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RESEARCH ARTICLE

Intersectionality: An Understudied Framework for Addressing Weight Stigma

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Introduction: Obesity is an ongoing public health concern in the U.S. Weight stigma is linked to a number of obesogenic health outcomes, which complicate obesity treatment and prevention. Despite higher rates of obesity in female and minority populations, little research has examined weight stigma in non-white women and men. This study investigated intersectionality in weight stigma and health-related coping responses to stigmatizing experiences across racial groups.

Methods: In 2015, a total of 2,378 adults completed questionnaires about weight stigma, weight bias internalization, and coping strategies. Analyses were conducted in 2016.

Results: No differences in weight stigma emerged as a function of race or gender, but women reported higher weight bias internalization (B=0.19, p=0.004). Further, black men and women reported less weight bias internalization than white men and women (B=–0.43, p=0.009). Compared with white women, black women were less likely to cope with stigma using disordered eating (B=–0.57, p=0.001), whereas Hispanic women were more likely to cope with stigma using disordered eating (B=0.39, p=0.020). Black men were more likely than white men to cope with stigma via eating (B=–0.49, p=0.017).

Conclusions: Findings highlight that weight stigma is equally present across racial groups, but that groups internalize and cope with stigma in different ways, which exacerbate health risks. Increased research and policy attention should address stigma as an obstacle in prevention and treatment for obesity to reduce weight-based inequities in underserved populations.

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INTRODUCTION

Obesity represents a public health priority in the U.S. that disproportionately affects women and racial minorities.[1] Age-adjusted prevalence of obesity exceeds 50% in black women and 44% in Hispanic women compared with 33% in white women.[1] Weight stigma, societal devaluation on the basis of body weight, is prevalent in the U.S.[2] Experiences and internalization (self-stereotyping based on weight)[3] of weight stigma contribute to high rates of obesity and obesogenic coping strategies independent of BMI.[4] Adults experiencing weight stigma report longitudinal declines in subjective health and increased weight gain,[5,6] suggesting that weight stigma creates significant barriers to obesity prevention and treatment. Further, weight stigma predicts mortality more strongly than other forms of stigma.[7] These outcomes remain regardless of sociodemographic factors and BMI.

Weight stigma has been linked with numerous health consequences independent of sociodemographics. However, this form of stigma is ignored in health research, especially among populations most vulnerable to obesity. Weight stigma uniquely contributes to adverse weight-related health via stress,[8] increased eating,[9] and reduced exercise motivation.[10] Weight stigma and internalization are causally linked with increased caloric consumption and depleted dietary self-efficacy.[9,11] Several decades of

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research have linked weight stigma and internalization with depression, anxiety, binge eating, low self-esteem, and body dissatisfaction independent of sociodemographics and other forms of stigma.[2,12–16] Stress responses to weight stigma complicate cardiometabolic disorders already associated with obesity, by inducing physiological reactivity.[17,18] Collectively, this evidence illustrates how weight stigma and internalization hinder prevention and treatment, similar to stigma-induced barriers present among other stigmatized diseases.[16,19]

Despite higher prevalence of obesity in black and Hispanic women, it is common for weight stigma samples to be 70%–95% white.[4,9,13] Often race is included as a control variable rather than meaningfully considered, which misses valuable information about stigma in populations most affected by obesity. Notable exceptions exist: Among adolescents, two studies found no differences in weight stigma among black, Hispanic, and white adolescents[20,21] and one found higher stigma experiences in white adolescents.[22] Only two adult studies examined race and weight stigma. Using national samples, these studies found high rates of weight discrimination in black and white women,[23,24] but no racial differences in weight-based employment discrimination. No studies have systematically examined the effects of race and gender on weight stigma experiences in adults (aside from workplace discrimination), nor has research examined intersectional differences in coping. This lack of diversity in the literature is concerning from both a public health and social justice perspective. In failing to consider racial differences in weight stigma, internalization, and coping, researchers miss the opportunity to understand how multiple social identities interact at the social and structural levels to influence obesity.

Intersectionality[25] involves examining multiple, interconnected social categories (e.g., race, gender). Advantages and disadvantages associated with each social category interact at individual and structural levels to affect health.[26] For example, a black woman may be categorized as "black," "female," or both. Each social category provides certain advantages or disadvantages, though the impact of categories is not simply additive (black + female).[27,28] Considering the ways in which multiple identities interact and combine within an individual to produce or protect against health risks is both important yet understudied in weight stigma. Multiple devalued social categories may induce "double jeopardy" or cumulative disadvantages that outweigh the disadvantage of either social category alone.[29–31] Further, buffering effects may occur when possessing multiple social categories protect an individual from disadvantages associated with a single social category.[29] Failure to systematically examine race and gender in weight stigma means missing protective or deleterious health factors.[26,28,29]

Weight stigma may be experienced or internalized differently in non-white populations. Black and Hispanic women are more likely to underestimate BMI, and describe having an overweight or obese BMI as healthy or normal.[32] Rates of body dissatisfaction are similar among Asian, Hispanic, and white women, but lower in black women.[33] Further, Asian and white women endorse similar beauty ideals (e.g., tall, thin), but black women find these ideals less self-relevant.[34] Although Hispanic and white women share similar anti-fat attitudes,[35] black women fear being fat less and place less importance on being thin.[36] These findings suggest black women may be buffered from the negative effects of stigma, whereas Asian women may experience effects similar to white women. Hispanic women could be at risk for double jeopardy because stereotypes about obesity are similar to racial stereotypes (e.g., lazy, unintelligent).[37,38] The same is true for black men and women, but Hispanic women do not have the same potential buffers against stigma.[33–36] Although suggestive, research has yet to systematically explore racial differences in stigma, internalization, or coping.

Very few studies have examined how people cope with weight stigma and weight bias internalization. Limited evidence suggests the most common strategies for coping with weight stigma and internalization reinforce emotional distress and obesogenic behavior.[13,39,40] For example, higher levels of depression exist in those who cope with stigma via negative emotions and 79% of women cope with distressing weight bias experiences and internalization via binge or emotional eating.[11,13] Thus, identifying coping strategies for experienced and internalized stigma is important because they contribute to weight-based inequities and impede treatment and prevention.

This study fills notable gaps in the literature by (1) examining experienced and internalized weight stigma in Asian, black, Hispanic, and white men and women; and (2) examining coping strategies in response to stigma as a function of race and gender. Given the pervasive nature of weight stigma, coping but not stigma was expected to vary by race and gender. Taking into account the small literature suggesting potential buffering effects in black women, black women were expected to have lower scores on maladaptive coping, and Hispanic women were predicted to have similar or higher scores on maladaptive coping strategies relative to white women.

METHODS

Study Population

This study was approved by the University of Connecticut IRB. In 2015 (data analysis, 2016), a diverse sample of 3,088 Americans was drawn from a national survey panel administered by Survey

Sampling International, which includes >2 million active research respondents.[41] Panelists were aged ≥18 years, and quotas were established for sex, income groups, and race, to approximate U.S. Census characteristics. Participants were excluded for failing to answer any questions (n=52); missing or improbable values for self-reported anthropometric variables (n=336); or missing demographic data (n=322), resulting in a total sample of N=2,378.

Experienced and internalized weight stigma were examined in the full sample. Coping strategies were examined in a subsample of participants who reported stigma (n=956), as only those experiencing stigma were asked about coping.

Measures

Participants reported their age, sex, race, ethnicity, education, income, height, and weight. Self-reported height and weight were used to calculate each participant's BMI.[42]

Following previous research,[43] weight stigma was measured using three (*yes*/*no*) questions in which participants indicated whether they had ever been teased, treated unfairly, or discriminated against because of their weight. Participants who answered *yes* to any of the three questions were classified as having experienced stigma.

Weight bias internalization was measured using the Modified Weight Bias Internalization Scale,[3] which assessed the extent to which participants stereotype and devalue themselves about their body weight. In line with recent evidence on the psychometric properties of this measure,[44,45] participants responded to a modified ten-item version on a scale of 1 (*strongly disagree*) to 7 (*strongly agree*, M=3.32, SD=1.48, α=0.94).

Participants who reported prior experiences with weight stigma (n=956) responded to 17 questions regarding how often they used different coping strategies in response to weight stigma on a scale ranging from 1 (*never*) to 5 (*very often*).[13,46] Coping strategies were divided into four subscales (Table 1): disordered eating (α=0.80); negative emotions (α=0.86); eating (α=0.80); and avoidance (α=0.84).

Statistical Analysis

Weight stigma was examined using binary logistic regression; weight bias internalization and coping were examined using linear regressions controlling for SES (income, education), age, and BMI. Coping models included experienced and internalized stigma. Dummy variables for race compared Asian, black, and Hispanic participants with a white reference group. Men served as the reference group for gender. Interaction variables were constructed by multiplying dummy variables for race (white=0, focal group=1) and gender (male=0, female=1). The intersections of race and gender were examined because prior evidence suggested that body perceptions and attitudes differ in meaningful ways between men and women and among Asian, black, Hispanic, and white individuals.[32–38] Following guidelines for examining moderation in multiple regression,[47,48] interactions were interpreted by examining simple effects.

RESULTS

Participants (50.3% women) had a mean age of 44.09 years (SD=16.82) and an average BMI of 26.65 (SD=5.74). The subsample reporting weight stigma (n=956) relative to those not experiencing stigma was slightly younger, more likely to be female, had higher BMI scores, and had a lower average income (corresponding to $50,000–$99,000 vs $25,000–$75,000). There were no race or education differences between the samples. Sample characteristics and sample comparisons are summarized in Table 2.

A large portion of the sample (40.7%) experienced weight stigma. Table 3 presents results for the logistic regression on experienced weight stigma by SES, age, BMI, race, and gender. Greater likelihood of experienced weight stigma was present among younger individuals, participants with higher BMI, individuals with greater education, individuals with lower income, and individuals with higher scores on internalization. No effects of gender, race, or interactions emerged for experienced stigma. A linear regression on weight bias internalization by SES, race, age, and gender (Table 4) showed higher levels of internalized weight bias among younger individuals; women; individuals identifying as white (relative to Hispanic/Latino); individuals reporting more weight stigma; and individuals with higher BMI. Black participants reported lower internalization scores, though the effect was moderated by gender. Although both black men (B= −0.20, β= −0.05, p=0.048) and black women (B= −0.63, β= −0.12, $p<0.001$) reported lower scores on internalized stigma relative to white participants, the effect was larger for black women. Taken together, these results indicate that women and white individuals were more likely to internalize weight stigma, but race and gender did not predict experienced weight stigma.

Among participants who experienced weight stigma, linear regressions were conducted on coping (disordered eating, negative emotions, eating, avoidance) by SES, age, BMI, experienced stigma, weight bias internalization, race, and gender (Table 4).

Coping via disordered eating was less likely to be used in response to stigma among older participants and individuals with higher BMI but was more likely to be endorsed as a coping strategy among individuals who reported experienced or internalized stigma. Significant interactions emerged between race and gender among black and Hispanic participants, but not Asian participants. Simple effects indicated no relationship between race and disordered eating among black men relative to white men (B=0.22, β=0.08, p=0.058). However, black women were less likely to engage in disordered eating relative to white women (B= −0.35, β= −0.10, p=0.009). Similarly, no relationship between disordered eating and race emerged among Hispanic men relative to white men (B= −0.11, β= −0.04, p=0.303), but Hispanic women were more likely to engage in disordered eating relative to white women (B=0.28, β=0.08, p=0.038).

Table 1A. Descriptive Statistics for Individual Coping Items

Items	Total, M (SD)	Total		Asian	
		Male, M (SD)	Female, M (SD)	Male, M (SD)	Female, M (SD)
Coping via disordered eating					
I tried using diet pills to lose weight.	2.17 (1.38)	2.07 (1.34)	2.25 (1.42)	1.68 (1.09)	2.15 (1.26)
I tried starving myself to lose weight.	2.45 (1.43)	2.30 (1.37)	2.57 (1.48)	2.23 (1.23)	2.67 (1.41)
I made myself vomit after I ate.	1.65 (1.19)	1.67 (1.22)	1.63 (1.17)	1.82 (1.33)	2.11 (1.37)
I became obsessed with my weight.	2.84 (1.39)	2.67 (1.31)	2.98 (1.44)	2.82 (1.26)	2.89 (1.55)
Coping via negative affect					
I felt mostly angry.	2.81 (1.30)	2.72 (1.34)	2.88 (1.27)	2.41 (1.40)	2.48 (1.19)
I felt mostly sad and depressed.	3.10 (1.35)	2.88 (1.37)	3.28 (1.31)	2.68 (1.32)	2.74 (1.51)
I felt worse about myself.	3.23 (1.34)	2.96 (1.35)	3.46 (1.30)	3.05 (1.53)	3.04 (1.48)
I felt badly about my body.	3.67 (1.15)	3.39 (1.15)	3.91 (1.11)	3.36 (1.05)	3.22 (1.37)
It didn't really bother me.[a]	3.72 (1.24)	3.43 (1.27)	3.96 (1.17)	3.14 (1.25)	3.85 (1.10)
I felt afraid.	2.32 (1.34)	2.31 (1.33)	2.34 (1.35)	2.68 (1.29)	2.59 (1.47)
It made me feel bad about my body.	3.45 (1.30)	3.19 (1.28)	3.66 (1.27)	3.05 (1.36)	3.37 (1.33)
Coping via eating					
I tended to eat more food.	2.86 (1.24)	2.79 (1.23)	2.93 (1.25)	3.05 (1.50)	3.04 (1.37)
I would binge/overeat because I was upset.	2.61 (1.41)	2.45 (1.38)	2.75 (1.42)	2.05 (1.36)	2.70 (1.32)
Coping via avoidance					
I avoided participating in physical activities.	2.68 (1.41)	2.56 (1.41)	2.78 (1.40)	2.32 (1.32)	2.74 (1.32)
I avoided going to the gym.	2.58 (1.43)	2.50 (1.43)	2.66 (1.43)	2.45 (1.34)	2.78 (1.28)
I avoided eating in front of other people.	2.78 (1.37)	2.55 (1.34)	2.97 (1.37)	2.32 (1.32)	2.52 (1.28)
I didn't feel like exercising.	3.00 (1.34)	2.90 (1.31)	3.09 (1.35)	2.73 (1.24)	2.78 (1.40)

Note: Items mirror coping previously reported in the literature.[13,46] All items ranged from 1 (*never*) to 5 (*very often*).
[a]Reverse scored.

Table 1B. Descriptive Statistics for Individual Coping Items

	Black		Hispanic		White	
Items	**Male, M (SD)**	**Female, M (SD)**	**Male, M (SD)**	**Female, M (SD)**	**Male, M (SD)**	**Female, M (SD)**
Coping via disordered eating						
I tried using diet pills to lose weight.	2.21 (1.42)	1.50 (0.93)	2.00 (1.24)	2.61 (1.51)	2.10 (1.38)	2.32 (1.44)
I tried starving myself to lose weight.	2.51 (1.45)	1.96 (1.36)	2.18 (1.34)	2.88 (1.47)	2.30 (1.37)	2.62 (1.48)
I made myself vomit after I ate.	1.84 (1.39)	1.54 (1.01)	1.59 (1.16)	1.98 (1.44)	1.63 (1.18)	1.57 (1.13)
I became obsessed with my weight.	2.62 (1.33)	2.77 (1.33)	2.51 (1.33)	3.15 (1.38)	2.74 (1.31)	2.99 (1.46)
Coping via negative affect						
I felt mostly angry.	2.61 (1.44)	2.70 (1.35)	2.73 (1.37)	3.14 (1.34)	2.79 (1.29)	2.91 (1.25)
I felt mostly sad and depressed.	2.72 (1.40)	2.91 (1.48)	2.81 (1.45)	3.33 (1.21)	2.99 (1.33)	3.37 (1.27)
I felt worse about myself.	2.86 (1.40)	2.96 (1.37)	2.82 (1.36)	3.37 (1.29)	3.05 (1.31)	3.57 (1.25)
I felt badly about my body.	3.43 (1.18)	3.52 (1.22)	3.21 (1.19)	3.88 (1.11)	3.46 (1.13)	4.01 (1.05)
It didn't really bother me.[a]	3.41 (1.45)	3.88 (1.16)	3.50 (1.20)	3.69 (1.29)	3.44 (1.24)	4.01 (1.16)
I felt afraid.	2.32 (1.44)	2.14 (1.42)	2.36 (1.45)	2.55 (1.35)	2.24 (1.25)	2.32 (1.33)
It made me feel bad about my body.	3.15 (1.31)	3.18 (1.38)	3.16 (1.31)	3.55 (1.17)	3.23 (1.26)	3.77 (1.25)
Coping via eating						
I tended to eat more food.	2.89 (1.39)	2.77 (1.11)	2.67 (1.17)	3.06 (1.14)	2.78 (1.18)	2.93 (1.27)
I would binge/overeat because I was upset.	2.70 (1.58)	2.38 (1.37)	2.33 (1.37)	2.86 (1.31)	2.46 (1.31)	2.79 (1.45)
Coping via avoidance						
I avoided participating in physical activities.	2.64 (1.43)	2.50 (1.36)	2.56 (1.44)	2.80 (1.40)	2.55 (1.40)	2.82 (1.42)
I avoided going to the gym.	2.51 (1.42)	2.59 (1.36)	2.49 (1.43)	2.53 (1.34)	2.50 (1.45)	2.68 (1.47)
I avoided eating in front of other people.	2.64 (1.41)	2.64 (1.38)	2.54 (1.24)	2.90 (1.43)	2.54 (1.37)	3.06 (1.36)
I didn't feel like exercising.	2.85 (1.35)	2.75 (1.32)	2.72 (1.37)	2.96 (1.24)	3.02 (1.28)	3.17 (1.36)

Note: Items mirror coping previously reported in the literature.[13,46] All items ranged from 1 (*never*) to 5 (*very often*).
[a]Reverse scored.

Table 2. Sample Characteristics

Variables	Total sample	Participants experiencing stigma	*a*	*t*	χ^2
Age, M (SD)	**44.09 (16.82)**	**39.64 (15.54)**		**10.83*****	
BMI, M (SD)	**26.65 (5.74)**	**27.69 (6.66)**		**−7.27*****	
Weight bias internalization, M (SD)	**2.79 (1.31)**	**4.10 (1.38)**	**0.94**	**−23.27*****	
Coping: Disordered eating		2.27 (1.07)	0.80		
Coping: Negative emotions		3.19 (0.95)	0.86		
Coping: Avoidance		2.76 (1.15)	0.84		
Coping: Eating		2.74 (1.23)	0.83		
BMI category, *n* (%)					**118.12*****
Underweight	127 (5.3)	71 (7.4)			
Normal weight	893 (37.6)	297 (31.1)			
Overweight	769 (32.3)	252 (26.4)			
Obese	589 (24.8)	336 (35.1)			
Sex, *n* (%)					**10.97*****
Female	1,195 (50.30)	520 (54.40)			
Male	1,183 (49.70)	436 (45.60)			
Race/ethnicity, *n* (%)					2.49
White, non-Hispanic, non-Latino	1,539 (64.70)	625 (65.40)			
Latino/Hispanic	391 (16.40)	152 (15.90)			
Black or African American	308 (13.00)	130 (13.60)			
Asian or Pacific Islander	140 (5.90)	49 (5.10)			
Income, *n* (%)					**29.60*****
<$25,000	348 (14.60)	172 (18.00)			
$25,000–$49,999	595 (25.00)	257 (26.90)			
$50,000–$74,499	500 (21.00)	198 (20.70)			
$75,000–$99,999	421 (17.70	159 (16.60)			
$100,000–$124,999	198 (8.30)	75 (7.80)			
≥$125,000	316 (13.30)	95.00 (9.90)			
Education, *n* (%)					10.41
Less than high school or GED	30 (1.30)	12 (1.30)			
High school or GED	363 (15.30)	136 (14.20)			
Vocational/technical school (2 years)	108 (4.50)	40 (4.20)			
Some college	640 (26.90)	286 (29.90)			
College graduate	823 (34.60)	334 (34.90)			
Postgraduate degree or higher	414 (17.40)	148 (15.50)			
Experienced weight stigma, *n* (%)					
Experienced no stigma	1,411 (59.30)				
Experienced stigma	967 (40.70)				

Note: Boldface indicates statistical significance (***$p < 0.001$). The *t* and χ^2 statistics compare the sample experiencing stigma to those who did not experience stigma. The total sample was 2,378. Participants experiencing stigma involves the subsample of participants who reported experiencing any weight stigma (*n*=956).
GED, General Educational Development test.

Women and individuals with higher scores on experienced and internalized stigma were more likely to cope via negative emotions. No effects of race or interactions emerged for coping with stigma via negative emotions.

Younger individuals, participants who experienced and internalized weight stigma, and those reporting higher income were more likely to cope via eating. Black participants were more likely than whites to cope with stigma via eating, but the effect was moderated by gender. Simple effects suggested no relationship between coping via eating and race among black women relative to white women (B= −0.15, β= −0.04, p=0.339); however, black men were significantly more likely to cope via eating than white men (B=0.28, β=0.09, p=0.035).

Coping via avoidance was higher among individuals who experienced or internalized weight stigma. No significant relationships on avoidance coping emerged for gender, race, or interactions.

Table 3. Logistic Regression on Any Experienced Weight Stigma by Race and Gender

Variables	*B*	Wald	*p*-value	OR
Age	**−0.02**	**51.17**	**0.000**	**0.98**
BMI	**0.04**	**16.90**	**0.000**	**1.04**
Income	**−0.13**	**15.00**	**0.000**	**0.88**
Education	**0.14**	**11.03**	**0.001**	**1.15**
Female (ref. male)	0.01	0.00	0.952	1.01
Black	−0.20	1.08	0.299	0.82
Asian	−0.27	0.80	0.372	0.76
Hispanic/Latino	−0.25	2.07	0.150	0.78
Weight bias internalization	**0.60**	**259.22**	**0.000**	**1.82**
Female X Black	0.34	1.22	0.269	1.40
Female X Asian	−0.09	0.05	0.822	0.91
Female X Hispanic	0.06	0.04	0.844	1.06

Note: Boldface indicates statistical significance ($p < 0.05$). Results were the same regardless of whether a summed measure of experienced stigma is used versus a binary any experienced stigma.

DISCUSSION

This study represents the first systematic examination of weight stigma, weight bias internalization, and coping at the intersection of race and gender. The aim of this study was to better understand experiences of weight stigma and coping strategies among individuals who are disproportionately affected by obesity[1] yet underrepresented in research. Similar to others,[2,23,24] these results suggest women score higher on weight bias internalization relative to men, but this is the first study to suggest a relationship between race and weight bias internalization. These results indicate less internalization among Hispanic participants (relative to white participants); black relative to white men and women; but similar internalization scores among Asian and white participants.

The similarities of experienced weight stigma among racial groups are valuable findings, as they suggest that weight stigma is not simply a white women's issue.[49–51] Indeed, these results suggest that weight stigma may be experienced equally across groups, though internalized less among black and Hispanic (relative to white) individuals. Given higher rates of obesity, similar reports of experienced stigma, and lower scores on stigma internalization among black and Hispanic individuals, these findings underscore the need for greater inclusion of diversity in studies of weight stigma.[4,9,13] Further, given the differential pattern of results in experienced versus internalized weight stigma, more research comparing these two measures of weight stigma is necessary to understand the unique or overlapping effects of each construct on health and coping.

This study also contributes new insights to the relatively small literature on coping with weight stigma, highlighting differences in coping strategies across racial groups. Black women were less likely to respond to stigma with disordered eating relative to white women. Together with the finding that black women have lower rates of weight bias internalization, these results suggest that black women may be buffered from the negative impact of stigma despite higher rates of obesity among black women. Previous research suggests that black women have lower rates of body dissatisfaction,[33] perceive an overweight BMI as a normal-weight BMI,[32] and hold fewer anti-fat attitudes[35] relative to white women. These factors likely contribute to lower internalization scores among black women despite higher obesity rates and similar stigma experiences relative to white women. They may explain why black women were less likely to engage in disordered eating behaviors relative to white women. This pattern of results highlights the importance of including both diversity and resources to address weight stigma in public health approaches to obesity.

Black men were more likely to cope with stigma via eating relative to white men, despite having lower scores on internalization. Further, Hispanic women were more likely to engage in disordered eating to cope with stigma relative to white women despite lower internalization scores among Hispanic relative to white participants. Taken together, these findings suggest that some groups may be responding to stigma in ways that reinforce obesity and unhealthy eating behaviors despite lower internalization, which may place these groups at risk for double jeopardy. Though these findings are important, this study represents only the first systematic investigation of the role of race, gender, and coping as they relate to weight stigma and internalization. More work is needed to clarify the ways in which groups cope with weight stigma (which may protect or exacerbate consequences of stigma) to effectively inform treatment

Table 4. Linear Regressions on Weight Bias Internalization and Coping Strategies in Response to Weight Stigma by Race and Gender

Variables	R^2	*df*	*F*	*p*-value	*B*	*β*	*p*-value
Weight bias internalization	**0.31**	**12, 2323**	**87.27**	**0.000**			
Age					**−0.02**	**−0.22**	**0.000**
Female (ref. male)					**0.19**	**0.06**	**0.004**
Black					**−0.21**	**−0.05**	**0.043**
Asian					−0.26	−0.04	0.091
Hispanic/Latino					**−0.23**	**−0.06**	**0.014**
BMI					**0.06**	**0.23**	**0.000**
Income					−0.01	−0.01	0.601
Education					−0.03	−0.03	0.181
Sum experienced stigma					**0.53**	**0.39**	**0.000**
Female X Black					**−0.43**	**−0.06**	**0.009**
Female X Asian					0.33	0.04	0.133
Female X Hispanic					−0.05	−0.01	0.727
Coping via disordered eating	**0.36**	**13, 941**	**40.73**	**0.000**			
Age					**−0.01**	**−0.07**	**0.018**
Female (ref. male)					0.06	0.03	0.380
Black					0.20	0.06	0.094
Asian					−0.15	−0.03	0.429
Hispanic/Latino					−0.11	−0.04	0.291
BMI					**−0.02**	**−0.13**	**0.000**
Income					0.03	0.05	0.105
Education					0.03	0.03	0.288
Sum experienced stigma					**0.18**	**0.15**	**0.000**
Weight bias internalization					**0.40**	**0.52**	**0.000**
Female X Black					**−0.57**	**−0.12**	**0.001**
Female X Asian					0.21	0.03	0.412
Female X Hispanic					**0.39**	**0.08**	**0.020**
Coping via negative emotions	**0.053**	**13, 941**	**79.47**	**0.000**			
Age					0.00	−0.01	0.759
Female (ref. male)					**0.26**	**0.14**	**0.000**
Black					−0.02	−0.01	0.820
Asian					−0.06	−0.02	0.669
Hispanic/Latino					−0.07	−0.03	0.370
BMI					0.00	−0.02	0.507
Income					0.02	0.03	0.301
Education					−0.01	−0.02	0.457
Sum experienced stigma					**0.24**	**0.22**	**0.000**
Weight bias internalization					**0.41**	**0.59**	**0.000**
Female X Black					−0.23	−0.06	0.076
Female X Asian					−0.19	−0.03	0.346
Female X Hispanic					0.03	0.01	0.835
Coping via eating	**0.33**	**13, 941**	**35.82**	**0.000**			
Age					**−0.01**	**−0.07**	**0.019**
Female (ref. male)					0.09	0.04	0.292
Black					**0.29**	**0.08**	**0.037**
Asian					−0.07	−0.01	0.754
Hispanic/Latino					−0.15	−0.04	0.228
BMI					0.00	0.02	0.420
Income					**0.05**	**0.06**	**0.036**
Education					−0.01	−0.01	0.851
Sum experienced stigma					**0.29**	**0.20**	**0.000**

(continued on next page)

Table 4. Linear Regressions on Weight Bias Internalization and Coping Strategies in Response to Weight Stigma by Race and Gender *(continued)*

Variables	R^2	*df*	*F*	*p*-value	*B*	*β*	*p*-value
Weight bias internalization					**0.40**	**0.45**	**0.000**
Female X Black					**−0.49**	**−0.09**	**0.017**
Female X Asian					0.20	0.03	0.515
Female X Hispanic					0.25	0.05	0.208
Coping via avoidance	**0.37**	**13, 941**	**42.27**	**0.000**			
Age					0.00	0.02	0.527
Female (ref. male)					0.13	0.06	0.091
Black					0.08	0.02	0.537
Asian					−0.11	−0.02	0.592
Hispanic/Latino					−0.06	−0.02	0.585
BMI					0.00	0.02	0.587
Income					0.04	0.06	0.056
Education					−0.04	−0.04	0.185
Sum experienced stigma					**0.30**	**0.23**	**0.000**
Weight bias internalization					**0.41**	**0.49**	**0.000**
Female X Black					−0.23	−0.05	0.210
Female X Asian					0.08	0.01	0.770
Female X Hispanic					−0.02	0.00	0.922

Note: Boldface indicates statistical significance ($p < 0.05$). Weight bias internalization (scale: 1=strongly disagree to 7=strongly agree) examined included the total sample (N=2,378). The coping measures (scale: 1=never to 5=very often) analyses included the subsample of participants who reported experiencing any obesity stigma (n=956).

and prevention efforts. Most obesity and weight-loss interventions fail to consider the impact of weight stigma on health or weight-related outcomes. These findings suggest that public health approaches to obesity should recognize the impact of stigma on obesity and focus on the inclusion of adaptive, healthy strategies to cope with experienced and internalized stigma. Further, shifting focus in treatment away from weight toward an active lifestyle and balanced diet could serve to both encourage better treatment outcomes and reduce stigma experienced by patients.

Limitations

Several limitations of this study should be noted. First, participants were not asked about their experiences with race or sex discrimination. Future work should examine the impact that multiple forms of discrimination may have on weight-related health. Some buffering effects were found in black women and double-jeopardy effects in Hispanic women and black men; however, more research is needed to understand racial differences and protective mechanisms, including policy-level protections, which may impact stigma processes. Examining race and gender represents an important first step in incorporating intersectionality research into the field of weight stigma, but more research is needed to fully understand the impact of additional contexts or identities (e.g., social class, weight status) on stigma, coping, and health. The current assessment of coping strategies focused on maladaptive coping responses that may contribute to obesity and impede prevention efforts. Future research should examine a broader range of coping strategies and stigma experiences using both a qualitative and quantitative strategies. These results indicated a positive relationship between education and experienced stigma, but a negative relationship between income and experienced stigma. Consistent negative associations were found between age and stigma as well as coping strategies. Similar findings have emerged in previous work,[2] but more research is needed to understand the relationships between SES, age, and stigma. Participants self-reported all data. Although this introduces potential reporting bias, national studies have found high concordance rates between self-reported and measured height and weight in adults.[52,53] Finally, the cross-sectional nature of this study precludes directional inferences, and longitudinal work is needed to identify the impact of coping responses on health outcomes over time.

CONCLUSIONS

Weight stigma is a social injustice and a public health issue[16]; in addition to weight-based inequities

documented in multiple domains of living,[38] this form of stigma creates significant barriers in public health efforts to improve weight-related health. Experiencing weight stigma induces obesogenic behaviors[9,10]; increases risk of weight gain[5,7]; and is associated with poor psychological health,[12–16] disease burden,[54] and mortality.[7,54] Despite this evidence, stigma is rarely considered as an obstacle that may interfere with broad-level public health approaches to address obesity. Given this study found no racial differences in experienced stigma but important differences in internalized stigma and coping strategies, these results underscore the importance of increasing diversity in research samples beyond simply including race as a control variable. Without systematic examinations of race in weight stigma, researchers fail to understand weight-based inequities. The results further highlight the need for increased attention to identify effective coping strategies that can help buffer against the harmful heath implications of stigma for those who are vulnerable targets of this pervasive bias.

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REFERENCES

1. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011-2012. *JAMA*. 2014; 311(8):806–814. https://doi.org/10.1001/jama.2014.732.
2. Puhl RM, Andreyeva T, Brownell KD. Perceptions of weight discrimination: prevalence and comparison to race and gender discrimination in America. *Int J Obes*. 2008;32(6):992–1000. https://doi.org/10.1038/ijo.2008.22.
3. Pearl RL, Puhl RM. Measuring internalized weight attitudes across body weight categories: validation of the modified weight bias internalization scale. *Body Image*. 2014;11(1):89–92. https://doi.org/10.1016/j.bodyim.2013.09.005.
4. Tomiyama AJ. Weight stigma is stressful: a review of evidence for the cyclic obesity/weight-based stigma model. *Appetite*. 2014;82:8–15. https://doi.org/10.1016/j.appet.2014.06.108.
5. Sutin AR, Stephan Y, Carretta H, Terracciano A. Perceived discrimination and physical, cognitive, and emotional health in older adulthood. *Am J Geriatr Psychiatry*. 2015;23(2):171–179. https://doi.org/10.1016/j.jagp.2014.03.007.
6. Jackson SE, Beeken RJ, Wardle J. Perceived weight discrimination and changes in weight, waist circumference, and weight status. *Obesity (Silver Spring)*. 2014;22(12):2485–2488. https://doi.org/10.1002/oby.20891.
7. Sutin AR, Stephan Y, Terracciano A. Weight discrimination and risk of mortality. *Psychol Sci*. 2015;26(11):1803–1811. https://doi.org/10.1177/0956797615601103.
8. Hunte HER, Williams DR. The association between perceived discrimination and obesity in a population-based multiracial and multiethnic adult sample. *Am J Public Health*. 2009;99(7):1285–1292. https://doi.org/10.2105/AJPH.2007.128090.
9. Vartanian LR, Porter AM. Weight stigma and eating behavior: a review of the literature. *Appetite*. 2016;102:3–14. https://doi.org/10.1016/j.appet.2016.01.034.
10. Vartanian LR, Novak SA. Internalized societal attitudes moderate the impact of weight stigma on avoidance of exercise. *Obesity (Silver Spring)*. 2011;19(4):757–762. https://doi.org/10.1038/oby.2010.234.
11. Puhl RM, Moss-Racusin CA, Schwartz MB. Internalization of weight bias: implications for binge eating and emotional well-being. *Obesity (Silver Spring)*. 2007;15(1):19–23. https://doi.org/10.1038/oby.2007.521.
12. Friedman KE, Ashmore JA, Applegate KL. Recent experiences of weight-based stigmatization in a weight loss surgery population: psychological and behavioral correlates. *Obesity (Silver Spring)*. 2008;16(suppl 2):S69–S74. https://doi.org/10.1038/oby.2008.457.
13. Puhl RM, Brownell KD. Confronting and coping with weight stigma: an investigation of overweight and obese adults. *Obesity (Silver Spring)*. 2006;14(10):1802–1815. https://doi.org/10.1038/oby.2006.208.
14. Rosenberger PH, Henderson KE, Bell RL, Grilo CM. Associations of weight-based teasing history and current eating disorder features and psychological functioning in bariatric surgery patients. *Obes Surg*. 2007;17(4):470–477. https://doi.org/10.1007/s11695-007-9082-6.
15. Hatzenbuehler ML, Keyes KM, Hasin DS. Associations between perceived weight discrimination and the prevalence of psychiatric disorders in the general population. *Obesity (Silver Spring)*. 2009; 17(11):2033–2039. https://doi.org/10.1038/oby.2009.131.
16. Puhl RM, Heuer CA. Obesity stigma: important considerations for public health. *Am J Public Health*. 2010;100(6):1019–1028. https://doi.org/10.2105/AJPH.2009.159491.
17. Schvey NA, Puhl RM, Brownell KD. The stress of stigma: exploring the effect of weight stigma on cortisol reactivity. *Psychosom Med*. 2014; 76(2):156–162. https://doi.org/10.1097/PSY.0000000000000031.
18. Major B, Eliezer D, Rieck H. The psychological weight of weight stigma. *Soc Psychol Personal Sci*. 2012;3(6):651–658. https://doi.org/10.1177/1948550611434400.
19. Pomeranz JL. A historical analysis of public health, the law, and stigmatized social groups: the need for both obesity and weight bias legislation. *Obesity (Silver Spring)*. 2008;16(suppl 2):S93–S103. https://doi.org/10.1038/oby.2008.452.
20. Neumark-Sztainer D, Story M, Faibisch L. Perceived stigmatization among overweight African-American and Caucasian adolescent girls. *J Adolesc Health*. 1998;23(5):264–270. https://doi.org/10.1016/S1054-139X(98)00044-5.
21. Bucchianeri MM, Gower AL, McMorris BJ, Eisenberg ME. Youth experiences with multiple types of prejudice-based harassment. *J Adolesc*. 2016;51:68–75. https://doi.org/10.1016/j.adolescence.2016.05.012.
22. Bucchianeri MM, Eisenberg ME, Neumark-Sztainer D. Weightism, racism, classism, and sexism: shared forms of harassment in adolescents. *J Adolesc Health*. 2013;53(1):47–53. https://doi.org/10.1016/j.jadohealth.2013.01.006.
23. Dutton GR, Lewis TT, Durant N, et al. Perceived weight discrimination in the CARDIA study: differences by race, sex, and weight status. *Obesity (Silver Spring)*. 2014;22(2):530–536. https://doi.org/10.1002/oby.20438.
24. Roehling MV, Roehling PV, Pichler S. The relationship between body weight and perceived weight-related employment discrimination: the role of sex and race. *J Vocat Behav*. 2007;71(2):300–318. https://doi.org/10.1016/j.jvb.2007.04.008.
25. Crenshaw K, Stanford S, Review L, Jul N. Mapping the margins: intersectionality, identity politics, and violence against women of color. *Stanford Law Rev*. 1991;43(6):1241–1299. https://doi.org/10.2307/1229039.
26. Bowleg L. The problem with the phrase women and minorities: intersectionality—an important theoretical framework for public health. *Am J Public Health*. 2012;102(7):1267–1273. https://doi.org/10.2105/AJPH.2012.300750.

27. Hankivsky O. Women's health, men's health, and gender and health: Implications of intersectionality. *Soc Sci Med*. 2012;74(11):1712–1720. https://doi.org/10.1016/j.socscimed.2011.11.029.
28. Bauer GR. Incorporating intersectionality theory into population health research methodology: challenges and the potential to advance health equity. *Soc Sci Med*. 2014;110:10–17. https://doi.org/10.1016/j.socscimed.2014.03.022.
29. Purdie-Vaughns V, Eibach RP. Intersectional invisibility: The distinctive advantages and disadvantages of multiple subordinate-group identities. *Sex Roles*. 2008;59(5-6):377–391. https://doi.org/10.1007/s11199-008-9424-4.
30. Grollman EA. Multiple forms of perceived discrimination and health among adolescents and young adults. *J Health Soc Behav*. 2012;53(2):199–214. https://doi.org/10.1177/0022146512444289.
31. Grollman EA. Multiple disadvantaged statuses and health: the role of multiple forms of discrimination. *J Health Soc Behav*. 2014;55(1):3–19. https://doi.org/10.1177/0022146514521215.
32. Dorsey RR, Eberhardt MS, Ogden CL. Racial/ethnic differences in weight perception. *Obesity (Silver Spring)*. 2009;17(4):790–795. https://doi.org/10.1038/oby.2008.603.
33. Grabe S, Hyde JS. Ethnicity and body dissatisfaction among women in the United States: a meta-analysis. *Psychol Bull*. 2006;132(4):622–640. https://doi.org/10.1037/0033-2909.132.4.622.
34. Evans PC, McConnell A. Do racial minorities respond in the same way to mainstream beauty standards? Social comparison processes in Asian, black, and white women. *Self Identity*. 2003;2(2):153–167. https://doi.org/10.1080/15298860309030.
35. Pepper AC, Ruiz SY. Acculturation's influence on antifat attitudes, body image and eating behaviors. *Eat Disord*. 2007;15(5):427–447. https://doi.org/10.1080/10640260701667912.
36. Hebl MR, King EB, Perkins A. Ethnic differences in the stigma of obesity: identification and engagement with a thin ideal. *J Exp Soc Psychol*. 2009;45(6):1165–1172. https://doi.org/10.1016/j.jesp.2009.04.017.
37. Ghavami N, Peplau LA. An intersectional analysis of gender and ethnic stereotypes: testing three hypotheses. *Psychol Women Q*. 2012;37(1):113–127. https://doi.org/10.1177/0361684312464203.
38. Puhl RM, Heuer CA. The stigma of obesity: a review and update. *Obesity (Silver Spring)*. 2009;17(5):941–964. https://doi.org/10.1038/oby.2008.636.
39. Fettich KC, Chen EY. Coping with obesity stigma affects depressed mood in African American and white candidates for bariatric surgery. *Obesity (Silver Spring)*. 2012;20(5):1118–1121. https://doi.org/10.1038/oby.2012.12.
40. Schvey NA, Barmine M, Bates D, et al. Weight stigma among active duty U.S. military personnel with overweight and obesity. *Stigma Health*. In press. Online September 26, 2016. https://doi.org/10.1037/sah0000057.
41. Survey sampling international: the science of sampling. www.surveysampling.com/. Published 2011. Accessed October 1, 2016.
42. CDC. Defining overweight and obesity: overweight and obesity. CDC. www.cdc.gov/obesity/adult/defining.html. Published 2012. Accessed September 16, 2016.
43. Schvey NA, Puhl RM, Brownell KD. The impact of weight stigma on caloric consumption. *Obesity (Silver Spring)*. 2011;19(10):1957–1962. https://doi.org/10.1038/oby.2011.204.
44. Durso LE, Latner JD, Ciao AC. Weight bias internalization in treatment-seeking overweight adults: psychometric validation and associations with self-esteem, body image, and mood symptoms. *Eat Behav*. 2016;21:104–108. https://doi.org/10.1016/j.eatbeh.2016.01.011.
45. Lee MS, Dedrick RF. Weight Bias Internalization Scale: psychometric properties using alternative weight status classification approaches. *Body Image*. 2016;17:25–29. https://doi.org/10.1016/j.bodyim.2016.01.008.
46. Puhl RM, Luedicke J. Weight-based victimization among adolescents in the school setting: emotional reactions and coping behaviors. *J Youth Adolesc*. 2012;41(1):27–40. https://doi.org/10.1007/s10964-011-9713-z.
47. Aiken LS, West SG. *Multiple Regression: Testing and Interpreting Interactions*. London: Sage; 1991.
48. Dawson JF. Moderation in management research: what, why, when, and how. *J Business Psychol*. 2014;29(1):1–19. https://doi.org/10.1007/s10869-013-9308-7.
49. Chugh M, Friedman AM, Clemow LP, Ferrante JM. Women weigh in obese African American and White women's perspectives on physicians' roles in weight management. *J Am Board Fam Med*. 2013;26(4):421–428. https://doi.org/10.3122/jabfm.2013.04.120350.
50. Fikkan JL, Rothblum ED. Is fat a feminist issue? Exploring the gendered nature of weight bias. *Sex Roles*. 2012;66(9-10):575–592. https://doi.org/10.1007/s11199-011-0022-5.
51. Lewis RJ, Cash TF, Jacobi L, Bubb-Lewis C. Prejudice toward fat people: the development and validation of the Antifat Attitudes Test. *Obes Res*. 1997;5(4):297–307. https://doi.org/10.1002/j.1550-8528.1997.tb00555.x.
52. Kuczmarski MF, Kuczmarski RJ, Najjar M. Effects of age on validity of self-reported height, weight, and body mass index: findings from the third national health and nutrition examination survey, 1988–1994. *J Am Diet Assoc*. 2001;101(1):28–34. https://doi.org/10.1016/S0002-8223(01)00008-6.
53. Connor Gorber S, Tremblay M, Moher D, Gorber B. A comparison of direct vs. self-report measures for assessing height, weight and body mass index: a systematic review. *Obes Rev*. 2007;8(4):307–326. https://doi.org/10.1111/j.1467-789X.2007.00347.x.
54. Sutin AR, Terracciano A. Perceived weight discrimination and obesity. *PLoS One*. 2013;8(7):1–4. https://doi.org/10.1371/journal.pone.0070048.