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The weight of racism: Vigilance and racial inequalities in weight-related measures

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Abstract

In the United States, racial/ethnic inequalities in obesity are well-documented, particularly among women. Using the Chicago Community Adult Health Study, a probability-based sample in 2001–2003 (N=3,105), we examined the roles of discrimination and vigilance in racial inequalities in two weight-related measures, body mass index (BMI) and waist circumference (WC), viewed through a cultural racism lens. Cultural racism creates a social environment in which Black Americans bear the stigma burden of their racial group while White Americans are allowed to view themselves as individuals. We propose that in this context, interpersonal discrimination holds a different meaning for Blacks and Whites, while vigilance captures the coping style for Blacks who carry the stigma burden of the racial group. By placing discrimination and vigilance within the context of cultural racism, we operationalize existing survey measures and utilize statistical models to clarify the ambiguous associations between discrimination and weight-related inequalities in the extant literature. Multivariate models were estimated for BMI and WC separately and were stratified by gender. Black women had higher mean BMI and WC than any other group, as well as highest levels of vigilance. White women did not show an association between vigilance and WC but did show a strong positive association between discrimination and WC. Conversely, Black women displayed an association between vigilance and WC, but not between discrimination and WC. These results demonstrate that vigilance and discrimination may hold different meanings for obesity by ethnoracial group that are concealed when all women are examined together and viewed without considering a cultural racism lens.

Keywords

racism; discrimination; obesity; health inequalities; racial inequalities

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INTRODUCTION

Ethnoracial inequalities in obesity, indexed with body mass index (BMI) or waist circumference (WC) have been widely documented in Americans, particularly in American women (Ogden et al., 2014). Recent estimates indicate that 82% of non-Hispanic Black women and 77% of Hispanic women are either overweight or obese while 63% of non-Hispanic White women are overweight or obese (Wang & Beydoun, 2007). More concerning is the inequality in visceral adiposity, often proxied by WC, as this type of adiposity is a particular risk factor for many chronic diseases such as cardiovascular disease and diabetes (Despres & Lemieux, 2006; C. M. Y. Lee et al., 2008). Data indicate that 54% of non-Hispanic White women are centrally obese while 70% of non-Hispanic Black and 60% of Mexican American women are centrally obese (Wang & Beydoun, 2007). The inequalities in obesity, particularly those that proxy visceral adiposity, may then result in a cascade of health, social, and economic consequences that burden non-White adults with decreased life chances compared to White adults.

Chronic psychosocial stress may play an important role in obesity inequalities. First, research indicates that consumption of high calorie, high saturated fat foods in response to psychological stress results in the release of certain biochemicals known to reduce feelings of stress (Dallman et al., 2003; Dallman et al., 2005). Moreover, psychosocial stress alters metabolism to result in visceral adipose deposition specifically (Dallman et al., 2005). Second, there are racial inequalities in psychosocial stress and social stressors (Jackson et al., 2010; Schulz et al., 2005; Turner, 2009).

However, there are only a handful of empirical studies in which the authors examine the associations between psychosocial stress and racial inequalities in either obesity or the weight-related measures that may capture the development of obesity. For example, chronic stress during adolescence was linked to greater increases in BMI for Black compared to White girls (Tomiyama et al., 2013). Everyday discrimination as a stressor is related to weight-related measures within and across racial groups; notably, however, it does not appear to explain racial inequalities in these measures (Cunningham et al., 2013; Hunte, 2011; Hunte & Williams, 2009; Lewis et al., 2010).

The paucity of empirical literature may be due to the use of stress measures that are not racially-salient and biologically-meaningful. We examine discrimination and vigilant coping style within a cultural racism framework to clarify the ways in which these psychosocial stressors are related to racial inequalities in weight-related outcomes. As we discuss below, cultural racism, through the specific processes of racialization and stigmatization, results in racially-divergent meanings of discrimination and racism for Black and White adults. While a culturally-racialized social environment may present increased exposures to interpersonal discrimination for Blacks compared to Whites, we propose that the overall burden stigmatization of blackness results in chronic vigilance for potential prejudice, discrimination, and racism – and that this vigilance is particularly salient for the health of Blacks.

Furthermore, consistent with the literature on discrimination and health across racial group (Hunte, 2011; Hunte & Williams, 2009; Lewis et al., 2009), we propose that discrimination remains salient for the health of Whites. This salience may be due to the implicit understanding of White privilege and American sense of fairness. Because Whites do not carry the burden of the racial group membership, they perceive unfair treatment as individuals rather than representatives of their group (DiAngelo, 2011; Feagin, 2013; Grillo & Wildman, 1991; Wildman & David, 1994). By placing discrimination and vigilance within the context of cultural racism, we operationalize existing survey measures and develop statistical models that clarify the equivocal nature of the literature on discrimination and inequalities in weight-related measures and provide clues as to the root causes of the overall racial inequalities in obesity.

In the paper, we begin with a discussion of the psychology and sociology literatures on cultural racism. We weave together scholarship not regularly applied to public health literature to suggest that cultural processes – girded by racial inequities in power – result in a racialized social environment in which Black (and other non-White ethnoracial) group members are routinely stigmatized (Fleming et al., 2012; Lamont et al., 2014; Link & Phelan, 2014). The process of racialization results in a shared understanding of the social meanings of race and racial categories within a society (Lamont et al., 2014). Stigmatization results in the natural psychological and emotional vigilance by marginalized group members (Fleming et al., 2012; Goffman, 1974; Lamont & Mizrachi, 2012; Link & Phelan, 2014). We then discuss the concept of racism-related vigilance, developed from the qualitative literature on the burden of racism, capturing anticipatory and ruminative stress (Essed, 1991; Feagin, 1991). Previous work suggests that vigilance, unlike other types of psychosocial stressors and strain, explains racial inequalities in health including hypertension prevalence (Hicken et al., 2014) and sleep difficulty (Hicken et al., 2013a).

Using a probability-based sample of Chicago that includes non-Hispanic White, non-Hispanic Black and Hispanic adults aged 18 years and older, we examine the role of discrimination and vigilance in the racial inequalities in two weight-related measures, BMI and WC. We show that vigilance, as a reflection of the psychological burden of cultural racism, is related to WC for Black but not White women. Furthermore, we show that discrimination, which may reflect the strength of contemporary racialization processes in which Whites are able to view themselves as raceless individuals within a society that promotes equality and fairness, is related to WC for White but not Black women.

BACKGROUND

Cultural Racism in the United States

Racism, defined as:

> [a] *system of dominance, power, and privilege based on racial group designations* … where members of the dominant group create or accept their societal privilege by maintaining structures, ideology, values, and behavior that have the intent or effect of leaving nondominant-group members relatively excluded from power,

> esteem, status and/or equal access to societal resources. (Harrell, 2000, p.43, emphasis added)

is considered by many a bedrock of historical and contemporary American society (Bobo et al., 1997; Bonilla-Silva, 1997, 2010). Racism does not require explicit intent or personal dislike on the part of its dominant actors. Rather, it is woven into our social structure and institutions, allowing for unequal life experiences and chances based on the socially-constructed racial group membership categories.

This working definition includes both the interwoven structural and cultural aspects of racism (Jones, 1997). We focus on the cultural racism which places focus on the socially accepted "ideology, values, and behavior," ultimately set by the dominant power group. Cultural racism is a particularly insidious form of racism as it operates on the level of our shared social subconscious (Carter, 2007; Jones, 1997; Sue, 2003). The processes that comprise cultural racism are invisible to many, but the result is a reified set of ideologies, values, and behaviors that are defined by the dominant racial group, which in the US is the White, Christian, middle-class, male group. Moreover, while the cultural processes that result in the America racial hierarchy are invisible to many, the fact that cultural racism is infused through our institutions (e.g., education, labor) means that there are visible social, political, and economic consequences (Jones, 1997; Lamont et al., 2014). And, with the invisibility of the processes, our institutions appear neutral and rational, with the visible racially unequal consequences apparently arising only from poor ideology, values, and behavior on the part of non-dominant racial groups (Bobo et al., 1997; Bonilla-Silva, 2010; Lamont et al., 2014).

Cultural racism is developed and maintained through multi-level processes. At the micro (individual) level, psychologists have shown that humans use cognitive processes, categorizing and classifying the world around us, in an effort make sense of large amounts of information (Allport, 1979; Macrae et al., 1994). This alone does not drive cultural racism – it is our classification schema as well as the meanings assigned to these categories, that is problematic (Hatzenbuehler et al., 2013; Link & Phelan, 2001). At the macro (societal) level, sociologists discuss notions of symbolic power or the imposition of the dominant class's traditions, behaviors, and values as the standard (Bourdieu, 1984). These symbolic and cultural power inequalities are arguably as strong as the economic and material inequalities more often discussed in sociology (Lamont et al., 2014).

At the meso-level are the processes that link the doxa to the individuals as they navigate the social world. Specifically, two classes of processes – identification and rationalization – are thought to drive racial inequalities in social, economic, and political power, and, we argue, in health (Hatzenbuehler et al., 2013; Lamont et al., 2014; Link & Phelan, 2001). These processes mobilize the dominant classification systems, resulting in a large-scale shared cultural set of meaningful mores and values. Identification processes dynamically set the contemporary shared meanings of a racial group while rationalization processes institutionalize these racial meanings in a way that delinks the original racialized process, making the institutional practices appear neutral (and rational). We focus on the first set of processes here, in the interest of space, as they are more relevant to our specific research

question. Identification processes involves racialization (Omi & Winant, 1994) as the recognition of a phenotype, particularly the constellation of phenotypes that indicate social race (e.g., skin color, hair texture) and assignment of shared meaning to this phenotype. Aspects of cultural racism dynamically shift to fit contemporary social mores through these cultural processes of identification and rationalization. In tandem, identification involves stigmatization (Goffman, 1974; Link & Phelan, 2001) as the process by which groups are labeled, stereotyped, and ultimately marginalized. These cultural processes that dynamically maintain contemporary flavors of cultural racism result in the continual misrecognition of blackness (and whiteness), with visible effects on health and health inequalities.

Misrecognition of Blackness, Discrimination, and Vigilance

Citizens of a democratic society desire more than a fair distribution of resources, but also of the recognition of their humanity and uniqueness (Harris-Perry, 2011). However, in the United States, cultural racism results in a misrecognition of Black men and women – the attachment of crude, stigmatizing stereotypes that mischaracterize their humanity and obscure within group variation (Harris-Perry, 2011). With the misrecognition of Black Americans, and blackness more broadly comes with at least two consequences. First is the increased exposure to prejudice and interpersonal discrimination (Link & Phelan, 2001). Discrimination and its relation to health is well-discussed and we leave the details to several excellent reviews (Lewis et al., 2015; Williams et al., 2012; Williams & Mohammed, 2009; Williams et al., 2008).

A second consequence of cultural racism is the need for Black Americans to develop adaptive strategies to negotiate everyday (White) social space (Allport, 1979; Major & Vick, 2005) – by which we mean the social spaces that Americans inhabit to conduct everyday life such as the workplace and classroom, and even stores, parks, and other public spaces (Feagin, 1991). There is a diverse literature, mostly qualitative, on the thoughts and behaviors of Black Americans as they traverse ordinary life and we highlight three main themes.

First, there is a growing literature on the ways in which Black Americans attend to self-presentation (Della et al., 2002; Fleming et al., 2012; Goffman, 1969; H. Lee & Hicken, 2016; Sue et al., 2008). We highlight two aspects in particular – attention to appearance and attention to speech. For example, a Black male study participant at an American Ivy League school, discussed how he considered his appearance each day before leaving home:

> I kind of find myself thinking a lot before I leave my house, like: Do I look too threatening? Like, maybe I shouldn't wear this, maybe I shouldn't wear that. Sometimes, when I didn't even need my backpack, but I'd carry it with me anyway … (Torres & Charles, 2004, p.124)

Similarly, other studies document how Black men and women speak in certain ways to receive good service or to be taken seriously, using a "white-on-white voice", as one study participant phrased it (Feagin & Sikes, 1994, pp.54–55).

Scholars also argue that there is a level of risk assessment and management when deciding when and where to engage dominant White space. For example, in one study, a Black

physician discussed how he decides when to avoid social obligations, stating that he needs to think about whether it is a personal or professional situation and whether or not he may be truly welcome (Feagin & Sikes, 1994). The researchers of this study noted "the tragic legacy of Black Americans of having to know one's place" and commented on the pain in this participant's words (Feagin & Sikes, 1994, p.275).

Finally, the stigmatizing misrecognition may also result in Black Americans needing to mentally and emotionally prepare themselves for negotiating everyday White social space (Allport, 1979; Major & Vick, 2005). For example, one study participant described how she prepared for parent-teacher conferences with her child's teachers:

> …[I]t's like you get tense. Because you know…I know this person is going to say something that's going to make me, my heart rate [go up], or maybe have to hold back my tears while I'm talking to them… with a White person, you know that some level of racism is going to hop out of their mouth… And so you have to prepare your body for that. (Nuru-Jeter et al., 2009, p.35)

This preparation may be due to previous interpersonal experiences with prejudice and discrimination, but may also be due to vicarious experiences. Furthermore, these vicarious experiences may be with those in one's immediate social network (e.g., sister, neighbor) or, with the rise of smart phones and social media, with any other Black Americans (e.g., Sandra Bland, Tamir Rice). In sum, engagement in chronic vigilant thoughts and behaviors in order for one's humanity to be properly recognized is an important source of racism-related stress.

The Toxic Weight of Chronic Vigilance

Research points to two aspects of stress that may be particularly relevant for racial health inequalities. First, anticipatory stress is the activation of the biological stress response system in anticipation of a potentially stressful situation. Notably, research shows that the *anticipation* of the situation alone – even in the absence of the actual situation– is enough to activate the stress response system. This is a normal, healthy part of human physiology. However, chronic anticipatory stress may result in wear and ultimate dysfunction of the stress response system (McEwen, 1998). Second, ruminative stress occurs with the prolonged cognitive representation of a stressful situation. Ruminative stress can transform an acute stressor (e.g., loss of job) into a chronic stressor that repeatedly activates the biological stress response system (Brosschot et al., 2006; Brosschot et al., 2005).

Cultural racism may result in the need for vigilant thoughts and behaviors – and we propose that these thoughts and behaviors reflect an underlying anticipation and rumination about navigating everyday White social spaces (e.g., work, school, shopping). The small literature in this area supports this notion. First, researchers showed that the anticipation of prejudice resulted in a greater blood pressure reaction compared with the anticipation of a more general stressor (Sawyer et al., 2012). Specifically, Latina college student study participants were asked to give a speech about their qualifications as a lab partner. Some of the students were led to believe that their audiences held racist views about Latino Americans while others were led to believe that their audiences held racial views normative for the campus. The group assigned to the "racist" audience had a markedly greater increase in blood

pressure as they were preparing their speeches compared to the group assigned to the "racially normative" audience (Sawyer et al., 2012). These stress biology changes are reflected in the qualitative literature as well, as exemplified above by the study participant preparing for her parent-teacher conferences.

Second, research suggests that, in samples of Black Americans, chronic vigilance is related to dysfunction of the biological stress response system (Clark et al., 2006) and multiple physical and mental health measures including depressive symptoms, self-rated health, and a count of chronic conditions (H. Lee & Hicken, 2016). Finally, research using probability-based samples suggests that vigilance plays an important role in racial *inequalities* in health. For example, vigilance, but not other types of stressors (e.g., poverty), explained the Black-White inequalities in sleep difficulty (Hicken et al., 2013a), a potentially major determinant of numerous chronic diseases. In other work, researchers reported that when vigilance was low, Black-White inequality in hypertension prevalence was relatively small and explained entirely by hypertension risk factors such as smoking and body mass index (BMI) (Hicken et al., 2014). However, at higher levels of vigilance, the hypertension inequalities were substantially greater and not explained by any of the risk factors (Hicken et al., 2014).

To date there is no work on vigilance and weight-related measures. However, other research on stress and weight-related measures provide support for the notion that vigilance may be positively associated with weight and may furthermore explain racial inequalities in weight. First, research indicates that stress results in metabolic changes that result in visceral adipose deposition (Dallman et al., 2005). Second, others have shown that obesogenic foods result in the release of biochemical that eases feelings of stress (Dallman et al., 2003; Dallman et al., 2005). Finally, research suggests that environmental cues and social mores affect the stress coping approaches adopted by different social groups (Jackson et al., 2010). Specifically, Black women may adopt obesogenic coping behaviors to address stress to preserve mental well-being (Jackson et al., 2010).

We hypothesize that for Black, but not White, adults, chronic vigilance, as a reflection of the burden of racialized stigma, will be related to weight-related measures. We further hypothesize that interpersonal discrimination, as a reflection of the racialized White privilege with the American sense of fairness, will be associated with weight-related measures for White but not Black adults. The small literature on discrimination and weight-related outcomes suggests that discrimination is associated with weight for both Black and White women (Cunningham et al., 2013; Hunte, 2011; Lewis et al., 2011) or perhaps only for White women (Hunte & Williams, 2009). Several studies including only Black adults show that discrimination is associated with weight-related measures (Cozier et al., 2009; Cozier et al., 2014; Vines et al., 2007). However, vigilance was not examined and we hypothesize that, in the face of vigilance, the burden of interpersonal discrimination does not have as strong an impact. Finally, we hypothesize that these associations will be particularly strong with regard to the weight-related measure that more closely proxies the stress-related visceral adipose deposition, WC.

METHODS

Dataset

We used data from the Chicago Community Adult Health Study (CCAHS), a cross-sectional survey designed to examine the biological, social, and environmental correlates of adult physical and mental health. The CCAHS is a multi-stage probability sample of 3,105 adults, aged 18 years and older, living in Chicago. Face-to-face interviews were conducted and direct physical measurements were taken between 2001 and 2003 with a response rate of 71.8%.

Variables

We examine both WC and BMI because, although they are highly correlated, they have been shown to proxy different types of adipose distribution, representing different biological processes. WC and BMI were measured by trained technicians using the standard protocols of the National Health and Nutrition Examination Survey. WC was measured in centimeters using a tape measure just above the hip bone. Weight in kilograms was measured using a calibrated digital scale. Height in meters without shoes was measured using a stick measure. BMI was calculated as weight divided by the square of height.

The vigilance measure was created based on ethnographic research describing how participants anticipated and prepared for racial discrimination (Clark et al., 2006; Essed, 1990; Feagin & Sikes, 1994). A scale was created from responses to the following four questions: In your day-to-day life, how often do you do the following things (1) try to prepare for possible insults from other people before leaving home; (2) feel that you always have to be very careful about your appearance to get good service or avoid being harassed; (3) carefully watch what you say and how you say it; and (4) try to avoid certain social situations and places. Responses were on a Likert-like scale of: 1=at least once a week, 2=a few times a month, 3=a few times a year, 4=less than once a year, and 5=never. When responses were reverse-coded and summed to create a continuous scale with higher values representing higher levels of vigilance within a range of zero to 20, the Cronbach's alpha=0.74. However, we operationalized the vigilance measure into three categories (none, low, high) to reflect the importance of chronic stress as follows: those who reported "never" on all four items were categorized as "none"; those who reported "at least once a week" on at least one item or "a few times a month" on at least two items were categorized as "high"; then all others were categorized as "low".

Everyday discrimination was measured using five questions (Kessler et al., 1999). Respondents were asked if, in their day-to-day lives: (1) s/he is treated with less courtesy or respect than other people, (2) s/he receives poorer service than others at restaurants or stores, (3) people act as if s/he is not smart, (4) people act as if they are afraid of her/him, and (5) s/he was threatened or harassed. Responses were on a Likert-like scale like that applied to vigilance. When responses were reverse-coded and summed to create a continuous scale with higher values representing higher levels of discrimination within a range of zero to 25, the Cronbach's alpha =0.75. However, as with the vigilance measure, we operationalized the discrimination into three categories to reflect the importance of chronic stress as follows:

those who reported “never” on all five items were categorized as “none”; those who reported “at least once a week” on at least one item or “a few times a month” on at least two items were categorized as “high”; then all others were categorized as “low”.

Race/ethnicity was categorized as non-Hispanic White, non-Hispanic Black, Hispanic, and non-Hispanic other (which included American Indian, Asian, and Pacific Islander). Because the last racial/ethnic category comprised only four percent of the sample and was a mixture of races that make interpretation difficult, we report these results in the tables for completeness, but do not discuss them.

Analytic approach

For descriptive analyses, we estimated means with standard errors of continuous variables and percentages of categorical variables by race/ethnicity and gender. Standard errors were estimated rather than standard deviations because the latter could not be estimated with multiply-imputed data. (The multiple imputation is described in the last paragraph of this section). We used t-tests to test for differences by race/ethnicity within gender.

We estimated multivariate associations adjusting for age, education, household income-to-poverty ratio (IPR, household income in dollars standardized to the poverty level for household size and composition from 2000 Census data), and immigrant generation between race/ethnicity and WC or BMI, in separate models. We then estimated models including the focal measures as follows: vigilance [Model 2]; discrimination [Model 3]; vigilance, discrimination [Model 4]; vigilance, interaction between race/ethnicity and vigilance [Model 5]; discrimination, interaction between race/ethnicity group and discrimination [Model 6]; and vigilance, discrimination, interaction between race/ethnicity group and vigilance, interaction between race/ethnicity group and discrimination [Model 7].

We stratified all models by gender due to the literature indicating gender differences in body shape with relation to weight (Karastergiou et al., 2012; Lemieux et al., 1993). We calculated within-ethnoracial group associations between vigilance and discrimination and weight-related outcomes using the ‘margins’ suite of post-estimation commands in STATA 14.0 SE (StataCorp, College Station, TX).

To address the possibility that weight-related discrimination or stigmatization resulted in reverse associations, we estimated the same models, excluding those who reported discrimination due to weight (women: White, n=12; Black, n=3; Hispanic, n=1; men: White, n=5; Black, n=5; Hispanic, n=4). We also estimated models excluding all those who fell into the Class III obese category, defined as a BMI≥40kg/m2 by the National Institutes for Health, which decreased our sample size by 226 (women: White, n=28; Black, n=115; Hispanic, n=34; other, n=1; men: White, n=11; Black, n=23; Hispanic, n=14).

To ensure that our results were not driven by the novel operationalization of the vigilance and discrimination measures, we estimated models using continuous forms of these measures.

We handled missing data on income (n=501) and vigilance (n=11) using multiple imputation using IVEware (University of Michigan, Ann Arbor, MI) via SAS (SAS Institute, Cary, NC)

to create five imputed datasets. We used the multiple imputation suite of commands in STATA, which “adjusts coefficients and standard errors for the variability between imputations according to the combination rules by Rubin (1987)” (Stata Press, 2011, p.43), to analyze the imputed data. All analyses were weighted to account for complex survey design, differential selection into the sample, non-response, and household size. With respect to age, race/ethnicity, and sex, the distribution of the weighted sample and the 2000 Census estimates were comparable. All analyses were conducted in STATA using survey weights that result in estimates that are representative of the racial/ethnic composition of Chicago. Institutional review board approval was granted at the University of Michigan and written informed consent was obtained from all participants.

RESULTS

Our results suggest that these psychosocial stress measures operate in relation to weight for women but not men. Therefore, due to space constraints, we will discuss the results for women here and provide results for men in supplemental tables. Black women had higher mean WC (97 cm) and BMI (31 kg/m2) compared to both Hispanic (92 cm and 32 kg/m2, respectively) and White women (86 cm and 26 kg/m2, respectively, Table 1). Furthermore, Black women also reported the highest level of vigilance; Thirty percent of Black women fell into the high vigilance category, while only nine percent and 16% of White and Hispanic, respectively, fell into this category. This higher vigilance may not simply be due to SES, as the results were qualitatively similar when looking within race, across SES (results available upon request). Similarly, Black women reported higher discrimination; seven percent of Black women fell into the high discrimination category, while only two and three percent of White and Hispanic women, respectively, fell into that category.

In models adjusting for age, education, household poverty, and immigrant generation, Black women showed a 9.0 cm greater mean WC compared to White women (se=1.24, $p<0.001$, Table 2, Model 1). Furthermore, Black women showed a 3.9 kg/m2 greater mean BMI compared to White women (se=0.56, $p<0.001$, Table 2, Model 1). Hispanic women showed only a 6.4 cm greater mean WC compared to white women (se=1.27, $p<0.001$, Table 2, Model 1), but a 3.4 kg/m2 greater mean BMI (se=0.56, $p<0.001$, Table 3, Model1).

Our initial models suggest that, for women as a single group, discrimination, in particular, is an important stressor. For example, when discrimination and vigilance are modeled together, those in the high discrimination category showed a 7.2cm greater WC compared to those in the no discrimination category (se=2.66; p=0.007) (Table 2, Model 4). There was no association between vigilance and WC. This pattern of results was similar when examining BMI (Table 3, Model 4). However, our results suggest that vigilance and discrimination may hold different meanings for weight by racial group that are obscured when examining the mean of all women together. This becomes clearer in models with interactions between racial group and each of the racism-related stress measures. Specifically, White women did not show an association between vigilance and WC but showed a strong positive association between discrimination and WC (Table 2, Model 7). For White women, those in the high discrimination category showed an 11.0 cm greater mean WC compared in the no discrimination category (se=5.31, p=0.040, Table 2, Model 7).

With Black women, there was an association between vigilance and WC – but not discrimination and WC – as shown by the coefficients and standard errors calculated post-estimation. Those in the high vigilance group showed a 3.9 cm greater mean WC compared to those in the no vigilance group (se=1.96, p=0.049, not shown in table form). Interestingly, our results suggest evidence of a nonlinear relation between vigilance and WC. Black women in the low vigilance group showed a 6.1 cm greater mean WC compared to Black women in the no vigilance group (se=1.83, p=0.001, not shown in table form).

Hispanic women did not show an association between either vigilance or discrimination and either WC or BMI (While the standard errors for the interaction coefficients in Tables 2 and 3 are relatively large, in post-estimation calculations, results showed that for this group, there were no associations.)

Our results show suggestive support for the notion that discrimination (for White women) and vigilance (for Black women) are operating through the stress systems which would result in increased visceral fat. In both cases, the standard errors were relatively smaller when examining WC compared to BMI.

In sensitivity analyses, results were nearly the same after excluding those women who fell into the Class III obese category and reported unfair treatment due to weight. Similarly, the pattern of results was nearly identical when operationalizing vigilance and discrimination as continuous variables.

DISCUSSION

Framing our discussions around cultural racism, we examined the relation between the vigilance that may result from cultural racism and racial inequalities in weight-related measures. Our results suggest that vigilance and discrimination have different meanings for health depending on race. For White women, interpersonal discrimination, rather than vigilance, was positively related to WC and BMI. However, for Black women, it was vigilance, rather than discrimination, that was positively related to WC and BMI.

That discrimination is related to health for White women is consistent with the existing literature showing that discrimination is related to health – including obesity – in multi-ethnic samples that include large proportions of White women (Hunte, 2011; Hunte & Williams, 2009; Lewis et al., 2010). The extant literature also shows that discrimination is often associated with weight-related outcomes for Black women (Cozier et al., 2009; Cozier et al., 2014), particularly when the focus is on racial discrimination rather than general discrimination (Cunningham et al., 2013). Notable, however, is that vigilance was not modeled with discrimination in previous work. Indeed, in our models, when vigilance was not included, discrimination was positively related to WC and BMI for Black women. But when these two sources of stress were modeled together, vigilance continued to show a positive relation with both WC and BMI. This may be due to vigilance capturing adaptive strategies documented in the stigma literature in response to cultural racism. Through the stigmatization process of cultural racism, Black women's individual humanity is misrecognized because they carry the burden of broad racial stereotypes. This stigmatization

then may drive the need for chronic vigilance when negotiating everyday social spaces that ultimately trumps the health effects of individual encounters with interpersonal discrimination.

While not the theoretical focus of our paper, we note that our results suggest that neither discrimination nor vigilance was related to weight for Hispanic women. Previous studies are inconclusive regarding the association between discrimination and weight-related measures with some finding no association for Hispanic men or women (Hunte & Williams, 2009) and others finding a positive relationship for Hispanic immigrant women but not for their male counterparts (McClure et al., 2010). These measures for vigilance and discrimination were developed from qualitative and ethnographic work primarily with Black Americans. It is likely that the measures of discrimination and vigilance do not capture the aspects of these constructs that are important for Hispanic women. While Hispanic women reported greater levels of vigilance in this study, it may be that these are not the aspects of vigilance that matter most to health for this group. For example, research suggests that Hispanic Americans may be more attentive to assumptions of their legal or undocumented status, threats of deportation, and victimization due to language differences (Hacker et al., 2011; Vasquez, 2011; Viruell-Fuentes, 2007). Clarifying the aspects of vigilance that are important to the health of this heterogeneous group is an important next research step.

Similarly, our results did not show that either discrimination or vigilance was related to weight for men. This is not to say that discrimination and vigilance do not matter for men's health. Indeed, previous work on vigilance in particularly indicates that it is related to health for men as well as women (Clark et al., 2006; Hicken et al., 2013a; Hicken et al., 2014; LaVeist et al., 2014; H. Lee & Hicken, 2016).What is more likely is that inequalities in weight-related measures capture a chronic stress component in women in particular (Hicken et al., 2013b).

While the pattern of results was qualitatively similar when using WC and BMI, the standard errors were relatively smaller when using WC. It may be that WC better reflects differences in weight-related outcomes that are associated with biological stress processes. WC has been shown to predict both abdominal adiposity and, even more specifically, visceral adiposity, better than BMI (Janssen et al., 2002). Abdominal and visceral adiposity and WC, as opposed to total or subcutaneous adiposity or BMI, have been shown to be more strongly related to social and biological stress processes on the one hand (Epel et al., 2000; Wardle et al., 2011) and then also chronic disease outcomes such as diabetes and cardiovascular disease on the other hand (Despres & Lemieux, 2006; Rexrode et al., 1998).

While this study is the first to examine multiple types of racism-related stress in relation to racial inequalities in weight-related measures, it is not without limitations. First, it is cross-sectional in nature, meaning that we cannot specify a temporal order to the relation between vigilance/discrimination and weight. However, after excluding those who reported weight-related discrimination and those who fell into the highest obesity category, our results did not change. Second, our sample came from Chicago only. However, it was a probability-based sample rather than the more conventional convenience sample used in most other studies on racism-related stress and obesity. Finally, this sample was collected in 2000–2002

and there have been many shifts in the face of racism (Bonilla-Silva, 2010; Haney-Lo?pez). Further research using samples collected during the so-called post-racial years may provide further information on the ways in which cultural racism is related to racial health inequalities, through vigilance and discrimination.

In conclusion, we examine the link between chronic stress and racial inequalities in weight through the lens of cultural racism. Our results suggest that vigilant coping style may be an important marker of the racism-related stress for Black Americans. Furthermore, our results suggest that discrimination is meaningful for health differentially across race, perhaps due to the differential social environments for Blacks and Whites due to cultural racism.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Descriptive means (with standard errors) and percentages for women by ethnoracial group, Chicago Community Adult Health Study, 2000–2002 (N=1807).

	Women						
	Total N=1870	**White N=551**	**Black N=824**	**Hispanic N=455**	**B-W**	**H-W**	**B-H**
Body mass index, kg/m2	28.52	26.05	30.71	29.63	***	***	*
	(.24)	(.32)	(.36)	(.35)			
Waist circumference, cm	91.05	85.52	96.79	92.42	***	***	***
	(.57)	(.84)	(.84)	(.82)			
Vigilance categories (%)					***		***
None	29	35	18	36			
Low (ref)	53	56	52	48			
High	18	9	30	16			
Discrimination (%)					***		***
None	34	37	23	45			
Low (ref)	62	61	70	52			
High	4	2	7	3			
Age, years	43.37	44.95	44.50	39.88		***	***
	(.51)	(.97)	(.68)	(.94)			
Income poverty ratio	2.95	4.41	2.21	1.95	***	***	†
	(.14)	(.30)	(.11)	(.11)			
Education, years	12.88	14.35	12.89	10.45	***	***	***
	(.141)	(.193)	(.137)	(.248)			
Race/ethnicity (%)							
White	37						
Black	35						
Hispanic	25						
Other	3						
Immigrant generation (%)					***	***	***
1st	26	20	2	62			
2nd	13	17	2	24			

	Women						
	Total N=1870	**White N=551**	**Black N=824**	**Hispanic N=455**	**B-W**	**H-W**	**B-H**
3rd or more (ref)	61	64	97	13			

Note: Standard errors are reported due to multiply-imputed data used to obtain estimates.

*** p<.001;

** p<.01;

* p<.05;

† <.1.

Table 2

OLS regression coefficients (and standard errors) for the association between vigilance and discrimination and waist circumference in women, Chicago Community Adult Health Study (N=1870).

	Model						
	--1--	--2--	--3--	--4--	--5--	--6--	--7--
Race/ethnicity							
Non-Hispanic White	ref	ref	ref	ref	ref	ref	ref
Non-Hispanic Black	9.028***	8.693***	8.496***	8.455***	5.899**	10.938***	7.380**
	(1.236)	(1.256)	(1.233)	(1.251)	(1.945)	(2.078)	(2.241)
Hispanic	6.420***	6.179***	6.088***	6.027***	7.475***	7.734***	8.076***
	(1.266)	(1.265)	(1.208)	(1.220)	(1.875)	(1.571)	(1.812)
Other	−2.322	−2.714	−2.850	−3.012	−4.063	.338	−2.253
	(2.103)	(2.044)	(2.045)	(2.033)	(2.699)	(3.276)	(3.093)
Vigilance							
None		ref		ref	ref		ref
Low		2.621**		1.545	2.224		−.336
		(.901)		(1.009)	(1.533)		(1.887)
High		2.503*		.806	1.482		−1.861
		(1.271)		(1.367)	(2.337)		(2.623)
Discrimination							
None			ref	ref		ref	ref
Low			3.530***	3.039**		5.613***	5.869**
			(.899)	(1.017)		(1.462)	(1.826)
High			7.463**	7.215**		9.508†	10.961*
			(2.555)	(2.660)		(4.901)	(5.318)
Black*vigilance interaction							
No vigilance					ref		ref
Low vigilance					4.145†		6.364*
					(2.239)		(2.645)
High vigilance					2.907		5.703

	Model						
	--1--	--2--	--3--	--4--	--5--	--6--	--7--
					(3.024)		(3.266)
Hispanic*vigilance interaction							
No vigilance					ref		ref
Low vigilance					−2.756		−.875
					(2.407)		(2.730)
High vigilance					1.311		2.452
					(3.506)		(3.838)
Black*discrimination interaction							
No discrimination						ref	ref
Low discrimination						−3.177	−4.558 †
						(2.194)	(2.489)
High discrimination						−5.236	−7.414
						(6.226)	(6.602)
Hispanic*discrimination interaction							
No discrimination						ref	ref
Low discrimination						−3.498	−3.594
						(2.171)	(2.527)
High discrimination						3.902	1.755
						(6.980)	(7.545)
Constant	87.114 ***	89.096 ***	88.246 ***	87.706 ***	89.024 ***	86.530 ***	86.329 ***
	(2.845)	(2.576)	(2.505)	(2.542)	(2.729)	(2.578)	(2.635)

All models are adjusted for age, education (in years), household income poverty ratio, and immigrant generation (1st, 2nd, or 3rd and higher).

*** p<.001;

** p<.01;

* p<.05;

† <.1.

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Table 3

OLS regression coefficients for the association between vigilance, discrimination, and body mass index in women, Chicago Community Adult Health Study (N=1870).

	Model						
	--1--	--2--	--3--	--4--	--5--	--6--	--7--
Race/ethnicity							
Non-Hispanic White	ref	ref	ref	ref	ref	ref	ref
Non-Hispanic Black	3.907***	3.731***	3.704***	3.646***	2.912***	4.376***	3.265***
	(.555)	(.568)	(.561)	(.569)	(.844)	(.850)	(.949)
Hispanic	3.400***	3.280***	3.270***	3.221***	3.331***	4.010***	3.720***
	(.560)	(.561)	(.548)	(.552)	(.699)	(.685)	(.707)
Other	−1.158	−1.322 †	−1.344 †	−1.420 †	−1.234	.647	−.303
	(.770)	(.741)	(.761)	(.745)	(1.069)	(1.018)	(1.013)
Vigilance							
None		ref		ref	ref		ref
Low		1.101**		.761 †	.836		−.053
		(.381)		(.419)	(.574)		(.731)
High		1.27*		.668	.972		−.461
		(.542)		(.581)	(1.121)		(1.11)
Discrimination							
None			ref	ref		ref	ref
Low			1.228**	.961*		1.958***	2.017**
			(.380)	(.424)		(.576)	(.731)
High			3.133*	2.872*		5.363	5.750
			(1.269)	(1.305)		(3.635)	(3.633)
Black*vigilance interaction							
No vigilance					ref		ref
Low vigilance					1.251		1.940†
					(.990)		(1.108)
High vigilance					.742		1.868

	Model						
	--1--	--2--	--3--	--4--	--5--	--6--	--7--
					(1.403)		(1.423)
Hispanic*vigilance interaction							
No vigilance					ref		ref
Low vigilance					−.248		.573
					(.895)		(1.054)
High vigilance					.606		1.539
					1.484		1.427
Black*discrimination interaction							
No discrimination						ref	ref
Low discrimination						−.820	−1.258
						(.902)	(1.022)
High discrimination						−3.292	−3.997
						(4.027)	(4.066)
Hispanic*discrimination interaction							
No discrimination						ref	ref
Low discrimination						−1.410	−1.736†
						(.885)	(1.049)
High discrimination						−.945	−1.922
						(4.434)	(4.405)
Constant	27.363***	27.559***	27.402***	27.091***	27.702***	26.743***	26.681***
	(1.367)	(1.256)	(1.208)	(1.224)	(1.300)	(1.252)	(1.261)

All models are adjusted for age, education (in years), household income poverty ratio, and immigrant generation (1st, 2nd, or 3rd and higher).

*** p<.001;

** p<.01;

* p<.05;

† <.1.