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# Perceived Discrimination and Health: Integrative Findings

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## Abstract and Keywords

The Midlife in the United States (MIDUS) study was the first national health study to include a comprehensive battery to measure both major acute and chronic experiences of discrimination. Studies using MIDUS data have made significant contributions to the growing area of research on discrimination and health. This chapter provides an overview of research on discrimination and health, giving special attention to how findings from the MIDUS study have contributed to this literature. It provides a description of the discrimination instruments in MIDUS and summarizes key MIDUS findings that have examined discrimination in relation to health outcomes. This chapter outlines priority areas for future research. With growing recognition of the need to better understand the conditions under which specific aspects of discrimination are pathogenic for particular social groups, this chapter highlights the importance of using MIDUS to reach these goals.

Keywords: MIDUS study, health, discrimination, health outcomes, biological pathways, disease, biomarkers

# Introduction

Self-reports of unfair treatment based on race or perceived racial discrimination have emerged as a risk factor for poor health that disproportionately affects racial/ethnic minorities. Nevertheless, perceived discrimination, whether attributed to race or other social categories across multiple societal contexts, is adversely related to health (Williams & Mohammed, 2009). The inclusion of a comprehensive battery of measures of both major acute and chronic ongoing experiences of discrimination in the Midlife in the

United States (MIDUS) study has contributed much to our knowledge of the association between discrimination and health (Kessler, Mickelson, & Williams, 1999).

This chapter is organized into six sections. First, we provide a brief account of the catalyst that influenced the development and use of the discrimination measures found in MIDUS. Second, we provide a description of the measures' psychometric properties and general acceptance and validation in the field. Third, we highlight the first study in MIDUS that examined the association between discrimination and health and offer an overview of the current landscape in the literature since that study's publication. Fourth, we highlight examples of MIDUS studies that have examined the association between a variety of discriminatory experiences and health outcomes. Fifth, we draw attention to examples of studies from MIDUS that have investigated the biological and behavioral processes that link discrimination to health. Last, we describe potential opportunities within MIDUS that could advance our understanding of the association between discrimination and health.

# Conceptualizing Perceived Discrimination

Ethnic minorities, particularly African Americans (or blacks), experience a disproportionate burden of disease, disability, injury, and death compared to whites. Despite gains in life expectancy for both blacks and whites, blacks continue to live shorter (p. 444) lives than whites (Arias, 2016). Recent data reveal that for most leading causes of death, including heart disease, cancer, stroke, and hypertension, blacks continue to have higher death rates than whites (Xu, Murphy, Kochanek, & Bastian, 2016).

Historically, genetic predisposition has been proposed as an explanation of racial/ethnic differences in health. While racial differences in biological processes, such as in the apolipoprotein L1 gene, have been found to increase the risk of hypertension and prostate cancer for blacks, it is not the primary source of racial differences in health (Aiken, 2011; Cuevas, Williams, & Albert, 2017; Hu, Klopfer, & Ray, 2012; Lipkowitz et al., 2013; Reams et al., 2011; Williams, Priest, & Anderson, 2016). Growing evidence suggests that disease processes may be influenced by psychosocial factors and interact with genetic variation to affect health (Kuzawa & Sweet, 2009). Socioeconomic status (SES) has been identified as one of these risk factors. Those with low SES are more likely to live in poorer neighborhoods and be exposed to more crime and violence, more pollution, fewer opportunities for upward mobility, and fewer safe places to play and exercise (Fiscella & Williams, 2004; Pampel, Krueger, & Denney, 2010; Williams & Mohammed, 2009). These factors can lead to differential exposures to stressors and, in turn, increase risk for diseases.

Racial and ethnic minorities are overrepresented in lower SES groups. For example, according to the US Census Bureau, 26.2% of blacks and 23.6% of Hispanics live in poverty compared to 10.1% of whites (Proctor, Semega, & Kollar, 2016). Moreover, only 22.5% of black and 15.5% of Hispanic adults have earned a bachelor's degree compared to 36.2% of whites (Proctor et al., 2016). Given the strong relationship between race and SES, it is a reasonable assumption that racial differences in SES are a major contributor to the racial gaps in health. However, while racial differences in health are substantially reduced when SES is accounted for, racial differences in health persist after the adjustment for SES (Williams et al., 2016). The persistence of a residual association between race and health at every level of SES suggests that other unmeasured explanatory factors linked to race were likely significant contributors to racial disparities in health.

Accordingly some researchers saw the need to develop measures of discrimination that would facilitate our ability the assess discrimination's contribution to health inequities over and above SES (Williams, Yu, Jackson, & Anderson, 1997). At the time of the inception of the MIDUS study, scientific understanding of discrimination's influence on health was very limited. First, there had been few empirical analyses of discrimination and health, and several of the existing ones had used a single-item measure of discrimination, which underestimated the true prevalence of discriminatory experiences. Second, most discrimination measures attempted to capture major episodic experiences of discrimination, ignoring the minor, yet chronic, experiences of discrimination that racial/ethnic minorities often encounter. Last, most studies were cross-sectional and had used self-reported measures of health status, which provided no clarity regarding any observed association between discrimination and health.

The MIDUS study was the first population-based, nationally representative study to include a comprehensive measure of discrimination and addressed several of these limitations. Since its inception, there has been compelling evidence that perceived discrimination is associated with a variety of health outcomes, such as blood pressure and depressive symptoms (Paradies et al., 2015; Pascoe & Smart Richman, 2009; Williams & Mohammed, 2009; Williams et al., 2016). Much of these findings have derived from MIDUS studies.

# Measuring Acute and Chronic Discrimination in MIDUS

Beginning with baseline assessments in 1995, MIDUS attempted to capture two key domains of discriminatory stressors: daily hassles and major life events. Box 32.1 provides basic details of the scales' components. The Major Experiences of Discrimination scale (Kessler et al., 1999; Williams et al., 1997) tried to capture acute and observable discriminatory experiences that are viewed as equivalent to other major life events, such

as being involved in a serious accident, in the larger literature on stress (Williams et al., 1997). Because of interest in capturing the burden of these events over the life course, participants were asked to provide the number of times in multiple life domains they have been discriminated against because of their race, ethnicity, gender, age, religion, physical appearance, sexual orientation, or other characteristics. Sample items included number of times the participant was denied a scholarship and was not hired for a job. Although researchers can examine each item individually, the scale is typically summed, with higher numbers indicating greater experiences of lifetime discrimination. (p. 445)

Box 32.1 Measures of Discrimination in MIDUS

# 1. Major Experiences of Discrimination

Type of stress: Acute and observable

Scaling: The scale can be constructed by taking the number of "1 or higher" responses to the items.

*In each of the following, indicate how many times in your life you have been discriminated against because of race, ethnicity, gender, age, religion, physical appearance, sexual orientation, or other characteristics?* (If the experience happened to you, but for some reason other than discrimination, enter "0.")

**1.** You were discouraged by a teacher or advisor from seeking higher education.
**2.** You were denied a scholarship.
**3.** You were not hired for a job.
**4.** You were not given a job promotion.
**5.** You were fired.
**6.** You were prevented from renting or buying a home in the neighborhood you wanted.
**7.** You were prevented from remaining in a neighborhood because neighbors made life so uncomfortable.
**8.** You were hassled by the police.
**9.** You were denied a bank loan.
**10.** You were denied or provided inferior medical care.
**11.** You were denied or provided inferior service by a plumber, car mechanic, or other service provider.

*Response:* Each item is answered by frequency (# of times) of its happening.

# 2. The Everyday Discrimination Scale

Type of stress: Chronic

Scaling: The daily discrimination scale can be constructed by calculating the sum of the reverse-coded values of the items.

*How often on a day-to-day basis do you experience each of the following types of discrimination?*

1. You are treated with less courtesy than other people are.
2. You are treated with less respect than other people are.
3. You receive poorer service than other people at restaurants or stores.
4. People act as if they think you are not smart.
5. People act as if they are afraid of you.
6. People act as if they think you are dishonest.
7. People act as if they're better than you are.
8. You are called names or insulted.
9. You are threatened or harassed.

*Response categories:* 1 (Often), 2 (Sometimes), 3 (Rarely), 4 (Never)

### Follow-up Item

*What was the main reason for the discrimination you experienced?* (If more than one main reason, check all that apply.)

*Response categories:* 1) Your age; 2) Your gender; 3) Your race; 4) Your ethnicity or nationality; 5) Your religion; 6) Your height or weight; 7) Some other aspect of your appearance; 8) A physical disability; 9) Your sexual orientation; 10) Some other reason for discrimination

# 3. Global Follow-up Items

Overall, how much has discrimination interfered with you having a full and productive life?

Overall, how much harder has your life been because of discrimination?

*Response:* 1 (A lot); 2 (Some); 3 (A little); (4) Not at all

(p. 446) The Everyday Discrimination Scale (EDS) tried to capture the chronicity of more minor forms of unfair treatment (Williams et al., 1997). It is presumed that these exposures, albeit subtle and minor, can be more deleterious to one's health than acute discrimination due to their persistent and, often, incessant duration (Williams et al., 1997). For EDS, participants were asked how often on a day-to-day basis they experience multiple types of minor discriminatory events, such as being treated with less courtesy and respect than other people, receiving poorer service than others in restaurants and stores, or being called names or insulted. For each question, the response options ranged from 1 (*Never*) to 4 (*Often*). A follow-up question is asked to assess the main reason or reasons for experiencing these events. This scale is commonly constructed by calculating the sum of the values of the items, indicating that higher scores reflect greater everyday discrimination. MIDUS also included two global items after these two discrimination measures. These overall measures attempted to capture the burden of experiencing unfair treatment. Participants were asked (a) how much discrimination has interfered with having a full and productive life and (b) how much harder life has been because of discrimination. For each question, the response option ranged from 1 (*A lot*) to 4 (*Not at all*).

# Discrimination, Mental Health, and Physical Health in MIDUS

The MIDUS study was the first national study to provide a glimpse of the distribution, prevalence, and mental health correlates of lifetime and everyday discrimination (Kessler et al., 1999). Among 3,032 Americans, with ages ranging from 25 to 74, perceived discrimination was found to be more prevalent in people with disadvantaged social status (e.g., women, nonwhite, and low SES). In addition, perceived discrimination was relatively common in the total population, with 33.5% of participants reporting exposure to at least one type of major discrimination and 60.9% reporting at least one type of everyday discrimination. The most common reasons for perceived discrimination were race/ethnicity (37.1%), gender (32.9%), appearance (e.g., weight; 27.5%), and age (23.9%). Both greater lifetime and everyday perceived discrimination were positively associated with nonspecific distress and major depression (MD), but were not associated with generalized anxiety disorder (GAD). It is unclear why perceived discrimination was not associated with GAD because subsequent studies had found a link between discrimination and GAD, along with a range of *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*; American Psychiatric Association, 1994) psychiatric illnesses, such as eating and psychotic disorders (Lewis, Cogburn, & Williams, 2015).

Kessler and colleagues (1999) also found that while perceived discrimination was more prevalent among people with disadvantaged social status, perceived discrimination did not explain the association between the disadvantaged social statuses and mental health problems. The authors suggested the reason for perceived discrimination explaining a small portion of the association may be due to its high prevalence of discrimination and strong association with mental health across all social groups. Given the comparable magnitude with other social stressors on mental health, these findings suggest that discrimination should be considered an important risk factor for the overall mental health problems in the United States. This first publication on discrimination and health from the MIDUS study documented the potential importance of discrimination for understanding social status variations in health. It had a large impact on the field, as is reflected in its over 1,450 citations.

Since publication of this landmark MIDUS study, research in the area of discrimination and health has grown significantly, providing clearer evidence of associations between perceived discrimination and health. The scientific impact of this new line of inquiry has been major and extended beyond MIDUS. In a recent meta-analysis and systematic review of 333 published articles, scholars found compelling evidence that racial/ethnic discrimination is associated with poorer mental health, including depression, anxiety, and psychological stress, as well as poorer general health and physical health (e.g., blood pressure and cardiovascular disease) (Paradies et al., 2015).

It is also worth noting that subsequent studies in the United States, South Africa, New Zealand, and Australia have found that self-reported measures of discrimination make an incremental contribution over income and education in explaining racial differences in health (Williams & Mohammed, 2009). Studies have also illuminated the pathways by which discrimination is related to health. Based on meta-analyses, perceived discrimination erodes an individual’s health through psychological (e.g., depression) and physiological (e.g., cortisol level) stress responses and through unhealthy behaviors (e.g., smoking; Pascoe & Smart Richman, 2009; (p. 447) Williams & Mohammed, 2009). With compelling evidence of the link between perceived discrimination and health, researchers have begun to disentangle the health consequences of perceptions of unfair treatment based on a variety of social statuses.

# Varieties of Discrimination in MIDUS

While race/ethnicity may be the most common reason for perceived discrimination among disadvantaged racial/ethnic groups, unfair treatment based on more generic experiences or other social statuses tends to have similar adverse health effects (Williams & Mohammed, 2009). Nevertheless, the extent to which unfair treatment based on race may have unique adverse effects on health compared to other forms of unfair treatment remains an unresolved issue. For example, Lewis and colleagues (2006) found that racial discrimination was not significantly related to coronary calcification for black women. However, in combining measures that capture racial and nonracial discrimination, they found that overall perceived discrimination (regardless of attribution) was positively associated with coronary calcification. Conversely, Mouzon, Taylor, Woodward, and Chatters (2017) found that racial discrimination and overall discrimination were associated with negative self-reported indicators of health, while nonracial discrimination was not. These findings suggest that future research needs to better understand the conditions under which racial discrimination may have unique adverse effects on particular measures of health. Because the discrimination instruments in MIDUS allow respondents to choose the reasons for the discrimination experienced, researchers have been able to disentangle this issue and examine the health consequences among multiple stigmatized group members.

## General/No Attribution

A number of studies have used measures, such as the EDS, to examine the health effects of discrimination without attributing to, or differentiating between, discrimination due to race, gender, sexuality, or other attributes. Some research suggests that the experience of unfair treatment, irrespective of the personal characteristic on which it is based, has negative consequences for health (Grollman, 2014; Sutin, Stephan, Carretta, & Terracciano, 2015). Several MIDUS studies have used this approach, finding generic perceived discrimination to predict increases in waist circumference and risk for cardiovascular disease (Friedman, Williams, Singer, & Ryff, 2009; Hunte, 2011). Researchers using cross-sectional data from MIDUS: Survey of Minority Groups found evidence that greater perceived discrimination, regardless of attribution, was associated with poorer relationship quality (Doyle & Molix, 2014a). This association was found to be partially mediated by low self-acceptance (Doyle & Molix, 2014a). Although further analyses are needed to understand whether certain forms of discrimination lead to different disease pathways, these findings suggest that any experience of discrimination can generate psychological distress and influence adverse health outcomes.

## Race/Ethnicity

Stressors that threaten an individual's most salient self-concept may lead to more psychological distress (Pearlin, Schieman, Fazio, & Meersman, 2005; Perry, Harp, & Oser, 2013; Rivera, 2014). For racial/ethnic minority group members, especially those living in a racialized society such as the United States, one's self-identity is closely tied to his or her race/ethnicity; thus, the experience of everyday racial discrimination can have a greater impact on health. While the distinct effects of unfair treatment based on race compared to other forms of unfair treatment remain an unresolved issue in the literature, MIDUS studies have expanded our knowledge of the association between perceived racial discrimination and a variety of health outcomes.

Pain researchers have begun paying particular attention to individual-level factors that may shape pain responses as they may help explain disparities in acute and chronic pain states between African Americans and whites (Edwards, Doleys, Fillingim, & Lowery, 2001). The potential stress response to racial discrimination may help explain existing racial/ethnic disparities in the prevalence of painful conditions. Using MIDUS, Edwards (2008) found that lifetime and everyday racial discrimination was associated with back pain. When segmented by race, results showed that these associations were generally found only among African American respondents. While the biological and behavioral processes that link discrimination to back pain are yet to be explored, this study advanced our understanding of the ways in which discrimination may contribute to the racial/ethnic disparities of pain conditions.

Perceived racial discrimination has also been shown to be associated with a variety of healthcare-related outcomes, such as greater distrust of the healthcare system, greater distrust of clinicians, and lower medication adherence (Armstrong et al., 2013; Cuffee et al., 2013). Although there is (p. 448) mounting evidence to show that the experience of racial discrimination is a risk factor for healthcare-related outcomes, few researchers have examined the association between perceived racial discrimination and the use of Complementary and Alternative Medicine (CAM). The overall rate of CAM use is generally lower for African Americans compared to whites (Su & Li, 2011). Yet, little is known regarding why blacks are less likely to venture outside the realm of conventional medicine in addressing health needs.

Among black adults in MIDUS ($N$ = 201), racial discrimination was associated with a higher likelihood of using any type of CAM, as well as using more modalities of CAM. Also, both discrimination in healthcare and discrimination in nonmedical contexts predicted greater use of CAM. The findings suggest that use of alternative means of healthcare may be a way for blacks to cope with experiences of discrimination within and outside healthcare (Shippee, Schafer, & Ferraro, 2012).

## Overweight/Obesity

Individuals who are overweight and obese are stigmatized in society, often being perceived as lazy and unsuccessful (Puhl & Heuer, 2010; Sutin & Terracciano, 2013). Analyses of Wave 1 of the MIDUS study (1995–1996) revealed that obese individuals were more likely to report major experiences of discrimination and everyday discrimination compared to persons who are normal weight (Carr & Friedman, 2005; Carr & Jaffe, 2012). Among obese individuals, those who work in professional occupations reported more everyday discrimination and employment discrimination (not hired for a job, not given a promotion or fired) compared to their peers in lower status jobs (Carr & Friedman, 2005). The prevalence of weight/height discrimination in particular was high for those who were overweight and obese, with 40% of individuals with body mass index (BMI) of 35 and greater reporting weight discrimination compared to only 2% of those who were normal weight (Puhl, Andreyeva, & Brownell, 2008). Women and younger adults, especially those with higher BMI, were at greater risk for weight/height discrimination than men and older adults, respectively (Puhl et al., 2008).

Using new waves of data, researchers found that while race discrimination has remained stable, the prevalence of weight/height discrimination increased from 7% in 1995–1996 to 12% in 2004–2006, affecting all population groups but the elderly (Puhl et al., 2008). Surprisingly, this growth was not explained by changes in obesity rates, which may suggest worsening societal attitudes and stigma toward overweight and obese individuals (Andreyeva, Puhl, & Brownell, 2008). The large increase in weight/height discrimination increases vulnerability for poor psychological and physical health for overweight and obese individuals. MIDUS studies found that overweight and obese individuals were more likely to report more frequent negative mood and unkind treatment by strangers, less frequent good mood, lower levels of self-acceptance, and a lower likelihood of self-acceptance (Carr & Friedman, 2005; Carr & Jaffe, 2012). Carr and Friedman (2005) also found that weight discrimination explains the association between obesity and lower levels of self-acceptance.

Prospective studies from MIDUS have shown that weight discrimination predicts increases in depressive symptoms over time and mediates the prospective association between obesity and depressive symptoms. Weight discrimination explained about 31% of the obesity-related increase in depressive symptoms over time for persons with a BMI of 35 and greater. Using data from MIDUS 2 (2004–2006), MIDUS 3 (2013–2014), and part of the second National Study of Daily Experiences, MIDUS researchers have shed new light on the chronic nature of experiences of weight discrimination. Among persons with a BMI of 25 and greater ($N$ = 1,153), those who reported weight discrimination also reported greater daily stressors (e.g., interpersonal stress) and negative affect (e.g., feelings of anger and frustration) over the 8 days of observation (Sutin et al., 2016). These findings suggest that the chronic experience of weight discrimination can take a physical and emotional toll on health, especially for those most vulnerable to discrimination.

Recent evidence suggests that weight discrimination may also contribute to early mortality. Combining data from MIDUS ($N$ = 5,079) and the National Death Index (or household proxy report), researchers have found that perceived weight discrimination is associated with an increase in mortality risk of nearly 60% and the association is generally stronger for those who are obese (Sutin, Stephan, & Terracciano, 2015).

### Sexual Orientation

Homosexuality is still widely stigmatized in the United States and may be a risk factor for higher rates of psychological disorders. Analysis of MIDUS data revealed that homosexual individuals had a higher prevalence of psychiatric morbidity than (p. 449) heterosexual individuals (Cochran, Sullivan, & Mays, 2003). The causes of these differences are not fully understood, but research suggests that the effects of being a member of a stigmatized group and perceiving unequal treatment toward one's group may partially explain these differences (Cochran et al., 2003). Using MIDUS, Mays and Cochran (2001) found that individuals who identify as homosexual or bisexual ($n$ = 73) reported greater exposure to both lifetime and everyday discrimination than individuals who identified as heterosexual, and 42% attributed that to their sexual orientation ($n$ = 2,844; Mays & Cochran, 2001). Controlling for these differences in perceptions, the associations between psychiatric morbidity (i.e., MD, GAD, and panic disorder) and sexual orientation were attenuated, providing evidence that perceived discrimination may be a risk factor for the existing mental health disparities among homosexual individuals.

## Discrimination and the Biological Processes in MIDUS

The availability of multiple waves of data in MIDUS allows researchers to examine the effects of discrimination on the onset and potential progression of preclinical indicators and unhealthy behaviors. Specifically, researchers can identify the biological and behavioral processes that link discrimination to adverse health outcomes. For example, endothelial dysfunction can induce the process of atherosclerosis, increasing the risk for cardiovascular disease. Friedman et al. (2009) examined the association between perceived discrimination and E-selectin, a marker of endothelial dysfunction. Among 804 white participants who had completed questionnaire and biomarker data, greater lifetime discrimination and everyday discrimination predicted higher circulating levels of E-selectin for men only. This association remained significant after adjusting for confounding variables, such as age, health status, and health behaviors.

Another risk factor for cardiovascular disease, glycosylated hemoglobin ($HbA_{1c}$), has been tied to obesity and central adiposity (Mokdad et al., 2003; Tsenkova, Carr, Schoeller, & Ryff, 2011). A MIDUS study found that obese individuals who perceived greater weight

discrimination daily were more likely to have elevated $HbA_{1c}$ than obese individuals with lower reported weight discrimination (Tsenkova et al., 2011). These studies underscore the potential biological mechanisms by which exposure to unfair treatment may be related to health, particularly cardiovascular function. Moreover, they add to growing literature suggesting that unfair treatment in general may predict adverse health outcomes.

Psychosocial stressors, like perceived discrimination, can induce emotional stress, which may, in turn, evoke a physiological response meditated in part by activation of the sympathetic nervous system, inflammation, and the hypothalamic–pituitary–adrenal axis (Black & Garbutt, 2002; Spruill, 2010). The chronicity of these stressors can cause dysregulation of these physiological systems and in turn increase the risk for diseases. Allostatic load is a construct that seeks to capture multisystem biological dysregulation that can reflect the effects of chronic stress on the body (McEwen & Stellar, 1993). Based on a systematic review of 58 articles, allostatic load was found to be associated with poor physical health, poor mental health, and all-cause mortality.

While evidence suggests that perceived discrimination is associated with poor self-rated health, little focus has been given to the biological underpinnings of discrimination and health. Using cross-sectional data from the MIDUS 2 Milwaukee African American sample ($N$ = 233), Ong, Williams, Nwizu, and Gruenewald (2017) found that perceptions of everyday unfair treatment were associated with higher allostatic load z(the sum of seven separate physiological system risk indices: cardiovascular regulation, lipid, glucose, inflammation, sympathetic nervous system, parasympathetic nervous system, hypothalamic pituitary adrenal axis). This association persisted even after adjusting for sociodemographic factors, medication use, smoking status, alcohol consumption, depressive symptoms, lifetime discrimination, and global perceived stress.

Using cross-sectional data from the MIDUS 2 Milwaukee African American sample, Doyle and Molix (2014a,b) also embarked on a unique approach to understanding the potential consequences of perceived discrimination on relationship strain through biomarkers. They first documented that everyday discrimination was positively associated with three indicators of chronic inflammation (interluekin 6 [IL-6], E-selectin, and C-reactive protein [CRP]). Next, they showed that these inflammatory biomarkers also significantly mediated the relationship between discrimination and relationship strain, which suggested that discrimination not only adversely affected physiological functioning, but also, negatively affected the social **(p. 450)** relationships of African Americans through these mechanisms. Nevertheless, given the cross-sectional nature of their analyses, it is not possible to determine the temporal ordering of the associations among perceived discrimination, inflammation, and relationship strain (Doyle & Molix, 2014a, 2014b). Thus, the utilization of longitudinal data in MIDUS can help to identify the extent of potential bidirectional effects among perceived discrimination, inflammation, and relationship strain.

Other researchers have also highlighted potential behavioral processes that link discrimination to health. For example, waist circumference is often used as a proxy for both diet and exercise behavior and is associated with hypertension, dyslipidemia, and the metabolic syndrome (Janssen, Katzmarzyk, & Ross, 2004). Possible antecedents to this relationship are stressors that can influence individuals to engage in less physical activity and consume fatty foods (Barrington, Ceballos, Bishop, McGregor, & Beresford, 2012; Mouchacca, Abbott, & Ball, 2013). Hunte (2011) used MIDUS data to examine the effects of everyday discrimination on waist circumference change. Among 1,452 respondents who completed questionnaires from MIDUS 1 and MIDUS 2, everyday discrimination predicted an increase in waist circumference of 2.39 cm for men and 1.88 cm among women (Hunte, 2011). Despite the dearth of studies examining the behavioral pathways the link perceived discrimination and health, these findings provide prospective evidence of the possible obesogenic effects of the stress of everyday discrimination.

# Promising Directions for Future Research

Despite the growth in studies examining discrimination and health, this area is still emerging. Further focus is needed to examine potential mediators and moderators that illuminate the different pathways by which discrimination might affect health outcomes. Moderator variables, also referred to as protective, or buffering, factors, can provide evidence of ways to reduce the pathogenic effects of discrimination, while mediators can help explain how discrimination links with health. The combination of certain factors, such as the levels of family support; lifestyle choices (e.g., physical activity, dietary behaviors); personality factors; and genetic predisposition, can mediate or moderate the relationship between discrimination and health outcomes.

The MIDUS study is rich with social and psychological measures, which can help researchers examine these factors. For example, Jang, Chiriboga, and Small (2008) found that among 1,554 MIDUS respondents, the relationship between discrimination and negative affect (e.g., feelings of nervousness, sadness, and hopelessness) was weaker for those who had a strong sense of control (e.g., having autonomy in one’s life), suggesting that sense of control may serve as a protective factor. Bierman (2006) also found that religious attendance (but not religious comfort) buffered the positive association between discrimination and negative affect among African American MIDUS respondents, suggesting that religious attendance may provide forms of social and instrumental support for combating discrimination.

These studies have helped to identify individual and social factors that can aid in reducing the negative effects of discrimination on mental health. Identifying how a broader range of psychosocial factors (such as multiple dimensions of psychological well-being) might cushion some of the negative effects of discrimination will assist researchers

in developing effective interventions that could help those most vulnerable to experiences of discrimination.

Other studies suggest that the experiences of adversity, such as racism, may contribute to a deepened sense of purpose in life. For instance, a MIDUS study found that blacks have fewer mental disorders than whites. Even after adjusting for social inequality and discrimination, blacks continued to have better mental health than whites, suggesting that in the face of social inequality and discrimination, blacks exhibit mental health resilience (Keyes, 2009). Factors of resilience, such as purpose in life and self-acceptance, may help racial/ethnic minorities cope with social, situational, and structural adversities. Another MIDUS study found that, compared to whites, racial/ethnic minorities had greater eudaimonic well-being (i.e., having purpose in life, personal growth, autonomy, environmental mastery, self-acceptance, and positive relations with others) than whites, even after controlling for social inequality and discrimination (Ryff, Keyes, & Hughes, 2003).

While we continue to identify and understand the factors that foster eudaimonic well-being, Keyes (2009) suggested that racial socialization and identification with one's race may help instill meaning in one's life, particularly for racial/ethnic minorities. Using MIDUS, future studies can help to broaden our understanding of some of the counterintuitive relationships we find between perceived (p. 451) discrimination and physiological health through the investigation of intrapersonal factors, such as racial identification and purpose in life.

There is a growing focus on objective measures of health given that much of the early literature on discrimination and health was dominated with the use of self-report measures. Studies showed that discrimination may be inversely associated with multiple indicators of preclinical end points, such as CRP and IL-6, which are markers for inflammation, and telomere length (Chae et al., 2014; Kershaw et al., 2016; Lewis, Aiello, Leurgans, Kelly, & Barnes, 2010). MIDUS's inclusion of biomarkers and neuroscience data, such as fasting blood specimens, 12-hour urine specimen, and salivary cortisol, provide rich opportunities to examine biological and neurological pathways of discrimination and health (Love, Seeman, Weinstein, & Ryff, 2010).

For example, using data from MIDUS 2 and the subset National Study of Daily Experiences, researchers considered the influence of everyday discrimination on the diurnal cortisol rhythm of 50 African American older adults and 100 whites (Fuller-Rowell, Doan, & Eccles, 2012). Although African Americans in this sample had a lower waking cortisol level and a flatter diurnal slope than whites, which is indicative of hypothalamic–pituitary–adrenal axis dysregulation, everyday discrimination was found to be associated with a flatter (less healthy) diurnal cortisol slope among whites but a steeper (more healthy) diurnal slope among African Americans. Although perplexing at first, these findings suggest that an awareness of racism for African Americans may serve as a protective factor to health.

Discrimination should be understood within the context of a broad range of stressors on health. Psychosocial stress is multidimensional in nature, and the clustering of these stressors is greater among ethnic minorities than whites (Sternthal, Slopen, & Williams, 2011). Focusing on a single stressor can lead to an overestimation of the effects of the stress. As discussed in Chapter 6 in this volume by Slopen, Meyer, and Williams, recognizing the cumulative impact of stress can allow researchers to examine dose–response relationships between multiple domains of stress and health. Slopen et al. (2013) recently used MIDUS to examine the predictive nature of cumulative stress on smoking relapse and persistence over 9–10 years, finding that relationship stress, financial strain, workplace stress, perceived inequality, family problems, and the accumulation of stress predicted greater odds of persistent smoking. Although discrimination did not specifically predict smoking persistence, other prospective studies have found that greater experience of major discrimination is associated with a reduced likelihood of achieving smoking abstinence (Borrell et al., 2007; Kendzor et al., 2014).

Nevertheless, framing discrimination as part of a comprehensive measure of stressful life experiences allows researchers to capture the multidimensional nature of cumulative stress that spans a person’s life course, which has been a major limitation of prior research. Understanding how multiple types of stressful experiences cluster and accumulate at different stages of the life course could add further insight into the role of stress in contributing to health disparities.

Focusing on behavioral risk factors can also help shed light on the mechanisms by which racial discrimination affects health. Some individuals may adopt unhealthy behaviors, such as smoking and drinking, or even choose healthy ones (e.g., exercise) to cope with the stress of discrimination (Borrell et al., 2007). However, our knowledge remains limited of the complex ways in which discrimination may influence health behaviors and in turn lead to morbidity and mortality. MIDUS provides an opportunity for researchers to explore this area, given its collection of health behavior data at multiple waves. With greater focus on this mechanism, we can better understand the biobehavioral pathways of discrimination and health.

Issues pertaining to limited statistical power for obtaining stable estimates and exploring within-group differences due to small sample sizes was a limitation of some of the early studies of discrimination and health using MIDUS data. MIDUS has taken steps to enhance the sample size by recruiting a new national probability sample and a new sample of African Americans in Milwaukee, referred to as the MIDUS Refresher. The MIDUS Refresher study recruited a national sample of 3,577 adults, aged 25 to 74, thus paralleling the five age decades of the first MIDUS study. The MIDUS Refresher study employed the same comprehensive measures as MIDUS 1, such as sociodemographics, psychosocial measures, and physical and mental health information, along with additional questions pertaining to the effects of the 2008–2009 economic recession. As a part of the Refresher, MIDUS also added a large sample of African Americans from Milwaukee, Wisconsin, to help improve understanding of minority health. With these new additions,

there are opportunities to address some of the sample size (p. 452) limitations that existed with earlier MIDUS analyses seeking to explore the biobehavioral pathways linking perceived discrimination to health.

The instruments in MIDUS have not been used to their fullest potential. For example, researchers typically create a composite score of lifetime experiences of discrimination. This approach allows researchers to examine the additive impact of all of the major discriminatory experiences on health. However, it may also be important for researchers to compare the health effect of different types of acute discriminatory events. Kessler et al. (1999) found that prevalence estimates varied based on types of major discriminatory experiences. For example, among the 3,032 respondents, 16% reported not being hired for a job, while 6.4% reported being hassled by police. The differences in these reports provide opportunities to compare the magnitude of specific incidents of discrimination on health. The addition of a third wave of MIDUS data allows researchers to examine the cumulative impact of specific types of discrimination (as well as combined measures of discrimination) on health over time. For example, Friedman and colleagues (2009) used two waves of data to formulate a “chronic discrimination” construct. This allowed them to capture the chronicity of discrimination over time and its impact on physiological health. With three waves of survey data, researchers can explore how the patterning and trends of exposure to discrimination over time is linked to changes in health status.

Last, a priority for future research is to better understand the interdependence of discriminatory experiences based on multiple co-occurring stigmatized statuses and how they combine to influence health. Research using the MIDUS data that has examined the association between the overall number of types of discrimination with health illustrates the importance of capturing the full burden of discrimination. For example, Grollman (2014) found that among MIDUS respondents ($N$ = 2,647), those who occupied multiple disadvantaged statuses were more likely to experience poor health. Importantly, these individuals also reported more types of discrimination (age, gender, race, religion, weight, ability, appearance, sexual orientation) and higher levels of discrimination and viewed their discriminatory experiences as more stressful. Importantly, exposure to discrimination partially mediated the association between multiple stigmatization and health. Further research in MIDUS is needed to examine the intersectionality among multiple types of discrimination and health so that we can better understand the lived experience of those who grapple with multiple types of stigmatization.

# Conclusion

The inclusion of a comprehensive battery of discrimination measures in MIDUS has importantly enhanced our understanding of the role of discrimination in health in general as well as the contribution that this risk factor plays in initiating and sustaining inequities in mental health and physical health in the United States, particularly for stigmatized groups. There is still a great need to better understand the full physical and mental health impact of perceived discrimination as a psychosocial stressor. MIDUS has behavioral and biomarker data that allow for further examination of the behavioral and biological pathways by which discrimination affects health. With a broad array of other social psychosocial factors, there are opportunities to better understand the conditions under which discrimination can adversely affect health.

Further, the availability of discriminatory experiences for multiple co-occurring stigmatized statuses, in the context of broad assessment of psychosocial risks and resources, provides an unprecedented opportunity identify how the social environment gets under the skin to affect physical and mental health. These rich opportunities can bring better understanding of the complex ways in which discrimination combines with other health risks and resources to influence health and health disparities. Such inquiries will lay the foundation for a new generation of research that seeks to identify innovative intervention and prevention measures to reduce health risks and improve the health and well-being of those who are vulnerable to discrimination.

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