

# Weight Stigma Among Sexual Minority Adults: Findings from a Matched Sample of Adults Engaged in Weight Management

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**Objective:** Despite elevated rates of obesity among some groups of sexual minority (SM) adults, research examining weight stigma in this population is scarce.

**Methods:** Weight stigma and weight-related health correlates were assessed in SM adults ( $N=658$ ) versus heterosexual adults ( $N=658$ ) matched on sex, race/ethnicity, age, education, and BMI. Adults enrolled in WW (formerly Weight Watchers) completed digital questionnaires assessing experienced weight stigma, weight bias internalization (WBI), weight cycling, eating self-efficacy, eating to cope, physical activity, and health-related quality of life (HRQOL).

**Results:** Survey response rates ranged from 0.8% to 3.5%. There were no differences in experienced weight stigma between SM and heterosexual participants; more than two-thirds experienced weight stigma, and more than 50% reported stigma from family, health care providers, teachers and classmates, and community members. Gay men endorsed higher WBI than heterosexual men ( $\beta=0.22$ ,  $P<0.001$ ). Regardless of sexual orientation, WBI was associated with poorer mental HRQOL, lower eating self-efficacy, and increased eating to cope, controlling for demographics and BMI.

**Conclusions:** Experiencing weight stigma is as common for SM adults as heterosexual adults engaged in weight management, and WBI is associated with maladaptive eating behaviors and poor mental HRQOL. Increased attention to weight stigma and its health implications in SM populations is warranted.

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## Introduction

Sexual minority (SM) adults have elevated rates of obesity, particularly among SM women compared with heterosexual women and SM men (1-5). For example, the prevalence of obesity is higher for women who identify as lesbian (37%) or bisexual (41%) than for heterosexual women (28%) (2) and SM men (16%) (1). SM adults are also more likely to experience adverse weight gain trajectories through adulthood compared with heterosexual women and SM men (1,3,4), even when accounting for demographic factors (6). For people who have overweight or obesity, confronting societal weight stigma because of their weight is a common experience (7). This includes negative weight-based stereotypes, prejudice, and unfair treatment in multiple life domains, including employment, health care, and education (8-10). National studies have indicated that weight discrimination is a common

form of societal discrimination reported by United States adults (especially women) (11), and as many as 40% of adults report being the target of stigma and/or unfair treatment because of their higher body weight (12).

Substantial research has demonstrated consistent links between weight stigma and adverse health consequences, often independent of BMI (13,14). Prospective studies have shown that experiencing weight stigma predicts weight gain and obesity over time, controlling for demographic characteristics and baseline body weight (15). Research has suggested that weight stigma contributes to weight gain through a range of behavioral and psychological mechanisms, such as maladaptive eating behaviors like binge eating and unhealthy weight control practices (16), increased physiological stress (17), and poor psychological health (18). This evidence demonstrates weight stigma

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to be a key psychosocial contributor to obesity and poor weight-related health (19).

In addition to experiencing weight stigma, some people internalize negative weight-based stereotypes and blame themselves for their weight status (known as weight bias internalization [WBI]) (20,21). A recent review of 74 studies found that WBI is linked to adverse mental health indices (e.g., depression, anxiety), eating pathology, binge eating, poorer weight loss maintenance, and worse cardiometabolic health, even after accounting for BMI (21). Typically, WBI is elevated in women compared with men, in individuals with higher BMI compared with lower BMI, and among people who are trying to lose weight (21,22). For example, a recent study of 3,504 US adults found high levels of WBI in approximately 20% of participants; among those with the highest levels of WBI, 94% were dieting to try to lose weight, and 72% were women (22).

Despite considerable evidence documenting weight stigma and its health consequences, there has been an absence of quantitative research examining weight stigma in SM adults. The literature on weight stigma has been largely isolated from that on sexual identity, with limited attention given to these overlapping stigmatized identities in youth (23) and almost none in adults (24). Thus, very little is known about weight stigma in SM women and men. This gap in knowledge is concerning given documented weight disparities in SM adults and evidence that SM populations are already vulnerable to stigma because of their sexual identity (25). It is important to understand the intersections of stigmatized identities pertaining to weight and sexual orientation and what this means for weight-related health. To begin to address this understudied area, our study is the first to systematically assess experienced and internalized weight stigma among SM adults and links between weight stigma and weight-related health. Using data from a recent study of US adults enrolled in WW (formerly Weight Watchers; New York, New York), we assessed weight stigma and weight-related health correlates in SM women and men engaged in weight management compared with heterosexual adults matched on sex, race/ethnicity, age, education, and BMI.

## Methods

### Procedure

Eligible participants were WW members who had maintained a WW membership for >3 months, were  $\geq 18$  years old, and were living in the United States. WW is a validated behavioral weight management program that focuses on health behaviors in three areas: food, activity, and mind-set (26,27). The survey was initially piloted with 142 WW members to examine survey length and potential issues with collection. No issues arose during piloting, and no changes were made to the survey after the piloting phase was completed. Data collection occurred from September 2017 to August 2018, recruiting both “Workshop+Digital” members (whose WW membership included attending in-person workshops) and “Digital” members (membership involving access to the WW mobile application and online tools). WW sent a one-time email invitation to a random subset of its members each week, inviting them to complete a voluntary survey about body weight, health, and challenges that come with these experiences such as stress, self-confidence, and stigma. In total, WW contacted 305,000 Workshop+Digital members (response rate 3.5%) and 850,000 Digital members (response rate 0.8%). Interested members clicked on a survey link from the email, which took them to the study website hosted on Qualtrics.com (Qualtrics, Seattle, Washington) and managed by the researchers. On the home page, a consent form described

the study procedures; those who wanted to participate were asked to provide consent by clicking an appropriate icon on the website. After providing consent, participants completed self-report questionnaires. The study protocol was approved by the University of Connecticut Institutional Review Board.

### Participants

In total, 23,432 individuals entered the survey, consented, and met all eligibility criteria. Exclusions were made for participants who completed less than half of the survey ( $n=2,728$ ) or for those missing key demographic or anthropometric information (i.e., BMI, sex, or race) ( $n=1,935$ ). The full study sample consisted of 18,769 participants.

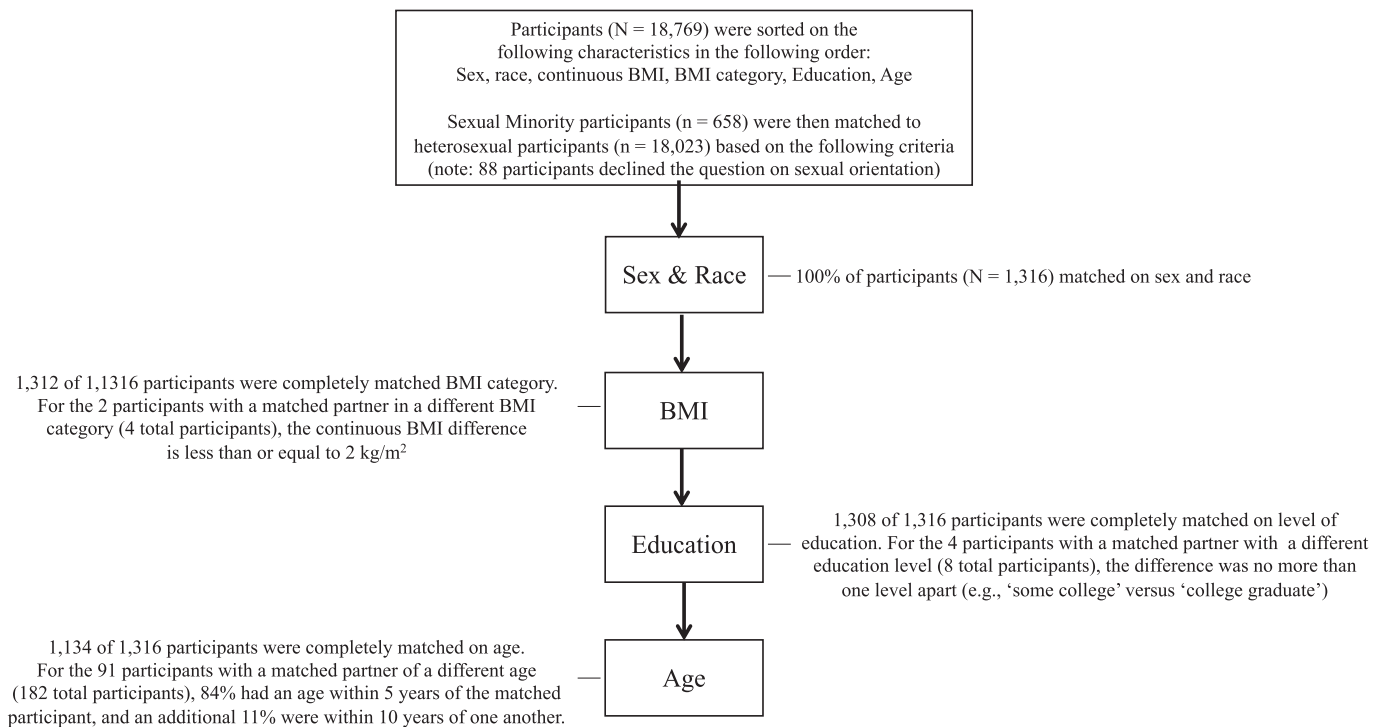
The present study focused on participants who identified as SM ( $n=658$ ) and a matched heterosexual sample ( $n=658$ ) for a total of 1,316 participants. Individuals who identified as SM (3.6% of the full sample) were matched to heterosexual individuals on sex, race, BMI category, education, and age. Data were sorted on these variables prior to matching (as well as continuous BMI), and in cases in which there were multiple heterosexual matches for a single SM participant, the first matching heterosexual participant from the list in the data set was chosen. When a perfect match did not exist on all variables, priority was given to matches in the following order: sex, race, BMI category, education, and age (Figure 1). All participants were completely matched on sex and race. Only two SM participants did not have a heterosexual peer with a matching BMI category, but in these cases, categorical differences corresponded to less than a two-point difference in continuous BMI (e.g., BMI of 29 vs. 31). While cases were not matched identically on continuous BMI, in most cases, the continuous BMI of matched individuals was very similar, and the average BMI for each SM group was not significantly different than the heterosexual group to which it was matched (differences in BMI between SM and heterosexual match group:  $P=0.519$  to  $0.987$ ). All but four participants were identically matched on education, and in these four cases, the education of either participant was no more than one level apart (e.g., some college vs. college graduate). A total of 91 participants could not be matched exactly on age (182 total), but 84% of these participants had an age within 5 years of the matched participant, and an additional 11% had a match within 10 years of the matched participant. There were no statistical differences in the matched sample between SM and heterosexual peers on any of the matching variables (i.e., sex, race, ethnicity, age, or BMI). See Supporting Information Table S1 for a summary of demographic characteristics of the full sample versus the matched sample.

Participants in the study sample had a mean age of 48.42 years (SD 13.78) and a mean BMI of 32.99 kg/m<sup>2</sup> (SD 7.49), and they primarily identified as white (89.4%). Participants identified as heterosexual (50.0%), lesbian (19.7%), gay (10.2%), bisexual (17.9%), or “other, not listed” (2.2%). Table 1 provides characteristics of the study sample.

### Measures

**Participant characteristics.** Participants indicated their demographic characteristics, sexual orientation, and current height and weight. BMI was calculated and stratified into weight categories using clinical guidelines from the Centers for Disease Control and Prevention (28).

**Weight stigma.** Participants responded to three yes/no questions indicating whether they had ever been teased, treated unfairly, or discriminated against because of their weight (29). Participants who



**Figure 1** Matching variables for sexual minority (n=658) and heterosexual (n=658) samples.

responded “yes” to any question were coded as “1,” and those who responded “no” to all three questions were coded as “0,” indicating no prior experience of weight stigma. Participants also reported whether they had experienced weight stigma from any of 25 interpersonal sources (30), including family members, friends, health care providers, community members, people in the workplace, and classmates or teachers (Table 2). Those who reported stigma from any specific source were coded as “1” for that source and individuals who had never experienced stigma from a given source were coded as “0” for that source. To measure WBI, participants answered the 10-item Modified Weight Bias Internalization Scale (31), which assesses the extent to which individuals self-stereotype and devalue themselves because of their body weight (seven-point Likert scale;  $\alpha=0.91$ ). Higher scores reflect greater internalization. The Weight Bias Internalization Scale has demonstrated good psychometric properties and validity in both clinical and community samples of varying weight statuses (21,22).

**Weight-related health behaviors.** Weight-related health behaviors were assessed with validated and widely used self-report measures. To assess weight cycling, participants indicated how frequently they had lost 10 or more pounds (in the absence of illness) followed by weight regain. Response options included never, once or twice, three to four times, or five times or more (32-34). The eight-item version of the Weight Efficacy Lifestyle Questionnaire (34,35) assessed self-efficacy to control eating behaviors. Participants rated their confidence (on a scale of 0-10) to overcome challenges to resist overeating, with higher summed scores indicating greater self-efficacy ( $\alpha=0.89$ ). The Coping Subscale of the Motivations to Eat Scale (36) (five-point scale) assessed how frequently (never to always) participants eat to cope with negative emotions,

cope with stress, or to comfort oneself ( $\alpha=0.90$ ). Physical activity was measured with the Godin Leisure-Time Exercise Questionnaire (37) to assess the frequency with which individuals engage in mild, moderate, or strenuous exercise in a given week. Exercise levels were weighted differently according to intensity level, and a total score was computed, with higher values indicating more exercise.

**Physical and mental health-related quality of life.** Participants completed the Short-Form Health Survey-12 (38), which measures physical and mental health-related quality of life (HRQOL). Mental and physical health scores were computed based on existing population norms. Scores ranged from 0 to 100, with higher scores indicating better HRQOL.

## Statistical analyses

Analyses were conducted using SPSS Statistics version 25 (IBM Corp., Armonk, New York). Descriptive statistics for primary measures stratified by sexual orientation are presented in Table 2. We collapsed the sexual identity subgroups into a combined SM group (n=658) to conduct simple comparisons with the matched heterosexual subgroup (n=658) on each primary measure. These simple comparisons yielded no significant differences between the combined SM group and the heterosexual group on any primary measure. Because we also examined these variables in a regression framework (described subsequently), we do not report further on the simple comparisons. Given documented differences in WBI between women and men (39), and weight disparities present in SM women versus men (1,4), all regression models were computed separately for men and

TABLE 1 Demographic characteristics for the total matched sample and sexual minority subgroups

Variable	Total matched sample, N=1,316		Combined sexual minorities, n=658		Heterosexual, n=658		Gay, n=134		Lesbian, n=259		Bisexual, n=236		Other, n=29	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<b>Sex</b>														
Male	302	22.9	151	22.9	151	22.9	134	100	0	0	16	6.8	1	3.4
Female	1014	77.1	507	77.1	507	77.1	0	0	259	100	220	93.2	28	96.6
<b>WW membership</b>														
Workshop + Digital	660	50.2	322	48.9	338	51.4	62	46.3	145	56	106	44.9	9	31
Digital	656	49.8	336	51.1	320	48.6	72	53.7	114	44	130	55.1	20	69
<b>Education</b>														
HS or less	45	3.4	23	3.5	22	3.3	5	3.7	10	3.9	8	3.4	0	0
Votech or some college	259	19.7	129	19.6	130	19.8	26	19.4	41	15.9	56	23.7	6	20.7
College graduate	457	34.7	229	34.8	228	34.7	47	35.1	75	29	96	40.7	11	37.9
Postgraduate	555	42.2	277	42.1	278	42.2	56	41.8	133	51.4	76	32.2	12	41.4
<b>Race/ethnicity</b>														
White	1176	89.4	588	89.4	588	89.4	121	90.3	235	90.7	206	87.3	26	89.7
Black	38	2.9	19	2.9	19	2.9	1	0.7	9	3.5	9	3.8	0	0
Asian	12	0.9	6	0.9	6	0.9	0	0	2	0.8	4	1.7	0	0
Hispanic/Latino	54	4.1	27	4.1	27	4.1	7	5.2	7	2.7	11	4.7	2	6.9
Other race	36	2.7	18	2.7	18	2.7	5	3.7	6	2.3	6	2.5	1	3.4
<b>BMI category<sup>a</sup></b>														
< 18.5 kg/m <sup>2</sup>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18.5-24.9 kg/m <sup>2</sup>	126	9.6	63	9.6	63	9.6	11	8.2	23	8.9	28	11.9	1	3.4
25-29.9 kg/m <sup>2</sup>	408	31	205	31.2	203	30.9	46	34.3	86	33.2	70	29.7	3	10.3
≥ 30.0 kg/m <sup>2</sup>	782	59.4	390	59.3	392	59.6	77	57.5	150	57.9	138	58.5	25	86.2
<b>BMI</b>	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
	32.99	7.49	33.16	7.94	32.83	7.02	32.39	6.73	32.50	6.77	33.86	9.32	36.88	9.35
<b>Age</b>	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
	48.42	13.78	48.31	13.83	48.53	13.73	51.91	12.72	53.68	12.29	41.35	12.61	40.00	13.70

No significant differences emerged between combined sexual minority sample (n=658) and matched heterosexual participants (n=658). Each sexual minority subgroup matched to heterosexuals from full sample (N=18,769) based on sex, race, BMI category, education, and age. There were no significant differences on any demographic variables between individual sexual minority groups (e.g., lesbian) and their matched heterosexual counterparts (heterosexuals matched to lesbian subgroup based on sex, race, BMI category, education, and age).  
<sup>a</sup>Categories for BMI are as follows: <18.5 kg/m<sup>2</sup> refers to underweight, 18.5-24.9 kg/m<sup>2</sup> refers to normal weight, 25-29.9 kg/m<sup>2</sup> refers to overweight, and ≥30.0 kg/m<sup>2</sup> refers to obesity.  
 HS, high school; votech, vocational or technical school.

TABLE 2 Descriptive statistics for outcome variables as a function of sample and sexual identity

	Total matched sample		Combined sexual minorities		Heterosexual		Gay		Lesbian		Bisexual		Other	
	N = 1,316		n = 658		n = 658		n = 134		n = 259		n = 236		n = 29	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
WBI	4.40	1.44	4.47	1.43	4.32	1.45	4.49	1.49	4.24	1.36	4.68	1.44	4.71	1.50
Weight cycles	3.10	0.91	3.06	0.94	3.14	0.89	3.11	0.92	3.10	0.90	2.97	0.99	3.28	0.88
SF-12 physical health	49.46	9.24	49.16	9.43	49.77	9.05	50.08	8.84	48.61	9.25	49.49	9.86	47.01	9.67
SF-12 mental health	41.69	11.00	40.85	10.98	42.52	10.97	43.09	10.56	43.85	10.32	37.09	10.73	35.21	9.48
Eating self-efficacy	50.70	16.97	42.76	16.91	50.68	17.01	50.90	19.03	52.59	16.35	49.06	16.25	46.86	16.01
Eating to cope	2.88	0.98	2.94	1.01	2.82	0.96	2.88	1.01	2.81	0.94	3.07	1.06	3.30	0.90
Physical activity	34.87	11.82	34.93	11.67	34.81	11.97	34.15	11.86	34.83	11.52	35.63	11.67	33.60	12.42
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Previous experience of weight stigma														
None	371	28.2	174	26.4	197	29.9	33	24.6	78	30.1	57	24.2	6	20.7
Any	945	71.8	484	73.6	461	70.1	101	75.4	181	69.9	179	75.8	23	79.3
Interpersonal sources of weight stigma														
Family of origin	772	58.7	404	61.4	368	55.9	76	56.7	146	56.4	160	67.8	22	75.9
Extended family	570	43.3	304	46.2	266	40.4	57	42.5	104	40.2	126	53.4	17	58.6
Family of procreation	517	39.3	265	40.3	252	38.3	55	41	77	29.7	122	51.7	11	37.9
Friends	672	51.1	353	53.6	319	48.5	74	55.2	120	46.3	140	59.3	19	65.5
Workplace	652	49.5	353	53.6	299	45.4	73	54.5	128	49.4	133	56.4	19	65.5
School	791	60.1	407	61.9	384	58.4	79	59	145	56	160	67.8	23	79.3
Health care professional	710	54.0	388	59.0	322	48.9	70	52.2	144	55.6	151	64	23	79.3
Community	772	58.7	400	60.8	372	56.5	77	57.5	145	56	157	66.5	21	72.4
Other	58	4.4	31	4.7	27	4.1	11	8.2	11	4.2	9	3.8	0	0

There were no significant differences between combined sexual minority group ( $n = 658$ ) and heterosexual group ( $n = 658$ ) on any of the variables, with one exception: health care as an interpersonal source of weight stigma (reported by 48.9% of heterosexuals vs. 59.9% of the combined sexual minority sample). This difference was not present among sexual identity subgroup comparisons and was not present when variables examined in logistic framework with demographic controls (i.e., age, race, sex, education, or BMI). For interpersonal sources of weight stigma, categories included the following: family of origin (mother, father, sister, brother), extended family (grandmother, grandfather, aunt, uncle, cousin), family of procreation (spouse, son, daughter), friends, workplace (coworker, employer/supervisor), school (classmate, teacher, professor), health care professional (doctor, nurse, dietitian, mental health professional), community (authority figure, sales clerk, restaurant server), and other.

SF-12, Short-Form Health Survey-12; WBI, weight bias internalization.



**TABLE 3** Regressions on weight stigma variables as function of sexual identity

	Weight bias internalization				Experienced weight stigma			
	Women <sup>a</sup>		Men <sup>b</sup>		Women <sup>c</sup>		Men <sup>d</sup>	
	$\beta$	<i>P</i>	$\beta$	<i>P</i>	OR	<i>P</i>	OR	<i>P</i>
WW membership (reference: Workshop + Digital)	0.02	0.554	-0.03	0.524	0.91	0.572	0.67	0.206
Age	-0.17	<0.001	-0.16	0.004	0.98	0.005	0.97	0.019
BMI	0.22	<0.001	0.21	<0.001	1.08	<0.001	1.07	0.027
Education	-0.03	0.398	0.01	0.854	1.08	0.297	1.26	0.120
Race (reference: white)								
Black	-0.08	0.009	-0.04	0.436	0.52	0.082	0.00	0.999
Asian	0.00	0.921	0.03	0.535	2.13	0.383	0.92	0.945
Hispanic	0.04	0.199	0.06	0.228	0.90	0.808	0.40	0.178
Other race	-0.04	0.183	0.06	0.255	4.13	0.034	0.15	0.003
Sexual orientation (reference: heterosexual)								
Gay or lesbian	-0.04	0.242	0.22	<0.001	1.21	0.313	1.02	0.952
Bisexual	0.00	0.977	0.06	0.244	1.18	0.434	0.43	0.203
Other sexual orientation <sup>e</sup>	-0.02	0.441			0.93	0.880		
Weight stigma <sup>f</sup>	0.24	<0.001	0.27	<0.001	1.54	<0.001	1.73	<0.001

<sup>a</sup> $R^2=0.19$ ,  $F(12, 996)=19.56$ ,  $P<0.001$ .

<sup>b</sup> $R^2=0.27$ ,  $F(11, 283)=9.43$ ,  $P<0.001$ .

<sup>c</sup> $\chi^2(12)=155.25$ , Cox & Snell  $R^2=0.14$ .

<sup>d</sup> $\chi^2(11)=72.44$ , Cox & Snell  $R^2=0.22$ .

<sup>e</sup>Only one man indicated an "other" sexual orientation, so this variable could not be included in models for men.

<sup>f</sup>Weight stigma refers to experienced weight stigma in weight bias internalization model and weight bias internalization in experienced weight stigma model.

OR, odds ratio.

**TABLE 4** Regressions on health variables as function of sexual identity and weight stigma in men

	Physical activity <sup>a</sup>		SF-12 physical <sup>b</sup>		SF-12 mental <sup>c</sup>	
	$\beta$	<i>P</i>	$\beta$	<i>P</i>	$\beta$	<i>P</i>
WW membership (reference: Workshop + Digital)	-0.05	0.394	0.02	0.792	-0.08	0.128
Age	-0.11	0.113	-0.19	0.002	0.04	0.535
BMI	-0.27	<0.001	-0.38	<0.001	0.10	0.097
Education	0.02	0.706	-0.04	0.518	-0.07	0.188
Race (reference: white)						
Black	0.06	0.362	0.05	0.417	-0.11	0.048
Asian	-0.09	0.204	-0.08	0.193	0.07	0.239
Hispanic	-0.05	0.409	0.06	0.291	-0.06	0.244
Other race	0.07	0.259	-0.04	0.525	-0.05	0.363
Sexual orientation (reference: heterosexual)						
Gay	-0.07	0.725	-0.02	0.901	0.10	0.555
Bisexual	0.41	0.066	-0.16	0.453	0.04	0.835
Experienced weight stigma	0.19	0.036	-0.07	0.406	-0.03	0.694
Weight bias internalization	-0.03	0.736	0.01	0.935	-0.45	<0.001
Gay*experienced weight stigma	-0.20	0.164	-0.08	0.564	-0.03	0.840
Bisexual*experienced weight stigma	0.00	0.970	0.06	0.564	0.05	0.607
Gay*weight bias internalization	0.08	0.729	0.14	0.486	-0.12	0.544
Bisexual*weight bias internalization	-0.42	0.062	0.21	0.295	-0.15	0.437

Interaction terms in model denoted with asterisks; for example, "gay\*experienced weight stigma" represents interaction of dummy variable "gay" (relative to heterosexual) and variable "experienced weight stigma."

<sup>a</sup> $R^2=0.12$ ,  $F(16, 255)=2.18$ ,  $P=0.006$ .

<sup>b</sup> $R^2=0.20$ ,  $F(16, 266)=4.13$ ,  $P<0.001$ .

<sup>c</sup> $R^2=0.28$ ,  $F(16, 266)=6.38$ ,  $P<0.001$ .

women. WBI and experienced weight stigma were examined in a linear and logistic regression, respectively (Table 3), as a function of WW membership (reference group: Workshop + Digital), age, BMI, education, race (reference group: white), and sexual orientation (reference group: heterosexual). Linear regressions were performed for physical activity, physical and mental HRQOL (Tables 4 and 5), and eating-related variables (eating self-efficacy, eating to cope, and weight cycling; Tables 6 and 7) as a function of controls (WW membership, age, BMI, education, race), weight stigma (experienced, internalized), sexual orientation, and the interaction of weight stigma (experienced, internalized) and sexual orientation to determine whether the relationship between weight stigma and these health variables was moderated by sexual orientation. Only one man reported having an unspecified sexual orientation; therefore, the effects of "other sexual orientation" are presented for women only. Given the size of the full sample, only probability values  $\leq 0.001$  were interpreted to reduce the likelihood of Type I error, and small  $\beta$  values were interpreted with caution (40).

## Results

Prior experiences of weight stigma were reported by 70.1% of heterosexual participants and 73.6% of SM participants (Table 2). No differences emerged in experienced stigma between SM and heterosexual participants. Multiple interpersonal sources of weight stigma were reported, with at least 40% of respondents in each sexual identity group

(and as many as 79%) indicating that they had experienced weight stigma from various people in their lives (Table 2). Classmates and teachers were reported as the most common sources of weight stigma by participants identifying as heterosexual (58.4%), gay (59%), and "other" (79.3%). Similarly high rates of weight stigma experienced at school were reported by lesbian (56%) and bisexual participants (67.8%), but close family members were the most common source of weight stigma reported by those identifying as lesbian (56.4%) and bisexual (67.8%). More than half of SM participants across sexual identity groups reported weight stigma from health care providers compared with 48.9% of heterosexual participants. Although simple comparisons (i.e., a  $\chi^2$  test) indicated that SM participants experienced significantly more stigma from health care providers than heterosexual participants, this difference was not significant when SM subgroups were compared with heterosexual matched peers separately, and no significant differences emerged when controlling for demographic characteristics in a logistic model (results available upon request).

No differences in WBI emerged between SM women and heterosexual women, but gay men endorsed higher WBI scores compared with heterosexual men ( $\beta=0.22, P<0.001$ ). Experienced weight stigma was associated with higher WBI scores among women ( $\beta=0.24, P<0.001$ ) and men ( $\beta=0.27, P<0.001$ ) regardless of sexual identity. Similarly, for every one-point increase in WBI, the odds of having experienced weight stigma increased by 1.73 (men) and 1.54 (women) independent of sexual identity (Table 3).

**TABLE 5** Regressions on health variables as function of sexual identity and weight stigma in women

	Physical activity <sup>a</sup>		SF-12 physical <sup>b</sup>		SF-12 mental <sup>c</sup>	
	$\beta$	<i>P</i>	$\beta$	<i>P</i>	$\beta$	<i>P</i>
WW membership (reference: Workshop + Digital)	-0.01	0.822	-0.01	0.735	0.02	0.590
Age	-0.11	0.004	-0.27	<0.001	0.17	<0.001
BMI	-0.19	<0.001	-0.38	<0.001	0.09	0.003
Education	0.01	0.777	0.05	0.064	-0.05	0.088
Race (reference: white)						
Black	-0.07	0.043	-0.01	0.653	-0.02	0.550
Asian	0.04	0.273	0.00	0.914	-0.05	0.050
Hispanic	0.00	0.997	-0.01	0.731	-0.01	0.691
Other race	0.00	0.984	0.00	0.930	-0.02	0.521
Sexual orientation (reference: heterosexual)						
Lesbian	0.07	0.548	0.07	0.476	-0.25	0.011
Bisexual	0.04	0.722	0.03	0.750	-0.25	0.015
Other sexual orientation <sup>d</sup>	-0.18	0.123	-0.16	0.092	-0.11	0.257
Experienced weight stigma	0.06	0.193	-0.01	0.800	-0.06	0.122
Weight bias internalization	-0.13	0.007	-0.06	0.166	-0.49	<0.001
Lesbian*experienced weight stigma	0.04	0.602	0.01	0.857	0.00	0.978
Bisexual*experienced weight stigma	0.05	0.550	-0.03	0.631	-0.07	0.241
Other sexual orientation*experienced weight stigma	0.06	0.433	-0.02	0.811	0.14	0.033
Lesbian*weight bias internalization	-0.06	0.616	-0.11	0.308	0.29	0.006
Bisexual*weight bias internalization	-0.03	0.796	-0.06	0.578	0.20	0.057
Other sexual orientation*weight bias internalization	0.14	0.279	0.15	0.124	-0.10	0.317

Interaction terms in model denoted with asterisks; for example, "lesbian\*experienced weight stigma" represents interaction of dummy variable "lesbian" (relative to heterosexual) and variable "experienced weight stigma."

<sup>a</sup> $R^2=0.08, F(19, 889)=4.09, P<0.001$ .

<sup>b</sup> $R^2=0.23, F(19, 953)=15.14, P<0.001$ .

<sup>c</sup> $R^2=0.30, F(19, 953)=20.97, P<0.001$ .

<sup>d</sup>Only one man indicated an "other" sexual orientation, so this variable could not be included in the models for men (Table 4).

**TABLE 6** Regressions on eating and weight variables as function of sexual identity and weight stigma in men

	Eating self-efficacy <sup>a</sup>		Eating to cope <sup>b</sup>		Weight cycling <sup>c</sup>	
	$\beta$	<i>P</i>	$\beta$	<i>P</i>	$\beta$	<i>P</i>
WW membership (reference: Workshop + Digital)	0.00	0.987	0.00	0.986	0.00	0.986
Age	-0.03	0.589	-0.02	0.728	0.15	0.017
BMI	-0.11	0.066	0.01	0.809	0.17	0.005
Education	-0.21	<0.001	0.07	0.129	0.02	0.757
Race (reference: white)						
Black	-0.08	0.158	0.05	0.264	0.05	0.353
Asian	0.08	0.190	0.04	0.466	0.04	0.575
Hispanic	-0.01	0.845	0.03	0.580	0.03	0.553
Other race	0.02	0.719	0.06	0.188	0.03	0.555
Sexual orientation (reference: heterosexual)						
Gay	0.10	0.539	-0.09	0.505	0.19	0.278
Bisexual	0.06	0.778	-0.48	0.006	0.34	0.115
Experienced weight stigma	0.06	0.473	0.01	0.888	0.17	0.049
Weight bias internalization	-0.32	<0.001	0.53	<0.001	0.21	0.020
Gay*experienced weight stigma	0.05	0.695	0.05	0.634	0.13	0.331
Bisexual*experienced weight stigma	0.10	0.284	0.01	0.871	-0.03	0.785
Gay*weight bias internalization	-0.23	0.233	0.19	0.263	-0.34	0.100
Bisexual*weight bias internalization	-0.14	0.480	0.44	0.009	-0.45	0.031

Interaction terms in model denoted with asterisks; for example "gay\*experienced weight stigma" represents interaction of dummy variable "gay" (relative to heterosexual) and variable "experienced weight stigma."

<sup>a</sup> $R^2=0.23$ ,  $F(16, 278)=5.27$ ,  $P<0.001$ .

<sup>b</sup> $R^2=0.45$ ,  $F(16, 278)=14.36$ ,  $P<0.001$ .

<sup>c</sup> $R^2=0.16$ ,  $F(16, 277)=3.17$ ,  $P<0.001$ .

Models examining HRQOL and physical activity yielded no significant relationships between sexual orientation, no interactions between experienced weight stigma and sexual orientation, and no interactions between WBI and sexual orientation for physical activity or HRQOL. WBI was associated with lower mental HRQOL scores in both women ( $\beta=-0.49$ ,  $P<0.001$ ) and men ( $\beta=-0.45$ ,  $P<0.001$ ) regardless of sexual orientation, but no other consistent effects emerged (Tables 4 and 5). Similarly, while the linear regression models explained a significant portion of the variance in eating self-efficacy, eating to cope, and weight cycling among both men and women, no effects of sexual orientation or interactions between sexual orientation and weight stigma (experienced, internalized) emerged. WBI was associated with lower eating self-efficacy in both women ( $\beta=-0.44$ ,  $P<0.001$ ) and men ( $\beta=-0.32$ ,  $P<0.001$ ), as well as more eating to cope in women ( $\beta=0.51$ ,  $P<0.001$ ) and men ( $\beta=0.53$ ,  $P<0.001$ ) (Tables 6 and 7), but no group differences emerged on these variables between SM and heterosexual participants.

## Discussion

Our study provides the first systematic examination of experienced and internalized weight stigma in SM adults and the first matched comparison of these variables to heterosexual peers. We found no differences in experienced weight stigma between SM and heterosexual participants; across sexual orientation identities, more than two-thirds (69%-79%) of participants reported experiencing weight stigma. High percentages of SM and heterosexual participants experienced weight stigma from multiple interpersonal sources; more than 50% of SM participants reported

experiencing weight stigma from their family members, classmates and teachers, health care providers, and other community members. While previous quantitative research on weight stigma has focused almost exclusively on heterosexual populations, our findings indicate that weight stigma and its negative health correlates are equally present in SM adults. Given previous research documenting adverse health consequences of weight stigma experienced by family members (41) and from health care providers (e.g., avoidance of health care) (42), our findings highlight the importance of increased attention to weight stigma and its health implications in SM populations, which may compound existing vulnerabilities to health disparities stemming from stigma due to sexual orientation.

While levels of WBI were equivalent in SM and heterosexual women, WBI scores were significantly higher in men who identified as gay relative to heterosexual. Prior research suggests that gay men are more likely than heterosexual men to idealize thinner body types, report body dissatisfaction, engage in appearance-based social comparisons, and perceive sociocultural pressures to be attractive (43). While these types of body image concerns were not examined in this study, future research is needed to determine whether these factors contribute to higher levels of WBI in gay men. In general, levels of WBI were fairly high across all sexual identity groups. The mean WBI scores across these groups (ranging from 4.24 to 4.71) are similar to previous studies of adults engaged in weight loss or behavioral lifestyle treatment programs (44). There were no differences between SM and heterosexual participants in the relationship between experienced weight stigma and WBI; across sexual identity groups, experiences of weight stigma were associated with higher WBI.



**TABLE 7** Regressions on eating and weight variables as a function of sexual identity and weight stigma in women

Variables in model	Eating self-efficacy <sup>a</sup>		Eating to cope <sup>b</sup>		Weight cycling <sup>c</sup>	
	$\beta$	<i>P</i>	$\beta$	<i>P</i>	$\beta$	<i>P</i>
WW membership (reference: Workshop + Digital)	-0.05	0.078	-0.02	0.533	-0.05	0.082
Age	0.02	0.612	-0.02	0.591	0.29	<0.001
BMI	-0.02	0.469	0.04	0.130	0.19	<0.001
Education	-0.07	0.026	0.09	0.001	0.07	0.022
Race (reference: white)						
Black	-0.02	0.542	0.00	0.972	-0.04	0.179
Asian	0.01	0.646	0.01	0.741	0.00	0.970
Hispanic	-0.04	0.228	0.03	0.203	-0.02	0.414
Other race	0.07	0.021	-0.05	0.047	-0.02	0.584
Sexual orientation (reference: heterosexual)						
Lesbian	-0.06	0.577	0.00	0.967	-0.14	0.180
Bisexual	-0.10	0.347	-0.07	0.474	-0.23	0.037
Other sexual orientation <sup>d</sup>	-0.12	0.214	0.00	0.966	0.10	0.337
Experienced weight stigma	0.05	0.284	0.08	0.032	0.14	0.001
Weight bias internalization	-0.44	<0.001	0.51	<0.001	0.12	0.009
Lesbian*experienced weight stigma	0.05	0.440	-0.03	0.616	0.05	0.400
Bisexual*experienced weight stigma	0.01	0.868	-0.03	0.613	-0.04	0.531
Other sexual orientation*experienced weight stigma	-0.04	0.580	-0.07	0.304	0.02	0.726
Lesbian*weight bias internalization	0.08	0.462	0.01	0.956	0.01	0.921
Bisexual*weight bias internalization	0.12	0.278	0.14	0.155	0.24	0.032
Other sexual orientation*weight bias internalization	0.16	0.120	0.10	0.297	-0.09	0.385

Interaction terms in model denoted with asterisks; for example, "lesbian\*experienced weight stigma" represents interaction of dummy variable "lesbian" (relative to heterosexual) and variable "experienced weight stigma."

<sup>a</sup> $R^2=0.18$ ,  $F(19, 987)=11.30$ ,  $P<0.001$ .

<sup>b</sup> $R^2=0.35$ ,  $F(19, 982)=27.60$ ,  $P<0.001$ .

<sup>c</sup> $R^2=0.19$ ,  $F(19, 985)=12.31$ ,  $P<0.001$ .

<sup>d</sup>Only one man indicated an "Other" sexual orientation, so this variable could not be included in the models for men (Table 6).

Finally, for both women and men across sexual orientation groups, WBI was associated with poorer mental HRQOL, lower self-efficacy to control eating behaviors, and more eating to cope with negative emotions and stress. Sexual orientation did not moderate these effects, suggesting that the relationship between WBI and poor health are present across SM groups. These findings are somewhat puzzling given evidence that SM populations have increased vulnerability to stressors and health disparities because of their stigmatized sexual identity (45). Thus, exposure to stigmatization stemming from body weight might be expected to create an additive health disadvantage. Future research that includes measurement of multiple types of stigma (e.g., both weight stigma and sexual identity stigma) as well as stigma-specific stress may help to inform these observed relationships. However, more broadly, our study findings align with previous research documenting links between WBI and psychological distress and maladaptive eating behaviors (21), including findings from the larger data set of WW members from which our study sample was derived, and suggest that WBI could contribute to behaviors that interfere with weight management and weight-related health. Future research should examine these relationships in SM populations with diverse weight and sexual identities using more comprehensive measures across a broader range of health indices.

Our study has several limitations. This research represents cross-sectional, self-reported data. The survey response rate was low and may have drawn participants for whom weight stigma is salient; there may have been some response bias in that participants who have

experienced weight stigma or are more affected by stigma may have been more likely to respond to the study advertisement, and it was not possible to collect information about nonresponders to conduct comparisons of these groups. This self-selected sample limits the generalizability of our findings to other WW members and treatment samples. Longitudinal research should examine the nature and health consequences of weight stigma in SM adults over time, including a broader range of health indices, and in both clinical and community samples of diverse weight categories. For example, SM men and those who identify as "Other" sexual orientation may have an increased risk of being underweight (5) and thus were likely missed in our WW sample. Recent evidence indicates that weight-based victimization is prevalent across diverse sexual and gender identities of youth (23); future research examining weight stigma in SM adults should include individuals with emerging sexual identities (e.g., asexual, pansexual), as well as more established sexual identities, and assess weight stigma across diverse gender and racial/ethnic identities. Although our study included multiple measures of weight stigma, we did not assess psychological or behavioral responses to interpersonal sources of stigma, which could help inform the relationship between weight stigma and health in future research.

Nevertheless, this study is the first to assess multiples aspects of weight stigma in SM adults matched to heterosexual adults on key sociodemographic variables, and our results provide novel insights about the nature and sources of experienced weight stigma, and degree of WBI,

among adults with different sexual identities. As weight stigma and sexual identity have primarily been studied in isolation of each other previously, our findings suggest the need for increased attention to the intersectionality of stigmatized identities related to body weight and sexual orientation and the need for recognition that people may be vulnerable to stigma and unfair treatment because of both their body weight and their sexual identity. These issues warrant attention not only in research but also in clinical practice. Health care professionals who work with patients who have obesity and/or individuals trying to lose weight should be aware that adults may be vulnerable to weight stigma across diverse sexual identities. Given that SM populations are already vulnerable to societal stigma and health disparities because of their sexual identity (25), facing weight stigma could potentially put them at additional risk for compounding stressors and adverse health outcomes.

## Conclusion

Our systematic comparison of SM adults versus a matched sample of heterosexual adults indicates that weight stigma is as common an experience for SM adults as for heterosexual adults engaged in weight management. We found no differences between SM and heterosexual participants in their experiences of weight stigma. Furthermore, our study suggests that regardless of sexual orientation, stigmatizing experiences about weight occur from multiple interpersonal sources, including family members and health care providers, and that stigmatizing experiences are likely to be internalized across sexual identity groups. For both SM and heterosexual participants, internalizing weight bias was associated with maladaptive eating behaviors and poor mental HRQOL. Collectively, these findings emphasize the need for increased research attention to weight stigma and its negative health implications in SM populations that have been neglected in studies on weight stigma. **O**

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