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# Reducing Obesity Stigma: The Effectiveness of Cognitive Dissonance and Social Consensus Interventions

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**Obese individuals experience pervasive stigmatization. Interventions attempting to reduce obesity stigma by targeting its origins have yielded mixed results. This randomized, controlled study examined the effectiveness of two interventions to reduce obesity stigma: cognitive dissonance and social consensus. Participants were college undergraduate students ($N$ = 64, 78% women, mean age = 21.2 years, mean BMI = 23.1 kg/m$^2$) of diverse ethnicities. Obesity stigma (assessed with the Antifat Attitudes Test (AFAT)) was assessed at baseline (Visit 1) and 1 week later, immediately following the intervention (Visit 2). Participants were randomly assigned to one of three intervention groups where they received standardized written feedback on their obesity stigma levels. Cognitive dissonance participants ($N$ = 21) were told that their AFAT scores were discrepant from their values (high core values of kindness and equality and high stigma), social consensus participants ($N$ = 22) were told their scores were discrepant from their peers' scores (stigma much higher than their peers), and control participants ($N$ = 21) were told their scores were consistent with both their peers' scores and their own values. Following the intervention, omnibus analyses revealed significant group differences on the AFAT Physical/Romantic Unattractiveness subscale (PRU; $F(2, 59) = 4.43$, $P < 0.05$). Planned contrasts revealed that cognitive dissonance group means were significantly lower than control means for AFAT total, AFAT PRU subscale, and AFAT social/character disparagement subscale (all $P < 0.05$). No significant differences were found between social consensus and controls. Results from this study suggest that cognitive dissonance interventions may be a successful way to reduce obesity stigma, particularly by changing attitudes about the appearance and attractiveness of obese individuals.**

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## INTRODUCTION

A large proportion of American adults are overweight or obese (1), and the health (2) and social (3) complications resulting from obesity have been well-established. Negative attitudes and beliefs about obesity (also called obesity stigma) are widespread, and many overweight individuals experience weight discrimination (negative actions/behaviors) as a result. Obesity stigma and weight-based discrimination is widespread in healthcare settings, workplaces, and schools (4). For example, physicians and other health professionals report negative biases toward obese patients, obese individuals are negatively evaluated in hiring practices and job competency evaluations, and obese adolescents report bullying and teasing from peers and even school staff (4). Self-reported discrimination based on body size increased 66% from 1995 to 2006 in the United States (5). Weight discrimination was particularly common among women, young people, minorities, and individuals with a higher BMI (kg/m$^2$) (6). Discriminating experiences are linked to negative psychological, social, and health consequences for obese individuals (6–9). These harmful consequences highlight the importance of identifying effective methods to reduce obesity stigma.

Stigma-reduction interventions have examined ways to reduce negative attitudes about obesity by targeting the perceived origins of these attitudes; a comprehensive review of published studies reveals mixed success (10). Several studies have attempted to reduce obesity stigma by changing beliefs about the controllability of obesity, based on theory that stigma originates from the belief that people are personally responsible for being overweight (11). The results of these interventions have been mixed. Several studies demonstrated that psychoeducation teaching the medical origins of obesity can decrease negative attitudes toward obese individuals as well as change beliefs about the causes of obesity (11–14). Other studies succeeded in changing beliefs about the causes of obesity but failed to decrease negative attitudes toward obese individuals (15,16). Other controllability-focused interventions saw improvements in negative attitudes about obesity among

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some but not all participants (17), or were unable to create any changes in negative attitudes (18).

Other interventions have attempted to elicit empathy toward obese individuals in order to reduce stigma. Largely unsuccessful, these interventions involved presenting personal accounts of overweight individuals describing their weight-related discrimination (16,19,20) and providing education on obesity stigma and its negative consequences (21,22). Other unsuccessful empathy-focused interventions provided positive depictions of obese models (18) or direct contact with obese individuals (12,23).

Interventions based on social consensus theory, which posits that belief formation is influenced by the beliefs of peers (24), show promise in reducing obesity stigma. Puhl, Schwartz, and Brownell (25) found that participants reduced negative stereotypes and increased positive stereotypes about obesity after receiving manipulated feedback that their peers held more positive attitudes than the participants did. Zitek and Hebl (26) used a study confederate who endorsed or condemned discrimination toward groups of individuals, including obese people, in front of participants. Participants were more likely to condemn or condone discriminatory statements according to statements of the confederate peer. The positive results of these two studies suggest that, to date, social consensus theory shows the most promise in improving attitudes toward obese individuals. Yet given the overall mixed success of interventions targeting negative attitudes toward obesity, there is a need to continue exploring alternative stigma-reduction strategies.

Cognitive dissonance theory posits that inconsistency among people's beliefs, attitudes, or actions causes psychological discomfort, and that people will attempt to eliminate this inconsistency by changing their beliefs, attitudes, or actions (27). Creating a discrepancy between attitudes, beliefs, or behaviors has been commonly used as a means to create change in negative or resilient attitudes and behaviors (e.g., refs 27,28), including internalization of the thin ideal, a construct related to weight stigma (e.g., refs 29,30). For example, cognitive dissonance strategy was used to decrease racial prejudice in a study that identified discrepancies between individuals' life values (31). Participants were informed that the order in which they ranked key life values showed that they prioritized their own freedom over anyone else's freedom. This feedback evoked participant dissatisfaction with their value placement and caused participants to change their value rankings compared to a control group. In response to this successful intervention, Rokeach concluded that Americans will experience self-dissatisfaction (or cognitive dissonance) when confronted with aspects of themselves that are inconsistent with the tenets of democracy and equality (31). Despite Rokeach's conclusion that most US college students consider themselves to be egalitarian and believe in equal treatment for all, obesity stigma is pervasive in this population (32). These two attitudes are fundamentally inconsistent, yet both are widespread. Therefore, an intervention that draws attention to this inconsistency has the potential to create self-dissatisfaction (via cognitive dissonance) and may produce attitude change.

The aim of the current study was to examine the effectiveness of two interventions designed to reduce obesity stigma: cognitive dissonance and social consensus. An experimental design assessed participants' value systems and beliefs about obese individuals at baseline (Visit 1) and 1 week later (Visit 2), following one of three types of randomly selected feedback about their values and beliefs: (i) feedback that their level of obesity stigma was discrepant from their values (cognitive dissonance condition), (ii) feedback that their level of stigma was discrepant from their peers (social consensus condition), (iii) feedback that their level of stigma was both consistent with their own values and similar to the stigma levels of their peers (control condition). It was predicted that participants who received cognitive dissonance or social consensus feedback would demonstrate a reduction in obesity stigma compared to the control condition.

## METHODS AND PROCEDURES

### Participants and recruitment

Participants were 66 undergraduate psychology students at the University of Hawai'i (Honolulu, HI) who received course extra credit for participation. Sample size was determined before running the study using power calculations specific to ANOVA designs (33) based on 0.80 power and a small effect size (0.20). Participants who completed the first visit but not the second ($N = 2$) were removed from the study analyses. The final study sample was composed of 64 participants (78% women). All procedures were approved by the institutional review board of University of Hawai'i and informed consent was obtained from all participants.

### Measures

*Portrait Values Questionnaire (PVQ).* The PVQ is a 40-item self-report questionnaire designed to assess participant's value systems. Participants must select the degree to which the person in each description is similar to them, ranging from "very much like me" to "not at all like me" (34). The PVQ reflects the 10 motivationally distinct values proposed by Schwartz (35): conformity, tradition, benevolence, universalism, self-direction, stimulation, hedonism, achievement, power, and security. Sample item: "She thinks it is important that every person in the world be treated equally" (benevolence subscale). Higher scores indicate greater endorsement of a particular value. Internal consistency of the PVQ in the current sample was high for the total scale at Visit 1 (0.85), and modest for subscales (Cronbach's α ranging from 0.42 for Self-Direction subscale to 0.81 for Achievement subscale). The subscales of primary focus in the current study, Benevolence and Universalism, had adequate internal consistency (0.64 and 0.79, respectively). Previous studies show good discriminant and convergent validity and moderate test–retest reliabilities for all values (ranging from 0.66 to 0.88; (34)). The PVQ was administered as part of the study deception so that participants would perceive that their values were being assessed to add authenticity to feedback conditions that included information of the values. No feedback was given on participants' actual values.

*Antifat Attitudes Test (AFAT).* The AFAT consists of 47 statements about "fat people" rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate higher obesity stigma (32). The AFAT yields three subscales; Social/Character Disparagement (SCD), Weight Control/Blame (WCB), and Physical/Romantic Unattractiveness (PRU). Sample item: "Society is too tolerant of fat people" (SCD subscale). Internal consistency of the AFAT in the current sample was high for the total scale at Visit 1 (0.93) and high for each of the three subscales, (Cronbach's α ranging from 0.72 to 0.86). The AFAT has demonstrated discriminant and convergent validity in

previous studies, with no significant correlation to measures of socially desirable response styles (32).

*Marlowe-Crowne Social Desirability Scale (M-C SDS).* The M-C SDS is a 33-item true/false self-report questionnaire designed to measure socially desirable response styles (36). Items on the M-C SDS consist of socially sanctioned but highly improbable statements, such as "I always try to practice what I preach." Internal consistency of the M-C SDS in the current sample was high for the total scale at Visit 1 (0.73). Higher scores indicate greater socially desirable responding. The M-C SDS has previously been used to examine relationships between measures of obesity stigma and socially desirable response styles (e.g., refs. 25,32).

*Post-feedback questions.* Following feedback, participants were given a questionnaire designed to confirm that they had attended to the results feedback and to assess discrepancy and self-dissatisfaction. Specifically, they were asked how surprised they were at their results, how accurate they felt their results page was in reflecting their values and attitudes, what their results paragraph indicated (two questions specific to the cognitive dissonance and social consensus conditions), and if they felt upset or disappointed with themselves after reading their results page (two separate questions). All questions were rated on a 5-point Likert scale.

### Procedure

*Visit 1.* As part of the study deception to disguise the fact that obesity was the focus of the experiment, participants were told that the study examined the influence of different value systems on thoughts and actions toward different groups of individuals. Participants were informed they had an equal, random chance of being questioned on their feelings toward one of the following groups: Canadians, athletes, elderly individuals, physicians, obese individuals, college students, Mormons, Scientologists, and educators. Participants then selected an envelope from a box that they were told contained equal numbers of envelopes representing each group, with questionnaires on the specific group inside. In reality, every envelope contained the demographics questionnaire, PVQ, AFAT, and M-C SDS. Participants were told that they could expect to receive feedback on this first set of questionnaires during Visit 2.

*Visit 2.* One week later, participants returned for their second visit, where they were told that their data had been entered into the computer, generating a "results page" containing a personalized interpretation of their scores. The experimenter printed out this page from the computer in the participants' presence and reviewed the "personalized results page" with each participant, explaining the key findings. In reality, the "results page" was predetermined according to randomization group. Each participant was randomized to one of three groups at the time he or she showed up for the second visit using a random sequence generator.

In the cognitive dissonance condition, participants learned from their results page that they reported "strong values" (quantified with a fake score of 82 out of 100 on the PVQ), with highest scores on the values of Benevolence and Universalism. The terms Benevolence and Universalism were defined for participants, with examples given. The results page went on to explain that participants also had a low AFAT score (quantified with a fake score of 21 out of 100), which indicated very negative attitudes toward obese people. The conclusion of the results page explained that these two sets of results were unexpected because they were inconsistent with each other, as individuals with strong values of Benevolence and Universalism are normally very positive and accepting toward all different types of people.

In the social consensus condition, the results page did not provide any specific feedback about their value ratings. Instead, participants in this condition learned from their results page that they held very negative attitudes toward obese people (quantified as a fake score of 21 out of 100; participants were told this score was at the 12th percentile, where 88% of people scored higher than the participant did). The results page went on to explain that other University of Hawai'i students viewed obese individuals much more favorably than they did, with previous studies at the university finding an average score of 84 out of 100, which was 63 percentage points higher than their own score.

In the control condition, participants learned that their values were important to them and consistent with their attitudes about obese individuals, and that their scores on the AFAT were in the normal range and similar to other University of Hawai'i students.

After reading their results page, participants completed the PVQ and the AFAT once again as well the post-feedback questions.

*Debriefing.* During post-study debriefing, participants were told of the true purpose of the study and all study deception was revealed.

### Statistical analysis

Manipulation checks were conducted to ensure that participants could identify the main components of their feedback. Following examination of baseline differences between randomization groups, separate analysis of covariance were conducted on Visit 2 AFAT total and subscale mean scores with M-C SDS scores and Visit 1 AFAT total scores (for total score analyses) or AFAT subscale means (for subscale analyses) as covariates. Based on the *a priori* hypothesis that AFAT scores between the three groups would differ, planned simple contrasts were conducted following each analysis of covariance, regardless of the significance of the overall F.

## RESULTS

### Participant characteristics

The mean age of study participants was 21.22 years (s.d. = 5.68) and mean BMI, based on self-reported height and weight, was 23.07 kg/m$^2$ (s.d. = 4.47). The ethnic background of the sample was as follows: 62% Asian (Japanese, Chinese, Filipino, Korean, or Other Asian), 20% mixed ethnicity, 11% white/Caucasian, 5% Hawaiian/Pacific Islander, and 2% Black/African American.

### Randomization check and differences at baseline

A series of univariate ANOVAs confirmed that there were no BMI or age differences between the three groups ($F(2,61) = 1.22$, not significant (n.s.)) and no significant differences between experimental conditions on Visit 1 AFAT means ($F(2,61) = 0.18$, n.s.) or any subscale means (SCD subscale: $F(2,61) = 0.53$, n.s.; WCB subscale: $F(2,61) = 0.06$, n.s.; and PRU subscale: $F(2,61) = 0.27$, n.s.). Correlational analyses revealed that neither BMI nor M-C SDS scores were significantly related to initial or final AFAT mean scores, with the exception that M-C SDS scores were inversely correlated with Visit 2 PRU subscale mean scores ($r = -0.26$, $P < 0.05$). Addressing this potential association between M-C SDS scores and obesity stigma, the M-C SDS was also included in the main analyses as a covariate, as described above.

### Manipulation check

Table 1 presents group means on all manipulation check questions. To examine whether participants could identify the main components of their feedback, univariate ANOVAs were conducted on mean responses to the question "To what extent did your results indicate your values and attitudes were consistent," rated from 1 (very consistent) to 5 (very inconsistent). Results showed a significant differences between the three groups ($F(2,61) = 22.83$, $P < 0.001$). Planned simple contrasts revealed

**Table 1 Mean scores and standard deviations on manipulation check and discrepancy questions for each intervention group**

| | Cognitive dissonance | | Social consensus | | Control | |
|---|---|---|---|---|---|---|
| Item | Mean | s.d. | Mean | s.d. | Mean | s.d. |
| Were values and attitudes consistent? | 3.76[a] | 0.60 | 3.55[a] | 1.34 | 1.33[b] | 0.73 |
| Were values and attitudes same as others? | 3.33[a] | 0.73 | 3.45[a] | 1.34 | 1.76[b] | 0.77 |
| Was feedback surprising? | 3.71[a] | 1.30 | 4.23[a] | 0.87 | 1.76[b] | 1.14 |
| Was feedback accurate? | 2.86[a] | 1.01 | 2.14[b] | 1.08 | 3.80[c] | 0.62 |
| How upset were you with yourself? | 2.62[a] | 1.02 | 2.73[a] | 0.83 | 1.14[b] | 0.36 |
| How disappointed were you with yourself? | 2.48[a] | 1.21 | 2.55[a] | 1.34 | 1.29[b] | 0.56 |

Means in the same row that do not share superscripts differ at $P < 0.05$ in the simple planned contrasts comparison.

that cognitive dissonance means were not significantly different than social consensus means, but participants in both the cognitive dissonance and social consensus group rated their results as significantly more inconsistent compared to control (both $P < 0.001$). The same pattern was found for the question "To what extent did your results indicate your attitudes were the same as others?" rated from 1 (exactly the same as others) to 5 (very different from others). There was a significant difference between the three groups ($F(2,61) = 19.24$, $P < 0.001$). Planned simple contrasts revealed there was no significant difference between cognitive dissonance and social consensus means, but participants in both the cognitive dissonance and social consensus group rated their attitudes as more discrepant from others compared to controls (both $P < 0.001$).

Group differences were examined for how surprised participants were with their feedback and how accurate they perceived their feedback to be. Univariate ANOVAs on responses to these items showed significant group differences in surprise with feedback ($F(2,61) = 29.71$, $P < 0.001$, as well as accuracy of feedback, $F(2,60) = 16.65$, $P < 0.001$). Planned simple contrasts showed that both cognitive dissonance and social consensus groups were significantly more surprised than the control group (both $P < 0.001$), but cognitive dissonance and social consensus were not significantly different from each other. For accuracy, however, simple contrasts revealed significant differences in mean scores between all groups (all $P < 0.01$). The control group had the highest mean accuracy ratings, followed by the cognitive dissonance group, and then the social consensus group.

### Group differences in obesity stigma postintervention

*AFAT total.* An omnibus analysis of covariance revealed no significant overall difference between groups on Visit 2 AFAT total mean scores ($F(2,59) = 2.82$, n.s.), but planned simple contrasts revealed that following the intervention, the cognitive dissonance group held significantly less stigmatizing attitudes than the control group ($P < 0.05$; **Table 2**). There were no significant differences between cognitive dissonance and social consensus or social consensus and control groups.

*SCD subscale.* There was no significant overall difference between groups on Visit 2 SCD subscale mean scores ($F(2,59) = 2.27$, n.s.), but planned simple contrasts revealed a similar pattern to the total score, where the cognitive dissonance group held significantly less stigmatizing attitudes following the intervention than the control group ($P < 0.05$). There were no significant differences between cognitive dissonance and social consensus or social consensus and control groups.

**Table 2 Mean scores and standard deviations on the AFAT total score and each subscale at Visit 1 and Visit 2 for each intervention group**

| | Cognitive dissonance | | Social consensus | | Control | |
|---|---|---|---|---|---|---|
| Group | Mean | s.d. | Mean | s.d. | Mean | s.d. |
| AFAT1 total | 2.01[a] | 0.43 | 2.09[a] | 0.48 | 2.02[a] | 0.52 |
| AFAT2 total | 1.80[a] | 0.32 | 2.01[a,b] | 0.55 | 2.01[b] | 0.58 |
| SCD1 | 1.45[a] | 0.44 | 1.58[a] | 0.50 | 1.45[a] | 0.44 |
| SCD2 | 1.39[a] | 0.28 | 1.59[a,b] | 0.55 | 1.60[b] | 0.60 |
| WCB1 | 2.56[a] | 0.55 | 2.63[a] | 0.70 | 2.60[a] | 0.80 |
| WCB2 | 2.36[a] | 0.49 | 2.47[a] | 0.72 | 2.43[a] | 0.86 |
| PRU1 | 2.51[a] | 0.46 | 2.63[a] | 0.54 | 2.59[a] | 0.59 |
| PRU2 | 2.12[a] | 0.38 | 2.46[b] | 0.65 | 2.50[b] | 0.51 |

Means in the same row that do not share superscripts differ at $P < 0.05$ in the simple planned contrasts comparison.
PRU, Physical/Romantic Unattractiveness; SCD, Social/Character Disparagement; WCB, Weight Control/Blame.

*WCB subscale.* There was no significant overall difference between groups on Visit 2 WCB subscale mean scores ($F(2,59) = 0.96$, n.s.). Planned simple contrasts revealed that stigmatizing attitudes following the intervention were not different across groups.

*PRU subscale.* There was a significant group overall difference on Visit 2 PRU subscale mean scores ($F(2,59) = 4.43$, $P < 0.05$). Planned simple contrasts revealed that following the intervention, the cognitive dissonance group held significantly less stigmatizing attitudes than the two other groups. The cognitive dissonance PRU group mean was significantly lower than both control ($P < 0.05$) and social consensus ($P < 0.05$) group means. There were no significant differences between social consensus and control means.

### Potential mechanisms for change: discrepancy questions

Group differences in potential discrepancy questions were examined using univariate ANOVAs on responses to items asking

how "upset" and how "disappointed" participants were with themselves after receiving their feedback. There were significant overall group differences in both how "upset" ($F(2,61) = 26.74$, $P < 0.001$) and how "disappointed" ($F(2,61) = 8.88$, $P < 0.001$) participants rated themselves. Planned simple contrasts revealed that the cognitive dissonance and social consensus groups both reported significantly higher levels of "upset" and "disappointment" with themselves than the control group (all $P < 0.001$), and cognitive dissonance and social consensus ratings did not differ from each other on either of these items (**Table 1**).

To examine the potential relationship to change, Pearson product-moment correlations assessed the relationship between AFAT scores and the mean ratings on the two questions assessing "upset" and "disappointment." Ratings of "disappointment" were significantly correlated with Visit 2 AFAT total means ($r = -0.27$, $P < 0.05$) as well as Visit 2 PRU subscale means ($r = -0.34$, $P < 0.05$). Thus, higher ratings of disappointment were associated with lower AFAT total and PRU subscale scores following the intervention. No significant correlations were found between ratings of "upset" and AFAT scores.

### Changes in Portrait Values Questionnaire

To examine the possibility that feedback elicited changes in values structure (rather than changes in stigma), exploratory univariate ANOVAs were conducted on the total PVQ scale as well as the Benevolence and Universalism subscales for Visit 1 and Visit 2 PVQ scores. Results indicated there were no significant differences between groups in Values scores at Visits 1 or 2. For Visit 1, Total score $F(2,61) = 0.70$, n.s.; Benevolence subscale $F(2,61) = 0.32$, n.s.; and Universalism subscale $F(2,61) = 0.81$, n.s.. For Visit 2, Total score $F(2,61) = 0.85$, n.s.; Benevolence subscale $F(2,61) = 0.78$, n.s., and Universalism subscale $F(2,61) = 1.13$, n.s.

## DISCUSSION

The results of this study indicate that a cognitive dissonance intervention successfully reduced negative attitudes about the appearance and attractiveness of obese individuals. After participants received feedback that their obesity stigma was inconsistent with their values, their negative attitudes toward obese people's physical and romantic unattractiveness were lower than participants who did not receive this feedback. Furthermore, when means were directly compared, participants in the cognitive dissonance group had significantly lower total stigma as well as lower SCD stigma at the second visit compared to controls. Thus, cognitive dissonance was the only successful intervention in this study. However, in the omnibus analysis of covariance, the cognitive dissonance and social consensus interventions did not significantly reduce overall obesity stigma ($P = 0.07$). This result is not entirely unsurprising, given previous research which shows the difficulty of changing negative attitudes toward obese individuals (e.g., refs. 13,16,17). However, it is promising that some aspects of stigma can be manipulated. Prior obesity stigma intervention studies have consistently changed attitudes about the controllability of weight, but have been less consistently successful in changing judgments about character, attractiveness, and negative stereotypes about obesity (e.g., refs. 15,16).

The effectiveness of the cognitive dissonance method may be explained by the significant correlation between how disappointed participants were with themselves following feedback. As disappointment increased, postintervention AFAT total scores and PRU scores decreased. Participants also reported that they felt disappointed with themselves to a greater degree in both intervention groups compared to the control group. Taken together, these findings suggest that participants may have desired to change their stigmatizing attitudes to resolve their disappointment with themselves, consistent with cognitive dissonance theory (27).

It is possible that the cognitive dissonance intervention had more impact on PRU and SCD, and less impact on WCB, because the values emphasized in this intervention (being kind to others and treating them equally) are related to the personality and appearance facets of stigma. In contrast, attitudes about controllability of weight, assessed in the WCB subscale, may be less related to kindness and equality. For example, the questions on the AFAT PRU subscale (e.g., "If I were single, I would date a fat person" and "Fat people should be encouraged to accept themselves the way they are") and the Social/Character Disparagement subscale, (e.g., "If bad things happen to fat people, they deserve it" and "Most fat people are boring") may reflect the values of kindness and equal treatment. When participants in the cognitive dissonance intervention were faced with evidence that they valued kindness and equality, they may have modified only the attitudes that were related to these values.

Items on the AFAT WCB subscale, however (e.g., "Fat people do not necessarily eat more than other people" (reverse scored) and "Most fat people buy too much junk food") and may instead be seen as more factually based, rather than value-based attitudes. In fact, interventions that have changed attitudes about controllability of weight (e.g., refs. 12–15) have done so by presenting factual knowledge about obesity (e.g., information that genetics are a likely cause for obesity). The current study did not provide any factual information about the controllability of obesity; this may explain why the WCB subscale was not significantly affected.

Interventions that can ameliorate the negative judgments about the personality and attractiveness of obese individuals are essential, given the pervasiveness of these judgments. Research has found that daily interpersonal interactions are the most common context for perceived discrimination due to body size among overweight men and women, which may result in difficulty initiating romantic relationships and problems forming friendships (6). Further, obese individuals are often seen as less attractive and romantically desirable (32). One study found that men dating heavier women judged their partners to be less physically attractive than did men dating thinner women, and heavier women were less satisfied with their relationships than thinner women (37). Obese girls report less experience with dating than their

normal weight peers, and both obese boys and obese girls reported lower satisfaction with their romantic and dating status compared to normal weight peers (38). This may have an effect on long-term relationships; men and women who were overweight during dating years (e.g., ages 17–25) were less likely to be married later in life than their normal weight peers (3). It is encouraging that a brief cognitive dissonance intervention was able to positively influence attitudes about the personality and romantic attractiveness of obese individuals.

The social consensus intervention was unsuccessful in changing negative attitudes, a surprising finding in light of recent success using this approach (25,26). Participants in the social consensus group in the current study reported the lowest accuracy ratings, so it is possible that individuals in this group did not believe their feedback. In truth, stigmatization of obesity is common among college students (39), and participants in interventions may be aware of this fact and unable or unwilling to believe that their level of stigma is much greater than their peers. The false feedback used in the current study drew a large discrepancy between stigma levels of peers (which were stated as very positive) and of the participant (which were stated as very negative); perhaps feedback that draws a smaller discrepancy would be more believable and more effective at eliciting change in attitudes. Additionally, creating more believable feedback (e.g., using confederates who make believable statements about obese individuals) may make such feedback more credible. One advantage of the cognitive dissonance intervention used in the current study is that it requires less deception and may be more believable overall than social consensus feedback.

There are several limitations in the current research that should be noted. First, the age (i.e., college undergraduates) and ethnic diversity of the sample may limit the generalizability of the findings. An additional limitation is that the outcome measures used in this study were self-report questionnaires, and these reflect only attitude change and not actual behavior change. Scores on attitudinal measures may not always translate into changes in behavior (40). Future research on obesity stigma interventions should also include measures of actual behavior change.

Since few obesity stigma interventions have been consistently effective in reducing negative attitudes, it is crucial to continue to investigate potentially successful methods of intervention. A brief, cognitive dissonance intervention that highlights the inconsistency between holding certain values along with stigmatizing attitudes was successful in reducing negative attitudes about the physical appearance and romantic attractiveness of obese individuals, and the intervention may be successful in reducing negative attitudes overall as well as judgment about the character of obese individuals. Future research should aim to replicate this methodology in order to expand existing knowledge about the effectiveness of cognitive dissonance interventions on reducing negative attitudes about obesity. In addition, future interventions should continue to explore the different aspects of obesity stigma to identify those that seem most changeable, and target those for additional intervention.

## DISCLOSURE

The authors declared no conflict of interest.



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