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Nutrition Content of Food and Beverage Products on Web Sites Popular With Children

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We assessed the nutritional quality of branded food and beverage products advertised on 28 Web sites popular with children. Of the 77 advertised products for which nutritional information was available, 49 met Institute of Medicine criteria for foods to avoid, 23 met criteria for foods to neither avoid nor encourage, and 5 met criteria for foods to encourage. There is a need for further research on the nature and extent of food and beverage advertising online to aid policymakers as they assess the impact of this marketing on children. (*Am J Public Health.* 2009;99:S587–S592. doi:10.2105/AJPH.2008.152918)

Children and youths often visit Web sites designed especially for them.[1,2] The top food and beverage advertisers on children's television have branded Web sites designed to appeal to children,[3] and these companies are innovators in the digital marketing ecosystem.[4] The Institute of Medicine (IOM) has established that food and beverage marketing encourages children to request and eat foods that are not good for them; therefore, the IOM has recommended a reduction in children's exposure to such marketing.[5]

Evidence shows that online advertising builds favorable attitudes toward brands, regardless of whether site visitors remember seeing advertisements.[6] Yoo exposed undergraduate students to Web banner advertisements and found that students who had been exposed to an advertisement for a brand were more likely to choose that brand in a later test than were those not exposed to the advertisement for that brand.[6] To date, only a handful of studies in the United States[3,4,7,8] and Australia[9] have documented the evolving online food-marketing environment targeting children and youth. Moore[3] documented the range and extent of marketing techniques designed to engage children with company brands on food and beverage company Web sites. A 2007 report documented additional modes of targeting children and youth with food and beverage product marketing in the digital age—including mobile marketing, branding instant messaging, viral video, and commercializing online communities.[4] A content analysis of 10 children's Web sites found that the foods marketed on the sites were not well suited to a healthful diet.[7] Weber et al. found that the Web sites of 40 top food and beverage brands used "advergames" and cartoon characters to engage children with their brands.[8] The Australian study found similar engagement techniques and references to unhealthful branded foods on popular Australian Web sites targeted toward children.[9]

In an attempt to provide further information on the food and beverage marketing to which children are exposed online, we examined Web sites popular with children to determine whether the sites contained depictions of branded foods and beverages. We also assessed the nutritional value of any marketed products on these Web sites and evaluated their appropriateness for school-age children.

METHODS

We purchased a ranking of the top 30 children's Web sites in the United States for October 2006 (the most recent month available when the study commenced) from Hitwise, an online activity tracking company.[10] The ranking was ordered by number of visits. Because of the complexity and dynamism of Web sites, our study was exploratory. We did not have multiple coders, which precluded assessment of intercoder reliability. Between July 11, 2007, and August 28, 2007, E.B. examined each of the 30 home pages (and every page 1 click away from each home page) for the presence of advertisements for branded foods or beverages.

When we identified a branded product per the methods just described, we assessed the product's nutritional content using the IOM's 2007 standards for "competitive" foods in

TABLE 1—Branded Food and Beverage Products Found on the 30 Most Popular Children's Web Sites (Ranked by US Site Visits) for October 2006: July–August 2007

Web Site	Branded Food or Beverage Product	Present on Home Page	Present 1 Click Away From Home Page
Disney Channel	Teddy Grahams Oatmeal snacks		X
	Splenda artificial sweetener		X
Cartoon Network	Cheez-It Stix crackers	X	X
	Cheese Nips crackers		X
	McDonalds Happy Meal		X
	Red Robin restaurant		X
	Sour Patch Extreme candy	X	X
Neopets	Apple Jacks cereal		X
	Cocoa Krispies cereal		X
	Gushers Fruit Snacks		X
	M&Ms candy		X
	Skittles candy		X
Disney Online	Baked Cheetos snacks		X
	Cheez-It Stix crackers		X
	Horizon Organic Milk		X
	PUR Water		X
	Splenda artificial sweetener		X
Nickelodeon Online	Apple Jacks cereal	X	
	Cheez-It Stix crackers		X
	Cinnamon Toast Crunch cereal		X
	Froot Loops cereal		X
	Froot Loops Cereal Straws snack		X
	Froot Loops Smoothie cereal		X
	Fruity Pebbles cereal		X
	Honey Nut Cheerios cereal		X
	Kid Cuisine frozen dinner		X
	Kraft Macaroni and Cheese		X
	Lunchables Pizza		X
	Reeses Puffs cereal		X
	Splitz Pop-Tarts		X
	Teddy Grahams Oatmeal snacks		X
PBS Kids	Arby's restaurant		X
	Chick-Fil-A restaurant		X
	Chuck E. Cheese's restaurant		X
	McDonald's restaurant		X
	Stonyfield Farm Organic Yo Baby yogurt		X
Millsberry	Cinnamon Toast Crunch cereal		X
	French Toast Crunch cereal		X
	Lucky Charms cereal	X	X
	Reese's Puffs cereal		X
Nick Jr	Eggo Waffles		X
	FruitaBu Organic Fruit snacks		X
	McDonald's Asian Salad		X
	PUR Water		X
	Quaker snack bars		X
	Teddy Grahams Oatmeal snacks		X

Continued

TABLE 1—*Continued*

Barbie	No food or beverage products		
My Scene	No food or beverage products		
Fun Brain	Domino's Pizza restaurant		X
	M&Ms candy		X
	McDonald's Happy Meal		X
	Quaker snack bars		X
Enchanted Learning	No food or beverage products		
Wrigley's Candystand	Altoids candy		X
	Altoids Cinnamon Mints		X
	Big League Chew gum	X	X
	Big League Chew: watermelon gum		X
	Big Red gum	X	X
	Crème Savers candy	X	X
	Doublemint gum	X	X
	Eclipse gum	X	X
	Eclipse Mints		X
	Extra gum	X	X
	Extra Wildberry Frost Plen-T-Pak gum		X
	Freedent gum		X
	Hubba Bubba gum	X	X
	Hubba Bubba Bubble Tape gum	X	X
	Hubba Bubba Max gum	X	X
	Hubba Bubba Ouch! Bubble Gum		X
	Juicy Fruit gum	X	X
	Life Savers candy	X	X
	Life Savers Five Flavor candy		X
	Life Savers Fruit Tarts candy		X
	Life Savers Gummies candy		X
	Life Savers Jelly Beans candy		X
	Life Savers Orange Mints candy		X
	Life Savers PepOMint candy		X
	Life Savers Sours candy		X
	Life Savers Sugar Free Wint-*O*-Green candy		X
	Life Savers Sweet Mints candy		X
	Orbit gum	X	X
	Orbit Citrusmint gum		X
	Orbit White gum	X	X
	Trollis candy		X
	Winterfresh gum	X	X
	Wrigley's Spearmint gum		X
Big Fat Awesome House Party	No food or beverage products		
Disney World	Chef Boyardee canned food		X
	Fruity Pebbles cereal		X
Everything Girl	No food or beverage products		
Funschool	Cheese Nips crackers		X
	Enfamil A.R. LIPIL infant formula		X
	Enfamil Gentlease LIPIL infant formula		X
	Froot Loops Smoothie cereal		X
	Hebrew National Kosher Hot Dogs		X

Continued

TABLE 1—*Continued*

	Horizon Organic Milk Plus DHA Omega-3		X
	Nestle Juicy Juice Harvest Surprise		X
	Nutramigen LIPIL infant formula		X
	PUR flavored water		X
	Slim Jim beef jerky		X
	Special K cereal		X
	Teddy Grahams snacks		X
	Teddy Grahams Oatmeal Snacks	X	X
Bratz	Burger King Kids Meal		X
The N	Sprite soda		X
	Slim Jim beef jerky		X
Disney's Toontown Online	Oscar Mayer Hot Dogs		X
	PUR flavored water		X
LEGO Worlds	No food or beverage products		
Polly Pocket	No food or beverage products		
StarFall	No food or beverage products		
Scholastic	Cheerios cereal		X
	Crunchberries cereal		X
	Eggo Waffles		X
	Froot Loops cereal		X
	Honey Nut Cheerios cereal		X
	Lucky Charms cereal		X
	Trix cereal		X
Playhouse Disney	Site not available		
Fisher Price International	Site not available		
Fisher Price US	Quaker Oats		X
	McDonald's Corporation		X
DLTK's Crafts for Kids	No food or beverage products		
Postopia	Cocoa Pebbles cereal	X	X
	Fruity Pebbles cereal	X	X
	Honeycomb cereal	X	X
	Post cereals		X
American Girl	No food or beverage products		

Note. Web sites are ordered by rank from most visited to least visited.

schools (foods sold outside of school lunch programs).[11] These standards provided an evidence-based proxy for what could be considered healthful or unhealthful foods for children and youths, regardless of where the foods were consumed. The IOM has grouped foods into 3 tiers: tier 1 foods are consistent with what the US Department of Health and Human Services' 2005 Dietary Guidelines for Americans (DGA) call "foods to encourage"[11(p120)] and are recommended for all students, tier 2 foods do not meet tier 1 criteria but do not fall outside DGA recommendations for other nutrients and are recommended only for high school students after school hours, and tier 3 foods are all those that are not recommended for any child at any time in school.

RESULTS

Two of the 30 Web sites were unavailable for viewing during the study period. There were 1709 unique pages directly linked (i.e., 1 click away) to the 28 remaining home pages (n=1737 pages). We found 22 different food and beverage products on 6 of the home pages, and we found 71 additional products one click away from 18 of the home pages, for a total of 93 unique products (Table 1).

We obtained nutrition information on the products either from the product label (25 products) or from the manufacturer's Web site (52 products). We excluded 16 products because of a lack of product specificity or unobtainable nutrition information. Of the remaining 77 products, only 2 (Nestle Juicy Juice Harvest Surprise and Quaker Oats Oatmeal) met the IOM tier 1 criteria[11] (Table 2). Three additional products included at least 1 variety that met tier 1 criteria. Another 20 products met tier 2 criteria, and 3 other products had at least 1 variety that met tier 2 criteria. The remaining 49 products fell into tier 3.

TABLE 2—Branded Food and Beverage Products Found on the 30 Most Popular Children's Web Sites (Ranked by US Site Visits) for October 2006, Categorized by Institute of Medicine Standards for Competitive Foods in Schools: July–August 2007

Tier 1 Products	Tier 2 Products	Tier 3 Products	Products Excluded From Analysis
FruitaBu Organic Fruit snacks[a]	Baked Cheetos snack	Altoids candy	Arby's restaurant[b]
Horizon Organic Milk[a]	Cheerios cereal	Altoids Cinnamon Mints	Big League Chew gum[c]
Horizon Organic Milk Plus DHA Omega-3[a]	Cinnamon Toast Crunch cereal	Apple Jacks cereal	Big League Chew: watermelon gum[c]
Nestle Juicy Juice Harvest Surprise	Eclipse gum	Big Red gum	Chick-Fil-A restaurant[b]
Quaker Oats	Eclipse Mints	Burger King Kids Meal[d]	Chuck E. Cheese's restaurant[b]
	Extra Wildberry Frost Plen-T-Pak gum	Cheese Nips crackers	Domino's Pizza restaurant[b]
	French Toast Crunch cereal	Cheez-It Stix crackers	Enfamil A.R. LIPIL infant formula[e]
	Froot Loops Cereal Straws snack	Chef Boyardee canned food[d]	Enfamil Gentlease LIPIL infant formula[e]
	Honeycomb cereal	Cocoa Krispies cereal	McDonald's Corporation[b]
	Honey Nut Cheerios cereal	Cocoa Pebbles cereal	McDonald's restaurant[b]
	Kid Cuisine frozen dinner[f]	Crème Savers candy	Nutramigen LIPIL infant formula[e]
	Life Savers Fruit Tarts	Crunchberries cereal	Hubba Bubba gum[c]
	Life Savers Sugar Free Wint-O-Green candy	Doublemint gum	Life Savers Sours candy[c]
	Orbit gum	Eggo Waffles	PUR Water[c]
	Orbit Citrusmint gum	Extra gum	Red Robin restaurant[b]
	Orbit White gum	Freedent gum	Stonyfield Farm Organic Yo Baby Yogurt[e]
	Post Cereals[f]	Froot Loops cereal	
	PUR flavored water	Froot Loops Smoothie cereal	
	Quaker snack bars[f]	Fruity Pebbles cereal	
	Special K cereal	Gushers Fruit Snacks	
	Splenda artificial sweetener	Hebrew National Kosher Hot Dogs	
	Teddy Grahams snacks	Hubba Bubba Bubble Tape gum	
	Teddy Grahams Oatmeal snacks	Hubba Bubba Max gum	
		Hubba Bubba Ouch! Bubble Gum	
		Juicy Fruit gum	
		Kraft Macaroni and Cheese	
		Life Savers candy	
		Life Savers Five Flavor candy	
		Life Savers Gummies candy	
		Life Savers Jelly Beans candy	
		Life Savers Orange Mints candy	
		Life Savers PepOMint candy	
		Life Savers Sweet Mints candy	
		Lucky Charms cereal	
		Lunchables Pizza[d]	
		M&Ms candy	
		McDonald's Asian Salad	
		McDonald's Happy Meal[d]	
		Oscar Mayer Hot Dogs	
		Reese's Puffs cereal	
		Skittles candy	
		Slim Jim beef jerky	
		Sour Patch Extreme candy	
		Splitz Pop-Tarts	
		Sprite soda	

Continued

TABLE 2—*Continued*

	Trix cereal
	Trollis candy
	Winterfresh gum
	Wrigley's Spearmint gum

Note. "Competitive" foods are those sold in schools outside of meals provided by the school. Tier 1 foods are consistent with what the US Department of Health and Human Services' 2005 Dietary Guidelines for Americans (DGA) call "foods to encourage"[11(p120)] and are recommended for all students; tier 2 foods do not meet tier 1 criteria but do not fall outside DGA recommendations for other nutrients and are recommended only for high school students after school hours; and tier 3 comprises all other foods.

[a]At least 1 available variety meets tier 1 criteria.

[b]Excluded from analysis because the advertised brand was a restaurant that sold too many products to assess.

[c]Excluded from analysis because nutrition information was unavailable or incomplete.

[d]No available varieties meet criteria for tier 1 or tier 2.

[e]Excluded from analysis because the product is unlikely to be consumed by school-age children.

[f]At least 1 available variety meets tier 2 criteria.

DISCUSSION

The Federal Trade Commission has reported that food and beverage marketing targeting youths in 2006 was dominated by campaigns integrating product promotion across traditional platforms (e.g., television, print) and evolving platforms (e.g., Web, cell phone).[12] On Web sites for children alone, there were 2 billion impressions (ads displayed to a site visitor) for foods and beverages in 2006.[12] The results of our study point to the likelihood that the food and beverage products advertised on the Web were those children should avoid.

Our study had several limitations. Data collection was confined to each Web site's home page and pages that were 1 click away. These criteria yielded more than 1700 Web pages for analysis, but they did not necessarily reflect how a visitor would explore a site nor did they reflect the depth and complexity of the sites—links may be followed far from the initial entry point. The pages also cannot be assumed to be independent of one another. E.B. collected the data, so we could not assess intercoder reliability. Furthermore, the sites most popular in October 2006 (the most recent month for which site rankings were obtainable) may have been less popular when the data were collected from those sites in July and August 2007, and the products advertised on the sites may have changed between site ranking and data collection.

Although we provide only a limited examination of Web sites popular with children, we found the food and beverage products marketed on the sites to be of poor nutritional quality. In 2006, 44 companies spent $1.6 billion marketing foods and beverages to children and youths,[12] and the proportion of marketing dollars spent online is predicted to grow.[13] Therefore, further research on the extent and nature of food and beverage advertising online is needed to aid policymakers as they assess the impact of this marketing on children. ■

About the Authors

At the time of the study, Elena O. Lingas, Lori Dorfman, and Eliana Bukofzer were with the Berkeley Media Studies Group, Berkeley, CA.

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Contributors

E.O. Lingas developed the study protocols and coding guides, oversaw data collection and analyses, and led the writing of the article. L. Dorfman conceptualized the study and supervised all aspects of its implementation. E.O. Lingas and L. Dorfman interpreted findings and wrote article drafts. E. Bukofzer collected and entered data and conducted the nutrition analysis.

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Human Participant Protection

No protocol approval was necessary because data were obtained from secondary sources.

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