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Obesity

Overlooked and Understudied: Health Consequences of Weight Stigma in Men

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Objective: A substantial amount of literature has suggested that weight stigma impairs health. Evidence on gender differences in weight stigma has been mixed, but studies of weight stigma within men have been primarily absent from the literature.
Methods: In two samples of men recruited nationally from across the United States ($N = 1{,}753$), participants completed self-report measures assessing their height, weight, demographics, weight stigma (experienced and internalized), psychological well-being (depression), health behaviors (sleep, alcohol, smoking, binge eating, dieting, physical activity), and self-rated health.
Results: Regression analyses showed that, independent of race, socioeconomic status, and BMI, experienced weight stigma and weight bias internalization among men were associated with poor health, including greater depressive symptoms, increased dieting, lower self-reported health, and increased odds of binge eating. Neither internalized nor experienced weight stigma was consistently associated with physical activity, smoking, drinking, or trouble sleeping.
Conclusions: These findings suggest that both experienced and internalized weight stigma are associated with several indices of poor health in men. It may be informative for future work to examine how men cope with weight stigma, particularly if certain coping responses to stigma involve behaviors that contribute to poorer health.

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Introduction

A substantial amount of literature has implicated weight stigma in poor health (1,2). Many large-scale studies of weight stigma and health have included both men and women (3-5); gender is frequently mentioned as a covariate in study methodology but omitted in subsequent reporting of results, precluding researchers from viewing the effects of these variables within the context of stigma and health (4,5). While exceptions exist (6-9), studies considering gender as a moderator have been in the minority in the larger literature. More commonly, examinations of gender in the weight stigma literature focus on a single gender group, primarily women (10-12). For example, more than 20 studies examining health effects of weight stigma in the past 5 years alone have been limited to women (10-12), but very few studies to date have been limited to men (13-15). Studies of men typically have focused on men's weight bias toward others (13) or have documented men's experiences with weight stigma (14,15) rather than examining health effects of stigma within men. Examining gender as a moderator in the relationship between weight stigma and health is necessary to assess statistical differences between men and women (6-9,16), yet more studies of weight stigma within men are also needed to better understand how stigma is associated with men's health and whether within-gender differences in health exist between men who experience or internalize weight stigma versus men who do not. The present study responds to several calls for additional research on weight stigma in men (13,17) and seeks to address this lack of balance in the literature by assessing links between weight stigma and health among men.

The limited research examining weight stigma and health within men may be attributed in part to perceptions that women are more affected by body image and weight stigma than men (18-22). Although evidence of gender differences in the prevalence of experienced weight stigma (EWS) is mixed (particularly as individuals move into higher body weight categories) (3,14,21,23,24), research has suggested that approximately 40% of men report experiencing weight stigma (14). Yet weight stigma may be perceived as worse for women than men (21,22) because weight stigma was documented at lower levels of BMI (kilograms per meter squared) for women (18), women may be judged more harshly for their weight

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than men (19), women were shown to have higher rates of body dissatisfaction (20), and women are more likely than men to internalize weight stigma (3,7,20,25). Gender differences in the prevalence of weight stigma do not necessarily indicate that men are less affected by weight stigma than women, and examining health effects of weight stigma using both between-gender approaches and within-gender approaches is important to elucidate relationships between weight stigma and health.

An amassing literature documenting gender differences in health indices and behaviors has highlighted the importance of including both within-gender analyses and adequately powered between-gender analyses to examine links between weight stigma and health. For example, women consistently endorse higher rates of depression compared with men, and men outrank women in substance abuse and dependence (26,27). Women were shown to be more likely than men to report disordered eating pathology, including binge eating (28). Men are more likely to exercise than women (27), but they are simultaneously less likely to engage in healthy eating behaviors (e.g., limiting fat or red meat) than women (27). Research controlling for sociodemographic factors implicated EWS in psychological outcomes such as depression, anxiety, and substance use (23). Similarly, consistent correlational and experimental evidence has suggested a robust relationship between weight stigma and maladaptive eating (e.g., overeating, binge eating) as well as dieting (24). Although the relationship between weight stigma and exercise is mixed, the most consistent evidence has linked weight stigma with lower motivation and self-efficacy for exercise (29). Several studies have examined these stigma-health relationships within women (10-12) and between men and women (3,30), yet scarce research has considered these constructs as a function of weight stigma within men.

Similar to EWS, the vast majority of research on weight bias internalization (WBI) and health has either not examined gender or has focused on women. A recent systematic review of the literature on WBI and health noted that only 5 of 74 studies examined gender in the WBI-health relationship (29). These studies yielded mixed results on the role of gender in the relationship between WBI and depression, body image, and binge eating (29). The authors noted the lack of gender diversity in the literature as a key limitation in studies of WBI and health. Collectively, this literature on EWS, WBI, and health demonstrates the need for more studies examining gender as a moderator as well as within-gender research to understand relationships between weight stigma (EWS and WBI) and health within men.

In summary, while many studies have examined the relationship between weight stigma and health within women (10-12), studies assessing links with EWS, WBI, and health indices within men are scarce. That is, a substantial amount of literature on the health effects of stigma within women exists; a similar amount of literature does not exist for men, and a scant amount of literature exists comparing health effects of weight stigma between men and women. Using two independent national samples of men from across the United States, the present study examined both experienced and internalized weight stigma and their associations with health by comparing self-rated health, psychological well-being, and health behaviors among men reporting weight stigma versus men who do not.

Methods

Participants and procedures

Men were recruited across the United States from two national panels. Many of the measures were identical between samples, allowing results from Sample 1 to be replicated in Sample 2. Survey procedures were identical in both samples, though recruitment demographics varied slightly. All procedures were approved by the Institutional Review Board at the University of Connecticut.

Sample 1. A total of 1,523 men from a US national online survey panel (Survey Sampling International, http://www.surveysampling.com/) made up Sample 1. This panel includes more than 2 million active participants from several thousand sources, including panel members from all 50 states. To ensure data quality, Survey Sampling International validates respondent demographics across several databases. Prior to data collection, quotas were established for income groups and race to approximate US Census characteristics. Men who were missing demographic characteristics or provided improbable anthropometric variables (e.g., height of 2 ft) were excluded ($n=274$), yielding a final sample of 1,249 men. Participants were, on average, 45.45 years old (SD 16.26) with a mean BMI of 27.38 (SD 6.35) (Table 1).

TABLE 1 Sociodemographic characteristics

	Sample 1 ($n=1,249$)		Sample 2 ($n=504$)	
	Mean	SD	Mean	SD
Age	45.45	16.26	33.00	12.10
Current BMI	27.38	6.35	26.41	6.99
	n	%	*n*	%
Race				
White	658	52.7	163	32.3
Black	202	16.2	169	33.5
Asian	73	5.8	0	0
Hispanic/Latino	288	23.1	172	34.1
Other	27	2.2	0	0
Education				
High school	192	15.4	178	35.4
Some college	343	27.5	138	27.4
College	449	36.0	137	27.2
Postgraduate or higher	262	21.0	50	9.9
Income				
Under $25,000	172	13.8	126	25
$25,000-$49,999	274	22.0	130	25.8
$50,000-$74,999	256	20.6	85	16.9
$75,000-$99,999	234	18.8	65	12.9
$100,000-$124,999	119	9.6	37	7.3
$125,000 or more	188	15.1	61	12.1
BMI category				
Underweight BMI	55	4.4	42	8.3
Normal weight BMI	390	31.2	188	37.3
Overweight BMI	487	39.0	154	30.6
Obesity BMI	317	25.4	120	23.8
Experienced weight stigma (any)	475	38.0	295	58.5
Teased	419	33.5	269	53.4
Treated unfairly	261	20.9	176	34.9
Discriminated against	207	16.6	153	30.4

Sample 2. A total of 525 men recruited via a Qualtrics online panel made up Sample 2 (https://www.qualtrics.com). Qualtrics paneling recruited and verified participants based on the requested study demographics from a panel of 6 million individuals living in the United States. Quotas were established for race to achieve a US national sample with approximately equal numbers of non-Hispanic black, Hispanic white, and non-Hispanic white men. Participants who were missing more than 75% of their data were excluded ($n=21$). The final sample included 504 men. Participants were, on average, 33.00 (SD 12.10) years old with a mean BMI of 26.41 (SD 6.99).

Measures

Table 2 presents descriptive statistics. Dependent variables (depressive symptoms, WBI, trouble sleeping, drinking, smoking, dieting, physical activity, self-rated health) were examined for skewness, kurtosis, and outliers. Outliers (±3 SD from the mean) were excluded from analyses.

Demographics. Participants indicated their age, race/ethnicity, education, and income.

Anthropometrics. Participant BMI was constructed based on self-reported height and weight. BMI status was stratified into weight categories according to guidelines from the Centers for Disease Control and Prevention (31).

TABLE 2 Summary statistics for focal dependent variables

Variable	Sample 1 ($n=1,249$)			Sample 2 ($n=504$)		
	M	SD	α	M	SD	α
Psychological health						
Weight bias internalization	3.28	1.54	0.94	3.25	1.54	0.93
Depression	19.04	6.89	0.89	21.73	7.31	0.86
Health behaviors[a]						
Trouble sleeping	2.20	1.04		2.47	1.24	
Drinking behavior	0.98	0.82		1.08	1.02	
Smoking behavior	0.38	0.94		0.79	1.36	
Dieting	1.90	1.15		2.43	1.31	
Physical activity	36.44	12.49		36.87	12.75	
Self-rated health[b]	68.21	20.22	0.73	3.65	0.94	
	n	%		*n*	%	
Binge eating						
No	772	65.8		327	65.0	
Yes	401	34.2		176	35.0	

All variables examined for normality, and outliers removed from depression (3 from Sample 1), drinking (15 from Sample 1 and 6 from Sample 2), and smoking (41 in Sample 1 and 7 in Sample 2) in both samples and self-rated health in Sample 1 only ($n=7$).
[a]Smoking and drinking behavior refer to mean number of cigarettes and mean number of drinks. This number includes nonsmokers and nondrinkers coded as zero for these variables. Smoking was log transformed to correct skewness in all models, but untransformed mean presented in this table.
[b]Self-rated health in Sample 1 refers to the Word Health Organization Quality of Life (WHOQOL) Overall Health Scale, in which higher scores refer to better health; self-rated health in Sample 2 is the question on self-rated health, in which higher scores refer to better health.

EWS. Participants completed three "yes" or "no" questions to indicate whether they had ever been teased, treated unfairly, or discriminated against because of their weight (3,14). If participants answered "yes" to any of the three questions, they were classified as having EWS; participants answering "no" to all three questions were coded as having experienced no stigma.

Psychological health

Depressive symptoms. Depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (32) (11 items). Participants indicated their frequency of depressive symptoms during the past week on a scale of 1 (rarely or none of the time) to 4 (most or all of the time) (32). Items were summed to compute an index of depressive symptoms, and three outliers were removed from Sample 1 (mean = 19.04, SD = 6.89, $\alpha=0.89$; Sample 2 mean = 21.73, SD = 7.31, $\alpha=0.86$).

WBI. The Modified Weight Bias Internalization Scale (33) (10 items) assessed the extent to which participants blame and stereotype themselves because of their body weight on a scale of 1 (strongly disagree) to 7 (strongly agree) (Sample 1: mean = 3.28, SD = 1.54, $\alpha=0.94$; Sample 2: mean = 3.25, SD = 1.54, $\alpha=0.93$).

Health behaviors

Sleep. Using a question on sleep patterns from the Weight and Lifestyle Inventory (34), participants indicated the frequency with which they have trouble sleeping on a scale of 1 (never) to 5 (always) (Sample 1: mean = 2.20, SD = 1.04; Sample 2: mean = 2.47, SD = 1.24).

Substance use. Using three items, participants indicated the number of alcoholic drinks they typically consume in a week (liquor, wine, beer) on a scale ranging from 0 (I do not drink) to 5 (drinks in excess of 15) (34). A mean score was created to indicate drinking behavior, including those who indicated no alcohol consumption. Outliers (Sample 1 = 15, Sample 2 = 6) were removed from analyses (Sample 1: mean = 0.98, SD = 0.82; Sample 2: mean = 1.08 SD = 1.02). For smoking behavior, participants indicated whether they currently smoke cigarettes (yes/no) and how many cigarettes they typically consume in a day using a scale ranging from 0 (do not smoke) to 6 (more than 25 cigarettes per day) (34). Because of the number of nonsmokers, smoking was skewed and log-transformed to correct for skewness. Outliers (Sample 1 = 41; Sample 2 = 7) were removed (Sample 1: mean = 0.38, SD = 0.94; Sample 2: mean = 0.79, SD = 1.36).

Binge eating. Two items from the Questionnaire on Eating and Weight Patterns-Revised assessed whether individuals engaged in binge eating (yes/no) and whether episodes of binge eating involved loss of control (yes/no) (35). The binary variable for binge eating reflects binge eating with loss of control; participants who reported binge eating without loss of control or who reported no binge eating were coded as zero.

Dieting. Participants indicated the number of restrictive diets they engaged in to intentionally lose weight during the past year (Sample 1: mean = 1.90, SD = 1.15; Sample 2: mean = 2.43, SD = 1.31) (36).

Physical activity. Using the Godin Leisure-Time Exercise Questionnaire (37), participants indicated the number of times they engaged in strenuous, moderate, and mild exercise for at least

15 minutes during a typical 7-day period. Items were weighted and scored according to the measure instructions, with higher scores indicating greater physical activity (37) (Sample 1: mean = 36.44, SD = 12.49; Sample 2: mean = 36.87, SD = 12.75).

Self-rated health

In Sample 1, self-rated health was measured using the World Health Organization Quality of Life, Brief assessment (38). The overall health subscale (mean = 68.21, SD = 20.22, $\alpha = 0.73$) included two items rated on a scale of 1 (not at all) to 5 (an extreme amount/completely). The overall health subscale score was transformed to represent a value ranging from 0 to 100, in which higher scores represent better health (seven outliers were removed from Sample 1). In Sample 2, participants answered the following single question about their self-rated health status: "In general, how would you rate your health?" (39). Responses were rated on a scale of 1 (very good) to 5 (very bad) but reverse coded so higher scores refer to better health (mean = 3.65, SD = 0.94).

Statistical analysis

Data were analyzed using SPSS Statistics version 25.0 (IBM Corp.). Power analyses for linear regressions with 2 focal predictors and 11 overall predictors suggested a power level of 0.99 to 1.00 in Sample 1 and 0.82 to 0.99 in Sample 2 to detect small effects ($f^2 = 0.02$-0.05). Outcome variables were as follows: depressive symptoms, WBI, trouble sleeping, drinking, smoking, dieting, physical activity, binge eating, and self-rated health. Both WBI and EWS were examined in each model (exception: model predicting WBI) with the following covariates: age, BMI, socioeconomic status (education, income), and race (Sample 1: Asian, Black, Hispanic, and Other with white as the reference group; Sample 2: black and Hispanic with white as the reference group). All models were linear (Table 3), except binge eating, which represents a binary logistic regression (Table 4). Including outliers in the analyses did not change effect sizes of the models or beta values for relationships between the focal weight stigma variables and each health outcome; analyses including outliers are available in Supporting Information Tables 1-3. Depressive symptoms were examined as an outcome and also included as a covariate in all other models to investigate the unique relationship between weight stigma and health outcomes independent of depressive symptoms (32). Because we included WBI as both an independent variable in health models and a dependent variable predicted by EWS and covariates, we included exploratory mediation analyses to examine the indirect effect of EWS on each health outcome via WBI. Using the PROCESS macro, a 95% CI for the indirect effect of EWS on the outcome via WBI was constructed via bootstrapping with 5,000 replications; when the CI does not include zero, an indirect effect is present (40).

Results

Psychological health

Model statistics and coefficients are included in Table 3. Both EWS and WBI were associated with more depressive symptoms in Sample 1 (EWS $\beta = 0.10$, $P < 0.001$; WBI $\beta = 0.53$, $P < 0.001$) and Sample 2 (EWS $\beta = 0.18$, $P < 0.001$; WBI $\beta = 0.47$, $P < 0.001$). EWS was associated with increased internalization scores in both samples (Sample 1: $\beta = 0.23$, $P < 0.001$; Sample 2: $\beta = 0.22$, $P < 0.001$).

Health behaviors

EWS and WBI were associated with trouble sleeping in Sample 2 (EWS $\beta = 0.13$, $P = 0.005$; WBI $\beta = 0.13$, $P = 0.008$), but no associations between weight stigma (EWS, WBI) and trouble sleeping emerged in Sample 1 (EWS $\beta = 0.03$, $P = 0.290$; WBI $\beta = 0.01$, $P = 0.724$). No associations were found between physical activity and EWS (Sample 1: $\beta = 0.02$, $P = 0.587$; Sample 2: $\beta = 0.06$, $P = 0.206$) or WBI in Sample 2 ($\beta = 0.04$, $P = 0.206$), but WBI was associated with lower rates of physical activity in Sample 1 ($\beta = -0.10$, $P = 0.013$). Smoking was significantly associated with EWS in Sample 1 ($\beta = 0.10$, $P = 0.002$) but not Sample 2 ($\beta = 0.07$, $P = 0.130$); WBI was unrelated to smoking in Sample 1 ($\beta = 0.00$, $P = 0.957$) and Sample 2 ($\beta = -0.01$, $P = 0.908$). No associations were observed for EWS or WBI with increased alcohol consumption in either sample (Sample 1: EWS $\beta = 0.06$, $P = 0.087$; WBI $\beta = 0.07$, $P = 0.076$; Sample 2: EWS $\beta = 0.02$, $P = 0.684$; WBI $\beta = 0.10$, $P = 0.078$).

Both EWS and WBI were associated with more dieting in Sample 1 (EWS $\beta = 0.06$, $P = 0.050$; WBI $\beta = 0.16$, $P < 0.001$) and Sample 2 (EWS $\beta = 0.13$, $P = 0.007$; WBI $\beta = 0.20$, $P < 0.001$). EWS was associated with 2.30 increased odds of binge eating with loss of control in Sample 1 ($\beta = 0.83$, $P < 0.001$) and 2.01 increased odds of binge eating with loss of control in Sample 2 ($\beta = 0.70$, $P = 0.004$). WBI was associated with 1.24 increased odds of binge eating with loss of control in Sample 2 ($\beta = 0.21$, $P = 0.012$) but not associated with odds of binge eating with loss of control in Sample 1 ($\beta = 0.07$, $P = 0.243$).

Self-rated health

WBI was associated with lower self-rated health in both Sample 1 ($\beta = -0.14$, $P < 0.001$) and Sample 2 ($\beta = -0.14$, $P < 0.005$), but EWS was not associated with self-rated health (Sample 1: $\beta = -0.05$, $P = 0.067$; Sample 2: $\beta = -0.08$, $P = 0.077$).

Exploratory mediation analyses

Bootstrapped CIs for the indirect effect of EWS on each health outcome via WBI are displayed in Table 5. EWS was indirectly associated with more depressive symptoms (Sample 1 CI: 2.22 to 3.26; Sample 2 CI: 1.91 to 3.48), more dieting (Sample 1 CI: 0.05 to 0.14; Sample 2 CI: 0.05 to 0.21), and lower self-rated health (Sample 1 CI: −2.17 to −0.56; Sample 2 CI: −0.12 to −0.02) via WBI. EWS was indirectly associated with trouble sleeping via (CI: 0.01 to 0.15) and binge eating via WBI in Sample 2 only (CI: 0.03 to 0.29). EWS was also indirectly associated with lower rates of physical activity in Sample 1 only (CI: −1.16 to −0.07). No indirect effect of EWS on drinking or smoking behavior via WBI emerged in either sample.

Discussion

This study provides a systematic examination of EWS, WBI, and health within men. Independent of BMI and sociodemographic characteristics, EWS and WBI were associated with greater depressive symptoms, increased odds of binge eating, increased dieting, and decreased self-reported health. Weight stigma was not reliably associated with physical activity, smoking, drinking, or trouble sleeping across both samples. Taken together, these results suggest that weight stigma may negatively contribute to some health indices in men. These findings highlight the need for research assessing health effects of weight stigma in adequately powered gender-inclusive samples, which can examine whether gender moderates associations between weight stigma and health.

TABLE 3 Linear regressions predicting mean or scale scores of health outcomes

	Sample 1 (n = 1,249)					Sample 2 (n = 504)				
Outcome	B	SE	β	t	P	B	SE	β	t	P
WBI	R^2 = 0.47, F (10,1163) = 101.25, P < 0.001					R^2 = 0.36, F (8,490) = 34.87, P < 0.001				
Depression	0.11	0.01	0.48	19.75	<0.001	0.09	0.01	0.44	11.41	<0.001
Age	−0.01	0.00	−0.14	−5.57	<0.001	−0.01	0.01	−0.05	−1.23	0.219
BMI	0.05	0.01	0.19	8.21	<0.001	0.03	0.01	0.12	3.22	0.001
Asian	−0.32	0.15	−0.05	−2.21	0.027					
Black	−0.26	0.10	−0.06	−2.66	0.008	−0.34	0.14	−0.11	−2.44	0.015
Hispanic	−0.20	0.09	−0.05	−2.32	0.021	0.07	0.14	0.02	0.48	0.634
Other	−0.62	0.23	−0.06	−2.76	0.006					
Education	0.04	0.03	0.03	1.23	0.220	0.07	0.04	0.06	1.50	0.135
Income	0.02	0.02	0.02	0.75	0.453	0.07	0.04	0.07	1.75	0.080
EWS	0.71	0.08	0.23	9.45	<0.001	0.67	0.12	0.22	5.51	<0.001
Depression	R^2 = 0.41, F (10,1163) = 80.63, P < 0.001					R^2 = 0.32, F (8,490) = 28.79, P < 0.001				
Age	−0.05	0.01	−0.12	−4.55	<0.001	0.01	0.03	0.02	0.43	0.668
BMI	−0.11	0.03	−0.10	−4.02	<0.001	−0.10	0.04	−0.09	−2.30	0.022
Asian	0.01	0.69	0.00	0.01	0.994					
Black	0.45	0.46	0.02	0.98	0.328	0.82	0.69	0.05	1.18	0.239
Hispanic	−0.07	0.40	0.00	−0.16	0.872	0.64	0.68	0.04	0.94	0.346
Other	0.07	1.07	0.00	0.07	0.947					
Education	−0.28	0.14	−0.05	−2.07	0.039	−0.51	0.22	−0.10	−2.36	0.019
Income	−0.37	0.11	−0.09	−3.32	0.001	−0.16	0.19	−0.04	−0.83	0.408
WBI	2.37	0.12	0.53	19.75	<0.001	2.24	0.20	0.47	11.41	<0.001
EWS	1.37	0.37	0.10	3.75	<0.001	2.69	0.61	0.18	4.44	<0.001
Trouble sleeping	R^2 = 0.18, F (11,1158) = 22.71, P < 0.001					R^2 = 0.24, F (9,488) = 16.99, P < 0.001				
Depression	0.06	0.01	0.39	11.15	<0.001	0.06	0.01	0.33	6.92	<0.001
Age	0.00	0.00	0.01	0.32	0.749	0.01	0.00	0.12	2.75	0.006
BMI	0.00	0.01	0.02	0.54	0.592	−0.01	0.01	−0.06	−1.45	0.147
Asian	−0.09	0.12	−0.02	−0.75	0.456					
Black	0.01	0.08	0.00	0.06	0.954	−0.12	0.13	−0.05	−0.94	0.347
Hispanic	0.04	0.07	0.02	0.60	0.551	−0.02	0.12	−0.01	−0.12	0.901
Other	−0.05	0.19	−0.01	−0.25	0.805					
Education	−0.04	0.02	−0.06	−1.81	0.071	−0.07	0.04	−0.08	−1.77	0.078
Income	−0.01	0.02	−0.02	−0.50	0.616	−0.01	0.03	−0.01	−0.23	0.822
WBI	0.01	0.03	0.01	0.35	0.724	0.11	0.04	0.13	2.65	0.008
EWS	0.07	0.07	0.03	1.06	0.290	0.32	0.11	0.13	2.85	0.005
Drinking behavior[a]	R^2 = 0.10, F (11,1148) = 11.22, P < 0.001					R^2 = 0.08, F (9,455) = 4.12, P < 0.001				
Depression	0.01	0.00	0.12	3.15	0.002	0.01	0.01	0.04	0.67	0.502
Age	0.00	0.00	−0.04	−1.26	0.210	0.00	0.00	0.03	0.52	0.601
BMI	−0.02	0.00	−0.12	−3.85	<0.001	−0.01	0.01	−0.03	−0.65	0.515
Asian	−0.27	0.10	−0.08	−2.61	0.009					
Black	−0.02	0.07	−0.01	−0.26	0.796	0.22	0.12	0.10	1.91	0.057
Hispanic	0.02	0.06	0.01	0.35	0.728	0.20	0.11	0.09	1.72	0.087
Other	−0.28	0.16	−0.05	−1.77	0.077					
Education	0.06	0.02	0.10	3.15	0.002	0.08	0.04	0.12	2.21	0.027
Income	0.08	0.02	0.17	5.10	<0.001	0.09	0.03	0.14	2.78	0.006
WBI	0.04	0.02	0.07	1.77	0.076	0.07	0.04	0.10	1.77	0.078
EWS	0.09	0.05	0.06	1.71	0.087	0.04	0.10	0.02	0.41	0.684
Smoking behavior[a]	R^2 = 0.07, F (11,1124) = 7.89, P < 0.001					R^2 = 0.07, F (9,482) = 3.88, P < 0.001				
Depression	0.01	0.00	0.11	2.90	0.004	0.01	0.00	0.09	1.61	0.109
Age	0.00	0.00	0.02	0.45	0.653	0.01	0.00	0.16	3.24	0.001
BMI	−0.01	0.00	−0.17	−5.53	<0.001	0.00	0.00	−0.03	−0.60	0.547

TABLE 3 (continued).

	Sample 1 ($n=1,249$)					Sample 2 ($n=504$)				
Outcome	B	SE	β	*t*	*P*	B	SE	β	*t*	*P*
Asian	−0.17	0.06	−0.09	−2.98	0.003					
Black	0.02	0.04	0.02	0.58	0.560	−0.14	0.07	−0.12	−2.20	0.029
Hispanic	−0.07	0.03	−0.06	−2.00	0.045	−0.18	0.07	−0.14	−2.76	0.006
Other	−0.05	0.09	−0.02	−0.56	0.575					
Education	−0.03	0.01	−0.08	−2.55	0.011	−0.06	0.02	−0.16	−2.99	0.003
Income	0.00	0.01	0.01	0.16	0.873	0.00	0.02	−0.01	−0.25	0.805
WBI	0.00	0.01	0.00	0.05	0.957	0.00	0.02	−0.01	−0.12	0.908
EWS	0.10	0.03	0.10	3.15	0.002	0.09	0.06	0.07	1.52	0.130
Dieting	$R^2=0.09$, $F(11,1159)=10.97$, $P<0.001$					$R^2=0.16$, $F(9,489)=10.35$, $P<0.001$				
Depression	0.01	0.01	0.03	0.85	0.393	0.01	0.01	0.07	1.40	0.163
Age	−0.01	0.00	−0.10	−3.05	0.002	0.00	0.01	−0.03	−0.60	0.549
BMI	0.02	0.01	0.11	3.73	<0.001	0.01	0.01	0.08	1.69	0.092
Asian	−0.08	0.14	−0.02	−0.55	0.583					
Black	−0.14	0.09	−0.04	−1.45	0.146	−0.18	0.14	−0.07	−1.31	0.191
Hispanic	−0.10	0.08	−0.04	−1.25	0.213	−0.22	0.14	−0.08	−1.63	0.104
Other	−0.42	0.22	−0.05	−1.88	0.060					
Education	0.04	0.03	0.04	1.34	0.182	0.05	0.04	0.05	1.04	0.297
Income	0.03	0.02	0.04	1.38	0.169	0.12	0.04	0.15	3.15	0.002
WBI	0.12	0.03	0.16	4.26	<0.001	0.17	0.04	0.20	3.94	<0.001
EWS	0.15	0.08	0.06	1.96	0.050	0.34	0.12	0.13	2.73	0.007
Physical activity	$R^2=0.09$, $F(11,1127)=10.60$, $P<0.001$					$R^2=0.09$, $F(8,486)=5.23$, $P<0.001$				
Depression	−0.08	0.07	−0.04	−1.21	0.226	−0.09	0.09	−0.05	−1.03	0.306
Age	−0.17	0.03	−0.22	−6.77	<0.001	−0.15	0.05	−0.14	−3.03	0.003
BMI	−0.25	0.06	−0.12	−3.85	<0.001	−0.26	0.08	−0.14	−3.01	0.003
Asian	−2.42	1.58	−0.05	−1.53	0.125					
Black	0.20	1.04	0.01	0.20	0.845	2.04	1.41	0.08	1.45	0.149
Hispanic	−0.52	0.92	−0.02	−0.56	0.573	0.12	1.39	0.00	0.09	0.931
Other	2.41	2.46	0.03	0.98	0.328					
Education	1.10	0.31	0.11	3.55	<0.001	0.54	0.44	0.06	1.24	0.215
Income	0.64	0.26	0.08	2.51	0.012	1.08	0.38	0.14	2.82	0.005
WBI	−0.79	0.32	−0.10	−2.48	0.013	0.43	0.45	0.05	0.96	0.339
EWS	0.46	0.84	0.02	0.54	0.587	1.59	1.25	0.06	1.27	0.206
Self-rated health[b]	$R^2=0.28$, $F(11,1137)=39.44$, $P<0.001$					$R^2=0.19$, $F(9,488)=12.73$, $P<0.001$				
Depression	−0.96	0.10	−0.33	−9.93	<0.001	−0.02	0.01	−0.18	−3.68	<0.001
Age	−0.10	0.04	−0.08	−2.78	0.005	−0.01	0.00	−0.06	−1.36	0.176
BMI	−0.66	0.09	−0.19	−7.11	<0.001	−0.02	0.01	−0.18	−4.19	<0.001
Asian	−5.36	2.24	−0.06	−2.39	0.017					
Black	4.42	1.50	0.08	2.95	0.003	0.15	0.10	0.08	1.53	0.126
Hispanic	0.44	1.32	0.01	0.33	0.740	0.07	0.10	0.04	0.77	0.440
Other	−0.96	3.47	−0.01	−0.28	0.782					
Education	0.73	0.44	0.05	1.63	0.103	0.01	0.03	0.02	0.42	0.677
Income	1.60	0.37	0.13	4.36	<0.001	0.09	0.03	0.16	3.46	0.001
WBI	−1.80	0.46	−0.14	−3.94	<0.001	−0.09	0.03	−0.14	−2.80	0.005
EWS	−2.22	1.21	−0.05	−1.83	0.067	−0.15	0.09	−0.08	−1.78	0.077

[a]Smoking and drinking behavior refer to mean number of cigarettes and mean number of drinks. This number includes nonsmokers and nondrinkers coded as zero for these variables. Smoking was log transformed to correct for skewness.
[b]Self-rated health in Sample 1 refers to the Word Health Organization Quality of Life (WHOQOL) Overall Health Scale, in which higher scores refer to better health; self-rated health in Sample 2 is the question on self-rated health, in which higher scores refer to better health.

TABLE 4 Logistic regressions on binge eating with loss of control

	Sample 1 (n = 1,249)					Sample 2 (n = 504)				
Outcome	B	SE	Wald	OR (β)	P	B	SE	Wald	OR (β)	P
Binge eating	Cox and Snell R^2 = 0.12, $\chi^2(11)$ = 146.09, P < 0.001					Cox and Snell R^2 = 0.21, $\chi^2(9)$ = 117.12, P < 0.001				
Depression	0.03	0.01	7.51	1.03	0.006	0.10	0.02	30.47	1.10	<0.001
Age	−0.02	0.01	13.19	0.98	<0.001	−0.01	0.01	0.55	0.99	0.457
BMI	0.04	0.01	9.66	1.04	0.002	0.00	0.02	0.03	1.00	0.868
Asian	−0.60	0.32	3.50	0.55	0.061					
Black	−0.38	0.20	3.64	0.69	0.057	0.06	0.28	0.04	1.06	0.838
Hispanic	−0.32	0.17	3.59	0.72	0.058	0.11	0.26	0.18	1.12	0.672
Other	−0.32	0.50	0.43	0.72	0.513					
Education	−0.09	0.06	2.58	0.91	0.109	0.16	0.09	3.52	1.17	0.061
Income	0.15	0.05	9.62	1.16	0.002	0.09	0.07	1.44	1.09	0.230
WBI	0.07	0.06	1.36	1.07	0.243	0.21	0.08	6.34	1.24	0.012
EWS	0.83	0.15	31.00	2.30	<0.001	0.70	0.24	8.14	2.01	0.004

TABLE 5 Bootstrapped CIs around indirect effect of EWS via WBI

	Sample 1 (n = 1,249)		Sample 2 (n = 504)	
Outcome	Lower CI	Upper CI	Lower CI	Upper CI
Depression	2.22	3.26	1.91	3.48
Trouble sleeping	−0.03	0.04	0.01	0.15
Drinking behavior	0.00	0.06	0.00	0.11
Smoking behavior	−0.04	0.03	−0.06	0.06
Dieting	0.05	0.14	0.05	0.21
Physical activity	−1.16	−0.07	−0.27	1.00
Self-rated health	−2.17	−0.56	−0.12	−0.02
Binge eating	−0.39	0.13	0.03	0.29

Both EWS and WBI were positively associated with depressive symptoms across both samples, which aligns with previous research in treatment-seeking samples (29). Prevalence rates for depression are generally lower in men (26,27); weight stigma could identify men in the primary care setting who may be vulnerable to depression. Despite consistent associations with depression, weight stigma was not reliably associated with trouble sleeping, suggesting that effects of weight stigma on sleep may not be independent of depressive symptoms. This lack of consistency warrants further investigation to understand how weight stigma uniquely contributes to depression and related symptoms.

EWS was associated with higher WBI scores, and EWS indirectly contributed to depressive symptoms, dieting, and self-rated health through its association with WBI. WBI as a mediator of the weight stigma and health relationship has been previously documented (41), and EWS may operate both independently on health and indirectly through WBI. However, previous evidence has also suggested that WBI can occur independent of EWS (25,29), indicating that both EWS and WBI have unique effects on health. Future work examining the types, frequency, and distress of EWS and WBI may be useful to understand the relationship between both EWS and WBI and their links with health.

Models including weight stigma accounted for a small portion of the variance in dieting and binge eating, but the standardized coefficients for EWS and WBI suggest that these variables have stronger associations with these health measures than BMI, race, and socioeconomic status. There are clearly other factors contributing to the variance in these health behaviors, but these results suggest that weight stigma warrants more attention in men, particularly within disordered eating, which is often underdiagnosed and undertreated in men (28). It may be informative for future work to examine how men cope with weight stigma, particularly if coping responses to stigma could involve unhealthy eating behaviors.

WBI was associated with lower self-rated health in both samples similar to prior work in treatment-seeking samples (29). However, weight stigma was not consistently related to smoking or drinking, contradicting evidence of associations between weight discrimination and substance use (23). While the probability values for drinking were marginal, the standardized effects for WBI and EWS were small. Both samples were adequately powered to detect small effects. This could be a key difference between men and women in the negative effects of weight stigma, which might be explained by men's higher overall rates of substance use and abuse (26,27). More research is needed to clarify the role of gender in moderating the effect of weight stigma on substance use.

Finally, weight stigma was not reliably associated with exercise behavior, though WBI was associated with lower rates of physical activity in Sample 1. A recent systematic review of the literature on WBI and exercise suggests that WBI may be more strongly related to motivational factors (e.g., exercise self-efficacy) rather than exercise engagement (29). Exercise is one of the few health behaviors in which men tend to fare better than woman (27) and may be an important area in which effects of weight stigma could be different for men and women. More research examining potential gender differences in exercise motivation and engagement (e.g., examining gender as a moderator) are needed to elucidate these differences.

The present findings offer several directions for future research. Longitudinal studies are needed to clarify the nature and progression of weight stigma and health consequences in men and women over time. It will be important for future work to examine a broader range of health

indices, such as acute stress effects of weight stigma in men, an area of research that has almost exclusively focused on women (11). Given that treatment-seeking samples for obesity tend to include more women than men (2,29), it will also be useful to examine weight stigma in samples of men seeking treatment for obesity. Two recent qualitative studies of men seeking bariatric surgery for obesity have illustrated how gender may shape treatment experiences; for example, men noted surgery changed their self-concept around masculinity, and male bariatric patients noted that information about the surgery procedure (e.g., recovery, patient experiences, health benefits) was largely geared toward women (42,43). Future research should also assess mechanisms that may drive gender differences in the weight stigma and health relationship. For example, estrogen and testosterone directly influence endocrine stress hormones such as cortisol (44), which has been theorized as an underlying mechanism driving a cyclic pattern of weight stigma and obesity (45).

This study provides novel insights into the health implications of weight stigma in men; however, several limitations should be noted. This study is correlational; experimental and longitudinal work in both the United States and international as well as treatment-seeking samples is necessary to understand the causal role of weight stigma in men's health. Second, although recruiting from a U.S. national online panel with particular attention to achieving diversity in two separate samples is a considerable strength of this study, respondents differ from a true probability sample. Third, we measured EWS in the context of presence or absence of previous mistreatment related to weight; more comprehensive measures of EWS are needed, including measures that address situational-specific assessment of weight stigma. Future work should include more comprehensive clinical measures to clarify associations with weight stigma and diagnostic criteria for psychological disorders and eating-related problems.

In conclusion, our findings suggest that weight stigma in men is associated with depressive symptoms, dieting, binge eating, and lower self-rated health. Although there has been increasing attention to the harmful effects of weight stigma, research on weight stigma in men is often neglected. Our study suggests the need for increased attention to men, both in weight stigma research and among health professionals treating men for a variety of health conditions in which weight stigma may play a contributing role. **O**

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