



Implicit bias about weight and weight loss treatment outcomes



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ARTICLE INFO

Article history:

Received 24 February 2014

Received in revised form 10 July 2014

Accepted 21 August 2014

Available online 16 September 2014

Keywords:

Implicit weight bias

Implicit associations test

Obesity

Weight loss treatment

ABSTRACT

Objectives: The goal of the current study was to examine the impact of a weight loss intervention on implicit bias toward weight, as well as the relationship among implicit bias, weight loss behaviors, and weight loss outcomes. Additionally, of interest was the relationship among these variables when implicit weight bias was measured with a novel assessment that portrays individuals who are thin and obese engaged in both stereotypical and nonstereotypical health-related behaviors.

Methods: Implicit weight bias (stereotype consistent and stereotype inconsistent), binge eating, self-monitoring, and body weight were assessed among weight loss participants at baseline and post-treatment ($N = 44$) participating in two weight loss programs.

Results: Stereotype consistent bias significantly decreased from baseline to post-treatment. Greater baseline stereotype consistent bias was associated with lower binge eating and greater self-monitoring. Greater post-treatment stereotype consistent bias was associated with greater percent weight loss. Stereotype inconsistent bias did not change from baseline to post-treatment and was generally unrelated to outcomes.

Conclusion: Weight loss treatment may reduce implicit bias toward overweight individuals among weight loss participants. Higher post-treatment stereotype consistent bias was associated with a higher percent weight loss, possibly suggesting that losing weight may serve to maintain implicit weight bias. Alternatively, great implicit weight bias may identify individuals motivated to make changes necessary for weight loss.

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1. Introduction

Individuals with obesity are often characterized unfavorably (e.g., viewed as “lazy,” “weak-willed,” “ugly,” etc.) and experience discrimination in nearly all domains of life, including employment, medical, and educational settings, and interpersonal relationships (Puhl & Heuer, 2009). Individuals who are overweight and obese show little in-group favoritism (Rudman, Feinburg, & Fairchild, 2002; Wang, Brownell, & Wadden, 2004) and often evidence explicit and implicit anti-fat bias (e.g., Carels et al., 2010; Schwartz, Vartanian, Nosek, & Brownell, 2006; Wang et al., 2004).

Explicit attitudes represent a person's conscious views toward people, objects, or concepts, whereas implicit attitudes represent thoughts and feelings toward objects, groups or concepts which one is either unaware of or cannot attribute to an identified previous experience (Greenwald & Banaji, 1995; Lane et al., 2007). On explicit measures of weight bias individuals who are obese or overweight attribute negative characteristics (e.g. lazy; lacking in self-control) to individuals who are obese at a greater rate than they attribute those same characteristics to individuals who are thin (Carels et al., 2010; Wang et al., 2004). On

implicit measures of weight bias, individuals who are overweight or obese express negative implicit bias more frequently toward obese individuals than to thin individuals (Carels, Young, Wott, et al., 2009; Carels et al., 2010; Schwartz et al., 2006; Wang et al., 2004).

Generally, explicit attitudes more often predict deliberative responses, such as written evaluations of individuals, whereas implicit attitudes more often predict spontaneous and nonverbal behaviors, such as the amount of time spent looking at someone during a conversation (Bessenhoff & Sherman, 2000; Dovidio, Kawakami, & Gaertner, 2002). In weight bias research, implicit and explicit biases are often not significantly correlated and are differentially associated with psychological well-being and weight loss treatment outcomes (Carels et al., 2010). To date, analyses have not been conducted to examine whether implicit bias predicts various treatment outcomes above and beyond explicit bias. Typically, explicit and implicit weight bias among overweight individuals seeking weight loss treatment have been associated with poor psychosocial and weight loss treatment outcomes (Carels, Young, Coit, et al., 2009; Carels, Young, Wott, et al., 2009; Carels et al., 2010; Carels, Burmeister et al., 2013; Puhl & Heuer, 2009; Wott & Carels, 2009). With few exceptions (Latner, Wilson, Jackson, & Stunkard, 2008), these findings are consistent with research showing an association between weight bias and unhealthy eating behaviors known to negatively influence weight loss, such as loss of control during eating, increased caloric intake, reduced desire to exercise, lower energy expenditure, and

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inconsistent self-monitoring (Ashmore, Friedman, Reichmann, & Musante, 2008; Carels, Young, Wott, et al., 2009; Carels et al., 2010; Schvey, Puhl, & Brownell, 2011; Seacat & Mickelson, 2009; Vartanian & Novak, 2011; Wott & Carels, 2009).

Research suggests that implicit attitudes are malleable and responsive to stimulus characteristics, such as the type of images employed (Dasgupta & Greenwald, 2001). Therefore, it is conceivable that participation in a weight loss program may challenge negative stereotypes about obesity, particularly when participants are exercising regularly and eating more healthfully. Yet, weight loss program participation does not appear to reduce implicit weight bias (Carels, Young, Wott, et al., 2009). For example, in two studies, implicit weight bias remained unchanged following weight loss treatment (Carels, Young, Wott, et al., 2009; Carels et al., 2010). Because it is automatic in nature, implicit bias may be more resistant to change. Nevertheless, given that implicit weight bias has been associated with poor weight loss treatment outcomes, high levels of weight bias following treatment could create a barrier for successful long-term weight loss.

An alternative explanation for the observed lack of change in implicit bias following weight loss treatment is that the past assessment of implicit bias was not sensitive enough to capture changes in bias. Past weight bias research using the implicit associations test (IAT; Carels, Young, Wott, et al., 2009; Carels et al., 2010; Schwartz et al., 2006; Wang et al., 2004) has often relied on the non-specific concepts of 'fat' and 'thin' rather than images. However, more recently, IATs were developed that contain realistic images of individuals with obesity engaging in behaviors *consistent* (being sedentary or eating junk food) and *inconsistent* (exercising or eating healthy) with obese stereotypes and weight loss (Carels, Hinman et al., 2013; Hinman, Burmeister, Kiefner, Borushok, & Carels, in press). We used these IATs to examine change in implicit weight bias in response to weight loss treatment.

Given that the images in the current study were designed to depict individuals who are thin and obese engaging in behaviors commonly associated with obesity (eating junk food and being sedentary) and weight loss (exercising and eating vegetables), implicit bias assessed in response to these images may be more responsive to change following participation in a weight loss program. For example, the automatic associations between being obese and eating junk food (stereotype consistent) might be weakened following participation in a weight loss program, particularly if the individual is engaging in regular exercise and healthy eating. The predictions are somewhat less clear regarding stereotype inconsistent weight bias. In prior research, stereotype inconsistent weight bias was significantly lower than stereotype consistent weight bias (Carels, Hinman et al., 2013; Hinman et al., in press). Nevertheless, participating in a weight loss program and becoming accustomed to engaging in positive behaviors commonly associated with weight loss, such as eating healthy and exercising, might serve to diminish implicit weight bias further (e.g., that 'fat' is 'bad').

One aim of the current study was to examine the relationship between stereotype consistent and inconsistent implicit bias about weight and weight loss outcomes, as well as behaviors associated with weight loss outcomes, including self-monitoring frequency, daily caloric intake, daily minutes of exercise, and binge eating. It was hypothesized that during and following weight loss treatment, greater bias, including stereotype consistent or inconsistent implicit biases, would be associated with greater binge eating, less self-monitoring, lower levels of exercise, increased caloric intake, and lower percent weight loss.

In prior research, implicit weight bias was greater when participants viewed images of individuals with obesity engaging in stereotype consistent activities (e.g., watching TV; eating junk food), compared to when the same individuals were engaging in stereotype inconsistent activities (e.g., exercising; eating healthy; Carels, Hinman et al., 2013). It was expected that these findings would be replicated. However, another aim of the current study was to examine whether implicit bias assessed utilizing images of individuals who are obese and thin engaging in stereotype consistent and inconsistent activities would be

reduced following participation in a weight loss program. That is, as participants find themselves engaging in healthy behaviors (exercise, healthy eating) it was hypothesized that both stereotype consistent and inconsistent bias would be diminished.

2. Method

2.1. Participants

Overweight and obese adults (BMI ≥ 27 ; $N = 44$) were recruited through mass email, advertisements, and flyers posted in public areas of a medium-sized metropolitan area in the Midwestern United States. Participants were primarily female (84%) and Caucasian (94%). Average age was 53.2 ($SD = 13.6$) and average BMI was 37.0 ($SD = 7.6$; range 27.5–63.3). Sixty-four percent had at least a college degree and 87% reported an annual income greater than \$30,000.

2.2. Behavioral weight loss program

Participants were randomized into one of two behavioral weight loss programs: a) Diabetes Prevention Program (The Diabetes Prevention Program (DPP) Research Group, 2002) or b) Transform Your Life program (Carels et al., 2011). Both programs lasted 18 weeks and met weekly in small groups of 12–15 participants for 90 min. Both programs included a combination of didactic instruction, interactive exercises, and homework designed to facilitate weight loss goals through a greater understanding and use of nutrition principles, increased physical activity, and the use of behavioral principles (e.g., goal setting, habit formation). Neither program emphasized issues related to weight bias or other potential confounders, such as body image. Additional details on each program can be found at Diabetes Prevention Program (The Diabetes Prevention Program (DPP) Research Group, 2002) or Transform Your Life (Carels et al., 2011).

2.3. Measures

The measures described below for binge eating, implicit bias, and weight were administered before the start of each program and again after its conclusion at 18 weeks (post-treatment). Self-monitoring data were collected throughout the length of each program.

2.4. Self-monitoring

Participants were instructed to record dietary intake. They were encouraged to use popular online calorie databases, such as CalorieKing.com and NutritionData.com and were provided with a calorie guide for common foods items. Participants provided daily calorie intake and self-reported minutes exercised (e.g., 20 min walking) electronically to a website or via paper and pencil.

2.5. Binge eating

Participants completed the Binge Eating Scale (Gormally, Black, Dastin, & Rardin, 1982). This widely used 16 item scale measures the severity of an individuals' binge eating behavior across several behavioral and psychological areas. Research has shown that the BES is capable of discerning binge eating pathology severity (Gormally et al., 1982). In the current study sample the Cronbach's α s were .87 at baseline and .82 at post-treatment.

2.6. Weight loss

Weight was measured to the nearest 0.1 lb at baseline and post-treatment using an electronic Tanita BF-350 scale (Tanita; Arlington Heights, Illinois). Height was measured in inches to the closest 0.5 in. using a height rod on a standard spring scale at baseline. Height was

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