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Food and Beverage Marketing to Youth

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Abstract After nearly a decade of concern over the role of food and beverage marketing to youth in the childhood obesity epidemic, American children and adolescents — especially those from communities of color — are still immersed in advertising and marketing environments that primarily promote unhealthy foods and beverages. Despite some positive steps, the evidence shows that the food and beverage industry self-regulation alone is not likely to significantly reduce marketing of unhealthy foods and beverages to youth. A variety of research is needed to monitor industry marketing of unhealthy products to young people, and identify the most promising approaches to improve children's food marketing environments. The continued presence of unhealthy marketing toward children despite years of industry self-regulation suggests it is time for stronger action by policymakers to protect young people from harmful marketing practices.

Keywords Marketing · Food and beverage marketing · Children · Adolescents · Industry self-regulation · Policy · Digital · Food environments · Schools

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Introduction

Since the onset of national concern over the epidemic rates of obesity among young people, food companies [1], governments [2, 3], and schools [2, 3] have all made some efforts to improve young people's food marketing environments in the United States. Despite these efforts, however, youth nevertheless grow up surrounded primarily by promotions for foods and beverages that fail independent nutritional criteria [4]. Research has long established that the food marketing young people receive matters because it influences children's food preferences, requests, dietary behaviors and health outcomes [5]. In particular, young people's exposure to marketing for products with few nutrients but high in sugar, salt, and saturated fats is associated with overweight and obesity [6], with youth from communities of color facing disproportionate burdens from these conditions [7]. In turn, young people who become overweight or obese are at an elevated risk for a variety of nutrition-related chronic diseases that can affect them for the rest of their lives [8, 9].

This review examines the context of youth's exposure to food and beverage marketing — especially the disparities facing low-income and youth of color, the prominent forms of these marketing practices, and the implications for policy interventions and future research that seek to protect youth from these harmful practices.

Youth, and Youth of Color, are Specifically Targeted

Marketing Foods and Beverages to Youth Through the "4 P's"

Young people are a key audience targeted by food and beverage marketers. Between 1994-2004, companies brought to market 4447 new food and beverage products aimed at youth, nearly ten times as many new products aimed at the general

market during that time [10]. In 2009, the major food and beverage manufacturers spent $1.8 billion on promotions to children and adolescents for products with generally unhealthy levels of saturated fat, sugar, or sodium [11]. This included a dramatic 50 % increase in expenditures on digital promotions [11]. Marketers such as fast-food companies use price strategies such as dollar menus to reach young people with limited disposable income [12]. Food and beverage companies also inundate the places youth frequent, including schools, neighborhoods, youth events, and the digital spaces in which youth socialize.

Marketing Targeting Youth from Communities of Color

Youth from African American, Latino, and other communities of color are coveted target audiences for food and beverage marketers. These young people are early adopters [13, 14] and heavy users of media devices [15], and are considered cultural trend-setters for their peers [16, 17]. This may be in part why food and beverage companies target children and youth of color. Research consistently illustrates that youth of color are disproportionately targeted with marketing for unhealthy foods and beverages [18–20].

Between 2008 and 2010, when compared with White children and adolescents, African American youth were exposed to 80 percent to 90 percent more television commercials for sugary beverages and energy drinks, while Latino children were exposed to 49 percent more commercials [19]. Analyses of English-language and Spanish-language television ads for all foods have found that fast food advertisements were more common on Spanish-language television [20], and that the foods advertised were of poorer nutritional quality [18]. Comprehensive reviews illustrate that Latino youths are particularly likely to be vulnerable to food and beverage marketing because they have higher levels of media exposure and companies use targeted strategies to reach this population, ultimately concluding that industry self-regulation is less effective at protecting Latino youths [17, 21].

Latino and African-American youth also tend to live in neighborhoods with greater density of convenience stores and restaurants that market unhealthy foods, and that specifically target children [22, 23]. For example, convenience and grocery stores are nearly twice as likely to include cartoon characters promoting unhealthy snacks (48.1 % versus 26.3 %) and breakfast cereals (44.4 % versus 25.0 %) in predominantly African American as compared to White neighborhoods [22]. A study that compared restaurant marketing by neighborhood found that restaurants in low-income neighborhoods with high minority populations were more likely to be fast food restaurants, had fewer healthy entrees than those in other neighborhoods, and were more likely to target children with marketing strategies like children's meals and special characters [23]. Moreover, the fast food outlets located in low-income communities of color employ more aggressive place-based marketing strategies, such as exterior advertising, than their counterparts in high-income, majority White neighborhoods [24].

Community-centered research suggests that despite public health concerns over target marketing of unhealthy foods and beverages, youth of color often have more nuanced relationships with food marketers. Focus groups with African American youth and adults indicate that some respondents are highly critical of using cultural cues to target their community, while others see targeting as normal business practices and praise special products or the use of popular celebrities [16]. A qualitative study examining caregiver's perceptions of African-American children's food environments revealed widespread awareness of food marketing as supporting unhealthy eating, but also loyalty to companies that sponsored local events, contributing to conflicting views about the overall impact of food companies' impact in African American communities [25].

Prominent Forms of Food and Beverage Marketing Targeting Youth

The food and beverage industry uses several prominent forms of marketing to target young people, including television, digital media, product packaging, school and neighborhood environments, and neural techniques.

Television

Though food and beverage industry spending on television expenditures has declined [11], television remains the primary tool for marketing to youth: in 2009, television accounted for more than one-third of all food and beverage advertising expenditures [4]. As of 2011, the average child aged 2-11 saw nearly 13 food and beverage ads per day [26], while teens saw an average of 16 per day [26].

Cumulatively, children are on average exposed to more than 900 calories per day from television [27], primarily from promotions for unhealthy items [19, 28]. In 2008, for example, children saw four times as many ads for high sugar cereals as did adults [29]. Despite the introduction of industry self-regulatory pledges, fast-food advertising to children on television actually increased by more than 20 percent from 2003 to 2009 [28]; similarly, between 2008 and 2010, children's exposure to television commercials doubled for non-diet soda [19]. Sugary drinks accounted for 70 % of the brand appearances children identified during popular prime-time programming [30].

Televised food ads that children see employ a series of persuasive techniques, most commonly including premium

offers (toy giveaways), appearances by promotional characters, health and nutrition claims, and appeals to taste and fun [31]. These techniques are frequently used together: licensed or trademarked promotional characters appear in nearly three out of four child-targeted food ads, and the majority of those include health or nutrition messages, despite the fact that most of the foods advertised are of poor nutritional quality [32]. Indeed, the majority of commercials for unhealthy foods feature health-related messages [29, 32, 33] while most commercials featuring physically fit professional athletes promote energy dense, nutrient-poor foods [34].

Beyond commercials, the majority of food and beverage product placements on youth-oriented or "tween" programming (that is, foods that are eaten, discussed, appear in the background or as part of a plotline, etc.) do not conform to independent nutrition recommendations [35]. Experimental research suggests that children, especially older children, are vulnerable to placements for unhealthy products promoted on television [36].

A substantial body of research highlights limitations of the food and beverage industry's self-regulatory policies governing television through the Children's Food and Beverage Advertising Initiative (CFBAI). According to CFBAI guidelines, television shows are child-directed if the audience base comprises more than 35 % children aged 12 and under — a definition that excludes slightly more than half of all food and beverage ads seen by children [37]. When compared to commercials seen by adults, fast-food ads promoting children's meals emphasize toy premiums and movie tie-ins with substantially reduced promotion of food items, practices that contravene self-regulatory pledges made in the CFBAI which promise to highlight food products instead of toy premiums in advertising directed to children [38]. Experimental evidence indicates that while food marketers such as fast-food companies have changed their advertising to promote healthier options such as apple slices instead of French fries, children mistake the apples for fries, suggesting that even fast-food ads compliant with self-regulation can deceive children [39]. Overall, advertisements from CFBAI member companies promote fewer healthy products than ads from non-member companies [40]: according to one study, almost all ads by CFBAI member companies that appeared on children's programming were for products high in calories, saturated and trans fats, sodium or total sugars [40]. Though there is increasing evidence that teens who are especially receptive to food advertising may be at higher risk for obesity [41, 42], the CFBAI does not govern marketing to children 12 years and older.

Digital Food and Beverage Marketing to Youth

Food and beverage marketers increasingly use digital media to engage young people and integrate brands into their online identities [43]; between 2006 and 2009, industry spending on digital marketing to youth rose more than 50 % [11]. Mobile marketing is a key venue for food and beverage marketing to youth, as 95 % of adolescents are online, and 37 % report owning a smart phone; 93 % of 12-13 year-old are online, and 71 % report having mobile access to the Internet [44]. As early adopters and the heaviest users of digital media devices, youth of color are particularly vulnerable to digital marketing exposures [15, 45, 46].

Food marketers maintain a dominant presence on the digital channels popular with youth such as smartphone applications, text messaging, and banner ads on mobile websites to engage youth [47]. On Facebook, a key marketing channel to reach youth, unhealthy food and beverage brands make up five of the top ten most popular on the influential social network [48]. Such social media activity is an important predictor of real-world behavior: Coca-Cola has more than 30 million Facebook "fans," for example, who are twice as likely to drink and ten times more likely to buy Coca-Cola products than consumers who are not declared fans [49]. McDonald's web-based marketing targets children as young as 2 years old [50].

Food and soft drink companies use sophisticated techniques to embed marketing content into immersive online experiences to target children and adolescents that are designed to tap into youths' subconscious processes that compromise rational decision-making [46]. Scholars have also indicated that these practices may be "inherently deceptive" and violate children's privacy protections, because such strategies intend to reach youth in part by bypassing their cognitive defenses [46, 51–53].

Digital food marketing is a pervasive and highly successful practice, especially when it involves branded game play through "advergames." In 2009, more than 2 million youth visited food and beverage websites with advergames on average every month, spending 88 % longer on these sites than on websites that did not [47]. Advergames promoting unhealthy foods embed branded games into playful environments that build positive brand associations for youth without appearing to be advertising [47, 54]. Sugary cereal advergames, for instance, teach children that "the most nutritionally poor food items are the most valuable," and that consuming them will not affect their health [55].

Multiple studies have found that CFBAI-participating companies successfully use advergames to target children with foods that fail CFBAI and independent nutritional criteria [47, 56, 57]. An analysis of CFBAI-participating companies' digital marketing found that one-half of the websites with substantial audiences of children included advergames featuring foods that violated the companies' own nutritional criteria for marketing directed to children; among these advergames, candy was the most-frequently promoted food category [47]. Of food advergames popular with children, nearly 80 % are sponsored by CFBAI-participating companies [56]. Eighty-

eight percent of these games do not include age limitations, and compared to advergames not popular with children, these games included higher levels of brand integration and promoted unhealthier foods; games with greater brand presence were also more likely to be popular with children [56]. Cross-national data indicate that because of relatively lax protections, when compared to European countries such as France, U.S. digital marketing to children emphasizes unhealthy features such as brands, games, and rewards instead of nutrition and health [58].

A growing body of work extends core findings about the effects of television food advertising on children [5] to examine the efficacy of digital techniques. Experimental studies have diverged on whether the placement of unhealthy products in branded advergames influences children to consume more unhealthy foods than when children are exposed to advergames with healthful foods [47, 59]. A randomized trial found children playing games featuring energy-dense snacks or fruit ate increased levels of food after gaming compared to children exposed to the control condition, suggesting that even games promoting healthy foods can encourage unhealthy eating behaviors [59].

Research on the effects of advergames consistently shows that fewer children are aware of the advertising in advergames than on television [54, 60–62], and higher levels of children reporting positive views toward advertising in social games [60, 61]. Experimental research shows that the "underlying mechanism of the persuasion process" differs for traditional and digital marketing, and that a critical attitude toward marketing, rather than cognizance of it, is a superior defense against the persuasive impact of advergames; this indicates that children may be vulnerable until older than previously suggested by studies using television, when such a critical attitude can develop [60, 61]. The social aspect of online gaming is also salient because the susceptibility to peer pressure is a key influence on children's desire for the brands promoted [60].

Marketing to Youth with Product Packaging

Marketing through product packaging may include a variety of techniques like celebrity endorsements; the use of licensed media characters or company-owned spokescharacters; or marketing messages that evoke the product's taste, convenience, nutritional value, or other attributes [63]. These techniques are effective in helping marketers appeal to both children and their parents: for example, research indicates that when young children see cereal boxes branded with media characters, their preference for the cereal inside increases [64]. Parents report that they are more willing to buy their children cereals that feature health and nutrition claims [65], though such on-package nutrition claims have been found to create a "backlash effect" on children, leading them to choose less healthy products under experimental conditions [66]. Despite the effectiveness of on-package marketing techniques, CFBAI does not apply to product packaging at all, unless the packaging is itself featured in ads that directly target children under age 12 [67].

Observational surveys have found that companies regularly use on-package marketing techniques to reach children. A study of retail stores in Illinois found that at many of the most popular stores for families, child-targeted packaging techniques appeared on the majority of products across all food categories, and were used most frequently on the packaging of unhealthy items [63]. Similarly, a Connecticut study found that marketers target children for the purchase of unhealthy foods by incorporating references to popular athletes, sports teams, and physical activity into the packaging of many foods and beverages that do not meet nutritional standards [34]. Marketers may also combine on-package marketing tactics to maximize their products' appeal to children: cereals branded with child-targeted spokescharacters, for example, have been found to be strategically positioned in stores to maximize the characters' eye contact with children, building their trust in and connection to the brand by 16-28 % [68].

Food packaging that supports point-of-sale marketing promotions is not covered by CFBAI [4]. Some efforts have been made on a local level to improve the nutrition standards of the children's meals offered at fast-food restaurants that include toy giveaways, and there is evidence that at a population level, these policies could help avert weight gain among children [69]. However, preliminary studies of counties that have implemented such policies indicate that they have produced only minimal improvements in the nutritional quality of children's meals offered [70].

Food and Beverage Marketing to Youth in Schools

Food and beverage marketing in elementary and secondary schools is widespread [71]. Much of this research has examined whether school food environments are in compliance with national requirements [72–74], notably The Healthy, Hunger-Free Kids Act of 2010, which directed the USDA to align the nutrition standards for all foods and beverages sold in schools with current dietary guidelines.

A national analysis examining whether school district's policies on competitive foods conformed to the 2010 USDA Dietary Guidelines for Americans found that less than 5 % of school district's policies were in compliance, suggesting little implementation of this requirement of the Healthy, Hunger-Free Kids Act of 2010 [72]. A national survey of elementary schools for the 2009–2010 school year found that 60 % of public elementary students were able to purchase beverages outside the school lunch program, a significant increase from 2006–2007 [74]. Over the same period, a separate analysis of the Institute of Medicine (IOM)'s recommendation that

elementary students only have access to healthful beverages (1 % milk, 100 % juice, and water) increased from 10 % to 19 % [74]. Across the country, 10 % of elementary school students and almost one third of high school students have access to fast food at least once a week during school lunch [75].

In addition, while federal law mandated public elementary schools to create wellness policies that included criteria for competitive foods and beverages by the 2006 school year, only 55 % of elementary schools had such policies for the 2009-2010 school year [76]. A nutritional survey analyzing vending machines in secondary schools in the St. Paul-Minneapolis area found that more than 95 % of foods offered failed IOM criteria for foods sold outside of meal programs [73]. To address concerns about the impact of creating wellness policies with nutritional criteria on competitive foods that meet the 2010 Dietary Guidelines for Americans, a national projection estimated that such policies would improve the health status of students — especially among those populations suffering from the greatest exposure to unhealthy food and beverage marketing; at the same time, any revenue decline schools experience would be offset by increased reimbursements from greater meal program participation [77].

In addition, research indicates that students in low-income schools are more likely to be exposed to various forms of food and beverage marketing than students attending high-income schools [71], and are also more likely to be exposed to unhealthy food and food marketing in businesses close to their schools [78]. A study mapping fast food locations and Boston-area schools, for example, found that schools in low-income neighborhoods were closer to fast food restaurants and convenience stores, disproportionately exposing children attending those schools to unhealthy eating options [78].

Outdoor Food and Beverage Advertising Targeting Youth

Youth are also exposed to significant marketing where they live, including the food outlets and outdoor advertising in their communities. As of 2009, major food and beverage companies spent $113 million on in-store and product packaging marketing [11], and more than $75 million on outdoor advertising in 2006 [79].

A growing body of research has found that because food marketing is frequently found in neighborhoods surrounding schools [80], "youth may be exposed to a disproportionate amount of outdoor food and beverage advertising, especially for unhealthy products" [80]. Survey results found that almost 70 percent of stores in Los Angeles County had outdoor advertising promoting unhealthy products while only 12 percent of stores displayed exterior advertising for healthy products such as fresh fruits or vegetables; many stores are within 1000 feet of schools and are frequented by youth before or after school [81]. Pilot data collected near four middle schools in Austin, TX, found 563 advertisements in the surrounding area, the majority (56 %) of which were on nearby convenience stores or gas stations [80].

The connections between place-based marketing and health outcomes are complex. Much of the research on place-based marketing has focused on differences in exposure across communities based on differences in socioeconomic and racial characteristics. Low-income communities of color are less likely to have grocery stores [82], and low-income neighborhoods tend to have a higher density of fast food outlets offering unhealthy options [23, 78]. Within neighborhoods, the lowest-income residents tend to live closer to fast food outlets [83]. Some studies have found that proximity to unhealthy food outlets such as fast food restaurants is associated with unhealthy eating patterns among low-income African American children [84] and teens [85], and higher body mass index (BMI) among adults [83]. Others have found that the overall economic health and retail variety of the neighborhood, rather than the presence or absence of fast food outlets, may have the greatest impact on supporting or harming children's and teen's health [86, 87].

Youth's Neural Responses to Food and Beverage Marketing

A growing body of research highlights the powerful effects of food and beverage marketing on children by measuring neural responses using sophisticated brain scanning technologies such as functional magnetic resonance imaging (fMRI). A study of 17 children compared responses to food versus other corporate logos. When exposed to food logos, children's brains experienced significant activation in areas known to control reward responses and brand recognition, suggesting food logos are especially "emotionally salient" for children [88]. Further research examined adolescents' response to food and non-food control commercials, instead of logos, with similar findings of mental activation as well as heightened recall, indicating the power of food messages [89]. A study of 27 adolescents found that regular Coca-Cola drinkers exhibited lower inhibition when anticipating consuming Coca-Cola, and greater stimulation when exposed to the Coke logo, indicating a potential neurological basis "to perpetuate habitual consumption" [90].

There is some disagreement on whether overweight youth exhibit particular vulnerabilities to food marketing. A comparative analysis of ten healthy weight and ten obese children's neural responsivity found that obese children exhibited significantly less response to food logos in brain regions known to regulate cognitive control, and somewhat greater response in reward regions [91]. A study of 30 adolescents found that lean adolescents displayed the greatest impulse control reaction to food commercials combined with messages about the difficulty of weight control, however, suggesting

that all teens may be vulnerable to food marketing messages [89].

Implications for Addressing Unhealthy Food and Beverage Marketing to Youth

This review suggests several implications for protecting children from environments that promote unhealthy foods and beverages, including evaluations of existing policies, improvements to policies that protect youth from marketing, and areas for future research.

Evaluating Policy Efforts to Address Food and Beverage Marketing to Youth

Nationally, the primary policy response to unhealthy food and beverage marketing targeting youth has been industry self-regulation. While the industry continues to improve its self-regulatory programs [92–94], significant loopholes and gaps remain. A comprehensive review of all industry actions to meet the IOM's recommended actions established in 2006 to address unhealthy food marketing to youth, found that the private sector has achieved only "limited" to "moderate" advancement [1]. For example, in 2010, three out of four children's cereals — a key product category marketed to children — failed to meet the voluntary nutritional criteria suggested as healthy for marketing to youth by the Interagency Working Group on Food Marketed to Children (IWG) [95]. In July 2011, the CFBAI announced uniform nutrition criteria within product categories that conform to the 2010 USDA Dietary Guidelines for Americans, with member companies pledging to stop advertising products that do not meet the uniform criteria as of January 1, 2014 [92]. As of this writing, those standards have not been in effect long enough to assess.

During the same period, food and beverage industry lobbyists sought to halt the release of comprehensive voluntary marketing guidelines to improve the nutritional quality of food and beverage products marketed to American children and adolescents. The guidelines were developed at the request of Congress by the IWG, comprised of agency representatives from the Federal Trade Commission (FTC), USDA, Food and Drug Administration (FDA), and Centers for Disease Control and Prevention (CDC). Amidst $37 million in industry lobbying [96], the FTC initially recommended that the draft IWG principles exclude a variety of food activities that target youth, and that the principles apply only to children under age 12 instead of 17 [97]. In December 2011, Congress required a cost-benefit analysis of the proposed voluntary guidelines [98], effectively halting the IWG process without additional appropriations to fund the analysis.

Evaluations of interventions by local authorities to improve food and beverage marketing to children have shown varied results. An assessment of the Santa Clara County, CA, ordinance that required children's meals at fast-food chain restaurants including toy premiums to meet nutritional criteria found that while the policy did not improve the nutritional quality of children's meals at these locations, the franchises had improved their marketing practices to promote healthier offerings as stipulated by the policy [99]. An evaluation of Boston public schools' limitation on sugary beverages found that the policy substantially reduced the average daily sugary beverage consumption among high school students from 1.71 to 1.38 [100]. A nationally-representative survey of middle schools, however, found that policies to prevent the sale of some or all sugary beverages successfully reduced students' in-school access to these unhealthy products, but was not associated with significantly different overall intake of sugary beverages [101].

Improving Policies to Protect Youth from Marketing

Public schools are a logical place to protect children from food and beverage marketing. Because schools are vested with the legal responsibility of "in loco parentis" to protect and care for children, they are subject to lower thresholds to governmental interventions on commercial speech, and are ideal institutions to implement restrictions on marketing practices for unhealthy foods [102]. USDA's proposed rule for local school wellness policies to restrict marketing to foods and beverages that meet the Smart Snacks in Schools nutrition standards [103] is an important opportunity to bring protections to children from marketing in schools.

Policies and self-regulatory strategies based on research using television commercials must be adjusted to take account of the unique persuasion mechanism of interactive digital marketing techniques to protect against children's particular vulnerabilities to these advertising forms [62, 104]. Currently, regulations are based on a model from television research in which children develop cognitive awareness of advertising's persuasive intent by approximately age 12. This is not a sufficient model for protection against digital marketing, which requires the viewer to form a critical attitude toward marketing that typically occurs in a later developmental stage [41].

Aligning the currently large number of nutritional guidelines (USDA [105], FDA [106], IOM [107]) into a standardized system, such as proposed through the IWG, would better inform the public about the healthfulness of foods marketed to children and offer researchers a single metric with which to evaluate industry progress [57]. Policies could then conform around that single standard, making it easier for food and beverage companies to know what was expected and comply.

The science identifying sugar — often found in large quantities in products marketed to youth — as addictive has important policy implications. Addictiveness is traditionally associated with the intoxication and overdose of substances not essential for human life; sugar addiction relies on the inability to exert control over consumption when facing negative consequences. As this science matures, it will suggest legal and regulatory approaches to address the health consequences of sugar addiction [108].

Areas for Further Research

Because food and beverage marketing to youth includes a dynamic landscape of industry players and practices, as well as an evolving set of public health policy interventions, there are a variety of important avenues for further research. These include the targeting of key populations, the power of digital and other "stealth" forms of marketing, monitoring industry self-regulatory programs, brain development studies to assess how youth are affected by marketing, and legal research on opportunities for public policy approaches to protect children and youth from the harmful effects of food and beverage marketing.

Key Populations

More research is needed to assess the effects of food and beverage marketing targeting youth from low income and communities of color to health outcomes [109]. Most analyses of marketing to youth of color focus on Latino and African American populations, while additional focus is needed on Asian and Pacific Islander, Native American, and other youth populations targeted by marketers [14]. Many young people from these communities also struggle with low incomes, making them particularly vulnerable to unhealthy food marketing, and further research should explore these intersections and their implications.

"Stealth" and Digital Marketing

As youth appear to be more vulnerable to "stealth" [110] forms of digital marketing than television, research could identify the extent of children's susceptibility, and specify which digital marketing techniques may be of primary concern to inform potential regulatory protections [111, 112]. This research can further determine the age at which children are aware of and display critical attitudes toward digital marketing, and what types of interventions to protect against digital persuasion will be most effective [62].

Research into food and beverage marketing targeting youth must similarly assess it as an integrated marketing communications approach, simultaneously analyzing the entire "synergistic communications-whole" [113]. This goes beyond the singular channels and overt forms of marketing such as television commercials to include subtler, subversive forms such as digital product placement and brands as content creators (Mountain Dew's "Dewmocracy" campaign crafted entire digital programs instead of traditional stand-alone ads) [114].

Child, Adolescent, and Adult Susceptibility to Marketing

Research must continue to establish the susceptibility of adolescents, and even adults, to the marketing of foods and beverages. Experimental research which finds that exposure to food advertising as children affects preferences even into adulthood [115] suggests questions about the traditional developmental paradigm that children are only susceptible to marketing until they develop sufficient cognitive defenses [5]. New research should confirm and elaborate these findings, including the efficacy of the prevailing policy regime [92] of protecting only children less than 12 years old [41]. Research employing neuroimaging techniques such as fMRI would inform great promise for policy because they make visible children's vulnerability to food marketing messages. In particular, these studies help make the case for policies to protect all children, not only those already suffering health consequences from unhealthy food marketing, from the threats posed by marketing for unhealthy products [116].

Industry Self-regulation Monitoring and Evaluation

As the food industry is the primary influence on food environments affecting children, there is an ongoing need to monitor and evaluate the implementation and effectiveness of industry self-regulatory pledges [117]. Ideally, this monitoring would create international accountability benchmarks by combining publically available information on food company marketing activities, nutritional profiles of the products marketed, and information on other relevant commercial practices, such as lobbying activity [118]. Because high-profile industry-sponsored research praises the results of self-regulatory initiatives while independently-funded research contradicts these results, public health scholars must execute high-quality, timely, and innovative research that is well promoted, including through news coverage, to effectively inform the public and policymakers [119]. For example, there is an immediate need to examine implementation of the USDA's "Smart Snack" rules for so-called competitive foods (foods sold outside of breakfast and lunch meal programs) that will come into effect for the 2014-2015 school year.

Legal Research

Scholarship should continue to address concerns over whether the First Amendment to the U.S. Constitution protecting the freedom of speech permits government regulation of

unhealthy marketing to youth as commercial speech. Government regulation of food marketing to youth may survive such a challenge because youth lack the cognitive development to defend themselves against marketing, categorizing these messages as "inherently misleading" [52]. Contemporary characteristics of child-targeted food marketing that relies on emotional rather than rational appeals to young people may be misleading and thus may not warrant the protections afforded by the "commercial speech doctrine" [120]. This may be especially true of digital techniques that exploit youth's vulnerabilities to identify and protect themselves against marketing.

Conclusion

This review confirms previous analyses that have found marketing for unhealthy products dominates children and youth's food environments. The ubiquity of these messages makes such marketing appear unremarkable, influencing social norms and behaviors of impressionable young people already at unprecedented risk of obesity-related chronic diseases. In 2006, the Institute of Medicine recommended that the U.S. Department of Health and Human Services monitor progress made in improving food marketing to children and "Within 2 years, the Secretary should report to Congress on the progress and additional actions necessary to accelerate progress" [5]. Nearly a decade after that landmark report—far beyond the IOM's original deadline—research continues to document the billions of dollars of unhealthy food marketing saturating children's environments. It is time for stronger efforts from lawmakers to hold companies accountable for recruiting children to be their present and future customers of foods that put their health at risk.

Compliance with Ethics Guidelines

Conflict of Interest Andrew Cheyne, Pamela Mejia, Laura Nixon, and Lori Dorfman declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

References

1. Kraak VI, Story M, Wartella EA, Ginter J. Industry progress to market a healthful diet to American children and adolescents. Am J Prev Med. 2011;41(3):322–33.
2. Wartella E, Kraak V, Story M, Ginter J, Vandewater E. Progress on Public Policy: The Aftermath of the 2005 Institute of Medicine Report on Food Marketing and the Diets of Children and Youth. In: Williams JD, Pasch KE, Collins CA, editors. Advances in Communication Research to Reduce Childhood Obesity. New York: Springer; 2013. p. 19–32.
3. Kraak VI, Story M, Wartella EA. Government and School Progress to Promote a Healthful Diet to American Children and Adolescents: A Comprehensive Review of the Available Evidence. Am J Prev Med. 2012;42(3):250–62.
4. Powell LM, Harris JL, Fox T. Food marketing expenditures aimed at youth: putting the numbers in context. Am J Prev Med. 2013;45(4):453–61.
5. McGinnis JM, Gootman JA, Kraak VI. Food marketing to children and youth: Threat or opportunity? Washington DC: Institute of Medicine: Committee on Food Marketing and the Diets of Children and Youth. 2006.
6. Zimmerman FJ, Bell JF. Associations of television content type and obesity in children. Am J Public Health. 2010;100(2):334–40.
7. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010. JAMA J Am Med Assoc. 2012;307(5):483–90.
8. Flores G. Racial and ethnic disparities in the health and health care of children. Pediatrics. 2010;125(4):e979–e1020.
9. Basen-Engquist K, Chang M. Obesity and cancer risk: recent review and evidence. Curr Oncol Rep. 2011;13(1):71–6.
10. Williams JD. Product Proliferation for New Food and Beverage Products Targeted to Children 1994-2004. Austin, TX: University of Texas Working Paper; 2005.
11. Federal Trade Commission. A review of food marketing to children and adolescents: follow-up report. Washington, D.C.: Federal Trade Commission; 2012.
12. Chapman M. McDonald's value menu entices customers in first quarter. In. Deseret News; 2010.
13. Zmuda N. How Coke is targeting black consumers. In: Ad Age; 2010.
14. Cheyne A, Gonzalez P, Mejia P, Dorfman L. Food and beverage marketing to children and adolescents: Limited progress by 2012. Minneapolis, MN: Healthy Eating Research; 2013.
15. Rideout VJ, Foehr UG, Roberts DF. Generation M2: Media in the Lives of 8-to 18-Year-Olds. Menlo Park, CA: Henry J. Kaiser Family Foundation; 2010.
16. Lassiter VC, Grier SA. Understanding Community Perspectives: A Step Towards Achieving Food Marketing Equity. In: Williams JD, Pasch KE, editors. Advances in Communication Research to Reduce Childhood Obesity. Heidelberg: Springer; 2013. p. 343–66.
17. Ramirez AG, Gallion K, Adeigbe R. Latino Youth and Obesity: Communication/Media Influence on Marketing. In: Advances in Communication Research to Reduce Childhood Obesity. Heidelberg: Springer; 2013. p. 367–87.
18. Kunkel D, Mastro D, Ortiz M, McKinley C. Food Marketing to Children on U.S. Spanish-Language Television. J Health Commun. 2013;18(9):1084–96.
19. Harris JL, Schwartz MB, Brownell KD, Javadizadeh J, Weinberg M, Sarda V, et al. Sugary Drink FACTS: Evaluating sugary drink nutrition and marketing to youth. New Haven, CT: Yale Rudd Center for Food Policy & Obesity; 2011.
20. Fleming-Milici F, Harris JL, Sarda V, Schwartz MB. Amount of Hispanic youth exposure to food and beverage advertising on Spanish- and English-language television. JAMA Pediatr. 2013;167(8):723–30.
21. Germond C, Ramirez A, Gallion K. Regulation of Food and Beverage Marketing to Latino Youths. Austin, TX: Salud! America. 2013.
22. Grigsby-Toussaint DS, Moise IK, Geiger SD. Observations of marketing on food packaging targeted to youth in retail food stores. Obesity. 2011;19(9):1898–900.
23. Lee RE, Heinrich KM, Reese-Smith JY, Regan GR, Adamus-Leach HJ. Obesogenic and Youth Oriented Restaurant Marketing in Public Housing Neighborhoods. Am J Health Behav. 2014;38(2):218–24.

24. Powell L, Rimkus L, Igor Z, Barker D, Chaloupka F. Exterior Marketing Practices of Fast-Food Restaurants – A BTG Research Brief. Chicago, IL: Bridging the Gap Program, Health Policy Center, Institute for Health Research and Policy, University of Illinois at Chicago; 2012.
25. Baskin ML, Herbey I, Williams R, Ard JD, Ivankova N, Odoms-Young A. Caregiver perceptions of the food marketing environment of African-American 3–11-year-olds: a qualitative study. Public Health Nutr. 2013;16(12):2231–9.
26. Dembek C, Harris J, Schwartz M. Trends in television food advertising to young people: 2011 update. New Haven, CT: Yale Rudd Center for Food Policy & Obesity; 2012.
27. Powell L, Schermbeck R, Szczypka G, Chaloupka F. Children's exposure to food and beverage advertising on television: Tracking calories sand nutritional content by company membership in self-regulation. In: Williams J, Pasch K, Collins C, editors. Advances in communication research to reduce childhood obesity. New York: Springer; 2013. p. 179–94.
28. Powell LM, Schermbeck RM, Szczypka G, Chaloupka FJ, Braunschweig CL. Trends in the nutritional content of television food advertisements seen by children in the United States: analyses by age, food categories, and companies. Arch Pediatr Adolesc Med. 2011;165(12):1078–86.
29. LoDolce M, Harris J, Schwartz M. Sugar as part of a balanced breakfast? What cereal advertisements teach children about healthy eating. J Health Commun Int Perspect; 0: 1-17. 2013
30. Speers SE, Harris JL, Schwartz MB. Child and adolescent exposure to food and beverage brand appearances during prime-time television programming. Am J Prev Med. 2011;41(3):291–6.
31. Jenkin G, Madhvani N, Signal L, Bowers S. A systematic review of persuasive marketing techniques to promote food to children on television. Obes Rev. 2014;15(4):281–93.
32. Castonguay J, Kunkel D, Wright P, Duff C. Healthy characters? An investigation of marketing practices in children's food advertising. J Nutr Educ Behav. 2013;45(6):571–7.
33. Castonguay J, McKinley C, Kunkel D. Health-related messages in food advertisements targeting children. Health Educ. 2013;113(5): 420–32.
34. Bragg MA, Liu P, Roberto C, Sarda V, Harris J, Brownell K. The use of sports references in marketing of food and beverage products in supermarkets. Public Health Nutr. 2012;16(4):738–42.
35. Roseman M, Poor M, Stephenson T. A content analysis of food references in television programming specifically targeting young audiences aged 11 to 14 years. J Nutr Educ Behav. 2014;46(1):20–5.
36. Hudson S, Elliot C. Measuring the impact of product placement on children using digital brand integration. J Food Prod Mark. 2013;19(3):176–200.
37. Harris J, Sarda V, Schwartz M, Brownell K. Redefining "child-directed advertising" to reduce unhealthy television food advertising. Am J Prev Med. 2013;44(4):358–64.
38. Bernhardt A, Wilking C, Adachi-Mejia A, Bergamini E, Martijnissen J, Sargent J. How television fast food marketing aimed at children compares with adult advertisements. PLoS ONE. 2013;8(8):e72479.
39. Bernhardt AM, Wilking C, Gottlieb M, Emond J, Sargent JD. CHildren's reaction to depictions of healthy foods in fast-food television advertisements. JAMA Pediatr. 2014. doi:10.1001/jamapediatrics.2014.140.
40. Powell L, Schermbeck R, Chaloupka F. Nutritional content of food and beverage products in television advertisements seen on children's programming. Child Obes. 2013;9(6):524–31.
41. Harris JL, Heard A, Schwartz MB. Older but still vulnerable: All children need protection from unhealthy food marketing. New Haven, CT: Yale Rudd Center for Food Policy & Obesity; 2014.
42. McClure A, Tanski S, Gilbert-Diamond D, Adachi-Mejia A, Li Z, Li Z, et al. Receptivity to television fast-food restaurant marketing and obesity among US youth. Am J Prev Med. 2013;45(5):560–8.
43. Montgomery K, Chester J. Digital food marketing to children and adolescents: problematic practices and policy interventions. National Policy & Legal Analysis Network to Prevent Childhood Obesity (NPLAN): Oakland. 2011
44. Madden M, Lenhart A, Duggan M, Cortesi S, Gasser U. Teens and technology 2013. Washington, D.C.: Pew Internet & American Life Project; 2013.
45. Grier SA. African American and Hispanic youth vulnerability to target marketing: implications for understanding the effects of digital marketing. In: Second NPLAN/BMSG Meeting on Digital Media and Marketing to Children. Berkeley, CA: Berkeley Media Studies Group; 2009.
46. Montgomery KC, Chester J. The Digital Food Marketing Landscape: Challenges for Researchers. In: Advances in Communication Research to Reduce Childhood Obesity: Springer; 2013. p. 221-242.
47. Harris JL, Speers SE, Schwartz MB, Brownell KD. US food company branded advergames on the internet: children's exposure and effects on snack consumption. J Child Media. 2012;6(1):51–68.
48. Mashable. How the 10 most popular Facebook brands rank by engagement. In: Mashable; 2011.
49. Post W. Clark says Coca-Cola uses social media for marketing. In. Washington, D.C: Washington Post; 2011.
50. Harris JL, Schwartz MB, Brownell KD, Sarda V, Ustjanauskas A, Javadizadeh J, et al. Fast food FACTS: Evaluating fast food nutrition and marketing to youth. New Haven, CT: Yale Rudd Center for Food Policy & Obesity; 2010.
51. Campbell A. A Complaint and Request for Investigation of PepsiCo's and FritoLay's Deceptive Practices in Marketing Doritos to Adolescents. Washington, D.C.: Institute for Public Representation Georgetown University School of Law Center; 2011.
52. Graff S, Kunkel D, Mermin SE. Government Can Regulate Food Advertising To Children Because Cognitive Research Shows That It Is Inherently Misleading. Health Aff. 2012;31(2):392–8.
53. Harris JL, Graff SK. Protecting Young People From Junk Food Advertising: Implications of Psychological Research for First Amendment Law. Am J Public Health. 2012;102(2):214–22.
54. van Reijmersdal EA, Rozendaal E, Buijzen M. Effects of Prominence, Involvement, and Persuasion Knowledge on Children's Cognitive and Affective Responses to Advergames. J Interact Mark. 2012;26(1):33–42.
55. Thomson DM. The mixed health messages of Millsberry: a critical study of online child-targeted food advergaming. Health Commun. 2011;26(4):323–31.
56. Paek H-J, Quilliam ET, Kim S, Weatherspoon LJ, Rifon NJ, Lee M. Characteristics of food advergames that reach children and the nutrient quality of the foods they advertise. Internet Res. 2014;24(1):63–81.
57. Weatherspoon LJ, Quilliam ET, Paek H-J, Kim S, Venkatesh S, Plasencia J, et al. Peer Reviewed: Consistency of Nutrition Recommendations for Foods Marketed to Children in the United States, 2009–2010. Preventing chronic disease; 10. 2013
58. Lascu D-N, Manrai AK, Manrai LA, Amissah FB. Online marketing of food products to children: the effects of national consumer policies in high-income countries. Young Consumers: Insight and Ideas for Responsible Marketers; 14(1): 19-40. 2013.
59. Folkvord F, Anschütz DJ, Buijzen M, Valkenburg PM. The effect of playing advergames that promote energy-dense snacks or fruit on actual food intake among children. Am J Clin Nutr. 2013;97(2): 239–45.
60. Rozendaal E, Slot N, van Reijmersdal EA, Buijzen M. Children's Responses to Advertising in Social Games. J Advert. 2013;42(2–3): 142–54.

61. Panic K, Cauberghe V, De Pelsmacker P. Comparing TV Ads and Advergames Targeting Children: The Impact of Persuasion Knowledge on Behavioral Responses. J Advert. 2013;42(2–3): 264–73.
62. Owen L, Lewis C, Auty S, Buijzen M. Is Children's Understanding of Nontraditional Advertising Comparable to Their Understanding of Television Advertising? J Public Policy Mark. 2013;32(2):195–206.
63. Grigsby-Toussaint DS, Rooney MR. Food Marketing Targeting Youth and Families: What Do We Know about Stores Where Moms Actually Shop? J Environ Public Health. 2013. doi:10.1155/2013/674181.
64. Lapierre M, Yaala S, Linebarger D. Influence of licensed spokescharacters and health cues on children's ratings of cereal taste. Arch Pediatr Adolesc Med. 2011;1(165):229–34.
65. Harris JL, Thompson JM, Schwartz MB, Brownell KD. Nutrition-related claims on children's cereals: what do they mean to parents and do they influence willingness to buy? Public Health Nutrition; 1(1): 1-6.
66. Miller EG, Seiders K, Kenny M, Walsh ME. Children's use of on-package nutritional claim information. J Consum Behav. 2011;10(3):122–32.
67. Kolish E, Hernandez MD, Blanchard K. (2011). The Children's Food and Beverage Advertising Initiative in action: Compliance and implementation during 2010 and five year retrospective 2006-2011. Available at: http://www.bbb.org/storage/16/documents/cfbai/cfbai-2010-progress-report.pdf. Accessed February 4, 2014.
68. Tan A, Musicus A, Wansink B. Eyes in the Aisles: Why Is Cap'N Crunch Looking Down at My Child. In: Social Science Research Network; 2014.
69. Freij M, Sell R, Bozack A, Weiss L, Garcia A. Modeling potential effects of reduced calories in kids' meals with toy giveaways. Child Obes. 2014;10(1):58–63.
70. Otten JJ, Hekler EB, Krukowski RA, Buman MP, Saelens BE, Gardner CD, et al. Food marketing to children through toys: response of restaurants to the first U.S. toy ordinance. Am J Prev Med. 2012;42(1):56–60.
71. Terry-McElrath YM, Turner L, Sandoval A, Johnston LD, Chaloupka FJ. Commercialism in US Elementary and Secondary School Nutrition Environments: Trends From 2007 to 2012. JAMA Pediatr. 2014. doi:10.1001/jamapediatrics.2013.4521.
72. Schneider L, Schermbeck RM, Chriqui JF, Chaloupka F. 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.
73. Pasch KE, Lytle LA, Samuelson AC, Farbakhsh K, Kubik MY, Patnode CD. Are school vending machines loaded with calories and fat: an assessment of 106 middle and high schools. J Sch Health. 2011;81(4):212–8.
74. Turner L, Chaloupka FJ. Wide availability of high-calorie beverages in US elementary schools. Arch Pediatr Adolesc Med. 2011;165(3): 223–8.
75. Terry-McElrath Y, Turner L, Sandoval A, Johnston L, Chaloupka F. Commercialism in US elementary and secondary school nutrition environments: Trends from 2007-2012. JAMA Pediatr. 2014;168(3):234–42.
76. Turner L, Chaloupka F, Sandoval A. School Policies and Practices for Improving Children's Health: National Elementary School Survey Results: School years 2006-07 through 2009-10. Chicago, IL: Bridging the Gap Program, Health Policy Center, Institute for Health Research and Policy, University of Illinois at Chicago; 2012.
77. Pew Charitable Trusts. Health Impact Assessment: National Nutrition Standards for Snack and a la Carte Foods and Beverages Sold in Schools. Washington, D.C.: Pew Charitable Trusts; 2012.
78. Walker R, Block J, Kawachi I. The Spatial Accessibility of Fast food Restaurants and Convenience Stores in Relation to Neighborhood Schools. Applied Spatial Analysis and Policy: 1-14. 2013.
79. Advertising Age. 100 leading national advertisers. In: 2007 Marketer Profiles Yearbook; 2007.
80. Pasch K, Poulos N. Outdoor food and beverage advertising: A saturated environment. In: Williams J, Pasch K, Collins C, editors. Advances in communication research to reduce childhood obesity. New York: Springer; 2013. p. 303–15.
81. Healthy Stores Healthy Communities. Healthy Stores for a Healthy Community. In; 2014.
82. Lamichane A, Warren J, Puett R, Porter D, Bottai M, Mayer-Davis E, et al. Spatial patterning of supermarkets and fast food outlets with respect to neighborhood characteristics. Health Place. 2013;23:157–64.
83. Reitzel LR, Regan SD, Nguyen N, Cromley EK, Strong LL, Wetter DW, et al. Density and Proximity of Fast Food Restaurants and Body Mass Index Among African Americans. Am J Public Health. 2013;104(1):110–6.
84. Carroll-Scott A, Gilstad-Hayden K, Rosenthal L, Peters SM, McCaslin C, Joyce R, et al. Disentangling Neighborhood Contextual Associations with Child Body Mass Index, Diet and Physical Activity: The Role of Built, Socioeconomic, and Social Environments. Soc Sci Med. 2013;95:106–14.
85. Babey S, Wolstein J, Diamant A. Food environments near home and school related to consumption of soda and fast food. Los Angeles, CA: UCLA Center for Health Policy Research; 2011.
86. Bader MD, Schwartz-Soicher O, Jack D, Weiss CC, Richards CA, Quinn JW, et al. More neighborhood retail associated with lower obesity among New York City public high school students. Health Place. 2013;23:104–10.
87. Berge JM, Wall M, Larson N, Forsyth A, Bauer KW, Neumark-Sztainer D. Youth dietary intake and weight status: Healthful neighborhood food environments enhance the protective role of supportive family home environments. Health Place. 2014;26:69–77.
88. Bruce AS, Bruce JM, Black WR, Lepping RJ, Henry JM, Cherry JB, et al. Branding and a child's brain: an fMRI study of neural responses to logos. Soc Cogn Affect Neurosci. 2014;9(1):118–22.
89. Gearhardt AN, Yokum S, Stice E, Harris JL, Brownell KD. Relation of obesity to neural activation in response to food commercials. Social Cognitive and Affective Neuroscience: nst059. 2013
90. Burger KS, Stice E. Neural responsivity during soft drink intake, anticipation, and advertisement exposure in habitually consuming youth. Obesity. 2013;22(2):441–50.
91. Bruce AS, Lepping RJ, Bruce JM, Cherry JBC, Martin LE, Davis AM, et al. Brain Responses to Food Logos in Obese and Healthy Weight Children. J Pediatr. 2013;162(4):759–764.e2.
92. Kolish E. The Children's Food & Beverage Advertising Initiative White Paper on CFBAI's Uniform Nutrition Criteria. In. Washington, D.C.: Council of the Better Business Bureaus, Inc.; 2011.
93. National Restaurant Association. Kids LiveWell. Healthy Choices. Happy Kids. In. Washington, D.C. : National Restaurant Association. 2011.
94. BlackPRWire. McDonald's USA's new Happy Meal campaign to engage families in the benefits of active play, balanced eating. In: BlackPRWire; 2011.
95. Pestano P, Yeshua E. Sugar in Children's Cereals: Popular Brands Pack More Sugar than Snack Cakes and Cookies. Washington, D.C.: Environmental Working Group; 2011.
96. Watzman N. Food and media companies lobby to weaken guidelines on marketing food to children. In. Washington, D.C.: Sunlight Foundation Reporting Group; 2011.
97. Vladeck D. Prepared Statement of the Federal Trade Commission on the Interagency Working Group in Food Marketed to Children before the House Energy and Commerce Committee Subcommittee on Commerce, Manufacturing, and Trade and the Subcommittee on

Health. In. Washington, D.C.: United States House of Representatives; 2011.
98. ElBoghadady D. Lawmakers want cost-benefit analysis on child food marketing restrictions. In. Washington, D.C.: Washington Post; 2011.
99. Otten JJ, Hekler EB, Krukowski RA, Buman MP, Saelens BE, Gardner CD, et al. Food marketing to children through toys: Response of restaurants to the first US toy ordinance. Am J Prev Med. 2012;42(1):56–60.
100. Cradock AL, McHugh A, Mont-Ferguson H, Grant L, Barrett JL, Wang YC, et al. Effect of school district policy change on consumption of sugar-sweetened beverages among high school students, Boston, Massachusetts, 2004-2006. Prev Chronic Dis. 2011;8(4):A74.
101. Taber DR, Chriqui JF, Powell LM, Chaloupka FJ. Banning all sugar-sweetened beverages in middle schools: reduction of in-school access and purchasing but not overall consumption. Arch Pediatr Adolesc Med. 2012;166(3):256–62.
102. Liu PJ, Wisdom J, Roberto CA, Liu LJ, Ubel PA. Using Behavioral Economics to Design More Effective Food Policies to Address Obesity. Applied Economic Perspectives and Policy. Available at: http://aepp.oxfordjournals.org/content/early/2013/10/02/aepp.ppt027.abstract. Accessed October 2, 2013.
103. United States Department of Agriculture. Local School Wellness Policy Implementation Under the Healthy, Hunger-Free Kids Act of 2010. In. Washington, D.C.: United States Department of Agriculture; 2013.
104. Cairns G. Evolutions in food marketing, quantifying the impact, and policy implications. Appetite. 2013;62:194–7.
105. U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans. 7th ed. Washington, D.C.: U.S. Government Printing Office; 2010.
106. National Institutes of Health Office of Dietary Supplements. Daily Values. In; 2014.
107. Stallings VA, Yaktine AL, editors. Nutrition Standards for Foods in Schools: Leading the Way toward Healthier Youth. Washington, D.C.: National Academies Press; 2007.
108. Gearhardt A, Roberts M, Ashe M. If Sugar Is Addictive…What Does It Mean for the Law? J Law Med Ethics. 2013;41:46–9.
109. Schwarte L, Lafleur M, Williams JD. Targeted Marketing of Junk Food to Ethnic Minority Youth: Fighting Back with Legal Advocacy and Community Engagement. In: Williams JD, Pasch KE, Collins CA, editors. Advances in Communication Research to Reduce Childhood Obesity: Springer; 2013. p. 389-405.
110. Calvert SL. Bradley J. Bond, Melissa N. Richards, Calvert, Sandra L. In: Lemish D, editor. The Routledge International Handbook of Children, Adolescents, and Media: Taylor & Francis; 2013. p. 232.
111. Blades M, Oates C, Li S. Children's recognition of advertisements on television and on Web pages. Appetite. 2013;62:190–3.
112. Montgomery KC, Grier SA, Chester J, Dorfman L. Food Marketing in the Digital Age: A Conceptual Framework and Agenda for Research. Princeton, NJ: Robert Wood Johnson Foundation; 2011.
113. Jackson M, Harrison P, Swinburn B, Lawrence M. Unhealthy food, integrated marketing communication and power: a critical analysis. Crit Public Health: 1-18. 2014
114. Zmuda N. New Pepsi 'Dewmocracy' Push Threatens to Crowd Out Shops. In: Ad Age; 2009.
115. Connell PM, Brucks M, Nielsen JH. How Childhood Advertising Exposure Can Create Biased Product Evaluations That Persist into Adulthood. J Consum Res; 41(June 2014).
116. Gearhardt AN, Brownell KD. The Importance of Understanding the Impact of Children's Food Marketing on the Brain. J Pediatr. 2013;163(4):672–3.
117. Swinburn B, Sacks G, Vandevijvere S, Kumanyika S, Lobstein T, Neal B, et al. INFORMAS (International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support): overview and key principles. Obes Rev. 2013;14(S1):1–12.
118. Sacks G, Swinburn B, Kraak V, Downs S, Walker C, Barquera S, et al. A proposed approach to monitor private-sector policies and practices related to food environments, obesity and non-communicable disease prevention. Obes Rev. 2013;14(S1):38–48.
119. Harris JL, Weinberg M, Javadizadeh J, Sarda V. Monitoring Food Company Marketing to Children to Spotlight Best and Worst Practices. In: Williams JD, Pasch KE, Collins CA, editors. Advances in Communication Research to Reduce Childhood Obesity: Springer; 2013. p. 153-175.
120. Harris JL, Graff SK. Protecting children from harmful food marketing: options for local government to make a difference. Prev Chronic Dis. 2011;8(5):A92.