

Food Marketing and Childhood Obesity: An Evidence-Based Examination of Influence, Mechanisms, and Policy Implications

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ABSTRACT

Childhood obesity remains a growing public health challenge in the United States and globally, with food marketing identified as a significant environmental driver of unhealthy dietary patterns among children. This narrative review synthesizes evidence on the mechanisms through which food marketing across television, digital media, in-store environments, and school settings shapes children's food preferences, consumption behaviors, and long-term risk of obesity. The analysis draws upon interdisciplinary research from public health, psychology, marketing, and economics to examine how marketing captures attention, alters risk perception, increases brand salience, and promotes energy-dense, nutrient-poor foods. Evidence consistently demonstrates that children are highly susceptible to marketing due to developmental limitations, limited advertising literacy, and heightened responsiveness to animated, personalized, and emotionally appealing content. Digital and algorithmically targeted marketing has intensified exposure, presenting new challenges for regulation and surveillance. Studies of policy interventions, including school-based restrictions, television advertising bans, and digital marketing regulations, show mixed but generally positive effects on reducing exposure, caloric intake, and obesity-related outcomes. However, industry resistance, voluntary codes with limited enforcement, and shifts toward unregulated platforms continue to undermine progress. Methodological gaps persist, particularly concerning causal pathways, socioeconomic disparities, and long-term behavioral effects. Overall, this review emphasizes that effective obesity prevention requires comprehensive policy action, ethically grounded regulation, and sustained research to counteract pervasive commercial influences that shape children's food environments.

Keywords: Childhood Obesity, Food Marketing, Digital Advertising, Consumer Behavior, and Public Health Policy.

INTRODUCTION

The steady rise of childhood obesity remains a crucial public health issue in the United States, with prevalence in 2016 at nearly 20% for children and teens aged 2 to 19 years, which equals around 14 million youth. Obesity and overweight have been declared a worldwide epidemic, growing at concerning rates among youth [1], and fueling research on the potential role of food marketing as a promoter of unhealthy foods and beverages [3]. The increasing availability of food and beverage products; pressure on children to purchase these products, especially during meals and snacks; the escalating marketing efforts targeting children, adolescents, and even pre-school children; and the escalating growth of Take-out & Delivery Market during the COVID pandemic has drawn the attention of Berry (2016) who, while acknowledging that the rise of over 30% in Take-out and Delivery in Food Services occurred mainly during COVID 19 pandemic lockdown, stated in 2016 that the cultural indifference among F&B operators and marketers to pre-school children has become a "serious" concern; the policies re-marketing to counteract this shared social responsible to share a concern with food suppliers and Regulators; the industry-wide campaigns and measures overseen by self-regulation and non-hard law approach is still necessary to reduce unhealthy eating habits among pre-school children [2]. Food marketing to children, both traditional and

digital, and restaurant marketing, influences what children eat and, therefore, represents one of many factors linked to childhood obesity [2]. The landmark Institute of Medicine of the National Academy of Sciences report conducted by the Committee on Food Marketing and the Diets of Children and Youth presents a detailed examination of evidence linking food marketing to childhood obesity [2]. Public health experts have called for comprehensive action to promote healthy eating, prevent obesity, and reduce diet-related chronic diseases among children, marking the beginning of the policy discourse in tackling childhood obesity. Marketing a wide variety of unhealthy food products extensively targets children and youth; these products are marketed heavily during children's programming or venues where children are allowed access, and children account for a large percentage of adults making F&B purchasing decisions in restaurants (i.e., Family Dining)[3]. The many ways in which advertising captures attention, shapes preferences and tastes, and alters brand salience among children have been recognized; marketing of unhealthy food encourages high-calorie consumption and takes place predominantly through media channels to which children have access[2].

The Landscape of Food Marketing Targeting Children

Government regulations and corporate self-regulation pervade food marketing, particularly promotions targeting children [1]. Despite considerable attention to food marketing as a contributor to childhood obesity, its role remains insufficiently delineated. Research affiliations, commercial interests, and shifting market strategies complicate analyses. Several influential and contemporary reports focus on food marketing expenditures, advertising regulations, and marketing of nutritionally poor foods in schools, yet marketing's contribution to obesity is de-emphasized [2]. Consequently, the precise mechanisms by which marketing promotes excess calorie intake and the environmental contexts that amplify its influence warrant further investigation. Understanding marketing's role within broader behavioral, cultural, and environmental determinants is crucial for effective public health policy [3]. Food marketing shapes children's diets by influencing food and beverage preferences, purchase requests, and consumption both in and outside of the home [2]. Two prominent reports characterize the link as tenuous and caution against drawing unqualified conclusions; marketing may not be a significant causal factor. Research on attention, cognitive processing, and stimulus properties indicates that marketing commands children's attention and responses even when they lack formal expertise; elementary school-aged children actively gather elements and plot narratives in commercials[3]. Furthermore, marketing for foods high in sugar, fat, and sodium, which contribute to obesity, is pervasive. Significant gender differences persist; girls consume fewer calories and purchase healthier products but exhibit greater overall growth in eating, preferences, and advertising response [3].

Behavioral and Physiological Pathways Linking Marketing to Obesity

Food marketing can encourage unhealthy eating by impacting attention, risk perception, consumption patterns, and physiological responses [1]. Marketing shapes attention at both conscious and unconscious levels throughout development, capturing interest toward specific foods and brands [1]. Food typically has lower nutritional value than nonfood products, yet children devote up to 40% of ad-viewing time to food items. Exposure to food marketing alters preferences, influencing brand choice and, in some cases, liking of particular products [4]. Food marketers capitalize on developmental gaps by accentuating novelty, fun, and adventure in product promotion, contributing to the establishment of dietary habits and the adoption of specific foods or brands. Marketing also affects brand salience, or the ease of remembering food options within heavy media and marketing environments characterized by continuous visual stimulation [3]. Children under ten years of age (between four and seven years more commonly) prove more susceptible to brand salience initiatives because they cannot discriminate between ads and programming at the perceptual level [2]. Influence extends from variable exposure to distribution and composition between types of content [3]. Various marketing forms operate across children's media environments, promoting unhealthy products, despite measures to limit children's exposure, such as self-regulation by the advertising and marketing industry [2]. Regulations apply only to broadcast media in certain jurisdictions; widespread marketing occurs in non-regulated environments, such as retail stores. Children aged two to eleven still account for 83% of food-promotion expenditure nationally, with these financial resources mostly directed toward high-calorie beverages and low-nutrient food [2].

Attention and Preference Formation

Most children are exposed daily to a wide range of food marketing modalities [1]. Such marketing often captures children's attention, shapes preferences toward marketed products, and alters brand salience, characterizing preferred items [4]. These processes are strongly linked to childhood obesity. Indeed, research shows that excessive marketing exposure contributes over 20% of the increase in energy intake associated with growing up and that, for children aged 6 to 11, energy intakes nearly double for every 10% increase in food marketing expenditures [3]. The relevant cognitive and developmental evidence indicates several reasons why marketing induces larger changes among children than adults [4]. First, food marketing garners more visual attention from

children, who are generally attracted to colorful and animated stimuli. Second, attention to food marketing influences their preferences more than for other categories. This attentional capture intensifies further during childhood: only 14% of babies less than 1 month old watch television, rising to 74% among 18- to 24-month-old toddlers, whereas preschoolers devote much television time to marketing [3]. Third, children require many more exposures to learn about new products, so they are more frequently targeted to build brand equity. Analyses of developmental psychology suggest an age-based attention focus complementary to marketing strategies: children aged 1-6 prefer animated, cute, and humorous cues; ages 7 to 10, prizes and opportunities for companionship; and 11-14 gender-specific content. Such evidence strongly positions food marketing in the category of unrestricted and unhindered adult behavioral influences on childhood decision-making [1, 2].

Consumption Patterns and Energy Balance

Marketing-induced increases in the frequency, share of nutrient-poor foods, and overall energy intake among children have been observed [2]. Marketing is positively related to diet, and consumption increases with exposure across age and geographical contexts. Increased intake of foods promoted by food marketing is consistently associated with overall energy intake; yet, with sufficient data, the proportion of foods marketed may act solely as a robust predictor of diet [3]. While the evidence linking food marketing to obesity is substantial, research should diversify by population, venue, and socio-economic factors; the specific age range affected requires further definition; methodological rigour must improve; and long-term effects remain unclear [5].

Risk Perception and Eating Behaviors

Food marketing influences children's perceptions of food risks and enjoyment, contributing to obesity. Children exposed to food ads perceived the risk of obesity, heart disease, and teeth damage to be lower compared to unexposed peers [1]. Marketing reduces the perception of negative health consequences, promotes beliefs that snacking is normative, and encourages compensatory consumption [2]. Three studies show an inverse relationship between exposure to food ads and healthy food perception. Marketing using licensed characters conveys the message that food provides pleasure, increasing demand for restricted food and soft drink items [2]. Studies indicate that marketing reinforces poor dietary choices and promotes consumption of unapproved food and beverage products in schools [1].

Media Environments and Marketing Reach

Digital and social media contexts have become prominent outlets for food marketing, alongside traditional mass media. Despite children and teens spending more time on digital platforms than watching television, experimental and observational evidence links media consumption to food brand recognition and preferences [2]. Digital marketing benefits from targeted, personalized design and differs from traditional media in characteristics such as interactivity and entertainment value [2]. On social media, youngsters may see marketing content unrelated to their preferred pages. Algorithmically tailored marketing influences bedtime snacks. Although systematic research on marketing mechanisms, strategies, and impacts remains limited, measurable quantities such as engagement, reach, likes, shares, and cites permit methodical study [3]. Further, the prevalence of food marketing has increased from 2007 to 2017 across media outlets that children frequently use [5]. Observational analysis reveals that during monitored periods, 88% of 8-16-year-olds viewed advertisements. The marketing landscape comprises multiple modalities like television, online video, computer and mobile gaming, social media, print, radio, and billboards. School marketing adopts diverse and eye-catching approaches [3]. In-school marketing occurs in around 65% of U.S. schools, primarily at the secondary level. Online, companies can engage directly, sidestepping traditional elite and mass media constraints [2].

Digital and Social Media Contexts

Rapid advances in technology and the proliferation of digital, social, and mobile media have transformed the childhood media landscape and substantially increased both advertising exposure and valuable information on audience behavior, preferences, and psychological profiles [7]. Children and adolescents convey personal data defined by their online activities, which is directly valuable to marketers seeking to upload, share, and distribute messages. Consequently, the range of communication modalities that marketers can deploy in digital settings has expanded, complicating the task of monitoring children's exposure to food marketing [5]. Personalization has also made it harder to track exposure because the determination of the intended audience is elusive [6]. Digital marketing has migrated to social media platforms preferred by youth and mobile mechanisms that facilitate communication. Digital platforms such as websites and apps increasingly deploy algorithms to target audiences according to specific attributes or behaviors [5]. Data collected from content and the audience, sometimes termed big data, allows marketers to analyze online social networks and information dissemination, pinpointing influencers and customizing messages accordingly. Within social media, the intended audience is deduced from follower count, profiles, online conversations, and content selection [6]. Many brands assemble databases to

identify influencers whose audiences match target profiles in interest, demographics, behavior, income, and locality, subsequently crafting tailored messages for them. Marketers can deploy sponsored posts as ads or integrate them into user feeds to increase reach and the likelihood of forwarding [5].

Television and In-Store Marketing Dynamics

Food marketing has dynamic characteristics, depending on the media channel used [1]. Television marketing is positively related to heightened awareness and attitude toward advertised products and associated brands [3]. On the other hand, in-store marketing can influence purchasing behaviour in the absence of prior knowledge of a specific product [2]. Overall, youth exposure to television advertising continues to decline, owing especially to increased "time-shifted" viewing practices using digital video recorders (DVRs) [1]. Nevertheless, a substantial amount of advertising is still transmitted during children's programming. Typical commercial breaks consist of 10 or 11 ads in a one-hour children's show, compared to about seven or eight commercials in adult programming [6].

Evidence on Marketing Restrictions and Public Health Outcomes

Government authorities in various countries have introduced, or are considering, restrictions on food marketing directed at children [3]. Such regulations aim to diminish the exposure of minors to advertising that encourages the purchase and consumption of unhealthy food products, those that are high in fat, sugar, and salt, and to foster healthier dietary habits [7]. Some jurisdictions have also begun to restrict marketing to other vulnerable segments of the population, such as low-income groups or individuals suffering from obesity. Empirical data on the effects of such marketing restrictions could therefore inform the public debate surrounding similar measures. Regulations limiting marketing to children and adolescents are being implemented in numerous regions on the basis of evidence about their anticipated effects on purchase behavior and consumption [5]. Various quasi-experimental and econometric studies, including those using difference-in-differences and synthetic control methodologies, have documented the impact of marketing restrictions in different contexts on consumption levels and obesity-related outcomes [3]. The evidence, however, is highly heterogeneous [7]. It encompasses regulations at schools, bans on broadcasting advertisements aimed at children, restrictions on digital marketing, and age-based prohibitions on the advertising of unhealthy products. Studies that contrast marketing-free or counter-marketing school environments with conventional settings reveal lasting effects on calorie intake that endure even in secondary schools, lowering both the likelihood of obesity and the corresponding BMI, waist circumference, and skinfold thickness. Interventions conducted in childcare centers and other community venues yield similar results [5].

Food Marketing Regulations and Their Effects

Marketing restrictions have been adopted worldwide to prevent children from exposure to unhealthy food items. Regulations on marketing to young audiences have reduced children's exposure to unhealthy food marketing content, mitigated energy intake from unhealthy food content, and lessened childhood obesity [1]. Assembly Bill 2572 in France, 265 in Canada, and the Broadcasting Code in the United Kingdom have passed restrictions on the marketing of unhealthy food to children. Similar efforts have sparked interest in limiting online food marketing to minors [3]. A systematic overview of quasi-experimental and econometric studies investigates the impacts of food marketing restrictions on children on public health. Regulations applied to in-school food promotion, general television advertisement, and online marketing, subjected to age limits, positively affected consumption, purchasing, and obesity outcomes [2]. These regulations should be a priority for decision-makers and public health stakeholders in the pursuit of healthier food systems and balanced diets for children [2]. A systematic review synthesizes studies on food marketing restriction and childhood obesity from 2009 to 2021 [7]. Associations between policies aimed at regulating food and non-alcoholic marketing to children and public health indicators are assessed. Broader and effective options of food marketing restriction have shown encouraging effects on children's exposure and empowerment in multiple nations. Substantial evidence documents a large share of food marketing exposure through both broadcast and the internet [5]. Policies restricting unhealthy food marketing through broadcasting, food promotion in schools, and internet marketing to underage children demonstrate significant influence on reducing food purchasing and other related characteristics [5]. Unsolicited internet advertisements and pop-ups have also received positive feedback upon broad-based food marketing restriction implementation [3].

School and Community-Based Interventions

School environments where marketing-promoted food is not sold, or where counter-marketing initiatives are integrated, are more effective in reducing children's food intake than conventional settings [7]. Indeed, addressing the demand for unhealthy food products generated outside schools can bolster such efforts. Implementing policies that require marketing-free grounds or support counter-marketing demonstrations can lead to effective, scalable, and sustainable changes in food consumption patterns [6]. Schools are controlled environments conducive to nurturing healthy eating through food marketing interventions, complemented by the endorsement of nutritional

benefits related to academic performance and achievement gap reduction [4]. Policy advocacy emphasizing schools' social responsibility to mitigate childhood obesity and chronic disease can galvanize action [8]. Interventions targeting school-based physical activity, such as quality physical education coupled with out-of-school activity promotion and screen-time reduction, enhance effort and efficacy [3]. Increases in healthy food consumption flow from removing sugar-sweetened beverages and unhealthy food items from school-operated vending machines, cafeterias, and fundraising activities [3]. Policies extending beyond the United States Department of Agriculture (USDA) Smart Snacks standards to encourage health-promoting food choices while simultaneously increasing participation in healthy school meal programmes further strengthen such interventions [2].

Economic and Industry Considerations

Food marketing is a key factor in fueling the childhood obesity epidemic. It influences both children and their caregivers, shaping dietary intake and activity patterns and undermining diverse competing prevention approaches [3]. However, the food and beverage industry dominates the market and strenuously opposes regulation. Industry players have preemptively enacted voluntary pledges that fall far short of restricting food marketing exposure to children [4]. They routinely respond to signs of imminent regulation by reformulating products [3], shifting marketing budgets to nonregulated channels, and instituting price incentives that paradoxically lead to increased media spending targeting children and adolescents [2]. Because of the hyped-up rhetoric of junk food, elite resistance to regulation, and the inventiveness of the industry, a multifaceted system of regulation akin to that for tobacco is unlikely to develop or to withstand regulatory attacks from free-market advocates [5].

Methodological Considerations in Marketing and Obesity Research

Food marketing to children has been widely acknowledged as a contributing factor to childhood obesity due in part to the level of expenditure and extensive food marketing regulations; however, the precise form of the mechanisms and the aspects of food marketing that contribute the most towards childhood obesity remain subjects of ongoing research [7]. Because most obesity studies have not focused on children and those that have tended to focus on only one mechanism or channel, five fundamental questions remain critical, along with relevant timing, targeting, and economic issues: [1] What is the influence of food marketing on children's obesity? [2] What behavioral and physiological pathways explain the influence of marketing upon children? [3] What media environments allow firms to reach and market to children? [4] Have the regulations aimed at restricting marketing that targets children closed the gap in exposed versus unexposed individuals? [5] Have regulation-based changes in the marketing of food to children altered children's consumption and obesity indicators? Other questions concern the detailed nature of food marketing, including the specific means by which firms seek to capitalize on media changes to adjust marketing practices, the differentiated impact of marketing based on age or background, industry attitudes toward regulation, the feasibility and realistic conduct of randomized control trials, and the local and community-based alternatives to regulation that remain available [6]. Despite the average age at which children are first exposed to televised food marketing being around 2.5 years, wide-ranging developmental changes affect the level of influence that marketing exerts upon them and the precise channels through which marketing operates [5]. Systematic variation in the impact of marketing is also readily apparent across children from different socioeconomic backgrounds and regions. Furthermore, the level of influence varies considerably over time. Accordingly, the differential response and effect of marketing linked to age or socioeconomic status warrant careful attention when gauging the influence and extent of food marketing among this demographic [6]. Established best-practice empirical standards for the creation of beneficial empirical evidence, gauging the portion of a child's food marketing exposure attributable to others, exploring how the marketing of food interacts with broader regulations concerning other harmful products, and considering the parallel evolution of household and school media are among the avenues for the triangulation of high-quality evidence that continue to provide substantial scope for the safe accumulation of knowledge on the excessively aggressive and damaging marketing of food to children [7].

Policy Recommendations and Ethical Considerations

The marketing of foods and beverages high in sugar and fat, especially toward children, is a significant contributor to unhealthy consumption patterns and obesity, an urgent public health concern worldwide [8]. Youth are targets of food and beverage marketing across multiple channels, including television, video games, online platforms, and retail environments. Recent estimates reveal that children aged 2 to 11 are exposed to an average of 21.8 food ads annually on digital platforms and 203.8 ads on television [6]. This section presents actionable, evidence-grounded, and ethically conscious policy options to restrict the promotion of unhealthy foods to youth, informed by broad patterns of food marketing, well-established pathways linking that marketing to the obesity epidemic, and empirical assessment of existing regulations. Such measures can mitigate the disproportionate effect of food promotion on children from under-resourced communities, who often encounter higher levels of marketing, thus

advancing the goal of equitable health support for diverse populations [6]. Despite widespread efforts, the policies considered appear limited in scope compared to the pressing challenge posed by commercial pressures on healthy eating [4]. The table lists numerous policies across tax, pricing, marketing, and product reformulation categories, highlighting common implementation obstacles [8]. The charitable emphasis on voluntary action has gained traction, yet voluntary codes have failed to protect youth effectively. Absent immediate government regulation, the promotion of health-preventive policies at all levels remains paramount 2. Partnerships with youth on research and policy development can amplify agency and raise awareness of the relationship between healthy eating and rigorous marketing. The commercial sector also engages youth to solicit feedback on products and marketing strategies [3].

Gaps in Knowledge and Directions for Future Research

Marketing influences childhood obesity through numerous mechanisms, but key pathways remain understudied. Additional research on underexplored mechanisms such as implicit or subliminal marketing, social norm establishment, social equity promotion, and non-materialist consumption modeling could yield new policy opportunities [7]. Similarly, extending the temporal scope of studies provides insights into targets like taste formation, long-term preferences, and broader behavioral effects [8-12]. Greater examination of effects within diverse populations, considering variables like race, language, and geographic location, enables identification of systemic, structural, or ecological factors that vary by context. Research exploiting robust natural experiments also furthers understanding by producing unbiased, specific estimates for specific jurisdictions or channels [8]. Ecosystem-wide impacts warrant further consideration, particularly regarding changes in availability, affordability, promotion, purchase patterns, and consumption in response to intrusions on commercial speech. Data on industry behavior during the COVID-19 pandemic suggests adaptation, such as shifting to other channels or altering brand positioning, but the impact of prior tightening on such adjustments remains unclear. Direct experiments measuring effects on distribution, pricing, or marketing spending throughout the evolving food system seek to capture these dynamics. Context-sensitive, population-representative research employing internally valid evaluation designs assists in disentangling complex relationships [13, 14].

CONCLUSION

Childhood obesity is a multifactorial public health problem, yet extensive evidence demonstrates that food marketing is a powerful and pervasive influence that shapes children's dietary choices, eating behaviors, and long-term health trajectories. Across traditional and digital platforms, marketing for energy-dense, nutrient-poor foods consistently captures children's attention, manipulates preferences, normalizes unhealthy consumption, and reduces perceptions of dietary risk. These mechanisms operate at both conscious and unconscious levels and exploit developmental vulnerabilities, particularly among younger children who cannot adequately distinguish commercial content from entertainment. The rise of personalized and algorithm-driven digital marketing has intensified exposure and complicated efforts to monitor or regulate how children encounter promotional material. Although regulatory measures such as school-based restrictions, broadcast advertising limits, and emerging digital marketing policies demonstrate promising reductions in exposure and modest improvements in consumption patterns, implementation remains fragmented and insufficient to counter the scale of commercial influence. Industry-led voluntary initiatives have repeatedly proven inadequate, often prompting shifts in marketing spending toward less regulated environments and widening disparities in exposure among low-income and minority populations. Ensuring equitable protection for all children, therefore, requires stronger statutory regulation, robust enforcement mechanisms, and comprehensive definitions of marketing that cover cross-platform, immersive, and data-driven advertising strategies. Future research must address persistent evidence gaps, including the long-term behavioral effects of marketing, the influence of social norms and peer dynamics, disparities across demographic groups, and the evolving role of digital ecosystems. Rigorous natural experiments, longitudinal designs, and cross-sector collaboration are essential to inform effective policy. Ultimately, protecting children from aggressive and harmful food marketing is not solely a regulatory challenge but an ethical imperative. A coordinated effort involving governments, schools, parents, public health agencies, and youth themselves is necessary to build healthier food environments, strengthen resilience against commercial pressures, and advance global efforts to reduce childhood obesity.

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