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Screen time Use and Food Marketing Influences on Children's Eating Behaviors

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Introduction

Among children and adolescents, a key determinant of food preferences is taste which is shaped by early environmental exposure to food during infancy and childhood. Taste preferences are acquired through learning processes,[1] including repeated exposure and positive messaging about various foods. Additionally, two of the strongest dietary predictors appear to be familiarity and sweetness of food.[2-4] Repeated exposure and high frequency to food marketing, often of unhealthy foods, influences food preference, purchase requests, consumption, and importantly long term brand preferences, with negative health outcomes for youth.[5-7]

Screentime, including time spent in front of a television (TV) and other digital platforms results in increased exposure to food advertising increasing the risk of overweight or obesity among children and adolescents.[8] In recent years, the expansion of digital media platforms has caused a

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shift from TV viewership to digital media providing food companies with additional platforms to expand their food marketing strategies to children. This shift is more prevalent among adolescents whereby TV viewership has decreased while digital media use has increased leading the food and beverage companies to increase their investment in food advertising in digital media spaces.[9,10] Trends also suggest that adolescents are more likely to have unhealthy diets compared to younger children, partly due to aggressive marketing practices.[11] Despite the decrease in TV viewing among children in recent years, it still remains an important source of exposure to food advertising among these age groups.[12] Additionally, TV advertisements for certain food products viewed by children exert a persuasive and motivating effect through visual, emotional, and sensorineural stimulation, exerting a large influence on purchase requests, purchases, and ultimate consumption of energy dense and unhealthy foods, compared to adults viewing such advertisements, thus highlighting the importance of children's screentime towards shaping their dietary practices.[13,14]

There are associations between increased screen time among children and adolescents and lower intakes of fruits and vegetables higher intakes of energy-dense snacks, beverages, and fast foods, and a higher percentage of energy intake from dietary fats and added sugars leading to subsequent obesity.[5,15–17] From 1999 to 2023, the prevalence of obesity among 2-19 year olds in the US has increased from 13.9% to 21.1%, while the prevalence of severe obesity has nearly doubled from 3.6% to 7%.[18] Studies have shown that due to psychological and neurological mechanisms affecting children's judgement, they tend to make more immediate food-related decisions than older adults following exposure to food advertisements. This leads to decisions favoring taste over health[19] leading to over-consumption of foods high in calories, refined sugars and salt, all of which are associated with outcomes such as obesity and other negative health outcomes.[20]

Prevalence and types of screentime use among children and adolescents

In the US, there has been a decline in traditional TV viewership by 57% and 60% among 2-11 years old children and 12-17 year old adolescents, respectively.[21] During this same period, the amount of entertainment-related screen time has increased among all age groups, with 8–12-year-old children and 13–18-year-old adolescents reporting 5.5 hours per day and 8 hours per day of screen time, respectively. This is largely attributed to digital media platforms, especially those accessed via mobile devices.[21]

With the growth of digital media and the use of mobile devises, the pervasiveness of advertising to children has increased as well. In the US, the most popular social media sites among children aged 5 years and older and adolescents aged 11-17 years are TikTok, Snapchat, and Instagram, while younger viewers aged 3-5 years primarily watch YouTube and YouTube kids.[21,22] This highlights that social media, video streaming, branded websites, and gaming sites take up the majority of younger viewers' screen time and have replaced traditional cable TV as the preferred alternative platform for entertainment access. In turn, the increase in screen time choices has presented food companies with a plethora of digital venues to engage in food marketing to children. Due to its diverse nature and unique characteristics, digital food marketing compared to traditional advertisement (TV, print media) presents a challenge in assessing children's exposures and impact on their health outcomes and in developing policies and solution to address potential harms. The diversity and constantly evolving media platforms (e.g. mobile phones, gaming, social media, websites, etc.) and message sources allow for targeted and personalized messaging (e.g., sociodemographic) using creative approaches (e.g., influencers, branding, artificial intelligence, etc.) are a few of the characteristics of food digital marketing.[21]

Food and beverage marketing strategies and budget

Advertisements on TV, and more recently, on digital media platforms, have been identified as the two most popular venues where unhealthy, energy-dense, nutrient poor foods[23] are advertised to children and adolescents by employing sponsored content, influencers, data collection technology, and personalized behavioral marketing using machine learning.[7,24] To appeal to younger audiences, companies use strategies, such as celebrity endorsements, promotions, gifts / incentives (e.g., toys), games, branding, and other salient claims such as sporting prowess to promote products.[7] Studies indicate that in the US, food, beverage, and restaurant companies spend around $14 billion each year for advertisements, with over 80% of that budget dedicated towards food which are generally considered unhealthy for children and adolescents, such as fast food, sugary drinks, candy, and snacks.[25] The food and beverage advertising budget dedicated to TV reaches $11 billion annually.[26] In Canada, in 2019, advertisers spent an estimated $628.6 million dollars on food advertising and 79.5% of this went to ads on television (67.7%) and digital media (11.8%). According to a study in Canada,[27] there were over 54 million food display ads (e.g., pop-up ads and banner ads) in one year on the most popular Canadian children's websites.

Research Context

Influence of TV viewing and digital use and advertising on eating behaviours of children

As one in five of U.S. children and adolescents have obesity and diets high in added sugars, sodium, and saturated fats are associated with a host of diet-related chronic diseases in adulthood, it is critical to examine the extent to which TV viewing and digital media use and food marketing negatively influence current and future eating behaviours among children and adolescents. Thus, it is important to discuss potential regulations that can protect children from TV and digital deceptive marketing practices. Finally, given the ubiquitous nature of food marketing using traditional and digital platforms, implications for policy makers and parents will be discussed.

Key Research Questions

- Is there an association between food marketing through traditional and digital platforms and eating behaviors in children and adolescents?
- Does advertising in TV and digital media platforms impact the quality of diet among children and adolescents? What are the effects of digital food marketing on children?
- Are there racial and socioeconomic differences in children's exposure to food marketing?
- Are TV viewing and digital media use and food advertising associated with diet-related health issues, such as obesity in children?
- What are the policy implications of existing marketing practices employed by food companies?

The role of TV and digital platforms in shaping the diet quality of children and adolescents

The overall diet quality of children and especially adolescents remains low with over half of all youth ages 5-18 years in the US having poor dietary patterns with an average Healthy-Eating Index score of about 50 out of a possible 100.[28] It has been documented that among young children, TV viewing is significantly associated with increased consumption of unhealthy foods, including fast food,[29] increased requests of foods seen on TV, and more positive attitudes toward unhealthy foods.[12,13,30–32] With the addition of digital food marketing, the increase in the overall screentime exposure has exposed children to more sources of high salt, sugar, and high energy-dense foods, including snacks, sugar-sweetened beverages, and fast food.[4,33,34]

While children younger than 7 years old display limited ability to recognize the persuasive nature of food advertisements, children from 7-14 tend to show greater awareness of the intent behind such advertisements. Despite this, adolescents are still undergoing cognitive development, and companies target this inability to comprehend disguised, persuasive marketing strategies, by influencing attitudes, food preferences, and poor impulse control.[10] Adolescents are particularly vulnerable to celebrity endorsements, music sponsorships, social media and influencer-based marketing of potentially unhealthy food products leading to high levels of engagement and trust towards many brands across both traditional and digital marketing platforms.[32,35] While adolescents might be more aware against such marketing tactics, their social desire to fit in and peer influence can overcome their skepticism towards media advertisements, thus creating a positive emotional associations to advertised products and making them feel more open to trying out new foods and beverages.[32,36]

Overall, both traditional TV advertising and digital food marketing have the same negative impact on children's food-related behaviors and more broadly on social norms and family relations; additionally, efforts to advertise healthy foods through digital media do not increase consumption of these foods neither do they decrease consumption of unhealthy foods.[21] Based on World Health Organization (WHO) reviews, unhealthy food marketing exposure increases immediate food intake and request for purchases. The frequent and amplified effects of food exposure through all multiple media platforms also has an effect on intermediate outcomes including brand awareness and loyalty, favorable ads, taste preferences, and purchasing intent for unhealthy foods.[37]

Racial and socioeconomic differences in children's exposure to food marketing

Targeted advertisements associated with TV and digital media usage can lead to disparities in diet-related health outcomes. Food and beverage advertising companies employ marketing practices targeting younger Hispanic and Black consumers in a disproportionate manner, which can have detrimental effects on the health of children and teenagers of ethnically diverse backgrounds.[38–40] Reports indicate that fast food companies increased their budget for advertisements on Spanish speaking TV channels by 33% from 2012 to 2019, compared to a 9% increase across all channels combined. As a result of such discriminatory practices, viewing of fast-food advertisement among Hispanic children and adolescents increased in 2019. During the same time, Black children and adolescents also reported viewing 75% more fast food advertisements compared to their white counterparts, due to increased advertisements during

TV programming popular among Black youth.[41] Overall, despite the decrease in overall screen time associated with TV programming among all children and adolescents, the number of TV advertisements viewed by Black youth was higher compared to the number of advertisements viewed by youth in other racial groups.

Recognizing the rising presence of Black and Hispanic users in digital medial platforms, companies have also employed food marketing geared towards younger audiences from these population groups in recent years.[42] Recent studies found that social media accounts of food and beverage companies on platforms such as Facebook, Instagram, and TikTok have amassed significantly higher numbers of Hispanic and Black youth followers compared to social media accounts of other commercial products. Hispanic and Black youth have even reported feeling more valued by food and beverage companies who employ racially targeted advertisements, which can lead to higher levels of online brand engagement compared to consumers from other racial backgrounds, affecting purchasing intent and actual purchases of unhealthy food and beverages.[42] These findings parallel the demographic differences in the prevalence of obesity among youth across different racial and ethnic groups, with Hispanic and Black children and adolescents being more likely to have obesity compared to their white counterparts.[43,44]

Children and adolescents in socioeconomically disadvantaged families are at a relatively higher risk of exposure to food and beverage advertisements from TV viewing compared to other groups. While the types of foods included both healthy and unhealthy items, the differences in exposure to unhealthy food advertisements is higher among younger viewers from lower socioeconomic backgrounds compared to the more affluent families.[38] This may be due to children from lower socioeconomic backgrounds spending more time in front of screens compared to children from higher socioeconomic backgrounds resulting in a subsequent dose-response relationship, with higher screen-time and advertisement exposure leading to increased purchases and higher consumption of unhealthy food and beverages.[38,40]

Parental educational attainment has been shown to play a role on a child’s exposure to food and beverage advertisements, especially on mobile devices, with children of lesser educated parents reporting higher advertisement exposure.[38] The reason for this discrepancy seems to be more related to the type of content viewed rather than duration of screen time, as families reporting lower socioeconomic status are found to be more likely to avoid higher subscription fees associated with subscription only streaming services. This results in more frequent commercial breaks in-between online entertainment, thus, greater exposure to food marketing practices.[45]

Policies to limit TV and digital media food advertising

The World Health Organization at the 63rd World Health Assembly in 2010, called for Member States to introduce policies that reduce the impact of advertising to children of foods high in sodium, sugars and saturated fat.[46] In 2023 WHO updated their statement calling for global action to reduce the impact of marketing of these foods to children. Specifically, they called for comprehensive and mandatory polices that reduce exposure of unhealthy food and beverage advertising among both children and adolescents based on nutrition criteria developed by governments.[47] Currently, 20 countries have mandatory policies, that vary in scope and enforcement.48 For example, in 2023, Norway's parliament agreed to new regulations to restrict all advertisements of unhealthy foods to children under the age of 18 and will ban the marketing of unhealthy foods and beverages that are high in fats, sugars and salt in all media that children are likely to see, such as television, radio, the internet, and social media.[47] Chile and Portugal have the most comprehensive policies restricting all marketing and persuasive techniques in broadcast and non-broadcast platforms in children and adolescents.[49] Chile requires manufacturers to include front-of-package warning labels on prepackaged foods high in saturated fats, added sugars, and sodium or beverages, and bans their marketing to children under the age of 14 in media intended for children. These marketing restrictions apply to schools, product packaging, point-of-sale, print media, radio, television, and websites.[47,48]

In the US, in 2006, in partnership with the Council of Better Business Bureau's Children's Food and Beverage Advertising Initiative (CFBAI), a coalition of 21 of the largest food companies pledged to improve the nutritional quality of foods advertised to children under the age of 12 years.[50] Companies that participate in the CFBAI pledge that will only advertise foods and beverages that meet only "strict" nutrition criteria in "advertising primarily directed to children under age 13 in the U.S." Together, these stakeholders pledged to advertising only products which meet CFBAI criteria on children-directed media.[51] Prior evaluation of these policies has found that they excluded certain marketing venues, such as product packaging, in-store marketing, company own digital marketing, brand marketing etc. It is important to note that adolescents are not offered the same protections under the CFBAI increases their vulnerability for exposure to unhealthy food and the potential for altered food preferences, over-consumption, and subsequent health issues.[51]

In response to the rise in digital media usage among children, in 2018 the CFBAI updated their core principles to expand the digital media section of the agreement that was implemented in

2020.[52] Additionally, Children's Advertising Review Unit (CARU) is the primary self-regulatory mechanism for the advertising industry.[53] Disney and Google have established additional policies addressing food marketing to children on their own digital platforms.

Even after the updated CFBAI principles, analysis shows that the total number of products which are regulated by the CFBAI through self-regulatory practices across traditional TV and digital media platforms represent a very small portion of the overall calories consumed by children, which negates the possibility of such principles having any significant public health impact in curtailing childhood obesity rates.[52] Food and beverage companies continue to advertise products with low nutritional value to young audiences, encouraging unhealthy dietary habits that lead to obesity and related negative health outcomes.[51,54] Recent studies also indicate that while many companies avoid marketing their brands on made-for-kids channels on platforms like YouTube and YouTube Kids, they can by-pass existing CFBAI guidelines through strategic product placements and endorsements of candy, sugar-sweetened beverages, salty snack and junk food on child-influencer videos.[55–57] In addition, the lack of protection for adolescents through the CFBAI policies, and the various vulnerabilities of this age group to targeted advertisement campaigns have so far not been addressed by any regulatory authorities as public health priority.[58] Given the failure of the food industry's self-regulation initiatives, stronger policies are needed to protect children and adolescents from the harmful impact of food marketing. There is a need for government agencies in the US to implement and enforce mandatory regulatory policies on unhealthy marketing to children and youth.

In Quebec, the Consumer Protection Act prohibits commercial advertising, including all foods directed at children under the age of 13. In Canada, in 2016 the Minister of Health launched the Healthy Eating Strategy to help improve the food environment. Restricting food advertising to children is an important component of this Strategy. Health Canada considers the monitoring of food advertising to children as a priority and the Department of Health is monitoring the strategies that are most frequently used in advertising directed at children.[59]

Research Findings and Gaps

Some progress has been made in assessing the degree of exposure and content of TV and digital advertisement to children and adolescents, including expansion on newer popular media forms such as social media (e.g., Instagram), video streaming (e.g., Netflix, YouTube, TikTok), and livestream gaming (Twitch). Based on a panel report published by Healthy Eating Research

(HER),[21] recent studies have expanded on the growing trend of influencer videos and other creative strategies in these platforms indicating the increased prevalence of branded posts and their impact on children. As adolescents engage more frequently with social media, recent studies have focused on adolescents compared to older studies that mostly included younger children. They have also observed that exposure to food advertising through influencers have immediate impact on young adolescents' consumption of unhealthy foods, despite providing ad disclosures.

Additional research gaps need to be addressed in future research.[21] In addition to traditional TV advertisements, the plethora of digital platforms and the constantly evolving creative marketing strategies, require continuous research to understand the long-term impact of the cumulative and synergistic exposure on children's eating behaviors, health risks, and socio-cultural outcomes. While some research has been conducted to record unhealthy food marketing to racially and socioeconomically diverse children, more extensive research is needed to understand and address the impact of digital food marketing on the health inequities among these groups. It's important to develop programs addressing the impact of the expanding food marketing practices on children's eating behaviors as well as to evaluate the effectiveness of policies.

Conclusions

The types and amount of screen time that children and adolescents are exposed to has dramatically increased mainly due to the increase in the availability of digital entertainment platforms. While TV viewership has decreased, the increase in digital media has provided a plethora of food and beverage advertisements that amplified the persuasive massaging seen in traditional forms of media. Unfortunately, the vast majority of foods and beverages that are advertised to younger audiences across all digital platforms are unhealthy in nature[7] supporting the link between increased screentime, food marketing, and childhood and early life obesity.[60] The ubiquitous digital entertainment offerings in digital platforms and social media, (TikTok, Snapchat, Instagram) gaming platforms and video streaming services and the creative marketing strategies blur the lines between food promotion and entertainment with immediate and long term effect on food tastes and preferences of older children and adolescents.[22,36]

Youth from certain racial minority and socioeconomic backgrounds have been disproportionately affected as companies that cater to these audiences use targeted food marketing strategies in

specific platforms and time-slots. Parental educational attainment has also been shown to contribute towards disproportionate exposure to unhealthy food advertisements among children and adolescents.[38] The exposure and impact of these diverse and targeted food marketing practices across different age, racial, and socioeconomic groups need to be further evaluated in order to develop policies aimed at protecting youth especially from vulnerable backgrounds.

There are no uniform policies and restrictions on food advertising to children internationally.[61] In North America, only Quebec and Mexico have mandatory restrictions on food advertising to children.[59]

Implications for Parents, Providers, and Policy

Parents' and caregivers' efforts to promote healthy eating at home are undermined by the high volume and influence of food advertisements that children see and hear where they learn, live, and play. Parents play an important role in the lives of young children, however the evolving landscape of food advertising to children undermines the parents’ and caregivers’ efforts to promote healthy eating to their children. When possible, parents can opt for child friendly plans when it comes to TV and digital media viewing, which will use high-quality media content that are considered less harmful in influencing unhealthy eating behavior. Clear and open communication between parents and children on how to assess marketing tactics on TV, social media, gaming websites and other screen-based platforms can equip young audiences with better skills for navigating unhealthy foods such as fatty foods, sugary-drinks, salted snacks, candy and others which can lead to both short and long-term negative health outcomes. Steps for building awareness within families of children who are disproportionately targeted by aggressive marketing will be key in shaping future dietary outcomes among minority and socioeconomically disadvantaged communities. School meetings, community events, and even places of worship can be used for disseminating information regarding digital media literacy, so that parents, guardians, and children of all ages can become better equipped in building their awareness of marketing strategies. Parents should also understand the importance of refraining from watching TV or using mobile devices during meals, removing TV from children’s bedrooms, and generally limiting their children’s exposure to TV and other devices. According to American Academy of Pediatrics, children below the age of 2 years should not watch TV and anyone older than 2 years should only watch 1 to 2 hours of quality programming per day.[62] Health care providers should be abreast of the latest research and policies regarding TV viewing and digital media use and children’s dietary behaviours and obesity. At well-child visits, health care

practitioner should discuss with families their media habits and inform them about the negative impact of food advertising on children's dietary behaviours.

Policy makers should monitor the media and strategies employed by food advertisers and collaborate with the food industry to develop evidence-based strategies and enforce regulatory guidelines to limit the TV and digital marketing of unhealthy products to children in all age groups. The regulatory principles can be extended in order to incorporate children 14 years old and older in order to offer added protection to adolescents during this crucial developmental stage in their lives, when lifelong dietary habits are being shaped and consolidated. Finally, digital media platforms can be pressured in order to restrict their usage of personal data from mobile phones, tablets and other streaming and gaming devices which make it easier for advertisers to target certain groups for advertising food and beverages under the guise of social desirability and increased celebrity / influencer engagement.

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