



Review article

Marketing Food and Beverages to Youth Through Sports



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A B S T R A C T

Food and beverage marketing has been identified as a major driver of obesity yet sports sponsorship remains common practice and represents millions of dollars in advertising expenditures. Research shows that food and beverage products associated with sports (e.g., M&M's with National Association for Stock Car Auto Racing logo) generate positive feelings, excitement, and a positive self-image among adults and children. Despite this, self-regulatory pledges made by food companies to limit exposure of unhealthy products to children have not improved the nutritional quality of foods marketed to children. We reviewed the literature about sports-related food marketing, including food and beverage companies' use of sports sponsorships, athlete endorsements, and sports video games. This review demonstrates that sports sponsorships with food and beverage companies often promote energy-dense, nutrient-poor products and while many of these promotions do not explicitly target youth, sports-related marketing affects food perceptions and preferences among youth. Furthermore, endorsement of unhealthy products by professional athletes sends mixed messages; although athletes may promote physical activity, they simultaneously encourage consumption of unhealthy products that can lead to negative health outcomes. We argue that more athletes and sports organizations should stop promoting unhealthy foods and beverages and work with health experts to encourage healthy eating habits among youth.

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IMPLICATIONS AND
CONTRIBUTION

Food companies use sports sponsorships to promote unhealthy food/beverage products and can influence false associations between energy-dense products and healthful behaviors. Findings can inform policies aimed to address food companies' marketing practices relevant to sports, athlete endorsements, and food product placement in advergames and video games.

Poor diet and obesity are significant public health challenges. Food marketing has been identified as a major driver of obesity [1], and policymakers in Norway, Quebec, Sweden, Finland, Australia, and the UK have imposed restrictions on child-targeted food marketing [2–5]. In the United States, few

policies exist to restrict food marketing to youth. Twenty-seven states restrict food and beverages sold in schools [6–11], but there are few restrictions on marketing in schools. Although wellness policies have been implemented in all school districts under the Healthy, Hunger Free Kid Act of 2010 [11], most do not address advertising. Maine is the only state that prohibits advertising certain foods and beverages in school settings (e.g., athletic scoreboards) [6,8]. More recently, several cities have either proposed or passed legislation to limit inclusion of toys in children's meals at fast food restaurants [12]. Although there has been growing interest in curbing child-targeted food marketing,

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the food industry's use of sports in product promotion has flown largely under the radar. Sports-related food marketing includes sponsorships (i.e., partnerships between food and beverage companies and professional, local, or youth sports organizations), athlete endorsements of food and beverages, and the use of food and beverage company logos and spokescharacters (e.g., "Red" the M&M) in sports video games. These partnerships are promoted through commercials, sporting events, in stores, and online, and food companies spend millions of dollars on these sports-related marketing tools.

Although food marketing can be used to promote healthy foods and beverages, the majority of food advertisements are for energy-dense, nutrient-poor products [13–15]. In the United States, food companies spend \$1.6 billion annually to reach youth through various avenues including television, the Internet, radio, packaging, in-store promotions, video games, and text messages [16]. Food companies are motivated to target youth because they collectively spend \$200 billion annually and indirectly influence \$200 billion in additional spending [1]. Children are viewed as integral to their business because they represent the next generation of consumers and because food and brand preferences can be shaped early.

A common claim made by the food industry is that consumers make the decision about what kinds of product categories they would like to buy and advertisements simply help to develop and sustain brand loyalty or entice consumers to switch brands [17]. But research shows that food advertisements can do much more. They can lead to increased food consumption, even when the food consumed differs from the advertised food [18–21]. An Institute of Medicine report on the effects of food marketing on youth concluded that the majority of advertised food is unhealthy and that food marketing influences children's preferences and purchases requests, short-term consumption, diet overall, and by extension, health problems [1]. Researchers hypothesize that food marketing themes may appeal to youth partly because they focus on the innate desires of adolescents, such as a desire for social status and value and a sense of independence, while highly palatable ingredients positively reinforce consumption [22,23].

The aim of this article was to identify and describe food and beverage industries' use of sports in marketing and describe the psychology of how food advertisements influence the perception and behaviors of children and adolescents. We also aim to provide guidance on how public health experts and policymakers should address the issue. In this article, we focus on three sports marketing strategies that each industry engages in: sponsorships, athlete endorsements, and sports video games.

Theoretical Framework for Understanding Food and Beverage Marketing

A variety of psychological principles contribute to scientific understanding of the way advertising influences consumer perceptions and behavior. Cue reactivity is one concept that suggests that exposure to stimuli (e.g., cigarette and food) can influence a physiological response and a specific craving that can lead to a specific behavior (e.g., smoking and eating unhealthy foods) [24]. For example, one study found that food-branded advergames increased consumption of both healthy and unhealthy snack foods among children [25], while other studies demonstrate that cue reactivity can lead children and adults to increase food intake in short-term periods [26,27]. Similarly, exposure to television

segments featuring individuals drinking alcohol can prime alcohol consumption among viewers [28], with similar effects found for viewing aggression and behaving aggressively [29]. One review of prospective cohort studies concluded that there is an association between alcohol advertising and subsequent alcohol consumption in youth [30]. In addition, one study found that familiarity with songs that mention alcohol brands was linked to self-reported alcohol consumption in youth [31].

Food Companies' Use of Sports Sponsorships, Athlete Endorsements, and Video Game Product Placement

Three major ways food and beverage companies engage in child-targeted, sports-related marketing are sports sponsorship, athlete endorsements, and video game product placement. Sponsorship is one form of sports-linked marketing and has been described as "indirect marketing" [32]. Sponsorship began gaining traction in the late 1980s and early 1990s and is now a \$37 billion industry worldwide [33]. Food companies engage in sports-related sponsorships in the United States and international sports communities. McDonald's logos often line the field of major Fédération Internationale de Football Association soccer matches and National Hockey League hockey games, while Coca-Cola's logo can be found on chairs in National Collegiate Athletic Association basketball games or alongside Olympic rings. Coca-Cola, particularly, has been a top sponsor of the Olympic Games since 1928. Between the years of 2012 and 2016, investments made by Coca-Cola in the Brazilian market reached \$7.6 billion [34]. Recently, Coca-Cola built a hangout space with Coca-Cola products where teens could take photos with the Olympic torch in Rio [35]. At the same time, obesity and diabetes rates have increased in low- and middle-income countries, with the prevalence of overweight and obesity rising from 8.1% in 1980 to 12.9% in 2013 for boys and from 8.4% to 13.4% in girls during those years [36]. This is especially alarming given that Coca-Cola has also pledged \$5 billion in expenditures to develop new plants and sales networks in India, while also committing \$17 billion by 2020 to raise its presence throughout Africa [37,38]. Other examples of partnerships include the #That'sGold campaign in which television commercials featured past successful Olympic athletes with a Coca-Cola beverage [39]. Another longtime sponsor of the Olympic Games, McDonald's has been committed to this worldwide event since 1968. For the past 10 years, including the most recent games in Rio, McDonald's has fed participating athletes as the "Official Restaurant of the Olympic Games" [40]. However, McDonald's recently ended their Olympic sponsorship early amid growing public criticism of the unhealthy sponsorship of sports, rising Olympic sponsorship costs, and declining Olympic television ratings [41]. Table 1 provides additional examples of food company sponsorships with sports organizations.

Becoming the official sponsor of a major sports organization requires immense financial resources, which may be the primary reason smaller companies that sell healthier products are not found in sponsorship arenas. McDonald's and Coca Cola have consistently topped lists for "The World's Biggest Public Companies" in the categories of restaurants and beverages, respectively [47]. Indeed, Coca-Cola reported aiming to spend \$1 billion on advertising in 2016, and McDonald's spent close to \$1 billion on ads in 2012, even though the entire restaurant industry spends nearly \$6 billion collectively [48–50]. These expenditures translate to increased brand awareness among consumers,

Table 1
Examples of food companies sponsoring sports organizations

Brand	Sports organization	Commercial description
McDonald's	Olympics	Commercial features Olympic athletes being awarded gold metals and biting into the medals. Following this is the line “the greatest victories are celebrated with a bite” and consumers are seen biting into McDonalds chicken nuggets while watching the Olympics [42].
Pepsi	National Football League	The commercial features old video footage of football teams and incorporates video footage of current football teams. At the end of both pieces of footage, fans are seen enjoying bottles of Pepsi [43].
Taco Bell	Major League Baseball	This commercial promotes the Taco Bell AM Crunchwrap and advertises free wraps for every base that is stolen during the MLB World Series [44].
Coca-Cola	National Basketball Association	This commercial features basketball players LeBron James and Yao Ming facing off in a battle entitled “East meets West” as animated characters. Both characters pull out items and people to represent where they come from. The commercial ends with both players pulling out bottles of Coke and drinking them [45].
Reese's Candy	National Collegiate Athletics Association	This commercial features Reese's cups playing basketball and instructs viewers to bring enough Reese's cups to games in order to avoid fouls, picks, and steals in a basketball game [46].

MLB = Major League Baseball.

including youth. One study showed that a majority of children were aware of the companies that sponsored their favorite sports team, and 15% of children correctly named one or more food and beverage company sponsors [51]. Children aged 10–11 years were more likely to think about those food and beverage sponsors when buying something to eat or drink, in comparison to children aged 12–14 years, and younger children were also more likely to express their appreciation to food and beverage companies for sponsoring their favorite teams by buying their products. This is concerning because it suggests that young people's awareness of the relationship between food companies and sports organizations influences them to purchase unhealthy products.

In addition, a systematic review conducted by Carter et al. [52] evaluated 14 studies that examined food environments in sports settings and concluded that sponsorship of youth sports were dominated by unhealthy products and sponsorship enabled food and beverage companies to gain immense brand exposure through sports venues, the Internet, and television coverage. Based on Nielsen television viewership data, adolescents receive even greater exposure to sports-related marketing than adults and children. This raises concerns that even when ads are targeted for “general audiences” (i.e., mostly adults), adolescents are exposed to the advertising at equal or higher rates [53]. For example, according to Nielsen, more than 93 million people in the United States watched March Madness—the National Collegiate Athletic Association championship tournament—in 2016, and 7% of the viewers were aged 12–17 years [54]. Although the vast majority of viewers were adults, roughly 6.5 million adolescents were exposed to the food and beverage company sponsor logos.

Social media has also facilitated unprecedented opportunities to expand advertising exposure, particularly to youth and to access the social and personal lives of youth. In 2015, 71% of teens aged 13–17 years used Facebook, while 52% used Instagram, 41% used Snapchat, and 33% used Twitter [55]. Although daily Internet use among teens is widespread (91% report going online at least once daily), self-reported “almost constant” use was higher among African-Americans (34%) and Latinos (32%) than whites (19%).

Many professional sports leagues are also capitalizing on these opportunities with social media accounts on Twitter, Facebook, and Instagram where they share sports content with fans (Figures 1–3). These platforms enable sponsors to expand

their brand exposure, particularly for large, sponsored events like the Super Bowl (i.e., the annual championship game of the National Football League). For example, in 2017 the National Football League (NFL) had 21.6 million followers on Twitter, compared with one of their largest sponsors, Pepsi, which has 3 million. Although cross-promotion of sponsorship via social media seems like a growing phenomenon, no research studies have investigated the growth or impact of this type of social media-based marketing.

Athlete endorsements are another common tool used by the food industry to promote products. Babe Ruth endorsed several products during his career, including Red Rock Cola and Wheaties Cereal. Whether food companies deliberately associate their brands and products with sports as a way to associate with health and fitness is unclear, but regardless of intent these partnerships are concerning given emerging evidence that sports advertisements make nutritionally poor products seem healthier [56]. Endorsement of unhealthy products by athletes further conveys a false message about good health by suggesting that intake of nutrient-poor products is congruent with physical

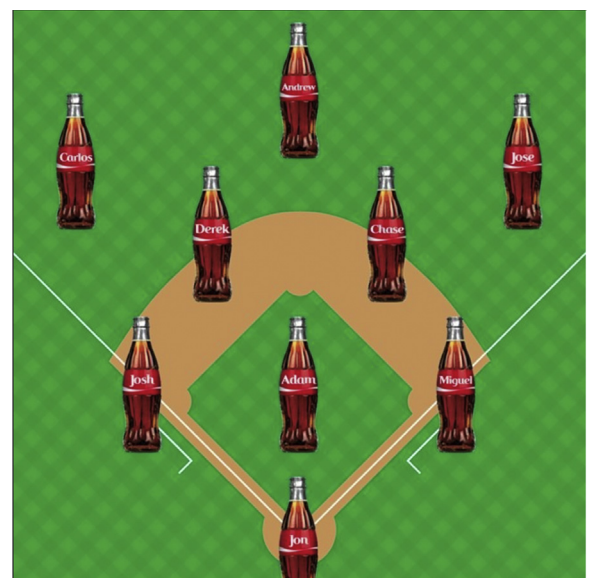


Figure 1. Coca-Cola Instagram post.



Figure 2. Pepsi Instagram post.

activity. One study showed that most products promoted by professional athletes are energy dense and nutrient poor [57]. Table 2 shows some examples of food products endorsed by athletes.

Public health researchers have also expressed concern about food advertisements in video games [63–66], and many of these video games are sports themed (e.g., basketball video games with food sponsors shown in the game; race car games that feature M&M candy characters). Although many video games are promoted as general audience–targeted products, the use of popular food-related spokescharacters (e.g., the M&M characters playing tennis in a Nintendo Wii game) strongly suggests they are targeted toward children (Figure 4). Approximately, 64% of children aged 5–14 years who access the Internet are seeking to play games [67]. A Kaiser Family Foundation report found that 73% of the 82 food brands examined had an advergaming (i.e., a game designed to promote a brand) available on their Web site [68]. Although the main purpose of sports video games is not to promote certain brands, like advergaming, they enable food companies to repeatedly expose youth to food brands through embedded characters (e.g., M&M candy characters) or product/logo



Figure 3. M&M's NASCAR partnership.

Table 2

Examples of athlete endorsements of food and beverage products

Brand	Athlete name	Commercial description
Sprite	LeBron James	This commercial features NBA player LeBron James in a pick-up game. A teenage boy is watching the game behind a fence and the boy begins drinking a Sprite. As he does this, LeBron James begins playing extremely well, and the court is destroyed as he plays [58].
Papa John's Pizza	Peyton Manning	This commercial has a "Back to the Future" theme and it features Papa John and Peyton Manning. They get in a car and are transported to 1984 where an entire pie of pizza is only \$0.30. The commercial ends with Papa John's 30-year anniversary pizza deal [59].
Double Stuf Oreos	Serena Williams	Commercial features the Manning brothers and the Williams sisters facing off in a Double Stuf Oreos eating competition [60].
Powerade	Chris Paul	Commercial features Chris Paul advertising Powerade ION 4 [61].
Gatorade	Sidney Crosby	Commercial features Sidney Crosby scoring a point at a hockey game after drinking Gatorade [62].

NBA = National Basketball Association.

placements. Table 3 provides examples of sports video games with food industry references. The presence of food brands in video games has been shown to promote consumption of



Figure 4. M&M's Adventure for Wii.

Table 3
Examples of food marketing in video games

Brand	Name of the game	Commercial description
Doritos	EA Sports Madden NFL '10	Bag of Doritos contained advertisement for video game, Web site contains cobranded video game content (Doritos, 2010) [69].
Mars Inc's M&M's	EA Sports NASCAR '07	M&M's-sponsored race car on cover of game [70].
Snickers	EA Sports Madden NFL '10	"Snickers player of the game" segment plays after each game [69].
Kentucky Fried Chicken	EA Sports Madden NFL '10	Sold 30 ounce Madden NFL beverages with promotional codes for the game, named food products after the video game (e.g., \$5 Madden NFL Box) and featured 4 NFL players from the video game in their commercials [69].
Mars Inc's M&M's	M&M NASCAR Kart Racing for Nintendo Wii	M&M's-sponsored race car on cover of game [71].

NASCAR = National Association for Stock Car Auto Racing; NFL = National Football League.

energy-dense snack foods [27,72,73] among youth, who are especially vulnerable to the effects of advertising [74].

The Psychology of Sports Sponsorships, Athlete Endorsements, and Video Game Product Placement

Food and beverage company logos, brand names, and products are featured in sports sponsorships, athlete endorsements, and sports video games in ways that affect youth perceptions and product preferences. Specifically, sponsorship has been shown to influence brand awareness and consumer attitudes, which are both typically used as markers to determine the effectiveness of a given advertising technique [32]. A number of studies have demonstrated the value of brand image transfer in sponsorships, where there is a beneficial transfer of brand image between the sponsor and the sponsored entity [75–77] (e.g., feelings of national pride and excitement regarding the Olympics "brand" can transfer to feelings of pride and excitement about an Olympic sponsor, such as the Coca-Cola "brand"). One study conducted by Keller [77] demonstrated that the more familiar a consumer is with a brand, the stronger and more unique the brand's association becomes among consumers. Cornwell and Coote [75] also found a positive relationship between a consumer's association with an organization and their intent to purchase the products of the sponsor company. More specifically, companies seem to benefit from sponsorships because consumers build more positive associations with the sponsor. Finally, Gwinner and Eaton [76] similarly found that sponsorships result in brand image transfer.

Brand associations created by engaging in long-term sponsor partnerships allow professional sports leagues and food companies to benefit from increased exposure. The Super Bowl, for example, highlights the profits gained from these sponsorships. Following the 2015 Super Bowl, sales of M&M's, a sponsor of the event, increased 9.17 percent, surpassing the 3.21% increase of sales for chocolate candy in general [78]. Similarly, after just 1 year of sponsoring the Super Bowl, Skittles gained 1.91 billion media impressions and experienced an 11.32% increase in sales. These results suggest that associating products with events that many customers view and care about may likely lead to immense monetary profit and increased brand loyalty.

Finally, the pervasiveness and effectiveness of unhealthy food and beverage advertising have been studied in several sports sponsorship settings. In the realm of children's sport in Australia, half of food company sponsorships did not fulfill healthy sponsorship criteria [79], and 10% of national and state sports organizations in Australia have unhealthy food/beverage, alcohol, or gambling sponsors [80]. Moreover, an analysis of the

sponsorship of community sports organizations showed that the majority of food company sponsors did not meet healthiness criteria ratings developed by a panel of 10 government officials and experts in nutrition, health promotion, physical activity, and health economics [81]. The detrimental effects of the continuation of unhealthy food and beverage sponsorship for such junior sports clubs as well as elite sports clubs is further highlighted by the high recall of sponsors, positive attitudes toward sponsors, and behavioral intentions of children belonging to junior sports clubs [82–84]. In two studies designed to assess sponsorship awareness, three quarters of children who took a survey about sponsorship were able to correctly match a sponsor with the relevant sport [82,83]. Another study indicated that parents and officials perceived children to be heavily influenced by elite sport sponsorship even more than the sponsorship of their own sporting clubs [85]. Research has suggested that restriction of unhealthy food and beverage company sponsorship, which has garnered support from parents and sporting communities, may not affect funding opportunities for sports clubs and may instead reduce the promotional opportunities given to food and beverage organizations through this sports sponsorship medium [85,86].

Another sports-related food marketing domain involves the use of celebrity athlete endorsements. These partnerships are common in food marketing [57], and studies show they can influence young consumers' attitudes and product preferences. There are several reasons athletes are likely persuasive marketers, including their attractive and likeable qualities [87] and their status and physical attractiveness that help add value to the endorsed product [88]. Furthermore, celebrity endorsements are likely to be most effective when the celebrity's image and the product's image are compatible or "match up," referred to as the match-up hypothesis [89,90]. For example, basketball star Michael Jordan and Gatorade match up well because of the congruence between an athlete and a sports drink. Athletes can also help build positive brand associations even when the link between the athlete and the endorsed product is less clear. For example, Till and Shimp [91] note that the fit between an endorser and the product does not have to be direct; the celebrity can actually create the desired positive association with the brand. For example, there might not appear to be an obvious match-up between a race car driver and unhealthy food products, but the match between the endorser and the product can be achieved through concepts that relate the two entities. Specifically, race car driving is associated with "excitement," "speed," and brightly colored cars and uniforms. These concepts can also apply to food and beverage products, specifically bright, red Coca-Cola bottles and multicolored M&M's, two brands that are

official sponsors of the National Association for Stock Car Auto Racing [92].

Athletes can be powerful marketing tools. For example, one study showed that food products that featured an athlete endorsement led parents to perceive the food as healthier than nonendorsed versions of the same product [56]. Those parents were also more willing to purchase the product for their children. Another experimental study demonstrated that male children were more likely to indicate a preference for energy-dense, nutrient-poor foods that were endorsed by celebrity athletes as compared with energy-dense, nutrient-poor foods without endorsements [93]. These findings suggest athletes may create a “health halo” [94] around unhealthy food products. Health halos can be created when health claims (e.g., “low fat” or “organic”) on packaging lead consumers to incorrectly perceive foods as healthier than their unlabeled counterparts. Such health halos can in turn lead to overconsumption of those foods [95]. Associations between athletes, food, and health may influence behavior even outside the food advertising context. One study conducted in the UK with children aged 8–11 years involved watching (1) a chips brand commercial featuring a former professional soccer player; (2) different savory snack brand commercial that did not feature a celebrity endorser; (3) television footage of the same former famous soccer player in a sportscasting video; or (4) a toy commercial. Children who watched the sportscaster video consumed significantly more chips compared with children who viewed the other commercials [96]. This may be because children already have strong associations between athletes and foods that cue unhealthy eating or it may simply reflect the association people have between watching sports and eating less healthy foods. These findings suggest exposure to sports celebrities might lead to increased food intake even when they are not appearing in an advertising context, but it is not clear what mechanism is driving this effect.

The third outlet for sports-related food marketing involves product placement in sports video games. Product placement began in movies but has since expanded to video games (e.g., Xbox games), television shows, and advergames (i.e., Internet-based games produced by a company to promote a brand). The use of Reese’s Pieces candy in the movie “E.T.” was one of the first and most famous examples of food product placements used as a marketing strategy [97]. Sales of Reese’s Pieces brand products increased by 65% in the 3 months following the release of the movie [98]. A study examining the effect of Pepsi product placement during a movie clip on child behavior found that children exposed to the clip with the Pepsi product placement were significantly more likely to indicate a preference for Pepsi over Coca-Cola than participants who saw the same movie clip without a branded product [99].

Food marketing studies have also demonstrated that children eat more food in response to playing food company advergames on the Internet. Advergames are branded computer games that appear on a food company’s Web site, and they represent an opportunity for food marketers to engage children with their products for long periods of time while promoting poor-nutrient foods [65,66,68]. One study demonstrated that children who engaged in advergame that promoted unhealthy food were more likely to consume nutrient-poor snack foods and fewer fruits and vegetables [27]. Another study concluded that playing advergames featuring food cues was related to increased

energy intake in general, regardless of health profile of product/brand being advertised (i.e., fruit vs. energy-dense snack), but consumption was highest for energy-dense, nutrient-poor foods [72].

Policy Interference Recommendations Regarding Sports Sponsorships and Endorsements

Currently, there are no government-based regulations on sports sponsorships with food companies in the United States. However, one approach to limiting the association between sports and unhealthy food and beverage products is to provide funding to organizations that rely on monetary assistance from these food and beverage companies (i.e., compensatory funding). This government-driven initiative would support promotion of healthy activities and prevention of chronic disease [100]. The Victorian Health Promotion Foundation in Australia, for example, targets contributors to poor health and provides programs to influence healthier lifestyles such as increasing access to fresh food and reducing salt intake [101].

Although known to contribute to childhood obesity rates in the United States, the government is unable to restrict food and beverage marketing under the First Amendment, and food and beverage companies often use this argument to defend their marketing practices. However, some companies involved in the Children’s Food and Beverage Advertising Initiative pledge to limit their marketing practices by not advertising unhealthy products (e.g., chips) to children aged 6 to 12 years and to not advertise to children younger than 6 years. Yet, study results show that children aged 6 to 11 years were exposed to 53% more snack food products over a 4-year period from companies that pledged not to do so [49]. Therefore, policymakers should propose policies that target unhealthy food products while proposing healthy alternatives. Still, efforts to circumvent or squash public health policies may foreshadow future antipolicy efforts of the food industry.

For over a century, the food industry has partnered with athletic icons and powerful sports organizations to market their products. The food industry has advertised extensively in sports video games and on television while spending billions of dollars on athlete endorsement contacts and sports sponsorships. In addition to scientific research demonstrating that sports-related marketing affects perceptions and behaviors, the billions of dollars spent by the food industry on this type of advertising strongly suggests there is something very influential about this marketing practice that helps sell more products.

Still, researchers and public health experts have not thoroughly scrutinized the prevalence and effect of food marketing through sports, and more research is needed to explore the impact of sponsorship, athlete endorsements, and sports video games on the behavior of young consumers. As countries around the world increase their policies to limit marketing to youth, and the industry continues to be under pressure to self-regulate, the food industry may shift more resources toward marketing through sports. This approach would enable the food industry to circumvent policies that may ultimately prohibit them from marketing directly to youth. Researchers and policymakers must anticipate and prepare for this possibility to protect youth. First, researchers must track the prevalence of sports-related food marketing over time to help quantify whether this type of advertising increases in the wake of regulations that limit television-based advertising. Second, more research is needed on

the extent and effects of cross-promotion of sports and food brands across these social media accounts and the ability of sports organizations' social media accounts to generate followers for food sponsors. Future research should also assess the influence of food company sponsorships with sports organizations on other health behaviors such as physical activity. Although we worry that athletes marketing unhealthy foods to children are promoting consumption of those products, it is possible that they simultaneously encourage more physical activity. More research is needed on the degree to which this happens and whether it is more likely to happen when athletes are paired with healthier versus less health products. Initial evidence suggests that some aspects of men's exercise motivations are positively correlated with emotions like shame, guilt, and pride [102], which may be activated by ads featuring physically fit athletes that contribute to feelings of self-consciousness in men.

When proposing government-based or voluntary industry policies to restrict food marketing, advocates, policymakers, and the food industry should be aware of the advertising exposure children receive through sports. Rather than developing policies based on whether or not a program is child targeted, policymakers and food companies should consider structuring policies to include television programs that are watched by large numbers of youth (e.g., sporting events). Specifically, research should examine the extent to which adolescents may consume more food in response to viewing "general audience"—targeted sporting events such as NFL games versus child-targeted shows. Policymakers should also anticipate loopholes that provide opportunities for child-targeted marketing. For example, if policies stipulate that companies may not use their brand name in sponsorships, some companies might simply use their logo or mascot. Sports video games marketed as "E for Everyone" may be another loophole that food companies would use to reach children. An experimental study could help illuminate whether youth playing "E for Everyone" games are vulnerable to increased consumption based on exposure to food brand logos in those games. Finally, food companies should extend voluntary pledges to reduce food marketing to include sports and other avenues that reach a large number of children.

Consumer demand can play a role in the types of products promoted to youth by food companies. The majority of sports-related food marketing involves unhealthy products, perhaps because large companies own mostly unhealthy products. Companies like Kellogg's, which owns healthy cereal brands like Kashi, only spent \$160 million on advertising for all their cereal brands in 2009 [103]. Still, they saw a 2% sales increase in response to a 17% increase in ad spending in the highly competitive cereal market [104]. One tool in changing what companies market seems to be consumer activism and demands for transparency and health. Companies "are well aware of the mounting distrust of Big Food" and state that social media has facilitated consumer conversations about which products to consume or avoid [105]. Aside from the consumer demand angle, using public health policies (e.g., sugary beverage taxes) to decrease consumer purchases of unhealthy products might also help shift the culture of consumption and lead companies to limit the presence of unhealthy products in sports advertising.

While food companies' use of sports to promote unhealthy food/beverage products may not explicitly target youth, this marketing technique appeals to young consumers and can influence false associations between energy-dense products and healthful behaviors among youth. Our review can inform policies

aimed to address the use of marketing practices used by food companies relevant to sports, athlete endorsements, and food product placement in advergames and video games. Voluntary food marketing pledges (e.g., Children's Food and Beverage Advertising Initiative) could expand to limit the amount of sports-related food marketing that reaches youth. In addition, sports organizations could require sponsors to showcase healthier products (e.g., the Professional Golf Association and PepsiCo showcase Aquafina as one of Pepsi's three sponsorship brands) [106], and advocates should continue demanding that food and beverage companies select healthier products for athlete endorsements [107] and praise companies when healthy partnerships are formed [108].

References

- [1] McGinnis JM, Gootman JA, Kraak VI. Committee on food marketing and the diets of children and youth; Institute of Medicine. Food marketing to children and youth: Threat or opportunity. Washington, DC: National Academies Press; 2006.
- [2] Australian Association of National Advertisers. Australian Association of National Advertisers Code for Advertising to Children. Available at: <http://aana.com.au/content/uploads/2014/05/AANA-Code-For-Marketing-Advertising-Communications-To-Children.pdf>. Accessed November 17, 2015.
- [3] Reinfeldt F, Sabuni N. Sweden: The Marketing Act (2008:486). Available at: http://www.wipo.int/wipolex/en/text.jsp?file_id=236789. Accessed November 17, 2015.
- [4] Shipley D. Children's Food Bill, 110. Available at: <http://www.publications.parliament.uk/pa/cm200304/cmbills/110/2004110.pdf>. Accessed November 17, 2015.
- [5] Hawkes C, World Health Organization. Marketing food to children [electronic resource]: Changes in the global regulatory environment, 2004–2006. Geneva, Switzerland: World Health Organization; 2007.
- [6] Centers for Disease Control and Prevention. Competitive foods and beverages in US schools: A state policy analysis. Atlanta: US Department of Health and Human Services; 2012. Available at: <http://www.cdc.gov/healthyyouth/nutrition/pdf/compfoods.booklet.pdf>. November 17, 2015.
- [7] Model Statute Limiting Food Marketing at Schools. Available at: http://www.changelabsolutions.org/sites/default/files/Model-Statute-Advert-School_FINAL-UPDATED_20170602_1.pdf. Accessed November 17, 2015.
- [8] Polacek M, O'Rourke K, O'Brien L, et al. Examining compliance with a statewide law banning junk food and beverage marketing in Maine schools. *Public Health Rep* 2012;127:216–23.
- [9] Story M, Kaphingst KM, Robinson-O'Brien R, et al. Creating healthy food and eating environments: Policy and environmental approaches. *Annu Rev Public Health* 2008;29:253–72.
- [10] Mello MM, Pomeranz J, Moran P. The interplay of public health law and industry self-regulation: The case of sugar-sweetened beverage sales in schools. *Am J Public Health* 2008;98:595–604.
- [11] Schneider LM, Schermbeck RM, Chiqui JF, et al. The extent to which school district competitive food and beverage policies align with the 2010 dietary Guidelines for Americans: Implications for federal regulations. *J Acad Nutr Diet* 2012;112:892–6.
- [12] Lipka M. NYC considers banning free toys with fatty foods. Available at: <http://www.cbsnews.com/news/new-york-city-to-consider-banning-free-toys-with-fatty-foods/>. Accessed November 17, 2015.
- [13] Harris JL, Schwartz MB, Munsell CR, et al. Fast food FACTS 2013: Measuring progress in nutrition and marketing to children and teens. New Haven, CT: Yale Rudd Center for Food Policy and Obesity; 2013.
- [14] Harris JL, Schwartz MB, LoDolce M, et al. Sugary drink FACTS 2014: Some progress but much room for improvement in marketing to youth. New Haven, CT: Rudd Center for Food Policy and Obesity; 2014.
- [15] Harris JL, Shehan C, Gross R, et al. Food advertising targeted to Hispanic and Black youth: Contributing to health disparities. *Rudd Report Uconn-ruddcenter.org/targetedmarketing*; 2015.
- [16] Harris JL, Pomeranz JL, Lobstein T, et al. A crisis in the marketplace: How food marketing contributes to childhood obesity and what can be done. *Annu Rev Public Health* 2009;30:211–25.
- [17] Chaudhuri A, Holbrook MB. The chain of effects from brand trust and brand affect to brand performance: The role of brand loyalty. *J Mark* 2001; 65:81–93.
- [18] Halford JCG, Gillespie J, Brown V, et al. Effect of television advertisements for foods on food consumption in children. *Appetite* 2004;42:221–5.

- [19] Halford JCG, Boyland EJ, Hughes G, et al. Beyond-brand effect of television (TV) food advertisements/commercials on caloric intake and food choice of 5–7-year-old children. *Appetite* 2007;49:263–7.
- [20] Harris JL, Bargh JA, Brownell KD. Priming effects of television food advertising on eating behavior. *Health Psychol* 2009;28:404–13.
- [21] Borzekowski DL, Robinson TN. The 30-second effect: An experiment revealing the impact of television commercials on food preferences of preschoolers. *J Am Diet Assoc* 2001;101:42–6.
- [22] Schor JB, Ford M. From tastes great to cool: children's food marketing and the rise of the symbolic. *J L Med Ethics* 2007;35:10–21.
- [23] Epstein LH, Leddy JJ, Temple JL, et al. Food reinforcement and eating: A multilevel analysis. *Psychol Bull* 2007;133:884–906.
- [24] Tetley A, Brunstrom J, Griffiths P. Individual differences in food-cue reactivity. The role of BMI and everyday portion-size selections. *Appetite* 2009;52:614–20.
- [25] Jansen A, Theunissen N, Slechten K, et al. Overweight children overeat after exposure to food cues. *Eat Behav* 2003;4:197–209.
- [26] Jansen A, Vanreyten A, van Balveren T, et al. Negative affect and cue-induced overeating in non-eating disordered obesity. *Appetite* 2008;51:556–62.
- [27] Harris JL, Speers SE, Schwartz MB, et al. US food company branded advergames on the Internet: Children's exposure and effects on snack consumption. *J Child Media* 2012;6:51–68.
- [28] Dunn ME, Yniguez RM. Experimental demonstration of the influence of alcohol advertising on the activation of alcohol expectancies in memory among fourth- and fifth-grade children. *Exp Clin Psychopharmacol* 1999;7:473–83.
- [29] Anderson CA, Bushman BJ. Psychology. The effects of media violence on society. *Science* 2002;295:2377–9.
- [30] Smith LA, Foxcroft DR. The effect of alcohol advertising, marketing and portrayal on drinking behaviour in young people: Systematic review of prospective cohort studies. *BMC Public Health* 2009;9:51.
- [31] Primack BA, McClure AC, Li Z, et al. Receptivity to and recall of alcohol brand appearances in U.S. popular music and alcohol-related behaviors. *Alcohol Clin Exp Res* 2014;38:1737–44.
- [32] Cornwall TB. State of Art and science in sponsorship-linked marketing. *J Advert* 2008;37:41–55.
- [33] IEG's Guide to Why Companies Sponsor. Available at: <http://www.sponsorship.com/Resources/What-Companies-Sponsor.aspx>. Accessed December 22, 2015.
- [34] Trefis Team. Coca-Cola in Brazil: Global Events And Energy Drinks Could Drive Growth (Part 1). Available at: <https://www.forbes.com/sites/greatspeculations/2014/03/12/coca-cola-in-brazil-global-events-and-energy-drinks-could-drive-growth-part-1/#598791f97f5e>. Accessed April 5, 2017.
- [35] Coca-Cola is refreshing and entertaining at Rio 2016. Available at: <https://www.olympic.org/news/coca-cola-is-refreshing-and-entertaining-at-rio-2016>. Accessed April 5, 2017.
- [36] Ng M, Fleming T, Robinson M, et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: A systematic analysis for the Global Burden of disease study 2013. *Lancet* 2014;384:766–81.
- [37] Stynes T. Coca-Cola plans to spend additional \$5 billion in Africa. Available at: <https://www.wsj.com/articles/coca-cola-plans-to-spend-additional-5-billion-in-africa-1407256018>. Accessed April 5, 2017.
- [38] Gulati N, Ahmed R. India has 1.2 billion people but not enough drink Coke. Available at: <https://www.wsj.com/articles/SB10001424052702304870304577490092413939410>. Accessed April 5, 2017.
- [39] International Olympic Committee. Olympic Partner Programme. Available at: <https://www.olympic.org/sponsors>. Accessed December 21, 2016.
- [40] Marketing Fact File. Available at: <https://www.olympic.org/news/marketing-fact-file-facts-and-figures>. Accessed December 21, 2016.
- [41] Baker L, Grohmann K. McDonald's ends Olympics sponsorship deal early. Available at: <https://www.reuters.com/article/us-olympics-mcdonalds/mcdonalds-ends-olympics-sponsorship-deal-early-idUSKBN1971HB>. Accessed on October 16, 2017.
- [42] McDonald's. McDonald's Chicken McNuggets Commercial Olympic Gold Medal. 2014. Available at: <https://www.youtube.com/watch?v=G-q2cTv0OFY>. Accessed November 25, 2015.
- [43] Pepsi. Pepsi Refresh NFL. 2009. Available at: <https://www.youtube.com/watch?v=5d7dGIbmVBI>. Accessed November 25, 2015.
- [44] Taco Bell A M Crunchwrap - Funny MLB player stealing breakfast during games. 2015. Available at: <https://www.youtube.com/watch?v=ySYP6T-Tkm4>. Accessed November 25, 2015.
- [45] Coca-Cola. LeBron James vs China Yao Ming - Coke Commercial. Available at: <https://www.youtube.com/watch?v=W6I9Ac5FNTY>. Accessed November 25, 2015.
- [46] Reese's Candy. Reese's TV Commercial, 'NCAA Basketball'. 2014. Available at: <https://www.youtube.com/watch?v=Omzi5mZ9oS8>. Accessed November 25, 2015.
- [47] Journey C. The World's Biggest Public Companies. Available at: <https://www.forbes.com/sites/corinnejourney/2017/05/24/the-worlds-largest-public-companies-2017/#54350975508d>. Accessed May 25, 2017.
- [48] Zmuda N. Coca-Cola maintains marketing spend amid sluggish demand. Available at: <http://adage.com/article/cmo-strategy/coca-cola-maintains-marketing-spend-amid-sluggish-demand/294251/>. Accessed April 5, 2017.
- [49] Harris JL, Schwartz MB, Brownell KD, et al. Evaluating fast food nutrition and marketing to youth. New Haven, CT: Yale Rudd Center for Food Policy & Obesity; 2010.
- [50] AdvertisingAge. Fast food marketing. Available at: http://gaia.adage.com/images/bin/pdf/Kantar_whitepaper.pdf. Accessed on September 10, 2017.
- [51] Kelly B, Baur LA, Bauman AE, et al. "Food company sponsors are kind, generous and cool": (mis)conceptions of junior sports players. *Int J Behav Nutr Phys Act* 2011;8:95.
- [52] Carter M-A, Edwards R, Signal L, et al. Availability and marketing of food and beverages to children through sports settings: A systematic review. *Public Health Nutr* 2012;15:1373–9.
- [53] Bragg MA, Liu PJ, Roberto CA, et al. The use of sports references in marketing of food and beverage products in supermarkets. *Public Health Nutr* 2013;16:738–42.
- [54] Method behind March Madness: Why and how Americans engage with the NCAA Basketball Tournament. Available at: <http://www.nielsen.com/us/en/insights/news/2017/method-behind-march-madness-why-and-how-americans-engage-with-ncaa-basketball-tournament.html>. Accessed May 5, 2017.
- [55] Lenhart A. Teens, social media & technology overview. 2015. Available at: <http://www.pewinternet.org/2015/04/09/teens-social-media-technology-2015/>. Accessed February 22, 2016.
- [56] Dixon H, Scully M, Wakefield M, et al. Parent's responses to nutrient claims and sports celebrity endorsements on energy-dense and nutrient-poor foods: An experimental study. *Public Health Nutr* 2011;14:1071–9.
- [57] Bragg MA, Yanamadala S, Roberto CA, et al. Athlete endorsements in food marketing. *Pediatrics* 2013;132:805–10.
- [58] LeBron James Sprite NBA Commercial. Available at: <https://www.youtube.com/watch?v=qYbVvylh5bg>. Accessed November 25, 2015.
- [59] Papa John's Peyton Manning Back to the Future. Available at: <https://www.youtube.com/watch?v=g6In-toKpiE>. Accessed November 25, 2015.
- [60] Double Stuff Oreo Blimp Commercial with Manning Brothers and Williams Sisters. Available at: <https://www.youtube.com/watch?v=8HIKKS9OZWg>. Accessed November 25, 2015.
- [61] Powerade Chris Paul Commercial. Available at: <https://www.youtube.com/watch?v=I0DCcYONxRA>. Accessed November 25, 2015.
- [62] Sydney Crosby Gatorade Commercial. Available at: <https://www.youtube.com/watch?v=OZfpvhnV5mo>. Accessed November 25, 2015.
- [63] Montgomery KC, Chester J. Interactive food and beverage marketing: Targeting adolescents in the digital age. *J Adolesc Health* 2009;45: S18–29.
- [64] Lingas EO, Dorfman L, Bukofzer E. Nutrition content of food and beverage products on Web sites popular with children. *Am J Public Health* 2009;99(Suppl. 3):S587–92.
- [65] Henry AE, Story M. Food and beverage brands that market to children and adolescents on the internet: A content analysis of branded web sites. *J Nutr Educ Behav* 2009;41:353–9.
- [66] Weber K, Story M, Harnack L. Internet food marketing strategies aimed at children and adolescents: A content analysis of food and beverage brand web sites. *J Am Diet Assoc* 2006;106:1463–6.
- [67] Computer and Internet Use by Children and Adolescents in 2001. Available at: <https://nces.ed.gov/pubs2004/2004014.pdf>. Accessed December 15, 2016.
- [68] Advergames and the online marketing of food to children. Available at: <https://kaiserfamilyfoundation.files.wordpress.com/2013/01/7536.pdf>. Accessed December 15, 2016.
- [69] EA Sports. Madden NFL '10. Available at: <http://www.ea.com/madden-10>. Accessed on November 17, 2015.
- [70] EA Sports. NASCAR '07. Available at: <http://www.ea.com/uk/nascar-07>. Accessed on November 17, 2015.
- [71] Nintendo Wii. NASCAR Kart Racing. Available at: <http://www.gamestop.com/wii/games/nascar-kart-racing/73067>. Accessed November 17, 2015.
- [72] Folkvord F, Anschütz DJ, Buijzen M, et al. The effect of playing advergames that promote energy-dense snacks or fruit on actual food intake among children. *Am J Clin Nutr* 2013;97:239–45.
- [73] Dias M, Agante L. Can advergames boost children's healthier eating habits? A comparison between healthy and non-healthy food. *J Consumer Behav* 2011;10:152–60.
- [74] Kunkel D, Wilcox BL, Cantor J, et al. Report of the APA task force on advertising and children. Washington, DC: American Psychological Association; 2004.
- [75] Cornwell TB, Coote LV. Corporate sponsorship of a cause: The role of identification in purchase intent. *J Bus Res* 2005;58:268–76.

- [76] Gwinner KP, Eaton J. Building Brand Image Through Event Sponsorship: The Role of Image Transfer. *J Advert* 1999;28:47–57.
- [77] Keller KL. Conceptualizing, Measuring, and managing customer-based brand equity. *J Mark* 1993;57:1–22.
- [78] Mars sees success from NFL partnership. Available at: <http://www.sponsorship.com/IEGSR/2015/10/26/How-Sweet-It-Is-Mars-Sees-Success-From-NFL-Partne.aspx>. Accessed December 15, 2016.
- [79] Kelly B, Baur LA, Bauman AE, et al. Food and drink sponsorship of children's sport: Who pays? *Health Promot Int* 2011;26:188–95.
- [80] Macniven R, Kelly B, King L. Unhealthy product sponsorship of Australian national and state sports organisations. *Health Promot J Austr* 2015;26:52–6.
- [81] Kelly B, Baur LA, Bauman AE, et al. Role modelling unhealthy behaviours: Food and drink sponsorship of peak sporting organisations. *Health Promot J Austr* 2011;22:72–5.
- [82] Kelly B, Baur LA, Bauman AE, et al. Tobacco and alcohol sponsorship of sporting events provide insights about how food and beverage sponsorship may affect children's health. *Health Promot J Austr* 2011;22:91–6.
- [83] Pettigrew S, Rosenberg M, Ferguson R, et al. Game on: Do children absorb sports sponsorship messages? *Public Health Nutr* 2013;16:2197–204.
- [84] Bestman A, Thomas SL, Randle M, et al. Children's implicit recall of junk food, alcohol and gambling sponsorship in Australian sport. *BMC Public Health* 2015;15:1022.
- [85] Kelly B, Baur LA, Bauman AE, et al. Restricting unhealthy food sponsorship: Attitudes of the sporting community. *Health Policy* 2012;104:288–95.
- [86] Kelly B, King L, Bauman AE, et al. Identifying important and feasible policies and actions for health at community sports clubs: A consensus-generating approach. *J Sci Med Sport* 2014;17:61–6.
- [87] Bush AJ, Martin CA, Bush VD. Sports celebrity influence on the behavioral intentions of generation Y. *J Advert Res* 2004;44:108–18.
- [88] Kahle LR, Homer PM. Physical attractiveness of the celebrity endorser: A social Adaptation perspective. *J Consum Res* 1985;11:954–61.
- [89] Kamins MA. An investigation into the “match-up” hypothesis in celebrity advertising: When beauty may be only skin deep. *J Advert* 1990;19:4–13.
- [90] Kamins MA, Gupta K. Congruence between spokesperson and product type: A matchup hypothesis perspective. *Psychol Mark* 1994;11:569–86.
- [91] Till BD, Shimp TA. Endorsers in Advertising: The Case of Negative Celebrity Information. *J Advert* 1998;27:67–82.
- [92] Official Sponsors. Available at: http://www.nascar.com/en_us/sponsors.html. Accessed December 16, 2016.
- [93] Dixon H, Scully M, Niven P, et al. Effects of nutrient content claims, sports celebrity endorsements and premium offers on pre-adolescent children's food preferences: Experimental research. *Pediatr Obes* 2014;9:e47–57.
- [94] Chernev A, Chandon P. Calorie estimation biases in consumer choice. Leveraging Consumer Psychology for Effective Health Communications: The Obesity Challenge; 2010:104–21.
- [95] Sundar A, Kardes FR. The role of perceived Variability and the health halo effect in nutritional Inference and consumption. *Psychol Mark* 2015;32:512–21.
- [96] Boyland EJ, Harrold JA, Dovey TM, et al. Food choice and over-consumption: Effect of a premium sports celebrity endorser. *J Pediatr* 2013;163:339–43.
- [97] Karrh JA, McKee KB, Pardun CJ. Practitioners' evolving views on product placement effectiveness. *J Advert Res* 2003;43:138–49.
- [98] Gupta PB, Gould SJ. Consumers' perceptions of the ethics and acceptability of product placements in movies: Product category and individual differences. *J Curr Issues Res Advertising* 1997;19:37–50.
- [99] Auty S, Lewis C. Exploring children's choice: The reminder effect of product placement. *Psychol Mark* 2004;21:697–713.
- [100] Kelly B. Building solutions to protect children from unhealthy food and drink sport sponsorship. Available at: <http://sydney.edu.au/medicine/public-health/prevention-research/pdf/CCN13208Sportsshipreport.pdf>. Accessed December 15, 2016.
- [101] Salt Reduction in Victoria. Available at: <https://www.vichealth.vic.gov.au/programs-and-projects/salt-reduction>. Accessed December 20, 2016.
- [102] Castonguay AL, Pila E, Wrosch C, et al. Body-related self-conscious emotions relate to physical activity motivation and behavior in men. *Am J Mens Health* 2015;9:209–21.
- [103] Harris JL, Schwartz MB, Brownell KD, et al. Cereal FACTS 2012: Limited progress in the nutrition quality and marketing of children's cereals. Rudd Center for Food Policy & Obesity; 2012:12. Available at: www.Cerealfacts.org/media/Cereal_FACTS_Report_2012_7.
- [104] York E. Kellogg credits 17% ad spending boost for increased earnings. Available at: <http://adage.com/article/news/kellogg-credits-17-ad-spending-boost-increased-earnings/140065/>. Accessed April 5, 2017.
- [105] Schultz EJ. Big Food's big problem: Consumers don't trust brands. Available at: <http://adage.com/article/cmo-strategy/big-food-falters-marketers-responding/298747/>. Accessed May 5, 2017.
- [106] Official Sponsors. Available at: <http://www.pga.com/pga-america/pga-feature/pga-partners>. Accessed June 5, 2017.
- [107] Lee K, Fooks G, Wander N, et al. Smoke rings: Towards a comprehensive tobacco free policy for the Olympic Games. *PLoS One* 2015;10:e0130091.
- [108] Schultz EJ. Steph Curry Backs Brita – Not Coke or Pepsi. Available at: <http://adage.com/article/cmo-strategy/steph-curry-backs-brita-coke-pepsi/301841/>. Accessed June 5, 2017.