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Discrimination and Its Consequences for Health

DISCRIMINATION AND HEALTH INEQUITIES*

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In 1999, only 20 studies in the public health literature employed instruments to measure self-reported experiences of discrimination. Fifteen years later, the number of empirical investigations on discrimination and health easily exceeds 500, with these studies increasingly global in scope and focused on major types of discrimination variously involving race/ethnicity, indigenous status, immigrant status, gender, sexuality, disability, and age, separately and in combination. And yet, as I also document, even as the number of investigations has dramatically expanded, the scope remains narrow: studies remain focused primarily on interpersonal discrimination, and scant research investigates the health impacts of structural discrimination, a gap consonant with the limited epidemiologic research on political systems and population health. Accordingly, to help advance the state of the field, this updated review article: (a) briefly reviews definitions of discrimination, illustrated with examples from the United States; (b) discusses theoretical insights useful for conceptualizing how discrimination can become embodied and produce health inequities, including via distortion of scientific knowledge; (c) concisely summarizes extant evidence—both robust and inconsistent—linking discrimination and health; and (d) addresses several key methodological controversies and challenges, including the need for careful attention to domains, pathways, level, and spatiotemporal scale, in historical context.

Our future survival is predicated upon our ability to relate within equality.

—Audre Lorde, 1980

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Inequality hurts. Discrimination harms health. These seem like straightforward, even self-evident, statements. They are propositions that epidemiologists can test, just like any other proposition about health that we investigate.

When I wrote the above paragraph, in 1999, in the first published epidemiologic review article on discrimination and health (1), empirical research on discrimination as a determinant of population health was in its infancy.

At that time, I could identify only 20 studies in the public health literature that employed instruments to measure self-reported experiences of discrimination. Of these, 15 focused on racial discrimination (13 on African-Americans, two on Hispanics and Mexican-Americans), two of which additionally addressed gender discrimination; another solely examined gender discrimination; three investigated discrimination based on sexual orientation; and one concerned discrimination based on disability; all were from the United States; none addressed discrimination based on age.

Since then, research has burgeoned. As I discuss below, the number of empirical studies that directly measure exposure to discrimination to analyze its links to health easily exceeds 500, as tallied up in review articles, with these studies increasingly global in scope and focused on major types of discrimination (Table 1) variously involving race/ethnicity, indigenous status, immigrant status, gender, sexuality, disability, and age, separately and in combination. And yet, as I will also document, even as the number of investigations has dramatically expanded, the scope remains narrow. The overwhelming emphasis is on interpersonal discrimination, referring to encounters between individuals in which one person acts in an adversely discriminatory way toward another person, with this type of discrimination primarily conceptualized as a psychosocial stressor, and on the biological consequences of exposure to toxic stress. By contrast, empirical studies on the health impacts of structural discrimination, referring to discrimination enacted by institutions (e.g., laws or rules that impose adverse discrimination, by design, such as legalized racial discrimination, or in effect, such as the racialized impact of the New York Police Department's "stop-and-frisk" policy, under legal contest at the time of preparing this review [2]), remain scant, a gap consonant with the limited epidemiologic research on political systems and population health (3, 4).

The individual-level approach to analyzing discrimination and health, moreover, coexists with the still-dominant biomedical orientation, also focused on the individual level, which typically ignores social determinants of health and emphasizes genetic causes of disease within individuals to explain group rates of disease (4, 5). Exemplifying the dominant orientation (6), not only did the National Institutes of Health's 2008–2009 biennial report to Congress (7) allocate only 46 of its 732 pages to "Minority Health and Health Disparities" but also within these 46 pages the clear emphasis was on assumed genetic explanations of racial/ethnic differences in health status. Thus, the terms "genome," "genomic," "genetic," and "gene" appear 87 times, whereas "social determinants of health"

and “discrimination” each occur once, “socioeconomic” seven times, “poverty” twice, and “racism” not at all (7, 8).

Of course, knowledge of biological mechanisms is vital for vetting causal claims. Equally essential, however, is research on the societal mechanisms that generate discrimination and the myriad pathways, material as well as psychological, by which it becomes embodied and biologically expressed in individuals’ health status and population patterns of health inequities (4, 8). Stated simply, all biological phenomena—including health and disease—involve gene expression; what stands out is the neglect of the societal and ecological context driving this expression. At issue are not only day-to-day living and working conditions but also the exercise of civil, political, economic, social, and cultural rights—that is, human rights (9–11).

The question at hand, after all, is how individual and population health are affected by the economic consequences of discrimination and the accumulated insults arising from everyday and at times violent experiences of being treated as a second-class citizen. Focus solely on experiences that people can self-report, or on what can be gleaned from experimental studies, and neglect analysis of discriminatory exposures that can only be measured at the population level, and the full picture of discrimination’s toll recedes from view (8, 12). The totality of evidence of embodied harm, from institutionally to individually imposed, whether or not consciously named as discrimination by the targets of the discriminatory actions, is crucial—both for analyzing etiology and for guiding action to rectify and prevent health inequities.

Accordingly, to help advance the state of the field, this article will first briefly review definitions of discrimination, offer illustrations of their patterns within the United States, and discuss theoretical insights useful for conceptualizing how discrimination can become embodied and produce health inequities, including via distortion of scientific knowledge. It then will concisely summarize extant evidence—both robust and inconsistent—linking discrimination and health, after which it will focus on several key methodological controversies and challenges. The examples discussed, while often drawing on U.S. data (which still constitutes the bulk of work), raise conceptual, methodologic, and substantive issues germane for any type of discrimination in any country context.

But first: one critical caveat. The purpose of studying the health consequences of discrimination is not to prove that oppression is “bad” because it harms health. Unjustly denying people fair treatment, abrogating human rights, and constraining possibilities for living fully expressed, dignified, and loving lives is, by definition, wrong (9, 10, 13, 14)—regardless of effects on health. Rather, the rationale for studying discrimination and health, like that for studying any societal determinant of health, is to render an accounting of who and what drives population patterns of health and health inequities (15) and to generate knowledge useful for guiding policies and actions to prevent and rectify harm and advance health equity.

Table 1

Basic taxonomy of prevalent types of discrimination, United States by: type, constituent dominant and subordinated social groups, justifying ideology, material and social basis, and measurable aspects

Type of discrimination	Constituent social groups		Justifying ideology	Material and social basis	Measurable aspects (common to each type of discrimination)
	Dominant	Subordinated			
Racial/ethnic	White, Euro-American	People of color ^a : Black or African-American; American Indian or Alaska Native; Asian; Native Hawaiian or Other Pacific Islander; Hispanic or Latino	Racism	Conquest, slavery, skin color, property	<i>Expression of Discrimination</i> Form: legal or illegal; institutional, structural, interpersonal; direct or indirect; overt or covert Agency: perpetrated by state or by nonstate actors (institutional or individuals) Expression: from verbal to violent; mental, physical, or sexual
Anti-immigrant (see also racism for immigrants of color)	Native-born citizen	Foreign-born immigrants, both legal and undocumented	Nativism	Labor market, language	Domain: e.g., at home; within family; at school; getting a job; at work; getting housing; getting credit or loans; getting medical care; purchasing other goods and services; by the media; from the police or in the courts; by other public agencies or social services; on the street or in a public setting Level: individual, institutional, residential neighborhood, political jurisdiction, regional economy
Gender ^b	Men and boys	Women and girls	Sexism	Property, gender roles, religion	

Anti-gay, lesbian, bisexual, transgender (LGBT)	Heterosexual	Lesbian, gay, bisexual, queer, transgender, transsexual	Heterosexism	Gender roles, religion	<i>Cumulative Exposure to Discrimination</i> Timing: conception; infancy; childhood; adolescence; adulthood Intensity Frequency (acute; chronic) Duration
Disability	Able-bodied	Disabled	Ableism	Costs of enabling access	<i>Responses to Discrimination (Protective and Harmful)</i> <i>Protective</i>
Age	Non-retired adults	Youth, elderly	Ageism	Family roles, property	Active resistance by individuals and communities (e.g., involving organizing, lawsuits, social networks, social support) Creating safe spaces for self-affirmation (e.g., social, cultural, sexual) <i>Harmful</i>
Social class	Business owners, executives, professionals	Working-class, poor	Class bias	Property, education	Internalized oppression and denial Use of psychoactive substances (legal and illegal)

^aEach of these racial/ethnic groups is extremely heterogeneous; the terms listed are the major classifications employed since 1997 by the U.S. government, including in the census (Office of Management and Budget (175)). Examples (far from exhaustive) of sub-groups include: Black: African American, Afro-Caribbean, and Black African; Latino/a & Hispanic: Chicano, Mexican American, Cuban, Puerto Rican, Central and South American; Native Hawaiian and Pacific Islander: Native Hawaiian, Samoan, Guamanian; Asian: Chinese, Japanese, Filipino, Korean, Laotian, Hmong, Samoan; American Indian and Alaska Native: 565 federally recognized American Indian tribes and additional state-recognized tribes and tribes not recognized by either the U.S. federal or state governments, and also Aleuts and Eskimos.

^bAlso called "sex discrimination."

DISCRIMINATION: DEFINITIONS AND PATTERNS

Definitions of Discrimination

According to the *Oxford English Dictionary* (16), the word “discriminate” derives from the Latin term *discriminare*, which means “to divide, separate, distinguish.” From this standpoint, “discrimination” simply means “a distinction (made with the mind, or in action).” Yet, when people are involved, as both agents and objects of discrimination, discrimination takes on a new meaning: “to discriminate against” is “to make an adverse distinction with regard to; to distinguish unfavorably from others.” In other words, when people belonging to one societal group exclude and discriminate against people outside of their group, more than simple distinctions are at issue. Instead, those who discriminate restrict, by judgment and action, the lives of those against whom they discriminate.

The invidious meanings of adverse discrimination become readily apparent in the legal realm, where people have created and enforce laws both to uphold and to challenge discrimination. Legally, discrimination can be of two forms. One is *de jure*, meaning mandated by law; the other is *de facto*, without legal basis but sanctioned by custom or practice. Examples of *de jure* discrimination in the United States include Jim Crow laws, now overturned, that denied African-Americans access to facilities and services used by white Americans (17–19) and entrenched laws, increasingly contested, prohibiting gay and lesbian marriage (20–22). By contrast, differential and inadequate treatment, for example, by race/ethnicity or gender, of persons otherwise medically warranting the same care constitutes a form of *de facto* discrimination (23, 24).

Whether *de jure* or *de facto*, discrimination can be perpetrated by a diverse array of actors. These include the state and its institutions (ranging from law courts to public schools), nonstate entities (e.g., private-sector employers, private schools, religious organizations), and individuals. From a legal or human rights perspective, however, it is the state that possesses critical agency and establishes the context—whether permissive or prohibitive—for discriminatory acts: it can enforce, enable, or condone discrimination, or, alternatively, it can outlaw discrimination and seek to redress its effects (Table 2) (9, 10, 14). A powerful example of the latter is the post-apartheid South African constitution (25). This document mandates, in the most inclusive language of any national constitution in the world, that “The state may not unfairly discriminate directly or indirectly against anyone on one or more grounds, including race, gender, sex, pregnancy, marital status, ethnic or social origin, colour, sexual orientation, age, disability, religion, conscience, belief, culture, language and birth”; discrimination by individuals on these terms is likewise prohibited. Even so, as attested to by South Africa’s growing economic inequality and persistent racial/ethnic economic and health inequities (26), the legal abolition of contemporary discrimination,

Table 2
Selected U.S. laws and international human rights instruments prohibiting discrimination

U.S. laws	International human rights instruments
U.S. Constitution	Universal Declaration of Human Rights (1948)
13th Amendment (banned slavery) (1865)	Discrimination (Employment and Occupation Convention) (1958)
14th Amendment (guaranteed due process to all citizens, excepting American Indians) (1866)	Convention Against Discrimination (in Education) (1960)
15th Amendment (banned voting discrimination based on “race, color, or previous condition of servitude”) (1870)	International Convention on the Elimination of All Forms of Racial Discrimination (1965)
19th Amendment (banned voting discrimination “on account of sex”) (1920)	International Covenant on Civil and Political Rights (1966)
Civil Rights Act (1875) (declared unconstitutional by U.S. Supreme Court in 1883)	International Covenant on Economic, Social, and Cultural Rights (1966)
Civil Rights Act (1964)	Declaration on the Elimination of Discrimination Against Women (1967)
Voting Rights Act (1965)	Declaration on Race and Racial Prejudice (1978)
Fair Housing Act (1968)	Convention on the Elimination of All Forms of Discrimination Against Women (1979)
Equal Opportunity Act (1975)	Convention on the Rights of the Child (1989)
Americans with Disabilities Act (1990)	
Genetic Information Nondiscrimination Act (2008)	
Lilly Ledbetter Fair Pay Act (2009)	
Matthew Shepard and James Byrd, Jr. Hate Crimes Prevention Act (2009)	
Fair Sentencing Act (2010)	

Sources: Jaynes and Williams (18: pp. 224–238); Tomasevski (14); ADA (176); GINA (177); U.S. government (178).

however essential, is by itself insufficient to eradicate the lifelong health and social consequences, within and across generations, of past discrimination or to change extant distributions of accumulated power and wealth without additional reform (8, 19, 27).

Despite its legal dimensions, however, discrimination is never simply a legal affair. Conceptualized more broadly, it refers to all means of expressing and institutionalizing social relationships of dominance and oppression. At issue are practices of dominant groups to maintain privileges they accrue through subordinating the groups they oppress and the ideologies they use to justify these practices, which typically revolve around notions of innate superiority and inferiority, difference, or deviance. Thus, the *Collins Dictionary of Sociology* defines “discrimination” as “the process by which a member, or members, of a socially defined group is, or are, treated differently (especially unfairly) because of his/her/their membership of that group” (28, p. 169). Extending this definition, the *Concise Oxford Dictionary of Sociology* holds that discrimination involves not only “socially derived beliefs each [group] holds about the other” but also “patterns of dominance and oppression, viewed as expressions of a struggle for power and privilege” (29, pp. 125–126). In other words, random acts of unfair treatment do not constitute discrimination. Instead, discrimination is a socially structured and sanctioned phenomenon, justified by ideology and expressed in interactions among and between individuals and institutions, that maintains privileges for members of dominant groups at the cost of deprivation for others.

Although sharing a common thread of systemic unfair treatment, discrimination nevertheless can vary in form and type, depending on how it is expressed, by whom, and against whom. As summarized in Table 1, diverse forms identified by social scientists include: legal, illegal, overt (or blatant), and covert (or subtle) discrimination, and also institutional (or organizational), structural (or systemic), and interpersonal (or individual) discrimination (12, 30, 31). Although usage of these terms varies, institutional discrimination typically refers to discriminatory policies or practices carried out by state or nonstate institutions; structural discrimination refers to the totality of ways in which societies foster discrimination (e.g., in housing, education, employment, earnings, benefits, credit, media, health care, criminal justice, etc.) that in turn reinforce discriminatory beliefs, values, and distribution of resources (32); and interpersonal discrimination refers to directly perceived discriminatory interactions between individuals—whether in their institutional roles (e.g., employer/employee) or as public or private individuals (e.g., shopkeeper/shopper). In all cases, perpetrators of discrimination act unfairly toward members of socially defined subordinate groups to reinforce relations of dominance and subordination, thereby bolstering privileges conferred to them as members of a dominant group.

Patterns of Discrimination: U.S. Examples

A full accounting of discrimination in the United States today is beyond the scope of this article. Instead, to provide a reminder of its ubiquity as well as background to considering how it can harm health, I next review, briefly, five notable ways that discrimination can permeate people's lives.

First, as summarized in Table 1, many groups experience discrimination in the United States at present. Dominant types of discrimination are based on race/ethnicity, indigenous status, immigrant status, gender, sexuality, disability, age, and, although not always recognized as such, social class (20, 31, 33–36). Although each type of discrimination has its own justifying ideology, material basis, and legal history (see Table 2), all share the common feature of systematic inequitable treatment directed against and adversely affecting individuals in the subordinated group, to the benefit, at the group level if not the individual level, of those who belong to the dominant group.

Second, as explicitly recognized by the South African constitution, and as theoretically propounded in sociological and legal work on “intersectionality” (31, 37, 38), individuals can experience multiple forms of discrimination. For example, whereas white women may be subject, as women, to gender discrimination, women of color—whether black, Latina, Asian or Pacific Islander, or American Indian—may be subject to both gender and racial discrimination. Moreover, this experience of multiple subordination cannot simply be reduced to the “sum” of each type. During the past two decades, a growing body of scholarship on gendered racism, for example, has elucidated how, in a context of overall negative stereotypical portrayals of black Americans as lazy and unintelligent (30, 31), black women—as black women—remain stereotyped, as Patricia Collins observed back in 1990 (39, p. 97), as “mammies, matriarchs, welfare recipients and hot mammas,” while black men—as black men—remain stereotyped as criminals and rapists (31, 39). Understanding discrimination experienced by black women and men thus requires considering the salience of, minimally, both their race/ethnicity and gender; also germane are their socioeconomic position, sexuality, nativity, and age, as is true for members of any societal group.

Third, singly or combined, different types of discrimination can occur in just about every facet of public and private life. The full gamut extends from the grinding daily realities of what Philomena Essed two decades ago influentially termed “everyday” discrimination (30) to less common yet terrifying and life-transforming events, such as being victim of a hate crime (31, 35).

In a typical day, experiences with discrimination accordingly can start—depending on type—in the morning, at home; continue with public encounters en route to or while at school or work or when shopping, eating at a restaurant, or attending a public event; and extend on through the evening, whether in the news or entertainment or while engaging with family members (30, 31, 33, 35, 36).

Other common but not typically daily scenarios for experiencing discrimination include applying for a job, looking for housing, getting a mortgage or a loan, getting health care, or interacting with the police, public agencies, or the legal system (12, 31, 33–35).

Fourth, while some experiences of discrimination may be interpersonal and obvious, they are more likely to be institutional and invisible. To know, for example, that you have been discriminated against in your salary, or that you have been denied a mortgage, or an apartment, or been steered away from certain neighborhoods when you are looking for a home, requires knowing how the employer, bank, landlord, or real estate agent treats other individuals (1, 12). Typically, it is only when people file charges of discrimination in court that evidence of such patterns of inequality can be obtained. Other clues can be obtained by examining social patterning of economic inequality, since acts of discrimination—whether institutional or interpersonal, blatant or covert—usually harm economic as well as social well-being (12, 30–39). Table 3 illustrates this point for U.S. racial/ethnic discrimination, depicting marked racial/ethnic inequalities in wealth, poverty, education, unemployment, health insurance, incarceration, and political parity in representation.

Fifth and finally, attesting to some of the animosity that feeds and justifies discrimination are, to give but one example, a long lineage of U.S. racial attitudes (18, 40). Despite declines in racial prejudice over time, reported levels remain high, even taking into account that: (a) people underreport negative social attitudes and (b) dominant groups typically deny discrimination exists (12, 40–42), especially if it is no longer legal (see, for example, 43–45). Indeed, as Jackman has long argued (46), paternalism combined with: (a) friendly feelings toward individual members of subordinate groups and (b) denial of any responsibility for institutional discrimination is as much a hallmark of contemporary discrimination as are outright conflict and negative attitudes. Strikingly, then, data from the 1990 General Social Survey revealed that fully 75 percent of white Americans agreed that “black and Hispanic people are more likely than whites to prefer living on welfare” and a majority concurred that “black and Hispanic people are more likely than whites to be lazy, violence-prone, less intelligent, and less patriotic”; in 2008, data from this survey documented that the majority of white Americans (just over 50%) continued to believe that, compared to whites, black Americans were lazier, and 30 percent held that they were less intelligent (40). Moreover, in 2010, a national poll conducted right after the election of Barack Obama as the first black U.S. president found that, despite the data shown in Table 3, fully 48 percent of the U.S. white population agreed with the statement, “Today discrimination against Whites has become as big a problem as discrimination against Blacks and other minorities,” a statement also endorsed by 56 percent of Republicans and 62 percent of Tea Party adherents (47). By contrast, 70 percent of black respondents and 68 percent of Hispanics disagreed, as did 68 percent of Democrats (47). These are ugly social facts, with profound

implications for not only our body politic but also the very bodies in which we live, love, rejoice, suffer, and die.

THEORIZING DISCRIMINATION AS A DETERMINANT OF HEALTH INEQUITIES

Before reviewing the contemporary evidence and methods used to investigate whether discrimination harms health, I start with explication of the theoretical framework I use to inform my critique. The theory I draw on is the ecosocial theory of disease distribution (4, 6, 48–50), which concerns who and what drive social inequalities in health.

Using Ecosocial Theory to Guide Research on Discrimination and Health Inequities

A central focus of ecosocial theory is on how we literally biologically embody exposures arising from our societal and ecological context, thereby producing population rates and distributions of health. At issue are socially patterned exposure-induced pathogenic pathways, mediated by physiology, behavior, and gene expression, that affect the development, growth, regulation, and death of our body's biological systems, organs, and cells, culminating in disease, disability, and death. The contrast is to frameworks that treat causes of disease—and of group differences in biological characteristics and disease rates—as primarily innate, for example, as has long been argued for racial/ethnic inequities in health (51–53).

Indeed, integral to ecosocial theory is a painful awareness of the contested history of scientific ideas and practice, whereby eminent scientists, including in the health sciences, have been just as or more likely to develop and use scientific frameworks that justify, rather than question, discrimination and social inequality (4). Case examples particularly relevant to epidemiologic research on discrimination and health, about which reams have been written, include not only scientific racism and eugenics, but also scientific sexism and heterosexism (5, 35, 52–55).

Ecosocial theory accordingly requires explicit consideration of pathways of embodiment in relation to types and levels of exposure, the period and spatial expanse involved (i.e., spatiotemporal scale), and historical context, along with phenomena that affect susceptibility and resistance to exposure, ranging from micro (e.g., role of the gut microbiome in innate immunity) to macro (e.g., social organizing to challenge health inequities). Also core are issues of accountability (causal responsibility for) and agency (the power and ability to act) at every level, because they pertain not only to the magnitude of health inequities but also to how they are monitored, analyzed, and addressed. A critical knowledge of history is thus essential: the history of the exposures and outcomes under consideration, and the history of contending ways in which scientists have, in the context of their times, debated possible causal links (4). As with any scientific theory (56), the point is to frame and guide analysis of the phenomena of interest—in this

Table 3

Analyzing U.S. racial/ethnic discrimination and health inequities in context: relevant socioeconomic, sociopolitical, and embodied facts

Racial/Ethnic inequity indicators	Total U.S. population	White non-Hispanic ^a	Asian ^b	Hispanic	Black non-Hispanic ^c	American Indian/Alaska Native
Wealth (2011): net worth (\$)	68,828	110,500	89,399	7,683	6,314	...
Poverty (2011): % below poverty line	15.0	9.8	12.3	25.3	27.6	27.03 (2007–2011)
Median usual weekly earnings of full-time wage and salary workers (25 yrs. and older) (2011): \$	\$797	\$825	\$901	\$582	\$643	
Less than a high school diploma	451	458	448	419	416	...
High school graduate, no college	638	663	564	568	538	...
Some college, no degree	719	743	710	643	611	...
Associate degree	768	95	7113	706	624	...
Bachelor's degree and higher	1150	1165	1124	1000	958	...
Unemployed (2011): %	8.9	7.2	7.0	11.5	15.9	14.6
Incarceration of men (2008), per 100,000 population	1403	727	...	1,760	11,137	...
Political parity ratio (2004), defined as: (% in political office/% in population) –Congress	...	Men, 2.28; Women, 0.30	Men, 0.53; Women, 0.00	Men, 0.49; Women, 0.21	Men, 0.84; Women, 0.33	...
–State legislatures	...	Men, 2.04; Women, 0.52	Men, 0.41; Women, 0.15	Men, 0.34; Women, 0.49	Men, 0.89; Women, 0.46	...

No health insurance, persons < 65 yrs. (2011): %	17.2	12.9	16.5	31.1	18.8	34.2
Infant mortality rate (2008), per 1,000 live births	6.6	5.5	4.5	5.6	12.7	8.4
Person-years lost per 100,000 population before 75 years of age (2010)	6642.9	6545.3	3061.2	4795.1	9832.5	6771.3
Self-reported fair or poor health status (2011): %	10.0	8.4	8.7	13.2	15.0	14.4
Severe psychological distress (2010–2011) ^c : %	3.3	3.2	1.7	4.0	3.7	5.6

Note: Ellipses indicate data not reported, which is indicative of imposed invisibility and is an informative social fact characterizing social context.

^aEarnings by education for White only; all other data are for White non-Hispanic.

^bEconomic data and data on self-reported health and psychological distress are for Asians only; all other health data reported for Asians and Pacific Islanders combined.

^cNet worth, poverty, and person-years of life lost before 75 years of age are reported for Blacks only; all other data for the Black non-Hispanic population.

^dSerious psychological distress in past 30 days among adults aged 18 years and older, as measured by the Kessler 6 scale (range = 0–24; severe psychological distress: ≥ 13).

Source: (a) wealth: U.S. Census (179); (b) poverty: U.S. Census (180) and Macartney et al. (181); (c) employment: U.S. Bureau of Labor Statistics (182); (d) incarceration: National Center for Health Statistics (183); (e) political parity ratio: Hardy-Fanta et al. (184); (f) health and health insurance data: National Center for Health Statistics (108).

case, population distributions of health, disease, disability, and well-being—and, as with any reflexive science, to generate knowledge relevant to altering the phenomena under study, in this case, the existence of health inequities (4).

Figure 1 illustrates the components of an ecosocial analysis as applied to the issue of racism and health (4, 8, 57). To guide both the research questions posed and the methods used, ecosocial theory posits, as shown on the left-hand side of the figure, that inequitable race relations simultaneously—and not sequentially (8, 58): (a) benefit the groups who claim racial superiority at the expense of those whom they deem intrinsically inferior, (b) racialize biology to produce and justify the very categories used to demarcate racial/ethnic groups, and (c) generate inequitable living and working conditions that, via embodiment, result in the biological expression of racism—and hence racial/ethnic health inequities (8, 51). A corollary is that there are many pathways, not just one, by which discrimination could harm health.

The right-hand side of Figure 1 accordingly displays the major theorized pathways involved. They comprise: (a) economic and social deprivation; (b) excess exposure to toxins, hazards, and pathogens; (c) social trauma; (d) health-harming responses to discrimination; (e) targeted marketing of harmful commodities; (f) inadequate medical care; and (g) especially (but not only) for indigenous peoples, ecosystem degradation and alienation from the land (1, 4, 8).

Moreover, as emphasized by ecosocial theory's simultaneous focus on exposure, susceptibility, and resistance, how people resist injustice and its health-harming effects, individually and collectively, and the resilience that enables them to do so also must be examined (1, 8, 48). Historical context in turn determines which pathways matter and are operative, at what level, and at what point in the life course. The implication is that just as expressions of discrimination can change, so too can their embodied manifestations, referring to both the kinds of health outcomes affected and the magnitude of the consequent and contingent health inequities.

The point is not that every study can or should attempt to measure every specified pathway at every level and at all relevant spatiotemporal scales. Rather, the value of a theoretical framework is that it can help concretize systematic substantive thinking about potential causal pathways, the constructs and entities employed and how they are operationalized and measured, the types of statistical analyses that should be conducted, potential threats to validity, and the complexities involved in interpreting study findings (4, 5, 56).

Discrimination and Structured Chance

Thus, as ecosocial theory clarifies, to understand the impact of discrimination on population health, discrimination itself must be conceptualized as a dynamic population phenomenon that simultaneously structures individual risk and population rates of disease, thereby giving rise to health inequities. The population groups involved are not simply a priori entities, but instead active

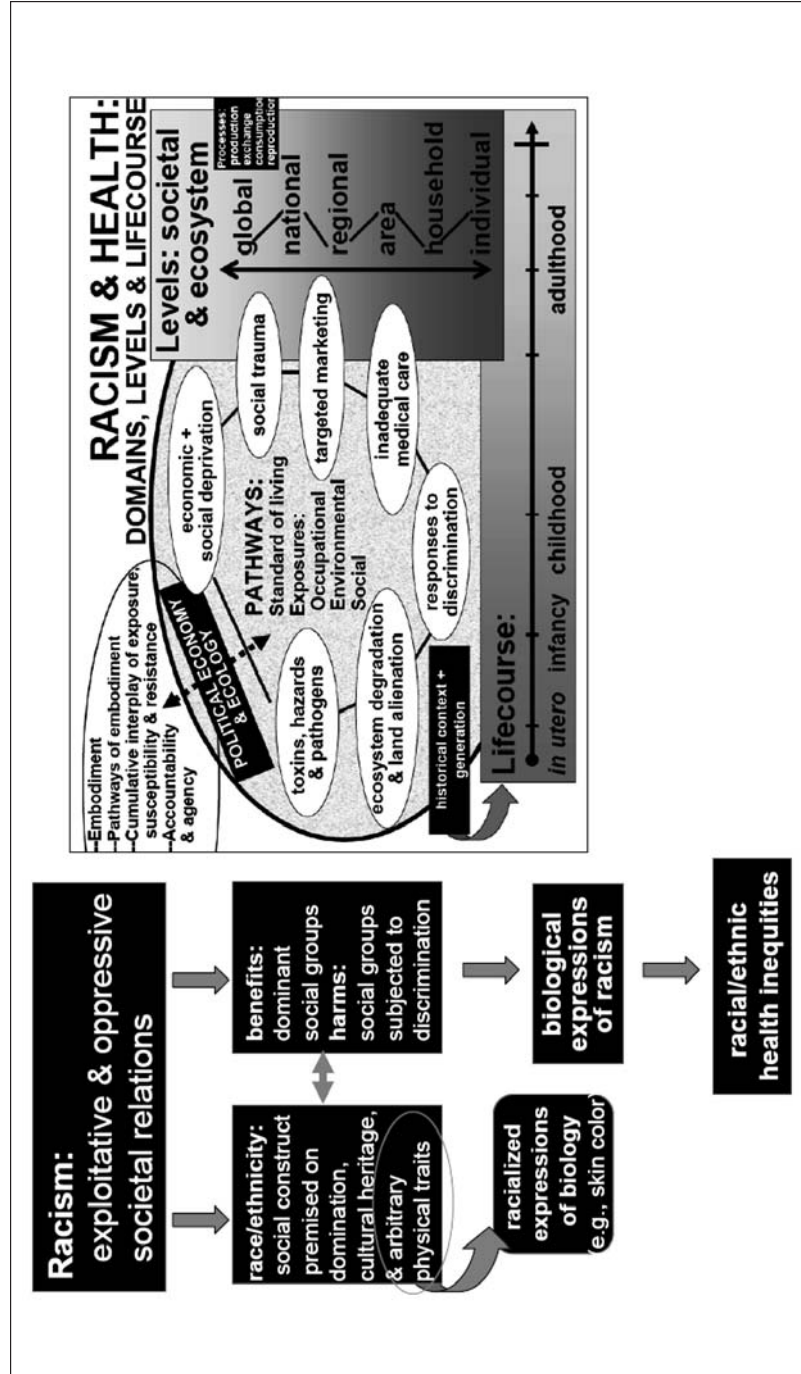


Figure 1. Ecosocial analysis of racism and health: core concepts and pathways of embodiment. Sources: Krieger (1, 4, 8, 48, 57, 58).

relational beings that arise from and are constituted by their underlying societal relationships (58). There can be no “black” without “white,” no “indigenous” without “colonizer,” no “immigrant” without “native-born,” no “women” without “men,” no “LGBT” without “straight,” no “disabled” without “abled,” and no “elderly” without “young.” The underlying causal presumption is that inequitable societal relationships between these co-defined societal groups shape each group’s distribution of adverse exposures and health status, for good and for bad. By contrast, the causal reasoning of self-justifying discriminatory ideologies holds that characteristics of, distinctions between, and differential treatment of the groups at issue are “natural,” due to innate differences (4, 5, 55).

One important corollary of the thesis that discrimination structures risk is that any random set of individuals selected from either of the groups, if subjected to the same adverse exposures, would have a greater likelihood of morbidity or mortality compared to individuals who are not exposed. The claim is not that each person would have the same elevated risk, given both the fundamental role of chance in disease etiology (59) and also heterogeneity among the unique individuals who constitute and are shaped by their membership in societal groups (58). Nor is the claim that all group differences in morbidity and mortality rates are inequities (60, 61). For example, only people who have prostates (that is, men) can get prostate cancer, just as only people who have a cervix (that is, women) can get cervical cancer, such that the sex-linked difference in rates of these cancers comparing men to women is strictly that: a difference—but, that said, among men and among women there can be and are marked socioeconomic and racial/ethnic inequities in incidence, survival, and mortality (62). Consequently, where discrimination matters is for outcomes for which the on-average population risk would be similar across the societal groups at issue were it not for the adverse exposures due to structured differences in inequitable treatment.

Illustrating how discrimination can structure chance is an ingenious twist involving the first-ever mechanical device designed to provide a mechanical model of probability (Figure 2) (58). Its inventor was Sir Francis Galton (1822–1911), a highly influential British scientist and eugenicist, who himself coined the term “eugenics” and who held that heredity fundamentally trumped “environment” for traits influencing the capacity to thrive, whether physical, such as health status, or mental, such as “intelligence” (54, 63–65). In his 1889 opus *Natural Inheritance*, Galton sketched “an apparatus . . . that mimics in a very pretty way the conditions on which Deviation depends” (63, p. 63), whereby gunshot would be poured through a funnel down a board whose surface was studded with carefully placed pins, off which each pellet would ricochet, to be collected in evenly spaced bins at the bottom.

Galton termed his apparatus, which he apparently never built (65), the “Quincunx” because the pattern of the pins used to deflect the shot was like a tree-planting arrangement of that name, which at the time was popular among the English aristocracy (65). The essential point was that although each presumably

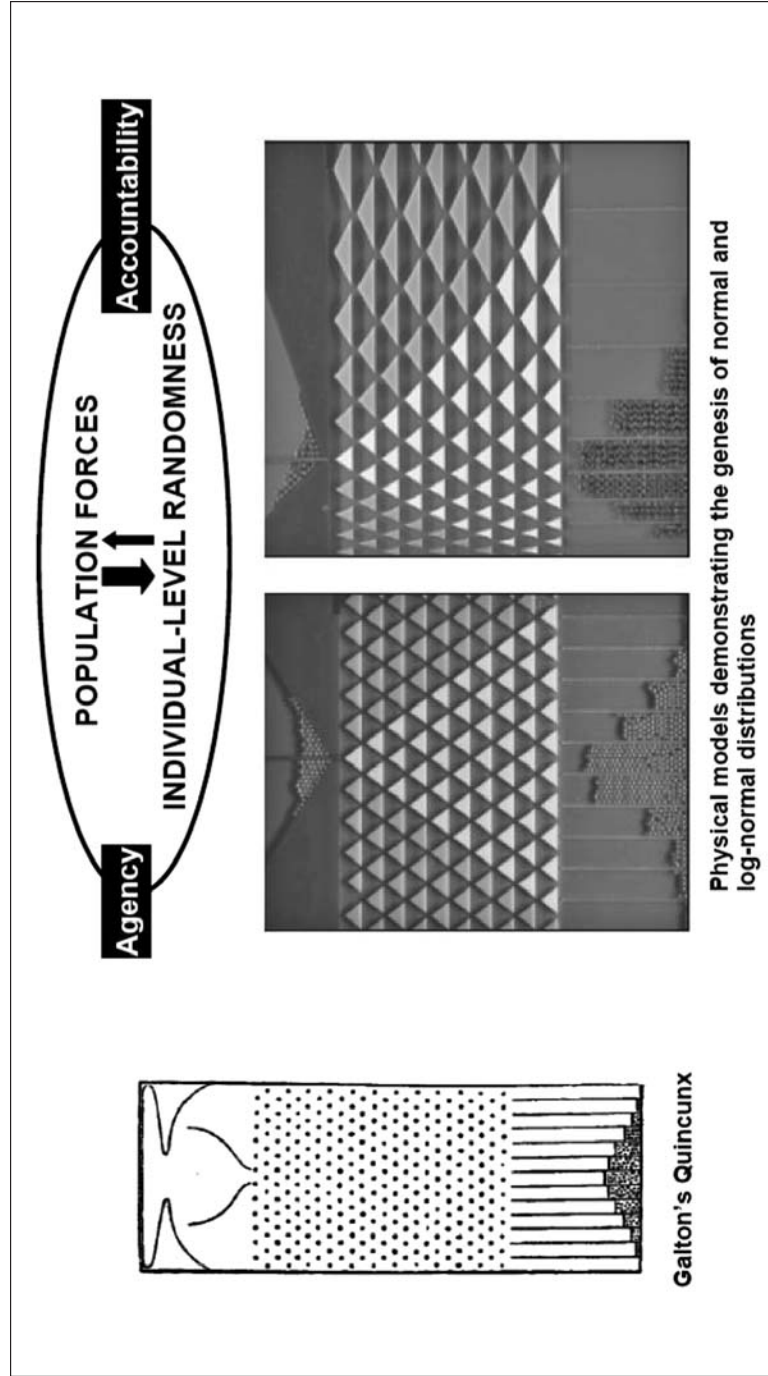


Figure 2. Producing population distributions: structured chance. *Sources:* Krieger (58); Galton (63); Limpert et al. (66) (reproduced with permission).

identical ball had the same starting point, depending on the chance interplay of which pins it hit during its descent at which angle, it would end up in one or another bin. The accumulation of balls in any bin in turn would reflect the number of possible pathways (i.e., likelihood) leading to its ending up in that bin. Galton designed the pin pattern to yield a normal distribution. His conclusion?—that the device revealed (63, p. 66) “. . . a wonderful form of cosmic order expressed by the ‘Law of Frequency of Error.’ The law would have been personified by the Greeks and deified, if they had known of it. It reigns with serenity and in complete self-effacement amidst the wildest confusion. The huger the mob, and the greater the apparent anarchy the more perfect is its sway . . . each element, as it is sorted into place, finds, as it were, a pre-ordained niche, accurately adapted to fit it.”

To Galton it was obvious that the observed distribution reflected the intrinsic properties of each “element” (in this case, the gunshot)—an inference that not only assumed the arrangement of the pins as a given but also conveniently side-stepped his role in designing their placement to produce a normal distribution.

However, a little more than a century later, some physicists not only built Galton’s “Quincunx,” as others have done (65), but went one further (66): they built two, one designed to generate the normal distribution and the other to generate the log-normal distribution (a type of distribution skewed on the normal scale, but for which the natural logarithm of the values displays a normal distribution) (Figure 2). As their devices clearly show, what structures the distribution is not the innate qualities of the “elements” themselves but the features of both the funnel and the pins—both their shape and placement. Together, these structural features determine which pellets can (or cannot) pass through the pins and, for those that do, their possible pathways.

The lesson is clear: altering the structure can change outcome probabilities, even for identical objects, thereby creating different population distributions. For the population sciences, this insight permits understanding how there can simultaneously be both chance variation within populations (individual risk) and patterned differences between population distributions (rates) (58, 59). Such an understanding of “structured chances” rejects explanations of population difference premised solely on determinism or chance and instead grounds the study of populations in real-life, historically contingent causal processes, including those structured by human agency, such as discrimination.

DISCRIMINATION AND HEALTH INEQUITIES: THE STATE OF THE EVIDENCE AND METHODS EMPLOYED

*Indirect, Direct Individual, and Direct Institutional Measures:
Initial Approaches and Evidence Linking Discrimination
and Health (1980s–2000)*

When I first reviewed the evidence on discrimination and health nearly 15 years ago, I delineated the three main approaches used to quantify health effects

of discrimination (Figure 3). Listed in order of their frequency of use, from most to least common, they were (and remain): (a) indirectly, by inference, at the individual level; (b) directly, using measures of self-reported discrimination, at the individual level; and (c) in relation to institutional discrimination, at the population level. As I further explicated, all three approaches are informative, complementary, and necessary.

In brief, for the “indirect” approach, investigators compare health outcomes of subordinated and dominant groups, albeit without any direct data on exposure to discrimination. If distributions of these outcomes differ, then researchers determine whether observed disparities can be explained by “known risk factors.” If so, investigators interpret their findings in light of how discrimination may shape distribution of the relevant “risk factors.” If, however, a residual difference persists, even after controlling for these other risk factors, then additional aspects of discrimination may be inferred as a possible explanation for the remaining disparities (assuming no unmeasured confounders and also no differential bias in measurement of the relevant “risk factors”).

Although the weaknesses of making causal inferences based on omitted variables is well-known, two factors spur use of the “indirect” approach. The first is the overwhelming lack of data on discrimination, either interpersonal or institutional, in most leading sources of population data (12), including for population health, for example, vital records, cancer registries, national surveys, and the vast majority of epidemiologic studies designed without considering whether discrimination might affect the health outcomes of interest (1). Partially accounting for this omission, beyond ideological aversion (45), is skepticism as to the feasibility of obtaining valid data on discrimination (1, 12). The indirect approach nevertheless has been used because, from a “lesser of two evils” standpoint, it is arguably better to determine whether “known risk factors” (especially economic) can—or cannot—account for observed societal health inequities, even absent data on discrimination, as opposed to leaving the question unasked and the inequities unanalyzed.

The second reason for use of the indirect approach is more affirmative and points to one of its cardinal strengths: its utility for analyzing outcomes where determination of whether discrimination has occurred requires an individual knowing about not only her or his own experience but also that of others (1, 12). A case in point is biased medical decisions by health providers; in such circumstances, indirect statistical evidence of discrimination based on medical records is the only available option, short of conducting studies that focus on the health care providers directly (as opposed to the people they treat) (1, 12, 23).

Attesting to the utility of the “indirect” approach, robust epidemiologic evidence indicates that racial/ethnic inequities in current and cumulative impoverishment versus affluence contribute substantially to explaining racial/ethnic inequities in disease occurrence, survival, and mortality, with

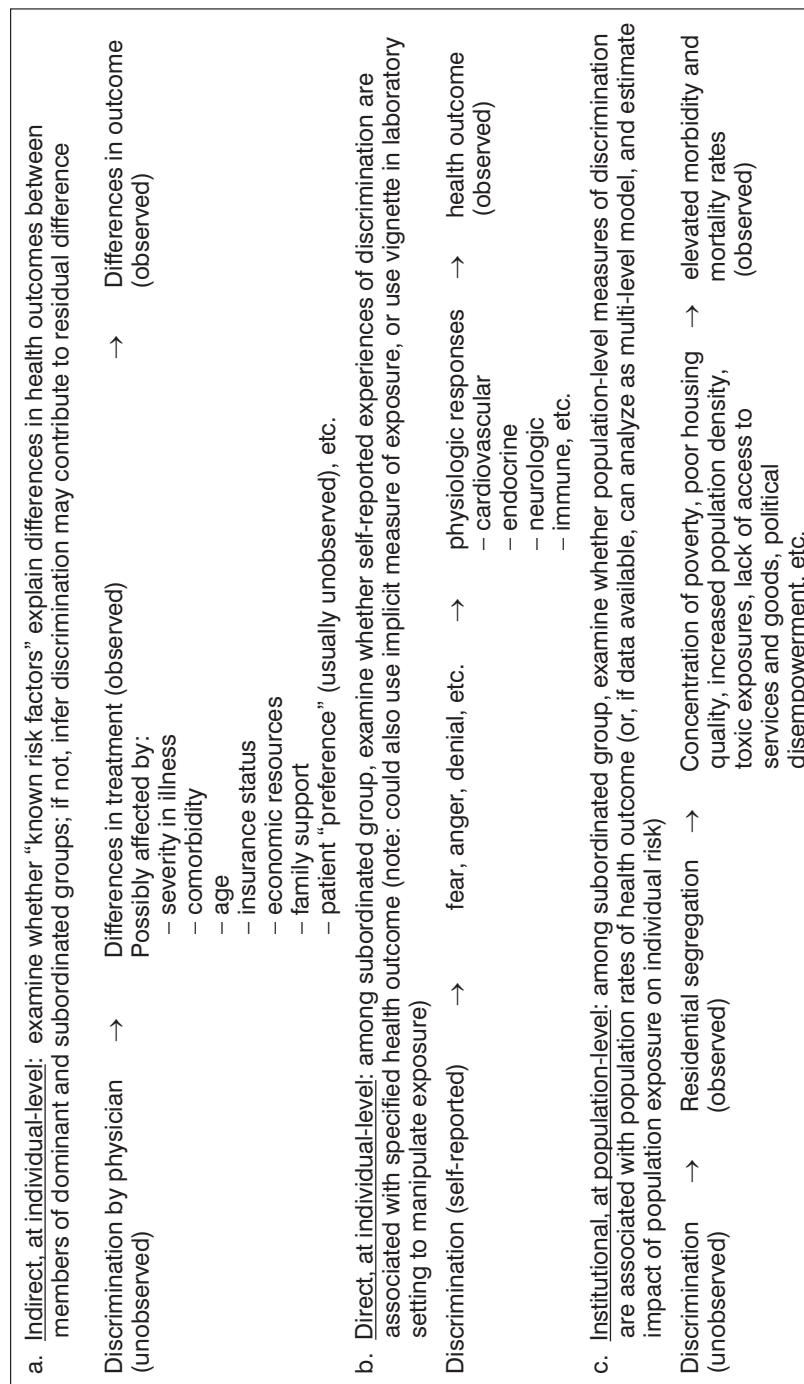


Figure 3. Three main epidemiologic approaches to studying the health effects of discrimination. *Source*: Krieger (1).

examples of this work stretching from the mid-19th century to the present day (67–74). Additional historical, sociological, and economic research (both observational and experimental) in turn provides robust evidence that institutional and interpersonal discrimination, present and past, contribute to contemporary racial/ethnic inequities in income, wealth, and education (12, 18, 31, 75, 76). Accordingly, as I previously noted, studies using indirect approaches to measuring health effects of discrimination can and do provide essential, powerful, and important evidence that discrimination shapes societal distributions of health and disease. Nevertheless, as I also observed, epidemiologic studies using the “indirect” approach remain vulnerable to: (a) nondifferential and differential measurement error (e.g., for socioeconomic position and other “risk factors” included) and (b) contending explanations of any observed residual difference (e.g., in the case of racial/ethnic health inequities, whether the remaining differences are due to racism versus “race,” conceptualized as innate racial difference) (1, 77).

Consequently, to meet the challenge of explicitly measuring people’s direct experiences of discrimination and relating this to their health status, starting in the 1980s a new generation of public health researchers began devising new methods and approaches (1). Skeptical instead of the common view that rigorous discrimination measures were impossible to devise, the emphasis was and remains on development of valid and reliable instruments to measure individuals’ exposure to discrimination across the life course, whether as direct target or as witness, and also their responses to this exposure: behaviorally, psychologically, and physiologically. One gap impelling this work was the absence of any well-characterized, “ready-to-use,” validated instruments in the social science literature that were appropriate for large-scale empirical studies. Instead, most empirical sociologic studies on discrimination at the time either had focused chiefly on racial attitudes of people who discriminate, rather than experiences of those who have endured discrimination (40, 46, 78), or else, as was also the case in psychological research, they employed in-depth interviews and other qualitative approaches not readily transferable to epidemiologic research (30, 79–81). Second, the measures developed in these kindred disciplines understandably were not concerned with measuring exposure in relation to the health-specific concern of etiologic period, that is, time between exposure, onset of pathogenic processes, and occurrence of disease, nor were they engaged with how biological effects could be different depending on the point in the life course when someone was exposed, from in utero onward (1, 8, 82, 83).

With regard to outcomes analyzed in relation to self-reported exposure to discrimination, in these initial studies the most common by far pertained to mental health, for example, depression or psychological distress; the second most frequent was hypertension or blood pressure; and other outcomes considered (but not by more than one study) included smoking and inadequate health care. Overall, these studies consistently reported that higher levels of self-reported experiences

of discrimination were associated with poorer mental health; associations with somatic health were both more complex and inconsistent.

Moreover, extending the idea of direct measurement to experimental design, two of the early studies reported that blood pressure and heart rate among African-Americans increased more quickly upon viewing movie scenes or imagining scenarios involving racist, as compared to nonracist but angry, or neutral, encounters (84, 85). Then as now (12), the experimental studies were conceptualized as having both strengths and limitations. Strengths included their ability to control exposure, to test particular biological pathways, and to use randomization to avoid or minimize concerns about the potential confounding endemic to observational studies. Recognized limitations of lab-based studies were that, by design, they could: (a) only manipulate short-term psychosocial exposures (and hence not any of the other types of pathways potentially implicated in how discrimination harms health, for example, chronic economic deprivation and social exclusion) and (b) only observe acute responses, whose predictive value for disease pathogenesis often is debatable; a third concern pertains to generalizability, depending on the type of selection bias involved in recruiting persons to be part of lab-based studies (12).

The third approach, whose use began in earnest in the early 1990s, shifted the focus to exposures that can be measured only at the population level, most typically in relation to residential segregation and also regarding population-level expressions of empowerment, such as representation in government. Early studies using this third strategy provided evidence that African-American morbidity and mortality rates were associated with not only residential segregation (building on prior work by DuBois [69] and Yankauer [86]), but also racial/ethnic political clout and regional racial attitudes (87–91).

Three types of spatiotemporal threats to validity, however, recognized at the time, tempered interpretation of results (1). One concerned aggregation bias, since the initial wave of studies relied heavily on group-level measures of both exposures and outcomes. The now common use of multilevel analysis (92, 93) has at least methodologically addressed this potential threat to validity, with the challenge to researchers now shifted to assembling databases with the relevant individual-level and contextual data. Also at issue was assessment of exposure in relation to not only etiologic period but also residential mobility, as extensively discussed in the sociological literature (12). Thus, from a temporal standpoint, an association of higher levels of residential segregation or negative racial attitudes with, say, concurrent infant mortality rates or childhood morbidity rates or homicide rates would provide more compelling evidence of health effects of segregation or racial attitudes than would its association with all-cause mortality among adults, given the much longer latency period for most causes of death (e.g., cardiovascular disease, cancer). If, however, current levels of segregation reflected past levels and little bias were introduced by residential mobility, the threat to causal inference would be lessened but not eliminated (1).

In summary, the first wave of explicit research on discrimination and health focused chiefly on racial discrimination and provided provocative evidence of diverse pathogenic pathways: via limiting access to educational, economic, occupational, residential, and political resources, thereby constraining options for living and working in healthy environments, and via serving as a stressor that adversely affected both psychological well-being and health behaviors, thereby increasing risk of somatic and mental illness. Study limitations notwithstanding, the net effect was to support the hypothesis that discrimination could elevate risk of adverse mental and somatic outcomes.

*The Research Today: A Review of Review Articles
(as of Mid-2013)*

By sheer count of the hundreds of empirical investigations cataloged in contemporary review articles that explicitly focus on discrimination and health (Table 4; see citations and search strategy in the table's footnote), research on this topic has dramatically escalated in the early 21st century—at least for some types of discrimination. Racial discrimination, for example, has been the focus of 40 review articles, all but three published during or after 2000, that together analyze well over 350 different studies—and although most research remains U.S.-based, with a focus especially on African-Americans, a growing number of studies pertain to immigrants of color and to indigenous peoples, and studies now hail from diverse countries in Latin America and Europe and from Canada, New Zealand, Australia, and Japan. Research focused on discrimination against lesbian, gay, bisexual, and transgender (LGBT) persons has likewise grown considerably, with the nine published review articles, all appearing during or after 2000, encompassing more than 50 empirical investigations, predominantly from the United States, but also including Canada, Australia, and several European countries.

In the case of gender discrimination and health, the 10 identified review articles (all but one published during or after 2000) analyzed upward of 250 articles, mainly from the United States, of which 80 percent focused on gender bias in medical care. Of note, search strategies focused on gender discrimination, bias, and prejudice yielded scant review articles pertaining to either disease etiology or to health in relation to self-reported experiences of gender discrimination, a finding likely reflecting the growing tendency in public health and medicine to reframe analysis of social inequalities in women's health in relation to "gender roles" and "gender-based violence" (94–97), absent use of terminology regarding—or instruments to measure—exposure to gender discrimination. Inclusion of epidemiologic review articles focused on violence against women and sexual abuse (including of children) not also indexed by terms pertaining to discrimination would have added another 60+ review articles.

Table 4
Empirical review articles on discrimination and health by type of discrimination: January 1, 1900–June 1, 2013

Author & year	Characteristics of empirical articles reviewed on discrimination and health	Key findings
<i>1) Multiple types (n = 5)</i>		
Krieger et al. [1993] (71)	Health outcomes P, M, HB, HC N of articles 10 Years 1984–1991 Countries US Study designs O (9); E (1)	pp. 101-102: “In addition to recognizing the profound significance of social class in shaping black/white differences in disease occurrence, several studies are beginning to explore some of the other adverse effects of other forms of racism on the health of black Americans, including outright discrimination within each socioeconomic stratum . . .”; pp. 104-105: “Much of the new ferment regarding ‘women’s health’ and the health of women is primarily concerned with sexism in both medicine and biomedical research. . . . Outside of medical interventions, however, little epidemiologic research has directly examined how non-violent forms of sexism (i.e., other than domestic violence, rape, etc.) may affect women’s health . . .”; p. 108: “Provocative research on the ‘hidden injuries of class,’ moreover, suggest that discrimination, exclusion, and subordination based on class might produce the same types of psychosocial trauma as racism and sexism”
Krieger [1999/2000] (1)	Health outcomes P, M, HB N of articles 20 Years 1984–1999 Countries US Study designs O	p. 311 (1999): “The most common outcome (ten studies) was mental ill-health, such as depression, psychological distress; the second most common (five studies) was hypertension or blood pressure. Overall, studies consistently reported that higher levels of self-reported experience of discrimination were associated with poorer mental health; associations with somatic health . . . were more complex.”

Pascoe and Richman [2009] (185)	Health outcomes N of articles Years Countries Study designs	P, M, HB, stress response 134 (meta-analysis) 1986–2007 US, NZ O (119); E (15)	p. 531: “Analysis of 134 samples suggests that when weighting each study’s contribution by sample size, perceived discrimination has a significant negative effect on both mental and physical health. Perceived discrimination also produces significantly heightened stress responses and is related to participation in unhealthy and nonparticipation in healthy behaviors.”
Santry and Wren [2012] (186)	Health outcomes N of articles Years Countries Study designs	HC 63 1991–2011 US O (50); E (13)	p. 137: “Racial, ethnic, and gender disparities in health outcomes are a major challenge for the US health care system. Although the causes of these disparities are multifactorial, unconscious bias on the part of health care providers plays a role. Unconscious bias occurs when subconscious prejudicial beliefs about stereotypical individual attributes result in an automatic and unconscious reaction and/or behavior based on those beliefs. This article reviews the evidence in support of unconscious bias and resultant disparate health outcomes.”
Goto et al. [2013] (187)	Health outcomes N of articles Years Countries Study designs	M 34 2000–2010 US, Mexico, Holland O	p. 445: “Positive and statistically significant associations were observed between discrimination and adverse mental health outcomes, particularly substance use, depression, and alcohol-related disorders. Only one-third of the studies explicitly adopted a specific theoretical framework to interpret the examined relationships.”
2) <i>Racial discrimination, including indigenous people and immigrants of color (n = 40)</i>			
a) <i>Adult persons of color (n = 16)</i>			
— see also “multiple types”: Krieger et al. (1993), 8 studies; Krieger (1999/2000), 15 studies; Pascoe and Richman (2009), 125 studies; Santry and Wren (2012), 53 studies; Goto et al. (2013), 27 studies			
Williams and Collins [1995] (72)	Health outcomes N of articles Years Countries Study designs	P, M, HB, HC 6 1984–1993 US O	pp. 366–367: “Racism can affect health in at least three ways. First, it can transform social status so that SES indicators are not equivalent across race. . . . Second, racism can restrict access to the quantity and quality of health-related desirable services such as public education, health care, housing, and recreational facilities. . . . Third, the experience of racial discrimination and other forms of racism

Table 4 (Cont'd.)

Author & year	Characteristics of empirical articles reviewed on discrimination and health	Key findings
Williams and Morris [2000] (188)	Health outcomes M N of articles 15 Years 1987–2000 Countries US, Canada Study designs O (community-based)	may induce psychological distress that may adversely affect physical and mental health status, as well as the likelihood of engaging in violence and addiction.” p. 243: “. . . the available scientific evidence suggests racism can adversely affect mental health status in three ways. First, racism in societal institutions can lead to truncated socioeconomic mobility, differential access to desirable resources, and poor living conditions that can adversely affect mental health. Second, experiences of discrimination can induce physiological and psychological reactions that can lead to adverse changes in mental health status. Third, in race-conscious societies, the acceptance of negative cultural stereotypes can lead to unfavorable self-evaluations that have deleterious effects on psychological well-being.”
Williams et al. [2003] (189)	Health outcomes P, M, HB N of articles 53 Years 1988–2002 Countries US, UK Study designs O (community-based)	p. 213: “The authors review the available empirical evidence from population-based studies of the association between perceptions of racial/ethnic discrimination and health. This research indicates that discrimination is associated with multiple indicators of poorer physical and, especially, mental health status. . . . Research on stress points to important directions for the future assessment of discrimination and the testing of the underlying processes and mechanisms by which discrimination can lead to changes in health.”
Schnittker and McLeod [2005] (190)	Health outcomes P, M, HB N of articles 17 Years 1990–2003 Countries US Study designs O	pp. 89-90: “self-reported discrimination is significantly associated with physical and mental health” including “major depression,” “generalized anxiety disorders,” and “self-rated health, chronic conditions, disability, and blood pressure and other cardiovascular risk factors, although the results for the latter are complex.”

<p>Paradies [2006b] (191)</p>	<p>Health outcomes N of articles Years Countries Study designs</p>	<p>P, M, HB 138 1980–2004 US primarily; also: Canada, Australia, NZ, Barbados, Dominica O (population-based)</p>	<p>p. 888: “This paper reviews 138 empirical quantitative population-based studies of self-reported racism and health. These studies show an association between self-reported racism and ill health for oppressed racial groups after adjustment for a range of confounders. The strongest and most consistent findings are for negative mental health outcomes and health-related behaviours, with weaker associations existing for positive mental health outcomes, self-assessed health status, and physical health outcomes.”</p>
<p>Williams and Mohammed [2009] (192)</p>	<p>Health outcomes N of articles Years Countries Study designs</p>	<p>P, M, HB, HC 115 2005–2007 US, Canada, UK, Denmark, Sweden, Netherlands, Austria, Bosnia, Croatia, S. Africa, NZ, Australia O (060); E (9)</p>	<p>p. 22: “Studies of mental health continue to dominate the discrimination and health literature . . .” p. 39: “The research on discrimination and health is continuing to grow rapidly. Although the discrimination variable has been operationalized in a variety of ways, the consistency of an inverse association between discrimination for an increasingly broad range of health outcomes, across multiple population groups in a wide range of cultural and national contexts is impressive, and lends credibility to the plausibility of perceived discrimination as an important emerging risk factor for disease.”</p>
<p>Brondolo et al. [2009] (193)</p>	<p>Health outcomes N of articles Years Countries Study designs</p>	<p>P, M 24 1989–2007 US O (20); E (4)</p>	<p>p. 74: “The effects of racial identity on mental and physical health are complex, and the data do not support a uniformly positive effect of each aspect of racial or ethnic identity on mental health”; p. 76: “Overall, the quantitative literature provides minimal support for the hypothesis that social support . . . buffers the impact of racism on psychological health . . . [or] on indices of physical health”; pp. 83–83: “The psychobiological effects of anger suppression among African Americans are among the most consistent findings in the literature on coping with racism. These data suggest that suppressing anger in the face of discrimination is associated with elevated BP or greater BP responses.”</p>

Table 4 (Cont'd.)

Author & year	Characteristics of empirical articles reviewed on discrimination and health	Key findings
Brondolo et al. [2011] (194)	<p>Health outcomes P</p> <p>N of articles 24</p> <p>Years 1984–2010</p> <p>Countries US</p> <p>Study designs O</p>	<p>p. 518: “Direct evidence linking individual/interpersonal racism to [hypertension] HTN diagnosis is weak. However, the relationship of individual/interpersonal racism to ambulatory blood pressure (ABP) is more consistent, with all published studies reporting a positive relationship of interpersonal racism to ABP. There is no direct evidence linking internalized racism to BP. Population-based studies provide some evidence linking institutional racism, in the forms of residential racial segregation (RRS) and incarceration, to HTN incidence. Racism shows associations to stress exposure and reactivity as well as associations to established HTN-related risk factors including obesity, low levels of physical activity and alcohol use. The effects vary by level of racism.”</p>
Brondolo et al. [2012] (195)	<p>Health outcomes P, M, HB</p> <p>N of articles 9</p> <p>Years 2002–2009</p> <p>Countries US</p> <p>Study designs O</p>	<p>p. 359: “the literature suggests that cultural, institutional, interpersonal and internalized racism affect peer relationships through a variety of pathways. In turn, racism-related effects on the development of peer relationships contribute to racial disparities in economic outcomes and health status.”</p>
Shavers et al. [2012] (147)	<p>Health outcomes HC</p> <p>N of articles 58</p> <p>Years 2008–2011</p> <p>Countries US</p> <p>Study designs O; E</p>	<p>p. 962: “We examined the availability of data on the prevalence, trends, mechanisms, and institutional policies and practices associated with racial/ethnic discrimination in health care settings. Although there were a number of studies that described race/ethnicity based discriminatory behaviors, attitudes, biases and preferences that could potentially contribute to discriminatory health care we found no studies that specifically addressed the US prevalence or trends. Also, relatively absent were studies that addressed how institutional racism impacts the health care received by racial/ethnic minority patients.”</p>

Couto et al. [2012] (196)	Health outcomes N of articles Years Countries Study designs	P 22 2000–2010 US O	p. 956: “The objective of this study was to update previous literature reviews on discrimination and blood pressure. . . . In the 22 studies assessed, the association between discrimination and blood pressure/hypertension was assessed 50 times. Twenty results (40%) showed no association between them, and only 15 (30%) revealed global positive associations, of which 67% were statistically significant. Eight negative associations were also observed, suggesting that higher exposure to discrimination would be associated with lower blood pressure/hypertension.”
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b) Children of color (n = 2)

Pachter and Garcia [2009] (197)	Health outcomes N of articles Years Countries Study designs	P, M, HB 49 1994–2007 US O	p. 260: “The studies in this review show that racism is associated with differential health outcomes and can adversely affect psychological and physiological functioning. Furthermore, they provide data to show that racism is associated with negative biopsychosocial sequelae that may contribute to health disparities, and different exposure to it contributes to variability in health outcomes within groups. This is most evident in the literature demonstrating its association with poor birth outcomes.”
Sanders- Phillips et al. [2009] (198)	Health outcomes N of articles Years Countries Study designs	P, M, HB 20 1997–2008 US O	p. S176: “. . . the social environment for many children of color includes personal and family experiences of racial discrimination that foster perceptions of powerlessness, inequality, and injustice. In turn, these perceptions may influence child health outcomes and disparities by affecting biological functioning (eg, cardiovascular and immune function) and the quality of the parent-child relationship and promoting psychological distress (eg, self-efficacy, depression, anger) that can be associated with risk-taking and unhealthy behaviors.”

Table 4 (Cont'd.)

Author & year	Characteristics of empirical articles reviewed on discrimination and health	Key findings
<i>c) African-American or black (only) (n = 7)</i>		
Wyatt et al. [2003] (199)	Health outcomes Cardiovascular N of articles 19 Years 1984–2003 Countries US, UK, Finland Study designs O	p. 327: “Despite hypothesized links between perceptions of racism, perceived discrimination, and CVD, few population-based studies have examined these associations. Findings, though inconsistent, do suggest the potential for such a relationship, particularly with hypertension.”
Brondolo et al. [2003] (200)	Health outcomes Cardiovascular N of articles 17 Years 1972–2001 Countries US Study designs O (6); E (11)	p. 62: “The existing data on the relationship of racism to BP [blood pressure] level or HT [hypertension] status are mixed. These pioneering studies provide important insights and guidance, but methodological limitations limit their interpretability and are likely to account for the inconsistent and relatively weak findings. A comprehensive evaluation of the relationship between racism and BP status has yet to be conducted. Findings from CVR [cardiovascular reactivity] studies are clearer. These studies suggest that acute exposure to racism is associated with increases in cardiovascular activation. In addition, past exposure to racism may influence current CVR to race-related and other stressors.”
Giscombé and Lobel [2005] (201)	Health outcomes Adverse birth outcomes N of articles 6 Years 1996–2005 Countries US Study designs O	p. 662: “The authors examine 5 explanations for these differences in rates of adverse birth outcomes: (a) ethnic differences in health behaviors and socioeconomic status; (b) higher levels of stress in African American women; (c) greater susceptibility to stress in African Americans; (d) the impact of racism acting either as a contributor to stress or as a factor that exacerbates stress effects; and (e) ethnic differences in stress-related neuroendocrine, vascular, and immunological processes. The review of literature indicates that

				<p>each explanation has some merit, although none is sufficient to explain ethnic disparities in adverse birth outcomes. There is a lack of studies examining the impact of such factors jointly and interactively.”</p> <p>p. 201: “In this article, we review emerging work that locates the cause of race-based health disparities in the external effects of the contextual social space on the internal world of brain functioning and physiologic response. These approaches reflect the growing interdisciplinary nature of psychology in general, and the field of race relations in particular.”</p>
Mays et al. [2007] (202)	Health outcomes N of articles Years Countries Study designs	P, M, HB 27 1989–2006 US O; E		
Giurgescu et al. [2011] (203)	Health outcomes N of articles Years Countries Study designs	Adverse birth outcomes 10 1996–2009 US O		<p>p. 362: “A consistent positive relationship existed between perceptions of racial discrimination and preterm birth, low birth weight, and very low birth weight. No relationship was found between racial discrimination and gestational age at birth.”</p>
Pieterse et al. [2012] (204)	Health outcomes N of articles Years Countries Study designs	M 66 (meta-analysis) 1966–2011 US O		<p>pp. 5-6: “. . . the aggregated correlation between perceived racism and psychological distress for 66 studies using a random-effects model was $r = .20$, 95% CI [0.17, 0.22] . . . results provided graphical and statistical support that publication bias was not present . . . the lack of significant moderation findings for sample type, publication type, and racism scale type suggest the relationship between perceived racism and mental health for Black Americans is quite robust.”</p>
Cuffee et al. [2012] (205)	Health outcomes N of articles Years Countries Study designs	Cardiovascular 15 1990–2010 US O		<p>p. 422: “This systematic review supports the association of racial discrimination with an increased risk of developing hypertension; however, the picture is not uniform. Methodological challenges, such as floor or ceiling effects of reported discrimination and low sample size, may have prevented researchers from detecting important associations.”</p>

Table 4 (Cont'd.)

Author & year	Characteristics of empirical articles reviewed on discrimination and health	Key findings
<i>d) Indigenous peoples (n = 2)</i>		
Paradies [2006a] (206)	Health outcomes P, M, HB N of articles 65 (Indigenous: 17) Years 1973–2004 Countries US, Australia, NZ Study designs O (50); intervention (15)	— focused on both Indigenous Peoples (n = 17 studies) and African-Americans (n = 48 studies); p. 295: “A range of chronic diseases, as well as harmful health behaviors, were associated with psychosocial stress for indigenous peoples and African Americans, with much stronger findings for mental rather than physical health outcomes.”
Walters et al. [2011] (124)	Health outcomes P, M, HB, + spiritual N of articles 3 Years 1999–2011 Countries US Study designs O	— focused on historical trauma among American Indians and Alaska Natives (AIAN); p. 185: “a high proportion of AIANs have high levels of historical-trauma loss manifesting in thinking about the impact of land-based trauma, on a weekly, and in some cases, daily basis. Moreover, after controlling for contemporary trauma, we found that HT land-based events continued to have a significant effect on mental and physical health.”
<i>e) Immigrants (Asian and Latinos, solely immigrants and for U.S. also including both immigrant and U.S.-born) (n = 4)</i>		
Gee et al. [2009] (166)	Health outcomes P, M, HB N of articles 62 Years 1960–2009 Countries US, UK, Canada, NZ, Australia, Finland, Japan Study designs O	— focused on Asian immigrants; p. 130: “The majority of articles focused on mental health problems, followed by physical and behavioral problems. Most studies find that discrimination was associated with poorer health, although the most consistent findings were for mental health problems.”

Nadimpalli and Hutchinson [2012] (207)	Health outcomes N of articles Years Countries Study designs	P, M 14 2002–2011 US O	— focused on Asian-Americans; p. 127: “Discrimination was associated with depressive symptoms in seven studies. Three studies found associations between discrimination and physical health, including cardiovascular disease, respiratory conditions, obesity, and diabetes. Although the literature was limited by self-reported data, cross-sectional designs, and inconsistent definitions and measurement of discrimination, the findings suggest that discrimination is a significant contributor to poorer health and health disparities for Asian Americans.”
Clough et al. [2013] (208)	Health outcomes N of articles Years Countries Study designs	HC 7 1980–2011 US O	— focused on US Asian immigrants; p. 387: “Four main themes emerged from the literature with respect to health care access and quality among Asian immigrants: access to health services; linguistic discordance and health communication between patient and provider; health-related beliefs of patients and cultural incompetency of health systems; and perceived discrimination in the health care setting.”
Viruell- Fuentes et al. [2012] (167)	Health outcomes N of articles Years Countries Study designs	P, M, HB 14 2000–2011 US O	— focused on US immigrants; p. 2100-1: “. . . even though some results are mixed, there is growing evidence that perceived discrimination is associated with lower levels of physical and mental health; poor access to quality health care; and certain deleterious health behaviors . . . the strength of the association between discrimination and health among immigrants appears to vary both by length of time in the United States and age at migration”; p. 2102: “for some, such as U.S.-born racialized groups, living in immigrant/ethnic enclaves may reflect limited opportunities for social, economic, and residential mobility . . . in some cases ethnic/immigrant enclaves in traditional urban immigrant gateway areas may provide a supportive environment for immigrants”; p. 2013: “Although research on the health effects of immigration policies is sparse, several studies point to their importance for health”

Table 4 (Cont'd.)

Author & year	Characteristics of empirical articles reviewed on discrimination and health	Key findings
<i>f) Residential segregation and environmental racism (n = 7)</i>		
Acevedo-Garcia et al. [2003] (209)	Health outcomes P, HB, env. exposures N of articles 29 Years 1966–2002 Countries US Study designs O	p. 216: “The majority of studies investigated the effect of racial residential segregation on the health of African Americans . . . a majority of the studies revealed a detrimental effect of Black-White segregation on African American mortality outcomes on Black-White mortality differentials . . .”
Brulle and Pellow [2006] (210)	Health outcomes P, env. exposures N of articles 13 (population-based) Years 1972–2005 Countries US Study designs O	pp. 103–104: “. . . in many communities, it is people of color and the poor who tend to live near environmentally hazardous facilities and who bear a larger share of the health burden from exposure to toxics . . .”
Mohai et al. [2009] (211)	Health outcomes P, env. exposures N of articles 40 (population-based) Years 1970–2007 Countries US Study designs O	p. 406: “Today, hundreds of studies conclude that, in general, ethnic minorities, indigenous persons, people of color, and low-income communities confront a higher burden of environmental exposure from air, water, and soil pollution from industrialization, militarization, and consumer practices. Known variously as environmental racism, environmental inequality, or environmental injustice, this phenomenon has also captured the attention of policy makers.”
Kramer and Hogue [2009] (212)	Health outcomes P N of articles 39 Years 1950–2008 Countries US Study designs O	p. 178: “Thirty-nine identified studies test an association between segregation and health outcomes. The health effects of segregation are relatively consistent, but complex. Isolation segregation is associated with poor pregnancy outcomes and increased mortality for blacks, but several studies report health-protective effects of living in clustered black neighborhoods net of social and economic

isolation. The majority of reviewed studies are cross-sectional and use coarse measures of segregation.”

p. 183: “Black and White neighborhoods are separate and unequal in a manner that may explain the separate, unequal health profiles of Blacks and Whites—particularly because most Blacks reside in mostly Black neighborhoods irrespective of their individual-level SES.”

p. 441: “The majority of the reported findings to date identify an association between residence in highly segregated areas and deleterious health outcomes, and to a lesser extent suggest a protective effect of segregation. The literature is fairly limited with regard to examining adult chronic diseases and health behaviors.”

p. 1278: “Increasing evidence indicates that racial/ethnic residential segregation is a key factor driving place-based health care inequalities.”

Landrine and Corral [2009] (213)
 Health outcomes P, HB, HC
 N of articles 31
 Years 2000–2008
 Countries US
 Study designs O

White and Borrell [2011] (214)
 Health outcomes P, M, HB
 N of articles 45
 Years 1950–2009
 Countries US
 Study designs O

White et al. [2012] (215)
 Health outcomes P, HC
 N of articles 13
 Years 1998–2011
 Countries US
 Study designs O

g) Methodological (instruments to measure self-reported experiences of racial discrimination) (n = 2)

Kressin et al. [2008] (216)
 Health outcomes HC
 N of articles 34 measures
 Years 1986–2007
 Countries US
 Study designs Psychometric
 p. 697: “We identified 34 measures of racism/discrimination; 16 specifically assessed dynamics in the health care setting. Few measures were theoretically based; most assessed only general dimensions of racism and focused specifically on the experiences of African American patients. Acceptable psychometric properties were documented for about half of the instruments.”

Table 4 (Cont'd.)

Author & year	Characteristics of empirical articles reviewed on discrimination and health	Key findings
Bastos et al. [2010] (217)	Health outcomes: All N of articles: 24 scales Years: 1973–2008 Countries: US (except 1 Australian) Study designs: Psychometric	p. 1091: “Despite the fact that discrimination stands as a topic of international relevance, 23 (96%) scales were developed within the United States. Most studies (67%, N = 16) were published in the last 12 years, documenting initial attempts at scale development, with a dearth of investigations on scale refinements or cross-cultural adaptations. Psychometric properties were acceptable; sixteen of all scales presented reliability scores above 0.7, 19 out of 20 instruments confirmed at least 75% of all previously stated hypotheses regarding the constructs under consideration, and conceptual dimensional structure was supported by means of any type of factor analysis in 17 of 21 scales.”
3) Gender (n = 7) — see also “multiple types”: Krieger et al. (1993), 2 studies; Krieger (1999/2000), 3 studies; Pascoe and Richman (2009), 13 studies; Santry and Wren (2012), 11 studies; Goto et al. (2013), 4 studies		
Swanson [2000] (218)	Health outcomes: P, M, HB N of articles: 7 Years: 1986–1997 Countries: US Study designs: O	p. 77: “Sexual harassment – unwanted, unsolicited verbal or physical behaviors – can be a severe occupational stressor with serious physical, psychological, behavioral and career consequences . . . Targets have reported a range of psychological symptoms such as depression, anxiety, fearfulness, feelings of guilt and shame; such physical symptoms as headaches, gastrointestinal disorders, and sleep disorders; and such job-related outcomes as job withdrawal, negative job attitudes, involuntary job loss, and career interruption. Several studies have shown that sexual harassment is a particularly noxious stressor for women and has a significant impact on psychological distress and absenteeism beyond that attributable to regular job stressors.”

Raine [2000] (219)	Health outcomes N of articles Years Countries Study designs	HC 138 1990–1999 US, UK, Canada, Israel, Finland, Germany, Spain O	p. 237: “One hundred and thirty-eight studies were identified covering five major topics: coronary artery disease; renal transplantation; human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS); mental illness; and other (mainly invasive) procedures. The majority (94) examined coronary artery disease . . .”; p. 246: “. . . the quality of the research limits the ability to draw conclusions as to the existence of bias. Specialist services for coronary heart disease have been most extensively studied and it appears that gender differences in use do occur along the management pathway that leads to angiography . . .”; p. 247: “. . . the topics identified may themselves reflect gender bias in the research agenda. The vast majority of the studies are concerned with gender differences in coronary artery disease, the major cause of mortality in men. In contrast, few studies examined gender differences in mental health services, an area in which female patients predominate with respect to minor psychiatric morbidity . . .”
Govender and Penn- Kekana [2007] (220)	Health outcomes N of articles Years Countries Study designs	HC 11 1983–2005 Global O	p. 4: “Evidence demonstrating impact of gender on patient-provider interactions was relatively hard to come by and synthesis. Apart from some studies documenting different treatment received by men and women most of the studies described are descriptive, or evaluations of relatively small scale interventions . . .”; p. 7: “sexual and reproductive health services are particularly impacted by gender bias and discrimination and that particular attention needs to be paid to how these services are provided within the health system”; p. 35: “Much of the gender discrimination that appears to take place is almost unconscious, reflecting the norms of the society in which both the health worker and the patient are based . . .”

Table 4 (Cont'd.)

Author & year	Characteristics of empirical articles reviewed on discrimination and health	Key findings
LaResche [2011] (221)	Health outcomes HC N of articles 58 Years 1995–2010 Countries US, Canada, Sweden Study designs O (55); E (3)	p. 1871: “Gender disparities in the amount of healthcare use for pain may be partially explained by the experience of higher-intensity pain in women. Pain intensity also seems to be a major factor influencing treatment, especially the prescription of medications for acute pain. However, clinicians’ gender stereotypes, as well as the clinician’s own gender, appear to influence diagnostic and treatment decisions for more persistent pain problems.”
McDonald [2012] (222)	Health outcomes P, M N of articles 9 Years 1997–2009 Countries US, Canada Study designs O	p. 4: “Studies consistently demonstrate that targets of [sexual harassment] SH experience a range of significant negative psychological, health and job-related outcomes. Mental and physical health consequences range from irritation and anxiety to anger, powerlessness, humiliation, depression and post-traumatic stress disorder.”
4) <i>Sexual orientation/identity (heterosexism; anti-lesbian, gay, bisexual, transgender [LGBT]) (n = 9)</i> — see also “multiple types”: Krieger (1999/2000), 3 studies; Pascoe and Richman (2009), 13 studies; Goto et al. (2013), 6 studies		
Williamson [2000] (223)	Health outcomes M N of articles 11 Years 1990–2009 Countries US, Australia Study designs O	— includes only lesbian and gay; p. 103: “Research involving HIV and AIDS represents the largest body of knowledge for testing the relationship between conceptualizations and measures of internalized homophobia and illness. The research produced has had rather mixed results.”

Dean et al. [2000] (224)	Health outcomes N of articles Years Countries Study designs	P, M, HB, HC 9 1989–2005 US O	— includes LGBT; p. 103: “Homophobia and heterosexism play a role in the inadequate assessment, treatment, and prevention of lesbian, gay, and bisexual health problems. LGB individuals suffer from discrimination in housing, employment, and basic civil rights. . . . Research on the effects of stigma, violence, social attitudes, and gender bias on the lives of transgender individuals is even less available than for LGB populations. Preliminary reports and existing studies suggest that the problems above may be even more severe for transgender individuals.”
Meyer [2003] (225)	Health outcomes N of articles Years Countries Study designs	M, HB 14 1994–2001 US O	— includes only LGB; p. 690: “. . . LGB individuals are exposed to excess stress due to their minority position and . . . this stress causes an excess in mental disorders.”
Szymanski et al. [2008] (226)	Health outcomes N of articles Years Countries Study designs	P, M, HB 42 1986–2006 US, Canada, Australia, England, Scotland, Finland O	— includes only LGB; p. 542: “the empirical literature shows relations between levels of IH [internalized homophobia] and sexual identity development, disclosure of sexual orientation to others, difficulties with the coming-out process, self-esteem, depression, psychological distress, social support, psychosocial distress, physical health, intimate and sexual relationship quality, adherence to traditional gender role and feminist attitudes, traditional religious beliefs, and perceived career barriers (among lesbians). Mixed findings were also reported, especially with regard to substance use in LGB individuals and risky sexual behavior in men who have sex with men.”
DeSantis [2009] (227)	Health outcomes N of articles Years Countries Study designs	HIV/AIDS 8 1998–2008 US O	— includes only transgender; p. 366: “Many MTF [male-to-female] transgender persons have reported that they do not seek health care because of previous experiences of discrimination or blatant verbal abuse by HCPs [health care providers] . . .”; p. 368: “About 40% of MTF transgender persons have experienced significant stigma and discrimination . . . [which] is reported to be more intense

Table 4 (Cont'd.)

Author & year	Characteristics of empirical articles reviewed on discrimination and health	Key findings
Newcomb and Mustanski [2010] (228)	Health outcomes: M N of articles: 31 (meta-analysis) Years: 1987–2008 Countries: US, Canada Study designs: O	and psychologically damaging than negative reactions that are experienced by gay, lesbian, and bisexual people. . . . In addition to the stigma and discrimination from HCPs as previously discussed, transgender women experience a significant amount of employment-related discrimination — includes only lesbian and gay; p. 1019: “Thirty-one studies were meta-analyzed for the relationship between [internalized homophobia] IH and mental health (N=5831), revealing a small to moderate overall effect size for the relationship between the two variables. . . . The relationship between IH and depressive symptomatology was stronger than the relationship between IH and symptoms of anxiety.”
5) <i>Disability (physical and/or mental) (n = 4)</i> — see also “multiple types”: Krieger (1999/2000), 1 study		
Burns [2009] (229)	Health outcomes: M, HC N of articles: 6 Years: 2002–2008 Countries: US, S. Africa, Brazil, Argentina, Canada Study designs: O	— focused on mentally disabled; pp. 23–24: “Both real and perceived prejudice against the mentally disabled within the health sector is a potent barrier to accessing care. . . . the mentally disabled receive unequal treatment for co-morbid physical disorders in comparison to their mentally-well counterparts.”

Thornicroft et al. [2007] (230)	Health outcomes N of articles Years Countries Study designs	M, HC 12 1997–2005 US, UK O	— focus on mentally ill; p. 113: “This paper discusses factors associated with low rates of help-seeking and poorer quality of physical healthcare among people with mental illnesses”; p. 117: “A series of focus groups in England asked service users about their experiences of stigma and about who should receive targeted educational sessions to reduce discrimination. The group most often mentioned (by about two-thirds of service users) was family doctors, closely followed by school children, employers and police”; p. 118: “There is strong evidence that people with a diagnosis of a mental illness . . . receive inferior care for diabetes and heart attacks”; p. 119: “Surprisingly little has been written about why people stop attending appointments, from the point of view of service users themselves, either to understand what affects their satisfaction with care, or to find out how stigma and discrimination play a role in these treatment decisions, or to appreciate the mixed feelings many people with mental illness have about their harmful healers.”
Emerson et al. [2009] (231)	Health outcomes N of articles Years Countries Study designs	P, M, HB, HC 5 1999–2008 England O	— includes physically and mentally disabled; pp. 8–9: “Direct effects of discrimination on health result from the existence of systemic disability discrimination in the operation of health care systems, the direct consequence of which is to impede disabled people’s access to appropriate health and social care. Indirect effects of discrimination on health arise through two interconnected pathways. First, discriminatory systems and practices contribute to the social exclusion of disabled people. As a result, disabled people are more likely than their peers to be exposed to living conditions (poverty, unemployment, social adversity, low control, low status, poor housing) associated with poor health. Second, the direct and indirect experience of disablism and disability discrimination may be expected to have a negative impact on the person’s mental and physical health. While no direct evidence is available to support this contention, equivalent processes (the experience of racism and racial discrimination) have been identified as central to understanding ethnic inequalities in health.”

Table 4 (Cont'd.)

Author & year	Characteristics of empirical articles reviewed on discrimination and health	Key findings
<i>6) Age (n = 3)</i>		
Ory et al. [2003] (232)	Health outcomes P, M, HB, HC N of articles 7 Years 1996–2003 Countries US Study designs O; E	p. 164: “Ageist stereotypes are pervasive in U.S. society and harmful to older adults’ psychological well-being, physical and cognitive functioning, and survival”; p. 166: “Ageism in medical care is manifested in doctors’ tendency to give less aggressive treatments based on age characteristics alone, regardless of how the older person would actually fare with the withheld treatments or regimens; p. 166: “older people . . . exposed to negative stereotypes had reduced memory performance, self-efficacy, and the will to live” and “heightened cardiovascular response to stress.”
Bugental and Helman [2007] (233)	Health outcomes P, M, HB, HC N of articles 16 Years 1990–2007 Countries US, UK Study designs O; E	p. 173: “. . . biased responses of others foster older adults’ stress-related emotional and hormonal responses – responses that may effectively reduce their social and cognitive competence”; p. 180: “employees who undergo unwanted retirement show higher rates of morbidity and mortality in the years immediately following retirement, in comparison with those who undergo forced retirement but are then rehired”; p. 193: for elder abuse in the US and UK, “the highest prevalence rates were reported for neglect (#1) and financial exploitation (#2). Psychological and physical abuse occurred at slightly lower levels (at equivalent rates) across the two countries. The lowest rates were found for sexual abuse.”
Meisner [2012] (234)	Health outcomes HC N of articles 25 Years 1971–2009 Countries US, Canada, Singapore Study designs O	p. 69: “From these published papers, predominantly representing an American system, it appears that physicians’ attitudes toward aging are complex, dependent on contextual factors, and may be negative in content . . . The little research on aging attitude and aging knowledge generates more questions than answers”; p. 70: “Most of these themes that emerged from the literature are rooted within

larger systemic issues that relate to the health care system itself . . . attitudes toward a decentralized health care system, the factors influencing financial reimbursement, and paper work may be stronger predictors of geriatric care attitudes than attitudes toward aging.”

Abbreviations: (a) Health outcomes; P = physical health, M = mental health, HB = health behavior, HC = health care; (b) study design: O = observational; E = experimental

Search protocol:

1) Databases searched: Web of Science (2013) and PubMed (2013); the search was for review articles published between January 1, 1900, and June 1, 2013.
 2) Articles needed to be identified by the database as a “review” and were selected for inclusion if they provided a review of empirical investigations that explicitly used measures of discrimination (structural or at individual-level) to analyze health outcomes or else evaluated instruments used to measure discrimination in health research; conceptual reviews were not included, and the N of studies listed as reviewed refers only to the empirical studies regarding associations between exposure to discrimination and health (as opposed to background articles, or studies of discrimination with no health outcomes, etc). Articles were not included if they focused only on stigma.

3) Initial search: conducted on May 31, 2013, and restricted to articles published from January 1, 2000, through May 31, 2013

Core search terms = “discrimination OR bias OR prejudice” AND “health OR disease OR morbidity OR mortality” and additional phrases added to the core were: (a) “racism OR racial OR race OR ethnic OR ethnicity OR indigenous OR native”; (b) “gender OR sexism”; (c) “anti-gay OR homophobia OR homophobic OR transgender OR transsexual OR LGBT OR (sexual AND minority) OR gay OR lesbian OR bisexual OR queer OR two-spirit”; (d) “class OR socioeconomic OR poverty”; (e) “disability OR disabled”; (f) “immigrant OR xenophobia OR nativist”; (g) “religion or religious”; (h) “age OR ageism”

4) Based on review of initial results, added relevant articles cited in the bibliographies, and also conducted a second set of searches on June 5, 2013, and June 6, 2013, expanding dates of articles to January 1, 1900, through June 1, 2013.
 Additional search terms = (a) “prejudice OR racism OR sexism OR homophobia OR heterosexism OR ableism OR ageism” AND “health OR disease OR mortality OR morbidity”; (b) “prejudice OR racism OR sexism” AND “Latino OR black OR (African AND American) OR Asian OR Pacific OR (American AND Indian) OR (Native AND American) OR Indigenous OR minority” AND “health OR disease OR mortality OR morbidity”; (c) “prejudice” AND “gender OR sex OR disabled OR impaired” AND “health OR disease OR mortality OR morbidity”; (d) “residential OR occupational” AND segregation” OR “structural AND violence” and “health OR disease OR disability OR morbidity OR mortality”; (e) “environmental OR environment” AND “racism OR justice OR injustice” AND “health OR disease OR disability OR morbidity OR mortality”; (f) “incarceration OR prison OR jail OR (criminal AND justice)” AND “racism OR discrimination” AND “health OR disease OR disability OR morbidity OR mortality”; (g) “gender AND equity” AND “discrimination OR prejudice OR bias” AND “health OR disease OR morbidity OR mortality OR disability.”

By contrast, the number of review articles—and empirical studies—explicitly focused on discrimination and health in relation to disability and age remains small: four and three, respectively, all of which acknowledged the scant evidence available (apart from studies on physical and sexual abuse). In both cases, the primary emphasis, as with the research on gender, pertained to discrimination in the health care system, even though most of the review articles acknowledged that discrimination in employment against disabled and older adults can affect economic resources relevant to maintaining health. None of the reviews focused exclusively on anti-immigrant discrimination (although, as noted below, this type of discrimination was addressed in diverse articles concerned with racial discrimination), nor did any focus directly on religious discrimination. Finally, only five review articles encompassed multiple types of discrimination, all of which considered discrimination based on race/ethnicity and gender, three of which also included discrimination based on sexual orientation, and two of which addressed discrimination based on disability and age.

Four key features of contemporary empirical research on discrimination and health stand out (Table 4):

1. The vast majority of review articles and studies are focused on interpersonal discrimination, with the majority of research still focused on racial/ethnic discrimination:
 - a. in the case of etiology, these studies primarily conceptualize discrimination as a stressor (i.e., type of social trauma), as measured directly using self-report instruments in observational studies, and
 - b. in the case of medical treatment, they primarily use indirect methods, with discrimination inferred if observed group differences persist even after accounting for major known factors that potentially could influence treatment decisions (e.g., age, type of symptoms, stage of disease, comorbidity, etc.).
2. In parallel, the growing use of experimental methods chiefly is, for etiologic studies, mainly focused on psychoneurophysiological responses to adverse stimuli involving discriminatory treatment, and for health care studies, on medical decision making in relation to use of vignettes and on unconscious bias.
3. Most review articles and the studies they include, whether observational or experimental, focus on only one type of discrimination; a growing number, however, employ self-report data on “unfair treatment” without specific attribution to any particular type of discrimination.
4. Only a handful of review articles focus on institutional or structural discrimination, and do so chiefly in relation to residential segregation and environmental racism.

Notably, the conclusions offered by the current review articles (Table 4) are in keeping with those of the first wave of investigations (1). Specifically:

1. The most robust etiologic findings pertain to positive associations between discrimination and psychological distress;
2. Growing evidence links exposure to discrimination to increased likelihood of adverse health behaviors (e.g., adverse use of psychoactive substances such as tobacco, alcohol, and other drugs; unsafe sex);
3. Evidence for associations between discrimination and somatic health remains inconsistent and weak, whether for the still-dominant work focused on cardiovascular outcomes (for which the evidence is stronger for cardiovascular reactivity than it is for hypertension), for the smaller number of new studies analyzing immunological and hormonal biomarkers of stress response, or for the handful of studies focused on obesity and on other non-communicable and infectious disease outcomes; and
4. Indirect and increasingly experimental evidence supports the hypothesis that decisions of health care providers can be adversely affected by bias (unconscious as well as conscious).

Does this accounting, however, fully capture the toll of discrimination on health and well-being? As informed by an ecosocial analysis, the likely answer is: no—for reasons that I will now elaborate.

ADVANCING THE WORK ON DISCRIMINATION AND HEALTH INEQUITIES

Methodological Challenges for Analyzing Structural Aspects of Discrimination for Health Research

One striking and disturbing finding revealed by Table 4 is the paucity of research on structural or institutional discrimination as a determinant of health inequities (3, 8, 82). As previously discussed, however, discrimination is not an individual matter, even as one manifestation is through interpersonal encounters. Discrimination instead is at core a historically entrenched cross-generational societal phenomenon, one that creates and preserves privilege for dominant groups at the expense of subordinated groups. After all, if discrimination served no function, it would presumably be simple to eliminate.

State-sanctioned discrimination, past and present, is of particular concern (8). Consider the example of racism in the United States. Not surprisingly, because the rising pressure of the civil rights movement finally forced the U.S. federal government to abolish legal (i.e., de jure) racial discrimination in the mid-1960s (98, 99), most contemporary U.S. research on institutional racism and health (Table 4) primarily focuses on present-day de facto discriminatory policies and

practices, chiefly in relation to: (a) residential, educational, and (to a lesser extent) occupational segregation and (b) environmental racism, as shaped by broader issues of political economy, political disempowerment, and poverty (100).

Reckoning with Currently Legal Discrimination: Lifetime Consequences. An important gap in current research, however, rendered visible by ecosocial theory's emphasis on accountability and agency, concerns the racialized health consequences of contemporary legal discrimination. Underscoring this point is nascent work on the myriad consequences of the legally color-blind, albeit racially motivated, U.S. War on Drugs and its role in producing or exacerbating health-debilitating racial/ethnic inequalities (8, 101–106). As Alexander explains (107): “President Ronald Reagan officially declared the current drug war in 1982, when drug crime was declining, not rising. From the outset, the war had little to do with drug crime and nearly everything to do with racial politics. The drug war was part of a grand and highly successful Republican Party strategy of using racially coded political appeals on issues of crime and welfare to attract poor and working class white voters who were resentful of, and threatened by, desegregation, busing, and affirmative action. In the words of H. R. Haldeman, President Richard Nixon's White House Chief of Staff: “[T]he whole problem is really the blacks. The key is to devise a system that recognizes this while not appearing to.”

Consequently, despite substantial evidence that rates of illicit drug use are similar across all U.S. racial/ethnic groups (101, 108, Table 58), research repeatedly has shown that African-Americans are especially much more likely than white Americans to be arrested, convicted, and sentenced for use of drugs (101, 103, 105, 109). For example, a national study published in 2013 found that despite equal marijuana use by black and white Americans, black Americans were 3.7 times more likely, on average, to be arrested on charges of marijuana possession, with this excess risk ranging from a “low” of 2.5 times higher in some states (e.g., Colorado, Oregon) to more than five times higher in other locales (e.g., Illinois, Iowa, District of Columbia) (109). Racial inequalities in imprisonment rates in the United States consequently exhibit not only period but also cohort effects, whereby the lifetime cumulative risk of imprisonment among U.S. men age 30–54 born between 1945 and 1949 equaled 1.4 percent for white men versus 10.6 percent for black men, but among those born between 1965–1969, these values respectively equaled 2.9 percent and 20.5 percent, with lifetime risk of imprisonment among black men age 30–34 without a college degree in 1999 equal to 30.2 percent (as compared to 12.0% in 1979) (104). As stated in one recent review, as of 1999, “among black male high school dropouts, the risk of imprisonment had increased to 60 percent, establishing incarceration as a normal stopping point on the rout to midlife” (104, p. 164).

The health impact of racial discrimination in drug arrests and other arrests linked to institutional and structural discrimination (e.g., racial profiling for

“stop-and-frisk” policing (2, 32), moreover, does not start and end with adverse exposure to health-damaging conditions in prison (8, 101, 106, 110). Following release, ex-felons are subject to legal discrimination in many U.S. states, whereby they are not only denied the right to vote and serve on juries but also confront legal prohibitions limiting access to such well-known determinants of health as employment, housing, education, and public benefits (101, 103, 105, 110). The exclusion of prisoners from most health studies in turn leads to a type of selection bias that would result in civilian-based studies (including most national surveys) underestimating the extent of—and contribution of racial discrimination to—racial/ethnic health inequities (8, 103). Far from unique to the United States, these concerns are of global significance, given links in many countries between racism, risk of imprisonment, and health inequities (111).

Other examples of active legal discrimination in the United States involve sexual orientation. At issue is still-legal discrimination in employment and housing in states whose civil rights laws do not explicitly include protection on the basis of sexual orientation (34, 35), as well as now highly contested U.S. state laws prohibiting gay marriage (as of June 2013, gay marriage was banned in 36 states, legal in 12 states plus Washington, D.C., and neither authorized nor prohibited in 2 [22]), with the longstanding restriction of federal tax benefits to only heterosexual married couples (34) only overturned in late June 2013 (112). A series of studies, for example, has found that rates of psychiatric disorders among LGB persons, controlling for other relevant covariates: (a) were higher among LGB persons who resided in states that did not versus did extend protection against hate crimes and employment discrimination based on sexual orientation (113) and (b) increased in states that instituted bans on gay marriage (114); by implication, state protection of rights reduces health inequities. Active contests in many other countries regarding LGBT rights (20, 34, 35), including the right to gay marriage (as of mid-June 2013, now legal in 14 countries) (21), again suggests these U.S. findings are likely relevant in other country contexts.

Reckoning with Prior Legal Discrimination: The Long Reach of History, Within and Across Generations. Nor is history dead within us. As ecosocial theory clarifies, measuring only contemporary exposure is likely to dilute estimates of the impact of discrimination on health (4, 8, 57). Age, period, and cohort effects all matter. A case in point is the mid-1960s abolition of U.S. Jim Crow laws—that is, laws enacted in the late 19th and early 20th centuries that upheld white supremacy and sanctioned legal racial discrimination (predominantly against black Americans, but also affecting American Indians, Latinos, and Asian-Americans) in voting, education, employment, health care, housing, the legal system, and use of public facilities, spaces, services, and transportation (17, 19, 98). In light of mounting evidence of the importance of early life conditions and cumulative disadvantage for both adult health and transgenerational transmission of risk (82, 83, 103, 115), a reasonable hypothesis is that Jim Crow, as well

as its abolition, had both immediate and enduring health consequences. In 2013, all U.S.-born persons aged 49 and older were born, and those aged 69 and above (i.e., the age group in which the bulk of mortality occurs) had already come of age and lived the first 20 years of their lives, and perhaps had their first child, when Jim Crow was legal in 21 out of 50 states plus the District of Columbia, with de facto discrimination in the remaining 29 states (8).

Yet, to date, scant research has investigated the impact of Jim Crow laws—or their abolition—for present-day racial/ethnic health disparities (8). Results of the literal handful of five studies of the topic have nevertheless all provided provocative evidence that the abolition of Jim Crow had a beneficial impact on black health, especially for infant mortality, and also a reduction, for some health outcomes, in black versus white health inequities, likely through a combination of improving working and living conditions plus the immediate impact of desegregation of hospital facilities (116–120). Even so, as indicated by Figure 4, although abolition of Jim Crow led to a singular convergence of black infant death rates comparing states that did versus did not have Jim Crow laws, its abolition was insufficient to eliminate the entrenched two-fold excess risk that

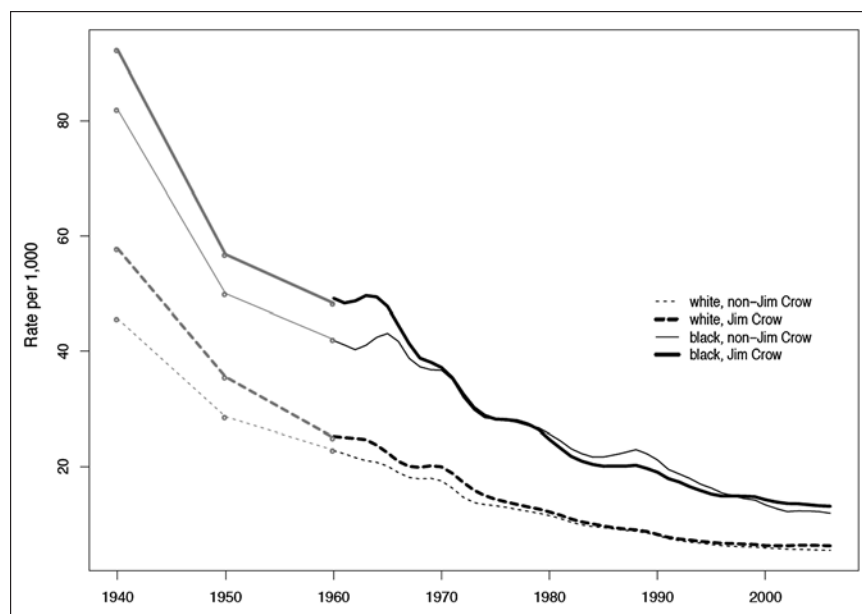


Figure 4. Infant death rates for U.S. black and white infants in the Jim Crow and non-Jim Crow polities, 1940–1960: rates per 1,000 (rolling 3-year average). *Note:* Gray lines based on pretabulated U.S. decennial mortality rates; black lines based on annual mortality data. *Source:* Krieger et al. (120).

continues to this day (120). A parallel argument regarding the continuing relevance of past as well as current injustice, including land expropriation, appears in the literature on indigenous people's health, concerning the ongoing somatic and mental health consequences of historical trauma (121–124), a concept itself first developed to understand health outcomes among children of Holocaust survivors (121, 125).

Conversely, as implied by the examples of the abolition of Jim Crow and also the passage of laws preventing anti-LGBT discrimination, it likewise is essential that research on discrimination and health investigate the health impact of societal actions to end and also redress discrimination. As I noted in my original review (1), research on discrimination and health would likely benefit from engaging with work in the fast-developing field of health and human rights (9, 10). The international human rights instruments listed in Table 2, for example, provide important benchmarks for assessing how enforcement (not just violation) of these internationally stipulated rights affects population health, both on average and in relation to the magnitude of health inequities. From a policy perspective, this could be particularly useful, since popular movements and professional organizations can hold governments, and sometimes even nonstate actors, accountable for stipulations in these human rights instruments (9, 10, 14). The troubling lack of any discussion of human rights in any of the post-2000 review articles included in Table 4, however, is not altogether surprising, given the previously noted neglect of epidemiologic research on political determinants of health (3). Related, only a handful of the review articles (primarily those regarding environmental justice and indigenous health) mentioned community organizing and social movements for change. The gaps are many, and there is much work to do.

*Measurement of Individuals' Exposure to Discrimination:
Explicit and Implicit*

Despite the glaring need for rigorous research on structural discrimination and health, addressing concerns regarding the plausibility of presumed biological pathways requires credible investigation on individuals' exposures and their embodiment (8). A starting point is to remember that individual-level data are more than simply individual—precisely because no one is an “individual” one day and a member of a “population” another. Each person is both, simultaneously (58). At issue are not only people's individual experiences, both material and psychological, but also their reference points for evaluating them—and for acting to alter future risk. Identification of discrimination at the individual level requires group-level knowledge—whether knowledge about group mores for what constitutes dignified treatment versus the denial of dignity (12, 126) or, in the case of discrimination regarding wages, occupational hazards, and medical referrals, knowledge about what others have experienced (1, 12). As the review articles

make clear, methodological challenges remain for measuring individuals' exposure to discrimination.

Individual Explicit (Self-Report) Data: Domains and Attribution—Domains Matter. Two distinct types of instruments appear in the literature on discrimination and health (Table 4): (a) explicit measures of exposure to diverse domains and (b) measures that emphasize psychosocial aspects of interpersonal interactions with less or no information about where the interactions occurred (8). For example, in relation to racial discrimination, widely used psychometrically validated examples of the former are: (a) the Experiences of Discrimination (EOD) measure, which asks about discrimination in nine domains (“at school”; “getting hired or getting a job”; “at work”; “getting housing”; “getting medical care”; “getting service in a store or restaurant”; “getting credit, bank loans, or a mortgage”; “on the street or in a public setting”; and “from the police or in the courts”) and about people’s responses to unfair treatment (127, 128), and (b) the major discrimination component of the Everyday Discrimination Scale (EDS), which specifies six domains (work, police, education, housing, bank, receipt of services) among its nine items (129). Also part of the EDS is a measure of “day-to-day unfair treatment” (129), which focuses on various types of unfair treatment, with the two domains mentioned (in the 10 items) pertaining to stores and restaurants.

Recently, a growing number of researchers, however, have begun using this latter EDS measure, regarding day-to-day unfair treatment, on its own, rather than in conjunction with the domain-oriented major discrimination EDS subscale (130–134). Yet, from both a data quality and a prevention and policy perspective, asking about the multiple domains in which discrimination occurs is critical as a key complement to, not replacement for, questions that focus on psychosocial aspects of the exposure (8). In part, this is because specification of domains is important for cognitively grounding the question and response (12) and because critical theoretically informed review of such lists can reveal gaps and hence potential new domains for inclusion (e.g., racial discrimination in cyberspace [82]). Beyond any psychometric considerations, however, are key points pertaining to agency and accountability: the occurrence of discrimination in diverse domains, such as discrimination at work, in housing, in education, and in health care, is legally actionable (1, 12, 135), and knowing where discrimination occurs, as opposed to treating it only as a free-floating psychosocial stressor, is relevant to ending it (8).

Individual Explicit (Self-Report) Data: Domains and Attribution—Attribution Matters. Current instruments to assess exposure to discrimination also differ in how they ask their questions. The primary two main approaches respectively: (a) ask explicitly about discrimination in the stem of the question (as in the Experiences of Discrimination measure [127, 128]) or (b) ask first about unfair



treatment, and if any is reported, follow up with a question about attribution, for example, to race/ethnicity or something else (as in the Everyday Discrimination Scale measure [129]). As has been noted for more than a decade (1, 136–138), these approaches are not equivalent.

Attesting to differences in these two approaches, in the case of racial discrimination, new empirical data from the 2007 California Health Interview Study unambiguously demonstrate—by employing identically phrased questions and a split-sample design—that self-reports of unfair treatment (without any attribution) are much higher—and demonstrate far less racial/ethnic variation—than self-reports of unfair treatment attributed to race/ethnicity and self-reports in response to a one-stage question that asks directly about racial discrimination (137, 138). By implication, unfair treatment (without attribution) would contribute less to explaining racial/ethnic health disparities and underestimate the health impact of racial discrimination. Supporting this inference, recent analyses from the Jackson Heart study (with 5,301 African-American participants) found that whereas risk of hypertension was associated with higher lifetime self-reports of discrimination (whether attributed to race/ethnicity or not), it was only associated with the burden of discrimination (referring to appraisal of how stressful it was) when discrimination was attributed to race/ethnicity, and it was not associated with everyday discrimination (unattributed) (139). It is thus worrisome that empirical studies and review articles continue to treat findings arrived at through these two different methods as if they were directly comparable (Table 4; see also Lewis et al. [134]; Albert et al. [140]; Taylor et al. [141]). The larger issue raised by these findings is whether self-report data are adequate for measuring exposure to discrimination.

Individual Implicit Data

One of the newer approaches in the discrimination and health literature that seeks to minimize well-known cognitive problems affecting self-report data is the Implicit Association Test (IAT), a methodology initially developed to measure prejudice (41, 142–144). First used in health research to measure unconscious bias in health care providers and its effect on treatment decisions (145–147), the motivation for adapting the IAT for measuring exposure to discrimination (Figure 5) (148, 149) is the concern that the people most affected by discrimination may be least able or willing to say so, even as such experiences may nevertheless affect their health (1, 8, 127). Two lines of empirical evidence support this hypothesis.

First, the phenomenon psychologists refer to as the “person–group discrimination discrepancy” reveals that people typically report more discrimination for their group, on average, than for themselves personally—even though it is not possible for all individuals to experience, on average, less discrimination than their group (150, 151). Second, several studies observed a linear association between

Discrimination:	Target concept categorization		Attribute categorization
Against Self (IAT-p)	Me My Mine	Them Their Theirs	Abuser Racist Bigot Target Victim Oppressed
Against Group (IAT-g)			

The IAT is a computer-based reaction-time methodology designed to capture phenomena that lie outside of the reaches of introspective access. The test contrasts the time it takes to make associations between two sets of items, e.g., "flowers" with the word "good," and "bugs" with the word "bad" – and then compares what happens when participants alternatively are asked to pair "flower" with "bad" and "bugs" with "good." A difference in average matching speed for opposite pairings determines the IAT score. Participants are typically aware that they are making these connections but unable to control them given the rapid response times and structure of the test. More than 500 studies have employed numerous versions of the IAT and have found the results to be robust, especially for phenomena that are subject to social desirability. Translated to the measurement of racial discrimination, as per the illustration above, we had two sets of targets for the IAT. First, for discrimination against oneself, the measure – which we call the "IAT-p" (for person) – used the pronouns me, my, mine, them, their, and theirs. Second, for discrimination against one's group – which we call the "IAT-g" (for group) – we used photos of black and white persons. For both measures, the attribute categorization words were: abuser, racist, bigot, target, victim, and oppressed. Using these measures, we could ascertain the differences in strength of association for being a perpetrator versus target of discrimination.

Figure 5. Implicit Association Test (IAT) and use for measuring exposure to racial discrimination. *Source:* *Camey et al. (148); Krieger (8); Krieger et al. (149).*

discrimination and health among more affluent persons, whereas among groups with fewer resources, risk was higher among respondents who reported no versus moderate discrimination, with the highest risk, however, occurring among respondents who reported high exposure (i.e., a J-shaped curve) (152–154). Together, these findings imply that self-reports of discrimination among exposed groups may underestimate exposure, especially among those with the least resources, even as this exposure can still adversely affect their health; one consequence would be underestimation of the impact of discrimination on health (1, 8, 57).

Tellingly, the first two studies to use the IAT to measure exposure to discrimination, both focused on racial discrimination (148, 149), have already shown that: (a) the implicit measure does not detect the person–group discrimination discrepancy observed with the explicit measure, suggesting that this phenomenon reflects self-presentational bias, and (b) the correlation between implicit and explicit measures is small, implying that they capture different phenomena, with the low correlation on par with that reported in other social psychological research comparing implicit versus explicit measures of phenomena subject to self-presentational bias.

The second study also reported two notable health-related findings (149). First, the IAT and the Experiences of Discrimination responses were independently associated with risk of hypertension among black Americans. Second, in models comparing the black and white participants that controlled for age, gender, socioeconomic position (educational level of the respondent and both parents), body mass index, social desirability, and response to unfair treatment, black participants remained at significantly higher risk of being hypertensive (odds ratio [OR] = 1.4; 95% confidence interval [CI] = 1.0, 1.9). Their excess risk, however, was effectively eliminated and rendered statistically nonsignificant (OR = 1.1; 95% CI = 0.7, 1.7) by additionally adjusting for exposure to racial discrimination by using both the IAT and the Experiences of Discrimination measure. These preliminary results thus point to the likely utility of health research on discrimination supplementing self-report data with IAT data (8).

Embodying Exposure to Multiple Types of Discrimination

Further underscoring the need for a more critical and integrated approach to investigating discrimination and health is the ecosocial inverse hazard law, which is modeled after Tudor Hart's famous inverse care law (155) and posits that “the accumulation of health hazards tends to vary inversely with the power and resources of the populations affected” (156). At issue is the cumulative embodiment of multiple types of discrimination, deprivation, and other harmful exposures (8).

Although the review articles in Table 4 addressing multiple types of discrimination acknowledge the need for such integrated research, most empirical investigations continue either to focus on one type of discrimination at a time or else, as

noted above, sometimes lump all types together under the common rubric of “unfair treatment.” Among the earlier studies to question this assumption was a mid-1990s investigation that found that lesbian and gay African-Americans reported higher rates of depressive distress than would be predicted based on summing risk for their race/ethnicity, gender, and sexual orientation (157). Also germane is new research on immigration and discrimination, which finds that recent U.S. immigrants of color are the least likely to report having experienced racial discrimination, despite their greater likelihood in encountering discrimination based on language (138, 158–164). This finding should not be surprising because if, indeed, “race” is a social construct, it follows that people born and raised outside of the United States have to learn how race is produced in the United States and what U.S. racial discrimination is like (158–160). This differential reporting, in conjunction with possibilities of a “healthy immigrant” effect (at least for the first generation) (165–167), points to the perils of ignoring nativity when assessing the impact of any kind of discrimination and health. This latter concern is of global relevance, in light of rising anti-immigrant discrimination in many countries across the world, variously construed in ethnic and religious terms (167, 168).

An empirical demonstration of why such an embodied approach is needed is analysis of data from the United for Health study, a cross-sectional investigation that recruited predominantly lower-income women and men employees from diverse racial/ethnic groups, both U.S.-born and-foreign born, from several workplaces in the Greater Boston area during 2003 and 2004 (169). Among members of this study, we documented high exposure to: (a) socioeconomic deprivation, (b) occupational hazards (i.e., chemicals, dusts, fumes, and ergonomic strain), (c) social hazards (i.e., racial discrimination, workplace abuse, and sexual harassment at work), and (d) relationship hazards (i.e., intimate partner violence and unsafe sex) (170–173). Despite being union members, one-third of the study participants earned less than a living wage (equal to US\$10.54/hour at the time of the study) and 40 percent were below the U.S. poverty line, while the black and Latino compared to white workers were nearly twice as likely to be impoverished (170).

Fully 85 percent of study members reported at least one high exposure to occupational hazards in the past year; nearly half (46%) reported three or more high exposures; and 17 percent reported five or more high exposures. Although some variation existed by race/ethnicity and gender, the majority of workers in each racial/ethnic-gender group were highly exposed (171, 172). Simultaneously, more than 85 percent of the participants reported exposure to at least one of the three social hazards; exposure to all three reached 20 percent to 30 percent among the black workers, the most highly exposed group (170). Additionally, a substudy showed that among the black participants, immigrants reported less discrimination than their U.S. counterparts, although this difference diminished with increasing time of the immigrants’ residence in the United States (164). For sexual

harassment, an additional social category was relevant: sexuality. Specifically, lesbian, gay, bisexual, and transgender workers reported twice as much sexual harassment as did their heterosexual counterparts (170). Furthermore, within each racial/ethnic group, about one-third of the men reported having ever been a perpetrator of intimate partner violence, and about one-third of the women reported having been a target of such violence (170).

As exemplified by analyses of severe psychological distress, attaining an accurate picture of risk required considering all the social hazards together. Findings revealed that analyses that included data on only one type of hazard yielded estimates of risk biased by not taking the other types of hazards into account. Moreover, analyses including all three hazards demonstrated the especially high toll imposed by racial discrimination, independent of other exposures (173).

TOWARD A RIGOROUS SCIENCE OF RESEARCH ON DISCRIMINATION AND HEALTH INEQUITIES

In conclusion, as this article demonstrates, rigorous scientific study of discrimination and health inequities requires: (a) conceptual clarity about the exploitative and oppressive realities of adverse discrimination; (b) careful attention to domains, pathways, level, and spatiotemporal scale, in historical context; (c) structural-level measures; (d) individual-level measures, albeit without relying solely on self-report data or reducing discrimination to solely a psychosocial exposure; and (e) an embodied analytic approach, one attuned to biological expression of historically contingent and dynamic societal conditions and to how discrimination can adversely affect the production of scientific knowledge itself.

Stated simply, the epidemiology of the health consequences of discrimination is, at heart, the investigation of intimate connections between our social and biological existence. It is about how truths of our body and body politic engage and enmesh, thereby producing population patterns of health, disease, and well-being. To research how discrimination harms health, we accordingly must draw on not only a nuanced understanding of the likely biological pathways of embodying discrimination, from conception to death, but also a finely tuned historical, social, and political sensibility, situating both the people we study and ourselves in the larger context of our times. Frank appraisal of diverse types of discrimination operative in any given country context are thus required, with research needed not only to deepen understanding of the health impact of types of discrimination already the subject of active research (e.g., racial discrimination) but also types of discrimination for which much less research exists (e.g., in relation to gender, sexuality, disability, age, social class, immigrant status, and religion), both singly and combined.

The stakes for getting our science right are high—both scientifically and practically. As this review of the state-of-the-field clarifies, extant research is

likely to yield conservative, not inflated, estimates of the impact of discrimination on health. Partly this is because of the emphasis on discrimination as an interpersonal psychosocial stressor, with the conservative bias magnified by reliance primarily on self-report exposure data, including exposure measures that refer only to “unfair treatment” overall, without specifying type or domain of discrimination. Concomitantly, research on the impact of structural discrimination—and efforts to end it—is sorely lacking, limiting understanding of the toll of discrimination on people’s health, its contribution to social inequalities in health, and how it can be altered. Although data by themselves cannot rectify health inequities, the absence of data demonstrating harm nevertheless is itself harmful (1, 4)—as underscored by the time-worn adage “no data, no problem” (174). Our responsibility, as public health researchers, is to use the best science possible—conceptually and methodologically—to build public clarity about the extent and health consequences of discrimination and the life-affirming value of eradicating it, as one necessary contribution to the society-wide task of shifting the balance from embodying inequity to embodying equity.

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