

Reducing the Stigma of Bariatric Surgery: Benefits of Providing Information about Necessary Lifestyle Changes

Lenny R. Vartanian and Jasmine Fardouly

Objective: The aim of this study was to determine whether providing information about the lifestyle changes required for an individual to lose weight following bariatric surgery would mitigate the negative judgments of that individual.

Methods: In an experimental design, participants provided their initial impressions of a woman with obesity before learning that she had lost a significant amount of weight through: (1) diet/exercise, (2) surgery, or (3) surgery + diet/exercise. Participants then provided their impressions of the woman after she had lost weight.

Results: For ratings of laziness, competence, and responsibility for weight loss, the individual who lost weight through surgery was rated most negatively, followed by the individual who lost weight through surgery + diet/exercise, with the individual who lost weight through diet/exercise alone rated as least lazy, most competent, and most responsible for her weight loss. Mediation analyses further showed that group differences in target ratings of laziness/competence were due to perceptions of responsibility for weight loss.

Conclusions: Providing information about the lifestyle changes required for losing weight following bariatric surgery can somewhat dampen the negative evaluations of surgery patients. These findings also highlight the importance of perceived effort in judgments of individuals with obesity.

Obesity (2014) **22**, 1233–1237. doi:10.1002/oby.20721

Introduction

Bariatric surgery is widely recognized as the most effective means of achieving significant weight loss among individuals with obesity. Whereas behavioral weight loss methods tend to produce modest outcomes (1,2), several meta-analyses indicate that bariatric surgery is associated with substantial and sustained weight loss. For example, Buchwald et al. (3) reported an average weight loss of 38.5 kg (55.9% excess body weight) following bariatric surgery, and this magnitude of weight loss was even observed in studies that had greater than a 2-year follow-up. Furthermore, in a review of randomized control trials comparing surgical to nonsurgical treatments for obesity, Gloy et al. (4) found that patients assigned to surgery treatments lost an average of 26 kg more than did patients assigned to nonsurgical treatments. In addition to the benefits for weight loss, bariatric surgery also leads to significant improvements in diabetes, blood pressure, and other conditions associated with obesity (3,5,6).

Despite the documented benefits of bariatric surgery for individuals with obesity, bariatric surgery is not viewed positively in all circles. For example, many primary care physicians appear to be reluctant to recommend surgery for their patients with obesity (7-9). Simi-

larly, individuals with obesity and type 2 diabetes (10), and members of the general public (11), indicate that they are reluctant to undergo bariatric surgery themselves or recommend it to others, and believe that surgery is not an effective treatment option. Furthermore, recent evidence suggests that individuals who lose weight through bariatric surgery are evaluated more negatively than are individuals who lose weight through behavioral methods. Specifically, individuals who lose weight through surgery are viewed as more lazy, less competent (12,13), and as less responsible for their weight loss (13,14). Vartanian and Fardouly (13) further demonstrated that lack of perceived responsibility for weight loss accounts for the negative evaluations of individuals who undergo bariatric surgery.

The negative evaluations of individuals who lose weight through surgery might be due to a misperception that bariatric surgery is the “easy way out” and that weight loss through surgery does not involve any effort on the part of the patient. In reality, however, individuals who undergo bariatric surgery must adhere to a strict diet and exercise regime in order to facilitate weight loss and prevent weight regain postsurgery (15). It may be, then, that educating people about the amount of effort that surgery patients invest in

School of Psychology, UNSW Australia, Sydney, New South Wales 2052, Australia
Correspondence: Lenny R. Vartanian (lvartanian@psy.unsw.edu.au)

Disclosure: The authors have no competing interests.

Received: 29 December 2013; **Accepted:** 6 February 2014; **Published online** 12 February 2014. doi:10.1002/oby.20721

their weight loss might mitigate some of the negative attitudes about surgery and surgery patients.

The importance of information about perceived effort invested in changing one's condition has been demonstrated in other contexts. For example, an early study on attributions for failures found that a student who fell behind in his school work was evaluated less negatively if he put in effort to remedy the situation, regardless of the reason for falling behind in the first place (16). More relevant to the current context, Black et al. (17) showed that a person with obesity who was investing effort to eat healthy and exercise was evaluated more favorably than was a person with obesity who did not put in such effort, even if there was no resulting weight change.

The purpose of the present study was to determine whether providing people with information about the effort invested by a bariatric surgery patient to lose weight would mitigate the negative judgments of that individual. Participants first made judgments of a woman with obesity, and then learned that she had lost weight through diet and exercise, through bariatric surgery, or through surgery along with diet and exercise. After learning about her weight loss, participants again made their judgments of the woman. We predicted that losing weight through surgery alone would result in more negative evaluations than losing weight through diet and exercise alone. Following from past research indicating that perceived effort is important in judgments of individuals with obesity (13,14,17), we predicted that providing information that a surgery patient had also invested effort in her diet and exercise would result in more favorable evaluations compared to the surgery alone condition. The results of this study could have implications for efforts to reduce the stigma of bariatric surgery, as well as obesity stigma more generally.

Methods

Participants

Participants were 275 community members (138 women, 137 men) recruited through Amazon's Mechanical Turk, which has been shown to produce data comparable in quality and reliability to traditional methods (18,19). Participants' mean age was 34.97 (SD = 11.62) and their mean body mass index (BMI; based on self-reported height and weight) was 30.58 (SD = 8.61). The majority were white (84.4%) and the modal income level was US\$20,000–40,000 (30.9%). This study was approved by the university's ethics committee.

Manipulation

The experimental manipulation involved showing participants an initial photograph of a woman with obesity along with some basic background information about that person (e.g., named Susan, age 35), and then showing participants a follow-up image of the same person when she had lost weight along with information about how the weight was lost. Photographs of two different women were used to increase the generalizability of the findings. One pair of photographs was taken from the website of a reality television weight-loss program showing professional quality photographs of contestants before and after weight loss and was the same photograph set used in past studies (12,13). A second pair of photographs was taken from an individual's personal webpage showing her own before- and after-weight-loss images.

The information provided about the method of weight loss varied by experimental condition. Participants in the diet/exercise condition

read that "[Susan] decided that she needed to lose weight and get healthier, so she started a strict diet, joined a gym and exercised regularly. Due to Susan's healthy lifestyle, she lost 95 pounds over a one year period." Participants in the surgery condition read that "[Susan] decided that she needed to lose weight and get healthier, so she visited an obesity clinic and organized to have gastric bypass surgery. After having surgery, she lost 95 pounds over a one year period." Participants in the surgery + diet/exercise condition read that "[Susan] decided that she needed to lose weight and get healthier, so she visited an obesity clinic and organized to have gastric bypass surgery. Although the surgery reduced the amount of food she could eat, Susan realized that she also needed to follow a strict diet, join a gym and exercise regularly in order to lose weight. After having surgery, she lost 95 pounds over a one year period." To confirm that initial ratings of the targets with obesity were in the negative direction, a control condition was also included in which the person was only evaluated when she was thin (and, therefore, no information about weight loss was provided).

Measures

Target ratings. At baseline and at follow-up, participants made ratings of the target individual on the following characteristics: two common stereotypes of individuals with obesity (lazy and sloppy), as well as more general stereotype dimensions of competence (competent, efficient, successful, intelligent, self-disciplined; baseline $\alpha = 0.89$, follow-up $\alpha = 0.89$) and sociability (likeable, popular, shy [reverse coded], aggressive [reverse coded], irritable [reverse coded], unhappy [reverse coded]; baseline $\alpha = 0.83$, follow-up $\alpha = 0.79$). Participants also indicated how attractive they thought the individual was. For each item, participants rated the extent to which they believed the characteristics applied to the target individual using a visual analog scale (anchored by 0 = Not at all, 100 = Extremely).

Responsibility for weight loss. Participants responded to two items asking them to indicate how much control they thought the target person had over her weight, and to what extent she was responsible for her weight loss (1 = Not at all, 4 = Very much). These items were highly correlated ($r = 0.63$, $P < 0.001$) and were combined to form an index of perceived responsibility for weight loss.

Self-report measures. Participants also completed the Willpower and Dislike subscales of the Anti-Fat Attitudes scale [AFA; (20)] which assess people's beliefs about the extent to which obesity is under personal control and their general attitude toward individuals with obesity, respectively ($\alpha_{\text{willpower}} = 0.77$, $\alpha_{\text{dislike}} = 0.89$). These measures were assessed as potential moderators, because past research has found these constructs to be relevant to evaluations of individuals with obesity (21).

Demographics. Participants provided some basic demographic information, including their age, sex, ethnicity, income level, and height and weight (which were used to calculate BMI). Age and BMI were examined as potential covariates.

Procedure

Participants completed the study online and were randomly assigned to one of three weight loss conditions or to the control condition. Participants in the weight loss conditions were initially shown an

image of a woman whose BMI was in the obese range, whereas participants in the control condition were shown an image of a lean woman. After viewing the image and reading the initial information, participants rated the target individual on a variety of traits. Next, participants in the weight loss conditions were shown an updated photograph of the individual after she had lost a significant amount of weight and were also provided with information about how the weight was lost that was specific to their assigned condition. Participants then rated the target individual on the same traits as the initial assessments and also completed the perceived responsibility items. Finally, participants completed the AFA Scale and provided the demographic information.

Data analysis

A one-way ANOVA was used to determine whether perceived responsibility for weight loss varied as a function of the method of weight loss. Next, in order to confirm that the targets with obesity were evaluated more negatively than was the lean target, a one-way ANOVA with planned contrasts was used to compare ratings of the three targets with obesity at baseline to ratings of the lean target in the control condition (with no information about weight loss) for each dependent variable. Because the stereotype dependent variables (lazy, sloppy, competent, sociable, attractive) were all significantly correlated at both baseline and follow-up (all P s < 0.001), we next conducted a 3 (weight loss condition) \times 2 (assessment point) mixed-model MANOVA to determine whether ratings of the target varied as a function of how she purportedly lost weight. The multivariate analysis was then followed up with a univariate analysis for each dependent variable. Finally, mediation analysis [following the indicator coding procedure outlined by Hayes and Preacher; (22)]

was used to determine whether perceptions of responsibility for weight loss mediated the effect of weight loss condition on ratings of the target individual. Participant gender, target type (professional vs. nonprofessional photographs), and the Willpower or Dislike subscales of the AFA did not moderate any of the effects and are, therefore, not included in the analyses described below. Similarly, controlling for participant age and BMI had no impact on the results and are, therefore, not included as covariates in the analyses described below.

Results

Perceived responsibility for weight loss

Ratings of perceived responsibility for weight loss varied as a function of weight loss condition, $F(2, 203) = 39.72, P < 0.001, \eta_p^2 = 0.28$. Participants rated the surgery patient to be least responsible for her weight loss ($M = 2.78, SD = 0.84$), followed by the surgery + diet/exercise patient ($M = 3.15, SD = 0.75$), with the individual who lost weight through diet and exercise alone being seen as most responsible for her weight loss ($M = 3.75, SD = 0.38$), all P s ≤ 0.001 .

Stereotypes

The multivariate analysis showed a significant main effect of condition $F(10, 400) = 3.93, P < 0.001, \eta_p^2 = 0.09$, a significant main effect of assessment point, $F(5, 199) = 84.90, P < 0.001, \eta_p^2 = 0.68$, and a significant condition \times assessment point interaction $F(10, 400) = 3.14, P = 0.001, \eta_p^2 = 0.07$. We therefore proceeded to examine each of the univariate analyses separately. Descriptive statistics for each of the stereotype ratings are shown in Table 1.

TABLE 1 Ratings of the target individual by weight loss condition

	Lean control (n = 69)	Surgery (n = 67)	Surgery + Diet/ exercise (n = 70)	Diet/exercise (n = 69)
Lazy				
Baseline	15.15 ^a (14.92)	35.90 ^b (23.35)	31.81 ^b (23.63)	32.80 ^b (23.60)
Follow-up	-	32.15 ^b (26.20)	16.00 ^c (18.82)	8.39 ^d (9.44)
Cohen's <i>d</i>	-	-0.13	-0.64	-1.27
Sloppy				
Baseline	17.20 ^a (17.04)	39.02 ^b (25.79)	32.30 ^b (23.73)	34.64 ^b (26.11)
Follow-up	-	22.16 ^c (19.90)	16.33 ^d (16.84)	13.52 ^d (15.57)
Cohen's <i>d</i>	-	-0.78	-0.83	-1.07
Competent				
Baseline	72.15 ^a (10.96)	58.85 ^b (15.23)	61.60 ^b (16.31)	63.94 ^b (14.74)
Follow-up	-	63.79 ^c (17.43)	70.79 ^d (17.32)	79.06 ^e (12.52)
Cohen's <i>d</i>	-	0.35	0.64	1.29
Sociable				
Baseline	80.12 ^a (10.87)	72.81 ^b (13.83)	74.06 ^b (13.37)	73.28 ^b (13.56)
Follow-up	-	76.00 ^c (12.85)	77.76 ^c (13.27)	79.77 ^c (10.95)
Cohen's <i>d</i>	-	0.31	0.36	0.69
Attractive				
Baseline	65.52 ^a (21.47)	36.52 ^b (22.10)	34.87 ^b (23.64)	38.41 ^b (24.44)
Follow-up	-	63.08 ^c (21.37)	63.21 ^c (22.29)	69.58 ^c (17.08)
Cohen's <i>d</i>	-	1.25	1.05	1.53

Note: For each dependent variable, means within a column and within a row with different superscripts are significantly different at $P < 0.05$.

Lazy. Preliminary analyses confirmed that the target individuals with obesity, as a group, were rated as more lazy than was the lean target individual, $F(1, 271) = 37.02, P < 0.001$. For evaluations of the targets with obesity, there was a significant main effect of weight loss condition, $F(2, 203) = 10.80, P < 0.001, \eta_p^2 = 0.10$, a significant main effect of assessment point, $F(1, 203) = 70.70, P < 0.001, \eta_p^2 = 0.26$, and a significant condition \times assessment point interaction, $F(2, 203) = 11.69, P < 0.001, \eta_p^2 = 0.10$. Simple effects analyses indicated the person who lost weight through diet and exercise (with or without surgery) was rated as less lazy after participants learned that she lost weight; the person who lost weight through surgery alone, however, was not rated as any less lazy after she lost weight. Furthermore, at follow-up, the surgery target was rated as more lazy than either of the other two targets, and the surgery + diet/exercise target was rated as more lazy than the diet/exercise target. Finally, mediation analysis showed that perceived responsibility for weight loss mediated the effect of weight loss condition on ratings of laziness (surgery + diet/exercise: 95% CI = -11.06, -1.91; diet/exercise: 95% CI = -22.34, -10.25).

Sloppy. Preliminary analyses confirmed that the target individuals with obesity, as a group, were rated as more sloppy than was the lean target individual, $F(1, 271) = 30.87, P < 0.001$. The ratings of targets with obesity revealed that there was only a significant main effect of assessment point, $F(1, 203) = 144.95, P < 0.001, \eta_p^2 = 0.42$, with all targets being rated as less sloppy after losing weight.

Competent. Preliminary analyses confirmed that the target individuals with obesity, as a group, were rated as less competent than was the lean target individual, $F(1, 271) = 28.24, P < 0.001$. For evaluations of targets with obesity, there was a significant main effect of weight loss condition, $F(2, 203) = 8.78, P < 0.001, \eta_p^2 = 0.08$, a significant main effect of assessment point, $F(1, 203) = 108.15, P < 0.001, \eta_p^2 = 0.35$, and a significant condition \times assessment point interaction, $F(2, 203) = 9.85, P < 0.001, \eta_p^2 = 0.09$. Simple effects analyses indicated that all targets were rated as more competent after losing weight, but that the magnitude of that effect was greater for the surgery + diet/exercise target than for the surgery alone target, and was greater for the diet/exercise target than for either of the other two targets. Mediation analysis showed that perceived responsibility for weight loss mediated the effect of weight loss condition on ratings of competence (surgery + diet/exercise: 95% CI = 1.12, 7.07; diet/exercise: 95% CI = 5.15, 14.54).

Sociable. Preliminary analyses confirmed that the target individuals with obesity, as a group, were rated as less sociable than was the lean target individual, $F(1, 271) = 13.96, P < 0.001$. Ratings of the targets with obesity indicated that there was only a significant main effect of assessment point, $F(1, 203) = 41.27, P < 0.001, \eta_p^2 = 0.17$, with all targets being rated as more sociable after losing weight.

Attractive. Preliminary analyses confirmed that the target individuals with obesity, as a group, were rated as less attractive than was the lean target individual, $F(1, 271) = 82.08, P < 0.001$. Ratings of the targets with obesity indicated that there was only a significant main effect of assessment point, $F(1, 203) = 360.20, P < 0.001, \eta_p^2 = 0.64$, with all targets being rated as more attractive after losing weight.

Discussion

The present study showed that individuals who lost weight through bariatric surgery were evaluated more negatively than were individuals who lost weight through diet and exercise. Specifically, they were

rated as more lazy, more sloppy, and less competent than individuals who lost weight through diet and exercise. Furthermore, individuals who lost weight through surgery were rated as just as lazy after they lost weight than before they had lost the weight and, although they were seen as being more competent after losing weight, the magnitude of that benefit was not as great as if they had lost weight through diet and exercise. Note, however, that there are other respects in which those who lose weight through surgery have the same advantage as people who lose weight through diet and exercise: both groups were seen as more sociable and more attractive. These results are consistent with previous research (12-14), and indicate that there is a stigma associated with losing weight through bariatric surgery.

The primary purposes of the present study was to determine whether providing additional information indicating that an individual needed to follow a strict diet and exercise regime in order to lose weight through surgery would change the impressions that people have of that individual. As predicted, providing this additional information about diet and exercise did somewhat dampen the negative evaluations of surgery patients, although (for ratings of laziness and competence) the ratings were still not as favorable as they were for the diet and exercise target who did not undergo surgery. Thus, it appears that correcting people's misperceptions about the effort involved in losing weight with the assistance of bariatric surgery can to some degree lessen the negative evaluations of surgery patients. This is also consistent with other research indicating that providing information about effort invested in maintaining a healthy lifestyle leads to more positive evaluations of a target individual, even if that individual has not lost any weight (17).

Importantly, the present research also identified perceived responsibility for losing weight as the mechanism underlying the differential judgment of individuals according to their weight loss method. The target who lost weight through diet and exercise alone was seen as being more responsible for her weight loss than was the target who lost weight through surgery along with diet and exercise. The target who lost weight through surgery without mention of diet and exercise was seen as the least responsible for her weight loss. Furthermore, consistent with the findings of Vartanian and Fardouly (13), our results showed that perceived responsibility for weight loss mediated the association between weight loss condition and ratings of laziness and competence.

A strength of the present study is that the sample was a community sample that had a higher mean age (35 years) and higher mean BMI (30.6) than the university samples used in previous studies on the stigma of bariatric surgery (12-14). Furthermore, two different sets of before-and-after pictures were used (one professional quality and one nonprofessional quality) with similar results, further increasing the generalizability of the findings. The primary limitation of this research is that evaluations were made in a fairly artificial context and with only a brief period of time between the initial and subsequent evaluations of the target individual. Future research should be conducted in more ecologically valid contexts in order to establish the real-world implications of the stigma of bariatric surgery, including how individuals react to and interact with surgery patients.

The findings of this research have implications for efforts to reduce the stigma of bariatric surgery, as well as obesity stigma more generally. Educating the public about the fact that individuals who undergo bariatric surgery are required to invest a considerable

amount of effort in changing their diet and exercise habits postsurgery might help correct some misperceptions about surgery that can lead to negative judgments. Reducing this bias could help some people consider surgery if they had previously avoided doing so out of embarrassment or fear of negative evaluation.

With respect to obesity stigma more generally, past efforts to reduce obesity stigma have not been met with great success (23). However, the most common approach to reduce obesity stigma has been to change people's beliefs about the causes of obesity (23). The results of the present study, along with other recent research (12-14,17), suggest that future stigma-reduction programs should include information about the effort that many overweight and obese individuals actively invest in trying to maintain a healthy diet and exercise regime, even if those efforts are not always successful in producing weight loss. This suggestion is consistent with research indicating that images of individuals with obesity engaging in nonstereotypical activities (such as exercising and shopping for fresh vegetables) result in less negative weight-related attitudes (24,25), presumably because these nonstereotypical portrayals demonstrate that some individuals with obesity are trying to lead a healthy lifestyle. By directly challenging people's assumptions about the (lack of) effort by individuals with obesity to maintain a healthy lifestyle, we can hope to make much needed progress toward reducing obesity stigma. This progress would be further supported if steps were taken to ensure that the media do not perpetuate existing stereotypes of individuals with obesity (26,27). **O**

© 2014 The Obesity Society

References

- Dansinger ML, Gleason JA, Griffith JL, Selker HP, Schaefer EJ. Comparison of the Atkins, Ornish, weight watchers, and zone diets for weight loss and heart disease risk reduction. *JAMA* 2005;293:43-53.
- Franz MJ, van Wormer J, Crain AL, et al. Weight-loss outcomes: a systematic review and meta-analysis of weight-loss clinical trials with a minimum 1-year follow-up. *J Am Diet Assoc* 2005;107:1755-1767.
- Buchwald H, Estok R, Fährbach K, et al. Weight and type 2 diabetes after bariatric surgery: systematic review and meta-analysis. *Am J Med* 2009;122: 248-256.
- Gloy VL, Briel M, Bhatt DL, et al. Bariatric surgery versus non-surgical treatment for obesity: a systematic review and meta-analysis of randomised controlled trials. *BMJ* 2013;347:f5934.
- Buchwald H, Avidor Y, Braunwald E, et al. Bariatric surgery: a systematic review and meta-analysis. *JAMA* 2004;292:1724-1737.
- Sarwer DB, Ritter S, Wadden TA, Spitzer JC, Vetter ML, Moore RH. Attitudes about the safety and efficacy of bariatric surgery among patients with type 2 diabetes and a body mass index of 30-40 kg/m². *Surg Obes Relat Dis* 2013;9:630-635.
- Foster GD, Wadden TA, Makris AP, et al. Primary care physicians' attitudes about obesity and its treatment. *Obes Res* 2003;11:1168-1177.
- Dixon JB, Hayden MJ, O'Brien PE, Piterman L. Physician attitudes, beliefs and barriers towards the management and treatment of adult obesity: a literature review. *Aust J Prim Health* 2008;14:9-18.
- Sarwer DB, Ritter S, Wadden TA, Spitzer JC, Vetter ML, Moore RH. Physician's attitudes about referring their type 2 diabetes patients for bariatric surgery. *Surg Obes Relat Dis* 2012;8:381-386.
- Courcoulas AP, Christian NJ, Belle SH, et al. Weight change and health outcomes at 3 years after bariatric surgery among individuals with severe obesity. *JAMA* 2013;310:2416-2425.
- Sikorski C, Luppá M, Dame K, et al. Attitudes toward bariatric surgery in the general public. *Obes Surg* 2013;23:338-345.
- Fardouly J, Vartanian LR. Changes in weight bias following weight loss: the impact of weight loss method. *Int J Obes* 2012;36:314-319.
- Vartanian LR, Fardouly J. The stigma of obesity surgery: negative evaluations based on weight loss history. *Obes Surg* 2013;23:1545-1550.
- Mattingly BA, Stambush MA, Hill AE. Shedding the pounds but not the stigma: negative attributions as a function of a target's method of weight loss. *J Appl Biobehav Res* 2009;14:128-144.
- Sarwer DB, Wadden TA, Fabricatore AN. Psychosocial and behavioral aspects of bariatric surgery. *Obes Res* 2005;13:639-648.
- Karasawa K. The effects of onset and offset responsibility on affects and helping judgments. *J Appl Soc Psychol* 1991;21:482-499.
- Black MJ, Sokol N, Vartanian LR. The effect of effort and weight controllability on perceptions of obese individuals. *Submitted*.
- Buhrmester M, Kwang T, Gosling SD. Amazon's mechanical Turk: a new source of inexpensive, yet high-quality, data? *Perspect Psychol Sci* 2011;6:3-5.
- Vartanian LR, Thomas MA, Vanman EJ. Disgust, contempt, and anger and the stereotypes of obese people. *Eat Weight Disord* 2013;18:377-382.
- Crandall CS. Prejudice against fat people: ideology and self-interest. *J Pers Soc Psychol* 1994;66:882-894.
- Bullock M, Stambush MA, Mattingly BA. Weight loss effort and anti-fat attitudes on perceptions of a target's sociability and experienced exclusion. *J Appl Biobehav Res* 2011;16:42-55.
- Hayes AF, Preacher KJ. Statistical mediation analysis with a multicategorical independent variable. *Br J Math Stat Psychol*. In press.
- Danielsdottir S, O'Brien KS, Ciao A. Anti-fat prejudice reduction: a review of published studies. *Obes Facts* 2010;3:47-48.
- McClure KJ, Puhl RM, Heuer CA. Obesity in the news: do photographic images of obese persons influence antifat attitudes? *J Health Commun* 2011;16:359-371.
- Pearl RL, Puhl RM, Brownell KD. Positive media portrayals of obese persons: impact on attitudes and image preference. *Health Psychol* 2012;31:821-829.
- Heuer CA, McClure KJ, Puhl RM. Obesity stigma in online news: a visual content analysis. *J Health Commun* 2011;16:976-987.
- Puhl RM, Peterson JL, DePierre JA, Luedicke J. Headless, hungry, and unhealthy: a video content analysis of obese persons portrayed in online news. *J Health Commun* 2013;18:686-702.