



# The Stigma of Obesity Surgery: Negative Evaluations Based on Weight Loss History

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## Abstract

**Background** The present study investigated the stigma of obesity surgery by examining whether attitudes towards a lean person can change after learning that the person used to be obese but recently lost weight either through surgery or through diet and exercise.

**Methods** Participants (total  $N=135$ ) initially viewed an image of a lean woman or man and rated their impression of that individual on a variety of characteristics. Participants were then shown an image of the individual before she/he lost weight and were informed that the weight loss was achieved through surgery or through diet and exercise. Participants once again rated their impressions of that individual.

**Results** After learning about the previous weight loss, participants rated the individual who lost weight through surgery as significantly more lazy and sloppy, less competent and sociable, less attractive, and having less healthy eating habits. The individual who lost weight through diet and exercise, in contrast, was not evaluated as harshly. Mediation analysis further showed that the difference between the two weight loss conditions in ratings of laziness, competence, and sociability was due to participants viewing surgery patients as less responsible for their weight loss.

**Conclusions** These findings suggest that learning about someone's weight history can negatively impact the way that person is seen by others. Furthermore, these findings suggest that the stigma may be strongest for people who lose weight through obesity surgery because those individuals are not seen as being responsible for their weight loss.

**Keywords** Obesity · Stigma · Weight loss · Obesity surgery

Many obese patients report undergoing bariatric surgery partially for social reasons (e.g., to reduce embarrassment and improve physical appearance) rather than for purely medical reasons [1–3], and some studies show that previously obese individuals experience less discrimination following weight loss through surgery [4–6]. Other studies, however, have found that obese individuals can experience residual weight bias after losing weight [7, 8]. Thus, although many obese people consider surgery in part because they hope it will help reduce the stigma, they might not be able to escape the stigma because surgery itself may be viewed as requiring little effort on the part of the patient [9], further perpetuating the stereotype of obese people as being lazy.

Only a few studies to date have examined perceptions of individuals based on how they lost weight [9, 10]. For example, one study investigated changes in perceptions of a woman following weight loss through surgery or diet/exercise [10]. That study showed that whereas the woman who lost weight through diet and exercise was rated as less lazy and more competent after having lost weight, the woman who lost weight through surgery was not. These findings suggest that weight stigma may remain after an individual loses weight through surgery. One explanation that has been offered for the negative judgments following obesity surgery is that individuals who undergo obesity surgery are not seen as being responsible for their weight loss [9], but the mediating role of perceived responsibility for weight loss has not been directly tested.

Thus, the aim of the present study was to provide a better understanding of people's perceptions of obesity surgery. The present study builds on past research in a number of ways. First, in the only study to date examining changes in weight bias associated with weight loss [10], participants initially rated an obese individual and then learned that she had lost weight. In everyday life, however, it might be more common

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to meet someone at her or his current weight and then learn about that individual's weight loss history. Thus, in the present study, we assessed the participants' judgments of a particular individual when that individual was at a relatively healthy weight and then informed them of the individual's previous weight loss through surgery or diet/exercise to examine any changes in their evaluations of that individual. We hypothesized that the participants' attitudes would become more negative after learning about weight loss through surgery but would not change after learning about previous weight loss through diet and exercise. Second, previous research has only focused on judgments of women after weight loss, and the present study therefore examined whether these findings also generalize to judgments of men. Third, we also assessed people's perceptions of the extent to which the individual was responsible for her or his weight after weight loss and predicted that differences in judgments as a function of weight loss method would be mediated by perceived responsibility for her/his weight.

## Method

### Participants

The participants were 135 undergraduate students (100 women, 35 men) who participated in exchange for course credit. Power analysis indicated that this sample size was sufficient to detect small-to-medium effects with 80 % power and alpha set at 0.05. Participants' mean age was 19.19 (SD=2.88) and their mean body mass index (BMI; kg/m<sup>2</sup>) was 21.51 (SD=3.23). This study was approved by the University's ethics committee.

### Materials and Procedure

Participants first provided informed consent. All participants were then shown an initial image of a woman (BMI=22.1) or a man (BMI=25.8) whose weight was in or close to the normal weight range and were also provided with some brief background information about that individual. Participants then rated the individual on a series of measures.

*Inferences About Behavior* Two questions assessed perceptions of the target individual's exercise behavior ( $\alpha=0.70$ ): “What percentage of the time do you think that Susan/Paul would walk to work?” (0=never, 100=always) and “How many times a week do you think that Susan/Paul exercises?” (1=0, 7=6+). Scores on those items were standardized before averaging them to create an index of exercise behavior (range at baseline was  $-1.59$  to  $2.37$  and at follow-up was  $-1.62$  to  $1.96$ ). Participants also responded to two questions assessing their perceptions of the target

individual's healthy eating habits ( $\alpha=0.81$ ): “What percentage of the time do you think that Susan/Paul would choose fruit and vegetables as a snack?” and “What percentage of the time do you think that Susan/Paul would choose chocolate, chips or lollies [an Australian term for confectionery] as a snack?” (reverse-coded). Responses to these questions were made on a six-point scale with each point representing 20 % increment (0=never, 100=always).

*Stereotypes* Participants indicated their perception of the target individual on 16 personality traits drawn from previous literature on stereotypes, prejudice, and impression formation [11–13]. Two traits represented common obesity stereotypes: *lazy* and *sloppy*. Perceived competence was assessed with the traits *successful*, *efficient*, *competent*, *self-disciplined*, and *intelligent* ( $\alpha=0.78$ ). We also assessed overall sociability with the traits *likeable*, *shy* (reverse-coded), *aggressive* (reverse-coded), *clumsy* (reverse-coded), *foolish* (reverse-coded), *irritable* (reverse-coded), *unhappy* (reverse-coded), and *popular* ( $\alpha=0.81$ ). Finally, participants were asked to rate to what extent the individual was physically *attractive*. Each trait was rated on a six-point scale (1=not at all, 6=extremely).

After completing these initial measures, participants were randomly assigned to one of three conditions: Participants in the two weight loss conditions (surgery and diet/exercise) were shown a new photograph of the target individual before weight loss when she/he was obese (woman's BMI =39.9, man's BMI=50.8), whereas participants in the control condition saw the same image of the target individual that they had seen initially (i.e., the after weight loss image). Participants in the weight loss conditions were informed that the photograph was taken of the target individual 1 year prior and were provided with specific information about that individual's weight loss: Participants in the *surgery* condition read that the target individual “visited an obesity clinic and organized to have gastric bypass surgery. After surgery Susan/Paul lost 45 kilograms over a one year period.” (Although the actual amount of weight loss for the man was more than 45 kilograms, we standardized the amount of weight loss to avoid any potential confounders in participants' judgments.) Participants in the *diet/exercise* condition read that the target individual “started to eat more healthily, joined a gym and exercised regularly. Due to Susan/Paul's healthy lifestyle, she/he lost 45 kilograms over a one year period.” Participants in the control condition were not given any information about the target individual's weight.

Participants were then asked to rate their impression of the target individual considering all of the information that they have about her/him and completed the same measures they had completed previously. Participants also rated (1) “How much control does Susan/Paul have over her/his weight?” and (2) “How responsible do you think Susan/Paul is for her/his weight?” on a six-point scale (1=no control/not at all, 6=

complete control/very much). These two items were significantly correlated ( $r=0.48, p<0.001$ ) and were therefore combined into a single index of weight responsibility (range=2 to 12). Finally, participants were asked to report their age, sex, height and weight (used to calculate their BMI) and were debriefed.

### Statistical Analyses

A one-way analysis of variance (ANOVA) was conducted to compare perceptions of responsibility for weight between the surgery and diet/exercise conditions. For each of the other outcome variables, mixed-model ANOVAs were conducted with the target individual's gender (male vs. female) and weight loss condition (surgery vs. diet/exercise vs. control) as the between-subjects factors and assessment point (baseline vs. follow-up) as the within-subject factor. Because there were no assessment point  $\times$  target gender  $\times$  weight loss condition interactions, the analyses reported collapse across male and female target individuals. Of particular importance to our hypotheses was any observed change in ratings of the target individual from baseline to follow-up for each weight loss condition. We also examined differences across weight loss groups (surgery vs. diet/exercise) at follow-up. When there were differences between weight loss conditions at follow-up, mediation analyses were conducted using the bootstrapping procedure described by Preacher and Hayes [14] to test whether these differences were mediated by perceptions of the target individual's responsibility for her/his weight (controlling for baseline measures). Bootstrapping involves repeatedly sampling from the data set (in this case, 1,000 bootstrap resamples) to create an approximation of the sampling distribution of the indirect effect and to generate confidence intervals for these effects.

## Results

### Perceived Responsibility for Weight

Participants in the *surgery* condition ( $M=8.04, SD=2.57$ ) rated the target individual as being less responsible for her/his weight after weight loss than did participants in the *diet/exercise* condition ( $M=9.89, SD=1.59, F(1, 89)=17.08, p<0.001, d=0.89$ ).

### Behavioral Inferences

**Exercise Behavior** Only the weight loss condition  $\times$  assessment point interaction was significant ( $F(2, 132)=5.29, p=0.01$ ). As seen in Table 1, simple effects analyses revealed that there was no difference from baseline to follow-up in the *surgery* or *control* condition; however,

participants in the *diet/exercise* condition rated the target individual as exercising significantly more frequently after they had learned about the individual's weight loss. At follow-up, there was no difference between the *diet/exercise* and *surgery* conditions.

**Healthy Eating Habits** Again, only the weight loss condition  $\times$  assessment point interaction was significant ( $F(2, 132)=4.67, p=0.01$ ). Simple effects analyses showed that participants in the *surgery* condition rated the target individual as eating significantly less healthily after learning about previous weight loss than before learning about the weight loss; no difference was found for the *diet/exercise* or *control* condition. At follow-up, there was no difference between the *surgery* and the *diet/exercise* conditions.

### Stereotypes

**Lazy** There was a significant main effect of weight loss condition ( $F(2, 132)=11.11, p<0.001$ ), a significant main effect of assessment point ( $F(1, 132)=38.80, p<0.001$ ), and a significant weight loss condition  $\times$  assessment point interaction ( $F(2, 132)=12.85, p<0.001$ ). As seen in Table 1, simple effects analyses showed that participants in the experimental conditions rated the target individual to be significantly more lazy after learning about previous weight loss than before learning about the weight loss, and this difference was more pronounced in the *surgery* condition; there was no change in ratings for participants in the *control* condition. At follow-up, participants in the *surgery* condition also rated the target individual to be significantly more lazy than did participants in the *diet/exercise* condition. Mediation analysis further showed that perceived responsibility for weight significantly mediated the relationship between experimental weight loss condition and follow-up laziness ratings (95 % CI=0.14, 0.69).

**Sloppy** There was a significant main effect of assessment point ( $F(1, 132)=41.58, p<0.001$ ) qualified by a significant assessment point  $\times$  weight loss condition interaction ( $F(2, 132)=11.34, p<0.001$ ). Simple effects analyses showed that participants in the experimental conditions rated the target individual as significantly more sloppy after learning about previous weight loss than before learning about the weight loss; there was no change in the control condition. At follow-up, there was no difference between the *surgery* and the *diet/exercise* conditions.

**Competent** There was a significant main effect of weight loss condition ( $F(2, 132)=3.73, p=0.03$ ) and a significant weight loss condition  $\times$  assessment point interaction ( $F(2, 132)=7.83, p=0.001$ ). Simple effects analyses revealed that participants in the *surgery* condition rated the target individual as significantly less competent after learning about previous

**Table 1** Mean (SD) for judgments of the target individual at baseline and follow-up

Measure	Method		
	Surgery (n=45)	Diet/exercise (n=46)	Control (n=44)
Behavioral inferences			
Exercise behavior			
Baseline	0.26 (0.90) b	-0.15 (0.69) a	-0.11 (0.70) a
Follow-up	-0.04 (1.06) a, b	0.25 (0.93) b	-0.22 (0.50) a
Cohen's d	-0.31	0.49	-0.18
Healthy eating habits			
Baseline	4.20 (0.68) a	3.88 (0.88) a	3.97 (0.90) a
Follow-up	3.46 (1.47) b	3.95 (1.41) a, b	4.00 (0.77) a
Cohen's d	-0.69	0.06	0.04
Stereotypes			
Lazy			
Baseline	1.84 (0.67) a	2.00 (0.73) a	1.86 (0.82) a
Follow-up	3.29 (1.31) c	2.71 (1.38) b	1.86 (0.73) a
Cohen's d	1.46	0.67	0.00
Sloppy			
Baseline	1.62 (0.61) a	1.80 (0.83) a	1.93 (0.79) a
Follow-up	2.73 (1.25) b	2.57 (1.11) b	1.93 (0.79) a
Cohen's d	1.19	0.79	0.00
Competent			
Baseline	4.34 (0.57) a	4.35 (0.57) a	4.42 (0.71) a
Follow-up	3.93 (0.71) b	4.33 (0.74) a	4.49 (0.79) a
Cohen's d	-0.64	-0.03	0.09
Sociable			
Baseline	4.91 (0.48) a	4.83 (0.51) a	4.75 (0.59) a
Follow-up	4.13 (0.75) c	4.47 (0.50) b	4.82 (0.57) a
Cohen's d	-1.27	-0.71	0.12
Attractive			
Baseline	3.87 (1.04) a	3.83 (1.10) a	3.68 (1.12) a
Follow-up	3.20 (1.18) b	3.26 (1.36) b, c	3.73 (1.11) a, c
Cohen's d	-0.60	-0.46	0.04

For each measure, means within a row or column with a different letter are significantly different at  $p < 0.05$

weight loss than before learning about the weight loss; however, there was no change in ratings for the *diet/exercise* or control conditions. At follow-up, participants in the *surgery* condition rated the target individual to be significantly less competent than did participants in the *diet/exercise* condition. Furthermore, perceived responsibility for weight significantly mediated the relationship between weight loss condition and competence ratings at follow-up (95 % CI=-0.54, -0.16).

**Sociable** There was a significant main effect of weight loss condition ( $F(2, 132)=3.35, p=0.04$ ), a significant main effect of assessment point ( $F(1, 132)=44.51, p<0.001$ ), and a significant weight loss condition  $\times$  assessment point interaction ( $F(2, 132)=21.21, p<0.001$ ). Simple effects analyses revealed that participants in both experimental conditions rated the target individual to be less sociable after they learned about

the individual's previous weight loss, but the control condition did not differ between baseline and follow-up. At follow-up, participants in the *surgery* condition rated the target individual to be less sociable than did those in the *diet/exercise* condition. Furthermore, perceived responsibility for weight significantly mediated the relationship between experimental weight loss condition and ratings of sociability at follow-up (95 % CI=-0.60, -0.14).

**Attractive** There was a significant main effect for assessment point ( $F(1, 132)=16.09, p<0.001$ ) qualified by a significant interaction between weight loss condition and assessment point ( $F(2, 132)=5.03, p=0.01$ ). Simple effects analyses showed that participants in both experimental conditions rated the target individual to be less physically attractive after learning about previous weight loss, but no

change in ratings of attractiveness was found for the control condition. At follow-up, the *surgery* and *diet/exercise* conditions did not differ.

## Discussion

Learning that an individual was previously obese and lost weight through surgery resulted in significantly worse impressions of that individual on virtually all of the measures that were assessed. Those who lost weight through surgery were rated as less likely to have healthy eating habits, as more lazy and sloppy, as less competent and sociable, and as less attractive. Those who lost weight through diet and exercise, however, were not evaluated nearly as negatively.

It has been suggested that obesity surgery is perceived as an “easy way out” that does not require effort on the part of the patient. Consistent with past research [9], we found that people who underwent surgery were rated as having less control over and less responsibility for their weight compared to those who lost weight through diet and exercise. Furthermore, we also found that perceptions of control and responsibility mediated the effect of weight loss condition on perceptions of laziness, sociability, and competence. These findings suggest that surgery patients were judged more negatively on these stereotype measures *because* the individual who lost weight through surgery was judged to be less in control of and less responsible for her/his weight than the individual who lost weight through diet and exercise was. These findings highlight a general ignorance regarding how obesity surgery works. Although obesity surgery does facilitate weight loss, the patient must adhere to a strict diet and exercise regime (one that requires considerable effort) in order to prevent weight regain [15].

The stigma of obesity surgery is particularly concerning because of the growing body of research indicating that individuals who experience weight-based stigmatization are more likely to overeat and binge eat and are more likely to avoid dieting and exercise [16–19]. Thus, stigma towards obesity surgery may interfere with obese individuals' motivation to adhere to the recommended behavioral changes post-surgery, which can ultimately result in less successful weight loss and fewer of the health benefits associated with losing weight. Future research is needed to test this possible consequence of stigma among surgery patients.

It is also possible that obese individuals may be reluctant to consult their physicians about the possibility of surgery out of embarrassment or fear of negative evaluation [20, 21]. Even if they do consult their physician, research shows that very few physicians would refer their patients who meet the criteria for obesity surgery to bariatric surgeons [22–24]. Thus, obese individuals seeking surgery may encounter

barriers from their own reluctance to seek consultation and from their physicians who may be reluctant to make a referral, and they may also experience residual obesity stigma after undergoing surgery. Given that obesity surgery is the most effective weight loss treatment available [25, 26], both physicians and the general public need to be better educated on the efficacy of weight loss treatments and the effort required to lose weight through surgery.

One limitation of the present study is that, as with other research on weight bias following weight loss [9, 10], the current study was carried out with undergraduate students, thus limiting the generalizability of the findings. Future research should test whether these findings are evident among other samples, including members of the general public and perhaps even medical students and healthcare professionals. Research shows that medical students and other healthcare professionals hold common stereotypes about obesity individuals [20, 21], and it would thus be important to determine whether these individuals also hold stereotyped beliefs about obesity surgery. Another limitation is that only two target individuals were included and that the male target was heavier (both before and after weight loss) than the female target. Future research could include target individuals with a greater range of initial weights and degrees of weight loss to determine the generalizability of the current findings. It would also be interesting for future research to examine whether different motives to lose weight through surgery (e.g., for esthetic vs. health reasons) differentially impact people's evaluations of a bariatric surgery patient.

In conclusion, learning about a person's previous weight loss through surgery can lead to more negative evaluations of that individual because surgery patients are seen as being less responsible for their weight after weight loss. Educating people about the effort required to lose weight following obesity surgery might help reduce the stigma of obesity surgery.

**Conflict of Interest** The authors declare no conflict of interest.

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