

Obesogenic Behavior and Weight-Based Stigma in Popular Children's Movies, 2012 to 2015

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abstract

BACKGROUND: Obesity-promoting content and weight-stigmatizing messages are common in child-directed television programming and advertisements, and 1 study found similar trends in G- and PG-rated movies from 2006 to 2010. Our objective was to examine the prevalence of such content in more recent popular children's movies.

METHODS: Raters examined 31 top-grossing G- and PG-rated movies released from 2012 to 2015. For each 10-minute segment ($N = 302$) and for movies as units, raters documented the presence of eating-, activity-, and weight-related content observed on-screen. To assess interrater reliability, 10 movies (32%) were coded by more than 1 rater.

RESULTS: The result of Cohen's κ test of agreement among 3 raters was 0.65 for binary responses (good agreement). All 31 movies included obesity-promoting content; most common were unhealthy foods (87% of movies, 42% of segments), exaggerated portion sizes (71%, 29%), screen use (68%, 38%), and sugar-sweetened beverages (61%, 24%). Weight-based stigma, such as a verbal insult about body size or weight, was observed in 84% of movies and 30% of segments.

CONCLUSIONS: Children's movies include much obesogenic and weight-stigmatizing content. These messages are not shown in isolated incidences; rather, they often appear on-screen multiple times throughout the entire movie. Future research should explore these trends over time, and their effects.



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WHAT'S KNOWN ON THIS SUBJECT: Screen time is associated with obesity. Media impacts children's behaviors in many health-related domains, including tobacco use, alcohol use, and sexual activity. The authors of a study of movies from several years ago found that obesogenic behaviors and weight stigma were often depicted simultaneously.

WHAT THIS STUDY ADDS: In this study, we show that obesogenic and obesity-stigmatizing content continues to be highly prevalent in recent top-grossing children's movies. We also provide a framework to investigate trends in the prevalence of obesogenic and stigmatizing content in children's movies over time.

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Childhood obesity rates have increased dramatically over the past 3 decades,¹⁻³ with the authors of recent reports estimating that 32% of children 2 to 19 years of age met criteria for overweight and that 17% had obesity.^{2,4} This widespread public health problem is associated with substantial physical and psychological health consequences that affect children and extend into adulthood.⁵⁻⁷ The increase in pediatric obesity is associated with many factors, including the changing food environment, eating preferences and behaviors, and trends in physical activity and sedentary time.⁸⁻¹⁰ In particular, a clear association between obesity and media use has emerged. Research spanning from the 1990s to the present has revealed a strong relationship between the amount of time children spend watching screens and BMI, such that more time spent watching screens is associated with greater BMI.¹⁰⁻¹² Although the association between obesity and media use is evident, the mechanisms driving the relationship are not yet fully understood.

The sedentary nature of screen use and its replacement of time spent being physically active has been partially credited for the complex relationship between weight and screen time.¹⁰⁻¹² Another contributing factor is the increase in energy intake prompted by screen use; children who watch more television and have more screen time also consume more calories,^{10,12,13} leading to weight gain. Finally, in addition to screen use itself altering children's eating and activity habits, the content presented on-screen also has the potential to influence behavior.

Media content depicting tobacco use, alcohol use, violence, and sex has been shown to influence children's health-related behaviors,¹⁴⁻¹⁷ although less is known about the effects of content that depicts food or eating. Food advertisements

frequently promote calorie-dense foods and have been shown to influence children's eating attitudes and food preferences, with studies revealing that advertisements tend to stimulate the intake of high-calorie foods that are low in nutritional content.¹⁰⁻¹²

Our team's previous work found that stigmatizing and obesity-related content was not only present but also prevalent in the majority of the top children's movies from 2006 to 2010.¹⁸ Furthermore, the movies often presented unhealthy foods and sedentary activities as the norm, while simultaneously stigmatizing obesity.¹⁸ There has been an increase in public attention to obesity and weight stigma, and some reports have revealed worsening weight discrimination over time.^{19,20} However, it is unknown if these kinds of messages remain prevalent, or which behaviors, specifically, are more common than others.

Our objective was to examine the prevalence of obesogenic and stigmatizing content in recent popular children's movies.

METHODS

Sample

This content examination was part of a larger study in which children's perceptions of obesity- and stigma-related messages in children's movies were examined; the study design has been described in detail elsewhere.^{21,22} Children ages 9 to 11 years ($n = 114$; see Table 1 for participant demographics) were recruited to participate in a study in which they completed an online questionnaire, watched a movie, selected snacks, and participated in a focus group discussion. Of interest to the current study is that participants were presented with a list of movies and asked, first, to select all that they had watched in a theater and, second, to select all

they had watched at home or at a friend's home. Participants were told to select only movies they had seen in their entirety; they were subsequently asked to select all movies for which they had seen short clips or trailers. All procedures were approved by the University of North Carolina at Chapel Hill's institutional review board and data analysis by the Duke University Health System institutional review board.

Movies listed were the 10 top-grossing G- and PG-rated movies of 2012, 2013, 2014, and 2015. The study was conducted beginning in August 2015, so that movies from the year 2015 included only those that had been released previously. Top-grossing movies were determined by using Box Office Mojo (<http://www.boxofficemojo.com>), a Web site that tracks US box-office revenue and has been used in other studies on portrayals of health behaviors.^{17,18} Of the 40 movies included on the list, whole movies seen by at least 20% of the sample either in a theater or at home were coded for content ($n = 31$ movies). We chose the 20% cutoff because we determined that although G- and PG-rated movies are often appropriate for children, they are not always targeted for child audiences. Thus, the movies that were not commonly watched by children were excluded.

Unit of Analysis

Each film was broken into 10-minute coding segments as in previous work,¹⁸ and each segment was evaluated for presence of the specified variables. We used a defined length of time to separate 1 segment from the next, rather than rater-determined "scenes," to examine discrete segments of the movie and ensure reliability.

Variables Coded

Raters worked from a predetermined list of variables to document obesity- and stigma-related content seen in

TABLE 1 Demographics of Participants (*n* = 114) in Larger Study

	M (SD) or <i>n</i> (%)
Age	9.82 (0.77)
9	46 (40.3)
10	43 (37.7)
11	25 (21.9)
Sex	
Boy	59 (51.8)
Girl	55 (48.2)
Grade	
Third	8 (7.0)
Fourth	41 (36.0)
Fifth	41 (36.0)
Sixth	23 (20.1)
Seventh	1 (0.9)
Race	
White	79 (69.3)
African American	6 (5.3)
Hispanic	11 (9.6)
Other	18 (15.8)
Ethnicity	
Non-Hispanic	103 (90.4)
Hispanic	11 (9.6)
BMI category	
Underweight	9 (8.5)
Healthy weight	75 (70.8)
Overweight	13 (12.2)
Obese	9 (8.5)

M, mean.

the movie. This list, derived from previous work,¹⁸ was modeled on an evidence-based guide created by the American Academy of Pediatrics for families on preventing and treating childhood obesity.¹⁸ The majority of variables included on the list were items, behaviors, or activities shown to be associated with adiposity and weight status in children, such as oversized portions, drinking sugar-sweetened beverages, and eating while watching screens.^{23,24} Additional eating and activity behaviors of interest to the team, such as a negative portrayals of physical activity, and the presence of weight-based stigma were also included. Because stigma is more of a subjective construct than the other behaviors examined, raters were instructed to code for stigma on the basis of verbal exchanges (eg, a statement or insult related to the character's weight) and visual presentation of characters (eg, negatively portraying characters with obesity as engaging in unhealthy

behaviors or as "lesser than" other characters). These definitions are consistent with examples of weight bias in media identified in previous research.²⁵

Coding Tool

Raters used a coding tool, developed by the team for the previous study,¹⁸ to electronically document the presence of any of the specified variables seen in each 10-minute segment. This tool, which was written in Perl and Java and was hosted online, functioned like a checklist. As raters watched the movie, they used the tool in real-time to note a variable's on-screen presence during the current segment. The tool also provided a text box for raters to record any qualitative comments or observations and prompted raters to subjectively rate the segment as "healthy," "unhealthy," or "neutral." At the end of a 10-minute segment, the tool prompted the rater to submit the coding data for the segment and then presented a new coding page

for the next 10-minute segment. Data were automatically stored in a secured PostgreSQL database server and later exported to a spreadsheet to prepare for data analysis.

Analysis

To confirm the viability of the coding scheme and address any coding difficulties, 3 raters instructed in the use of the coding scheme independently viewed and coded the same movie. Raters met to discuss the coding process, and after verification of the coding scheme and tool, movies were randomly assigned to raters to reduce any personal selection bias. Ten movies (32%) were coded by multiple raters, and Cohen's κ test of agreement among raters was assessed to examine interrater reliability. By using Stata (Stata Corp, College Station, TX), we analyzed the data in 2 different contexts: (1) "movies," considering the entire movie as 1 discrete unit, and (2) "segments," considering each 10-minute segment as 1 discrete unit.

RESULTS

Thirty-one movies met the inclusion criteria for the study. Twenty-four movies were animated (77%), 6 (19%) included some element of live action, and 1 (3%) did not include any computer-generated characters. Additional descriptive information about the movies coded can be found in Table 2. Participants had seen a mean of 17.7 (SD = 6.4) of the movies included in the current study, with 65% of the sample having seen more than 15 of the movies and 13% of the sample having seen more than 25 movies.

The result of Cohen's κ test of agreement among 3 raters for binary responses was 0.65, which is considered substantial agreement. Coding the 31 movies in 10-minute segments resulted in a total of 302 coded segments. For those segments coded by more than 1 rater, we

TABLE 2 Descriptive Characteristics of Movies Coded

Movie Characteristic	Data
Year released, % (<i>n</i>)	
2012	23 (7)
2013	32 (10)
2014	29 (9)
2015	16 (5)
MPAA rating, % (<i>n</i>)	
G ^a	6 (2)
PG ^b	94 (29)
Domestic box-office revenue ^c	
Range, \$ (millions)	71.0–400.7
Median, \$ (millions)	177.0
Mean (SD), \$ (millions)	182.1 (84.9)
Sum total, \$ (billions)	5.6

^a An MPAA G rating signifies that the film is intended for general audiences and that all ages can be admitted.

^b An MPAA PG rating signifies that parental guidance is suggested and that some material may not be suitable for children.

^c The range, median, and mean (SD) represent domestic box-office revenue per individual movie. The sum total represents the domestic gross box-office revenue for all 31 movies included in the study.

TABLE 3 Proportion of Coded Movies (*n* = 31) and Segments (*n* = 302) in Which Each Coded Variable Was Observed

	Movies, % (<i>n</i>)	10-Minute Segments, % (<i>n</i>)
Food or drink		
Unhealthy food	87 (27)	42 (128)
Fruit and/or vegetable	77 (24)	33 (101)
Exaggerated portion size	71 (22)	29 (88)
Sugar-sweetened beverage	61 (19)	24 (72)
Fast food	19 (6)	5 (15)
Branded food	10 (3)	3 (8)
Eating when not seated at table	74 (23)	22 (66)
Eating with screen on	10 (3)	1 (3)
Screen on and actively in use ^a	68 (21)	38 (114)
Screen on but not being watched ^b	48 (15)	19 (58)
Exercise portrayed negatively	29 (9)	4 (12)
Weight stigma	84 (26)	30 (90)

^a “Screen on and actively in use” denotes an instance of present screen media in which a character is actively engaging with the screen media depicted (ie, the character is shown watching the television screen, using the computer, or playing a video game).

^b “Screen on but not being watched” denotes the presence, but not the active use, of screen media (eg, a television screen is on while the character is in the room, but the character is not intentionally watching it).

considered a segment as containing the specified content as long as 1 rater indicated its presence.

In Table 3, we show the proportion of movies and segments in which the raters observed each of the coded variables. The most common food and beverage items observed on-screen were unhealthy and nutrient-poor, although fruits and vegetables were also commonly present in movies. Movies and segments featured both passive and active screen use by characters. Characters were commonly shown eating meals and snacks away

from a table setting, and they were rarely shown eating while watching television or using other screens. The majority of movies included examples of weight stigma; most were examples of stigma associated with overweight or obesity, although there were some instances of stigma associated with low body weight.

In addition to providing quantitative findings regarding the prevalence of obesogenic content, the raters provided qualitative comments that offered insight into the context of the depiction of certain foods. For example, fruits and vegetables were

in the majority of the movies, but they were not always portrayed in a positive way. The movie *Inside Out* included a scene in which a father is trying to feed a child broccoli for the first time, and the child knocks the bowl of broccoli off the table. The father threatens to not give the child dessert because of her refusal of the broccoli, which then causes the character representing the internal emotion of anger to prompt the child to scream.

Qualitative observations and comments from coders also revealed that a large portion of content, particularly regarding stigma, is contextual, with messages conveyed through the visuals rather than through overt comments and observable behaviors. In *The SpongeBob Movie: Sponge Out of Water*, for example, there is a starfish character (Patrick) who appears to have obesity. Patrick appears lazy and unintelligent, fulfilling the stereotypical and stigmatizing qualities often ascribed to individuals with obesity.²⁵ Characters in the movie, himself included, often verbally and pictorially point out his size and his gluttony. On other occasions, the stigma is more visual in nature; in 1 scene, for example, a key bounces in slow motion down a sleeping Patrick’s stomach and lodges in his bellybutton, while other characters gasp and observe with wide eyes. There is no verbal exchange that explicitly refers to Patrick’s weight, but the imagery clearly conveys a negative message about it. At other times, the imagery is much subtler and covert; in 1 scene, viewers are shown a panoramic view of the inside of the burger restaurant while hearing a voice-over. The viewer can see the patrons of the restaurant eating, and at 1 point, 2 fish are portrayed anthropomorphically as conventionally attractive patrons staring lovingly into each other’s eyes while splitting a burger. In the

TABLE 4 Examples of Free-Text Comments and Observations Made by Raters While Coding Movies

Movie	Comments and Observations While Coding
<i>Big Hero 6</i>	Idea that looking overweight is the main problem, rather than physical health
<i>Cinderella</i> (2015)	Woman running a bakery is overweight and stinks in an unpleasant way
<i>How to Train Your Dragon 2</i>	Throughout the movie, there was a constant idea that larger men and dragons were lethargic and less skilled.
<i>Ice Age: Continental Drift</i>	Granny: “Hey, fats, get me out of here”; “Pretend I’m a dessert; that should motivate you.”
<i>Monsters University</i>	Looking good is the reason for working out.
<i>Rio 2</i>	The child with overweight says that she smelled chicken, and then shortly after that, she was shown squirting whipped cream on the pancakes; seems to be food-motivated.
<i>The SpongeBob Movie: Sponge Out of Water</i>	Patrick [a character with overweight] whines about feet hurting and walking; Patrick is frequently depicted as being stupid and lazy.
<i>The Croods</i>	Man with overweight is the only exasperated character after running; an important quotation was “food fixes everything.”
<i>Dr Seuss’ The Lorax</i>	Overweight bear is eating sticks of butter inside the fridge; the Lorax calls the main character (who is lean) “Beanpole” [example of underweight-related name-calling, but, in contrast, without the negative connotation or negative context that typically accompanies overweight/obesity-related name-calling].
<i>The Smurfs 2</i>	This segment showed a large cake and a heavier Smurf, Greedy, who was immediately blamed for the missing piece of the cake before being seen with frosting all over his face.

background, an unattractive fish with a large belly is sitting alone. As he goes to take a bite of his burger, the chair underneath him breaks, stigmatizing his weight even in the low-gravity environment of the underwater world.

In Table 4, we present additional examples of qualitative observations and comments recorded by raters to describe the weight-based stigma observed.

DISCUSSION

Recent popular children’s movies contain a variety of obesogenic content, such as screen use by the characters, sugar-sweetened beverages, and exaggerated portion sizes. All 31 movies in the current study, which were released between 2012 and 2015, contained at least 1 segment in which obesity-promoting behaviors or obesogenic food or beverage items were observed. Furthermore, these behaviors and items had recurring appearances on-screen and were not isolated instances; in the majority of movies examined, many scenes throughout the entire movie included this type of content.

Our findings are similar to those discovered by our team in an earlier study of 20 movies released from 2006 to 2010,¹⁸ although the

TABLE 5 Percentage Change in the Proportion of Coded Movies and Segments Showing Each Variable Listed

Variable	Movies, %	Segments, %
Unhealthy food	+12	+15
Exaggerated portion size	+11	+16
Sugar-sweetened beverage	+6	+14
Fast food	+4	+3
Branded food	−15	−4
Weight stigma	+4	+5

The percentage change is in comparison with our earlier article on movies released from 2006 to 2010: Throop EM, Skinner AC, Perrin AJ, Steiner MJ, Odulana A, Perrin EM. Pass the popcorn: “obesogenic” behaviors and stigma in children’s movies. *Obesity (Silver Spring)*. 2014;22(7):1694–1700.

proportion of movies and scenes featuring some of the variables examined (namely unhealthy foods, sugar-sweetened beverages, fast food, and weight stigma) appears to have increased over the past decade. Interestingly, the prevalence of branded foods appears to have decreased. This can be seen in Table 5, wherein we show the absolute percentage change in the proportion of segments and movies in which the behaviors were observed. Because of the differences in sampling between the 2 studies, it is not possible to statistically compare them.

The authors of previous research have found that parent- and child-directed television advertisements for children’s food products frequently market food that is low in nutritional quality.^{26–29} Although most researchers in this field have examined television advertisements shown during children’s

programming, the limited extant research on food content depicted in children’s programming, itself, also reveals that the depiction of healthy foods is rare and that nutrient-poor foods are more commonly shown.^{30,31} Although we found that fruits or vegetables were observed on-screen in the majority of movies and in a third of segments through our study of children’s movie content, both the number of movies and number of segments featuring fruits and vegetables were outnumbered by those featuring unhealthy foods. Interestingly, this phenomenon is not limited to screen media; content analyses of popular children’s books have also found nutrient-poor foods to be commonly featured.^{32,33}

Perhaps a more concerning finding noted in studies in which both print and screen media are examined is that the context in which various foods are shown does not necessarily

reflect the nutritional quality of the food.^{27,31–33} For example, nutrient-poor foods are often presented with a positive affect or are associated with a positive outcome, like a character eating ice cream to feel better or to celebrate.³³ Much like the content analyses of foods in children's picture books and advertisements, we observed in our study that, in general, foods low in nutrients were commonly shown with positive messages, whereas healthy foods were often shown as having either a neutral or negative connotation. However, in the current study, we noted that it is not just a mere count of instances that is important; context and specific behaviors are also critical. Further research in which these positive and negative valences are explored in depth, rather than being explored with a reliance on real-time, write-in observations, is warranted.

The visual context of various eating- and weight-related messages will be important to consider when exploring the mechanisms by which these messages might impact behaviors and attitudes. Practitioners of social cognitive theory posit that observational learning, not only from peers but also from the media, plays a strong role in a child's behavior.³⁴ Children are likely to model the behaviors of other children their age or older,³⁴ which suggests that they may learn from movie characters and imitate the eating behaviors they see on-screen if they see the characters as representations of themselves and their peers. Additionally, the abundance of stigmatizing portrayals of obesity in movies, television programming, advertising, and news media^{18,25,35} may serve as cues or models for children's weight-related attitudes.

Also central to social cognitive theory are outcome expectations,³⁴ which may form on the basis of the incentives and consequences shown in connection to each of the actions

performed by a character. Just as movies rarely show the consequences of unsafe behaviors that can result in serious injury,³⁶ children's movies rarely show the consequences of unhealthy eating.¹⁸ Movies seldom portray the potential for obesity (and its comorbidities) should the child mimic characters' obesogenic behaviors, which may be problematic if such behaviors are shown in a context that leads children to not expect any negative impact or harmful health outcomes as a result of engaging in such behaviors.

Our study is has some limitations. We coded only 31 movies that were released over a 4-year period, all of which had an Motion Picture Association of America (MPAA) rating of G or PG. Because all of the movies coded were in the 10 top-grossing G- and PG-rated movies for the year of their release, findings may not be representative of movies that did not generate as much domestic box-office revenue. However, because these movies represented box-office success, the messages are likely reaching the most children. Because our study was limited to G- and PG-rated movies, findings may not be representative of PG13- and R-rated movies, nor may they be generalizable to television programs or other entertainment media.

Another limitation of this particular study is that we did not investigate how children interpret these messages. Although research on media messages in other health-related domains, such as tobacco and alcohol use, has shown that movies influence behaviors, we can only speculate on the impact of messages related to obesity at this time. Early findings from our larger study revealed that participants who watched a movie containing a substantial amount of product placement and obesogenic content were more likely to select the most-featured snack item, which was high in calories and low in nutrition,

than those who watched the movie that featured little product placement and obesogenic content.²¹ Understanding the context and content of the eating- and weight-related messages on-screen, as we have in the current study, is an important step in learning how those messages might lead to children's adoption of certain eating habits or attitudes related to weight and body size, how they impact children's immediate behaviors (as explored in our study), and how they impact children's long-term behaviors.

Future researchers would be wise to examine the extent to which children may model their eating or bullying patterns after the characters in movies and how the messages surrounding characters' eating patterns may influence children's expectations of health outcomes. In particular, differences between the influence of human versus nonhuman characters on children's beliefs and behaviors should be examined. In further studies, researchers should also investigate how stigmatizing portrayals of obesity may impact children's weight-related attitudes, because stigmatizing depictions of adults with obesity have been shown to impact adults' attitudes and increase their weight bias.^{37,38} Although the results from our larger study reveal that children exhibit implicit weight bias toward similarly-aged peers with overweight or obesity when these conditions are depicted in a neutral or nonstigmatizing manner,²² no research has been conducted, to our knowledge, to explore the effects of viewing stigmatizing images of children with obesity.

CONCLUSIONS

Children are exposed to many obesogenic and weight-stigmatizing messages while watching

top-grossing movies directed at child audiences. These messages can be conflicting in nature, as in depictions of nutritious and healthy foods in a negative or undesirable context. Obesogenic messages extend beyond the simple depiction of foods on-screen, because characters in movies are also shown watching screens, avoiding exercise, and engaging in other unhealthy behaviors. Obesogenic and stigmatizing messages are often communicated via verbal dialogue among characters, as well as through visual context and imagery. As obesogenic and stigmatizing content in children's movies continues to

appear, and in apparently greater quantities, additional research should be conducted to investigate the influence of such content on children's attitudes and behaviors related to health, weight, eating, and activity, as well as to investigate trends over time. In the process, perhaps the mechanisms driving the relationship between screen time and obesity will be uncovered. In the meantime, it is important for parents and pediatricians to be aware of the cultural milieu of children and to provide active and conscious messaging endorsing healthy behaviors consistent with the adoption of good habits that can last a lifetime.

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ABBREVIATION

MPAA: Motion Picture Association of America

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