Self-stigma and weight loss: The impact of fear of being stigmatized

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ABSTRACT

The current study sought to examine whether two facets of weight self-stigma (fear of enacted stigma and self-devaluation) were associated with weight change and treatment engagement for 188 individuals participating in a 3-month online weight loss program. Fear of enacted stigma predicted less weight loss 3-months later after controlling for demographics, eating problems, and psychological symptoms. Self-devaluation did not predict weight loss. Neither weight self-stigma variable predicted engagement in the online program. These results add to the literature indicating the negative effects of weight self-stigma while highlighting the central role of fear of being stigmatized by others in this process.

INTRODUCTION

People with obesity are frequently exposed to bias, discrimination, and ridicule (e.g. Puhl and Heuer, 2009; Carr and Friedman, 2005; Maranto and Stencien, 2000; Karnehed et al., 2006; Puhl and Heuer, 2010; Schwartz et al., 2003) and are almost universally ascribed negative characteristics (Allon, 1982; Allison et al., 1991; Weiner, 1995). It is well documented that the direct experience of weight-related stigma is associated with a myriad of poor psychosocial outcomes (Puhl and Brownell, 2001; Puhl and Heuer, 2009; Puhl and Heuer, 2010). There is evidence suggesting that the effects of weight-based stigma become more severe when they are internalized (referred to hereafter as "weight self-stigma,"), particularly when combined with poor coping skills (Lillis et al., 2011; Friedman et al., 2005; Puhl and Brownell, 2006); making it a potentially important target for study and intervention.

Research on weight self-stigma has been limited in part by lack of definitional clarity. Weight self-stigma refers to both the self-devaluation and the fear of enacted stigma that result from one's identification with a stigmatized group (Link and Phelan, 2001; Lillis et al., 2010). Specifically, self-devaluation is the internalization of negative beliefs about oneself and association with negative characteristics due to the stigmatization. Fear of enacted stigma is the fear that others will have unfavorable attitudes and engage in ridicule, bias, or discrimination toward the individual. In short, self-stigma is when individuals come to associate themselves with negative characteristics and fear that others will too.

Consistent with the homeostatic theory of obesity, self-stigma could lead to poorer eating habits (e.g. more consumption of high calorie, high density comfort foods) by contributing to higher levels of discontent and negative affect (Marks, 2015; Marks, 2016). Research in controlled settings has supported this notion (e.g. Schvey et al., 2011), however there is currently little research on the impact of weight self-stigma on weight control efforts. In addition, the existing literature has focused exclusively on the self-devaluation component of weight self-stigma, and methodological aspects of existing research such as the reliance on self-report and cross-sectional designs limit interpretability.

Carels and colleagues (2009) found that the attribution of fewer positive and greater negative personality traits to people with obesity was associated with higher attrition from a weight loss program. However, it was only the attribution of fewer positive traits to individuals with obesity people that predicted poorer weight loss in the context of a self-help behavioral weight loss program (N=46). Although endorsement of stigmatizing attitudes relates to self-

devaluation, the study did not directly assess any aspect of weight self-stigma, such as applying these attitudes towards oneself (Carels et al., 2009).

A recent cross-sectional study (N=549) examined the impact of weight bias internalization on maintaining a weight loss. Weight bias internalization, which could be a good representation of the self-devaluation component of weight self-stigma, was associated with reduced odds for maintaining a weight loss (Puhl et al., 2017). Although this provides some evidence for the impact of weight self-stigma on weight control, the study was limited by a cross sectional design and the use of self-report methods that assessed weight loss and maintenance retrospectively.

The current study examines both aspects of weight self-stigma (self-devaluation and fear of enacted stigma) in the context of a 3-month, online weight loss program. The first aim was to test for associations between participant characteristics at baseline and weight self-stigma. The second aim was to examine the impact of self-stigma on weight loss. It was hypothesized that greater self-devaluation and fear of enacted stigma at baseline would be associated with poorer weight loss at 3 months and poorer treatment engagement. This study is the first to examine the impact of weight self-stigma prospectively in relation to weight change.

METHODS

Design

This is a non-randomized weight loss intervention study that utilized baseline variables to predict 3-month weight change. The study was part of a larger trial in which individuals with overweight or obesity were initially invited to complete a 3-month online weight loss intervention and then were randomized to one of 3 conditions to facilitate maintenance, which is still ongoing. Data analyzed for this report come from the initial, non-randomized 3-month intervention. All study activities were conducted at the Weight Control and Diabetes Research Center in Rhode Island, United States. The Miriam Hospital IRB approved all study procedures.

Participants

Inclusion Criteria. Included participants were 18-70 years of age and had a body mass index (BMI) between 27.5-45 kg/m^2.

Exclusion Criteria. Participants were excluded for current participation in another weight loss program; current pregnancy or plans to become pregnant during the study period; reported heart condition, chest pain or inability to

engage in walking exercise; report of conditions that would render them unlikely to follow the protocol, including terminal illness, plans to relocate, a history of substance abuse, or a recent psychiatric hospitalization.

Recruitment and screening. Participants were self-referred via newspaper ads and direct mailings and completed a phone screen that assessed BMI and basic health status information. Potential participants then attended an in-person group orientation session where detailed information about the study was provided and informed consent was obtained.

Intervention

The internet-based weight loss intervention was previously developed and shown to be effective for physician referred individuals with overweight and obesity (mean weight loss 5.8% at the end of the 3-month program; (Thomas et al., 2015). It included two main components: 1) Training in the behavioral weight control strategies that have been shown to be effective in past research studies accomplished via weekly interactive multi-media lessons that participants access via their computer, and 2) Automated, computer-generated feedback provided weekly to participants in response to their self-monitoring records to increase accountability. Each week a new lesson was made available to participants. Lessons were audio/video presentations by weight control experts on topics such as energy balance, exercise goals, unhealthy eating cues, problem-solving, restaurant eating, social influences, and motivation. Target calorie goals ranged from 1200-1500 kcal/day and 33-42 grams of fat/day (25% calories from fat) based on starting weight. Participants were encouraged to gradually increase their physical activity to at least 200 minutes per week by the end of the program. Participants were asked to track their daily calorie intake, exercise minutes, and weight via the online system (an interactive website which received data reports from participants). Paper materials were provided for self-monitoring, however participants were encouraged to use online tools for self-monitoring if it was preferred.

Automated feedback was provided based on reported weekly calorie, physical activity, and weight data. The message was based on the participant's self-monitoring data and baseline characteristics (e.g., weight, gender, health problems), and compared the participants' self-reported weight loss, diet and activity to the goals that had been prescribed by the program. Each message was crafted with an opening statement that commented on weight loss for the week and overall weight loss to date. Subsequent comments differed depending on whether or not the person was achieving the weight loss goal. The tailored message then provided praise or feedback on caloric intake and activity. For

example, if calories were above recommended, suggestions were provided for reducing intake, including the use of prepackaged frozen meals or following a more structured meal plan.

Measures

All measures were collected in-person at baseline and 3 months.

Anthropometric. Weight was measured to the nearest 0.1 kg using a digital scale and height was measured to the nearest millimeter with a stadiometer, using standardized procedures, and used to calculate BMI (kg/m^2).

Weight Self-Stigma Questionnaire. The WSSQ is a 12-item measure of weight self-stigma using a 5-point, Likert-type rating that ranges from "completely disagree" to "completely agree" (Lillis et al., 2010). It contains two subscales: Self Devaluation and Fear of Enacted Stigma. The Self Devaluation subscale contains 6 items that pertain to ascribing personal blame and endorsing negative characteristics because of one's weight. For example, one question reads, "I became overweight because I am a weak person." The Fear of Enacted Stigma subscale contains 6 items that assess the degree to which someone is concerned with the possibility of being the target of ridicule, bias, or discrimination because of one's weight. For example, one question reads, "Others will think I lack self-control because of my weight problems." Total weight self-stigma, and its subcomponents, have demonstrated adequate internal consistency and construct validity (Lillis et al., 2010).

Eating Inventory. The Eating Inventory is a widely used measure of eating behavior that includes three subscales, restraint, hunger, and disinhibition (higher scores indicate greater endorsement of each; Stunkard and Messick, 1985). Disinhibition represents the tendency to eat in an unrestrained manner in the presence of external (seeing food) or internal (feeling sad) cues to eat, while the restraint scale represents the degree to which participants tend to restrict their eating purposefully. The disinhibition and restraint subscales were used as measures of eating pathology in the current study, as both represent behavioral aspects of problems with eating.

PROMIS Initiative Short-Forms. Depression, anxiety, quality of life, and satisfaction with relationships were assessed using standardized measures from the NIH PROMIS (Patient Reported Outcomes Measurement Information System) initiative (DeWalt et al., 2007). The *Depression-Short Form* measures depression using 4 self-report, Likert scale items. Higher scores indicate more depression. The *Anxiety-Short Form* measures anxiety using 4 self-report, Likert scale items. Higher scores indicate more anxiety. The *PROMIS Global* form is a 10-item self-report measure that assesses physical and mental quality of life. Higher scores indicate better quality of life. The *Satisfaction with Relationships-Short*

Form measures relationship satisfaction using 4 self-report Likert, scale items. Higher scores indicate greater satisfaction with relationships. PROMIS measures are well-established with population norms and good validity (DeWalt et al., 2007).

      Engagement. Treatment engagement was measured by the number of weeks the participant logged into the system and the number of lessons viewed (both out of 12).

Statistical analysis

      All analyses were completed using IBM SPSS Statistics software version 24 for PC in 2017. First, baseline means and standard deviations were calculated for all study variables for descriptive purposes, including separate means for males and females for weight self-stigma variables. Next self-devaluation and fear of enacted stigma were correlated with all other study variables at baseline.

      To examine the impact of self-stigma on weight loss and treatment engagement, hierarchical regression models were conducted with two steps. In step 1, self-devaluation and fear of enacted stigma were entered as predictors along with demographic variables. In step 2, eating behaviors, anxiety, and depression were entered as covariates. The dependent variables were 3-month percent weight loss, number of weeks logged in, and number of lessons viewed, with each outcome analyzed in a separate model. Hierarchical regression was chosen to examine the effects of self-stigma variables with and without covariates, as it could be argued both that, (A) eating pathology and psychological symptoms are variables through which stigma could affect weight, and thus including them all in the model could underestimate the impact of self-stigma, and, (B) self-stigma might just be representing generalized pathology, and thus covariates are required to show an independent effect for self-stigma.

      Given that this is the first prospective study of the impact of subcomponents of weight self-stigma on weight loss, participants were also categorized as "High" (≥ 1 standard deviation above norms) or "Low" (remaining participants) on baseline self-devaluation and fear of enacted stigma for descriptive purposes, using the overweight/obese, non-treatment seeking norms for the WSSQ (Lillis et al., 2010). Mean comparisons (one-way ANOVA and Chi Squared) were performed on the High vs Low group for 3-month percent weight loss, percent achieving 5% weight loss, number of weeks logged in, and number of lessons viewed. This study is part of a larger randomized trial which was designed to achieve 80% power to detect a 2.5kg (between two experimental conditions) and a 4.0kg

(between primary experimental and control condition) weight change difference at 24 months among 3 conditions with 190 participants.

RESULTS

A total of 188 participants entered the study and began the internet-based weight loss intervention. The sample was 76% female, 88% White, and had an average age of 55 ± 11 years. Table 1 presents the means and standard deviations for study variables at baseline. As shown, women had higher levels of fear of baseline disinhibition, restraint, anxiety, total self-stigma, and fear of enacted stigma.

We also examined the proportion of this sample who were ≥1 sd above the norms for non-treatment seeking individuals (Lillis et al., 2010). Approximately 33% (n=63) of the participants reported high self-devaluation while 39% (n=74) reported high fear of enacted stigma. There was a significant difference based on gender, with a higher percentage of females vs males reporting high fear of enacted stigma (44% vs 24%, χ^2=5.52, p=.019), but no significant difference between men and women on self-devaluation (36% vs 27%, χ^2= 1.24, p=.265).

Weight Self-Stigma Correlations

The two aspects of self-stigma--Self-Devaluation and Fear of Enacted Stigma—were strongly correlated (r=.61) with each other. Table 2 shows the correlations for self-devaluation and fear of enacted stigma with other baseline variables. Both self-devaluation and fear of enacted stigma were significantly associated with more psychological symptoms and eating pathology. These correlations identified multiple possible confounding factors to control for in subsequent analyses.

Weight Loss

Table 3 shows the results of the hierarchical regression analysis. Higher fear of enacted stigma was associated with poorer weight loss over three months when controlling for baseline demographic variables and BMI, and remained significantly associated when eating pathology (disinhibition and restraint) and psychological symptoms (anxiety and depression) were added as covariates. Self-Devaluation was not significantly associated with weight change.

When examined categorically, participants who reported high fear of enacted stigma (i.e., ≥1 SD above norms) lost significantly less weight when compared to participants reporting less fear of enacted stigma (-5.67±3.8 vs -7.80±3.8; F=10.79, p=.001, d=.56; See Figure 1). Participants who reported high fear of enacted stigma were also less

likely to reach the 5% weight loss goal (57% vs 79%, χ^2=7.86, p=.005). There were no significant differences in mean weight change for participants categorized as reporting high self-devaluation vs low (-6.70±3.9 vs -7.11±3.9; F=0.33, p=.568, d=.11).

Program Engagement

Hierarchical regression analyses showed that weight self-stigma subcomponents were not associated with total weeks logged in (Step 1, self-devaluation p=.383; fear of enacted p=.542) and total lessons viewed (Step 1, self-devaluation p=.528; fear of enacted p=.870).

When examined categorically, participants who reported high self-devaluation viewed fewer lessons when compared to participants reporting less self-devaluation (7.31±3.9 vs 8.50±3.7; F=3.99, p=.047, d=.32). There were no significant differences for participants reporting high vs. low fear of enacted stigma on average number of lessons watched (7.49±3.7 vs 8.49±3.8; F=3.14, p=.078, d=.27).

There were no significant differences in mean number of weeks logged in for participants reporting high self-devaluation vs low (9.62±3.4 vs 10.09±3.3; F=0.85, p=.357, d=.14) or high fear of enacted stigma vs low (9.57±3.4 vs 10.18±3.3; F=1.49, p=.114, d=.18).

DISCUSSION

This study was the first to examine the impact of weight self-stigma on weight loss prospectively, and the first to examine the two aspects of weight self-stigma, self-devaluation and fear of enacted stigma, in the context of a weight loss intervention. Consistent with hypotheses, fear of enacted stigma was associated with less weight loss with a medium effect size. Contrary to hypotheses, self-devaluation was not associated with less weight loss.

Although the negative psychosocial impact of weight stigma is well documented, less is known about its impact on efforts to control weight. To date, research on weight self-stigma and weight control has focused on the impact of self-devaluation (often referred to as weight bias internalization or internalized stigma). Results from this study suggest that it is important to distinguish between the two aspects of self-stigma, and that fear of enacted stigma is an important dimension that warrants inclusion in future studies.

Gender also played a role in weight loss. Being female and having high fear of enacted stigma were both independently associated with poorer weight losses. Unfortunately, the low number of males in the sample precluded a

categorical comparison of high/low stigma in males vs females. Related results showed that men reported similar levels of self-devaluation, but lower levels of fear of enacted stigma. To date there has been little examination of gender differences in relation to weight self-stigma, and many studies on the topic have utilized exclusively female cohorts. The current study suggests that interaction between gender and stigma and their combined impact on weight control warrants future attention.

It is not clear from this study why fear of enacted stigma, but not self-devaluation, had an impact on weight loss. There was some evidence from the categorical analyses that fear of enacted stigma might be associated with poorer treatment engagement (fewer lessons viewed), however self-devaluation showed a similar, slightly stronger effect. Fear of enacted stigma is the experience of wondering and worrying about the degree to which others will reject, hurt, and discriminate against you, and could reflect a powerful demotivating process on behaviors related to controlling weight. Future research will be needed to clarify how this relationship manifests, for example by isolation, increased binge eating, or via negative psychological symptoms, among other possible explanations.

Both self-devaluation and fear of enacted stigma were strongly associated with symptoms of anxiety and depression, suggesting more impaired psychosocial functioning. This finding is consistent with the vast literature documenting the deleterious effects of stigma. Both components of weight self-stigma were also associated with disinhibited eating. This finding is consistent with recent literature suggesting that exposure to stigmatizing situations resulted in greater caloric consumption (Schvey et al., 2011).

This study has many strengths. It is the first to examine the impact of weight self-stigma on weight loss prospectively in the context of a weight loss intervention. In addition, it is the first to examine two aspects of weight self-stigma, self-devaluation and fear of enacted stigma. The study utilized objective measurement of weight and blind assessors, which is an improvement on previous research that assessed weight via self-report retrospectively. However, this study is limited by the use of self-report measures for all other variables, lack of diversity in the sample (both in gender and race/ethnicity), and the absence of measuring experienced stigma.

If supported by future research, the results of this study could indicate a new treatment target for weight loss interventions. Coping with the chronic concerns about mistreatment from others because of one's body shape may be an important aspect of a comprehensive weight loss intervention that is not currently addressed in standard behavioral interventions. In addition, addressing self-stigma might be important for other aspects of healthy life change, as a recent

study has shown internalized stigma attenuates response to a physical activity intervention (Mesinger and Meadows, 2017). While efforts are needed to produce the cultural change necessary to reduced experienced stigma due to body shape, self-stigma may be a target more amenable to immediate change (and potentially effective in an intervention), as it can be addressed by the individual and a treatment provider directly and does not rely on changing the behavior of others.

References

Allison DB, Basile VC and Yuker HE. (1991) The measurement of attitudes toward and beliefs about obese persons. *International Journal of Eating Disorders* 10: 599-607.

Allon N. (1982) The stigma of overweight in everyday life. In: Woldman BB (ed) *Psychological aspects of obesity.* New York: Van Nostrand Reinhold, 130-174.

Carels RA, Young KM, Wott CB, et al. (2009) Weight bias and weight loss treatment outcomes in treatment-seeking adults. *Annals of Behavioral Medicine* 37: 350-355.

Carr D and Friedman MA. (2005) Is obesity stigmatizing? Body weight, perceived discrimination, and psychological well-being in the United States. *Journal of Health and Social Behavior* 46: 244-259.

DeWalt D, Rothrock N, Yount S, et al. (2007) Evaluation of item candidates: The PROMIS qualitative item review. *Medical Care* 45: S12-21.

Friedman KE, Reichmann SK, Costanzo PR, et al. (2005) Weight stigmatization and ideological beliefs: Relation to psychological functioning in obese adults. *Obesity Research* 13: 907-916.

Karnehed N, Rasmussen F, Hemmingsson T, et al. (2006) Obesity and attained education: Cohort study of more than 700,000 Swedish men. *Obesity* 14: 1421-1428.

Lillis J, Levin ME and Hayes SC. (2011) Exploring the relationship between body mass index and health-related quality of life: A pilot study of the impact of weight self-stigma and experiential avoidance. *Journal of Health Psychology* 16: 722-727.

Lillis J, Luoma J, Levin M, et al. (2010) Measuring weight self stigma: The Weight Stigma Questionnaire *Obesity* 18: 971-976.

Link BG and Phelan JC. (2001) Conceptualizing stigma. *Annual Review of Sociology* 27: 363-385.

Maranto CL and Stencien AF. (2000) Weight discrimination: A multidisciplinary analysis. *Employee Responsibilities and Rights Journal* 12: 9-24.

Marks DF. (2015) Homeostatic theory of obesity. *Health Psychology Open* 2: 1-30.

Marks DF. (2016) Dyshomeostasis, obesity, addiction, and chronic stress. *Health Psychology Open* 3: 1-20.

Mesinger JL and Meadows A. (2017) Internalized weight stigma mediates and moderates physical activity outcomes during a healthy living program for women with high body mass index. *Psychology of Sport and Exercise* 30: 64-72.

Puhl R and Brownell KD. (2001) Bias, discrimination, and obesity. *Obesity Research* 9: 788-805.

Puhl R and Brownell KD. (2006) Confronting and coping with weight stigma: An investigation of overweight and obese adults. *Obesity* 14: 1802-1815.

Puhl R and Heuer CA. (2009) The stigma of obesity: A review and update. *Obesity* 17: 941-964.

Puhl R, Quinn DM, Weisz BM, et al. (2017) The role of stigma in weight loss maintenance among US adults. *Annals of Behavioral Medicine*.

Puhl RM and Heuer CA. (2010) Obesity Stigma: Important Considerations for Public Health. *American Journal of Public Health* 100: 1019-1028.

Schvey NA, Puhl RM and Brownell KD. (2011) The Impact of Weight Stigma on Caloric Consumption. *Obesity* 19: 1957-1962.

Schwartz MB, Chambliss HO, Brownell KD, et al. (2003) Weight bias among health professionals specializing in obesity. *Obesity Research* 11: 1033-1039.

Stunkard AJ and Messick S. (1985) The 3-Factor Eating Questionnaire to Measure Dietary Restraint, Disinhibition and Hunger. *Journal of Psychosomatic Research* 29: 71-83.

Thomas JG, Leahey TM and Wing RR. (2015) An Automated Internet Behavioral Weight-Loss Program by Physician Referral: A Randomized Controlled Trial. *Diabetes Care* 38: 9-15.

Weiner B. (1995) *Judgments of responsibility: A theory of social conduct,* New York: Guilford.

Table 1 Baseline means, standard deviations, and comparisons by gender

	Total Sample (N = 188)		Males (N = 45)		Females (N = 143)		P-Value for Males vs. Females
	Mean	SD	Mean	SD	Mean	SD	
BMI	35.71	12.05	35.56	4.56	35.76	10.25	.923
EI Disinhibition	9.85	3.43	8.56	3.43	10.25	3.33	.004
EI Restraint	9.82	4.33	8.01	4.09	10.39	4.26	.001
Anxiety	7.31	3.03	6.53	3.22	7.56	2.94	.048
Depression	6.39	3.11	6.11	3.02	6.48	3.14	.486
Weight Self Stigma	32.89	9.51	30.11	8.96	33.76	9.54	.024
Self-Devaluation	18.18	4.66	17.42	4.39	18.42	4.73	.211
Fear of Enacted Stigma	14.71	5.89	12.69	5.35	15.34	5.92	.008

Table 2 Correlations between baseline characteristics and weight self-stigma

subcomponents

	Self-Devaluation	Fear of Enacted Stigma
Baseline BMI	.09	.15*
Age	-.28**	-.35**
Gender	.09	.19**
EI Disinhibition	.46**	.55**
EI Restraint	-.19**	-.09
Anxiety	.43**	.55**
Depression	.38**	.52**

**p<.01; *p<.05

Table 3 Hierarchical regression results using self-stigma and covariates to predict 3-month percent weight change

	B	se	p	r^2	Δr^2	F
Step 1				0.187		6.450**
Age	-0.018	0.034	0.588			
Gender	2.709	0.74	0.000			
Baseline BMI	0.042	0.023	0.075			
Self-Devaluation	-0.138	0.082	0.093			
Fear of Enacted Stigma	0.155	0.066	0.021			
Step 2				0.211	0.024	4.050**
Age	-0.021	0.035	0.554			
Gender	2.216	0.799	0.006			
Baseline BMI	0.041	0.025	0.100			
Self-Devaluation	-0.113	0.084	0.181			
Fear of Enacted Stigma	0.168	0.077	0.031			
Disinhibition	-0.01	0.115	0.930			
Restraint	0.144	0.076	0.061			
Anxiety	0.037	0.181	0.840			
Depression	-0.103	0.167	0.539			

**P<.01

Figure 1 Three-month percent weight loss by self-stigma category

Fear of Enacted

Self Devaluation

LOW HIGH

LOW HIGH

p=.001

p=.568