



# Weight Stigma and Diabetes Stigma: Implications for Weight-Related Health Behaviors in Adults With Type 2 Diabetes

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There has been little recognition that people with type 2 diabetes are vulnerable to weight stigma and diabetes stigma and almost no research examining the implications of these forms of stigma for their health and well-being. This study examined health behavior correlates of weight stigma and diabetes stigma in 1,227 adults with type 2 diabetes. Results showed that experiencing weight stigma in health care, experiencing differential treatment from others because of their diabetes, and engaging in self-stigma for diabetes and body weight were each significantly associated with increased frequency of binge eating and eating as a coping strategy to deal with negative feelings. Internalizing weight stigma was also significantly associated with lower levels of physical activity and worse self-rated health. These findings suggest that initiatives to improve the health and well-being of people with type 2 diabetes must consider the potentially harmful roles of weight stigma and diabetes stigma.

People with obesity (defined as a BMI  $>30$  kg/m<sup>2</sup>) have an increased risk for type 2 diabetes and are seven times more likely to develop type 2 diabetes than individuals with a BMI of 19–25 kg/m<sup>2</sup> (1). Because most people with type 2 diabetes have a BMI that classifies them as having overweight or obesity (2), the importance of addressing obesity and weight management in diabetes care is well established (3). Yet, despite the strong relationship between obesity and type 2 diabetes, there has been little recognition that people with type 2 diabetes are vulnerable to weight stigma (4,5), despite substantial evidence that weight stigma is commonly directed toward people with obesity and undermines their health (6).

Prevalence rates of weight discrimination range from 19 to 41% in people with obesity, with increased prevalence in individuals with a higher BMI (7). Adverse health consequences of weight stigma have been well documented and include psychological distress and disordered eating behaviors (8,9), as well as increased rates of cardiometabolic risk factors that are particularly relevant to the development of type 2 diabetes such as weight gain (10), elevated blood glucose (11), physiological reactivity (12), and increased oxidative stress (13), as well as increased risk of having a cardiometabolic diagnosis (14) and metabolic syndrome (15). Additionally, people who experience weight stigma may internalize these negative experiences, engaging in self-stigma and personal blame and thereby contributing to additional negative health consequences (16). Furthermore, within the context of health care, standard weight-focused approaches to patient care (e.g., emphasizing weight loss) may inadvertently contribute to disordered eating and further stigmatize individuals with higher weight (17–19).

Given the high prevalence and negative health implications of weight stigma, many of which can contribute to obesity, increase cardiometabolic risk, and potentially impair diabetes management, it is surprising that there has been almost no attention given to people with type 2 diabetes in the expanding literature on weight stigma. Initial evidence has found that adults with type 2 diabetes who experience weight discrimination report elevated diabetes-specific distress, worse diabetes self-care behaviors, and worse diabetes outcomes that persist after accounting for BMI, depressive symptoms, and

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demographic characteristics (4). Although these initial findings suggest that weight stigma may be harmful for people with type 2 diabetes, there is much that is not yet understood about the implications of weight stigma for specific health behaviors and health outcomes in this population.

In addition to experiencing weight stigma, having a diagnosis of type 2 diabetes can incur its own stigma. Researchers have begun to examine the various forms of stigma that people face because of their type 2 diabetes status. The limited evidence in this area comes primarily from several Australian studies showing that adults with type 2 diabetes report being stereotyped, blamed, and treated unfairly by others because of their diabetes status and also engage in self-stigma such as blaming themselves for their diabetes (20,21). Outside of Australia, one U.S. study documented that 52% of adults with type 2 diabetes ( $N = 12,000$ ) perceived social stigma from others because of their diabetes (22). Evidence further suggests that experiencing diabetes stigma is associated with adverse implications for diabetes management and treatment, including more negative insulin appraisals (22,23).

Importantly, these studies align with calls for increased recognition of, and responsiveness to, diabetes stigma and its potentially negative impact on the well-being of people with type 2 diabetes (24,25), including acknowledgment from Diabetes UK (26) and the International Diabetes Federation (27) that increased attention to diabetes stigma is warranted. However, the paucity of research in this area leaves many unanswered questions, and the health implications of diabetes stigma remain largely unexplored. To our knowledge, no research has examined links between diabetes stigma and factors such as eating behaviors and physical activity, which are particularly important health behaviors for people with type 2 diabetes, both for promoting optimal weight-related health and behavioral management of diabetes.

Collectively, this body of literature suggests that both weight stigma and diabetes stigma warrant increased research attention in people with type 2 diabetes. In particular, it is important to determine implications for health when people with type 2 diabetes encounter and/or internalize these forms of stigma. This study aimed to examine health behavior correlates of weight stigma and diabetes stigma among U.S. adults with type 2 diabetes. Because both experienced and internalized stigma can have negative consequences for health behaviors, we specifically assessed links between

weight-related health behaviors (maladaptive eating behaviors, physical activity, and weight loss attempts), self-rated health, and both experienced stigma (general and health care-specific experiences of stigma) and internalized stigma related to body weight and diabetes.

## Research Design and Methods

### Participants and Procedure

Participants were recruited by Interviewing Services of America (ISA), an online health care-focused research panel of >2 million participants with >150 medical conditions, including ~200,000 participants with type 2 diabetes. ISA validates geographic and demographic information for panelists. In exchange for participation, panelists receive incentives (e.g., gift cards to national retail chains or charitable donations). Advertisements are disseminated to panel members by phone, e-mail, and media postings. Advertisements for this study directed interested panel members to an online survey link that contained a consent form. Eligibility criteria included a previous diagnosis of type 2 diabetes, residency in the United States, and age  $\geq 18$  years. After providing consent, participants completed study questionnaires online. The survey was hosted by Qualtrics.com and included a battery of self-report measures to assess participants' experiences of weight stigma and diabetes stigma, eating and physical activity behaviors, and self-rated health. The study protocol was approved by the Institutional Review Board at the University of Connecticut.

For this study, we aimed to obtain a sample of 1,200 participants. A total of 1,458 individuals entered the survey, but 231 were excluded for completing <50% of the survey or for missing information on key demographics (BMI, sex, race/ethnicity, and type 2 diabetes diagnosis). Data collection occurred in August 2019, and the final sample consisted of 1,227 individuals.

### Measures

#### Participant Characteristics

Participants completed a demographics questionnaire that included items on age, race/ethnicity, sex, education, income, current height, and current weight. BMI was derived from height and weight reports according to Centers for Disease Control and Prevention guidelines and classifications (28). Participants also reported how long they had had type 2 diabetes.

## Weight Stigma

Three aspects of weight stigma were assessed: general experiences of weight stigma, perceived weight stigma in health care, and internalized weight bias. General experiences of weight stigma encompassed three yes/no questions in which participants indicated whether they had ever been teased, treated unfairly, or discriminated against because of their weight. Participants who answered “no” to all three items were coded as zero; those who answered “yes” to any of the three items were coded as 1 (29). Perceived weight stigma in health care was assessed using a single question: “In the last 12 months, did you ever feel that a doctor judged you because of your weight?” Participants responded via a 3-point scale (1 = never, 2 = sometimes, 3 = often) (30). Internalized weight bias was assessed using the 10-item modified Weight Bias Internalization Scale, which assesses endorsement of weight-related stereotypes toward oneself and self-devaluation because of weight (31–33). Participants indicated how much they agreed with 10 statements (e.g., “I hate myself for my weight”) using a 7-point scale (from 1 = strongly disagree to 7 = strongly agree), with higher scores reflecting greater levels of internalized weight bias ( $\alpha = 0.95$ ).

## Diabetes Stigma

Diabetes stigma was assessed using the Type 2 Diabetes Stigma Assessment Scale (20). This measure includes 19 items with three subscales: 1) “treated differently” (six items,  $\alpha = 0.94$ ), 2) “blame and judgement” (seven items,  $\alpha = 0.92$ ), and 3) “self-stigma” (six items,  $\alpha = 0.93$ ). Sample items from these scales include: “Some people see me as a lesser person because I have type 2 diabetes,” “I have been told that I brought my type 2 diabetes on myself,” and “Having type 2 diabetes makes me feel like a failure,” respectively. Participants indicate how much they agree with each of the 19 statements, using a 5-point scale (from 1 = strongly disagree to 5 = strongly agree). Items within each subscale are summed such that higher scores reflect greater diabetes stigma.

## Eating as a Coping Strategy

Participants completed the 5-item Coping Subscale of the Motivations to Eat Measure (34). Respondents were asked how frequently they eat in response to feelings of being depressed, sad, worthless, or inadequate and if they eat as a way to cope, comfort themselves, and distract themselves. Response options for each question include “almost never or never,” “rarely,” “sometimes,” “often,” and “almost always or

always.” Higher scores indicate more frequent use of eating as a coping strategy ( $\alpha = 0.93$ ).

## Binge Eating

Two indices of binge eating were derived using three items from the Questionnaire for Eating and Weight Patterns–5 (35). Two items asked participants to report whether or not they had engaged in binge eating episodes during the past 3 months and whether or not they experienced feelings of loss of control during these episodes. Participants who responded affirmatively to both questions were classified as engaging in binge eating with loss of control. Participants were also asked to rate how frequently these episodes occurred during the past 3 months (from 1 = <1 episode per week to 6 =  $\geq 14$  episodes per week). A frequency variable was constructed by combining all three items, with 0 indicating no binge eating with loss of control and scores of 1 to 6 indicated an increasing number of episodes per week.

## Attempted Weight Loss in the Past Year

Using a yes/no response, participants indicated whether they had intentionally attempted to lose weight or keep from gaining weight during the past year (36).

## Physical Activity

Using the Godin Leisure-Time Exercise Questionnaire, participants indicated how often they engaged in mild, moderate, or strenuous physical activity in a typical week (37). Participants were asked how many times per week, on average, they engaged in these different types of exercise for at least 15 minutes. Following scoring instructions, time spent exercising is weighted by type (i.e., mild, moderate, or strenuous) for a total score, with higher scores indicating more physical activity per week.

## Self-Rated Health

Participants used a 5-point scale (from 1 = excellent to 5 = poor) to rate their health in response to the question, “In general, how would you rate your health?” Lower scores indicate better self-rated health (38).

## Statistical Analyses

All variables were examined for skewness and kurtosis and found to be in acceptable ranges ( $-2$  to  $+2$ ). Linear regressions assessed relationships between demographics, BMI, weight stigma (general experiences of weight stigma, perceived weight stigma in health care, and weight bias internalization), and diabetes stigma

on eating to cope with stress, physical activity, binge eating, and self-rated health. Similarly, logistic regressions assessed relationships between demographics, BMI, weight stigma (experienced weight stigma, weight stigma in health care, and weight bias internalization), and diabetes stigma on weight loss attempts in the past year and likelihood of binge eating with loss of control.

Demographics included years since diagnosis of type 2 diabetes, BMI, age, education, income, sex, and race/ethnicity. Sex and race/ethnicity were dummy coded with males and White individuals as the reference group, respectively. Two individuals identifying as transgender were included in the sex reference group; however, excluding these individuals did not change the results. For inclusion, these individuals were retained. “Other” race refers to individuals who identified as multiracial or Native American.

To confirm the assumption that the predictor and outcome variables had a linear relationship, we examined scatterplots of standardized residuals with the standardized predicted values and fitted a Loess curve through them to detect nonlinearity for each model. In each model, the relationship of standardized predicted to residuals was linear around zero. To confirm the assumption that the residuals were normally distributed, we examined the residuals using P-P and Q-Q plots of the standardized residuals for each model. In each case, the standardized residuals conformed to the expected normal values.

## Results

### Participant Characteristics

On average, participants were 52.04 years of age (SD 14.96 years) and 51.4% were females. The mean BMI of participants was 31.64 kg/m<sup>2</sup> (SD 8.86 kg/m<sup>2</sup>), and, on average, participants had been diagnosed with type 2 diabetes for ~9 years (mean 8.96, SD 8.04 years). Participants identified as non-Hispanic White (75.1%), Black (12.4%), Hispanic White (7.3%), Asian (4.1%), or other (1.1%). Most participants identifying as “other” indicated that they were biracial, multiracial, or Native American. Education was normally distributed; 15.2% had completed postgraduate education, and an additional 16.6% had obtained a high school diploma or equivalent, with 1.8% having less than a high school education. Annual income was slightly right skewed; 48.4% earned <\$50,000, and 19.8% earned >\$100,000 per year.

### Descriptive Statistics

Table 1 presents summary statistics for each dependent variable, including eating as a coping strategy (mean 2.55, SD 1.14), binge eating with loss of control (28.7%), binge eating frequency (mean 0.81, SD 1.46), physical activity (mean 32.32, SD 11.89), self-rated health (mean 3.22, SD 0.94), and attempted weight loss in the past year (73.3%). A total of 53% of participants indicated that they had been stigmatized for their weight, and 44.1% had experienced weight stigma from a health care provider either sometimes or often. The mean score for internalized weight bias was 3.89 (SD 1.67). Diabetes subscale scores were as follows: treated differently, mean 14.31 (SD 6.88); blame and judgment, mean 20.61 (SD 7.50); and self-stigma, mean 15.57 (SD 7.14).

### Linear Regressions

Linear regressions are summarized in Table 2. Demographics (years diagnosed with type 2 diabetes, BMI, age, income, education, sex, and race/ethnicity), weight stigma (experienced weight stigma, weight stigma in health care, and internalized weight bias), and diabetes stigma (differential treatment, blame and judgment, and self-stigma) accounted for 50% of the variance in eating as a coping strategy [ $F(16, 1205) = 75.35, P < 0.001$ ], 24% of the variance in binge eating frequency [ $F(16, 1205) = 23.73, P < 0.001$ ], 23% of the variance in physical activity [ $F(16, 1193) = 22.23, P < 0.001$ ], and 21% of the variance in self-rated health [ $F(16, 1207) = 20.00, P < 0.001$ ]. The  $\beta$

**TABLE 1** Descriptive Statistics for Eating as a Coping Strategy, Binge Eating, Attempted Weight Loss, Physical Activity, and Self-Rated Health

	Mean (SD)
Eating as a coping strategy*	2.55 (1.14)
Binge eating frequency†	0.81 (1.46)
Physical activity‡	32.32 (11.89)
Self-rated health§	3.22 (0.94)
	<i>n</i> (%)
Attempted weight loss in the last year	900 (73.3)
Binge eating with loss of control	352 (28.7)

\*Scores on the Eating to Cope Subscale ranged from 1 to 5, with higher scores indicating more eating to cope. †Binge eating frequency ranged from 0 (no binge episodes) to 6 ( $\geq 14$  episodes per week). ‡Leisure-time physical activity scores represent a weighted score (based on exercise type and minutes) ranging from 17 to 68, with higher scores indicating more activity. §Self-rated health scores ranged from 1 (excellent) to 5 (poor).

**TABLE 2** Linear Regressions on Eating to Cope With Stress, Physical Activity, Binge Eating, and Health

	Eating as a Coping Strategy			Binge Eating Frequency		
	$R^2 = 0.50, F(16, 1205) = 75.35, P < 0.001$			$R^2 = 0.24, F(16, 1205) = 23.73, P < 0.001$		
	B	$\beta$	P	B	$\beta$	P
Years with type 2 diabetes	0.01	0.04	0.099	0.00	0.00	0.915
BMI	-0.01	-0.05	0.063	-0.02	-0.09	0.003
Age	-0.01	-0.14	<0.001	-0.01	-0.13	<0.001
Education	0.03	0.03	0.200	0.00	0.00	0.939
Income	0.01	0.02	0.421	0.01	0.02	0.588
Female (ref. male)	0.02	0.01	0.683	-0.11	-0.04	0.168
Race/ethnicity (ref. White)						
Asian	-0.07	-0.01	0.559	-0.05	-0.01	0.803
Black	-0.04	-0.01	0.566	0.14	0.03	0.240
Hispanic	-0.03	-0.01	0.757	-0.32	-0.06	0.032
Other	-1.08	-0.05	0.021	-0.58	-0.02	0.433
Weight stigma						
Experienced weight stigma	0.05	0.02	0.450	0.07	0.02	0.472
In health care	0.16	0.09	0.001	0.36	0.16	<0.001
Internalized	0.19	0.28	<0.001	0.13	0.15	<0.001
Diabetes stigma						
Treated differently	0.01	0.09	0.023	0.02	0.11	0.027
Blame and judgment	0.00	-0.02	0.613	-0.01	-0.05	0.274
Self-stigma	0.04	0.28	<0.001	0.02	0.11	0.023
				Physical Activity		
				$R^2 = 0.23, F(16, 1193) = 22.23, P < 0.001$		
				B	$\beta$	P
Years with type 2 diabetes	-0.02	-0.01	0.687	0.00	0.02	0.386
BMI	-0.24	-0.18	<0.001	0.02	0.22	<0.001
Age	-0.19	-0.23	<0.001	0.00	0.06	0.076
Education	0.69	0.08	0.007	-0.03	-0.04	0.154
Income	0.73	0.11	<0.001	-0.12	-0.23	<0.001
Female (ref. male)	-2.63	-0.11	<0.001	0.09	0.05	0.074
Race/ethnicity (ref. White)						
Asian	-1.06	-0.02	0.509	0.17	0.04	0.179
Black	1.16	0.03	0.228	0.02	0.01	0.805
Hispanic	0.56	0.01	0.650	-0.10	-0.03	0.297
Other	4.07	0.02	0.504	-0.31	-0.02	0.534
Weight stigma						
Experienced weight stigma	-1.00	-0.04	0.210	-0.06	-0.03	0.353
In health care	1.05	0.06	0.078	-0.09	-0.06	0.059
Internalized	-0.77	-0.11	0.012	0.09	0.16	<0.001
				Self-Rated Health*		
				$R^2 = 0.21, F(16, 1207) = 20.00, P < 0.001$		
				B	$\beta$	P

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**TABLE 2** Linear Regressions on Eating to Cope With Stress, Physical Activity, Binge Eating, and Health (continued)

	Physical Activity			Self-Rated Health*		
	B	$\beta$	P	B	$\beta$	P
	$R^2 = 0.23, F(16, 1193) = 22.23, P < 0.001$			$R^2 = 0.21, F(16, 1207) = 20.00, P < 0.001$		
Diabetes stigma						
Treated differently	0.16	0.10	0.047	0.00	0.02	0.631
Blame and judgment	0.09	0.05	0.275	0.01	0.09	0.079
Self-stigma	-0.04	-0.03	0.614	0.00	-0.03	0.616

\*Lower scores indicated better health.

coefficients described in the subsequent paragraphs describe the standardized relationship between the focal stigma variable specified and the dependent variable, independent of all other variables in the model (i.e., other stigma variables and demographic and anthropometric covariates).

Internalized weight bias was positively associated with eating as a coping strategy ( $\beta = 0.28, P < 0.001$ ), binge eating frequency ( $\beta = 0.15, P = 0.001$ ), and self-rated health (i.e., worse health;  $\beta = 0.16, P < 0.001$ ); it was negatively associated with physical activity ( $\beta = -0.11, P = 0.012$ ). Experiencing weight stigma in health care was positively associated with eating as a coping strategy ( $\beta = 0.09, P = 0.001$ ) and frequency of binge eating ( $\beta = 0.16, P < 0.001$ ) but was not associated with physical activity or self-rated health. A history of general experiences of weight stigma was not associated independently with eating as a coping strategy, physical activity, binge eating frequency, or self-rated health.

With respect to diabetes stigma, the “treated differently” and “self-stigma” subscales were both positively associated with eating as a coping strategy (treated differently:  $\beta = 0.09, P = 0.023$ ; self-stigma:  $\beta = 0.28, P < 0.001$ ) and more frequent binge eating (treated differently:  $\beta = 0.11, P = 0.027$ ; self-stigma:  $\beta = 0.11, P = 0.023$ ). Neither subscale was associated with self-rated health; however, the “treated differently” subscale was associated with more physical activity ( $\beta = 0.10, P = 0.047$ ). The “blame and judgment” subscale was not associated independently with eating as a coping strategy, binge eating frequency, physical activity, or self-rated health.

### Logistic Regressions

Table 3 presents results from logistic regressions. A Cox & Snell  $R^2$  suggested that demographics, weight stigma,

and diabetes stigma accounted for 11% of the variance in weight loss attempts during the past year and 19% of the variance in binge eating with loss of control. The coefficients below describe the unstandardized logarithmic relationship between the focal stigma variable specified and the dependent variable independent of all other stigma variables and demographic and anthropometric covariates. The odds ratio describes the change in logarithmic odds increase on the dependent variable as a function of a 1-unit increase in the focal stigma variable. With respect to weight stigma, the logistic regressions indicated that every 1-unit increase in internalized weight bias was associated with a 1.42 increase in odds of having attempted weight loss in the past year ( $B = 0.35, P < 0.001$ ) and a 1.33 increase in odds of binge eating with loss of control ( $B = 0.29, P < 0.001$ ). Weight stigma in health care was associated with a 1.31 odds increase of binge eating with loss of control ( $B = 0.27, P = 0.037$ ) but was not related to weight loss attempts. General experiences of weight stigma were unrelated to weight loss attempts or binge eating with loss of control. With respect to diabetes stigma, for every 1-unit increase in the “blame and judgment” subscale, the odds of having attempted weight loss in the past year increased by 1.04 ( $B = 0.04, P = 0.047$ ); conversely, the “treated differently” subscale was associated with lower odds of having attempted weight loss in the past year (odds decrease 0.95,  $B = -0.06, P = 0.006$ ). Every 1-unit increase in diabetes self-stigma was associated with a 1.04 odds increase in the likelihood of binge eating with loss of control ( $B = 0.04, P = 0.034$ ), but diabetes self-stigma was not related to weight loss attempts. Neither the “blame and judgment” nor the “differential treatment” subscales was associated with binge eating with loss of control.

**TABLE 3** Logistic Regressions on Attempted Weight Loss in the Past Year and Binge Eating With Loss of Control

	Attempted Weight Loss in the Past Year			Binge Eating With Loss of Control		
	$\chi^2 (16) = 136.37, R^2 = 0.11$			$\chi^2 (16) = 254.78, R^2 = 0.19$		
	B	$\beta$	P	B	$\beta$	P
Years with type 2 diabetes	-0.01	0.99	0.324	0.00	1.00	0.973
BMI	0.02	1.02	0.063	-0.02	0.98	0.047
Age	0.00	1.00	0.889	-0.02	0.98	0.001
Education	0.10	1.11	0.071	0.06	1.06	0.316
Income	0.13	1.13	0.009	-0.02	0.98	0.680
Female (ref. male)	0.29	1.34	0.045	-0.24	0.78	0.110
Race/ethnicity (ref. White)						
Asian	0.23	1.26	0.529	-0.13	0.88	0.736
Black	0.15	1.16	0.487	0.17	1.18	0.451
Hispanic	0.21	1.23	0.479	-0.44	0.65	0.118
Other	-1.24	0.29	0.314	-19.93	0.00	0.999
Weight stigma						
Experienced weight stigma	0.25	1.28	0.168	0.26	1.30	0.160
In health care	0.19	1.21	0.184	0.27	1.31	0.037
Internalized	0.35	1.42	<0.001	0.29	1.33	<0.001
Diabetes stigma						
Treated differently	-0.06	0.95	0.006	0.00	1.00	0.958
Blame and judgment	0.04	1.04	0.047	0.01	1.01	0.530
Self-stigma	-0.02	0.99	0.421	0.04	1.04	0.034

## Discussion

Our study provides new insights about the health implications of weight stigma and diabetes stigma for adults with type 2 diabetes. In particular, our study begins to address a key gap in this understudied area by examining both of these forms of stigma in relation to maladaptive eating behaviors, physical activity, and self-rated health. Although our findings are somewhat mixed, they suggest that certain types of weight stigma and diabetes stigma are associated with adverse health behaviors (especially binge eating and eating as a coping strategy) for individuals with type 2 diabetes. Collectively, this initial evidence indicates the need for additional research to clarify the ways in which weight stigma and diabetes stigma may interfere with health behaviors in this population.

Several types of weight stigma emerged as significant correlates with health behaviors. Although having a general history of experiences with weight stigma was not associated independently with weight-related

health behaviors, participants with higher levels of internalized weight bias reported significantly more engagement in eating as a coping strategy, greater frequency of binge eating, lower levels of physical activity, and worse self-rated health. These findings are consistent with previous evidence in both the general population and clinical samples of adults engaged in weight loss treatment showing consistent relationships between internalized weight bias and adverse health consequences, particularly maladaptive eating behaviors (16). In addition, participants in the current study who indicated that a doctor had judged them about their weight reported a greater frequency of engaging in binge eating and were more likely to eat as a coping strategy in response to stress or negative emotions. This finding supports some previous research showing that perceived weight stigma from a health care provider can impair weight loss in adults who have obesity (30), although little work has yet assessed whether different interpersonal sources of weight stigma have differential effects on health behaviors. Taken together, our results

suggest that weight stigma may have negative implications for weight-related health behaviors in adults with type 2 diabetes and that internalization of weight stigma may be potentially more harmful for health behaviors than having a history of experiencing weight stigma.

Several aspects of diabetes stigma were also significantly associated with maladaptive eating behaviors in the current study. Specifically, being treated differently by others because of one's diabetes and engaging in self-stigma related to one's diabetes were both associated with eating as a coping strategy and greater frequency of binge eating. Only one subscale ("treated differently") was associated with physical activity, although the association was positive, and none of the subscales on the Diabetes Stigma Assessment Scale were related to participants' reported levels of self-rated health. Thus, diabetes stigma may have more direct implications for maladaptive eating behaviors than other weight-related health behaviors. To our knowledge, this study is the first to examine links between diabetes stigma and weight-related health behaviors, so it will be important for future studies to clarify the nature and extent of these relationships.

Somewhat conflicting findings emerged in the relationships between both diabetes stigma and weight stigma and weight loss attempts for participants in our sample. Internalizing weight stigma was associated with increased odds of attempting weight loss in the past year but also with increased odds of binge eating with loss of control. Similarly, although higher diabetes stigma scores on the "blame and judgment" subscale were associated with greater odds of attempted weight loss during the past year, higher scores on the "treated differently" subscale of this measure were associated with lower odds of attempted weight loss. Thus, it could be that some aspects of weight stigma and diabetes stigma initially motivate attempts to lose weight, maybe with some short-term success, but also contribute to disordered eating behaviors that can become exacerbated over time and/or counter long-term weight management.

The broader weight stigma literature has demonstrated consistent links between weight stigma and disordered eating (8,39) but somewhat mixed findings regarding the role of weight stigma in weight loss (40,41), although several studies indicate that weight stigma is associated with poorer weight loss outcomes and increased weight gain over time (10,42–44). The current study's findings indicate that more research is warranted to better understand the implications of both weight stigma and diabetes stigma for disordered eating

behaviors, weight management, and health outcomes in individuals with type 2 diabetes.

These efforts should also consider how existing treatment approaches may play a role in contributing to these health behaviors and/or exacerbating stigma. For example, weight-normative approaches to care, which emphasize weight loss as the primary goal for people with higher BMIs, can be problematic by unintentionally contributing to disordered eating behaviors and weight stigma, whereas weight-inclusive approaches that prioritize improved health and well-being through modifiable health behaviors (e.g., healthy eating and physical activity) rather than weight loss may achieve the same healthful behaviors and goals without these unintended consequences (17–19). Thus, more research on weight-inclusive approaches to care is warranted as part of future work to address both weight stigma and diabetes stigma.

Our study responds to recent calls for research attention to stigma among individuals with type 2 diabetes and begins to address unstudied questions in this emerging area of interest. Collectively, our findings suggest that additional research is warranted to better understand the ways in which diabetes stigma and weight stigma may affect the health behaviors of people with type 2 diabetes. Given that various aspects of these forms of stigma emerged as significant correlates of maladaptive eating behaviors in our sample (e.g., internalized stigma, differential treatment, and perceived judgment in health care), it will be particularly important for future research to examine these relationships with comprehensive assessment of multiple aspects of stigma, including experiences of stigma in daily life and in specific contexts such as health care, as well as the degree to which people engage in self-stigma related to their weight or diabetes. These related components of stigma may have distinct or intersecting influences on eating behaviors and other weight-related health behaviors that can be determined more clearly in longitudinal studies with diverse samples of people with type 2 diabetes.

Several limitations of our study should be noted. Measures of health behaviors were self-reported, and the cross-sectional nature of the study prevents conclusions about causality or directions of relationships. Longitudinal research is needed to determine the nature of relationships between stigma and health in people with type 2 diabetes over time. Assessment of weight stigma in health care was limited to one question about perceived judgment about weight from a doctor, and more

comprehensive assessment of weight stigma in the context of health care and other daily life situations is needed to clarify these experiences among people with type 2 diabetes. Although our study included brief assessments of disordered eating behaviors (e.g., binge eating and eating as a coping strategy), future research needs to examine relationships with stigma using more comprehensive measures. Furthermore, it was beyond the scope of our study to examine additional indices of weight-related health such as dieting behaviors, weight loss/weight gain, physiological stress, and cardiometabolic risk factors, all of which warrant future research attention in adults with type 2 diabetes given their links with weight stigma in the broader literature. Finally, although our sample included individuals from various ethnic groups (e.g., Black, Hispanic, and Asian), 75% of participants identified as White. Therefore, future research needs to include more racially and ethnically diverse samples, particularly given that ethnicity is a known risk factor for type 2 diabetes and related health disparities.

Despite these limitations, our study offers several important contributions to the literature. We provide the first findings, to our knowledge, examining links between both weight stigma and diabetes stigma and weight-related health behaviors in people with type 2 diabetes. Our survey measures included both experienced and internalized stigma related to body weight and diabetes and validated measures of stigma, eating behaviors, and physical activity. With much of the existing limited research on diabetes stigma coming from other countries, our U.S. sample adds new insights about links between stigma and health behaviors for Americans with type 2 diabetes.

Initiatives to improve the health and well-being of individuals with type 2 diabetes must consider the potentially harmful roles of weight stigma and diabetes stigma. These neglected issues in the diabetes field warrant more attention to better understand how stigma may affect the health behaviors of people with type 2 diabetes. Important questions remain, but our study offers initial insights on potential implications of weight stigma and diabetes stigma for maladaptive eating behaviors and related aspects of weight-related health among people with type 2 diabetes. By increasing the inclusion of people with type 2 diabetes in the weight stigma literature and bringing more attention to both weight stigma and diabetes stigma in the diabetes field, much-needed progress can be made to identify effective approaches to support people with type 2 diabetes and

reduce the harmful impacts of stigma on their health and well-being.

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#### DUALITY OF INTEREST

No potential conflicts of interest relevant to this article were reported.

#### AUTHOR CONTRIBUTIONS

R.M.P. conceptualized and designed the study, drafted the initial manuscript, and revised the manuscript. M.S.H. supervised data collection, oversaw statistical analyses, and contributed to writing and revising the manuscript. J.S. contributed to the measures and to revision of the manuscript. All authors approved the final version for publication. R.M.P. is the guarantor of this work, and as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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