



Picturing obesity: Analyzing the social epidemiology of obesity conveyed through US news media images

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ABSTRACT

News media coverage can affect how Americans view health policy issues. While previous research has investigated the text content of news media coverage of obesity, these studies have tended to ignore the photographs and other images that accompany obesity-related news coverage. Images can convey important messages about which groups in society are more or less affected by a health problem, and, in turn, shape public understanding about the social epidemiology of that condition. In this study, we analyzed the images of overweight and obese individuals in *Time* and *Newsweek* coverage over a 25-year period (1984–2009), and compared these depictions, which we characterize as representing the “news media epidemiology” of obesity, to data describing the true national prevalence of obesity within key populations of interest over this period. Data collected included descriptive features of news stories and accompanying images, and demographic characteristics of individuals portrayed in images. Over the 25-year period, we found that news magazines increasingly depicted non-whites as overweight and obese, and showed overweight and obese individuals less often performing stereotypical behaviors. Even with increasing representation of non-whites over time, news magazines still underrepresented African Americans and Latinos. In addition, the elderly were starkly underrepresented in images of the overweight and obese compared to actual prevalence rates. Research in other policy arenas has linked media depictions of the populations affected by social problems with public support for policies to combat them. Further research is needed to understand how news media depictions can affect public stigma toward overweight and obese individuals and public support for obesity prevention efforts.

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Introduction

The dramatic rise in obesity over the last several decades, both in the United States and globally, has attracted substantial news media attention (Barry, Jarlenski, Grob, Schlesinger, & Gollust, 2011; Kim & Willis, 2007; Lawrence, 2004; Ries, Rachul, & Caulfield, 2011; Saguy & Almeling, 2008; Saguy & Gruys, 2010). Such news coverage can shape public opinion about obesity by suggesting to the public that obesity is an important problem (Iyengar & Kinder, 1987) and by framing obesity's causes, solutions, and the groups in society that are affected (Entman, 1993; Gilens, 1999; Iyengar, 1991). While previous research has examined the news media's framing of obesity based on the text of news coverage, little research is available on how the *images* accompanying news coverage may

frame the issue (for an exception, see Heuer, McClure, & Puhl, 2011). Research suggests that the photographs and other images included in news coverage can powerfully shape public perceptions of policy issues (Zillman & Brosius, 2000). Stressing this influence, political scientist James Morone (2005) contends that “the politics of social policy always turn on the mental images we create of the beneficiaries” (Morone, 2005, p. 15). In this study, we analyze the images included in news coverage of obesity in the two highest-circulation news magazines in the U.S. over a 25-year period, and we assess how accurately these news media depictions, which we refer to as the “news media epidemiology” of obesity, reflect the actual prevalence of the problem within different groups in American society.

Public perceptions of target groups

Social construction theory stipulates that the manner in which social problems are represented in society is politically significant,

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particularly the cultural characterizations and images associated with the target groups affected by public policies (see, e.g., Best, 1989; Schneider & Ingram, 1993). Empirical research on American public opinion demonstrates that the public's attitudes and stereotypes about groups are important determinants of their opinions about social policy matters (Kinder & Sanders, 1996; Nelson & Kinder, 1996; Peffley, Hurwitz, & Sniderman, 1997; Winter, 2008). And in turn, public opinion has been shown to be a critical factor in passage of public policies (see, e.g., Jacobs & Shapiro, 2000; Page & Shapiro, 1992).

Previous research examining media constructions of target groups has shown, for instance, that when the U.S. news media presents racially stereotypical coverage of African Americans in stories about crime or poverty, white Americans tend to have more punitive attitudes toward crime policy (Gilliam, Valentino, & Beckmann, 2002) and less support for government spending on welfare (Gilens, 1999). Limited research has thus far addressed the implications of group depictions in health-related discourse (Armstrong, Carpenter, & Hojnacki, 2006; Gollust, Lantz, & Ubel, 2010; Rigby, Soss, Booske, Rohan, & Robert, 2009; Winter, 2005) or in media depictions of obesity in particular (Saguy & Gruys, 2010). Yet since epidemiological research has established that important differences exist in the prevalence and health-related consequences of obesity across racial, ethnic, and socioeconomic groups (Flegal, Carroll, Ogden, & Curtin, 2010), media representations of how these different groups are affected by obesity may influence how the public thinks about obesity as a societal problem and their beliefs about what public policy responses to it are appropriate.

News media coverage of obesity

Researchers have sought to understand how the news media has framed obesity, by conducting systematic content analyses of the text of newspapers, television news transcripts, and magazines. These studies indicate that the news media focuses on individual behaviors rather than societal factors (e.g., lack of access to healthy foods in low-income neighborhoods) to explain rising rates of obesity among adults (Kim & Willis, 2007; Lawrence, 2004; Saguy & Almeling, 2008) and children (Barry et al., 2011). Likewise, news media coverage more often focuses on behavior-change-oriented solutions (i.e., diet and exercise change) as opposed to system-level or policy changes affecting neighborhoods, schools, or the food industry (Barry et al., 2011; Kim & Willis, 2007; Lawrence, 2004; Ries et al., 2011; Saguy & Almeling, 2008). These patterns of news coverage of obesity are consistent with public opinion survey data on perceived causes of obesity, suggesting media coverage reflects and/or reinforces public attitudes (Bleich & Blendon, 2010).

Saguy and Almeling (2008) found that news article texts more often attributed obesity to poor food choices and to social structural factors like the food industry and urban planning when the articles identified certain social groups – the poor, African Americans, or Latinos. In subsequent work, Saguy and Gruys (2010) examined the extent to which articles about obesity mentioned specific racial or ethnic groups, and found that articles mentioned non-whites more often than whites. While they did not examine the effects of these depictions, they conjectured that “depending on how they report the demographics of a given condition, the news media may reinforce group-based stereotypes” (Saguy & Gruys, 2010, p. 247). If, for instance, one racial or ethnic group is more commonly associated with obesity, stereotypes of that group as lacking self-control or being slovenly may become attached, thereby additionally burdening groups already subject to other negative stereotypes. No prior studies have examined how news coverage portrays the

obesity epidemic in the context of other groups in society, such as the age or gender of those affected.

News article text is only one component of the information conveyed by the news media about the population affected by a social problem like obesity. Photographs and other images (and associated captions) that accompany news articles constitute a powerful venue for communicating information about the problem of obesity in the U.S. Studies have demonstrated that when reading print news, people's eyes are drawn to photographs first (Garcia & Stark, 1991), and that photographs with captions have a particularly powerful influence on emotional response (Pfau et al., 2006). News images may be an important mechanism for providing information about the racial, ethnic, age, and gender composition of the obesity epidemic in America, even in the absence of explicit text-based cues. Content analysis research indicates that only small proportions of news articles ever even mention any target groups affected by overweight/obesity and related conditions (Gollust & Lantz, 2009; Saguy & Gruys, 2010). In contrast, photos instantly convey to the reader the racial, ethnic, or other demographic identity of people affected by obesity. A complete understanding of how groups affected by obesity are socially constructed in the news media demands an image-based methodological approach.

Effects of images on social perceptions

Previous studies illuminate the powerful effect of images on social perceptions. Zillman and Brosius (2000) have shown that pictures tend to remain accessible in individuals' minds for longer, so they have a larger influence than text does on issue perceptions. Gibson and Zillman (2000) demonstrated that an image accompanying a news article about a fictional illness affected the public's perceptions of the risk of that illness; if the picture was of a minority individual, study participants were more likely to indicate that that illness predominated among that ethnic group. The “cultivation” theory of media effects suggests that media imagery shapes people's views of social reality, such that those who are higher media consumers (e.g., of TV crime dramas) are more likely to believe the world looks as it does in the media version of reality (Morgan, Shanahan, & Signorielli, 2009).

Prior research indicates that news coverage about a policy issue that highlights a specific target group can activate stereotypes about that group in individuals' minds, affecting the way the public thinks about the issue in question (Nelson & Kinder, 1996; Winter, 2008). For instance, cueing race in media coverage of some social issue (like affirmative action, crime, or welfare) can trigger racist stereotyping among the public, especially among whites, often leading to lower support for policies to address that issue (Winter, 2008). Recent research has established that such a response is more likely when racial signals are implicit, such as in image or pictorial form, than when the text provides an explicit reference to a racial group (Valentino, Hutchings, & White, 2002; but see Hutchings, Walton, & Benjamin, 2010 for an exception). This is attributed to the American public having become conscious of the norm against endorsing racially discriminatory, equality-denying sentiments, preventing them from responding in overtly racist ways to explicit racial symbols (Mendelberg, 2001). When racial symbolism is less obvious, however, these norms do not become so easily activated. Messaris and Abraham (2003) suggest that images depicting African Americans can convey stereotypical information that may be controversial or meet resistance if it were presented in words.

The case of poverty provides an illustrative example of this principle. Gilens (1999) conducted a large-scale content analysis of every image accompanying every article about poverty appearing over a 40-year period in the news magazines *Time*, *Newsweek*, and

U.S. News and World Report. He found that after the year 1964, news media images of poverty tended overwhelmingly to depict African Americans among the poor (rising to nearly 70% of all people pictured in the late 1960s and early 1970s), far exceeding the “true” prevalence of African Americans in poverty of just 29%. In survey research, he also found that Americans tended to overestimate the proportion of African Americans among the poor, with a median reported estimate of 50% in one study (Gilens, 1996). Moreover, those who overestimated the proportion of African Americans among the poor tended to believe the government should spend less on welfare programs than those who believed that African Americans comprised a lower proportion of the poor. Thus, Gilens’ research advances two important claims: that pictures have the potential to shape public understandings of the demographics of social problems, and that public perceptions (or misperceptions) of those affected by social problems are associated with support for government actions.

Taking the Gilens study as our motivation, we sought to analyze how news media images depict obesity and the groups affected by obesity in American society. Only one prior study has examined how obese individuals are depicted in pictures accompanying news coverage, using a convenience sample of online news website photographs (where authors analyzed the first 500 results identified from searches of 5 major news websites) (Heuer et al., 2011). They found that 72% of all images of overweight/obese people met at least one criteria they determined to be stigmatizing (including emphasizing the abdomen, not wearing clothes or in ill-fitting clothes, not showing heads, eating unhealthily, or being sedentary). While their study focused on the stigmatizing nature of these depictions, our interest, following the extensive literature on group-based political attitudes (see, e.g., Kinder & Sanders, 1996), is to analyze socio-demographic depictions of overweight and obese individuals in news coverage. Portrayals of which groups are most affected could affect the public’s willingness to support governmental obesity prevention efforts (Schneider & Ingram, 1993). We coded the content of news media images in *Time* and *Newsweek* coverage from 1984 to 2009 to assess the news media epidemiology of obesity, and compared these findings to data on the true epidemiology of obesity in the U.S. Readers of these publications have a higher-than-average socioeconomic profile (Pew, 2009), and thus comprise a politically important constituency for policy support.

Data and methods

News media data

We collected and analyzed images in the two highest-circulation U.S. news magazines: *Time* (2008 circulation of 3.4 million) and *Newsweek* (2008 circulation of 2.7 million) (Pew, 2009) over a 25-year period, 1984 to 2009. We chose these publications because of their circulation, national scope and availability, and common use of pictures in presenting policy-oriented issues. While neither publication is considered overtly political, one analysis aiming to quantify news slant identified *Newsweek* as slightly more liberal than *Time* (Groseclove & Milyo, 2005).

We conducted searches in the EbscoHost database, which contained full-text coverage of both publications over the full time period. After pilot testing various search terms, we identified a search strategy using the terms “overweight” and “obes*” [truncated to capture both “obese” and “obesity”]. These searches yielded a total of 353 articles. For 311 of these (88%), original articles in bound volumes were found in the library and color-scanned, making up our final sample. Articles not included in the sample were duplicate articles identified in searches, or articles that

appeared in special regional issues (e.g., ‘Newsweek Atlantic Edition’) unavailable to us.

We first conducted an extensive literature review to identify other instruments used in image-based content analyses. We then developed a coding scheme using variables validated in previous studies, including body mass (Cusumano & Thompson, 1997; Greenberg, Eastin, Hofschire, Lachlan, & Brownell, 2003; Mastro & Stern, 2003; Robinson, Callister, & Jankoski, 2008; Stern & Mastro, 2004), gender (Stern & Mastro, 2004), age (Mastro & Behm-Morawitz, 2005; Stern & Mastro, 2004), and race (Gilens, 1996; Kean & Prividera, 2007; Mastro & Behm-Morawitz, 2005; Mastro & Stern, 2003). We collected image data at three levels: the article-level, the image-level, and the person-level.

After coding a pilot sample of articles, two authors (SEG and IE) developed a codebook with the variables described below. Next, two research assistants (not the authors) were trained to use the codebook over a period of two months, revising the codebook for reliability in an iterative process, and coder training proceeded until inter-rater reliability was sufficiently high (kappas > 0.70). The two coders each coded half the total sample with a 20% overlap of randomly selected double-coded articles ($n = 69$) to determine final inter-rater reliability statistics. Kappa statistics (a measure of inter-rater reliability that adjusts for agreement by chance) were calculated on this sample and ranged from 0.91 to 1.0 for the article-level variables, 0.73 to 1.0 for the image-level variables, and 0.69 to 1.0 for the person-level variables, indicating high reliability (Landis & Koch, 1977).

From our initial sample of 311 articles, we excluded 176 because the article text was not focused on overweight or obesity in people (versus animals), did not include an image (no graph, figure, photo, diagram, or illustration), or did not contain a representation of a person in the image (with at least half of the person’s body showing). Articles that featured, for instance, photos of food, sodas, or restaurants with no people were excluded.

For our final sample at the article-level ($N = 135$), we coded the news outlet (whether *Time* or *Newsweek*), the date of publication, the article’s length in pages, and the number of images it contained (≥ 1).

At the image-level ($N = 240$), we collected information on image size (less than $\frac{1}{2}$ page or greater than $\frac{1}{2}$ page), image type (illustration or photo), whether there was a caption, and the number of people in the image (with a maximum of 12, as more than 12 people in a given photograph were too difficult to code reliably).

At the person-level ($N = 374$), we collected information on every individual depicted in the image that met our criteria of at least half of the person’s body showing. The coded variables included: gender (female, male, unable to determine), race (white, non-white, unable to determine), and age (under 18, 18 to 64, 65 or older, unable to determine). We also coded for the perceived socioeconomic status of people included (poor, neither poor nor rich, or rich/celebrity). Inter-rater reliability for this variable was not sufficiently high (kappa = 0.465) so we do not include it in this analysis. If a person was coded as non-white, race/ethnicity was then coded (African American, Latino/Hispanic, Asian, Native American, or unable to determine). Coders were instructed to consider the U.S. Census Bureau definitions for race/ethnicity in making their judgments; for Asian, for example, this category encompasses individuals from the Far East (e.g., China, Japan) as well as Southeast Asia. Following models from previous research (Cusumano & Thompson, 1997; Robinson et al., 2008), we coded body mass using separate validated assessment tools for adults (Thompson & Gray, 1995) and for children (Truby & Paxton, 2002). These tools, developed to measure the lay public’s body image perceptions, show silhouettes of adults or children arrayed from thin to obese. Coders were directed to consider the last two silhouettes (the obese end of the scale) in

making their judgments about the weight status of people depicted in news magazine images. Given that a small proportion of photos depicted people who had lost a significant amount of weight (i.e., “before-and-after” photographs or people holding up their plus-size clothing), we measured 3 categories for body mass: normal weight, formerly overweight or obese, and overweight or obese. For all analyses reported here, we included those portrayed to be “formerly overweight” ($n = 20$) in the “overweight or obese” category, as such a representation provides clues to the public about the socio-demographic characteristics of the overweight population in America.

Finally, we coded pictured individuals’ behaviors, including their activity level (seated, standing still, or active); food consumption (eating, not eating, unable to determine); beverage consumption (drinking, not drinking, unable to determine); and physical activity (exercising, not exercising). Motivated by prior research analyzing the implications of multiple or overlapping stigmatizing health behaviors (Aronowitz, 2008; Bayer & Stuber, 2006; Puhl & Heuer, 2009), we also collected information on whether any overweight individuals were depicted smoking. Coders were instructed to take information conveyed in the image caption, if available, into account, but not information from the article text.

Prevalence data

To compare news images to epidemiological statistics, we collected data from the National Health and Nutrition Examination Survey (NHANES), the American Community Survey (ACS), and the U.S. Census. Our goal was to identify statistics representing the proportion of overweight American children and adults separately in each demographic group to match the media data collected (i.e., by race/ethnicity, by elderly versus non-elderly among adults, and by gender). Using the example of African Americans, the relevant statistic is not the proportion of African American adults and children who were overweight in 2008 (73.7% and 20% respectively) (Flegal et al., 2010; Ogden, Carroll, Curtin, Lamb, & Flegal, 2010), but the proportion of overweight adults and children who are African American (13% and 19% respectively). To make these calculations, we first gathered NHANES data for the share of overweight adults and children in the population overall and by the demographic subgroups described above. Next, we used ACS and Census data to determine the total number of overweight adults and children overall and by subgroup. To do so, we used NHANES data on the proportion of, for instance, African Americans who are overweight, multiplied by the total N of African Americans (from the Census), which yields the total N of African American overweight adults. This figure, divided by the total N of U.S. adults who are overweight, yields the percent of overweight adults who are African American. We calculated the demographic composition of the overweight population in two time periods (for reasons described below under Analysis): 1998–2003 (using data from the 1999–2002 NHANES and the 2000 Census) and 2004–2009 (using data from the 2003–2006 NHANES and the 2005–2007 ACS).

Analysis

We calculated frequencies for each news media variable at the article-level, image-level, and person-level. We measured person-level variables at three time periods chosen intentionally to reflect phases in the ascendancy of obesity on the media agenda: 1984–2000 (before coverage of obesity was common and before obesity had been elevated onto the U.S. or international policy agendas), 2001–2004 (when public attention to obesity was becoming quite common), and 2005–2009 (when attention to

obesity declined) (Barry et al., 2011). To test for differences by time period, we estimated logistic regression models, regressing the variable of interest (e.g., percent non-white) on indicator variables for the time period and adjusting the standard errors for clustering by news outlet (*Time* vs. *Newsweek*). Finally, we compared frequencies of news media data to national prevalence data by category for adults and children. Since the bulk of the articles examined (see Fig. 1) appeared after 1998, we only had sufficient sample size of pictured overweight or obese individuals after this time point. To compare the 1998 to 2009 time period media data to the actual prevalence data (which changed over this period), we broke this news media data into two six-year blocks: 1998–2003 and 2004–2009. Those two time periods captured the bulk of the news magazine data and allowed for meaningful comparisons with available national population data.

Results

Fig. 1 displays the volume of obesity-related news articles ($N = 311$) in *Time* and *Newsweek* from 1984 to 2009, demonstrating that the two publications closely track each other. Coverage of obesity was relatively rare (fewer than 5 articles/year) in both news magazines until 1999 when coverage began to increase, escalating dramatically after 2001, peaking in 2004, and declining thereafter. This coverage pattern corresponds with notable events in obesity-related policy domestically and internationally: the U.S. Surgeon General’s report on obesity was published in 2001 (DHHS, 2001); World Health Organization reports on obesity and nutrition were published in 2003 and 2004 (WHO, 2003, 2004); and an Institute of Medicine Report on childhood obesity was published in 2004 (IOM, 2004). Table 1 presents descriptive statistics of the sample at the article- and image-level.

Among the 374 individuals depicted in all images, 172 (46.0%) were portrayed as overweight or obese while 202 (54.0%) were of a “normal” weight. Thus, more than half of individuals depicted in articles about obesity are *not* overweight. While this may seem surprising, articles often included pictures of teachers, classrooms, nutritionists, authors, and family members – individuals germane to the issue of obesity but not necessarily overweight themselves. Table 2 displays the demographic and behavioral characteristics of the 172 overweight individuals. Column 1 indicates that for the full sample, over one-third of depicted individuals are children, few (3.5%) are elderly adults, most (70%) are white, and they are about equally divided by gender. These results mask some heterogeneity across the 25-year sample. From 1984 to 2000, when coverage of obesity was quite rare, about one-quarter of depictions were of children. In the period from 2001 to 2004, the share of child depictions rose to more than 40%. In the 1984–2000 period more women were depicted among the overweight and obese, but a majority of men were depicted by 2001–2004, flipping again in

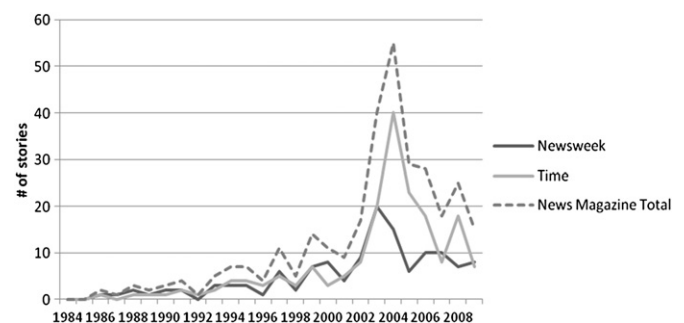


Fig. 1. Volume of news coverage about overweight and obesity by news magazine ($N = 311$), 1984–2009.

Table 1
Descriptive features of *Time* and *Newsweek* articles about obesity and their accompanying images.

	%	N
<i>Article-Level Features (N = 135 articles)</i>		
News Outlet		
Time	41.5	56
Newsweek	58.5	79
Years		
1984–2000	24.4	33
2001–2004	42.2	57
2005–2009	33.3	45
Images per article	Mean = 1.8 Median = 1 Range = 1–12 (70.4% have 1 image)	
<i>Image-Level Features (N = 240 images)</i>		
Image Type		
Photo	87.9	211
Illustration	12.1	29
People per Image	Mean = 1.8 Median = 1 Range = 1–12 (63.3% show one person)	

the most recent time period. Finally, the 25-year time period saw rising representation of non-whites among the overweight and obese, from 7% before 2001 to 17% between 2001 and 2004 and 20% thereafter. Adjusting for clustering by magazine, coverage of the non-white overweight/obese rose significantly ($p < .05$) after 2001.

Table 2 also shows the proportions of potentially stigmatizing behavioral depictions in the news magazines. No overweight individuals were depicted smoking cigarettes. Twelve percent of overweight individuals were shown eating food, 8% were drinking, and 26% were exercising. (While we attempted to code for the perceived “healthiness” of the food and beverage consumed, reliability on these variables was not sufficiently high to report these data.)

Overall, 72% of individuals were portrayed as inactive (seated, standing still, or otherwise posing), while 28% were active (e.g., walking, gardening, shopping, exercising). We detected a significant decline ($p < .05$) in portrayals of overweight individuals eating

(19% before 2001 versus 10% in 2001–2004 and 8% after 2004) and an increase in portrayals of overweight individuals exercising (21% before 2001 versus 28% after 2005). Significantly more overweight and obese people were depicted as active (33%) after 2005 compared to before 2001 (24%). We detected no statistically significant associations between the race of the overweight individual (white vs. non-white) and his or her depicted eating, drinking, or exercise behaviors.

Table 3 presents the demographic composition of overweight individuals pictured in news articles compared to actual prevalence statistics over two time periods: 1998–2003 and 2004–2009. As mentioned above, we do not show the period from 1984 to 1997 in this analysis. Given the very small sample size of pictorial depictions of overweight individuals since obesity was not yet on the public agenda, there was essentially no “media epidemiology” with which to compare the actual epidemiology of obesity. This is unfortunate, however, since this period saw marked increases in obesity rates in the United States (Flegal, Carroll, Ogden, & Johnson, 2002). In both time periods, news magazines overrepresented white overweight children and underrepresented non-white overweight children, with particular underrepresentation of Latino children especially in the earlier time period. Among adults, women tended to be overrepresented in media images compared to their true prevalence among the overweight in 1998–2003. White overweight adults tended to be overrepresented. As with depictions of children, Hispanic/Latino and black overweight adults tended to be underrepresented. Finally, the overweight elderly were dramatically underrepresented; there were no depictions of the elderly among the overweight in the magazines, but they should have accounted for about 18% of the overweight/obese if these two news sources faithfully replicated the true proportions in America.

Discussion

We investigated the implicit group-related messages that news magazine images convey about the problem of obesity. We found that two high-circulation U.S. news magazines portrayed non-

Table 2
Demographic and behavioral characteristics of the overweight and obese individuals pictured in news magazine images, 1984–2009.

	Full sample (N = 172)	1984–2000 (N = 42)	2001–2004 (N = 70)	2005–2009 (N = 60)
	% (N)	% (N)	% (N)	% (N)
Age				
Child (under 18)	35.5 (61)	26.2 (11)	41.4 (29)	35.0 (21)
Adult 18–65	59.9 (103)	57.1 (24)	58.6 (41)	63.3 (38)
Adult 65 or older	3.5 (6)	14.3 (6)	0.0 (0)	0.0 (0)
Unable to determine	1.2 (2)	2.4 (1)	0.0 (0)	1.7 (1)
Gender				
Male	47.1 (81)	42.9 (18)	55.7 (39)	40.0 (24)
Female	50.0 (86)	57.1 (24)	41.4 (29)	55.0 (33)
Unable to determine	2.9 (5)	0.0 (0)	2.9 (2)	5.0 (3)
Race/Ethnicity				
White	70.4 (121)	83.3 (35)	62.9 (44) ^a	70.0 (42) ^b
Non-white	15.7 (27)	7.1 (3)	17.1 (12) ^a	20.0 (12) ^b
Black	7.6 (13)	4.8 (2)	8.6 (6) ^a	8.3 (5) ^b
Hispanic	5.2 (9)	2.4 (1)	7.1 (5)	5.0 (3)
Asian	1.2 (2)	0.0 (0)	1.4 (1)	1.7 (1)
Native Am/Pacific Islander	1.2 (2)	0.0 (0)	0.0 (0)	3.3 (2)
Unable to determine	14.0 (24)	9.5 (4)	20.0 (14)	10.0 (6)
Behaviors				
Eating	11.8 (20)	19.0 (8)	10.3 (7) ^a	8.3 (5)
Drinking	7.7 (13)	14.3 (6)	9.0 (6)	1.7 (1) ^b
Active	27.9 (48)	23.8 (10)	25.7 (18)	33.3 (20) ^b
Exercising	25.6 (44)	21.4 (9)	25.7 (18)	28.3 (17) ^b

Note: Statistical tests for differences by the three time periods adjust standard errors for clustering by the news magazine.

^a Significant difference ($p < .05$) between 1984–2000 and 2001–2004.

^b Significant difference ($p < .05$) between 1984–2000 and 2005–2009.

Table 3

Comparing media epidemiology to social epidemiology of the overweight population in U.S., 1998–2009.

	1998–2003		2004–2009	
	Magazines	U.S. Population	Magazines	U.S. Population
	%	%	%	%
Children^a	N = 30		N = 27	
Male	60.0	53.7	48.2	53.7
Female	40.0	46.8	51.9	46.4
White	74.1	58.5	72.0	61.0
Non-white	25.9	41.5	28.0	39.0
Black	15.4	18.3	8.3	18.8
Hispanic/Latino ^b	3.9	23.1	16.7	25.5
Adults	N = 30		N = 56	
Male	41.4	50.8	49.1	52.3
Female	58.6	49.0	50.9	47.5
White	81.0	75.7	85.4	74.5
Non-white	19.1	24.3	14.6	25.5
Black	9.5	12.2	6.4	13.0
Hispanic/Latino ^b	9.5	11.8	4.3	14.2
65 years or older	0.0	18.3	0.0	17.9

Notes: Due to low sample size, comparisons for the earliest time period (1984–1997) are not shown. 1998–2003 magazine data are compared with data from the 1999–2002 NHANES and the 2000 Census; 2004–2009 magazine data are compared with data from the 2003–2006 NHANES and the 2005–2007 American Community Survey. To present these comparisons, observations for variables coded as “undeterminable” were excluded.

^a For all U.S. calculations, children are classified as under 20 years old for both the NHANES data and the Census/ACS data except for poverty status, which Census/ACS only calculates for under 18 years old.

^b NHANES obesity data are collected for Mexican American but not for other groups (e.g., Asians, Pacific Islanders) because the estimates are unreliable, but national estimates are calculated based on Census/ACS data for Hispanic/Latino Americans.

whites increasingly among the overweight and obese, and showed the overweight and obese less often performing stereotypical behaviors from 1984 to 2009. Despite this increasing representation of non-whites, these news magazines still underrepresented African Americans and Latinos. The elderly were uniformly underrepresented in images accompanying news stories about obesity, and children were increasingly depicted over the time period.

One explanation is that these obesity-specific patterns reflect broader norms of media attention to different groups. For example, research indicates that Latinos are particularly underrepresented in entertainment media (Mastro & Behm-Morawitz, 2005) and older women tend to be underrepresented in both commercials (Stern & Mastro, 2004) and magazines (Bessenoff & Del Priore, 2007). Obese individuals are a highly stigmatized group in American society (Puhl & Heuer, 2009). Had we observed an overrepresentation of minority individuals among the pictured obese, a concern that the negative stereotypes associated with images of obesity (e.g., lazy, slovenly, blame-worthy) would further harm groups already marginalized would have been warranted (Aronowitz, 2008; Saguy & Gruys, 2010). Instead, we found no evidence that news magazines disproportionately link minority groups to obesity. In fact, the underrepresentation of minority Americans among the obese is a striking contrast to the reported dramatic overrepresentation of

African Americans among depictions of poverty (Gans, 1995; Gilens, 1999).

The fact that news media images depict obesity as a predominantly white problem holds important political implications. If white, higher-income individuals view obesity as a problem that affects “people like them” and not just “others” (e.g., the poor, racial/ethnic minority groups), they may be more likely to support contributing public resources toward policies aimed at addressing the problem (e.g., food marketing restrictions, food or beverage taxes) — the opposite political implication as that for the poverty case (Kinder & Kam, 2009). This interpretation could bode well for those advocating for passage of obesity prevention policies, which could improve population health. (but see Kirkland, 2011 for a skeptical view on the benefit to harm balance of such environmentally-targeted anti-obesity policies.) On the other hand, the lack of representation of minority individuals among the overweight could perpetuate the American public’s generally low recognition of the existence of racial health disparities, which poses a challenge to mobilizing action to remedy such disparities (Booske, Robert, & Rohan, 2011; Rigby et al., 2009).

Even if it is a journalistic norm, inattention to the elderly in news media depictions of obesity could hamper public mobilization to support government interventions to prevent obesity. The public considers the elderly an important population deserving of government attention, more deserving even than children (Cook & Barrett, 1992). In contrast, our results indicate increased pictorial attention in *Time* and *Newsweek* to children among the overweight after 2001. This finding is consistent with research showing a shift toward child-focused obesity news coverage over time (Barry et al., 2011). Likewise, it is consistent with great attention in U.S. policy circles to the issue of childhood obesity, including attention by the Institute of Medicine (2004) and — beyond the time frame of our study — a White House Task Force report (2010) and Michelle Obama’s child-focused “Let’s Move” campaign (www.letsmove.gov). Given that evidence suggests more favorable public opinion toward obesity prevention policies that target children (e.g., school-based policies) compared to adults (e.g., sugar-sweetened beverage taxes) (Barry, Brescoll, Brownell, & Schlesinger, 2009), images of children among the overweight and obese could heighten public attention to childhood obesity and perhaps serve to bolster public support for government action to address the problem.

In seeking to explain the patterns of news magazine images of the obese described in this study, we cannot easily disentangle the influence of journalistic norms generally from those specifically operating in portrayals of the obesity epidemic in America. Our findings showing rising depictions of non-whites might reflect a growing awareness on the part of journalists of racial and ethnic demographic patterns in obesity. However, other research indicates that media norms have shifted over time to portray more racial and ethnic diversity in news magazine pictures generally, not just in the case of obesity (Lester & Smith, 1990). Thus, it is unclear whether we would have observed similar proportions of the non-white in depictions in news coverage of other social or health issues.

It is equally plausible that news magazine photo editors presented increasingly diverse images of obesity to appeal to a diversifying audience market. However, data on the news magazine readership suggest this interpretation of journalistic choices may not be accurate. Rather than becoming more socioeconomically diverse over the time period of the study, readers of these two news magazines became wealthier. The median income of news magazine readers in 2008 was \$81,104, 46% higher than the national median annual income (Pew, 2009). Thus, it does not seem that the editorial staff aims to appeal to a diverse audience in making their decisions about whom to picture as obese. Additional research, such as interviews with photo editors or health journalists (Gasher

et al., 2007; Gilens, 1999), would shed additional light on magazine decision-making.

Our results also may be suggestive of an increased sensitivity on the part of journalists to stigmatizing portrayals of obese individuals in news magazine coverage. Heuer et al. (2011) developed a list of characteristics that typify stigmatizing portrayals of the overweight and obese, including portraying an overweight/obese person eating or drinking (unhealthy food or beverage) or engaging in a sedentary activity. We found that overweight/obese individuals relatively rarely were depicted in these stigmatizing ways in *Time* and *Newsweek*, and that stigmatizing depictions were used less often over time. Efforts have been undertaken to reduce stigmatized portrayals in the media, and our findings may suggest that these initiatives are making a difference. For example, the Rudd Center for Obesity and Food Policy and The Obesity Society have jointly issued guidelines for news organizations to use to avoid perpetuating negative stereotypes about the obese (see http://www.yaleruddcenter.org/resources/upload/docs/what/bias/media/MediaGuidelines_PortrayalObese.pdf).

The findings should be interpreted in light of several limitations of the study design and analysis. First, over the 25-year period of the study, the media environment changed dramatically. *Time* and *Newsweek* endured declining readership and impact. By 2008, only 12% of Americans read a news magazine regularly, compared to 18% in 1994, and the circulation of both publications declined precipitously, from 4.715 million for *Time* in 1988 to 3.389 million in 2008, and 3.312 million for *Newsweek* in 1988 to 2.737 million in 2008 (Pew, 2009). After 2008, both magazines enacted changes in format and circulation to survive the changing media market. Yet since changes in format only occurred in the last two years of the study, these market modifications cannot totally explain the declining coverage of obesity observed in the latter years of the study.

Second, coding images necessarily requires some subjective judgments. Extensive coder training and careful documentation of inter-rater reliability for all variables discussed in this study helps assure that the coding decisions presented are replicable. However, some variables that we attempted to code (including socioeconomic status) failed to meet acceptable reliability. We note, though, that we identified very few ($n = 2$ over the 25-year time period, or 1% of all overweight/obese individuals) depictions of the impoverished (as conveyed through pre-determined symbols including reference to public programs in caption and/or pictures of rundown buildings or destitute neighborhoods), thus dramatically undercounting the poor among the overweight or obese compared to their epidemiological prevalence. Given our interest in examining signals about the socio-demographics of the obesity epidemic conveyed through images, we chose not to examine the text of collected articles. However, news coverage text may have conveyed additional information about the racial and socioeconomic composition of the overweight population not discernable through photographs. Future research might develop more reliable techniques to measure social class in health-related imagery, as such images might convey important information to the public about the social determinants of health, as well as examine the potentially interactive messages conveyed through text and images simultaneously.

Third, given the declining significance of news magazines as sources of information, Americans regularly get their news from other sources, particularly local television and the Internet (Pew, 2006). Both TV and Internet sources likely convey powerful images about obesity to the viewing public, yet we did not include these news outlets. We consider our study a “proof of concept” that information about the demographics of a particular condition in news images can be reliably and systematically obtained, and future efforts might assess whether depictions of obesity differ

across types of news outlets. We also did not include any ethnic specialty news magazines which would likely portray the demographics of obesity differently than mainstream publications (Campo & Mastin, 2007). In addition, given our interest in the policy agenda-setting function of the news, we did not include other forms of mass media in the study. Yet, the entertainment media (e.g., fashion or culture magazines, television sitcoms, reality shows, and movies) is also an important source for transmitting messages to the public about how groups in society may be differentially affected by the problem of obesity, and is often identified as a primary source for reinforcing stigmatized portrayals of obese individuals (Coulter, 1996; Greenberg et al., 2003; Himes & Thompson, 2007; Sender & Sullivan, 2008).

Finally, other study designs, such as experimental research methods, would be required to make causal inferences of the effect of photos on public perceptions. A recent experimental study finds that people exposed to negative photographs of the obese expressed more negative attitudes about obese people than did those exposed to more positive photographs (McClure, Puhl, & Heuer, 2011). Similar research would be helpful in determining whether photographic depictions can alter public support for obesity prevention policies or views of overweight individuals, as our research suggests they might.

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