

Public Reactions to Obesity-Related Health Campaigns

A Randomized Controlled Trial

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Background: Despite numerous obesity-related health campaigns throughout the U.S., public perceptions of these campaigns have not been formally assessed. In addition, several recent publicized campaigns have come under criticism in the popular media for reinforcing stigmatization of obese people. Thus, research in this area is warranted.

Purpose: To systematically assess public perceptions of recent obesity-related public health campaigns in the U.S.

Design: RCT.

Setting/participants: The data were collected online in summer 2012 from a nationally representative sample of American adults (N=1085).

Intervention: Participants were randomly assigned to view 10 obesity-related health campaigns that were pretested and publicly criticized as being stigmatizing of obese people, or 10 campaigns that contained more-neutral content.

Main outcome measures: Participants provided evaluations of each of the campaigns regarding the extent to which campaigns were rated to be stigmatizing of obese people, motivating for improving lifestyle behaviors, and promoting of self-efficacy for healthy behavior change. Participants additionally evaluated the appropriateness of the visual content depicted in each campaign. Analysis was completed in 2012.

Results: Stigmatizing campaigns were no more likely to instill motivation for improving lifestyle behaviors among participants than campaigns that were more neutral (OR=1.095, 95% CI=0.736, 1.630). Stigmatizing campaigns were also rated as inducing less self-efficacy (adjusted mean difference = -0.171 SD, 95% CI= -0.266, -0.076) and having less-appropriate visual content compared to less stigmatizing campaigns (adjusted difference in probability = -0.092, 95% CI= -0.124, -0.059). These findings remained consistent regardless of participants' body weight, and were generally consistent across sociodemographic predictors.

Conclusions: This study highlights the need for careful selection of language and visual content used in obesity-related health campaigns, and provides support for efforts to portray obese people in a nonstigmatizing manner.

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Background

Stigmatization has historically impaired treatment and prevention efforts for a range of public health crises including tuberculosis, HIV/AIDs, and

smoking,¹ with corroboration from the CDC that “stigmatization hampers prevention.”² A more recently identified public health concern is obesity, an issue that is popularized with the language and urgency of an epidemic.³ Concern about obesity stigmatization stems from its status as a social justice issue, but also because it may increase one’s risk for numerous negative health consequences, exacerbate health effects already associated with obesity, impair weight-loss efforts, and potentially lead to increased weight gain.^{4,5} Indeed, the generally accepted and unchallenged blaming, shaming,

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and unfair treatment of obese individuals can also create or exacerbate health disparities as well as interfere with public health promotion.^{1,6}

Obesity Stigmatization in Health Promotion Efforts

Public health campaigns to address obesity have increased in recent years, including efforts to increase physical activity and consumption of fruit and vegetables, reduce portion sizes and intake of sugar-sweetened beverages, and other messages promoting health behaviors to prevent obesity.⁷ Although these efforts stem from positive intentions to improve public health, several highly publicized campaigns have been singled out for inciting negative attitudes and stereotypes toward obese people, stigmatizing obese youth, or blaming parents of overweight children, with criticisms noted across the popular media^{8,9} and scientific literature.^{10,11} However, despite increasing calls to systematically examine stigmatization in obesity campaigns and health promotions,^{1,10–14} this issue remains uninvestigated. Although a few qualitative studies have explored stigmatization in obesity-related public health advertisements,^{15,16} these studies were conducted with relatively small samples of Australian adults. Thus, little is known about how the general American public perceives these types of campaigns, and how people's perceptions may influence their reception of the messages.

One exception is a recent experimental investigation of public opinions about obesity-related messages.⁷ In this study, a national sample of American adults (N=1014) rated 30 obesity-related messages from national and visible public health campaigns according to positive and negative attributes, with specific emphasis on whether each message was stigmatizing or motivating. Messages that were evaluated most positively (i.e., rated as helpful, motivating) were those that promoted topics related to healthy behavior changes such as increasing fruit and vegetable intake, and notably, did not refer to body weight or mention the word *obesity*. Similarly, messages that received public criticism for promoting stigmatization were rated by participants as the most negative (i.e., stigmatizing, inappropriate) and elicited the lowest intentions to engage in lifestyle behaviors promoted by the message.

Although this study is the first to systematically assess stigmatizing content in obesity-related health messages in the U.S., the authors assessed only the written content of messages in isolation of any accompanying visual media (e.g., images, billboards). It is important to examine both written and visual content in the context of public health advertisements, especially given that

stigmatizing portrayals of overweight people are common in entertainment and news media^{17,18} and that images can substantially alter weight-related attitudes regardless of the accompanying text.^{19,20} Additionally, perceptions of both visual and written components of public health campaigns may ultimately determine a message's success, namely, if it increases knowledge, alters attitudes, or changes behavior.^{21,22}

Current Study

The current study examined public perceptions of obesity-related health messages from recent and visible public health campaigns throughout the U.S. To improve on recent research, participants in the present study were provided with the entire visual and written content of promotional media for each obesity-related message (e.g., full-page advertisements, billboards). The primary objective of this research was to test the hypothesis that public health campaigns that are perceived as stigmatizing of obese people would be evaluated as less motivating for improving lifestyle behaviors and promoting self-efficacy for healthy behavior change. A secondary objective was to assess whether the visual content was viewed as appropriate to accompany the primary health message of the campaign. Demographic variables and personal health-related characteristics were also included as potential correlates of participants' responses.

Methods

Campaign Identification

Obesity-related public campaigns that had recently received media news attention for potentially stigmatizing or shaming obese people (or obesity in general) were identified,^{8,9,23–26} including “Strong4Life” (Children’s Healthcare of Atlanta or CHOA, formerly known as “Stop Childhood Obesity” from Georgia Children’s Health Alliance); “Are you pouring on the pounds?” and “Cut your portions. Cut your risk.” (New York City Department of Health and Mental Hygiene or NYC DOHMH); and anti-obesity billboards (featuring stigmatizing images of an obese person’s stomach and thighs) promoting reduced consumption of cheese (the Physicians Committee for Responsible Medicine or PCRM). These campaigns were specifically reported on by the news media for containing written or visual content that could be perceived as stigmatizing, shaming, or blaming of obese people or obesity.

In addition, national organizations charged with missions to improve nutrition and reduce obesity were also identified (e.g., the CDC, the NIH, and the DHHS). Their websites and promotional materials were searched for relevant obesity-related public health promotion campaigns. Several national campaigns were identified from these organizations, including *Let’s Move* (DHHS, U.S. Department of Agriculture, U.S. Department of Education, U.S. Department of the Interior, and The White House); *we can!* (DHHS, National Heart, Lung, & Blood Institute [NHLBI]; National Institute of Diabetes and Digestive and Kidney Diseases; The Eunice Kennedy Shriver National Institute of Child Health

and Human Development; and the National Cancer Institute); *Choose My Plate* (U.S. Department of Agriculture); and *Fruits & Veggies: More Matters* (CDC, Produce for Better Health Foundation).

Visual promotional and advertising materials of all campaigns were collected by individually searching each campaign website, supplemented by a search engine (i.e., Google) image search to locate other publicly disseminated images used in the campaign. Searches were conducted from January to February of 2012 and captured the most visible anti-obesity campaigns in the U.S. at the time of this data collection.

Message Selection

Promotional materials were selected from each campaign if they were primarily image-based (e.g., billboards, webpage advertisements, magazine ads, campaign logos, and slogans) and written in English. Campaign materials that were created as fact sheets (e.g., involving substantial written text) or TV commercials and video ads were excluded from selection. Campaign images that were clearly identified as being >2 years old were also excluded from selection. In total, 153 campaign images were collected.

Given the lack of feasibility in testing such a large pool of images, further exclusions were made. Campaign advertisements with messages that did not explicitly address obesity or weight-related health were excluded (e.g., campaigns focused on diabetes or heart disease; $n=88$). In an effort to retain campaigns that could be compared to each other with similar amounts of written and visual content, banner ads ($n=26$) were also excluded because they are primarily designed for web-only dissemination, contain very little text, and are difficult to compare to campaigns that can be disseminated in multiple formats (e.g., billboard, magazine, website) and contain more written content. In addition, images that were very similar within the same campaign were excluded ($n=17$) in favor of more recent, representative, or more widely disseminated images.

Throughout this exclusion process, effort was also made to retain campaign images that could serve as more neutral comparisons to campaigns that had been criticized for stigmatizing content. Thus, campaigns that were disseminated broadly during the same time period as stigmatizing campaigns and had similar underlying message themes about obesity (e.g., reducing consumption of sugar-sweetened beverages) but with more neutral content that had not been criticized by the media were retained for comparison with stigmatizing campaigns. This process allowed the remaining images ($n=22$) to be classified into one of two conditions: Stigmatizing (i.e., from campaigns that were publicly criticized for stigmatizing obesity or obese people; $n=11$) or Neutral (i.e., from campaigns that had not been publicly criticized for stigmatizing obesity or obese people; $n=11$).

The images ($n=22$) were then piloted online in a sample of American adults ($N=164$, 63.4% female, mean age=36 years, $SD=14.13$) to ensure that their content was actually perceived as stigmatizing or nonstigmatizing (neutral). Messages that were identified as outliers in piloting were eliminated from each condition ($n=2$), yielding a final sample of $n=20$ ($n=10$ in each condition). For complete descriptions of the ad, campaign, source, message, and visual, see Table 1. Examples of campaigns rated as stigmatizing can be viewed at these web links: pcrm.org/search/?cid=3099; and

www.huffingtonpost.com/2012/01/03/georgia-anti-obesity-ads-stop-sugarcoating_n_1182023.html. Examples of campaigns rated as neutral can be viewed here: www.nhlbi.nih.gov/health/public/heart/obesity/wecan/downloads/healthy-child-letter.pdf; and www.nyc.gov/html/doh/downloads/pdf/cdp/pouring_pounds_soda_distances_posters.pdf.

Participants

The final sample (Table 2) was recruited through a survey panel administered by Survey Sampling International (SSI; www.surveysampling.com). Participants were recruited through thousands of websites with data aggregators that reach millions of users. Panelists were aged ≥ 18 years, actively indicated their intention to join an SSI panel, provided validated geographic and demographic information, and did not duplicate panelists. SSI set quotas on completed interviews to approximate U.S. census demographics.⁷

Of the 1377 participants that entered the survey, exclusions were made for participants that declined to provide consent to participate ($n=80$); dropped out during or after providing demographic information ($n=189$); or had a reported BMI in the underweight range ($n=23$; Figure 1). This yielded a final sample of $N=1085$. Data collection occurred during 1 week in the summer of 2012. All participants provided informed consent, and the study was approved by the Yale University IRB.

Procedure

An online survey was developed. On beginning the survey, after an introduction and providing demographic information, participants were randomly assigned to the Neutral or Stigmatizing condition. Thus, the current study assessed 20 total campaign advertisements using a between-subjects design, in which each participant viewed only the campaigns in either the Neutral ($n=10$) or the Stigmatizing condition ($n=10$). Participants were asked a series of questions regarding their perceptions of each image. The survey took approximately 30 minutes to complete. A binary logistic regression with experimental condition as the outcome variable, and all variables shown in Table 2 as predictor variables, were used to assess potential confounding of the treatment effects because of selective treatment assignment. None of the estimated parameters was significant (all p 's > 0.05), and, thus, no indication of selective treatment assignment was found.

Measures

Stigmatization. Participants were asked seven questions pertaining to stigmatizing content of campaigns, and were asked if each campaign advertisement *promotes negative stereotypes about overweight/obese persons, increases blame towards people for being overweight, makes obesity seem like a much simpler issue than it really is, stigmatizes overweight/obese persons, increases dislike towards overweight/obese persons, portrays obese individuals in a disrespectful manner, and is insulting towards overweight/obese persons*. Responses were rated on a 5-point Likert-type scale (range: *strongly disagree* to *strongly agree*). This scale was developed by the authors, and demonstrated very good reliability across Neutral ($\alpha=0.97$ – 0.98) and Stigmatizing ($\alpha=0.96$ – 0.97) conditions. This scale was used to examine whether participants' perceptions of stigmatization in campaigns varied across sociodemographic factors, were related to their perceptions of the

Table 1. Descriptions and details for obesity-related public health campaigns

Label	Campaign	Source	Website	Written text of primary message	Description of visual image
Stigmatizing campaigns					
1. Don't Drink Yourself Fat	Pouring on the Pounds	NYC DOHMH	www.nyc.gov/html/doh	"ARE YOU POURING ON THE POUNDS? DON'T DRINK YOURSELF FAT. Cut back on soda and other sugary beverages. Go with water..."	A person's hand pours body fat out of a soda bottle into a glass
2. Warning: Chubby Kids	Strong4Life	CHOA	strong4life.com/	"WARNING CHUBBY KIDS MAY NOT OUTLIVE THEIR PARENTS."	Black and white photograph of an overweight African-American girl with a serious facial expression, shown above a red warning label
3. Warning: Big Bones	Strong4Life	CHOA	strong4life.com/	"WARNING BIG BONES DIDN'T MAKE ME THIS WAY. BIG MEALS DID."	Black and white photograph of an overweight Caucasian boy with a serious facial expression, shown above a red warning label
4. Ignoring the Problem	Strong4Life	CHOA	strong4life.com/	"75% of parents of overweight kids ignore the problem... Ignoring this problem is what got us here. It's time to wake up."	Black and white photograph of an overweight Caucasian boy with a serious facial expression, shown above a red warning label
5. Warning: Little Girl	Strong4Life	CHOA	strong4life.com/	WARNING IT'S HARD TO BE A LITTLE GIRL IF YOU'RE NOT."	Black and white photograph of an overweight Caucasian girl with a serious facial expression, shown above a red warning label
6. Portions (Amputee)	Cut your portions. Cut your risk.	NYC DOHMH	www.nyc.gov/html/doh	"PORTIONS HAVE GROWN. SO HAS TYPE 2 DIABETES, WHICH CAN LEAD TO AMPUTATIONS..."	Overweight African-American man with amputated leg sits on stool; overlay of increasing soda portions
7. Portions (Wheelchair)	Cut your portions. Cut your risk.	NYC DOHMH	www.nyc.gov/html/doh	"PORTIONS HAVE GROWN. SO HAS OBESITY, WHICH CAN LEAD TO MANY HEALTH PROBLEMS..."	Overweight woman rides in motorized chair across street; overlay of increasing burger portions shown
8. Portions (Stairs)	Cut your portions. Cut your risk.	NYC DOHMH	www.nyc.gov/html/doh	"PORTIONS HAVE GROWN. SO HAS OBESITY, WHICH CAN LEAD TO MANY HEALTH PROBLEMS..."	Overweight Caucasian woman walks up subway stairs; overlay of increasing portions of french fries

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Table 1. Descriptions and details for obesity-related public health campaigns (continued)

Label	Campaign	Source	Website	Written text of primary message	Description of visual image
9. Abs on Cheese	Anti-Obesity Cheese Billboards	PCRM	pcrm.org	“Your Abs on Cheese. PCRM.org.”	Overweight Caucasian man’s bare midsection (i.e., a bare stomach), to emphasize abdominal excess weight
10. Thighs on Cheese	Anti-Obesity Cheese Billboards	PCRM	pcrm.org	“Your Thighs on Cheese. PCRM.org.”	Overweight Caucasian woman’s thighs/buttocks shown in a bathing suit, grasping her flesh, emphasizing excess weight in thighs/buttocks
Neutral campaigns					
11. Walk 3 Miles	Pouring on the Pounds	NYC DOHMH	www.nyc.gov/html/doh	“You have to walk the 3 MILES from Yankee Stadium to Central Park to burn off the calories from ONE 20oz. SODA....”	Map of New York City with the 3-mile route between Yankee stadium and Central Park highlighted
12. Find Healthier Drinks	Rethink Your Drink	CDC	www.cdc.gov/	“rethink your drink. Find healthier drinks that quench your thirst.”	A glass of water overflows on a blue background
13. Stop Childhood Obesity	Strong4Life	CHOA	strong4life.com/	“Stop childhood obesity so our children can be Strong4Life.”	Overweight African-American girl leaning forward and smiling
14. Three Veggies Thursday	Let’s Move	DHHS ^a	www.letsmove.gov/	“Today is Three Veggies Thursday. Swapping out a fatty, sugary, salty snack with a vegetable or fruit is just one easy thing you can do to help...”	Young white girl holds a calendar with the text on it
15. Raise a Healthy Child	we can!	DHHS, NHLBI ^b	www.nhlbi.nih.gov/health/public/heart/obesity/wecan/	“A LESSON FOR RAISING A HEALTHY CHILD...”	A smiling girl holds an apple with a bite taken out of it; text is written on a chalkboard
16. Small Plate Saturday	Let’s Move	DHHS ^a	www.letsmove.gov/	“Today is Small Plate Saturday. Changing the size of your kids’ plates from adult size to kid size is one way you can help...”	Young African-American girl leans against another person; both holding onto a calendar with the text on it
17. My Plate	Choose My Plate	USDA	www.choosemyplate.gov	“Fruits Grains Dairy Vegetables Protein ChooseMyPlate.gov”	A plate and glass show the suggested amount of daily fruits, vegetables, grains, protein, and dairy

(continued)

Table 1. (continued)

Label	Campaign	Source	Website	Written text of primary message	Description of visual image
18. Face It	we can!	DHHS, NHLBI ^b	www.nhlbi.nih.gov/health/public/heart/obesity/wecan/	“Face it. Helping kids maintain a healthy weight is not easy. But you have more power than you know. You can provide nutritious foods...”	A smiling face is created out of peas, nuts, cereal, a banana, and a bat
19. More Matters	Fruits & Veggies: More Matters	CDC, Produce for Better Health Foundation	www.fruitsandveggiesmorematters.org/	“fruits & veggies more matters”	Green figure of a person juggles fruits and vegetables next to the text also written in green
20. Mom Was Here	Let’s Move	DHHS ^a	www.letsmove.gov/	“She thinks it’s astronaut food. WHATEVER WORKS. MOM WAS HERE.”	Young Caucasian girl holding a half-eaten slice of watermelon

Note: The full textual message is provided if space is available. In other cases, as much of the text is provided as is needed to indicate the theme of the ad.
^aU.S. Department of Agriculture (USDA), U.S. Department of Education, U.S. Department of the Interior, The White House
^bNational Institute of Diabetes and Digestive and Kidney Diseases, The Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Cancer Institute
 CHOA, Children’s Hospital of Atlanta; NHLBI, National Heart, Lung, & Blood Institute; NYC DOHMH, New York City Department of Health and Mental Hygiene; PCRM, Physicians Committee for Responsible Medicine; WBV, weight-based victimization

extent to which campaigns instilled motivation and self-efficacy, and as a manipulation check of the stigmatizing and nonstigmatizing categories of the campaigns.

Motivation. Participants were also asked their opinions about the extent to which each campaign advertisement instilled feelings of motivation to improve health behaviors. Given that campaigns contained a variety of messages (ranging from increasing awareness of obesity to encouraging specific health behaviors), participants were asked more generally to report how motivated they felt to “improve their lifestyle” in response to each ad. Responses were rated on a 5-point Likert-type scale (range: *not at all* to *extremely*).

Self-efficacy. Several questions in the survey assessed whether participants felt able to make health behavior changes promoted by the campaign ads. Specifically, participants answered four questions surveying their feelings and self-efficacy after viewing each campaign: *This campaign provides a clear action or behavior for people to engage in to improve their health; This message offers strategies for achieving the intended action or behavior; I feel like I would have the ability to engage in the behavior promoted in this campaign if I put my mind to it; and I am likely to change my behavior based on this message.* Responses were rated on a 5-point Likert-type scale (range: *strongly disagree* to *strongly agree*). This scale was developed by the authors, and it demonstrated very good reliability across Neutral ($\alpha = 0.95\text{--}0.98$) and Stigmatizing ($\alpha=0.96\text{--}0.98$) conditions.

Image suitability. Given that visual images have largely been overlooked in previous assessments of obesity-related media coverage,²⁷ and that assessing perceptions of campaign images was also a goal of the current study, participants were also asked if the picture used to accompany the main message of the campaign is appropriate for the message (*yes/ no*).

Sociodemographic information. Participants completed demographic information including age, gender, race, height and weight (to calculate BMI). Participants were also asked to report their political orientation, subjective health and weight status, if they have children, and their current and previous history of dieting. After viewing all 10 messages, participants also answered three questions regarding their experiences with weight-related victimization (i.e., being teased, treated unfairly, or discriminated against because of their weight). If any of these experiences was reported, participants were regarded as having a history of weight-based victimization.

Data Analysis

Descriptive statistics and multilevel models were used to analyze the data. Multilevel models²⁸ were necessary because of the clustered data structure of ratings nested within study participants. More specifically, varying intercept models were used to allow for different rating baselines among participants. Because of variation of the participants’ baseline ratings across geographic regions (i.e., state) in at least one case (self-efficacy, 8% of the variation accounted for by these regional differences; Table 4), a three-level structure was assumed for the linear models. For the ordinal logistic model a two-level structure was assumed, out of parsimony. Analyses were carried out using Stata, version 11.2, and GLLMM (name comes from: Generalized Linear Latent and Mixed Models) 2.3.20.

Results

Sample Characteristics

Table 2 presents a summary of sample characteristics, which generally approximated 2010 U.S. Census

Table 2. Sample characteristics

	<i>n</i> (%)
Gender	
Male	533 (49.9)
Female	536 (50.1)
Race	
White	737 (68.8)
Black	145 (13.5)
Other	189 (17.6)
Highest educational degree	
High school degree or less	379 (35.2)
Vocational/tech school; some college	299 (27.7)
College degree or higher	400 (37.1)
Annual household income (\$)	
< 25,000	326 (30.3)
25,000–49,999	261 (24.3)
50,000–74,999	212 (19.7)
≥ 75,000	276 (25.7)
Do you have children?	
Yes	546 (50.7)
No	530 (49.3)
Overweight children?^a	127 (23.3)
Weight status (BMI)	
Normal (18.5–24.9)	381 (37.6)
Overweight (25–29.9)	319 (31.5)
Obese (≥ 30)	312 (30.8)
Subjective health status	
Poor	49 (4.5)
Fair	295 (27.3)
Good	565 (52.3)
Excellent	171 (15.8)
Dieting Status (no. of times)	
0	545 (50.3)
1–4	394 (36.4)
≥ 5	144 (13.3)
Political orientation	
Conservative	337 (31.3)
Moderate	512 (47.5)
Liberal	228 (21.2)
Age (years), <i>n</i> with <i>M</i> (<i>SD</i>)	1058 (45.67) (16.8)

^aDisplayed percentage refers to participants with children; based on self-report in response to the question: *Are any of your children overweight (heavier than most children their age)?*

demographics in terms of gender, race, and household income.²⁹ Participant BMI was categorized using the clinical guidelines for the classification of overweight and obesity in adults by the NHLBI of the NIH.³⁰ This classification showed 37.6% of the sample was normal weight (BMI=18.5–24.9); 31.5% was overweight (BMI=25.0–29.9); and 30.8% was obese (BMI ≥ 30), which generally approximates the U.S. adult population.³¹ Average participant BMI was 27.95 (SD=6.85).

Descriptive Analyses

Public health campaign advertisements are numbered and described in Table 1. Mean ratings are provided in Table 3.

Ratings of Stigmatizing campaigns. In the Stigmatizing condition, both PCRM ads (Abs on Cheese, no. 9; and Thighs on Cheese, no. 10) were rated as the most stigmatizing, followed by each of the CHOA ads that portrayed overweight youth stamped with red warning messages (nos. 2, 3, and 5). The five most stigmatizing ads (nos. 2, 3, 5, 9, and 10) were also rated as the least motivating ads, and induced the least self-efficacy; their accompanying images were rated as the least suitable across all ads in this condition.

Ratings of Neutral campaigns. In the Neutral condition, campaign advertisements were rated as noticeably less stigmatizing. One exception was Strong4Life's Stop Childhood Obesity ad, which was rated as the most stigmatizing (no. 13) in this condition with a mean rating comparable to ratings of advertisements in the Stigmatizing condition. A higher percentage of participants in the Neutral condition also rated images to be appropriate for campaign messages, and those ads that were rated to be more stigmatizing received the lowest ratings of image suitability.

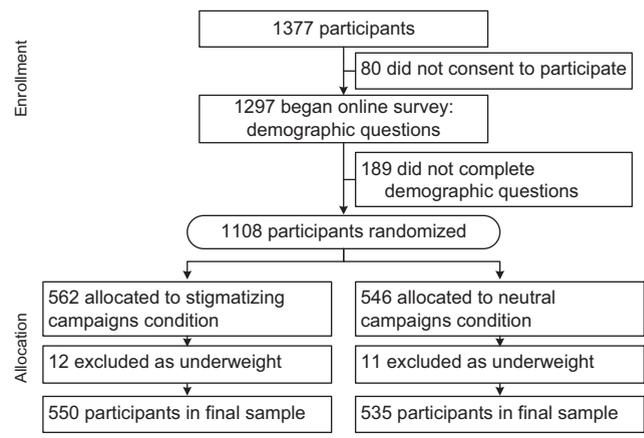


Figure 1. Flowchart of participant randomization to experimental conditions

Table 3. Descriptive statistics for public health campaigns to address obesity, M (SD) or %

Campaign message (label)	Stigmatizing scale	Motivating to improve lifestyle	Self-efficacy scale	Appropriateness of image
Stigmatizing condition				
1. Don't Drink Yourself Fat	2.35 (1.12)	3.10 (1.39)	3.76 (0.98)	78.7
2. Warning: Chubby Kids	2.61 (1.14)	2.77 (1.38)	3.05 (1.15)	61.7
3. Warning: Big Bones	2.70 (1.12)	2.86 (1.38)	3.25 (1.08)	66.3
4. Ignoring the Problem	2.55 (1.09)	3.00 (1.35)	3.50 (1.00)	81.5
5. Warning: Little girl	2.82 (1.18)	2.77 (1.41)	3.06 (1.19)	69.9
6. Portions: Amputee	2.57 (1.12)	3.10 (1.37)	3.65 (1.00)	81.3
7. Portions: Wheelchair	2.55 (1.08)	3.04 (1.35)	3.61 (1.01)	75.5
8. Portions: Stairs	2.60 (1.11)	3.12 (1.35)	3.68 (0.94)	82.1
9. Abs on Cheese	2.92 (1.17)	2.94 (1.43)	3.09 (1.22)	63.7
10. Thighs on Cheese	2.98 (1.21)	2.81 (1.45)	2.98 (1.22)	55.3
Neutral condition				
11. Walk 3 Miles	2.19 (1.14)	3.18 (1.27)	3.73 (0.89)	83.5
12. Find Healthier Drinks	2.03 (1.19)	3.03 (1.27)	3.68 (0.90)	87.2
13. Stop Childhood Obesity	2.54 (1.19)	2.67 (1.35)	3.00 (1.15)	54.6
14. Three Veggies Thursday	2.07 (1.16)	3.03 (1.24)	3.75 (0.87)	85.7
15. Raise a Healthy Child	2.12 (1.18)	3.16 (1.28)	3.82 (0.87)	91.0
16. Small Plate Saturday	2.16 (1.17)	2.74 (1.30)	3.54 (0.98)	75.8
17. My Plate	2.09 (1.20)	3.11 (1.28)	3.72 (0.93)	87.7
18. Face It	2.10 (1.14)	2.88 (1.29)	3.46 (0.98)	80.0
19. More Matters	2.07 (1.18)	3.03 (1.22)	3.60 (0.90)	86.6
20. Mom Was Here	2.08 (1.16)	2.73 (1.32)	3.31 (1.01)	74.9

Note: Original items were measured on Likert-type scales, ranging from 1 to 5.

Regression Analyses

Multilevel linear and ordered logistic regressions compared Neutral and Stigmatizing conditions according to participant ratings of stigma, motivation, self-efficacy, and image suitability. Results are presented for adjusted models, including relevant socio-demographic variables (gender, age, income, race, education, BMI, history of weight-based victimization, parent status, self-reported health, dieting status, and political orientation). The effect for the difference between experimental groups was not substantially different when estimated without covariates, indicating that the treatment effect was not confounded by the above-mentioned variables (as expected because of the experimental randomization; unadjusted effects

are summarized in the note of Table 4). The complete models are shown in Table 4.

Stigmatization. Overall, participants rated Stigmatizing campaigns as significantly more stigmatizing than Neutral campaigns. This effect remained after controlling for sociodemographic variables, although a few significant effects emerged. With increasing age, participants rated campaigns as less stigmatizing.

Motivation. Overall, participant ratings of the degree to which campaigns instilled motivation to improve lifestyle behaviors did not differ significantly across the Neutral and Stigmatizing conditions, indicating that stigmatizing campaigns are not perceived to be more motivating than campaigns that are more neutral and less stigmatizing. These findings remained

nonsignificant after including other predictor variables. (Appendix A, available online at www.ajpmonline.org, shows predicted probabilities for each of the ordered outcome categories.)

Several effects of participant sociodemographics emerged. Women rated campaigns as more motivating than did men. With increasing age, participants rated campaigns as less motivating. With increasing education, participants were less likely to rate the campaigns as motivating. Non-Caucasian participants were more likely to rate campaigns as motivating compared to Caucasian participants. Finally, participants who reported dieting within the past year rated campaigns as more motivating than those who had not dieted.

Self-Efficacy. Overall, participants reported less self-efficacy in response to Stigmatizing campaigns than Neutral campaigns. This effect remained after controlling for predictors; however, several effects of participant sociodemographics emerged. Women reported more self-efficacy than men, and African-American participants reported less self-efficacy than Caucasian participants. As with the findings relating to motivation, participants who had dieted within the past year reported more self-efficacy than participants who had not dieted. Finally, participants with a moderate political background reported more self-efficacy than those with a conservative background.

Image suitability. Overall, participants rated the pictures accompanying Stigmatizing campaigns as less appropriate than the pictures accompanying Neutral campaigns. This effect remained after controlling for predictors; however, several effects of participant sociodemographics emerged. As participants' ratings of their own subjective health improved, participants rated the pictures as more appropriate. Participants who had dieted ≥ 5 times within the previous year rated images as more appropriate than those who had not dieted. Finally, participants with moderate political affiliation rated images as more appropriate than those with conservative political backgrounds. Across all regression analyses, there were no effects of participant BMI. However, participants who reported a history of weight-based victimization reported higher ratings on each outcome (e.g., stigmatization, self-efficacy, appropriateness of image) than participants who had not experienced such victimization.

Discussion

Findings of the present study provide new evidence that obesity-related health campaigns rated as stigmatizing were no more likely to instill motivation for improving lifestyle behaviors than campaigns rated as less stigmatizing and more neutral. In addition, campaigns that were

perceived to be stigmatizing were also rated as inducing less self-efficacy to engage in health behaviors promoted by campaigns, and having less-appropriate visual content compared to neutral, less-stigmatizing campaigns. These findings remained consistent regardless of participants' body weight, and were generally consistent across socio-demographic predictors.

These findings are noteworthy in light of some public perceptions that stigmatization may be necessary to raise public awareness about obesity or provide incentive for individuals to lose weight.^{1,32–34} This perception remains despite evidence demonstrating that individuals who feel stigmatized or ashamed about their excess weight engage in higher calorie intake, unhealthy eating behaviors, binge-eating patterns, avoidance of exercise, and avoidance of health care,^{5,35–40} which can reinforce weight gain and impair weight loss. Findings from the present study add new evidence to suggest that public health campaigns that communicate stigmatizing messages are not perceived by the public to be more motivating, and instead induce lower self-efficacy for behavior change compared to less-stigmatizing or neutral campaigns. This finding challenges the notion that stigmatization is a necessary component of public health messaging about obesity, and suggests that this approach may be less effective than nonstigmatizing messages in efforts to encourage health behaviors.

Given the dearth of studies in this area, there is little to compare the present findings to with respect to public reactions to anti-obesity campaigns. However, the present study parallels recent research by the same authors demonstrating that stigmatizing anti-obesity campaigns are not perceived by the public to be effective strategies to motivate lifestyle behavior change,⁷ and this is the second study to demonstrate this finding in a national sample of Americans. Qualitative research from Australia has also documented that some public health messages about obesity are perceived to be stigmatizing and blaming and that obese people may in turn reject such messages in favor of more positive messages that emphasize benefits of healthy lifestyle behaviors.¹⁵ Although that research examined obese people's attitudes about general obesity-related public health messages in Australia rather than reactions to specific campaigns, it nevertheless highlights the sense of stigmatization that can be interpreted in reaction to obesity-related public health messages and the unintended consequences that this may pose for subsequent public attitudes and behavior.

Limitations

Several limitations of this study should be noted. Although findings were generally consistent across

Table 4. Adjusted treatment effect models for participants' ratings of obesity-related public health campaigns

	Linear models			Ordinal logistic model
	Stigmatizing	Self-efficacy	Appropriateness of campaign picture	Motivated to improve lifestyle
Experimental group				
Neutral messages	—	—	—	—
Stigmatizing messages	0.461^{***}	-0.171^{***}	-0.092^{***}	1.095
Gender				
Male	—	—	—	—
Female	-0.117[*]	0.110[*]	0.009	1.742^{**}
Age (years)	-0.007^{***}	-0.002	0.001+	0.979^{**}
Highest level of education				
High school or less	—	—	—	—
Some college	-0.111	-0.150[*]	-0.006	0.551[*]
College or better	-0.093	-0.239^{***}	-0.028	0.335^{***}
Household income (\$)				
<25,000	—	—	—	—
25,000–49,999	0.094	0.121+	0.004	1.547
50,000–75,000	0.012	0.037	-0.002	0.790
>75,000	-0.133	-0.009	0.021	1.068
Race				
Caucasian	—	—	—	—
African-American	0.001	0.290^{***}	0.020	3.498^{***}
Other	0.138+	0.071	-0.023	1.875[*]
Subjective health				
Poor	—	—	—	—
Fair	-0.123	0.043	0.051	0.818
Good	-0.078	0.110	0.093[*]	1.188
Excellent	-0.177	0.196	0.146^{***}	1.464
WBV background				
No	—	—	—	—
Yes	0.135[*]	0.189^{***}	0.040[*]	1.972^{**}
BMI				
Normal weight	—	—	—	—
Overweight	-0.035	0.080	0.002	1.503
Obese	-0.038	-0.002	-0.008	1.134
Do you have children?				
No	—	—	—	—

(continued on next page)

Table 4. Adjusted treatment effect models for participants' ratings of obesity-related public health campaigns (continued)

	Linear models			Ordinal logistic model	
	Stigmatizing	Self-efficacy	Appropriateness of campaign picture		Motivated to improve lifestyle
Yes	−0.002	0.083	0.027		1.299
Dieting during last year (no. of times)					
0	—	—	—		—
1–4	0.018	0.142*	0.027		2.776***
≥5	0.106	0.313***	0.069*		5.746***
Political orientation					
Conservative	—	—	—		—
Moderate	−0.037	0.131*	0.047*		1.258
Liberal	−0.044	0.017	0.042+		0.992
Constant	0.258	−0.223	0.607***	Threshold 1	−1.861
SD between state	0.000	0.119	0.023	Threshold 2	−0.285
SD between subjects	0.779	0.665	0.211	Threshold 3	2.242
SD within subjects	0.534	0.691	0.364	Threshold 4	4.818
<i>n</i>	8600	8585	8313		8637

Note: Boldface indicates significance. Three-level multilevel linear regression models, with varying intercepts across study subjects and states. “Stigmatizing” and “Self-efficacy” are z-standardized mean scales and, thus, coefficients reflect changes/differences in SD units. “Appropriateness of campaign image” is a binary variable (0=not appropriate, 1=appropriate) and coefficients from the linear probability model (times 100) reflect changes/differences in percentage points (e.g., the effect $b = -0.091$ indicates approximately 9 percentage points difference in the probability of regarding the campaign images as appropriate). The two-level multilevel ordered logistic regression model with varying intercepts across study participants shows ORs (except for thresholds, which are untransformed), estimated under the assumption of proportional odds.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; unadjusted treatment effect estimates and p -values (corresponding to above models from left to right): 0.426, $p < 0.001$; −0.176, $p < 0.001$; −0.090, $p < 0.001$; 1.078, $p = 0.685$

WBV, weight-based victimization

sociodemographic variables, there were several differences in ratings depending on a participants' history of dieting, gender, age, and race. Although these results were still in the same direction of the main findings, it may be useful to further examine the ways in which sociodemographic factors may influence public responses to obesity-related health campaigns.

Given that participants who had a history of weight victimization reported more-extreme ratings of campaigns, it will also be important to examine responses among individuals who may have heightened sensitivity to obesity-related messages. In addition, this study relied on self-report data, and self-reported attitudes and intentions do not necessarily reflect actual behavior. It was beyond the scope of the study to evaluate behavior change resulting from exposure to campaign messages, and it will be important for future research to assess behavioral outcomes to determine whether

various obesity-related messages affect behavioral modification.

Conclusion

Findings from the current study highlight the need for careful selection of language and visual content used in obesity-related health campaigns, and provide support for efforts to portray obese people in a nonstigmatizing manner. In addition, the present study offers several examples of obesity-related health campaigns that are perceived as both motivating and instilling of higher self-efficacy for behavior change. Examples of such campaigns are the *we can!* campaign to promote increased consumption of fruit among children (Campaign no. 15, depicting children eating fresh fruit); New York City's Department of Health campaign to reduce consumption of sugar-sweetened beverages (Campaign no. 11, depicting how many miles an individual would

need to walk to burn off the calories consumed in a soda); or the USDA's *Choose my plate* campaign, which demonstrates the recommended plate portions of fruits, vegetables, grains, and proteins (Campaign no. 17).

These campaigns promote specific health behaviors that all individuals can engage in, and they make no mention of obesity or obese people. It may be that individuals are more amenable to improving their eating habits and physical activity when the emphasis is on health, rather than body weight per se. More research is warranted to examine reactions to health messages that use obesity-specific language versus those with no weight-related terms, as are more systematic, research-based efforts to select appropriate content to disseminate in obesity-related public health campaigns.

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Appendix

Supplementary data

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.amepre.2013.02.010>.

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