1.45)	1.29 (0.21–7.99)	2.59 (0.43–15.50)
Treated worse in health care	2.17 (1.22–3.84)	–	1.99 (0.99–4.00)	3.40 (0.44–26.38)	2.90 (0.52–16.03)
Outcome = Sedentary					
EOD sum	0.96 (0.92–1.01)	1.06 (0.93–1.20)	0.94 (0.90–0.99)	0.92 (0.82–1.03)	1.02 (0.91–1.14)
EDS sum	0.97 (0.94–1.00)	0.93 (0.84–1.03)	0.97 (0.93–1.02)	0.94 (0.90–0.99)	0.97 (0.88–1.07)
Any unfair treatment	0.94 (0.64–1.38)	2.49 (0.68–9.10)	0.86 (0.45–1.66)	0.62 (0.30–1.30)	1.68 (0.26–10.37)
Treated worse	1.07 (0.42–2.74)	–	0.68 (0.31–1.51)	2.14 (0.49–9.27)	–
Treated worse in health care	1.47 (0.56–3.87)	–	0.71 (0.20–2.49)	3.27 (0.50–21.32)	2.12 (0.28–16.17)
N	1,699[c]	327	755	363	113

AOR Adjusted Odds Ratios, CI confidence intervals, NH non-Hispanic, EOD Experiences of Discrimination, EDS Everyday Discrimination Scale

[a] Estimates come from logistic regression models that include age, sex, nativity, education, insurance, and employment status

[b] Cell size too small

[c] The number of cases may vary slightly between models due to missing data

36 % increase in odds of depression for Whites compared with a 7 % increase in odds for Blacks.

Finally, in analyses not shown, the potential moderating role of coping responses was not supported by the data. Specifically, interaction terms were created between the EOD and the sum of emotional responses, as well as between EOD and problem-focused behaviors. Emotion-focused behaviors were not included because they were not significantly associated with both discrimination and the selected health outcomes, which is one of the prerequisites of moderation.[29] Models were run for the three health outcomes that showed significant relationships with discrimination —depression, activity limitations, and self-rated health. None of the interaction terms were significant, indicating that the emotional responses and problem-focused behavioral responses measured here did not alter the relationship between discrimination and the selected health outcomes.

DISCUSSION

Discrimination is increasingly being recognized as an important determinant of poor health outcomes and, consequently, a potential target for interventions designed to reduce race/ethnic disparities in health. However, existing studies are often limited to single measures of discrimination and/or coping, as well as homogenous or convenience samples. Moreover, few studies have been able to examine the association of different measures of discrimination with a variety of health outcomes, and even fewer have empirically tested the potential moderating role of coping. The current study adds to this growing literature by (1) examining multiple measures of discrimination and related coping mechanisms; (2) by investigating each measure's association with multiple health outcomes; and (3) by assessing the moderating role of coping mechanisms, all within a diverse, population-based sample.

High rates, and large differences among all four race/ethnic groups, were seen for most of the discrimination and coping measures. The prevalence of discrimination in this sample is startling with three fourths of the respondents reporting unfair treatment due to their race/ethnicity, for example. The levels of discrimination experienced appear to be much higher than other previously documented rates.[8,10,22,30] This may be due to the particularly disadvantaged nature of the selected communities, as well as the hyper-segregated status of Chicago (as labeled by Massey and Denton[31]). As expected, Blacks reported the highest rates of almost every measure of discrimination and Whites reported the lowest. Moreover, similar to the few prior studies in this area,[9,11,12,30,32] significant variations were seen among members of different Hispanic groups, though never before for this many measures of discrimination. It is important to note that both overall levels and race/ethnic differences in these levels varied substantially by the measure of discrimination used. For example, the single question regarding overall treatment relative to members of other race/ethnic groups produced much lower estimates of discrimination than the other global measures. The question about relative treatment while getting medical care had the lowest overall prevalence and also showed the fewest race/ethnic differences.

These findings support previous warnings to use caution when comparing studies using different measures of discrimination. The correlations seen between the measures reinforce this. Specifically, the correlations were generally significant, but often not substantial, indicating that the various scales and

items are tapping into different aspects of discrimination. This coincides with the differing goals of certain scales; for example, the Everyday Discrimination Scale attempts to measure daily (or chronic) stress caused by discrimination, while the EOD scale is designed to capture the frequency of more acute experiences of discrimination in a variety of situations.[3]

Given the large amounts, and types, of discrimination experienced by the respondents in a variety of settings, it is logical that a wide range of coping mechanisms were reported as well. It has been noted that discrimination is a complex stressor that requires individuals to not only deal with the direct effects (such as interpersonal altercations, poor treatment, and limited options), but also the emotional consequences, including an array of potential negative feelings and challenges to one's self-image.[26] Race/ethnic differences were seen, including differences between Mexicans and Puerto Ricans. Strategies may be designed or used to deal with a particular type of discrimination[26]; however, no clear patterns emerged correlating the two broad categories of behavioral coping and the different measures of discrimination. Interestingly, the correlations showed that discrimination measures were more closely associated with emotional responses than behavioral ones with more experiences with discrimination being generally related to the use of more coping strategies. Obviously, more work in this area is needed.

Similar to prior studies,[1–3] the discrimination measures were most strongly associated with the mental health outcome (depression) and were less consistently related to physical health outcomes and health behaviors. As previously found, more discrimination was associated with poorer mental health.[5,32,33] Discrimination was also significantly related to reporting an activity limitation across all groups. Discrimination was only sporadically associated with subjective health, binge drinking, smoking, and being physically active.

No existing studies were found that assessed the association between this many measures of discrimination and a broad range of health-related outcomes. This unique opportunity revealed several interesting results. To begin, all of the general measures of discrimination included here except the measure of relative treatment were associated with at least some of the selected health outcomes. The only domain-specific measure used, discrimination within the health care setting, was less consistent, although it was strongly related to both depression and smoking in the full sample. Previous studies have indicated that chronic discrimination tends to be more strongly associated with health-related outcomes than acute experiences[2,5]; however, no strong patterns were seen within the current study to differentiate one measure from another in terms of their association with health outcomes. Thus, more work is needed to better understand if and why certain types of discrimination are more detrimental to health than others.

Another contribution of this study was its ability to assess race/ethnic differences in these relationships. The results indicated that discrimination was most consistently related to health status and health behaviors for Blacks, followed by Whites and Mexicans, and finally Puerto Ricans. This supports a previous study that found a stronger impact of discrimination on mental health for Blacks compared with Mexicans and other Hispanics,[34] but contradicts others that found weaker associations for Blacks compared with other groups[6–10] or no differences by race.[11,35] Methodological explanations may be

at work here, with the sample sizes providing adequate power to detect significant differences for the largest sample subgroup (Blacks) and less power for the other groups (particularly for Puerto Ricans).

Finally, no support was found to indicate that coping responses (emotional or behavioral) influenced the direction or strength of the relationship between discrimination and health. Future research should continue to investigate the ways in which coping strategies are used to deal with discrimination and which mechanisms buffer (or exacerbate) the impact of discrimination on health. Longitudinal and qualitative studies would be particularly helpful.

Strengths and Limitations of the Current Study

The current dataset presented the opportunity to examine multiple measures of discrimination, coping, and health outcomes. Moreover, the analyses were conducted separately for four race/ethnic groups within a large, population-based sample. No previous studies were located that compared this many measures of discrimination and showed associations between the measures and a wide range of health-related outcomes, much less for four race/ethnic groups.

One significant weakness is on the limitations inherent in the measures of discrimination and coping. Methodologically, the EOD scale used in the current study only included eight of the nine original items and the EDS measured attribution simultaneously. This should be taken into consideration when comparing results with other populations as overall levels of discrimination reported by the EOD are decreased and those from the EDS are expected to be higher than levels gauged with the two-step approach.[23,36] Another limitation is that the race/ethnic classifications may obscure some differences between groups because there is racial diversity within ethnic groups, particularly for Puerto Ricans.[31,37] In addition, although most of the measures of discrimination used here (e.g., the EDS and EOD) have undergone psychometric testing in diverse populations,[22,23] we do not know whether reports of discrimination, or even the response options, mean the same thing for different people. This must be taken into account when comparing results across groups. Finally, it is difficult to disentangle race/ethnic discrimination (the focus of the current study) from other related forms of discrimination such as those based on language or immigration status or discrimination at other levels (e.g., institutional racism or segregation). The extent to which the current questions under- or over-estimate actual levels of discrimination in certain groups is unknown. The limitations of the coping with discrimination measures also need to be acknowledged. As discussed in more detail by Brondolo et al. (2009) and others, this type of coping scales is unable to gather contextual information such as how coping varies by setting, timing, or perpetrator of the discrimination. Moreover, coping strategies may differ by race/ethnic group, and such differences would be masked by the measure used in the current study. It is perhaps due to these limitations that none of the coping measures were found to be beneficial in ameliorating the effect of discrimination on health outcomes.

Future Directions and Implications

These findings provide some guidance for researchers working in this area. To begin, future studies should avoid combining Hispanic subgroups whenever possible. It appears as if Puerto Ricans experience levels of discrimination more similar to Blacks than to Mexicans and that their coping responses also differ substantially. The same could apply to other heterogeneous groups that are often lumped together, such as Asians and Africans, and researchers would do well to analyze groups separately whenever possible. Next, the findings support previous suggestions that multi-item scales are more useful measures than single items because single questions (such as the one regarding relative treatment compared with members of other race/ethnic groups) can greatly underestimate exposure to discrimination and also provide little guidance for potential interventions or policy changes.[22,38] Future work is also needed to more extensively evaluate the moderating role of emotional and behavioral coping mechanisms for different race/ethnic groups, as well as to consider possible mechanisms that can explain how these different types of perceived discrimination are embodied, resulting in measurable health differences.[39]

Moreover, without more qualitative work, it is not known how different individuals, such as members of different race/ethnic groups, interpret the questions or the response choices. For example, there was a high level of discrimination reported by Whites in the current study. In fact, 35 % reported discrimination in public, and 32 % reported being called names and insulted because of their race/ethnicity. Rates this high are rarely found,[22,23] and the potential consequences of such discrimination warrants further discussion. Most importantly, most definitions of discrimination involve an imbalance of power, which leads to questions about the validity of self-reports by non-minorities. This, together with the contradictory findings on race differences in the relationship between discrimination and health, signifies that more research is needed to determine if discrimination reported by Whites and minorities can be compared at face value, as well as to better understand the potentially different impact of discrimination for members of these groups.

This study suggests several practical implications as well. To begin, the findings reiterate previous appeals that interventions attempting to improve the health of minorities or trying to reduce health disparities need to take into account the influence of discrimination. For example, interventions to improve mental health should focus on finding successful coping mechanisms given the strong negative impact of discrimination on this aspect of well-being. The findings regarding levels of discrimination by setting also suggest that interventions (or possibly policy changes) are needed to reduce differential treatment by race. Given that over 20 % of the current sample reported being discriminated again in a medical setting, health care providers, for one, may need additional training to increase awareness of both potential subconscious biases as well as the overall negative impact of discrimination on health.

In closing, the current study revealed that large numbers of individuals reported perceived discrimination, unfair treatment, and differential treatment relative to other groups. All of these types of discrimination varied by race/ethnicity, but most had similar negative associations with several health outcomes. Developing a more nuanced understanding of these relationships is critical as we continue to combat disturbing race/ethnic disparities in health in the US.

ACKNOWLEDGMENTS

APPENDIX 1

TABLE 5   Emotional responses and behavioral coping strategies

	Mean or proportion
Emotional responses	
Angry	0.69
Frustrated	0.71
Annoyed	0.74
Powerless	0.52
Scared	0.33
Vulnerable	0.43
Humiliated	0.44
Vengeful	0.38
Inferior	0.26
Amused	0.51
Number of emotional responses used	5.01
Behavioral responses[a]	
Problem-focused	
Tried to do something about it	0.47
Talked to someone about how you were feeling	0.66
Worked harder to prove them wrong	0.58
Increased your efforts to make things work	0.68
Talked to someone who could do something concrete about the situation	0.46
Emotion-focused	
Accepted it as a fact of life	0.61
Blamed yourself	0.09
Tried to keep your feelings to yourself	0.39
Criticized yourself	0.16
Tried to forget that it happened	0.55
Number of problem-focused behavioral responses used (range, 0–5)	2.83
Number of emotion-focused behavioral responses used (range, 0–5)	1.79
N	1,278

[a]Question wording: "We are interested in other responses of yours to this most recent unfair experience due to race or ethnicity. Please tell me if you did each of the following things. Would you say you …?"

REFERENCES

1. Paradies, Y. A systematic review of empirical research on self-reported racism and health. *Int J Epidemiol*. 2006;35:888-901

2. Pascoe EA, Richman LS. Perceived discrimination and health: a meta-analytic review. *Psychol Bull*. 2009; 135(4): 531–554.

3. Williams DR, Mohammed SA. Discrimination and racial disparities in health: evidence and needed research. *J Behav Med*. 2009; 32(1): 20–47.

4. National Research Council (NRC). *Measuring racial discrimination: panel on methods for assessing discrimination*. Washington: National Academies Press; 2004.

5. Kessler RC, Mickelson KD, Williams DR. The prevalence, distribution, and mental health correlates of perceived discrimination in the United States. *J Health Soc Behav*. 1999; 40(3): 208–230.

6. Williams DR, Yan Y, Jackson JS, Anderson NB. Racial differences in physical and mental health. *J Health Psychol*. 1997; 2(3): 335–351.

7. Ayalon L, Gum AM. The relationships between major lifetime discrimination, everyday discrimination, and mental health in three racial and ethnic groups of older adults. *Aging Ment Health*. 2011; 15(5): 587–594.

8. Barnes LL, Mendes de Leon CF, Wilson RS, Bienias JL, Bennett DA, Evans DA. Racial differences in perceived discrimination in a community population of older Blacks and Whites. *J Aging Health*. 2004; 16(3): 315–337.

9. Benjamins MR. Race/ethnic discrimination and preventive service utilization in a sample of Whites, Blacks, Mexicans, and Puerto Ricans. *Med Care*. 2012; 50(10): 870–6.

10. Shariff-Marco S, Klassen AC, Bowie JV. Racial/ethnic differences in self-reported racism and its association with cancer-related health behaviors. *Am J Public Health*. 2010; 100(2): 364–374.

11. Otiniano, A., Gee, G. Self-reported discrimination and health-related quality of life among Whites, Blacks, Mexicans and Central Americans. *J Immigr Minor Health*.2012;14:189-197.

12. Lee MA, Ferraro KF. Perceived discrimination and health among Puerto Rican and Mexican Americans: buffering effect of the Lazo matrimonial? *Soc Sci Med*. 2009; 68(11): 1966–1974.

13. Karlsen S, Nazroo JY. Relation between racial discrimination, social class, and health among ethnic minority groups. *Am J Public Health*. 2002; 92(4): 624–631.

14. Harris R, Cormack D, Tobias M, et al. The pervasive effects of racism: experiences of racial discrimination in New Zealand over time and associations with multiple health domains. *Soc Sci Med*. 2012; 74(3): 408–415.

15. Kressin NR, Raymond KL, Manze M. Perceptions of race/ethnicity-based discrimination: a review of measures and evaluation of their usefulness for the health care setting. *J Health Care Poor Underserved*. 2008; 19(3): 697–730.

16. Clark R, Anderson NB, Clark VR, et al. Racism as a stressor for African Americans. A biopsychosocial model. *Am Psychol*. 1999; 54(10): 805–816.

17. Lazarus RS, Folkman S. *Stress, appraisal, and coping*. New York: Springer; 1984.

18. Matheny KB, Aycock DW, Pugh JL, Curlette WL, Canella KA. Stress coping: a qualitative and quantitative synthesis with implications for treatment. *Couns Psychol*. 1986; 14: 499–549.

19. Williams DR, Neighbors HW, Jackson JS. Racial ethnic discrimination and health: findings from community studies. *Am J Public Health*. 2003; 93(2): 200–208.

20. Whitman S, Shah AM, Benjamins MR, eds. *Urban health: combating disparities with local data*. New York: Oxford University Press; 2010.

21. Shah AM, Whitman S, Silva A. Variations in the health conditions of 6 Chicago community areas: a case for local-level data. *Am J Public Health*. 2006; 96(8).

22. Krieger N, Smith K, Naishadham D, Hartman C, Barbeau EM. Experiences of discrimination: validity and reliability of a self-report measure for population health research on racism and health. *Soc Sci Med*. 2005; 61: 1576–1596.

23. Shariff-Marco S, Breen N, Landrine H, Reeve BB, Krieger N, Gee GC, et al. Measuring everyday racial/ethnic discrimination in health surveys. *Du Bois Rev: Soc Sci Res on Race*. 2011; 8(01): 159–177.

24. Casagrande SS, Gray TL, LaVeist TA, et al. Perceived discrimination and adherence to medical care in a racially integrated community. *J Gen Intern Med*. 2007; 22: 389–395.

25. Lewis TT, Yang FM, Jacobs EA, et al. Racial/ethnic differences in responses to the everyday discrimination scale: a differential item functioning analysis. *Am J Epidemiol*. 2012;175:391-401

26. Brondolo EN, Bradyver Halen N, Pencille M, Beatty D, Contrada RJ. Coping with racism: a selective review of the literature and a theoretical and methodological critique. *J Behav Med*. 2009; 32(1): 64–88.

27. Kohout FJ, Berkman LF, Evans DA, Cornoni-Huntley J. Two shorter forms of the CES-D depression symptoms index. *J Aging and Health*. 1993; 5(2): 179–193.

28. Irwin M, Artin KH, Oxman MN. Screening for depression in the older adult: criterion validity of the 10-item Center for Epidemiological Studies Depression Scale (CES-D). *Arch Intern Med*. 1999; 159(15): 1701–1704.

29. Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J Pers Soc Psychol*. 1986; 51(6): 1173–1182.

30. Perez DJ, Fortuna L, Alegria M. Prevalence and correlates of everyday discrimination among U.S. Latinos. *J Community Psychol*. 2008; 36(4): 421–433.

31. Massey DS, Denton NA. *American apartheid: segregation and the making of the underclass*. Cambridge: Harvard University Press; 1993.

32. Shariff-Marco S, Gee GC, Breen N, Willis G, Reeve BB, Grant D, et al. A mixed-methods approach to developing a self-reported racial/ethnic discrimination measure for use in multiethnic health surveys. *Ethn Dis*. 2009; 19(4): 447–453.

33. Schultz AJ, Clarence C, Gravlee, Williams DR, Israel BA, Graciela M, Rowe Z, Clarence C. Discrimination, symptoms of depression, and self-rated health among African American women in Detroit: results from a longitudinal analysis. *Am J Public Health*. 2006; 96(7): 1265–1270.

34. Gee GC, Ro A, Shariff-Marco S, Chae D. Racial discrimination and health among Asian Americans: evidence, assessment, and directions for future research. *Epidemiol Rev*. 2009; 31: 130–151.

35. Lewis TT, Kravitz HM, Janssen I, Powell LH. Self-reported experiences of discrimination and visceral fat in middle-aged African-American and Caucasian women. *Am J Epidemiol*. 2011; 173(11): 1223–1231.

36. Brown TN. Measuring self-perceived racial and ethnic discrimination in social surveys. *Sociological Spectrum: Mid-South Sociological Association*. 2001; 21(3): 377–392.

37. Ford CL, Harawa NT. A new conceptualization of ethnicity for social epidemiologic and health equity research. *Soc Sci Med*. 2010; 71: 251–258.

38. Krieger N. Embodying Inequality: a review of concepts, measures, and methods for studying health consequences of discrimination. *Int J Health Serv*. 1999; 29(2): 295–352.

39. Krieger N. Methods for the scientific study of discrimination and health: an ecosocial approach. *Am J Public Health*. 2012; 102(5): 936–944.