The Association between Multiple Domains of Discrimination and Self-assessed Health: A Multilevel Analysis of Latinos and Blacks in Four Low-Income New York City Neighborhoods

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Objective. This study examines the association between discrimination due to race and other attributes (e.g., sex, age) and self-assessed mental and physical health among Latinos and blacks.

Data Source. Latino and black adult participants ($n = 873$) identified by random digit dialing were interviewed by telephone in four low-income neighborhoods in New York City: the South Bronx, East Harlem, Central Harlem, and Bedford-Stuyvesant.

Study Design. In this cross-sectional study, generalized estimating equations were used to fit multilevel multivariable models to test the association between discrimination and poor mental and physical health while controlling for socioeconomic status, access to health care, social support, smoking, and the racial and ethnic composition of each neighborhood.

Principal Findings. Discrimination due to race and discrimination due to other attributes were associated with poor self-assessed mental but not physical health in separate multivariable models. Persons who experienced multiple domains of discrimination had a greater probability of reporting poor mental health than persons who experienced no discrimination.

Conclusions. Discrimination due to race and other attributes was a significant correlate of mental health among Latinos and blacks independent of other accepted determinants of health.

Key Words. Discrimination, segregation, mental health, physical health

Disparities between the health of blacks, Latinos, and whites have been documented across a wide variety of health indicators. Black men and women have lower life expectancy than whites (Anderson et al. 1997; Geronimus et al. 1996; Williams 1999) and have higher age-adjusted death rates for 8 of the 10 leading causes of death (Williams 1999). The risk for low birth weight is higher among blacks compared to both white and Latino infants (Rowley 1994;

National Center for Health Statistics 1997). Latinos compared to whites have higher mortality rates among some age cohorts and subgroups (Amaro and Torre 2002) and for conditions such as cervical cancer (Wingo et al. 1998), sexually transmitted diseases (Centers for Disease Control and Prevention 1998), diabetes (Flegal et al. 1991), and HIV/AIDS (Centers for Disease Control and Prevention 1999).

Racial disparities in health have been shown to persist even after adjusting for socioeconomic status (Krieger et al. 1993; Williams and Collins 1995; Lille-Blanton and LaVeist 1996; Navarro 1990). This observation has resulted in a search for other explanations for the racial differences in health in the United States. A growing body of research is investigating the potential role of discrimination in shaping racial differences in health. Research has shown that individual experiences of racial discrimination are linked to depression (Salgado de Snyder 1987) and psychological distress (Ladrine et al. 1995; Meyer 1995; Broman 1996; Jackson et al. 1996; Amaro, Russo, and Johnson 1987; Williams et al. 1997). Experiences of discrimination have also been shown to be associated with rates of hypertension (Krieger 1990), raised blood pressure (James et al. 1984; Krieger and Sidney 1996), poorer self-rated health (Williams et al. 1997), increased cigarette smoking (Ladrine and Klonoff 1996), more reported days spent unwell in bed (Williams et al. 1997), and low birth weight among children whose mothers have been discriminated against (Collins et al. 2000).

The purpose of this study was to examine the association between individual experiences of discrimination and self-assessed mental and physical health among Latinos and blacks while adjusting for other known determinants of health (such as socioeconomic status and access to health care) that may be important confounders or mediators of this relationship. We also assessed if multiple domains of discrimination (racial discrimination and discrimination due to other attributes such as sex, age, sexual orientation, etc.) were associated with poor health.

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CONCEPTUAL FRAMEWORK

Discrimination has been defined as the "process by which a member, or members, of a socially defined group is, or are, treated differently because of his/her/their membership of that group" (Jary and Jary 1995). Discrimination may exist in multiple forms. For example, individual experiences of discrimination refer to discriminatory interactions between individuals that can be directly perceived. Structural discrimination refers to policies or practices that are discriminatory (Krieger 2000). Residential segregation is one form of structural discrimination that may affect health; other structural forms of structural discrimination such as redlining and political empowerment have also been studied (Gee 2002; Bobo and Gilliam 1990).

It has been suggested that individual experiences of racial discrimination may generate stress and in turn alter physiological processes that adversely affect health (Williams et al. 1997). However, it has been shown that individuals exposed to the same experience of discrimination have different stress responses. Research has found that blood pressure may be highest among blacks who actively try to overcome adversities (such as racial discrimination) but who have limited educational and socioeconomic resources to do so (James et al. 1984, 1987; James 1994).

The association between experiences of racial discrimination and health may also be affected by experiences of discrimination due to other attributes. While racial discrimination is the most prevalent form of discrimination experienced in the United States (Kessler, Mickelson, and Williams 1999), discrimination due to attributes such as one's sexual orientation, gender, age and mental illness are also common (Essed 1992; Vaid 1995; Gill 1996). A national survey of U.S. residents revealed that 33 percent of minority and nonminority respondents reported experiencing a major event of discrimination in their lifetime due to one of several attributes (Kessler, Mickelson, and Williams 1999). Persons who have more than one attribute that can be cause for discrimination may suffer discrimination due to multiple attributes. In one study, white gay men reported mainly antigay discrimination while lesbian women reported both antigay and gender discrimination, and black, gay women reported racial discrimination, antigay discrimination, and gender discrimination (Krieger and Sidney 1997). Another study found that lesbian and gay blacks reported higher rates of psychological distress than would be predicted based on the sum of their risk from experiences of racial, gender, and sexual orientation discrimination (Cochran and Mays 1994; Krieger 2000).

To appreciate the unique association between discrimination and health it is important to control for other potentially relevant contextual and individual-level factors that may confound or mediate this relationship. One such contextual factor is the racial and ethnic composition of one's neighborhood. Although research on the potential impact of racial/ethnic composition is sparse, evidence from research on residential segregation and health suggests some potential associations. Residential segregation may shape access to educational and employment opportunities and hence residents' socioeconomic status. According to this argument, individual socioeconomic status mediates the direct relationship between residential segregation and health (Williams 1999). Health can then be shaped by individual-level mechanisms such as health behaviors, which are associated with lowered socioeconomic status. For example it has been shown that low socioeconomic status, concentrated in areas of residential segregation, is associated with higher smoking rates (Flint and Novotny 1997). Racially segregated neighborhoods also have a paucity of facilities conducive to healthy lifestyles (such as athletic tracks or playing fields) (Williams and Collins 2001). In addition, targeted advertising for tobacco and alcohol in neighborhoods with a particular racial/ethnic composition, (Krieger 2000; Williams and Collins 2001) may impact health-related behaviors.

The racial and ethnic composition of one's neighborhood may also affect health by influencing more proximal determinants of health. For example, segregated communities frequently face a lack of health care providers and disproportionately low rates of health insurance; both factors are important predictors of differential access to medical care (Mayberry, Mili, and Ofili 2000). It has been shown that racial and ethnic minorities are less likely than whites to possess health insurance and to have a regular health care provider. They are more likely than whites to have difficulty getting care, to have fewer choices of where to receive care, and to receive care in an emergency room (Collins, Hall, and Neuhaus 1999).

Social relations and social support may play a unique role in shaping the relation between discrimination and poor health. For example, individuals with stronger social networks and higher levels of perceived social support may be better able to cope with major life stressors (Hirsch and Dubois 1992; Rhodes et al. 1994). By contrast, those who report lower levels of social support have been shown to be associated with increased risk of dying prematurely from several causes of death (see, for example, Berkman 1995; Berkman and Kawachi 2000). Resilience and vulnerability related to an individual's social support may affect her or his ability to cope with the stresses

of discrimination and may ultimately affect the relationship between discrimination and health.

Contributions to the Literature

In this study we explored the association between discrimination and health in both blacks and Latinos. It is important to explore the association between discrimination and health for other minority groups besides blacks because while blacks report the highest prevalence of discrimination experiences in studies among all racial/ethnic groups; other minority groups, namely Latinos and Asian-Pacific Islanders, also report discrimination experiences at higher levels than whites (Gee 2002; Public Health Special 2001). Although prior research suggests that multiple domains of discrimination experienced by individuals may be associated with poor health (Cochran and Mays 1994; Krieger and Sidney 1997; Diaz et al. 2001), little is known about the relation between experiences of multiple domains of discrimination and health. We assessed if individuals who experienced racial discrimination in addition to discrimination due to other attributes had worse health outcomes than those who experienced only a single domain of discrimination, racial or otherwise. The conceptual framework outlined above highlights the complexity of relationships that may exist between different social determinants and health. While prior work acknowledges the need to disentangle the relations between social and individual factors and health disparities, few studies consider the association between discrimination and health while adjusting for the presence of multiple potentially confounding or mediating factors. In this study, we assessed the relation between individual and contextual forms of discrimination and health while controlling for socioeconomic status, access to health care, social support, and smoking.

Methods

Sample

In this cross-sectional study, our sampling frame was adults 18 years of age or older living in the South Bronx, East Harlem, Central Harlem, and Bedford-Stuyvesant New York City, in households with telephones, during 2002. Neighborhoods were selected and defined by zip codes, which were determined through consultation with community members to be a reason-

able approximation of the neighborhoods in these areas. Using random-digit dialing, calls to households were made during evenings, weekends, and normal working hours. Numbers where there was no one at home received repeated calls daily for up to ten days. Once a household was reached, geographic eligibility was determined by asking respondents to identify their zip code. Households within our neighborhood boundaries were considered eligible.

We made 10,187 telephone contacts. Among these, 827 were never answered except by answering machines, and 393 numbers were not eligible for other reasons (mainly languages other than English and Spanish). We spoke with a total of 8,967 households; 2,459 were callbacks still not reached at the end of the study to complete the screening for eligibility. Among the 6,508 households with a resolved contact, 2,012 refused to complete the initial screening for the interviewing. Among the 4,496 screened, 3,072 persons screened out of the survey, 206 were not interviewed because the quota for their gender and neighborhood had been filled, and we completed interviews with 1,003 of the remaining 1,218 persons. After qualifying, 121 refused, and 94 were in callback status at study completion. The overall cooperation rate based on the sum of the number of completed interviews, quota outs, and screen-outs (i.e., 1,003 + 206 + 3,072) divided by the sum of completed interviews, quota outs, screen outs, refusals, and premature terminations (i.e., 1,003 + 206 + 3,072 + 2,012 + 121) was 66.7 percent. The overall response rates was 43.7 percent based on number of completed interviews, quota outs, and screen-outs divided by the sum of all contacts, persons not screened, refusals, and call backs not screened (American Association for Public Opinion Research 2000).

For households with more than one eligible adult, a respondent was randomly selected using a variation of the Kish procedure (Kish 1949). We asked to interview the household member whose birthday fell closest to the date of our call. This method ensured that the selected respondent was not simply the one who happened to be at home the most or who was most interested in talking on the phone. All responses were weighted to account for the number of individuals within a household and number of telephones within the household. All analyses were carried out using the weighted sample. The study was reviewed and approved by the Institutional Review Board of The New York Academy of Medicine.

Instrument

A structured 25-minute interview was administered by trained interviewers using a computer-assisted telephone interviewing system. The instrument was

available in English and Spanish. Back translation of the instrument from Spanish to English verified the consistency of questions asked. Native Spanish and English speakers carried out the interviews in their respective languages. The interview included questions regarding each respondent's age, gender, educational level, marital status, physical and mental health, family income, social support, access to health insurance and a regular source of care, smoking behavior, and experiences of discrimination. The survey instrument was pilot-tested in telephone interviews before the start of the study.

Measurement

1. Self-assessed Physical and Mental Health. We used two of the Centers for Disease Control's Health Related Quality of Life Measures to assess physical and mental health. These questions have known validity, reliability, and responsiveness (Andreson et al. 2000, 2001) and have been used in other well-known questionnaires (Behavioral Risk Factor Surveillance System Questionnaire and the National Health and Nutrition Examination Survey). The questions are: "for how many days during the past 30 days was your physical health not good?" and "for how many days during the past 30 days was your mental health not good?" We created two variations of both the physical and mental health measure: an ordered polychotomous dependent variable coded as no poor health days, poor health days below the mean for the sample, and poor health days above the mean for the sample and a dichotomous outcome variable coded as no poor health days and at least one poor health day.

2. Sociodemographic Measures. Age was coded as a categorical variable (18–34, 35–54, 55–64, 65 or older). Race was dummy-coded (black and Latino). Country of origin was also dummy-coded among Latino respondents (Puerto Rico, Dominican Republic, Mexico, and Other). Information on income and education was obtained to characterize the socioeconomic status of respondents. Education or schooling was coded as either less than high school education, high school education, or greater than a high school education. Household income was measured in the last year and was dummy-coded in three categories (less than $20,000, between $20,000 and 50,000, and more than $50,000). A dummy variable was also created for persons who were missing data on income.

3. Interpersonal Discrimination. To record perceptions of discrimination we asked the following question: "Have you ever been discriminated against, including being hassled or prevented from doing something because of any of the following [ITEM]?" (Krieger 1990). The question was repeated for each of

the following variables: age, race, gender, appearance such as obesity or tattoos, poverty, being on welfare, religion, mental illness, physical illness or disability, immigration status, sexual orientation, and having a criminal record. Respondents were prompted to provide other answers and these were recorded if volunteered. We dummy-coded responses to this question in the following manner: 0 = no discrimination reported, 1 = only racial discrimination reported, 2 = nonracial discrimination reported, 3 = racial and nonracial discrimination reported.

4. Other Relevant Covariates. We determined individual social support using three questions from the Medical Outcomes Study: "In the last 12 months, how often was each of the following available to you [ITEM]?" The items were: someone available to help you if you were confined to a bed, someone available to give you good advice about a crisis, someone available to love you and make you feel wanted (Sherbourne and Stewart 1991). These items have an alpha correlation of .76 in previous work done by the authors (Galea et al. 2002). Possible responses to these questions included none of the time, some of the time, most of the time, or all of the time. Responses were summed to create a scale ranging from 1 to 12. Those receiving a score between 9 and 12 (indicating a high level of social support) were coded as a 0, those receiving a score between 5 and 8 (indicating a medium level of social support) were coded as a 1, and those receiving a score of less than or equal to 4 were coded as a 2 indicating low levels of social support.

Separate black and Latino measures of the racial and ethnic composition of the neighborhood were created and analyzed in separate models. These measures were based on the proportion of black and Latino residents within the study's zip codes compiled from 2000 Census data. We created a categorical variable to compare areas of low racial and ethnic composition (proportion of black or Latino residents is less than 25 percent) to areas of medium racial and ethnic composition (proportion of black or Latino residents is between 25 and 50 percent) and high areas of racial and ethnic composition (the proportion of black and Latino residents is greater than 50 percent).

To assess access to health care we asked respondents if they have health insurance and a regular source of care. Having health insurance coverage was modeled as a dichotomous variable where not having health insurance was coded a 1 and having insurance was coded as 0. Having a usual source of care was also included as a dichotomous variable where not having a usual source of care was coded as 1 and having a usual source of care was coded as 0. If the respondent reported smoking cigarettes in the past 12 months they were

coded as a 2 for everyday smoker, 1 for some day smoker, and 0 for nonsmoker.

Statistical Analysis

Nonblack and non-Latino respondents were excluded for a total weighted sample of 873. We provide descriptive statistics for the study population and used a chi-square test to assess differences between blacks and Latinos. We show bivariate relations between the covariates of interest and self-assessed mental and physical health. Using the full sample, we used Generalized Estimating Equations (GEE) to fit multilevel multivariable models to assess the relationship between the covariates of interest and self-assessed mental and physical health controlling for potential intrazip code correlations. Racial and ethnic composition was modeled as a zip-code-level variable in all multivariable models. We modeled the dependent variables of interest (poor mental and physical health days) as both polychotomous and dichotomous variables. Model fit was not appreciably different and there was little substantive difference in effect parameters in both forms. Here we show only results of the logistic models. Parameter estimates and standard errors are shown for unadjusted and adjusted analysis. Statistical interaction between key individual and group-level determinants was examined using model interaction terms. To facilitate a discussion of the magnitude of our results, we calculated model-based relative changes in probability of poor mental and physical health based upon various combinations of racial and other domains of discrimination. To assess differences in association between discrimination and mental and physical health in blacks and Latinos we carried out stratified analyses by race.

RESULTS

Overall sample sociodemographics were comparable to census sociodemographics for the total sample within each of the four neighborhoods (data not shown). Table 1 shows selected respondent characteristics for the overall sample and stratified by race. Latinos compared with black respondents had lower reported household incomes, less education, and were younger. Latinos were more likely to report no experience of discrimination in their lifetime (62 percent) compared with black respondents (47 percent). Notably, black respondents reported experiences of racial discrimination (17 percent) more often than Latino respondents (8 percent). Blacks also were more likely than

Table 1: Characteristics of Survey Respondents in Four New York City Neighborhoods[a] by Race

	Total, N= 873		*Black, N= 455 (52%)[b]*		*Latino, N= 418 (48%)[c]*		
Demographics	*N*	*%*	*N*	*%*	*N*	*%*	*(X^2)[d]*
Gender							0.02
Female	488	44.1	256	56.2	233	55.7	
Male	385	56.0	199	43.8	185	44.3	
Family income, $							18.34*
<20,000	292	46.3	127	39.6	166	53.3	
20,000–50,000	238	37.8	127	39.7	111	35.8	
>50,000	100	15.9	66	20.7	34	11.0	
Missing income	242	27.7	135	29.7	107	25.6	
Age							20.97**
18–34	343	40.4	154	35.1	189	46.1	
35–54	329	38.8	169	38.4	161	39.2	
55–65	95	11.2	61	13.8	35	8.4	
65+	81	9.6	56	12.7	26	6.3	
Education							43.76**
Less than high school	210	24.6	68	15.4	142	34.4	
High school graduate	262	30.7	142	32.2	120	29.1	
Any college	382	44.7	232	52.4	150	36.5	
Country of Origin							
Puerto Rico					209	50.4	
Dominican Republic					88	21.1	
Mexico					32	7.7	
Other					86	20.8	
Discrimination							
Types of discrimination							27.17**
No discrimination	474	54.3	216	46.5	258	61.7	
Racial only	110	12.6	79	17.3	31	7.5	
Nonracial only	180	20.6	56	12.3	53	12.6	
Racial and nonracial	109	12.5	104	22.8	76	18.2	
Other Relevant Covariates							
Insurance							10.86*
No	111	13.1	41	9.4	70	17.0	
Yes	734	86.9	395	90.6	340	83.0	
Regular source of care							2.25
No	155	17.8	72	16.0	83	19.8	
Yes	716	82.2	380	84.0	335	80.2	
Social support							26.72**
Low	245	28.1	100	21.9	145	34.8	
Medium	393	45.0	204	44.9	189	45.2	
High	235	26.9	151	33.2	84	20.1	
Smoke							8.47*
Every day	144	16.5	90	19.7	54	12.2	
Some days	133	15.3	61	13.5	72	17.3	
Not at all	595	68.2	304	66.8	291	69.8	

[a]The four neighborhoods included the South Bronx, East Harlem, Central Harlem, and Bedford-Stuyvesant

[b]N may not add to 455 due to missing values.

[c]N may not add to 418 due to missing values.

[d]Two-tailed chi-square *p*-value.

**$p<.001$, *$p<.05$.

Latinos to report multiple domains of discrimination (23 percent versus 18 percent). Latinos reported being uninsured more often than blacks (17 percent versus 9 percent), and were less likely to report high levels of perceived social support compared to blacks (20 percent versus 33 percent). Blacks reported smoking every day more often than Latinos (20 percent versus 12 percent).

Unadjusted and adjusted associations between each covariate and poor mental health are shown in Table 2. The following factors were positively associated with poor mental health in adjusted analyses: younger age, any experience of discrimination (racial, nonracial, and multiple domains), and living in a highly segregated Latino neighborhood. By contrast, respondents living in highly segregated black neighborhoods were less likely to report poor mental health.

Shown in Table 3, factors that were positively associated with poor physical health in adjusted analyses were having less than a high school education and living in a highly segregated black neighborhood. Respondents living in highly segregated Latino neighborhoods were less likely to report physical health problems. Interpersonal experiences of discrimination were not associated with poor physical health.

To facilitate a discussion of the magnitude of the relation between interpersonal discrimination and poor mental and physical health we calculated model-based relative probability changes by varying the domains of discrimination under specified model conditions (see Legend to Table 4). Although these results are not generalizable to each member of the sample, they provide an estimate of the magnitude of the relation between experiences of discrimination and health at the population level. Respondents experiencing only racial discrimination were 17 percent more likely to report poor mental health compared with respondents experiencing no discrimination. Respondents experiencing a domain of discrimination other than race were 34 percent more likely to report poor mental health compared with respondents reporting no discrimination. Respondents experiencing racial discrimination and another domain of discrimination were 23 percent more likely to report poor mental health compared with respondents reporting no discrimination. By contrast, the association of interpersonal discrimination and poor physical health was smaller (8–9 percent).

Adjusted analyses stratified by race (Table 5) showed that experiences of discrimination were more highly associated with poor mental health among blacks as compared with Latinos, although the effect sizes for the parameter estimate measuring discrimination were not directly comparable.

Table 2: Unadjusted and Adjusted Associations between Covariates and Self-assessed Poor Mental Health ($N = 843$)[a]

	Poor Mental Health[b]					
	Unadjusted		*Adjusted*[c]		*Adjusted*[d]	
	b	*SE*	*b*	*SE*	*b*	*SE*
Demographics						
Race						
Black	−0.05	0.16	0.31	0.19	0.33	0.19
Hispanic (ref)	–	–	–	–	–	–
Gender						
Female	0.13	0.16	0.28	0.17	0.28	0.17
Male (ref)	–	–	–	–	–	–
Family income, $						
<20,000	0.21	0.27	−0.02	0.31	0.003	0.31
20,000–50,000	−0.04	0.27	−0.24	0.30	−0.23	0.30
>50,000 (ref)	–	–	–	–	–	–
Missing income	−0.14	0.28	−0.20	0.31	−0.17	0.31
Age						
18–34 (ref)	–	–	–	–	–	–
35–54	−0.19	0.18	−0.25	0.19	−0.24	0.19
55+	−0.77*	0.30	−0.83*	0.31	−0.86*	0.30
65+	−0.93**	0.28	−1.08**	0.30	−1.06**	0.30
Education						
Less than high school	0.28	0.20	0.64*	0.26	0.65*	0.26
High school graduate	0.26	0.19	0.43*	0.21	0.43*	0.21
Any college (ref)	–	–	–	–	–	–
Discrimination Variables						
Types of discrimination						
No discrimination (ref)	–	–	–	–	–	–
Racial only	0.22	0.23	0.53*	0.25	0.54*	0.25
Nonracial only	0.18**	0.23	1.24**	0.25	1.26**	0.25
Racial and nonracial	0.74**	0.24	0.75**	0.26	0.74**	0.26
Other Relevant Covariates						
Insurance						
No	−0.008	0.25	−0.16	0.27	−0.15	0.27
Yes (ref)	–	–	–	–	–	–
Regular source of care						
No	0.23	0.21	0.13	0.24	0.13	0.24
Yes (ref)	–	–	–	–	–	–
Social support						
Low	0.25	0.22	0.12	0.24	0.16	0.24
Medium	0.29	0.19	0.36	0.20	0.38	0.20
High (ref)	–	–	–	–	–	–
Black composition						
<25% (ref)	–	–	–	–		
25–50%	−0.34	0.23	−0.31	0.24		
50+%	−0.59**	0.22	−0.60*	0.23		

Table 2: *Continued*

	Poor Mental Health[b]					
	Unadjusted		*Adjusted*[c]		*Adjusted*[d]	
	b	*SE*	*b*	*SE*	*b*	*SE*
Latino composition						
<25% (ref)	–	–			–	–
25–50%	0.36	0.22			0.40	0.24
50+%	0.42*	0.18			0.49*	0.21

[a]Sample size was reduced by 30 respondents due to missing values.
[b]Poor mental health was defined as one or more poor mental health day in the past 30 days.
[c]Model includes black neighborhood composition variable.
[d]Model includes Latino neighborhood composition variable.
**$p < .001$, *$p < .05$.

DISCUSSION

Identifying the factors strongly associated with poor health in minority populations is an essential first step toward the elimination of racial disparities in health. In this study, we showed that in four low-income neighborhoods in New York City experiences of racial and other domains of discrimination were common among blacks and Latinos and were comparable with estimates observed in the general population (Kessler, Mickelson, and Williams 1999). Blacks were more likely than Latinos to report experiences of both racial and other domains of discrimination. We showed that after adjusting for contextual and individual factors identified by the previous literature as plausible explanations for racial health disparities, experiences of discrimination, including discrimination due to race, due to other domains, and due to multiple domains were associated with poor mental health. Although not always in the ways expected, there was a relationship between the racial and ethnic composition of neighborhoods and poor mental and physical health. High racial and ethnic composition was associated with poor physical health among blacks and with poor mental health among Latinos. By contrast, individuals living in disproportionately black neighborhoods were less likely to report poor mental health and individuals living in highly segregated Latino zip codes were less likely to report poor physical health.

The finding that experiences of discrimination were associated poor mental but not physical health is consistent with other research (Krieger 2000; Gee 2002; Williams, Spencer, and Jackson 1999). We used a measure of

Table 3: Unadjusted and Adjusted Associations between Covariates and Self-assessed Poor Physical Health ($N = 843$)[a]

	Poor Physical Health[b]					
	Unadjusted		*Adjusted*[c]		*Adjusted*[d]	
	b	*SE*	*b*	*SE*	*b*	*SE*
Demographics						
Race						
Black	0.16	0.16	0.15	0.19	0.15	0.19
Hispanic (ref)	–	–	–	–	–	–
Gender						
Female	0.02	0.16	−0.07	0.17	−0.08	0.17
Male (ref)	–	–	–	–	–	–
Family income, $						
<20,000	0.53*	0.27	0.44	0.30	0.43	0.30
20,000–50,000	−0.09	0.28	−0.10	0.28	−0.10	0.28
>50,000 (ref)	–	–	–	–	–	–
Missing income	0.15	0.29	−0.04	0.30	−0.05	0.30
Age						
18–34 (ref)	–	–	–	–	–	–
35–54	0.09	0.18	0.04	0.19	0.03	0.19
55+	−0.09	0.28	−0.21	0.30	−0.22	0.30
65+	0.46	0.26	0.33	0.27	0.31	0.27
Education						
Less than high school	0.56*	0.20	0.57*	0.23	0.58*	0.23
High school graduate	0.14	0.19	0.05	0.21	0.05	0.21
Any college (ref)	–	–	–	–	–	–
Discrimination Variables						
Types of discrimination						
No discrimination (ref)	–	–	–	–	–	–
Racial only	−0.10	0.67	0.20	0.25	0.20	0.25
Nonracial only	0.03	0.88	0.19	0.23	0.17	0.23
Racial and nonracial	−0.01	0.96	0.17	0.24	0.16	0.24
Other Relevant Covariates						
Insurance						
No	0.41	0.26	0.42	0.29	0.41	0.29
Yes (ref)	–	–	–	–	–	–
Regular source of care						
No	0.27	0.22	0.11	0.25	0.09	0.25
Yes (ref)	–	–	–	–	–	–
Social support						
Low	−0.007	0.22	−0.03	0.23	−0.05	0.23
Medium	−0.010	0.19	0.01	0.19	0.007	0.19
High (ref)	–	–	–	–	–	–
Smoke						
Every day	0.05	0.21	−0.01	0.22	−0.003	0.22
Some days	0.04	0.25	−0.04	0.26	−0.04	0.26
Not at all (ref)	–	–	–	–	–	–

Table 3: *Continued*

	Poor Physical Health[b]					
	Unadjusted		*Adjusted*[c]		*Adjusted*[d]	
	b	*SE*	*b*	*SE*	*b*	*SE*
Black composition						
<25% (ref)	–	–	–	–		
25–50%	0.04	0.25	0.09	0.25		
50+%	0.36	0.24	0.49*	0.25		
Latino composition						
<25% (ref)	–	–			–	–
25–50%	−0.11	0.23			−0.04	0.25
50+%	−0.35*	0.18			−0.41*	0.29

[a]Sample size was reduced by 30 respondents due to missing values.
[b]Poor physical health was defined as one or more poor mental health day in the past 30 days.
[c]Model includes black neighborhood composition variable.
[d]Model includes Latino neighborhood composition variable.
**$p < .001$, *$p < .05$.

mental health that may have encompassed several aspects of mental health, including life satisfaction, feelings of depression, unhappiness, and psychological distress, and we measured the role of perceived discrimination as a recent stressor. These aspects of mental health were plausibly influenced by situational stressors in the relative short-term and thus may have been more susceptible to our discrimination measure (Benschop and Schedlowski 1999). However, the measure of physical health we used in this study may reflect more chronic conditions with complicated intervening and mediating factors that might modify the hypothesized relations between discrimination and physical health. Longitudinal research that takes into account the cumulative burden of discrimination over time is needed to further explore the relationship between experiences of discrimination and health. One such study found that cumulative experiences of discrimination resulted in poorer mental health but, contrary to the authors' expectations, was also associated with slightly better physical health (Jackson et al. 1996).

In our study, there was no independent relation between race and mental health in multivariable models adjusting for discrimination and other covariates. In stratified analyses, the association between discrimination and poor mental health was somewhat greater for blacks as compared with Latinos, although model coefficients between stratified black and Latino

Table 4: Model-Based Relative Changes in Probability of Poor Health with Varying Domains of Discrimination ($N = 843$)[a]

Discrimination			*% Change*[d]	
Racial Discrimination Only	Nonracial Discrimination Only	Racial and Nonracial Discrimination	Poor Mental Health[b]	Poor Physical Health[c]
No	No	No	–	–
Yes	No	No	0.17	0.09
No	Yes	No	0.34	0.09
No	No	Yes	0.23	0.08

[a]Sample size was reduced by 30 respondents due to missing values.

[b]Model assumes respondent was a middle-aged black female, with income of less than $20,000 a year, who has less than a high school education, insurance but no regular source of care, a medium level of social support, and who lived in a neighborhood that was 25–50% African American.

[c]Model assumes respondent was a middle-aged black female, with an income of less than $20,000 a year, who has less than a high school education, has insurance but no regular source of care, has a medium level of social support, was an occasional smoker, and lived in a neighborhood that is 25–50% African American.

[d]Percent change between model-based probability of having at least one poor health day in the past 30 days for the given discrimination domains compared to no discrimination.

models were not directly comparable. There has been relatively little research on the relationship between discrimination and health and this is especially true for nonblack minorities. One study examining a broad array of discrimination experiences showed an association between poor mental health and discrimination only among blacks but not other minority groups (Williams, Spencer, and Jackson 1999). A study of Mexican-American women found that racial discrimination was associated with higher levels of psychological distress in this group (Salgado de Snyder 1987). Gee (2002) showed that racial discrimination adversely affects the health of Chinese Americans. Our work begins to suggest that the relative contribution of discrimination to health may differ between racial/ethnic groups and the risk factors that confound or modify these relations may vary by race and ethnicity.

In this study Latinos were less likely than blacks to have access to health insurance and to perceive high levels of social support. If these factors mediate the adverse relation between discrimination and health, experiences of discrimination may be more detrimental to health for Latinos than for blacks. For example, the existence of social support may allow a person experiencing discrimination to recognize and discuss these experiences with others. On the other hand, experiences of racial discrimination may be more common for

Table 5: Multilevel adjusted Models Predicting Self-assessed Poor Mental and Physical Health, by Race[a]

	Poor Mental Health[b]				*Poor Physical Health*[c]			
	Black (N= 461)		*Latino (N= 382)*		*Black (N= 461)*		*Latino (N= 382)*	
	E	*SE*	*E*	*SE*	*E*	*SE*	*E*	*SE*
Demographics								
Gender								
Female	0.20	0.25	0.49	0.26	0.05	0.24	−0.37	0.25
Male (ref)	–	–	–	–	–	–	–	–
Family income, $								
<20,000	−0.07	0.40	−0.32	0.60	0.96*	0.41	−0.03	0.49
20,000–50,000	−0.11	0.39	−0.66	0.58	0.76*	0.38	−1.34*	0.51
>50,000 (ref)	–	–	–	–	–	–	–	–
Missing income	−0.28	0.39	−0.36	0.60	0.28	0.41	−0.49	0.29
Age								
18–34 (ref)	–	–	–	–	–	–	–	–
35–54	0.16	0.27	−0.57	0.30	0.16	0.26	−0.21	0.29
55+	−0.94*	0.39	−0.84	0.47	−0.67	0.46	0.09	0.45
65+	−0.78	0.43	−1.48*	0.50	0.39	0.38	−0.37	0.50
Education								
Less than high school	1.39*	0.39	0.19	0.34	1.47**	0.37	0.04	0.32
High school graduate	0.88*	0.30	0.08	0.31	0.45	0.29	−0.30	0.31
Any college (ref)	–	–	–	–	–	–	–	–
Country of origin								
Puerto Rico (ref)			–	–			–	–
Dominican Republic			−0.45	0.37			−0.53	0.36
Mexico			−0.16	0.53			−2.20*	0.74
Other			0.09	0.32			−0.23	0.33
Discrimination								
Types of discrimination								
No discrimination (ref)	–	–	–	–	–	–	–	–
Racial only	0.65*	0.34	0.59	0.45	0.04	0.33	0.57	0.47
Nonracial only	1.64**	0.32	1.25**	0.38	0.34	0.31	0.11	0.36
Racial and nonracial	0.88*	0.39	0.42	0.38	−0.39	0.36	0.13	0.35
Other Relevant Covariates								
Insurance								
No	−0.14	0.45	−.014	0.37	0.30	0.45	0.94*	0.42
Yes (ref)	–	–	–	–	–	–	–	–
Regular source of care								
No	0.60	0.36	−0.16	0.33	0.21	0.35	0.08	0.36
Yes (ref)	–	–	–	–	–	–	–	–
Social support								
Low	0.36	0.35	−0.08	0.36	0.08	0.33	−0.33	0.36
Medium	0.56*	0.28	0.17	0.33	0.12	0.27	0.55	0.32
High (ref)	–	–	–	–	–	–	–	–

continued

Table 5: *Continued*

	Poor Mental Health[b]				*Poor Physical Health*[c]			
	Black (N = 461)		*Latino (N = 382)*		*Black (N = 461)*		*Latino (N = 382)*	
	E	*SE*	*E*	*SE*	*E*	*SE*	*E*	*SE*
Smoke								
Every day					−0.41	0.30	0.22	0.35
Some days					−0.07	0.38	0.20	0.39
Not at all (ref)					–	–	–	–
Racial and ethnic composition								
Low (ref)	–	–	–	–	–	–	–	–
Medium	−0.35	0.40	1.02*	0.45	0.09	0.40	0.02	0.39
High	−0.70*	0.36	0.90*	0.38	0.32	0.37	−0.56*	0.24

[a]Sample size is reduced by 30 respondents due to missing values.
[b]Poor mental health was defined as one or more poor mental health day in the past 30 days.
[c]Poor physical health was defined as one or more poor physical health day in the past 30 days.
**$p < .001$, *$p < .05$.

blacks as compared with Latinos, suggesting that at a population level, the influence of discrimination on health may be more influential in explaining higher rates of adverse health conditions among blacks than among other racial/ethnic groups.

Also of note was the substantial association between nonracial forms of discrimination and mental health. Our study was not adequately powered to examine the association between each domain of discrimination measured in this study and the dependent variables of interest. Because of the uniqueness of our black and Latino sample, we focused on the impact of race discrimination and grouped other domains of discrimination together. Ideally we would have assessed the association of each domain of discrimination separately. Although discrimination due to race appears to be the most prevalent form of discrimination in the general population (Kessler, Mickelson, and Williams 1999), a growing body of research has shown that multiple types of discrimination affect health differently in specific subgroups (Krieger 1990; Landrine et al. 1995; Mays and Cochran 2001).

Persons of color disproportionately have attributes that make them susceptible to experiencing multiple domains of discrimination compared with whites. For example, ethnic minorities are overrepresented among the poor. The poor are disproportionately women who live in single-parent

households and are at increased risk for a broad spectrum of mental health disorders. In this study, we found that persons who experienced more than one domain of discrimination were more likely to be in poor mental health. This suggests that in measuring discrimination due to categorical domains we may be underestimating the role of discrimination as a potential explanation for racial disparities in health. The ultimate consequences of discrimination are likely to include interactions between multiple domains of interpersonal discrimination. Research that is powered to detect statistical interaction is needed to assess the role of multiple domains of discrimination on health.

The finding that residents of neighborhoods where there was a high proportion of blacks were more likely to have poor physical health, but not poor mental health, was somewhat puzzling. Also unexpected was our observation that residents of neighborhoods where there was a high proportion of Latinos were more likely to have poor mental health but were less likely to be in poor physical health. In our conceptual framework we discussed possible mechanisms whereby the racial and ethnic composition of neighborhoods may harm health, although research in this area is in its infancy. It is possible that having a high composition of one ethnic group in a neighborhood would positively affect mental health by increasing mutual social support and by reducing exposure to discrimination (Halpern 1993; Halpern and Nazroo 1999).

In addition, there is some recent evidence to suggest that blacks and Latinos may have different reporting patterns of self-assessed physical and mental health. Two recent studies found that race and ethnicity were associated with disparities in self-assessed health status independent of socioeconomic status, suggesting there may be racial and cultural variation in the interpretation of health (Ren and Amick 1996; Zimmer et al. 2000).

Limitations

Telephone surveys present enormous challenges. In our study we had a response rate of 43.7 percent and a cooperation rate of 66.7 percent despite efforts made to minimize refusal rates and to recontact individuals. While approximately 96 percent of New York residents have telephones in their homes, this percentage may not be as high in lower-income neighborhoods (Northridge et al. 1998). In addition, individuals without working telephones may be different from other residents of the city in ways that might obscure the observed association between discrimination and health. For example, prior research conducted in Harlem has shown that nearly one-fifth of the

population lacked working telephones, and persons in those households had higher rates of smoking (61 percent) than those living in homes with working telephones (40 percent) (Northridge et al. 1998). Persons without phones may be more vulnerable to experiences of discrimination because of their lower socioeconomic status. It is also plausible that persons who have been discriminated against in the past may be less likely to respond to telephone surveys because of previous negative experiences and a lack of trust toward an unknown, unseen interviewer. However, we note that careful comparisons between our sample and census demographics found no significant differences between our respondents and residents of the four neighborhoods surveyed. It is reassuring that we have obtained a representative sample of residents in these neighborhoods. Insofar as it is plausible that persons who may have been discriminated against may be less likely to participate in this study, this would result in an underestimation of the prevalence of discrimination and its association to health.

For this study the populations of the South Bronx, East Harlem, Central Harlem, and Bedford-Stuyvesant in New York City were sampled. The racial and ethnic composition of each neighborhood was classified based on the respondent's zip code. Zip codes may not be homogeneous in their sociodemographic characteristics (Kaplan and Van Valey 1980). Although it would have been optimal to obtain the respondents' home addresses so that we could link the survey data to census tracts and block-groups, which are based on smaller numbers of people, this was not possible in the context of an anonymous survey that was designed to ask about sensitive behaviors and experiences. We note that in the context of the neighborhoods being studied, zip codes were probably a reasonable approximation of meaningful neighborhoods for their residents and, as such, we feel that, within stated limitations, provide valuable data that can form the empiric basis for the observations in this manuscript.

We used self-reported measures of discrimination, physical and mental health, and the other relevant covariates. Although self-reported health has been shown to be a robust predictor of morbidity and mortality (Idler and Angel 1990; Ferraro and Su 2000), it is possible that persons who are more likely to perceive discrimination may also overreport mental or physical health problems. In addition, there is ongoing recognition that the cumulative burden of discrimination, individual responses to it, and the context in which discrimination occurs (e.g., employment, from police) mediate or modify discrimination's relation to health. Research is needed to assess the relative importance of these factors for different domains of discrimination in varying

subgroups. Additional research is also needed to assess the health impacts of nonracial domains of discrimination. In this study nonracial domains of discrimination were more strongly correlated with poor mental health than discrimination due to race.

Because this study was carried out cross-sectionally we cannot infer causality in terms of the direction of the observed association between interpersonal discrimination and health. Although our study was adequately powered to detect relations between experiences of discrimination and the dependent variables of interest, a larger sample is needed to confirm the absence of cross-level interaction between experiences of discrimination and contextual discrimination observed in this study.

CONCLUSION

This study showed that experiences of discrimination were associated with poor mental health even when individual and contextual factors, which are commonly assumed to contribute to health disparities, were taken into account. These findings underscore the observation that socioeconomic status is only part of the explanation for observed racial disparities in health and investigation of further explanations is needed. In this analysis we showed that individuals experiencing multiple domains of discrimination were at a greater risk for poor mental health. Research on health disparities in the United States should include work on the association between racial and nonracial domains of discrimination and health and discrimination due to multiple attributes and health.

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