

ORIGINAL ARTICLE

Fighting obesity or obese persons? Public perceptions of obesity-related health messages

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OBJECTIVE: This study examined public perceptions of obesity-related public health media campaigns with specific emphasis on the extent to which campaign messages are perceived to be motivating or stigmatizing.

METHOD: In summer 2011, data were collected online from a nationally representative sample of 1014 adults. Participants viewed a random selection of 10 (from a total of 30) messages from major obesity public health campaigns from the United States, the United Kingdom and Australia, and rated each campaign message according to positive and negative descriptors, including whether it was stigmatizing or motivating. Participants also reported their familiarity with each message and their intentions to comply with the message content.

RESULTS: Participants responded most favorably to messages involving themes of increased fruit and vegetable consumption, and general messages involving multiple health behaviors. Messages that have been publicly criticized for their stigmatizing content received the most negative ratings and the lowest intentions to comply with message content. Furthermore, messages that were perceived to be most positive and motivating made no mention of the word 'obesity' at all, and instead focused on making healthy behavioral changes without reference to body weight.

CONCLUSION: These findings have important implications for framing messages in public health campaigns to address obesity, and suggest that certain types of messages may lead to increased motivation for behavior change among the public, whereas others may be perceived as stigmatizing and instill less motivation to improve health.

International Journal of Obesity (2012) **0**, 000–000. doi:10.1038/ijo.2012.156

Keywords: campaign; public health; stigma; weight; bias

INTRODUCTION

Public health campaigns aim to promote health, but in some instances may inadvertently stigmatize the individuals they intend to help. In the United States, stigma has been assessed in media campaigns and the framing of health issues such as HIV (human immunodeficiency virus)/AIDS (acquired immune deficiency syndrome), cancer, mental health/illness and sexually transmitted diseases.^{1,2} Concerns have been raised that stigmatizing portrayals of health topics may create barriers to testing and treatment.² For example, stigma associated with HIV/AIDS has been named as a contributor to public health risks including delay and avoidance of diagnosis and clinical treatment,³ and according to the Centers for Disease Control and Prevention, 'stigma hampers prevention'.⁴

Stigma is also important to examine in the context of obesity-related public health campaigns. With 69.2% of adults and 30.4% of youth now overweight or obese in the United States,^{5,6} numerous public health campaigns have surfaced to address obesity in recent years. Unfortunately, as obesity rates have increased, so has bias and prejudice against obese persons.⁷ Weight stigma is highly prevalent in the United States^{7,8} and in health-related media,^{9–11} and may also be present in some public health campaigns that address obesity. Although no studies have empirically assessed stigma in obesity campaigns, calls from across the globe including the United States, Australia, the United Kingdom and Canada have been made to review materials for stigmatizing content before dissemination, and to assess stigma in campaign evaluations (for example, refs. (12–18).

By stigmatizing obesity or overweight persons, campaigns could potentially alienate the audience they intend to motivate^{19,20} and hinder the behaviors they intend to encourage. Specifically, exposure to weight stigmatization can increase risk of unhealthy behaviors (for example, higher calorie intake, binge eating, less physical activity;^{21–27} that contribute to obesity and impair weight loss, may result in adverse psychological and health outcomes for obese individuals,¹⁵ and worsen negative societal attitudes toward obese persons.²⁸ Thus, stigmatizing messages in obesity-related public health campaigns could potentially contribute to weight gain, increase weight bias and deliver the opposite intended effect.

Public health campaigns have targeted obesity through a number of factors including physical activity, fruit and vegetable intake, portion sizes and sugar-sweetened beverage consumption. Some campaigns have simultaneously targeted multiple factors (for example, Change4Life targeted both activity and nutrition;²⁹ or appealed to one's sense of empowerment regarding modifying their body weight (for example, empowerME³⁰). As Michelle Obama recently sponsored childhood obesity prevention, campaigns in the United States have also targeted messages at parents (for example, Food Fit Philly's campaign to reduce consumption of sugary drinks ostensibly asked parents, 'Do you know what your kids are drinking?'.³¹ However, despite the multitude of public health campaigns addressing obesity that have emerged both nationally and internationally, there has been a lack of formal assessment of these campaigns or their impact on public attitudes and behaviors, and some have been met with

controversy and criticism because their messages and images were perceived as stigmatizing overweight individuals.^{32–34}

Given the recent proliferation of obesity-related public health messages, the lack of formal assessment of stigma in these campaigns, and the documented negative consequences of weight stigma, the current study systematically examined perceptions of obesity-related public health messages among American adults, including messages that have been publicly criticized for their stigmatizing content.

MATERIALS AND METHODS

Message Identification

Obesity-related campaigns were identified primarily through internet search engines (for example, Google) using the following keywords: 'obesity,' 'childhood obesity,' 'weight,' 'overweight,' 'body weight,' 'public health campaign,' 'public health communication,' 'public service announcement' and 'PSA'. Selection efforts were focused on active campaigns within the last 2 years from English-speaking countries. Additional campaigns were identified through empirical articles (for example, refs. (29, 35–38)) contact with and manual searches of the Centers for Disease Control and Prevention³⁹ and communities putting prevention to work⁴⁰ websites. Searches were conducted from June–July 2011.

Messages were selected if they were slogans or main messages from campaign advertisements or websites. A total of 266 messages were identified from 76 distinct campaigns. Most messages represented local, statewide, or regional campaigns in the United States ($n = 132$), or national campaigns in the United States ($n = 76$). International campaign messages were drawn from Australia ($n = 23$), the United Kingdom ($n = 16$) and Canada ($n = 18$).

Message selection

Given the large initial pool of collected messages, four rounds of exclusions were made. First, to avoid multiple demand characteristics associated with messages accompanied by visual media, messages were retained for analysis only if they were interpretable in their written form without visual content. Thus, messages that were not clearly related to obesity or health without accompanying visual media images or videos were excluded ($n = 187$).

Three coders analyzed the remaining messages ($n = 79$) and independently categorized them according to themes: sugar-sweetened beverages ($n = 17$), portion sizes ($n = 4$), fruits/vegetables ($n = 3$), physical activity ($n = 12$), personal empowerment ($n = 6$), parent targeted ($n = 27$), multiple topics ($n = 10$), stigmatizing ($n = 10$) and other (for example, statistics or health consequences related to obesity; $n = 12$). Inconsistently categorized messages were discussed until consensus was achieved.

Owing to a lack of feasibility in testing this many messages, the sample was reduced in a third round of exclusions. Priority was given to messages disseminated in national campaigns, supplemented by messages that had received significant media attention, and messages were reviewed to ensure an adequate number represented each category. Three coders analyzed messages according to themes and selected the final sample with minimal discrepancies. After this round of exclusions, the remaining messages ($n = 36$) were categorized into the following themes: sugar-sweetened beverages ($n = 6$), portion sizes ($n = 3$), fruits/vegetables ($n = 3$), physical activity ($n = 3$), personal empowerment ($n = 3$), parent targeted ($n = 3$), multiple topics ($n = 5$), stigmatizing ($n = 6$), and other ($n = 4$).

Messages were piloted using an on-line sample of adults ($n = 110$; 61% female; average age = 37.9 years). Categories with more than three examples were identified, and messages within these categories were removed if piloting indicated they were redundant with another message. Of the remaining messages ($n = 30$), 3 were categorized into each theme with the exception of stigmatizing, which contained 6 messages (see Table 1). Stigmatizing messages were oversampled given that assessing stigma was a primary objective. Messages were identified as stigmatizing if they had received public criticism for instilling blame or shame towards overweight youth or their parents through slogans and/or imagery,^{41–43} or if they used pejorative language known to be perceived as stigmatizing and blaming when referring to an overweight person (for example, 'fat').^{44,45}

Participants

The final sample was recruited through a survey panel administered by Survey Sampling International (SSI).⁴⁶ Participants were recruited through thousands of Websites with data aggregators that reach millions of users. Panelists were 18 years or older, 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 including geography, age, ethnicity and gender to approximate US census demographics.

Table 1. Final sample of obesity-related public health campaign messages

Message	Campaign	Location	Intent to comply (%) ^a	Previously seen/heard (%)
<i>Sugar-sweetened beverages</i>				
1. 'Cut down on sugary drinks.'	Let's move	National, USA	71.28	43.4
2. 'Fact: even drinks that look healthy can still be packed with sugar and calories. Check the label.'	5-2-1-0 Campaign	New York, USA	74.67	35.2
3. 'Adults who drink soda daily are 27% more likely to be overweight.'	California Campaign for healthy beverages	California, USA	61.54	26.4
<i>Portion sizes</i>				
4. 'Skip seconds... Lose your gut.'	Small steps	National, USA	54.65	19.0
5. 'Enjoy your food, but eat less.'	USDA (MyPlate)	National, USA	71.33	32.8
<i>Fruits/vegetables</i>				
6. 'Eat a variety of colorful fruits and vegetables every day.'	5-A-day	National, USA	83.91	47.8
7. 'Snack on fruits and vegetables...Lose your love handles.'	Small steps	National, USA	72.13	21.0
8. 'Low in calories, full of nutrients, reduces your risk of chronic disease...fill half your plate with fruits and vegetables at every meal. Fresh, frozen, dried, canned- they all count. Choose a variety of colors to stay healthy and fit. Your body will thank you.'	Eat smart, move more	North Carolina, USA	79.51	31.1
<i>Physical Activity</i>				
9. 'Move everyday!'	Let's move	National, USA	81.35	35.4
10. 'LOST: Love handles. Last seen before taking stairs instead of escalator.'	Small steps	National, USA	65.97	17.6
11. 'Park farther from your destination and walk.'	Small steps	National, USA	69.55	45.7

Table 1. (Continued)

Message	Campaign	Location	Intent to comply (%) ^a	Previously seen/heard (%)
<i>Personal empowerment</i>				
12. 'No one chooses to be obese. But you have the CHOICE to make a difference.'	Choice	National, USA	64.96	20.6
13. 'You have the strength to take control of your health.'	empowerME/Alliance	National, USA	77.97	26.9
14. 'The more you gain, the more you have to lose.'	for a healthier generation Measure up	Australia	60.07	30.3
<i>Parent targeted</i>				
15. 'Keep your kids naturally sweet and healthy.'	Kaiser permanente	Regional, USA	58.41	9.2
16. 'What will you do with your kids today? Raise an active kid. Make healthier food choices. Assess your child's weight. Be a healthy role model.'	5-2-1-0 Campaign	New York, USA	72.84	19.6
17. 'You wouldn't inject your children with junk. So why are you feeding it to them?'	Break the habit	Australia	54.04	15.4
<i>Multiple topics</i>				
18. 'Eat well. Move more. Live longer.'	Change4Life	United Kingdom	85.30	25.9
19. 'Learn the facts, eat healthy, get active, take action.'	Let's move	National, USA	77.63	24.1
20. 'Unhealthy eating and drinking and not enough physical activity can seriously affect your health.'	Measure up	Australia	78.29	34.8
<i>Stigmatizing</i>				
21. 'Childhood obesity is child abuse.'	Obesity prevention Australia	Australia	44.28	28.3
22. 'Too much screen time, too much kid.'	Small steps	National, USA	38.24	16.5
23. 'Keep obesity away from your child.'	Active life movement	Texas, USA	60.10	17.1
24. 'Being fat takes the fun out of being a kid.'	Children's Health care of Atlanta (CHOA)	Georgia, USA	36.74	13.7
25. 'Fat kids become fat adults.'	(CHOA)	Georgia, USA	40.09	36.3
26. 'Chubby kids may not outlive their parents.'	(CHOA)	Georgia, USA	49.53	18.4
<i>Other</i>				
27. 'It's not a diet, it's a lifestyle.'	CDC	National, USA	63.60	37.4
28. 'Take a small step to get healthy.'	Small steps	National, USA	75.79	24.8
29. 'The temptation to eat unhealthy food is hard to fight, but it's a fight that you and your community can win.'	YFood Fight (YMCA)	Kentucky, USA	69.47	16.2

Abbreviation: CDC, Centers for Disease Control and Prevention. Note: For more details regarding the visual presentation of specific campaign messages that were tested (for example, visual images accompanying written campaign messages or slogans), please contact the lead author directly. ^aStudy participants could indicate whether they do or do not intend to comply with a message, or whether the message was not personally applicable. Percentages shown reflect the proportion of participants that intended to comply with a message given the message was personally relevant.

Of the participants that began the survey, 70% completed it with usable data yielding a final sample of $n = 1014$. Data collection occurred during 1 week in the summer of 2011. All participants provided informed consent, and the study was approved by the authors' university Institutional Review Board.

Procedure

An online survey was developed. Participants were randomly provided with 10 of the 30 public health messages, which were presented individually, and in random order. Upon viewing each message, participants were asked a series of questions (see below) regarding their perceptions of the message. The survey took ~25 min to complete.

Measures

Demographic information. Participants were asked several demographic questions such as age, gender, ethnicity and height and weight (to determine participant body mass index (BMI)).

Reactions to messages. Participants answered questions that assessed their reactions to each message (adapted from previous research on HIV prevention messages).⁴⁷ This 13-item measure assessed participants' perceptions of the message's relevance, helpfulness, likeability, and whether it induced motivation to engage in healthy behaviors or promoted stigmatization of obese persons. Responses were measured on a 5-point Likert scale ('strongly disagree' = 1 to 'strongly agree' = 5).

Message characteristics. Participants were then presented with adjectives that assessed their perceptions of the characteristics of each message (also adapted from previous research on HIV prevention messages).⁴⁷ On this 14-item measure, participants rated each message in terms of positive ('effective,' 'motivating,' 'informative,' 'worth remembering,' 'accurate,' 'clear,' 'important' and 'credible') and negative descriptors ('complex,' 'confusing,' 'pointless,' 'stigmatizing,' 'inappropriate' and 'vague'). Responses were measured on a 5-point Likert scale ('not at all' = 1 to 'extremely' = 5).

Finally, participants were asked, 'Do you intend to do what you think this message wants you to do?' and given three response options ('yes,' 'no' and 'N/A'). Participants were also asked if they had seen or heard the message before.

Statistical analysis

Mean ratings are presented as point estimates with 95% confidence intervals. Table 2 summarizes the items used for composite mean scales reported in descriptive analyses below. One message was removed from the portion sizes category because of a minor survey error, leaving 2 messages in this category and 29 total messages for analysis. All scales were derived using factor analyses with (orthogonal) varimax rotation and the Kaiser criterion of a minimum eigenvalue of 1. Reliability coefficients (Chronbach's alpha) ranged from 0.71–0.97 (Supplementary Table S1). Analyses were carried out using Stata 11.2 (StataCorp, College Station, TX). Figures were created using ECLPLOT.⁴⁸

Table 2. Items used for composite mean scales

<i>Participant reactions</i>	<i>Message characteristics</i>
Scale: favorable reactions to message (α^a : 0.82–0.93) This message would motivate a person to eat healthier. This message would motivate a person to lose weight. This message would be helpful for people who want to improve their health. This message would motivate a person to exercise more. This message makes weight loss seem attainable. This message makes me concerned about my body weight.	Scale: positive descriptors attributed to message (α^a : 0.93–0.97) Effective ¹ Motivating Informative Worth remembering Accurate Clear Important Credible
Scale: negative reactions to message (α^a : 0.71–0.84) This message promotes a behavior that is difficult for me to do. This message promotes negative attitudes about overweight/obese persons. This message would increase blame towards people for being overweight. This message makes obesity seem like a much simpler issue than it really is. I do not like this message.	Scale: negative descriptors attributed to message (α^a : 0.76–0.90) Complex Confusing Pointless Stigmatizing Inappropriate Vague
Likert scales: 1 = strongly disagree to 5 = strongly agree	Likert scales: 1 = not at all to 5 = extremely
Note: all scales were derived using factor analyses with varimax rotation and the Kaiser criterion of a minimum eigenvalue of 1. ^a Cronbach's alpha across scales for 29 messages.	

RESULTS

Sample characteristics

Table 3 presents a summary of sample characteristics. Of the total sample, 50% of participants were female, 67% of participants were Caucasian, and the average age was 46.1 years (s.d. = 16.5). For self-reported annual household income, 27.7% of participants earned <\$25 000, 27.7% earned between \$25 000 and \$49 999, 20.8% earned between \$50 000 and \$74 000 and the remaining 23.9% reported earning more than \$75 000. Sample characteristics generally approximated 2010 US Census demographics in terms of gender, race/ethnicity, age and household income.⁴⁹

Participant BMI was calculated and classified into categories according to the clinical guidelines for overweight and obesity in adults by the National Heart Lung and Blood Institute of the National Institute of Health.⁵⁰ This showed 3.6% of the sample to be underweight (BMI <18.5), 36.5% normal weight (BMI 18.5–24.9), 33.4% overweight (BMI 25.0–29.9) and 26.5% obese (BMI \geq 30), which generally approximates the US adult population, but with slightly lower levels of obesity.⁶ Average participant BMI was 27.8 (s.d. = 12.2).

Descriptive analyses

Participant reactions. Mean ratings are provided in Table 4. Messages that elicited the most favorable reactions were no. 18 ('Eat well. Move more. Live longer.'), no. 19 ('Learn the facts, eat healthy, get active, take action.'), and no. 13 ('You have the strength to take control of your health.'). Messages no. 21 ('Childhood obesity is child abuse.'), no. 22 ('Too much screen time, too much kid.') and no. 24 ('Being fat takes the fun out of being a kid.') elicited the least favorable reactions. Messages that elicited the most negative reactions were no. 21 ('Childhood obesity is child abuse.'), no. 24 ('Being fat takes the fun out of being a kid.') and no. 25 ('Fat kids become fat adults.'). Messages no. 6 ('Eat a variety of colorful fruits and vegetables every day.'), no. 18 ('Eat well. Move more. Live longer.') and no. 28 ('Take a small step to get healthy.') elicited the least negative reactions.

Message characteristics. Mean ratings are also provided in Table 4. Messages that were rated most positively (for example, informative, accurate, important and credible) were no. 8 ('Low in calories, full of nutrients...fill half your plate with fruits and

vegetables at every meal...'), no. 18 ('Eat well. Move more. Live longer.') and no. 19 ('Learn the facts, eat healthy, get active, take action.'). All six messages coded as stigmatizing (no. 21–26) received the lowest ratings on positive characteristics. Messages that were rated most negatively (for example, inappropriate, pointless and confusing) were no. 21 ('Childhood obesity is child abuse.'), no. 22 ('Too much screen time, too much kid.') and no. 24 ('Being fat takes the fun out of being a kid.') and all six messages categorized as stigmatizing (no. 21–26) were rated as most negative. The least negatively described messages were no. 6 ('Eat a variety of colorful fruits and vegetables every day.'), no. 11 ('Park farther from your destination and walk.') and no. 18 ('Eat well. Move more. Live longer.').

Perceptions of motivation and stigma. Mean ratings are displayed in Figure 1. Messages no. 13 ('You have the strength to take control of your health.'), no. 18 ('Eat well. Move more. Live longer.') and no. 19 ('Learn the facts, eat healthy, get active, take action.'), were rated as the most motivating and messages no. 21 ('Childhood obesity is child abuse.'), no. 22 ('Too much screen time, too much kid.') and no. 24 ('Being fat takes the fun out of being a kid.') were rated as the least motivating. Messages no. 21 ('Childhood obesity is child abuse.'), no. 24 ('Being fat takes the fun out of being a kid.') and no. 25 ('Fat kids become fat adults.') were rated as the most stigmatizing, and messages no. 6 ('Eat a variety of colorful fruits and vegetables every day.'), no. 18 ('Eat well. Move more. Live longer.') and no. 28 ('Take a small step to get healthy.') were rated as the least stigmatizing. The percentage of participants who perceived each message to be stigmatizing is reported in Table 4, and shows that the majority of participants (54–62%) rated stigmatizing messages as most stigmatizing, compared with lower percentages of participants who perceived messages from other theme categories to be stigmatizing.

Message familiarity and intent to comply. Table 1 shows the percentage of participants who were familiar with each message (for example, had seen or heard the message before), and the percentage who indicated intentions to engage in the behavior that the message promoted. Familiarity with messages ranged from 9–47%, with most familiarity for messages categorized as fruits/vegetables, physical activity and sugar-sweetened

Table 3. Sample characteristics

	n	%		
Gender				
Male	497	49.8		
Female	500	50.2		
Race/ethnicity				
White	671	67.0		
Black	148	14.8		
Other	183	18.3		
Highest educational degree				
High-school degree or less	258	25.5		
Vocational/technical school; some college	369	36.5		
College degree or higher	385	38.0		
Annual household income				
Under \$25 000	278	27.7		
\$25 000–\$49 999	278	27.7		
\$50 000–\$74 999	209	20.8		
\$75 000 +	240	23.9		
Marital status				
Single	253	25.1		
Unmarried or married partner	587	58.2		
Separated/divorced/widowed	169	16.8		
Do you have children?				
No children	419	41.5		
Has children	591	58.5		
Weight status				
Underweight (BMI <18.5)	36	3.6		
Normal weight (BMI 18.5–24.9)	367	36.5		
Overweight (BMI 25–29.9)	336	33.4		
Obese (BMI ≥30)	266	26.5		
Subjective weight status				
Underweight	77	7.6		
About right	335	33.0		
Somewhat overweight	467	46.1		
Very overweight	135	13.3		
	n	M	s.d.	
Age (years)	1001	46.1	16.5	

Abbreviation: BMI, body mass index.

beverages.

Intentions to comply with message content were fairly high across message categories, with the exception of messages coded as stigmatizing, which received a noticeably lower percentage of participants who expressed intentions of compliance. For the remaining categories, intentions to comply with messages were highest for multiple topics (80.5%) and fruit/vegetables (78.6%), followed by physical activity (72.5%), other (69.6%), sugar-sweetened beverages (69.5%), personal empowerment (68%), portion sizes (63.5%) and parent targeted (61.8%). When testing intended compliance with stigmatizing messages (44.8%) versus all other messages (71.2%), the difference was significant (odds ratio = 0.33, $P < 0.001$).

Weight-related effects

Overall, public health messages induced some variation in reactions with respect to participants' weight status. The difference in means between participants who were categorized as obese versus normal weight or overweight was estimated for

the extent to which each public health campaign message was rated to be motivating and stigmatizing using linear regression models (Figure 2). Participants who were classified as underweight were excluded from this analysis. Compared with non-obese participants, obese participants perceived message no. 2 ('Fact: even drinks that look healthy can still be packed with sugar and calories. Check the label.') as less stigmatizing, and messages no. 4 ('Skip seconds... Lose your gut.'), no. 13 ('You have the strength to take control of your health.'), no. 25 ('Fat kids become fat adults.') and no. 29 ('The temptation to eat unhealthy food is hard to fight, but it's a fight that you and your community can win.') as significantly more stigmatizing. Messages no. 2 ('Fact: even drinks that look healthy can still be packed with sugar and calories.'), no. 15 ('Keep your kids naturally sweet and healthy.'), no. 21 ('Childhood obesity is child abuse.'), no. 25 ('Fat kids become fat adults.') and no. 27 ('It's not a diet, it's a lifestyle.') were perceived as less motivating by obese participants compared with non-obese participants.

Similar analyses were conducted to compare message perceptions between other weight groups. There were no differences in means of messages rated as motivating and stigmatizing between participants who were categorized as overweight versus normal weight. However, comparisons of message ratings between participants categorized as overweight versus obese were generally consistent with the aforementioned differences noted between message perceptions of obese and non-obese persons.

Results for weight-related effects were similar using subjective weight status and are available upon request.

DISCUSSION

To our knowledge, this study is the first to systematically assess public perceptions of health campaigns to address obesity, with particular attention to perceptions of stigmatizing versus motivating content of messages. Findings indicate that participants responded most favorably to messages involving themes of increased fruit and vegetable consumption, more general messages involving multiple health behaviors (for example, no. 19 'Learn the facts, eat healthy, get active, take action.'), and messages that attempt to instill confidence and personal empowerment of one's health (for example, no. 13 'You have the strength to take control of your health.'). These messages were also rated by participants to be the most motivating. It is of interest to note that messages that implied personal responsibility and blame for excess weight (for example, no. 14 'The more you gain, the more you have to lose.') received more negative/less positive ratings among participants. This suggests that messages intended to motivate individuals to be healthier may be more effective if framed in ways that foster confidence and self-efficacy to engage in health behaviors rather than in ways that imply personal blame or solitary effort. In contrast to messages that received positive ratings, participants responded most negatively to messages that were coded as stigmatizing (for example, no. 21 and 26). These messages were ascribed the most negative characteristics, the least positive characteristics, and were rated as the least motivating among all other messages.

In light of the above findings, it is perhaps not surprising that message categories that received the highest percentage of participants who expressed intentions of compliance were fruit/vegetables and multiple topics. It is striking to note the contrast between the relatively high percentage of participants who expressed positive intentions of compliance with message categories of sugar-sweetened beverages, fruit/vegetables, physical activity and portion sizes, versus the lower percentages of intentions of compliance for messages coded as stigmatizing.

Despite widespread prejudice induced by societal weight stigmatization, there nevertheless remains a perception that stigmatizing obese persons will instill motivation to engage in

Table 4. Percent endorsement of stigma and mean message descriptions and reactions

Message	Stigmatizing (%)	Positive reaction (M, s.d.)	Negative reaction (M, s.d.)	Positive description (M, s.d.)	Negative description (M, s.d.)
21. Childhood obesity is child abuse.	62.4	2.74 (0.99)	2.96 (0.94)	2.93 (1.26)	2.31 (0.97)
24. Being fat takes the fun out of being...	57.4	2.77 (0.92)	2.99 (0.86)	2.75 (1.19)	2.27 (0.90)
26. Chubby kids may not outlive their...	57.2	2.96 (0.92)	2.91 (0.88)	3.05 (1.17)	2.21 (0.90)
25. Fat kids become fat adults.	53.7	2.85 (0.92)	3.01 (0.91)	2.92 (1.22)	2.20 (0.96)
17. You wouldn't inject your children...	49.8	3.03 (0.95)	2.85 (0.88)	3.21 (1.17)	2.07 (0.91)
23. Keep obesity away from your child.	47.1	2.90 (0.86)	2.83 (0.85)	2.94 (1.16)	2.12 (0.91)
12. No one chooses to be obese...	45.7	3.24 (0.79)	2.84 (0.89)	3.23 (1.09)	2.02 (0.94)
3. Adults who drink soda daily...	43.2	3.22 (0.81)	2.64 (0.81)	3.49 (1.01)	1.82 (0.89)
4. Skip seconds...Lose your gut.	43.1	3.03 (0.89)	2.83 (0.92)	2.92 (1.23)	2.07 (0.91)
14. The more you gain, the more you...	41.5	3.20 (0.95)	2.80 (0.90)	3.32 (1.12)	2.02 (0.94)
22. Too much screen time, too much kid.	39.5	2.60 (0.99)	2.73 (0.90)	2.64 (1.19)	2.32 (0.99)
11. Park farther from your destination...	38.6	3.26 (0.76)	2.44 (0.87)	3.52 (0.94)	1.72 (0.86)
19. Learn the facts, eat healthy...	38.6	3.57 (0.73)	2.50 (0.89)	3.75 (0.95)	1.85 (0.93)
13. You have the strength to take...	38.0	3.49 (0.73)	2.57 (0.92)	3.59 (1.01)	1.78 (0.84)
16. What will you do with your kids...	38.0	3.34 (0.81)	2.62 (0.86)	3.59 (1.00)	1.81 (0.88)
29. The temptation to eat unhealthy...	37.8	3.36 (0.83)	2.59 (0.85)	3.36 (1.04)	1.90 (0.86)
7. Snack on fruits and vegetables...	37.1	3.46 (0.72)	2.58 (0.92)	3.51 (1.03)	1.84 (0.95)
20. Unhealthy eating and drinking...	36.9	3.47 (0.75)	2.66 (0.89)	3.62 (1.01)	1.79 (0.86)
5. Enjoy your food, but eat less.	35.3	3.31 (0.82)	2.65 (0.87)	3.38 (1.10)	1.83 (0.92)
27. It's not a diet, it's a lifestyle.	34.5	3.30 (0.85)	2.61 (0.89)	3.31 (1.16)	1.91 (0.89)
15. Keep your kids naturally sweet...	33.9	2.96 (0.97)	2.51 (0.87)	2.95 (1.18)	2.02 (0.96)
10. LOST: Love handles. Last seen...	33.8	3.29 (0.81)	2.66 (0.86)	3.32 (1.06)	1.84 (0.93)
1. Cut down on sugary drinks.	33.1	3.23 (0.86)	2.46 (0.90)	3.44 (1.05)	1.75 (0.92)
8. Low in calories, full of nutrients...	32.9	3.42 (0.73)	2.36 (0.84)	3.76 (0.95)	1.74 (0.90)
2. Fact: even drinks that look healthy...	32.9	3.37 (0.73)	2.46 (0.93)	3.75 (0.93)	1.76 (0.94)
6. Eat a variety of colorful fruits...	30.4	3.37 (0.74)	2.24 (0.89)	3.75 (0.88)	1.65 (0.80)
28. Take a small step to get healthy.	30.1	3.38 (0.86)	2.35 (0.92)	3.38 (1.12)	1.79 (0.88)
18. Eat well. Move more. Live longer.	29.9	3.63 (0.73)	2.35 (0.86)	3.82 (0.95)	1.67 (0.84)
9. Move everyday!	28.9	3.28 (0.83)	2.43 (0.89)	3.39 (1.13)	1.85 (0.97)

Note: percentages represent the proportion of participants who rated messages to be stigmatizing, 3–5, ('somewhat' to 'extremely') on 1–5 scale ('not at all' to 'extremely').

healthier lifestyles or is necessary to raise public awareness about the seriousness of obesity. As an example, in 2011 the Children's Health Care of Atlanta Campaign to address childhood obesity in Georgia publicized billboards and commercials portraying obese youth with captions such as 'Stocky, Chubby, and Chunky are Still Fat' and 'Fat Kids Become Fat Adults'. Despite being the target of public criticism for promoting shame and stigma towards families struggling with obesity, the spokesperson of the campaign stated, 'We felt like we needed a very arresting, abrupt campaign that said: 'Hey, Georgia! Wake up. This is a problem'.⁵¹ Although this perception may be common, considerable evidence demonstrates that individuals who feel stigmatized or shamed about their excess weight engage in higher calorie intake, unhealthy eating behaviors, binge-eating patterns, as well as avoidance of exercise,^{15,22,52} which can reinforce weight gain and impair weight loss. Thus, public health campaigns that communicate stigmatizing, shameful messages could inadvertently make the problem worse and harm those most in need of help. The current findings provide new evidence to suggest that the public does indeed perceive such messages to be stigmatizing, inappropriate and ineffective, with lower intentions to act upon the messages' content.

In addition, it was found that public health messages that instead focus on making behavioral changes (for example, increased fruit and vegetable consumption, increased physical activity) in a non-stigmatizing way received the most positive ratings and highest intentions for compliance. Of interest, messages that were perceived to be most positive and motivating

made no mention of 'obesity' at all. This suggests, perhaps, that people may be more amenable to improving their lifestyle behaviors when the emphasis is on health, rather than body weight *per se*. This finding is consistent with a recent proposal by Piggan and Lee²⁹ regarding the omission of the word 'obesity' from the United Kingdom's Change4Life campaign, and indicates the importance for future research to more rigorously test how weight-related terminology influences public responses to health messages.

Findings that participants' body weight influenced their perceptions of messages suggest the need for messages to provide specific behavioral strategies to improve nutrition or health, and to avoid blaming individuals for excess weight or poor health. Specifically, four of the five messages that obese individuals rated as less motivating provided no specific actionable behaviors (for example, no. 15, 21, 25 and 27). Obese individuals also perceived the two most stigmatizing messages (no. 25, no. 21) as less motivating, and message no. 25 as more stigmatizing compared to non-obese individuals. It is interesting to note that message no. 13 was rated positively and motivating by the total sample, but obese individuals perceived this message as more stigmatizing than non-obese individuals. Although the reason for this finding is unclear, it suggests the importance of pre-testing messages in the general public and ensuring that perceptions and reactions of obese persons are considered (see Lewis *et al.*¹⁹

Finally, it is worth noting that messages that were rated most stigmatizing were those that focused on children. Although both

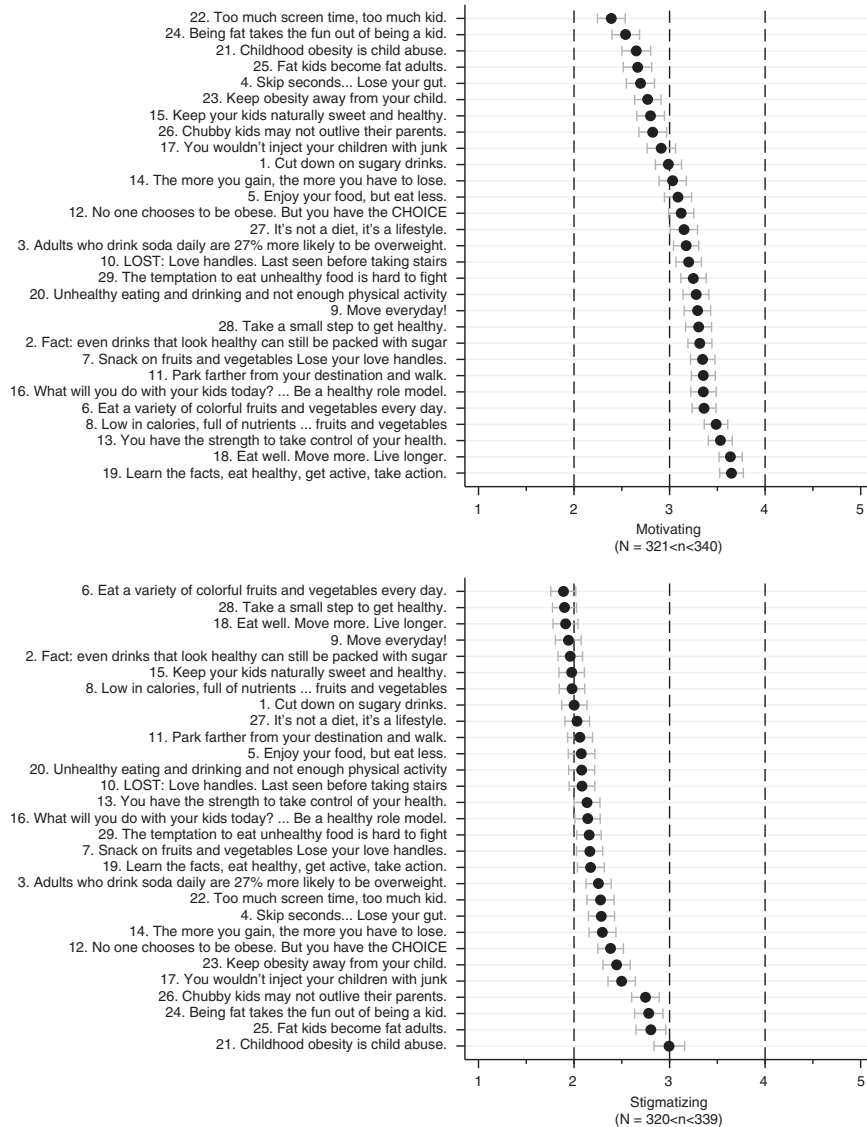


Figure 1. Mean ratings for perceptions of messages as motivating and stigmatizing. Graphs show results for ratings across 29 public health messages for the message as motivating or stigmatizing, respectively. The dots represent mean scores, the error bars depict 95% confidence intervals. Ratings were measured on a 5-point Likert scale ranging from 'not at all' to 'extremely'. Means can conservatively be considered significantly different from each other at a level of $P < 0.05$ when the confidence intervals do not overlap.

youth and adults who are obese are vulnerable to stigmatization and weight-based stereotypes,^{8,27} it may be that adults are more sympathetic and opposed to the stigmatization of obese children than obese adults. Although this distinction could not be examined using the data in the current study given the lack of comparable stigmatizing messages toward adults, it will be important for future experimental research to identify whether stigmatizing obesity-related health messages instill different public reactions depending on whether the target in the message is a child or adult, and also whether the individual reacting to the message is a child or adult.

Several limitations of this study should be noted. Although concerted effort was made to obtain a representative sample of public health messages, there are more messages that could be tested, and new messages that have recently emerged. It will be important for continued research in this area to examine how the public responds to obesity-related campaigns. Second, we analyzed only the written text of public health messages. Assessing both written messages and accompanying visual media

were beyond the scope of this study, but could additionally affect public responses and reactions. Future work should assess whether, and to what extent, visual media affects public perceptions of obesity-related health messages. However, the fact that participants in the present study viewed each public health message as written text in isolation of any visual media provides a stronger assessment of the message content and ensures that other factors did not affect participants' responses. Third, the study relied on self-reported data, and self-reported attitudes and intentions do not necessarily reflect actual behavior. In addition, the present study primarily asked participants about their own reactions to each of the messages, rather than how they thought others (for example, such as individuals of different weight categories) might react. It will be informative for future research to examine whether perceptions of health messages vary according to whether participants apply the messages to themselves or others. Although it was beyond the scope of the study to evaluate behavior change resulting from exposure to, or perceptions of these messages, the present findings nevertheless

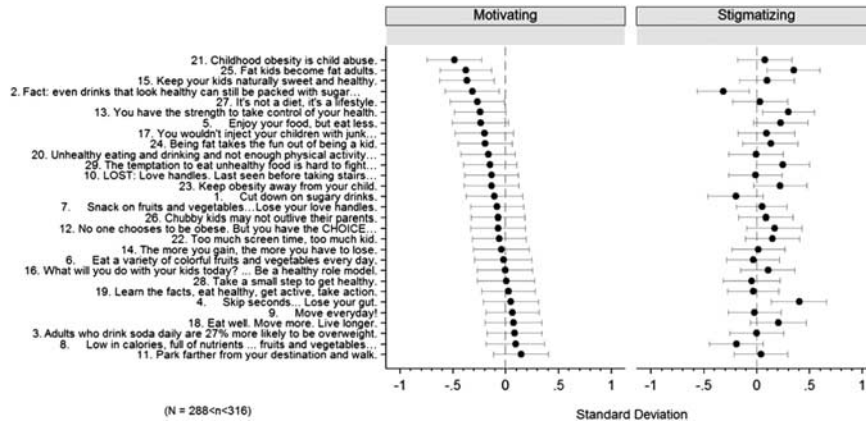


Figure 2. Obesity-related differences in mean perceptions of messages as motivating and stigmatizing. The graphs show (adjusted) differences in means between participants that were classified as obese ($\text{BMI} \geq 30$) and participants who were classified as not obese and not underweight ($18.5 < \text{BMI} < 30$), across all messages. The point estimates shown reflect regression coefficients from separate regression models. All models control for gender, age, education, income and race/ethnicity. Error bars indicate 95% confidence intervals. Differences in means are statistically significant when the confidence bounds exclude zero. Dependent variables were z-standardized.

provide important information about public reactions that may influence intentions to act and ultimately affect behavior. It will be important for future research to assess behavioral outcomes to determine whether different obesity-related messages affect behavioral change.

Despite these limitations, our study offers unique strengths with the inclusion of a nationally representative sample of participants, assessment of a diverse set of national, international and publicized messages disseminated in recent obesity-related public health campaigns, and provides the first systematic, experimental examination of public responses to these public health messages. Our findings additionally offer several important implications for framing messages in public health campaigns to address obesity, and suggest that certain types of messages may lead to more favorable public responses and increased motivation for behavior change whereas others may be perceived as stigmatizing and instill less motivation. First, messages that use pejorative language or statements that infer shame or blame may have the opposite effect on public responses as intended, and lead to negative reactions and lower intentions to comply with message content. Second, the public may react more positively and feel more motivated to improve their lifestyle behaviors in response to messages that promote health behaviors that can help reduce/prevent obesity, such as increased fruit and vegetable consumption and becoming more physically active. However, making reference to obesity itself may not be necessary to instill motivation amongst most people who may feel more motivated to comply with message content that emphasizes health behaviors rather than body weight. Given that increased nutrition and physical activity are important for all segments of the population, these messages could have a broader reach to the American population when weight-related language is absent. Finally, our findings highlight the need for research-based selection of messages to use in obesity-related public health campaigns. Such efforts should include assessment of message content that may be perceived as stigmatizing or shaming versus motivating and helpful, to ensure that campaign messages promote healthy behavior change without instilling bias or stigma toward those most in need of support.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENTS

Research and project support were provided by the Rudd Center for Food Policy and Obesity.

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Supplementary Information accompanies the paper on International Journal of Obesity website (<http://www.nature.com/ijo>)