

# Marketing Sugary Cereals to Children in the Digital Age: A Content Analysis of 17 Child-Targeted Websites

ANDREW D. CHEYNE, LORI DORFMAN,  
AND ELIANA BUKOFZER

Berkeley Media Studies Group, Berkeley, California, USA

JENNIFER L. HARRIS

Yale Rudd Center for Obesity and Food Policy,  
New Haven, Connecticut, USA

*The Institute of Medicine has warned of the harm of food marketing to children from television to new media channels such as the Internet. The authors identified and analyzed the techniques used to engage children on websites from cereal companies—the third largest food marketer to children. The authors found that top breakfast cereal manufacturers maintain child-oriented websites, using strategies unique to the Internet to capture and maintain children’s attention. These include branded engagement techniques such as advergames, videos, site registration, and viral marketing, including inviting friends to join the site. The authors found 3 progressive levels of telepresence on child-targeted cereal websites: sites with more than 1 engaging feature, multiple techniques present on individual pages, and the construction of a virtual world. Using Internet traffic data, the authors confirm that these techniques work: cereal marketers reach children online with lengthier and more sophisticated engagements than are possible with traditional, passive media such as television advertisements or product packaging. Despite the cereal manufacturer’s self-regulatory pledge to improve their marketing to children, their marketing practices exploit children’s susceptibility to advertising by almost exclusively promoting high-sugar cereals using deeply engaging techniques.*

Breakfast cereals are a large part of American children’s diets. Ready-to-eat cereals are found in more than 90% of all U.S. households (“Cereal breakfast foods,” 2010). On average, children younger than 18 years of age consume cereal 3.76 times per week (Albertson et al., 2008). According to the Federal Trade Commission (2008a), cereals are the largest packaged food marketer to children; in 2006, breakfast cereal

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Address correspondence to Andrew D. Cheyne, Berkeley Media Studies Group, 2130 Center Street, Berkeley, CA 94704, USA. E-mail: cheyne@bmsg.org

manufacturers spent \$229 million on promotions targeting children 2–11 years of age. Although most food and beverage marketing expenditures were for traditional measured media such as television, this marketing—including of breakfast cereals—is increasingly occurring through new media channels such as the Internet (Federal Trade Commission, 2008a; Harris, Schwartz, & Brownell, 2009). The Institute of Medicine (2005) report on food marketing to children specifically cited the need for new research on marketing methods besides television.

Food and beverage marketing to children is dominated by ads for products that children should avoid (Institute of Medicine, 2005). Such marketing influences children's and adolescents' food preferences and purchasing requests, and dietary intake, and it contributes to the high rates of overweight and obesity observed in American children and adolescents, ages 2 to 19 years (Institute of Medicine, 2005; Ogden, Carroll, & Flegal, 2008).

As food marketing and its effects received increasing scrutiny, in 2007 the Council of Better Business Bureaus responded with a self-regulation effort, the Children's Food and Beverage Advertising Initiative (Council of Better Business Bureaus, 2008). Each manufacturer who elected to participate created its own standards and pledged to promote healthier foods in its marketing to children. In 2007, cereal manufacturers Kellogg's and General Mills' pledges applied to products with 12 or fewer grams of sugar per serving; Post joined in 2009 and pledged an 11-gram-per-serving limit on products marketed to children (Council of Better Business Bureaus, 2010). During the 2007 baseline year of the pledges, the less nutritious a cereal was, the greater likelihood it was marketed to children (Schwartz et al., 2010). Despite these pledges, the nutritional quality of foods marketed to children on television predominantly failed U.S. Department of Agriculture guidelines, and has not improved with the pledges (Kunkel, McKinley, & Wright, 2009).

In 2009, Children's Food and Beverage Advertising Initiative companies extended their pledges to include their online marketing. Their online marketing, however, has not been independently evaluated.

The objective of this study was (a) to identify, describe, and analyze Internet marketing of branded breakfast cereals on websites targeting children; and (b) to assess cereal manufacturers' Internet advertising practices in light of their pledges to market healthful cereals to children online.

### **The Growing Importance of Digital Marketing of Food and Beverages to Children**

From a public health perspective, the trend toward advertising food and beverages to children online has significance for several reasons. First, the digital medium offers marketers new opportunities to reach children. Children's television, for example, is required by the Federal Communications Commission (among other regulations) to limit commercials to no more than 12 min each hour (Federal Communications Commission, 2011), while there are no limits to children's advertising exposure online (Moore & Rideout, 2007).

Against this regulatory vacuum, children are going online in greater numbers, and for longer periods of time. The 16 million children 2–11 years of age who are now online comprise 9.5% of the active U.S. Internet population (NielsenWire, 2009). Of American youth, 84% have Internet access at home, and young people between 8 and 18 years of age spend on average 89 min using computers for entertainment purposes

(e.g., non-schoolwork) daily (Rideout et al., 2010). Enabled by the availability of high-speed broadband Internet access to 81.8% of U.S. Internet users (WebSiteOptimization.com, 2007), food and beverage manufacturers are freed from the 30-second format of television commercials, and can design websites to encourage interactive, extended, and playful interactions with their brands (Linn & Novostat, 2008).

Food and beverage websites deliver branded content to young people through “immersive environments” (Montgomery & Chester, 2009) that include a variety of multimedia features. Advergaming is online video games that weave messages about the branded product into the game experience (Lee, Choi, Quilliam, & Cole, 2009; Moore, 2006; Moore & Rideout, 2007; Weber, Story, & Harnack, 2006). Food and beverage marketers also use cross-promotions, or agreements to promote other companies’ products, which connect characters movies or television shows to the food product (Harris et al., 2009; Weber et al., 2006). Cross-promotions are especially prevalent in child-targeted marketing, as they comprise 24.6% of cereal marketing directed to children (Federal Trade Commission, 2008a).

Advertising online also affords marketers the chance to amass information about children in ways impossible through television marketing. For example, marketers collect data using cookies, or electronic files placed on users’ computers that track their online behavior (Adroll, 2010). Children’s information is also collected through registration forms in which children offer their email addresses, preferences, and/or other personal information (Hallerman, 2008). Viral marketing techniques, such as encouraging children to email their friends an invitation to the site, extend such data gathering to include the child’s social networks as well (Montgomery & Chester, 2009). Because these practices concern parents and policymakers, the federal Children’s Online Privacy Protection Act requires marketers to receive “verifiable parental consent” before collecting information from children under 13 years old (Federal Trade Commission, 2008b).

Because the techniques are integrated throughout the website, when compared with traditional measured media, online food and beverage marketing presents a “greater challenge to children up to and including the age of 12 [years] to perceive the presence and intent of commercial messages” (Brady, Farrell, Wong, & Mendelson, 2008, p. 6). The branded messages embedded in advergaming blur the boundary between content and marketing while encouraging consumption of unhealthful foods and beverages (Montgomery & Chester, 2009; Moore, 2006).

Similarly, online games establish positive brand associations with players and increase user’s intent to purchase that product (Double Fusion, 2007). A Canadian survey found that more than 70% of children who played advergaming consider them to be just games, not advertisements (Taylor, 2001). Under experimental conditions, 46% of a sample of Australian children understood the persuasive intent of a cereal advergaming—but only 25% could identify the branded aspect of the game (Mallinckrodt & Mizerski, 2007).

While most of the research evaluating the effectiveness of advertising has focused on television (Livingstone, 2005), a growing body of research confirms that online marketing is also successful. Under experimental conditions, exposure to brands online has been shown to create favorable associations with viewers (Yoo, 2008). Interactive advertising research has found that the efficacy of online marketing is determined by its *telepresence*, or the ability to make the user feel as though he or she is in the online environment (Hoffman & Novak, 1996; Steuer, 1992). The telepresence of online content is determined by its *interactivity*, how much users can

modify the content; and *vividness*, how much the content appeals to the user's senses (Voorveld, Neijens, & Smit, 2009, 2010).

This literature illustrates that greater levels of telepresence improve the viewer's recall and favorability of the brands they are exposed to (Coyle & Thorson, 2001; Klein, 2003; Voorveld et al., 2010). Keng and Lin (2006) tested three levels of telepresence for online marketing. The most basic, *content presence*, is associated with websites that provide effective but simple presentations of products online. *Social presence* uses technologies such as Flash animation to create two-dimensional renderings of the product, music to appeal to users' auditory senses, and features to share the experience with others. *Personal presence* includes both of the previous levels but also "can create individual experience for product use" (Keng & Lin, 2006, p. 86) such as by allowing the user to control the content to craft a personalized experience.

Scholars have examined the content of websites targeting children representing sites promoting the top food and beverage brands (Alvy & Calvert, 2008; Story & French, 2004; Weber et al., 2006), and those most popular with children (Lingas, Dorfman, & Bukofzer, 2009). Confirming the Institute of Medicine's (2005) findings on television marketing, these studies have found that the foods and beverages marketed on these sites are foods high in fat, sugar, and salt.

Levels of telepresence have not yet been tested on children's processing of online advertising. Experimental research, however, has found that advergames that produce greater involvement among children also evoke more positive affective responses toward brands promoted in the games (Rozendaal, Lapierre, Van Reijmersdal, & Buijzen, 2011). It is important to note that even children who were aware of the games' persuasive intent still displayed more positive attitudes toward the brand, meaning that this knowledge was not a defense against the commercial purpose of the game (Rozendaal et al., 2011).

## Research Questions

Although the cereal industry is the third largest food marketer to children, no studies have comprehensively examined the digital techniques used by breakfast cereal manufacturers to target children online. Therefore, we initially want to establish the landscape of cereal marketing to children online.

Research Question 1: Which cereals do manufacturers promote online, and do cereal companies use engagement techniques used by other food marketers?

We next assess the content on these sites, informed by the interactive advertising literature to ask whether these sites can be grouped into progressively more immersive branded environments.

Research Question 2: Are there different levels of immersion on breakfast cereal websites that target children?

Last, using the levels of immersion developed in Research Question 2, we asked whether there are significant differences in the exposure of young people to highly immersive cereal websites as compared to those sites with less sophisticated content.

Research Question 3: How effective are these sites' engagement techniques? Do children spend more time on sites with higher levels of immersion?

## Method

### *Sample Selection*

To systematically assess the content on child-directed cereal websites, we began with a list of 26 branded websites generated from all cereals available at a major grocery store chain between October 2008 and March 2009 (Harris et al., 2009). We focus on brands in this research because online exposure to brands has been shown to induce favorable associations with viewers (Yoo, 2008), and children in particular are “brand-oriented in their request behavior” (O’Cass & Clarke, 2002, p. 37; Hite & Hite, 1995).

We defined a website as all pages containing the same stem URL. For example, if the site under review is Millsberry.com, then all pages containing the stem, Millsberry.com/\_\_\_\_ are secondary pages contained within the site. Each site has only one homepage but can have many secondary pages. See Table 1 for the complete list of sites.

We eliminated all branded cereal sites not targeting children directly. We categorized a website as not targeting children if it predominantly had instructions for mothers, contained only recipes, had no games, had little to no graphical content, or a combination of these. For example, CapnCrunch.com, although colorful, was determined not to be a child-directed website because it contained messages addressed to parents (e.g., “Help your family live a healthful lifestyle”), had product information but no games, had no flash animation, and had photographs of children with their mother. These criteria similarly meant that some pages within a site were directed at adults and were thus not included in the analysis.

During March 2009, we collected all of the child-targeted pages on each cereal website. We recorded a page as a video if there was movement on the page or an activity on the page required clicking the mouse; we recorded it as a PDF if the page was static.

### *Coding Procedure*

We developed coding criteria for online marketing techniques based in part on previous analyses of children’s websites (Lingas et al., 2009; Moore, 2006), digital marketing techniques (Chester & Montgomery, 2007), and online advergames (Lee et al., 2009; Moore & Rideout, 2007). We added further criteria from our initial exploration of the websites under study, and from an analogous content analysis of breakfast cereal television advertisements (Harris et al., 2009). On each site, we coded (a) the included features (e.g., games, videos, quizzes); (b) the branding present (e.g., spokes-characters, the product’s package); (c) how the product is represented; and (d) claims made on the site (e.g., about eating a healthful breakfast, the product itself).

When we identified a branded cereal, we assessed the product’s nutritional content. We then compared that information to the Institute of Medicine’s (2007) standards that competitive foods in schools (foods sold outside of school lunch programs) should have no more than 35% of calories from sugar. This standard serves as a proxy for identifying healthful foods because it identifies which foods should be avoided and which could be consumed without restriction in school settings.

We assessed the telepresence on each site by adapting the levels of telepresence found in Keng and Lin (2006) to create three groupings of low, medium, or high immersion. Informed by this scholarship, we predict each feature at each level of immersion on child-targeted websites in Table 2.

**Table 1** Nutritional content, pages, and interactive features of child-targeted websites (n = 452), and visitors to those site

Website	Calories from sugar (%)**	Interactive features					Traffic data*				
		Total pages on site	Pages with games (%)	Pages with video (%)	Pages with promotions (%)	Pages with information gathering and personalization (%)	Average unique visitors ages 2–11***	Average unique visitors ages 12–17***	Average visits per visitor	Average pages per visitor	Average minutes per visit
Apple Jacks	44	13	46	38	—	8	44,700	32,400	1	—	3
Cheerios	4	4	—	—	—	50	14,700	9,400	1	—	2
Chex	10	4	—	—	75	50	5,900	11,300	1	—	3
Choose Breakfast	N/A	9	—	33	—	11	—	—	—	—	—
Cocoa Puffs	44	4	50	25	—	—	—	—	—	—	—
Cookie Crisp	40	2	50	—	—	—	11,800	8,000	1	—	1
Corn Pops	44	1	100	—	—	100	21,400	11,100	1	—	2
Froot Loops	44	31	42	32	29	3	42,700	17,200	1	—	2
Frosted Flakes	40	20	5	10	20	20	12,100	5,200	1	—	3

Frosted Mini Wheats	24	15	7	13	—	27	—	—	—	—	—
Honeycomb	<b>33</b>	9	11	78	—	11	—	—	—	—	—
Honey Nut Cheerios	<b>33</b>	5	60	—	—	60	—	—	—	—	—
Lucky Charms	<b>40</b>	24	71	42	21	71	—	—	—	—	—
Millsberry	N/A	167	17	3	2	24	386,800	380,200	3	103	24
Postopia	N/A	112	74	—	100	71	154,400	110,300	2	44	15
Reeses Puffs	<b>40</b>	10	20	—	30	100	27,000	17,700	1	20	4
Trix	<b>40</b>	22	27	5	36	73	—	—	—	—	—
Average			37	10	30	40					

\*Source: comScore Media Metrix Key Measures Report (January 2008–March 2009).

\*\*The Institute Of Medicine's 2007 report on school nutrition standards for foods served to children stipulated that no more than 35% of calories should come from sugar. Bold values in this row indicate that the cereal promoted on the website had more sugar than allowed by the Institute Of Medicine's standard. N/A = nutritional content could not be assessed on sites that promoted more than one cereal.

\*\*\*This measure was calculated by adding total unique visitors reported each month from January 2008 through March 2009 for each demographic group divided by the number of months for which these data were available for each website (comScore, 2009, Media Metrix Suite: [http://comscore.com/About\\_comScore/Methodology/Media\\_Metrix\\_360\\_Hybrid\\_Measurement](http://comscore.com/About_comScore/Methodology/Media_Metrix_360_Hybrid_Measurement)). Data are missing either because there were not enough visitors among the comScore panel to extrapolate population-level traffic or because there was not a unique URL and thus traffic to the site was not independent of the parent site (e.g., [www.sillyrabbit.millsberry.com](http://www.sillyrabbit.millsberry.com)).

**Table 2** Expected features of child-targeted cereal websites, by level of immersion

	Low	Medium	High
Number of pages	Few, possibly 1	Multiple	Many; designed for repeat visits
Engagement features: games, video, promotions	Few to none	Yes	Yes
Information gathering and personalization techniques: site registration, content sharing, customizable content, avatar creation, virtual world	Few to none	Yes; fosters social experience	Yes; integrated into personalized site experience

### *Reliability Assessment*

Two coders tested the coding instrument on two child-oriented food but noncereal websites (MySlurp.com and FruitGushers.com), after which we refined the instrument to address discrepancies. The two coders then coded two websites included in this study (FrootLoops.com and LuckyCharms.com), and final changes were made to the coding instrument to clarify unclear categories. These coders finally assessed the content of all websites under consideration. Using Scott's pi intercoder reliability statistic, our agreement ranged between .79 and 1.

### *Statistical Analysis*

We conducted an analysis of variance test to assess the difference between the levels of immersion of each site. The means of each group were calculated and their variance tested on the number of pages, engagement features, and information gathering techniques.

We obtained data on exposure to these websites from the comScore Media Metrix Key Measures Report to determine the duration of child traffic on sugary cereal websites (comScore, 2010a). comScore collects data at the household and individual level using Session Assignment Technology, which can identify computer users without requiring them to log in (comScore, 2009). comScore does not collect any personally identifiable information from panel members. comScore uses these panel data to extrapolate the findings to the total population. Its Media Metrix database provides Internet exposure data by month for any websites visited by at least 30 of their panel members in a given month (comScore, 2010b). If the number of panel visitors is large enough in a given month, comScore also provides an estimate of total unique visitors in the United States, visits per month,<sup>1</sup> minutes spent on the website per visit and pages viewed. Media Metrix provides exposure information by visitor age for larger volume websites.

## **Results**

### *Child-Targeted Cereal Web Sites Promote Highly Sugared Products*

We identified 17 branded cereal websites that target children (Table 1); of those, 14 were for a single branded cereal, two included multiple cereal brands from a

<sup>1</sup>The data used for visits per month is comScore Media Metrix Key Measures Report's data for the measure: Average Visits per Visitor.



single manufacturer (millsberry.com, postopia.com), and one (General Mills' choosebreakfast.com) promoted no specific products.

We found 452 unique, child-oriented pages on these 17 cereal websites. Two-thirds of the cereals promoted on these sites are among the top nine selling brands, and include several products produced by three of the four main cereal manufacturers: General Mills, Kellogg's, and Post (*Market Share Reporter*, 2007). All of the cereals from participating manufacturers promoted on websites analyzed in this study met their respective Children's Food and Beverage Advertising Initiative pledges to only market cereals with no more than 12 grams of sugar per serving to children.<sup>2</sup> Yet, the majority of the cereals were unhealthful by other nutritional standards; of the 14 sites that promoted a single product, 64% failed the Institute of Medicine's (2007) guideline for competitive school foods.

### ***Research Question 1: Engaging Children With Cereal Brands Online***

Research Question 1 asked whether cereal websites that target children use the engagement techniques used by other food marketers. Branded cereal websites use a variety of techniques to engage children by encouraging interaction with and prolonged exposure to the website's content.

#### *Games and Advergames*

We found 165 games on 82% of the sites (Table 1). These games were rich with features to entice children to spend extended time on the site, averaging more than four features per game, including music, invitations to play again, game scores, and recommendations to play other games. 67% were advergames. All sites that had games, except Frosted Flakes, which had advergames. These included, on average, almost four instances of branding per game (401/109), such as logos (99%), the food item itself (77%), product packaging (41%), or a branded spokes-character (e.g., Toucan Sam for Froot Loops; 41%).

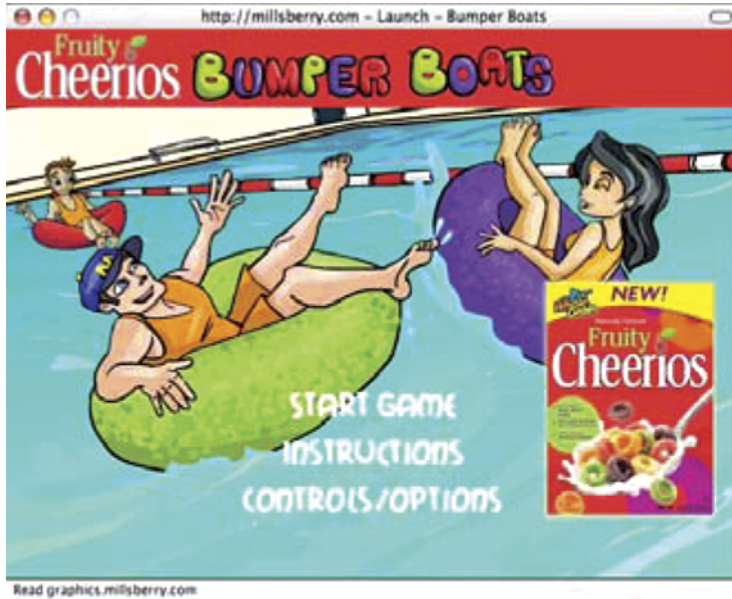
Of the 99 advergames that depicted food items, 88% went beyond displaying the product to use the cereal as more than food. This was accomplished by incorporating the cereal into the game as a piece of equipment or as an object used in the game. For example, in Millsberry.com's Fruity Cheerios Bumper Boats game, the characters ride Fruity Cheerios pieces and try to score points by bumping other players outside of the play space (Figure 1).

#### *Videos*

We found 52 videos on 10% of pages across these sites, including 10 TV commercials and 35 *webisodes*, which are animated serials that typically depicted branded spokes-characters. Webisodes are designed to create extended brand engagements, as they tell a story about the cereal and its spokes-characters, at times creating suspense to entice children to watch the next video by cutting off during the middle of a scene.

The video content on these websites was saturated with brand-promoting features. Spokes-characters appeared in 79% of videos, branded food items appeared in 67%, product packages in 44%, and brand logos appeared in 4%.

<sup>2</sup>Current pledges can be found at <http://www.bbb.org/us/children-food-beverage-advertising-initiative>.



**FIGURE 1** Millsberry.com's Fruity Cheerios Bumper Boats game launch page. (Color figure available online.)

#### *Promotions*

Of websites, 24% included online cross-promotions, 12% had licensed characters, and 12% had sweepstakes for online prizes. Cross-promoted brands included, for instance, a poll on the Chex site asking children vote for their favorite NASCAR driver (Figure 2). Postopia.com had the most online third-party promotions, as all 112 pages included Flintstones characters promoting Fruity or Cocoa Pebbles.<sup>3</sup>

Offline promotions enticed children visiting the site to purchase a product offline. Six sites included an incentive to purchase the cereal by requiring a code from a product package to gain access to otherwise restricted content on the website. Of websites, 12% included offline prizes from online sweepstakes such as the chance to win a vacation to Six Flags Discovery Kingdom.

#### *Information Gathering and Personalization Techniques*

Of websites, 29% included polls and/or quizzes to survey children about their personal preferences. These included brand-oriented questions, such as a poll on Apple-Jacks.com that asked children what they thought spokes-character CinnaMon was missing about his home while he traveled to New York City. Of websites, 18% offered children the opportunity to register: in exchange for offering personal information (e.g., child's birth date or age, gender, location, or e-mail address), the child could gain access to members-only content, such as the ability to send messages to other members. Millsberry.com further integrated registration with the ability to purchase items online. The site required children to register to earn Millsbucks by playing games on the site, which could then be used to purchase online products, including

<sup>3</sup>Although the Flintstones often acted as spokes-characters for the Fruity or Cocoa Pebbles cereals, they were coded as licensed characters because their existence on the animated television series precedes the development of those branded cereal products.

### Chex Most Popular Driver Registration

Please register to vote! And remember... you can only vote once per day, so please come back daily to vote for your favorite driver. You must be at least 13 years of age to participate.

**NOTE: Your password must be at least 7 characters!**

First Name:

Last Name:

ZIP Code:

Email Address:

Confirm Email:

Password:

Confirm Password:

Birthdate:  [Select Date](#)  
 ex. 05/21/1980

2009 NASCAR NMPA Chex® Most Popular Driver Award



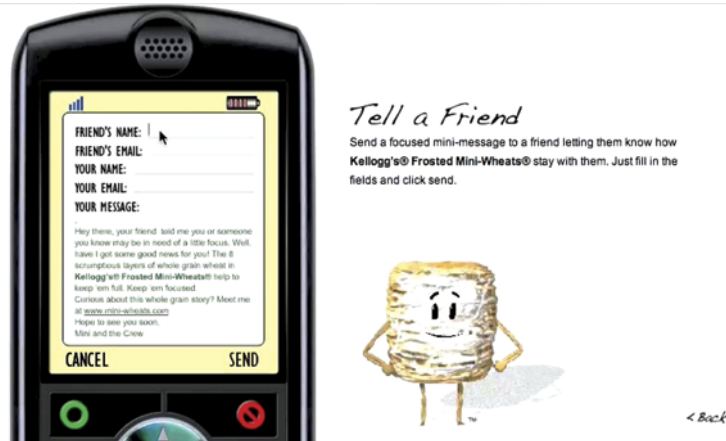
**FIGURE 2** Registration page for Chex site’s “Most Popular Driver” poll. (Color figure available online.)

branded cereals. Of these sites, only Postopia asked—but did not require—a child to obtain parental approval before registering.

We also found techniques designed to extend the branded experience by either encouraging children’s engagement with the brand offline, or spreading that engagement to their friends using viral marketing strategies. Of websites, 53% included invitations to share the online experience with child’s friends. The Frosted Mini-Wheats’ website encourages children to “Tell a Friend” about the cereal. The page includes a picture of a cellular phone, giving it the appearance of a text message, and asks the child to input his or her own, and friend’s, name and email address (Figure 3). Millsberry.com offered registered site users a place to directly communicate with other registered users. Of websites, 47% offered desktop wallpapers or screensavers to be downloaded to children’s computers. Froot Loops, for example, offers wallpapers featuring Toucan Sam, his family, and the branded cereal (Figure 4). This download was connected with incentives to consume the product, as the child was required to enter a code from a Froot Loops cereal box (see the image’s lower right corner) to access the downloads.

#### ***Research Question 2: Differences in the Level of Immersion on the Sites***

Research Question 2 asked whether the variation in the amount of pages, engagement features (games, videos, and promotions), and information gathering and personalization



**FIGURE 3** Kellogg's "Tell a Friend" function, which uses the appearance of a text message to encourage children to send friends a message about Frosted Mini-Wheats. (Color figure available online.)

techniques among cereal websites targeting children corresponded to the levels predicted by previous analyses of interactive advertising. An analysis of variance indicates a significant difference between all of the variables we examined: the number of pages, engagement techniques, and interactive features on each site. Low-immersion sites had very few pages and little interactive content; medium-immersion sites had multiple pages and a greater amount of engagement features, and high-immersion sites had many pages and sophisticated engagement and information gathering techniques that constituted virtual worlds (see Table 3).

#### *Low Immersion: Basic Sites*

Of websites, 47% had few pages, engagement techniques, information gathering, or personalization mechanisms (Table 3). These sites were the least graphic intensive,



**FIGURE 4** Froot Loops wallpaper available for download. (Color figure available online.)

**Table 3** Analysis of variance test for levels of immersion among child-targeted cereal websites

Measure	Cereal group												Test statistic
	All			Low immersion: Basic sites*			Medium immersion: Multiple features**			High immersion: Virtual worlds***			
	<i>M</i>	<i>SD</i>		<i>M</i>	<i>SD</i>		<i>M</i>	<i>SD</i>		<i>M</i>	<i>SD</i>		
Number of pages	26.58	44.41		8.8	9.06		17	7		139.5	38.89		$F = 83.2, p < .0001$
Number of engagement features (games, videos, promotions)	57.47	126.1		15.3	20.54		31	34.64		334.5	266.58		$F = 15.4, p < .001$
Number of information gathering and personalization techniques (site registration, content sharing, customizable content, avatar creation, virtual world)	2.17	2.42		1.3	1.16		1.6	0.89		8	1.41		$F = 31.2, p < .0001$

\*Cheerios, Chex, Choose Breakfast, Cocoa Puffs, Cookie Crisp, Corn Pops, Frosted Mini Wheats, Honey Nut Cheerios.

\*\*Apple Jacks Froot Loops, Frosted Flakes, Honeycomb, Lucky Charms, Reeses Puffs, Trix.

\*\*\*Millsberry, Postopia.

had the fewest, if any, games, videos or animation, and had the most inert, text-heavy content. Such content is shown in Figure 5, a page promoting Honey Nut Cheerios.

### *Medium Immersion: Multiple Features and Some Engagement*

Of websites, 41% had substantially more pages and engagement techniques. The content on these sites had greater levels of integration, as these sites combined engagement techniques across web pages. For instance, the Lucky Charms site's 10 webisodes told a story of the spokes-character Lucky the Leprechaun fighting mythic characters with help from his magical Lucky Charms (the cereal pieces). Elsewhere on the site, children could play games that required players to apply information from Lucky's webisode adventures to progress through the games.

### *High Immersion: Virtual Worlds*

Postopia and Millsberry had by far the most pages, engagement features, information gathering, and personalization techniques. These sites offered the most sophisticated, immersive experiences to children through the creation of virtual worlds. As seen in Figure 6, on Millsberry.com, this included a city complete with a grocery store, post office, construction store, city hall, police department, and other areas one would find in an actual city. Upon registration, Millsberry allowed the user to create an avatar (a character representing the player). The child could customize the avatar's gender, hair color, eyes and eyebrows, nose, skin tone, mouth, and clothing. Children could also assign traits to their avatar, including personality, personal interests, and his or her favorite school subjects, hangouts, and music. Site users can earn Millsbucks, the site's currency, by playing games and advergames. Children could use Millsbucks to purchase items for their avatars, such as clothing, food at the grocery store, a house in one of Millsberry's neighborhoods, furniture for the house, and so forth. At the Millsberry post office, children could send a greeting to other members of the site by typing the buddy's Millsberry username.



**FIGURE 5** The “for kids” page, promoting Honey Nut Cheerios, on General Mills’ low-immersion basic site for Cheerios. (Color figure available online.)



**FIGURE 6** The sign-in page on Millsberry.com's high-immersion virtual-world site. (Color figure available online.)

### ***Research Question 3: Do Children Spend More Time on Sites With Higher Levels of Immersion?***

Research Question 3 asked whether the number of engagement techniques is correlated with children's actual patterns of engagement with the sites. The sites with the most and most sophisticated engagement techniques also were the most heavily visited: children paid by far the most visits to Millsberry.com and Postopia.com (Table 1). The only exception to this pattern is Frosted Mini-Wheats, which did garner a substantial child audience despite its lower level of interactivity.

The sites with high immersion have the most success engaging children. The high immersion sites bring children back for an average of three visits, compared to one visit for Reese's Puffs (medium immersive). Children also went the deepest into high immersion sites, averaging more than 100 pages per visitor for Millsberry.com. Most telling, the visits to high immersion sites were extremely long lasting, averaging more than 20 min for children 2–17 years of age. These data, although incomplete, indicate that the sites with the greatest number of engagement techniques attract the most children and keep them interacting with the site and so exposed to branded content longer than sites with fewer techniques.

## **Discussion**

### ***Creating Immersive Branded Environments***

The top cereal manufacturers maintain child-targeted websites that use a variety of branded engagement techniques to target children. We found three escalating levels of immersive environments on these sites: websites with few interactive features, sites that

integrated multiple engagement techniques, and the construction of virtual worlds. Even sites with a medium level of immersion offer children interactive experiences far more engaging than the 30-second passive advertisements found on radio, television, or packaging.

Such lengthy, brand-saturated experiences have powerful effects on young people. The exposure to a stimulus object, such as a branded product, is sufficient to create an affective transfer effect, or emotional preference for that object (Harris et al., 2009; Zajonc, 2000). This process is of concern because these preferences occur without the awareness on the person viewing the brand, and are solidified over time with more frequent, and longer, exposures to the object. Children who spend lengthy amounts of time on branded cereal websites are therefore likely to adopt positive associations with these sugary products as a result of the time they spend interacting with them online. The content on the most immersive sites may be even more engaging, as avatar customization has been found to heighten children's feelings of presence and emotion (Baily, Wise, & Bolls, 2009), increasing their focus and attention while online.

At the same time, the majority of the cereals promoted on these sites have levels of caloric content from sugar that fail the Institute of Medicine's nutritional recommendations for healthful school foods. Moreover, although each participating manufacturer is meeting its Children's Food and Beverage Advertising Initiative pledge, these standards are regarded as weak by some nutritionists (Center for Science in the Public Interest, 2009), as well as the Federal Trade Commission (2008a). Thus, our findings also indicate that as of March 2009, despite being in compliance with their own pledges, the major cereal manufacturers' promotional practices continue to exploit children's susceptibilities to marketing by advertising high-sugar cereals using highly engaging techniques.

While cereal manufacturers may not have the largest online presence among the food industry, their marketing appears to be especially effective in engaging youth. For example, fast food restaurants—the largest food marketer to children (Federal Trade Commission, 2008a)—have had a greater online presence than cereal manufacturers. The category leader, McDonald's, alone had three websites for young people—Ronald.com for preschool-aged kids, HappyMeal.com for older children, and McWorld.com for adolescents (Harris et al., 2010). Yet, even the most engaging fast food website, HappyMeal.com, only occupied children 6.1 minutes on average—far below the 27-minute average of Millsberry.com.

The time children spend in sedentary activities—including *screen time*, or time spent consuming media through digital screens—has biological effects as well. Children's sedentary screen time is positively associated with elevated systolic and diastolic blood pressure levels, with the potential to create immediate and future health harms (Martinez-Gomez, Tucker, Heelan, Welk, & Eisenmann, 2009). Reducing screen time is a core recommendation among those concerned about childhood obesity (White House Task Force on Childhood Obesity, 2010).

A final concern is the extent to which these sites collect data on children's online behaviors, also known as behavioral targeting (Baker, 2004). Postopia.com illustrates this concern, as the site used information gathering techniques on more than 70% of the site's pages. When we visited the site in 2009, Postopia suggested a "friendly reminder to get your parent's permission before you register," but did not require parental approval for the child to register (<http://postopia.com/>, March 15, 2009). We visited Postopia again in May of 2011, however, and now if a user younger than 13 years old attempts to register, the site requires him or her to input his or her parent's e-mail address, and parental permission is required to complete the child's registration.



### **Limitations**

We were able to obtain traffic data for only 9 of the 17 sites, and thus we cannot fully confirm Research Question 3. These data were missing either because there were not enough visitors among the comScore panel to extrapolate population-level traffic, or because there was not a unique URL because the site was not independent from the parent website (e.g. Trix's [www.sillyrabbit.millsberry.com](http://www.sillyrabbit.millsberry.com)). Our study also represents only one moment in time, March 2009. With the dynamic nature of the online environment (Chester & Montgomery, 2007), it is likely that the sites we studied have been redesigned. This is the case for the Frosted Mini-Wheats' site, which was changed in April 2009, after a ruling by the Federal Trade Commission that the site carried claims falsely touting the product's health benefits to children's memory and attentiveness (Federal Trade Commission, 2009). General Mills also deactivated Millsberry.com as of April 2011 (Council of Better Business Bureaus, 2011). Similarly, we only assessed one food category, ready-to-eat cereals. Future work should systematically compare digital marketing across food categories to determine which manufacturers target children online most aggressively. Last, we cannot be sure that the level of immersion solely explains the pattern of traffic to these sites. The companies may also be spending differential amounts of money to drive visitors to the sites. Yet, if children were not engaged by the content of the immersive sites, they would neither spend such long periods, nor return to them.

### **Conclusion**

Future research should assess to what extent the engagement techniques on child-directed cereal websites affect children's brand awareness and preferences. This work should evaluate children's knowledge of these techniques' promotional intent, and their food preferences and requests after exposure to digital food and beverage marketing. Scholars have proposed models to do so which incorporate interactivity, which could capture a site's telepresence (Buijzen, Reijmersdal, & Owen, 2010). Future research should also examine websites for other unhealthy food categories, including whether different levels of immersion holds for those foods' digital marketing. These studies are necessary to document and understand the shifting landscape in which unhealthy foods are marketed directly to children in increasingly immersive and sophisticated ways. This is especially important given that the cereal industry touts compliance with its own voluntary nutrition guidelines regulating advertising to children. However, our analysis shows that cereal manufacturers persist in marketing unhealthy products to this vulnerable population using highly engaging techniques.

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