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SELF-REPORTED EXPERIENCES OF DISCRIMINATION AND HEALTH: SCIENTIFIC ADVANCES, ONGOING CONTROVERSIES, AND EMERGING ISSUES

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Abstract

Over the past two decades, research examining the impact of self-reported experiences of discrimination on mental and physical health has increased dramatically. Studies have found consistent associations between exposure to discrimination and a wide range of DSM-diagnosed mental disorders, as well as objective physical health outcomes. Associations are seen in cross-sectional as well as longitudinal studies and persist even after adjustment for controls, including personality characteristics and other threats to validity. However, controversies remain, particularly around the best approach to measuring experiences of discrimination; the significance of racial/ethnic discrimination versus overall mistreatment; the need to account for “intersectionalities”; and the importance of comprehensive assessments. These issues are discussed in detail, along with emerging areas of emphasis including: cyber-discrimination; anticipatory stress or vigilance around discrimination; and interventions with potential to reduce the negative effects of discrimination on health. We also discuss priorities for future research, and implications for interventions and policy.

Keywords

discrimination; stress; psychosocial; unfair treatment; racism; sexism; prejudice; measurement; systematic review

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THE ONGOING SIGNIFICANCE OF RACIAL/ETHNIC DISCRIMINATION IN A “POST-RACIAL” SOCIETY

The 2008 election of Barack Obama to the office of President – arguably the most prestigious post in the United States-- led many in the general public to argue that America had become “post-racial,” i.e. devoid of racial preference, prejudice, or discrimination. However, in the years following the election, the US experienced an 813% increase in hate groups, from 149 groups in 2008 to 1,360 groups in 2012 (Southern Poverty Law Center 2013) and recent polls suggest that discrimination on the basis of race and ethnicity remains a significant problem for many racial/ethnic minorities in the United States. According to 2011 report on Americans and race in the age of Obama, 56% of African-Americans and 27% of Latinos believe that there is “a lot” of discrimination in America today, compared to only 16% of Whites (Byrd & Mirken 2011).

In addition to subjective accounts of discrimination, numerous empirical reports have documented post-2008 discrimination against both African-Americans and Latinos across multiple domains. For example, a 2012 study sponsored by the US Department of Housing and Urban Development (U.S. Department of Housing and Urban Development 2013) found that when seeking housing, racial/ethnic minority candidates were told about and shown fewer homes and apartments than whites, even when their credit histories and incomes were the same. Similarly, a 2014 report from the New York Civil Liberties Union on “stop and frisk” patterns of New York police officers (New York Civil Liberties Union 2014) found that Black and Latino New Yorkers were more likely to be frisked than white New Yorkers, but among those frisked, were less likely to be found with a weapon (New York Civil Liberties Union 2014). Additionally, studies of Emergency Rooms across the country have found that among patients with long bone fractures or kidney stones (conditions where there are standards of care for pain management), African-American and Latino patients were less likely to receive adequate pain medication than their white counterparts (Pletcher et al 2008). Thus, there is considerable objective evidence that suggests that discrimination remains a significant problem in the United States today.

A large and growing body of research suggests that self-reported experiences of discrimination are a form of psychosocial stress that have an adverse impact on both mental and physical health outcomes across a range of racial/ethnic groups. The primary aim of this article is to summarize the current state of the science on discrimination and health and expand upon prior reviews (Brondolo et al 2011b, Paradies 2006, Williams & Mohammed 2009) and meta-analytic findings (Dolezsar et al 2014, Pascoe & Richman 2009, Schmitt et al 2014) with a particular emphasis on ongoing controversies, gaps in knowledge, and emerging areas of interest.

RESEARCH ON DISCRIMINATION AND “MENTAL HEALTH”

Prior reviews on discrimination and health have documented fairly strong and consistent associations between self-reported experiences of discrimination and a variety of indicators of mental health and psychological well-being (Paradies 2006, Schmitt et al 2014, Williams & Mohammed 2009). In fact, in a 2006 review, Paradies (2006) asserted that the impact of discriminatory experiences on outcomes was much more pronounced for mental compared to physical health. But a 2009 meta-analysis by Pascoe and Richman (Pascoe & Richman 2009) contradicted this assertion --concluding that while the overall effect of discrimination on mental health appeared to be slightly stronger than the effect of discrimination on physical health, the difference was not statistically significant.

One limitation of prior work on discrimination and mental health has been the overreliance on scales that measure psychological distress or poor well-being, rather than actual clinically diagnosed mental illness. While both distress and well-being have importance in daily life, by definition they do not have the sustained and long-lasting impact on human functioning that a psychiatric disorder would. Further, some scales that measure symptoms of psychological distress often include items that are confounded with experiences of discrimination. For example, the Centers for Epidemiologic Studies Depression scale (Radloff 1977) includes two items that measure interpersonal mistreatment – "I felt that people disliked me" and "People were unfriendly" –items that may tap more into feelings of discrimination than actual symptoms of major depressive disorder. But not all scales include such overlap, and studies that have utilized the CES-D after removing the two interpersonal items also find significant associations between reports of discrimination and depressive symptoms (Barnes et al 2004). Thus, it is important to note that despite their limitations, studies of discrimination and psychological distress have provided an important foundation for more recent work on discrimination and clinically diagnosed mental disorders.

DISCRIMINATION AND MENTAL DISORDERS

Research on discrimination and psychiatric disorders diagnosed via criteria established by the Diagnostic and Statistical Manual of Mental Disorders (DSM), version III, IV or V has been slightly more prevalent in the past 5 years, largely due to large-scale epidemiologic cohort studies of psychiatric disorders in racial/ethnic minority populations funded by the National Institutes of Mental Health. Select findings from the National Survey of American Life (NSAL) (Jackson et al 2004) and the National Latino and Asian American Study (NLAAS) (Alegria et al 2004) along with other studies of DSM-IV established mental disorders are summarized in Table 1. Although longitudinal research on reports of discrimination and psychiatric disorders has been limited, at least one prior study has examined these associations. In a sample of 799 African-Americans from the National Survey of Black Americans, Brown and colleagues (Brown et al 2000) found that greater reports of discrimination at one wave of data collection predicted higher levels of depression at follow-up one year later. Conversely, greater levels of depression at the earlier wave did not predict higher reports of discrimination at follow-up (Brown et al 2000); providing some evidence of temporal ordering, with reports of discriminatory experiences preceding elevated rates of depression. More recent studies have been primarily cross-sectional, but have greatly expanded upon the psychiatric outcomes studied. In addition to depression, studies have found remarkably consistent associations between various indices of interpersonal discrimination and a range of DSM-IV psychiatric illnesses, such as anxiety disorders, eating disorders, and even psychotic disorders (Table 1).

RECENT RESEARCH ON DISCRIMINATION AND PHYSICAL HEALTH

Some of the most compelling data linking discrimination to health has emerged over the past decade. Of particular note is the increased emphasis on “objective” physical health outcomes, rather than subjective, self-reported health. Studies have found prospective associations between reports of discrimination and a variety of objective clinical disease outcomes, including all-cause mortality (Barnes et al 2008), hypertension (Dolezsar et al 2014), incident breast cancer (Taylor et al 2007) and incident asthma (Coogan et al 2014a). Researchers have also observed associations between self-reported discrimination and silent, pre-clinical endpoints with established linkages to later disease such as carotid intima media thickness (Troxel et al 2003), coronary artery calcification (Lewis et al 2006), nighttime blood pressure (Beatty & Matthews 2009, Brondolo et al 2008, Tomfohr et al 2010), visceral fat (Lewis et al 2011a) and inflammation (Lewis et al 2010). Reports of discrimination have also been linked to other “silent” indicators of poor health and premature aging including allostatic load (Brody et al 2014), shorter telomeres (Chae et al 2014), oxidative stress (Szanton et al 2012) and dysregulations in cortisol (Zeiders et al 2014).

Both prospective studies and studies of “silent” disease have been critically important in advancing the science of discrimination and health because they provide evidence against reverse-causality arguments, which posit that individuals who are ill may also recall more negative experiences (i.e. poor health leading to greater reports of discrimination). Research linking discriminatory experiences to early, pre-clinical indicators as well as other studies that have found significant associations between discrimination and lifestyle factors (obesity) (Cozier et al 2014, Hunte & Williams 2009, Hunte 2011) and health behaviors (poor sleep, smoking) (Borrell et al 2010, Borrell et al 2013, Lewis et al 2013, Slopen & Williams 2014, Thomas et al 2006) also provide useful preliminary evidence on potential pathways through which these experiences might “get under the skin” to impact later disease.

IMPLICATIONS FOR RACIAL/ETHNIC DISPARITIES IN HEALTH

While there is a large body of research documenting the negative impact of discriminatory experiences on the mental and physical health of racial/ethnic minorities, relatively few studies have actually examined the extent to which discrimination accounts for racial/ethnic disparities in health (Albert & Williams 2011). The few studies that have examined this issue have largely focused on psychological distress or self-reported health (as reviewed by Williams and Mohammed (2009), and findings indicate that in the U.S., Australia, South Africa and New Zealand, reports of discrimination do account for some of the racial/ethnic disparities observed in these outcomes. Research on more objective health indicators has documented similar results. In a 2004 study of 352 African-American and White women from the Coronary Artery Risk Development in Young Adults (CARDIA) study, Mustillo and colleagues (2004) found that self-reported experiences of racial discrimination were significantly associated with higher rates of both preterm births and low birth weight babies. Moreover, black-white disparities in these outcomes were partially explained by reports of racial discrimination (Mustillo et al 2004). More recently, a 2010 study of everyday discrimination and 24-hour blood pressure in 78 African-American and White adults

(Tomfohr et al 2010), found that discrimination was significantly associated with higher levels of nocturnal non-dipping in both racial/ethnic groups and fully explained black-white disparities in non-dipping. Similar results were found in two separate studies examining associations between ethnic discrimination and polysomnography (PSG)-assessed sleep architecture in African-Americans and Whites (Thomas et al 2006, Tomfohr et al 2012). Although not all studies have observed this pattern of results (see (Lewis et al 2013) for an exception), taken together these findings provide preliminary support for the notion that discrimination may be a key contributor to racial differences in several important indicators of poor health and disease.

ONGOING CONTROVERSIES AND GAPS IN KNOWLEDGE

Despite the numerous inroads that have been made in the science of discrimination and health, there remain a number of controversies and unresolved issues in the field. Many of these issues center around: 1) factors related to perceiving and/or reporting discrimination; 2) the relative importance of racial/ethnic discrimination versus overall discrimination and the best way to measure these constructs; 3) the need for a better understanding of how “intersectionalities”, or multiple group identities, shape the experiences and consequences of discrimination; 4) the importance of capturing multiple aspects of discrimination across the lifespan and 5) the need to control for other important variables that might impact the association between discrimination and health, including other stressors due to social disadvantage, and in studies of physical health outcomes, depression and other mental disorders that could either confound, or potentially mediate, associations between reports of discrimination and clinical disease. These issues are summarized briefly below.

Qualities of Perception: Challenges for Measurement and Assessing Health Effects

Perception Bias—Self-reports of discrimination depend, in part, on the motivation and willingness of research participants to report discrimination. There are two types of perception bias that research needs to guard against (Kaiser & Major 2006): first, some individuals may perceive less discrimination than actually exists (a minimization bias), or, second, some may perceive more discrimination than actually exists (a vigilance bias).

Minimization Bias—Minimization bias in self-reports of discrimination occurs when individuals with objective experiences under-report their actual experience because of not attending to, underestimating, or even denying having been a target of such experiences (Kaiser & Major 2006). This minimization may occur because: 1) some perpetrators deny that discrimination occurred; 2) reporting discrimination can be psychologically costly; and 3) discrimination is sometimes subtle and ambiguous. The larger stress literature indicates that some people cope with stress by denying its occurrence. Denial can range from a single passive escape strategy to multiple active distractive strategies that seek to reduce the levels of distress (Vos & de Haes 2007). The emotional pain of racism may also affect recall, contributing to some individuals being unable to recall specific events (Carter 2007). Future research on discrimination needs to more clearly delineate the triggers, levels and consequences of denial and how denial relates to the broad range of coping strategies used for responding to discrimination (Brondolo et al 2009, Noh & Kaspar 2003).

Vigilance Bias—Bias linked to vigilance is evident when the prior history of an individual and/or his/her group experiences with discrimination can lead to attributing ambiguous experiences to discrimination. Such vigilance can protect the individual from physical harm and can foster feelings of self-worth when faced with negative evaluations since the individual can attribute these experiences to external reasons instead of personal failure. We do not have a clear picture of the social contextual triggers of this perceptual bias. Some evidence indicates that vigilance for discrimination increases when there is an increase in the threat of discrimination (Kaiser & Major 2006). Cultural worldviews may also affect the likelihood of reporting discrimination. Individuals belonging to low-status social groups but who endorse a meritocratic worldview may be less likely to report that they had personally been a victim of discrimination (Kaiser & Major 2006). These persons appear to be more willing to blame negative outcomes on themselves than on discrimination. In contrast, members of high status groups who favor individual mobility beliefs, or the view that advancement is possible for all people in America, are more likely to report personally being a victim of discrimination. Thus, there is a positive association between individual mobility beliefs and reporting reverse discrimination among whites (Kaiser & Major 2006). There remains a need for more systematic evaluation of the extent to which responses to questions about discrimination are subject to systematic biases linked to culture, nationality, age and other social and psychological factors. A review of this literature indicates that the current evidence is unclear with regards to whether vigilance or minimization biases predominate (Kaiser & Major 2006). Some studies have found that subordinate group members are more likely than dominant ones (women and blacks compared to men and whites, respectively) to interpret critical feedback as discriminatory, while other studies find no differences in the perceptions of rejections as bias among non-dominant versus dominant group members (Kaiser & Major 2006).

Addressing the Challenge of Perception Bias—A significant innovation in the assessment of discrimination is the development of a measurement instrument that does not rely on self-report and thus circumvents perception bias issues. Krieger and colleagues (Krieger et al 2011) have created a version of the Implicit Association Test (IAT) that seeks to assess the extent to which respondents view themselves and their racial/ethnic group as a target versus a perpetrator of discrimination. The goal is to overcome some of the limitations of self-reported data by measuring experiences of racial bias that individuals are unable or unwilling to report. These implicit measures in their current form demonstrate fairly weak-to-modest associations with health behaviors and indicators of health status (Krieger et al 2010, Krieger et al 2011). Thus, despite the enormous promise of this approach, many questions remain (Williams & Mohammed 2013). It is unclear exactly what aspects of racial discrimination are being tapped by these measures (actual prior exposure, severity of prior exposure, vigilance regarding discrimination, perceived threat, or other dimensions of racial discrimination or race-related experiences). The very low correlations between these new implicit measures of racial discrimination and the more commonly used, validated explicit measures of discrimination has also been raised as a concern; as has the question regarding the ability of implicit measures of racial discrimination to capture psychological stress appraisal processes that could be a central component of the stress process (Williams & Mohammed 2013). Future research is needed to enhance our understanding of what the current implicit measure of discrimination is capturing and to continue to explore the feasibility of accurately measuring at least some aspects of discrimination with measures that are independent of self-report.

The Potential Role of Personality Characteristics—Studies that continue to utilize self-reported measures of discrimination also need to carefully consider the role of personality characteristics, which could impact both the tendency to perceive and/or report discriminatory treatment. There are well-documented associations between poor health and personality traits such as hostility, neuroticism, pessimism, and extraversion (Cohen et al 2003, Tindle et al 2009, Turiano et al 2012, Wilson et al 2005); however few studies have examined associations among personality characteristics, discrimination and health. Studies of discrimination and health that have chosen to include personality traits have focused primarily on hostility (Beatty et al 2011, Brondolo et al 2011a, Lewis et al 2006, Lewis et al 2013), and other anger-related constructs (Beatty & Matthews 2009, Gibbons et al 2010, Steffen et al 2003). Less is known about how other personality characteristics impact associations between reports of discriminatory treatment and health.

In a small study of 31 African-American and 31 White adults, Richman and colleagues (Richman et al 2010) examined the role of neuroticism in addition to hostility as a potential confounder of the association between discriminatory experiences and ambulatory blood pressure dysregulation throughout the day and night. Findings revealed a significant association between discrimination and blood pressure dysregulation even after controlling for a range of biobehavioral and psychological confounders, including both neuroticism and hostility (Richman et al 2010). Similarly, Wagner et al found independent associations between discrimination and endothelial reactivity to stress after adjusting for neuroticism in a laboratory study of 113 women with type II diabetes (Wagner et al 2013), while Hunte and colleagues (Hunte et al 2013) observed a main effect of discriminatory treatment on depressive symptoms in a multi-ethnic community sample of 3,105 adults that persisted even after controlling for pessimism, hostility, and other anger-related constructs.

To our knowledge, only one study has examined the interactive effects of discrimination and personality traits on health. In a study of discrimination, neuroticism and cognitive function in 296 older African-Americans, Barnes and colleagues (Barnes et al 2012) found that while reports of discrimination were significantly associated with higher levels of neuroticism, neuroticism did not explain the inverse association between discrimination and cognition. Further, in analyses examining the interaction between discrimination and neuroticism, results revealed that the association between discrimination and poor cognitive function was only observed for older adults who were low – rather than high --in neuroticism (Barnes et al 2012), providing additional evidence that personality factors may not play a significant role in the association between reports of discrimination and health outcomes. Thus, to date, findings suggest that associations between discrimination and health are largely independent of personality. However, studies in this area have been small, with a limited range of personality characteristics, and predominantly cross-sectional. Additional, prospective studies are needed to fully disentangle the relationships among discrimination, a range of personality characteristics, and health.

Racial/Ethnic Discrimination vs. Overall Discrimination

How to Best Ask the Question: In One Stage or Two?—

A major unresolved issue in the field of discrimination and health is the extent to which racial bias has effects on health that are distinct from other forms of unfair treatment (Krieger 2012, Williams et al 2012). This is a key consideration in the ongoing controversy over whether “race” needs to be made salient in the assessment of self-reported experiences of racial discrimination or whether researchers should opt for the use of more neutral terminology. Many questions that are used to assess discrimination utilize what has been termed the one-stage approach where respondents are explicitly instructed to report on “racial discrimination” or experiences of discrimination “because of your race” (Krieger et al 2005, Landrine & Klonoff 1996). A potential limitation of questions explicitly framed about race is the potential for interviewer effects in which participants are motivated to please the interviewer by reporting the kind of information that s/he believes the interviewer is interested in (Smith 2002). Consistently inquiring about discrimination “because of your race” may create demand effects that trigger higher reports of racial discrimination. An alternative, two-stage approach, largely based on the work of Williams and colleagues (Kessler et al 1999, Williams et al 1997) was created in part, to offset these concerns. The two-stage approach inquires about discriminatory experiences as a form of unfair treatment more broadly, and only asks about the attribution after a generic experience has been endorsed. This approach appears reasonable given that the most frequently used term in the social science assessment of discrimination is “unfair” treatment (Smith 2002).

On the other hand, there are concerns about the ability of such questions to capture racial discrimination accurately. Some evidence suggests that the one-stage approach leads to higher reports of discrimination. For example in a sample of 586 African-Americans, Brown (2001) compared African-Americans’ reports of discrimination using a single-item question assessing whether the respondent had “ever been treated unfairly or badly because of your race or ethnicity” to responses to six items about unfair treatment (at work, by the police, in education and housing) that were each followed by a question asking for the main reason for unfair treatment. He found that 67% of participants reported racial discrimination with the one-stage question compared to 50% with the two-stage approach. In contrast, Chae and colleagues (2008) examined these issues in a study of discrimination and smoking in 2,073 Asian Americans in the National Latino and Asian American Study (NLAAS). They compared results from analyses of the nine item everyday discrimination scale (assessed with no attribution) to the results using a three item scale that included items assessing how often respondents felt that they were disliked or treated unfairly because of their race or ethnicity and how often they had seen friends of their racial/ethnic background treated unfairly. The researchers found higher reports of unfair treatment compared to racial discrimination, with 74% of Asians reporting everyday discrimination, and 62% reporting racial/ethnic discrimination. They also noted patterns of association that led them to question the idea that racial discrimination was a subset of unfair treatment and whether these two sets of questions capture two qualitatively different phenomena. First, the correlation between the two measures was .43 and second, both measures predicted smoking even after controlling for the other. Third, 30% of respondents who reported no unfair treatment on the everyday discrimination scale reported some racial discrimination. And, fourth, ethnic identification moderated racial discrimination but not unfair treatment. The authors concluded that: “racial/ethnic discrimination is distinct from the experience of unfair treatment” (Chae et al., 2008). Accordingly, some have argued that the assessment of discrimination with the one stage approach is a superior and a more valid measure of racial discrimination (Brown 2001, Chae et al 2008, Krieger 2012) than the two-stage approach. However, it is important to note that studies comparing these approaches have largely compared apples to oranges because the items compared, as detailed above, differed in aspects other than the explicit reference to race and ethnicity.

Experimental studies have found that the one stage approach yields higher reports of racial discrimination; but these studies also raise important questions about validity. Gomez and Trierweiler (2001) found higher reports of both racial and gender discrimination among African-American students and women when asked explicitly about “racism and race discrimination” and “sexism and gender discrimination”, respectively, than if first asked about their college experiences and subsequently asked a follow-up question that ascertained the reasons for mistreatment. Similarly, a comparative analysis of 7,505 African-American, White, Latino, American-Indian, Asian-American and Multiracial adults from the California Health Interview Survey (CHIS) found that across racial/ethnic groups, reports of discrimination differed depending on whether the question was asked in one stage versus two (Shariff-Marco et al 2011). For each racial/ethnic group, the overall unattributed unfair treatment with the two-stage approach was higher than racial discrimination with the one-stage approach, but reports of *racial* discrimination specifically were higher with the one-stage approach (Shariff-Marco et al 2011). While some have used this as an argument in favor of the one-stage approach (Shariff-Marco et al 2011), these findings have been interpreted by others to mean that making race (and gender) salient in the assessment of discrimination could lead to the potential for a vigilant response bias compared to the use of neutral terminology (Gomez & Trierweiler 2001, Williams & Mohammed 2009).

Future research is clearly needed that would use careful experimental designs, in multiple contexts, with multiple racial/ethnic groups in which there is direct comparison of these alternate approaches (Smith 2002). If reliable differences emerge from these tests, research would need to identify why the levels of reported discrimination differ and which approach yields more valid data. Open-ended follow-up questions after reports of perceived unfair treatment may prove useful (Williams et al 2012), as Bobo & Suh (2000) found that some initial reports of racial discrimination did not appear to be racially motivated in the supplemental details provided by a follow-up open-ended question. Thus, more in-depth cognitive interviewing that interrogates how respondents understand the terms “discrimination” and “unfair treatment” may also be important and would provide rich qualitative detail about these experiences that could help to elucidate the extent to which question wording can elicit reports of different phenomena.

Implications for Health Outcomes—Despite the abundance of arguments on the relative importance of assessing racial/ethnic discrimination in one stage versus two (Brown 2001, Chae et al 2008, Gomez & Trierweiler 2001, Krieger 2012, Krieger et al 2011, Shariff-Marco et al 2011, Williams et al 2012, Williams & Mohammed 2009), to date there is limited evidence that racial discrimination (as currently assessed) has effects on health that are substantively different from other types of discrimination. Results from prior reviews and meta-analyses indicate that reports of racial and non-racial discrimination have similar associations with health (Pascoe & Richman 2009, Williams & Mohammed 2009), suggesting that common processes may underlie both. Neuroimaging research has found that the perception of unfairness is linked to negative emotional responses and activation of brain regions associated with emotion regulation (Tabibnia et al 2008). This provides support for the notion that the quest for justice and fairness could be a core human drive, and violation of this drive may have important physiological consequences.

Some evidence suggests that irrespective of attribution, experiences of unfair treatment lead to negative psychological and physiological reactions. For example, research conducted in the United Kingdom on over 5,000 individuals from the Whitehall II study cohort has documented associations between a generic measure of perceived unfairness and the metabolic syndrome (De Vogli et al 2007a), incident psychiatric morbidity (Ferrie et al 2006), and incident coronary events (De Vogli et al 2007b). Similarly, Lewis and colleagues (2006) found that self-reported experiences of overall everyday discrimination (a combination of both racial and non-racial forms of mistreatment) were positively associated with coronary artery calcification among African-American women; however, attributing discrimination to race/ethnicity alone was not. Conversely, Guyll et al (2001) observed greater diastolic blood pressure reactivity to stress in African-American women who attributed everyday discrimination to race/ethnicity compared to those who attributed discrimination to other causes; while yet another study in African-American women using the same scale found that non-racial attributions were more strongly associated with hypertensive status than racial attributions (Roberts et al 2008). Additionally, as noted previously, Chae and colleagues found comparable main effects of everyday discrimination (without attributions) and a measure of racial/ethnic discrimination on self-reported smoking in Asian Americans (Chae et al 2008). Thus, although the majority of studies in this domain indicate that the experience of unfairness or mistreatment may be more important for health than what it is attributed to, additional research is needed to more comprehensively examine this notion as well as the extent to which the approach to capturing the attribution impacts any observed associations.

The Inherent Limitations of Self-Report Data for Accurate Attributions—It is important to note that studies that ask explicitly about racism, and studies that inquire about overall mistreatment more broadly both rely solely on self-reported data about discriminatory events. This assumes that the individual reporting the experience has all available information about a given interaction and is able to accurately distinguish between racial discrimination and other types of interpersonal mistreatment. Although at least one study has found that participants report feeling highly certain about their attributions (Williams et al 2012), it is also possible that these attributions are shaped by factors other than the interpersonal interaction itself. For example, in a study of 3,466 participants from the CARDIA cohort, Dutton and colleagues (Dutton et al 2014) found that even at the highest levels of BMI –class I and class II obesity-- African-American women reported less weight discrimination than their white female counterparts. This could be due to differences in actual exposure; experimental data has shown that obesity is less stigmatizing for African-

American women, with both African-Americans and Whites demonstrating a greater acceptance of larger body sizes for African-American, compared to White, women (Hebl & Heatherton 1998, Hebl et al 2009). However, it could also be due to differences in sensitivity, such that obese White women may be more sensitive to and therefore more likely to attribute interpersonal mistreatment to weight. For African-American women, perhaps across levels of obesity, discriminatory treatment due to race may be more salient (i.e. the ethnic prominence hypothesis (Levin et al 2002)), which might contribute to a higher likelihood of attributing unfair treatment to racism even under circumstances where it could potentially be due to weight. Thus, it is possible that even when individuals themselves are entirely certain about their attribution for interpersonal mistreatment, the actual underlying reason for mistreatment in a given situation is largely unknown.

“Intersectionalities” in the Study of Discrimination and Health

Much of the literature on discrimination and health has focused on a single attribution for discriminatory experiences –usually race/ethnicity. However, this practice ignores the fact that individuals frequently occupy more than one socially disadvantaged status and that these statuses may interact to shape their experiences (Cole 2009). For example, in 1989 Crenshaw argued that: “Black women sometimes experience discrimination in ways similar to white women’s experiences; sometimes they share very similar experiences with Black men. Yet often they experience double discrimination--the combined effects of practices [that] discriminate on the basis of race, and on the basis of sex. And sometimes, they experience discrimination as Black women---not the sum of race and sex discrimination, but as Black women” (Crenshaw 1989) p 149. Although the terminology describing this combination of effects, “intersectionality”, has been most frequently utilized to characterize the experiences of African-American women (Crenshaw 1989, Purdie-Vaughns & Eibach 2008), researchers have noted the advantage of this approach for understanding the unique experiences of HIV-positive gay African-American men, low-income Latina lesbians, and others at the intersection of two or more disadvantaged statuses (Bowleg 2012).

Although it is useful for understanding the complexity of exposure to discrimination across a diverse range of population sub-groups, the concept of intersectionality focuses largely on *qualitative* differences in experiences and exposures. Thus, researchers have discussed the inherent difficulties in modeling intersectionality quantitatively (Cole 2009, Seng et al 2012). However some headway has been made. In a recent analyses of 2,647 middle-aged adults from the MIDUS cohort, Grollman (2014) found that participants who were multiply disadvantaged on the basis of race, gender, sexual orientation and/or weight also reported more types of discrimination (e.g. discrimination on the basis of race, gender, sexual orientation, etc…). Individuals who reported more types of discrimination were in turn, more likely to report higher levels of psychological distress, poorer health, and greater functional limitations (Grollman 2014). Future studies are needed in this area in order to further understand how multiple types of discrimination combine to affect health.

Finally, while the intersectionality framework is often used to conceptualize the experiences of multiply disadvantaged groups; it is also helpful in thinking about the intersections between disadvantaged and privileged statuses. For example, middle-class African-

Americans occupy at least one disadvantaged and one privileged status, but may be unable to adequately access their privileged socioeconomic status because of the constraints of their race (Jackson & Williams 2006). With respect to discrimination, research suggests that race and SES interact for this group, such that across studies, higher-SES African-Americans consistently report more discrimination than their lower-SES counterparts (Borrell et al 2006, Dailey et al 2010, Hunt et al 2007, Krieger et al 2011, Taylor et al 2004). There is also some preliminary evidence that the effects of discrimination on cortisol may be more harmful for higher, compared to lower-SES African-Americans (Fuller-Rowell et al 2012). While provocative, these associations have not yet been replicated; thus, future studies with adequate representation of both low and middle-class African-Americans are needed to determine whether these findings would generalize to other cohorts and other outcomes.

The Need for a More Comprehensive Assessment of Racism and Discriminatory Experiences

Research on psychosocial stress more broadly suggests that failure to measure stress comprehensively could lead to a dramatic underestimation of the association between stress and health (Thoits 2010). Much of the earliest work on discrimination and health utilized scales that focused on acute, one-time instances of discriminatory treatment, conceptually similar to life events in the stress literature (Bastos et al 2010). Life events are experiences that are readily observable and discrete, with a clear onset and ending. Examples of discriminatory life events include job loss, or being denied a bank loan. However, there are other important types of experiences identified in the stress literature that have relevance for the study of discrimination, including chronic stressors, traumatic stressors, and macro-stressors. These exposures span the life course -often beginning early in life and continuing throughout old age.

Chronic stressors are stressful experiences that are ongoing or recurrent. These problems or difficulties can occur in major domains, for example parenting or work or they can be more minor day-to-day day hassles and irritations like being stuck in traffic or misplacing or losing things. Although measuring chronic stressors can be a challenge, they are generally more strongly linked to the onset and course disease than acute life events (Cohen et al 1995). In the discrimination literature, the Everyday Discrimination Scale (Williams et al 1997) has emerged as a widely used instrument in recent years that is designed to measure more chronic, or episodic aspects of interpersonal discrimination. Items range from generally minor-- somewhat analogous to the assessment of daily hassles in the stress literature (items related to being treated with less respect or courtesy)-- to more consequential occurrences (questions about being insulted or harassed). Attractive properties of the scale include its brevity, good psychometric properties (Taylor et al 2004), and its utility across multiple racial/ethnic groups in the U.S. (Lewis et al 2012) and in international contexts such as South Africa (Williams et al 2008). An emerging drawback in the literature is that in many studies, the Everyday Discrimination Scale is often utilized as the only measure of discrimination (Williams & Mohammed, 2009). This is potentially problematic because while this scale captures an important dimension of discrimination that had been historically neglected, it is nonetheless only one aspect of the phenomenon of discrimination.

Traumas are life events that are extreme and overwhelming. They are a type of stressful experience (such as having been in a life-threatening accident, kidnapped, sexually assaulted or tortured) that can have a long-term negative impact on health outcomes (Pearlin et al 2005, Stam 2007). They are different from life events in that they assess experiences that are potentially life-threatening in addition to being extreme and overwhelming in impact. To date, traumas have not received much attention in the discrimination literature. However a recently developed scale, the Race-Related Events Scale (RES) (Waelde et al 2010) includes items designed to assess a wide range of traumatic discriminatory events. Items ask respondents whether they were chased, beat or hurt, threatened with a knife, gun, or other weapon, or threatened to be killed because of their race/ethnicity. It also inquires about several vicarious discriminatory events of a traumatic nature such as witnessing someone of "your same race/ethnicity" seriously injured or killed (Waelde et al 2010). In a sample of 408 college students, greater exposure to events on the RES was associated with more PTSD symptomatology in racial/ethnic minority, but not White, students (Waelde et al 2010). Although additional research in this domain, across a wider range of populations is needed, these initial findings suggest that discriminatory experiences that are severe, life threatening, or dangerous could have great potential for psychological injury.

Macro-stressors are large-scale stressors such as natural or man-made disasters or economic recessions. The larger stress literature has documented that incidents such as the onset of war, earthquakes or terrorist attacks are positively associated with hospital admissions, incident heart disease, and heart disease mortality (Bhattacharyya & Steptoe 2007). However, less attention has been given to understanding the health impact of large-scale race or ethnicity-related traumatic events, such as race riots or highly publicized instances of police brutality. Limited evidence suggests that such events have potential to harm health. For example, in the wake of the terrorist attacks of September 11, 2001, there was a well-documented increase in discrimination and harassment of Arab-Americans that remained markedly elevated for several months. In an examination of birth outcome data in the six months following the attack for the state of California, Lauderdale (2006) found that rates of low-birth weight and pre-term birth were significantly higher for Arab-American women from October, 2001–March 2002, compared to the prior year during the same period (e.g. October, 2000–March, 2001). No other racial/ethnic group experienced an increase in adverse birth outcomes during the same period (Lauderdale 2006).

The Duke University Lacrosse team incident in 2006 is another example of a race/ethnicity-related macro-stressor. In this instance, an African-American woman accused several white male athletes of rape, violence and racial derogation (Richman & Jonassaint 2008). African-American students at the university reported feeling stressed and also expressed concerns for their safety as a result of the extensive and racially divisive media coverage of the incident. Data from an ongoing experimental study on the Duke University campus allowed researchers to compare students who participated in the experiment before the Lacrosse team incident with those who took part following the event. The researchers found that African-American students, particularly females, who participated in the experiment following the incident had higher levels of cortisol and were less responsive to the experimental task compared to those who participated before the media coverage of the Lacrosse scandal (Richman & Jonassaint 2008). Thus, both sets of findings provide evidence that macro-level discriminatory stressors may have an impact on health. Future research that capitalizes on emergent opportunities to further examine the health consequences of these types of events is needed.

Finally, although many discrimination measures seek to assess the lifetime occurrence of discriminatory events, inadequate attention has been given to capturing exposure to discrimination over the life course. There is a growing body of research on discrimination in children (Cogburn et al 2011, Coker et al 2009, Pachter & Coll 2009, Sanders-Phillips 2009), indicating that exposure to discriminatory events actually begins in childhood, which has important consequences for health in childhood and adolescence (Beatty & Matthews 2009, Brody et al 2014, Matthews et al 2005, Priest et al 2013, Zeiders et al 2014), and may also be linked to adverse health in later life. As one example, a small study of pregnant African-American women found that witnessing discrimination as a child --i.e. against a parent or other adult—was associated with increases in diastolic blood pressure during pregnancy (Hilmert et al 2014), as well as poorer birth outcomes (Dominguez et al 2008).

As outlined by Gee and colleagues (2012), taking a life course lens seriously in research on discrimination and health will require studies that explicitly examine early life experiences, potential sensitive periods, interdependence in exposures among persons, latency periods, stress proliferation processes and historical periods and birth cohorts (Gee et al 2012). In addition to research on children and/or early life exposures, studies of discrimination in elderly populations may prove particularly useful in examining some of these effects. For instance, studies have consistently found that elderly African-American and Hispanic adults report lower levels of discrimination compared to their middle-aged and young adult counterparts (Kessler et al 1999, Perez et al 2008, Sims et al 2009). It is unclear whether this is merely a result of selective survival; or whether it is an effect of aging, such that experiences and/or perceptions change across the life course; or whether it is indicative of a cohort effect, with older racial/ethnic minorities having experienced more traumatic or more severe instances of discrimination than most recent scales are designed to assess. Additional qualitative, as well as quantitative research on cohort effects, as well as changes in discriminatory experiences over the life course is warranted.

The Importance of Assessing Additional Psychosocial Stressors Related to Social Disadvantage

In addition to assessing discriminatory stressors comprehensively, there is also a need to assess other psychosocial stressors related to social disadvantage. Self-reported experiences of discrimination are an important and until fairly recently, neglected form of psychosocial stress. However, assessing these experiences alone does not capture all of the health-relevant aspects of racism, and does not take into account other psychosocial stressors driven by racism-related factors that might also contribute to disparities in health. The stress of discrimination should be measured and analyzed in the context of larger societal forces, including institutional racism, that initiate and sustain differences in exposure to a wide range of stressors (William & Mohammed, 2009). Thus, there is a need to examine racial differences in stressors that may be shaped by institutional discrimination including:

neighborhood conditions, violence, criminal victimization, financial stress, and relationship stress.

An example of the comprehensive assessment of stressors comes from the Chicago Community Adult Health Study. Using multiple stressors, adapted from some of the best available measures, this study measured stress in 8 domains that reflect key arenas in which people operate (e.g., home, job, neighborhood) & major roles/statuses they assume. These included acute life events, work stressors, financial stress, life discrimination (everyday discrimination and major experiences of discrimination), work discrimination, relationship stress, childhood adversity and neighborhood stress (Sternthal et al 2011). The authors observed a graded association between the number of stressors and poor self-reported health outcomes. Moreover, for African-Americans & U.S.-born Latinos, stress exposure explained a substantial portion of the health gap even after adjusting for SES. Additional analyses of this same sample found that discrimination made a unique contribution to accounting for racial differences in self-reported sleep even after adjustment for income, education and other stressors (Slopen & Williams 2014). Studies of objective physical health outcomes have found similar associations. In a re-analysis of data on discrimination and visceral fat, Lewis and colleagues (2011b) found that after taking additional psychosocial stressors such as financial strain, negative life events, and perceived stress into account, discriminatory stressors were the *only* stressors significantly associated with visceral fat; consistent with findings observed by Troxel et al (2003) in a study of discrimination, other psychosocial stressors and carotid atherosclerosis. Although the analyses led by Lewis and Troxel (Lewis et al 2011b, Troxel et al 2003) used less extensive measures of psychosocial stress than the Chicago Community Adult Health Study (Slopen & Williams 2014, Sternthal et al 2011), findings from all four studies underscore the importance of examining discrimination and health associations in conjunction with other stressors related to social disadvantage.

The Importance of Controlling for Depressive Symptoms in Studies of Discrimination and Physical Health

In addition to other psychosocial stressors related to social disadvantage, research on discrimination and health needs to fully consider the role of depression and depressive symptoms. As previously noted, a number of studies have documented fairly strong and consistent associations between reports of discriminatory treatment and depressive symptoms, as well as major depressive disorder (Barnes et al 2004, Brown et al 2000, Gee et al 2007, Lau et al 2013, McLaughlin et al 2010). Both major depression and elevated depressive symptoms have been implicated in the development of a wide range of clinical disease outcomes including, but not limited to, cardiovascular disease (Henderson et al 2013, Vaccarino et al 2007, Whooley & Wong 2013), diabetes (Golden et al 2008, Holt et al 2014), HIV (Ickovics et al 2001), and asthma (Brunner et al 2014, Coogan et al 2014b). Depression and elevated depressive symptoms have also been linked to several important health behaviors such as smoking (Breslau et al 1998), inadequate physical activity (Roshanaei-Moghaddam et al 2009), and sleep (Hall et al 2000, Tsuno et al 2005). Although it is possible that depression merely functions as a “third variable” that confounds the association between reports of discrimination and indicators of physical health, prospective studies indicate that experiences of discrimination may temporally precede the development of depression and elevated depressive symptoms (Brown et al 2000, Schulz et al 2006), suggesting that depressive symptoms may be one pathway through which discrimination impacts later clinical disease.

The larger literature on discrimination and health often ignores the potential role of depression and depressive symptoms as a means of further understanding discrimination and health associations (Cozier et al 2014, Cunningham et al 2012, Hunte 2011, Krieger et al 2013, Sims et al 2012). However, most studies that have controlled for depressive symptoms find that associations between discrimination and physical health are independent of (Barnes et al 2008, Friedman et al 2009, Gee et al 2008, Lewis et al 2010, Lewis et al 2011a, Lewis et al 2013, Mustillo et al 2004), or partially mediated through (Barnes et al 2012, Earnshaw et al 2013) depressive symptoms; and at least one study found that discrimination and depressive symptoms interacted to predict self-reported CVD (Chae et al 2012). Still, in order to more accurately estimate the independent effect of self-reported experiences of discrimination on physical health outcomes, more consistent control for depression and depressive symptoms is needed. Additionally, given the strong associations observed between reports of discrimination and other types of mental disorders (e.g. generalized anxiety, PTSD) (see Table 1) and the emerging literature linking these disorders to disease states (Farvid et al 2014, Goetz et al 2014, Lambiase et al 2014, Vaccarino et al 2013), future studies should also consider the role of psychological disorders outside of depression in order to further our understanding of psychological pathways through which discriminatory experiences impact clinical disease.

EMERGING AREAS OF INTEREST

As recent reviews and meta-analyses demonstrate (Brondolo et al 2009, Brondolo et al 2011b, Dolezsar et al 2014, Schmitt et al 2014, Williams & Mohammed 2009), the body of research on discrimination and health has grown exponentially over the past two decades. To date, much of this work has focused on examining the main effects of interpersonal discrimination alone on mental and/or physical health outcomes, in fairly traditional community-based, or laboratory settings. Less is known about 1) the health effects of discrimination in less-traditional arenas, such as commonly frequented online contexts; 2) the role of anticipatory stress, or vigilance, around discrimination and its potential impact on health; 3) traditional and/or novel stress “buffers” that might attenuate the effects of discrimination on health; and 4) effective interventions that might ultimately reduce the impact of discrimination on health outcomes. Emerging research in each of these areas is presented below.

Cyber Discrimination

Eighty-seven percent of American adults and 93% of teens access the Internet in some form (Fox & Rainie 2014, Lenhart et al 2010), spending nearly 9 hours a day online (Fox & Rainie 2014). This widespread adoption of Internet use has fundamentally altered the way people share, work, socialize and communicate (Fox & Rainie 2014), which may have important implications for the ways in which we understand and assess exposure to discrimination and its subsequent effects on mental and physical health. There are several characteristics of online social environments that may distinguish online experiences with discrimination from offline encounters. Online, or virtual social environments expand social networks and access to information, but can also provide a sense of anonymity that transforms the way individuals choose to communicate (Fox & Rainie 2014). Kang's (2000) cyberrace theory predicts that online social interaction improves understanding across racial groups and thus predicts a reduction in racial discrimination experiences. Other scholars, however, suggest that the anonymity provided by online social environments promotes disinhibited and impersonal interactions that increase the likelihood of prejudice and discrimination being expressed (Glaser & Kahn 2005, McKenna & Bargh 2000).

Although few studies have examined the prevalence of online discrimination and its effects on health, there is some evidence that online experiences with racial discrimination may be both common and meaningful (Tynes et al 2004, Tynes et al 2008). In an analysis of content from monitored and unmonitored popular teen web sites, Tynes and colleagues (Tynes et al 2004) found that race was a common feature of online interactions. Tynes and colleagues (2008) further examined exposure to cyber-discrimination in a separate study of 264 adolescents, and found that 20% of whites, 29 % of blacks, and 42% of multiracial/other race youth reported that they had experienced discrimination in online contexts, including text messaging, chat rooms, discussion forums and social network sites. Moreover, almost seven out of 10 adolescents had witnessed online racial discrimination that was not targeted at them personally (vicarious discrimination). The authors found that after adjustment for demographic factors, other adolescent stress, and offline discrimination, online individual racial discrimination was positively associated with both depressive and anxiety symptoms (Tynes et al 2008). However, online vicarious discrimination was not related to mental health.

Thus, while there is an emerging body of research examining the effects of online victimization more broadly (e.g. bullying) on psychological functioning (Moessner 2007), there remains a great deal to understand about online social environments as a context for experiencing racial and other forms of discrimination (Tynes et al 2008). Virtual spaces represent a potentially unique social context that may transform the dynamics of discrimination. But additional empirical evidence is needed regarding the prevalence of online racial and other types of discrimination, the locations of victimization (e.g. social media sites versus gaming sites) and whether effects of online discrimination on health differ from offline experiences. Further, because the bulk of research in this area has focused on adolescents and mental health outcomes, almost nothing is known about how online experiences of discrimination impact objective physical health outcomes, or the mental and physical health of adults. A comprehensive research agenda examining the effects of discrimination in online contexts across age groups and across outcomes will make an important contribution to future research on discrimination and health.

Vigilance and Anticipatory Stress

In addition to research on the effects of exposure to discrimination on health, several recent studies have also examined how *anticipating* discrimination might impact health. Measuring anticipatory stress or vigilance related to the threat of discrimination allows for a fuller understanding of the impact of stress generated by discrimination. Brosschot and colleagues (2006) use the term “perseverative cognition” to capture worry, rumination and anticipatory stress. Their review indicates that repeated or chronic activation of the cognitive imagery of a stressor can serve to prolong the stress and exacerbate the negative effects of stress on health. This anticipatory stress, reflected in chronic or sustained vigilance, can lead to dysregulation of both emotional and physiological functioning that can increase risks for multiple diseases. Researchers had long speculated that a heightened vigilance and a failure to ever completely relax because of the constant threat of discrimination and other dangers linked to residence in hostile residential contexts was a contributor to the elevated risk of disease in African-Americans (Myers et al 2003, Williams et al 1994). Growing evidence suggests that heightened vigilance related to the threat of discrimination has pathogenic effects on health. In a national sample of adults in Sweden, Lindstrom (2008) found that a single-item indicator of anticipatory ethnic discrimination was associated with lower levels of psychological health. Similarly, a study of Latina college students found that the anticipation of being discriminated against led to greater concern and threat emotions before an encounter with the potential perpetrator and more stress and greater cardiovascular responses after the encounter (Sawyer et al 2012).

In the 1995 Detroit Area Study (DAS), in addition to developing the Everyday Discrimination Scale, David Williams and colleagues also developed a 6-item scale to capture heightened vigilance (Clark et al 2006, Williams et al 1997). Thus, after respondents reported experiences of everyday discrimination, they were asked, “in dealing with the experiences that you just told me about, how often do you a) think in advance about the kind of problems that you are likely to experience?, b) try to prepare for possible insults before leaving home?, c) feel that you always have to be careful about your appearance (to get good service or avoid being harassed)?, d) carefully watch what you say and how you say it?; e) carefully observe what happens around you?, and f) try to avoid certain social situations and places?” (Clark et al 2006). Recent studies with this scale or abbreviated versions of it highlight the importance of assessing the health consequences of race-related vigilance. In a study of African-American youth (mean age = 12 years old), Clark et al. (2006) showed that vigilance was inversely related to large arterial elasticity (a preclinical index of cardiovascular function) for boys but not girls. A study of adults in Baltimore found that African-Americans had higher levels of vigilance than whites and that vigilance was both positively associated with depressive symptoms, and contributed to the black-white disparity in this outcome (LaVeist et al 2014). Similarly, a study of 3,105 adults in Chicago found that vigilance predicted elevated risk of self-reported sleep difficulties, independent of income and education, and that racial differences in sleep difficulty were completely attenuated when adjusted for vigilance (Hicken et al 2013). Another analysis with this same sample found that vigilance was associated with increased odds of hypertension for African-Americans and Hispanics but not Whites (Hicken et al 2014). Moreover, vigilance remained predictive of hypertension in African-Americans after adjusting for hypertension risk factors and discrimination. Taken together, these findings suggest that independent of actual experiences of racism or overall discrimination, the threat of discrimination alone may have important health consequences. Additional research that furthers our understanding of how and in what contexts discrimination-related vigilance impacts health is warranted.

Potential Moderators or "Discrimination Buffers"

As research continues to explore the threat of discrimination on health, there is a real need for increased attention to factors that serve to reduce or exacerbate these effects in order to inform future interventions. An earlier review on discrimination and coping (Brondolo et al 2009) found mixed results for racial/ethnic identity, generic coping strategies, accepting discrimination as a fact of life vs. talking about it, and social support as potential buffers against the effects of discrimination on health. More recent studies have explored how other factors, such as religious involvement and mindfulness might attenuate the negative effects of racial and other forms of discrimination on health.

Religious Involvement and The Potential Role of Prayer—Recent national data points to the continued significance of religious involvement in the lives of blacks with both African-Americans and Caribbean Blacks reporting similar levels of religious engagement that are higher than those of whites (Chatters et al 2009). Research has long shown that religious beliefs and behavior can buffer or moderate some of the negative effects of chronic and acute stressors on health (Ellison et al 2001, Williams et al 1991, Wink et al 2005). Most of the research on discrimination as a psychosocial stressor has not examined the potential effects of religious participation or specific religious behaviors (i.e. prayer) as buffers. But available evidence suggests that this may be a promising area of research inquiry. Prospective analyses of the National Study of Black Americans found that multiple aspects of religious engagement (attendance, church-based social support and seeking religious guidance in everyday life) reduced the negative effects of recent experiences of racial discrimination on mental health (Ellison et al 2008). Similarly, in the national survey of Midlife Development in the U.S. (MIDUS), religious attendance (but not religious comfort) buffered the positive association between discrimination and negative affect (Bierman 2006). This effect was evident for African-Americans but not for Whites. Most recently, in a small laboratory study of 81 African-American women, Cooper and colleagues (Cooper et al 2014) found that women who reported using prayer as a coping strategy for racist events were buffered against the negative effects of a racism-related anger recall task on negative affect and cardiovascular reactivity (Cooper et al 2014). These findings provide some preliminary support for the notion that religious involvement and religious behaviors may attenuate the effects of discrimination on outcomes, particularly for African-Americans. However, it is unclear whether these associations would generalize to other racial/ethnic groups, and there remains much to be learned about the conditions under which particular aspects of religion might reduce the negative impact of acute, chronic, and traumatic discriminatory stressors on physical and mental health.

Mindfulness—Another coping strategy that may have utility for the study of discrimination and health is mindfulness. Mindfulness, or nonjudgmental attention and awareness, has been identified as a successful coping strategy with wide ranging benefits for mental health and greater well-being (for review see(Brown et al 2007)). The benefit of mindfulness is generally thought to occur through the improvement of emotion regulation, the ability to separate experience from self-worth, and reduced emotional reactivity (Brown et al 2007). In a recent study of 605 adults from a wide range of racial/ethnic backgrounds, Brown-Iannuzzi and colleagues (Brown-Iannuzzi et al 2014) found that the adverse effects of discrimination on depressive symptoms were less pronounced for individuals high in trait mindfulness. The buffering effect of mindfulness on depressive symptoms was maintained even after accounting for the influence of positive emotions (e.g. amusement, awe, love), suggesting a unique benefit of mindfulness (Brown-Iannuzzi et al 2014). Although to date there has been limited research in this area, this work provides some preliminary evidence to support the use of mindfulness as a potential strategy for reducing the negative effects of discrimination on mental and physical health.

Emotional Support—Although Brondolo and colleagues (Brondolo et al 2009)found mixed evidence for social support as a buffer of cross-sectional associations between discrimination and health, a recent study suggests that emotional support from family members and peers might play a role in prospective associations between discrimination and health. In a sample of 331 African-American late adolescents, Brody and colleagues (Brody et al 2014), identified two classes of racial discrimination trajectories assessed over a three-year period, high and stable as well as low and increasing. While the low and increasing profile exhibited the lowest levels of allostatic load across levels of emotional support, individuals in the high and stable trajectory with high levels of emotional support had allostatic load levels at age 20 that were comparable to the low and increasing category. Additional longitudinal studies are needed to determine whether these effects can be replicated in other cohorts with a wider range of demographic characteristics.

Interventions

As an extension of the research on potential stress buffers of discrimination, there is also an emerging body of research that is beginning to focus on identifying, developing, and rigorously evaluating effective interventions to reduce the negative effects of discrimination on health. Three types of interventions may have promise for studies of discrimination and health: values affirmation interventions, anti-racism counter-marketing campaigns, and forgiveness interventions.

Values Affirmation Interventions—Values affirmation exercises provide an opportunity for individuals to briefly write about their most important value and why it is important to them. The exercise is designed to enhance an individual’s sense of adequacy and self-worth and appears to have stress-buffering properties. Research suggests that while self-affirmation does not reduce the perception of threatening stressors, it enhances an individual’s psychological resilience such that functioning is enhanced and the potential negative effects of stressors are reduced (Cook et al 2012, Sherman & Hartson 2011). Findings from randomized double-blind experiments indicate that values affirmation interventions may reduce some of the negative effects of negative racial stigmatization on academic performance (Cohen et al 2006, Cohen et al 2009) and there is growing interest in the potential of values affirmation interventions to affect health outcomes. Research reveals that this simple exercise can reduce HPA axis and sympathetic nervous system reactivity to stress (Creswell et al 2005, Sherman et al 2009).

A variation of the values-affirmation intervention, a social belonging intervention, has also shown remarkable results with racial/ethnic minority college students (Walton & Cohen

2011). The intervention -- a short two-hour procedure implemented once during the students' freshman year—was designed to neutralize the psychological perception of threat that many minority college students contend with. It did so by informing students that social adversity on campus was common to all incoming freshman, but temporary, and sought to help them internalize this message. Using a double-blind randomized field experiment, this study found that the social belonging intervention reduced healthcare visits and improve self-reported health over a three year observation period among African-Americans but not whites (Walton & Cohen 2011). The intervention also improved African-Americans' academic performance, reducing the black-white achievement gap in this sample by 50%. These results are particularly promising and the extent to which such interventions can reduce the negative effects of discrimination on a broader range of health outcomes will be an important priority for future research.

Forgiveness Interventions—In the rapidly emerging literature on forgiveness and health, transgressions (wrongful behavior by others toward oneself or one's own wrong actions) are viewed as stressors and forgiveness as an emotion-focused coping strategy that can reduce the negative effects of stress and promote health (Worthington & Scherer 2004). Forgiveness is defined as choosing to give up resentment in the face of injustice or unfair treatment and offering mercy and compassion toward the offender (Baskin & Enright 2004). Research in the U.S. finds that blacks and Mexican Americans report higher levels of forgiveness than whites (Krause 2012, McFarland et al 2012). Research reveals that interventions that promote forgiveness can be effective in promoting mental and physical health (Baskin & Enright 2004, Hui & Chau 2009, Reed & Enright 2006, Waltman et al 2009) in adults and children dealing with interpersonal wrong, conflict or emotional abuse. There has also been interest in the role of forgiveness in the context of ethnic and civil conflicts in places such as Rwanda and Sierra Leone (Doran et al 2012). In Rwanda, for example, a forgiveness intervention was associated with reduced trauma symptoms and a more positive orientation toward members of the other group (Staub et al 2005). However, little attention has been given to the potential of forgiveness interventions to reduce the negative effects of racial discrimination on health. Additional research in this area is warranted.

Racism "Countermarketing"—Finally, community-based interventions may also have potential to counteract the effects of racism on health. In the Racism Still Exists (RISE) campaign Kwate (2014) used outdoor advertising media at bus stops in predominantly Black neighborhoods in New York City to disseminate facts about the presence of racism in the United States over a period of six months. These facts included messages such as "Fast Food Companies Don't Target Black People – They Just Don't Have Any Restaurants in White Neighborhoods" or "Don't Want to Get Stopped by the NYPD? Stop Being Black." Compared to residents in a demographically similar neighborhood in New York that did not receive the advertisements, residents in the treatment neighborhood reported significant declines in psychological distress. While the study did not find differences in self-reported health status or health behaviors, this intervention represents a promising community-based approach for reducing the effects of racism on mental health and potentially addressing health inequalities (Kwate 2014).

FINAL THOUGHTS

The overwhelming body of research on discrimination and health indicates that self-reported experiences of discrimination are an important risk factor for poor mental and physical health. Studies have found remarkably consistent associations between reports of discrimination and health across cohorts, and across outcomes. Importantly, these associations are independent of potential threats to validity in terms of personality characteristics, and have been observed with both subjective and objective outcomes, and in cross-sectional as well as longitudinal studies.

The goal of this review was to summarize the current state of the science on discrimination and health with a particular emphasis on both ongoing and emerging issues. Presently, there is very little controversy over whether researchers should include measures of discrimination in studies of health disparities. Rather, recent discussions center on how to best measure these experiences, including whether to ask about “racism” specifically or general mistreatment more broadly, and whether to use implicit along with explicit measures of discrimination to obtain more accurate information. But more attention needs to be given to understanding how these different measurement strategies and different forms of discrimination impact associations with health.

For example, despite the current debates over making race salient versus not in the assessment of discrimination for African-American and other racial/ethnic minority groups, research suggests that racial and non-racial forms of interpersonal discrimination have similar associations with health. However, it is less clear why this might be and whether the underlying mechanisms (e.g. neural, cognitive, cellular) associated with discriminatory experiences due to race are similar to those of other forms of mistreatment. It is also unclear how this impacts research on racial/ethnic disparities in health. That is, in a world where everyone is impacted by interpersonal mistreatment, what are the implications for how researchers think about the effects of “race” and the historical legacy of racism on health?

These questions are difficult to answer, but provide a strong rationale for the importance of assessing discrimination comprehensively (acute, chronic and traumatic), at multiple levels (micro and macro), across the life course, and in a range of contexts (e.g. online)--particularly in studies of health disparities. It is important to recognize that interpersonal discrimination is not a “magic bullet” that explains all of the stress associated with racial/ethnic minority status. Thus it should be examined in the context of other macro-level forms of discrimination as well as other stressors associated with social disadvantage. Further, studies that focus on interpersonal forms of discrimination alone need to move beyond focusing on a sole aspect of identity (i.e. “race”) and understand how intersectionalities shape exposure to discrimination and health outcomes for individuals who occupy multiple statuses simultaneously (i.e. African-American and female, gay and Latino).

The field needs more well-designed observational studies that are longitudinal in nature, with objective outcomes, that take into account factors that might influence reports of discrimination (vigilance or minimization biases, personality characteristics), and identify mechanistic pathways through which experiences of discrimination “get under the skin” to ultimately influence health outcomes. Identifying potential pathways will make additional contributions to our understanding of where and when to intervene to counteract the negative effects of discrimination on health. As one very relevant example, understanding the ways in which depression and depressive symptoms contribute to associations between reports of discrimination and physical disease may prove useful in designing interventions for depression that include modules on coping with experiences of discrimination.

Studies that examine factors that promote resilience to discrimination are also greatly needed. To date, most studies of discrimination and health --particularly those with physical health outcomes –have focused on examining main effects. Research on coping with discrimination has yielded mixed results, but as detailed in this review, recent studies have found that religiosity, mindfulness and emotional support show some promise as potential stress buffers. Studies examining other individual-level coping strategies or dispositions that might foster resilience to discrimination will be important priorities for future research. Further, we know very little about contextual or environmental factors that could ameliorate the effects of discrimination on health. It is possible that there are neighborhood, or other aspects of the physical or social environment (e.g. ethnic minority-owned businesses) that might promote feelings of empowerment and reduce the negative effects of discriminatory treatment on mental and physical health.

Finally, the overwhelming majority of research suggests that health policies need to take into account the legacies of racial and ethnic inequality and levels of incivility, intolerance and anti-immigrant sentiment. We also need more research on individual, community and institutional-level interventions that might be effective in reducing the negative impact of discrimination on health in affected populations. The individual and community-level interventions reviewed here show some promise, but additional research in this area is greatly needed. Additionally, there are significant inroads that need to be made in order to dismantle the institutional policies, structures, and processes that underlie societal inequality and race-related discrimination. As research documenting the adverse effects of discrimination on health continues to grow, these efforts will become critically important as a means of improving health in societies shaped by racism and other forms of discrimination.

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Table 1

Select Studies on Discrimination and Mental Disorders

Study	Sample [a]	Design	Exposure	Outcome(s)	Covariates	Findings
McLaughlin et al (2010)	Black (N=6587); Hispanic (N=6587); lesbian, gay, bisexual (N=577); and females from all groups (N=20,089)	Cross-sectional	Experiences of Discrimination Scale, past 12 months	DSM-IV 12 month mood, anxiety and substance use disorders	Gender, race/ethnicity, age, income, education, region, urbanicity, marital status	• Positive associations for Major Depression, Mania/Hypomania, PTSD, Generalized Anxiety Disorder, Social Phobia for Blacks, Hispanics and Women, but not LGB groups
Soto et al (2011)	African-Americans (N=3,570), Afro-Caribbeans (N=1,438), non-hispanic Whites (N=891) from the National Survey of American Life (NSAL)	Cross-sectional	Detroit Area Study Lifetime Discrimination Scale (racial vs. non-racial attributions)	DSM-IV Generalized Anxiety Disorder	Gender, age, poverty index	• Positive association between non-racial discrimination and GAD for all three groups; positive association between racial discrimination and GAD for African-Americans only
Levine et al (2014)	African-Americans (N=3,570), Afro-Caribbeans (N=1,621), non-hispanic Whites (N=891) from the National Survey of American Life (NSAL)	Cross-sectional	Everyday Discrimination Scale, Lifetime Discrimination Scale	DSM-IV Social Anxiety Disorder	Sex, age, poverty index, marital status, education, employment status	• Positive association between everyday discrimination and SAD for all three groups. No association between lifetime discrimination and SAD.
Gee et al (2007)	Asian Americans (N=2,047) from the National Latino and Asian American Study	Cross-sectional	Everyday Discrimination	Any DSM-IV disorder within the past 12 months, DSM-IV 12 month anxiety disorder, DSM-IV 12-month Depressive Disorder	Age, gender, education, ethnicity, region, employment, marital status, generation, family cohesion, poverty, acculturative stress, self-reported physical health, social desirability	• Positive association with any DSM-IV disorder within the past 12 months • Positive association with DSM-IV 12-month depressive disorder • Positive association with DSM-IV 12-month anxiety disorder
Lau et al. (2013)	US and Foreign Born Asian American women (N=1030) from the National Latino and Asian American Study NLAAS	Cross-sectional	Everyday Discrimination Scale	DSM-IV lifetime depression DSM-IV lifetime anxiety	Age, income, education, social desirability	• Positive associations for both DSM-IV lifetime depression and DSM-IV lifetime anxiety
Leong et al (2013)	Latino (N=1,458) and Asian American (N=1594)		Everyday Discrimination Scale	DSM-IV lifetime and 12-month anxiety and depressive disorders	Age, sex	• Positive association for Latino immigrants with anxiety and depressive disorders

Study	Sample [a]	Design	Exposure	Outcome(s)	Covariates	Findings
	immigrants from NLAAS					• Negative association for Asian American immigrants with lifetime anxiety, 12 month and lifetime depressive disorders
Pilver et al (2011)	Asian, Latina and Black pre-menopausal women aged 18–40 (N=2,718) from NLAAS and NSAL	Cross-sectional	Everyday Discrimination Scale, “main reason” for experiences, and subtle vs. blatant sub factors of the scale	Pre-Menstrual Dysphoric Disorder (PMDD)	Race, age, employment status, education, income, self-rated physical health, self-rated mental health, smoking status, history of oral contraception, past-month DSM-IV diagnosis and social desirability	• Positive association between everyday discrimination and PMDD • Positive association between attributing discrimination to race, gender or any other reason and PMDD • Only subtle discrimination was associated with PMDD
Oh et al (2014)	8,990 Latino, Asian, African-American and Afro-Caribbean adults from NLAAS and NSAL	Cross-sectional	Everyday Discrimination Scale, main reason for experiences	Lifetime and 12-month prevalence of Psychotic Experiences (e.g. auditory hallucinations, visual hallucinations, delusions) using DSM-IV symptoms	Age, Gender, Income to poverty ratio, education, immigrant status, race, Substance Use or PTSD diagnosis, social interactions, and region	• Positive association between reports of everyday discrimination and increased prevalence of both lifetime and 12-month Psychotic Experiences
Durso et al (2012)	381 participants aged 18–76 years	Cross-sectional	Everyday Discrimination Scale, Lifetime Discrimination Scale, Overall impact of Discrimination Scale	Eating Disorder Diagnostic Scale (EDDS) assessed binge eating over the past 3 and 6 months. Eating Disorder Inventory (EDI) assessed Bulimia subscale.	Childhood weight, parental weight, perception of teasing scale because of weight, perceived stress, institutional discrimination, discrimination impact	• Positive association between everyday discrimination and binge eating in past 6, but not 3 months
Seng et al (2012)	Women pregnant with their first child (N=619), 55.3% White, 33.9% Black, 7.6% Asian/Pacific Islander, 9.2% Native American, Hispanic, or Middle Eastern	Cross-sectional	Everyday Discrimination Scale (9 items) and additional item inquiring about the “main reason” for experiences	National Women’s Study PTSD Module (NWS-PTSD) assessed PTSD symptoms using DSM-IV criteria	Poverty, education, residence in high crime area, minority racial/ ethnic status in neighborhood, lifetime trauma, sum of attributions for discrimination	• Positive association between everyday discrimination and PTSD symptoms in minimally and fully adjusted models. • The number of different attributions for everyday discrimination was significant in unadjusted analyses, but was no longer significant after taking into account the frequency of experiences of everyday discrimination.

Study	Sample [a]	Design	Exposure	Outcome(s)	Covariates	Findings
Ellis et al (2008)	Somali adolescents, aged 12–19 (N=135) living in the U.S. for at least 12 months	Cross-sectional	Everyday Discrimination Scale	PTSD, measured with the UCLA PTSD Index	Age, gender, war trauma, years in the US, arrived with parent, caregiver fluency, housing adequacy, post-war hardships, acculturative hassles	• Positive association between everyday discrimination and PTSD symptom severity
(Moomal et al 2009)	4,351 South African adults (Black, Colored, Indian/ Asian and White)		Detroit Area Study Major Discrimination Scale, Everyday Discrimination Scale, Main Reason for Experiences	DSM-IV Lifetime and 12-month mood and anxiety disorders	Age, sex, race, education, income, employment status, marital status, wealth, urban/rural location, natural resources, social stressors, social desirability, self-esteem	• Positive association between major and everyday non-racial discrimination and lifetime and 12-month mood and anxiety disorders • No significant association between major or everyday racial discrimination and outcomes in fully adjusted models