

**INFORMING POLICY:
DOES TELEVISION FOOD AND BEVERAGE ADVERTISING NOT SPECIFICALLY
TARGETING CHILDREN INFLUENCE THEIR BEHAVIOUR?**

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Declaration on the use of Artificial Intelligence (AI)

In the preparation of this thesis, artificial intelligence (AI) tools were used to support certain aspects of the writing and research process. As English is not my first language, I used AI-based tools, including ChatGPT by OpenAI and Grammarly, to assist with translation from Portuguese to English, grammar correction, refinement of academic tone, and improvement of coherence and clarity in writing. AI tools were also used to help locate relevant literature, format citations, and ensure adherence to academic standards.

All research design, data collection, analysis, interpretation of results, and the formulation of original arguments and conclusions were conducted independently by me, the author. The use of AI was strictly limited to linguistic and editorial support and did not replace critical thinking, data interpretation, or scholarly contribution. All sources cited were verified through academic databases and official publications.

This declaration is made in the interest of transparency and academic integrity.

Abstract

This research examined the frequency of child-targeted versus non-child-targeted food and beverage advertising on children's television, comparing two distinct food marketing policy environments in Canada (Quebec and Ontario). It also investigated children's perceptions of both types of advertising and identified the features that elicit positive attitudes and influence behavioural responses. Finally, the study explored whether parental exposure to unhealthy food marketing is associated with children's consumption and requests for such products, and whether these behavioural outcomes differ across countries. A mixed-methods design addressed the research questions. Study 1 involved a cross-sectional analysis of advertisements (ads) on popular children's television channels in Ontario and Quebec, with descriptive statistics tabulated for the frequency of ads and marketing techniques classified as child-targeted and non-child-targeted. Study 2 comprised open-ended online interviews with 17 children recruited through convenience sampling, during which participants viewed four ads: one child-targeted and one non-child-targeted ad for both healthy (plain milk) and unhealthy (chocolate) foods. A thematic analysis was conducted. Study 3 consisted of a secondary analysis of the 2018 International Food Policy Study, including 5,764 parents of children under 18 from Australia, Canada, Mexico, the United Kingdom, or the United States. Binary logistic regressions assessed associations between parental exposure to unhealthy food marketing and children's purchase request and actual purchasing outcomes. Results indicated that food and beverage advertising represented a higher proportion of total advertising in Quebec, with Ontario showing a higher frequency of child-targeted ads and Quebec a higher frequency of non-child-targeted ads, including alcohol ads. In Study 2, pre-existing familiarity with products was more relevant than marketing techniques. No notable differences were observed between child-targeted and non-child-targeted ads. Study 3 found that greater parental exposure to unhealthy food marketing was associated with higher purchase request and purchase outcomes. These findings highlight critical gaps in current regulatory frameworks. Food marketing is a complex and persistent public health challenge that requires coordinated, multi-level policy responses. Effective policies must go beyond narrow definitions and adopt broader, exposure-based strategies. This thesis contributes evidence to support stronger, more comprehensive regulations that reflect the diverse ways in which marketing reaches and influences children and families.

Dedication

This dissertation is dedicated first and foremost to God, who created me, inspired me, and sustained me throughout this long journey. Without Him, none of this would have been possible.

Secondly, I dedicate this work to my family, who supported me during this important phase. To my husband, Isaac—thank you for helping me manage our personal life while I devoted myself to my career.

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Chapter 1: Introduction

Chronic diseases, also known as non-communicable diseases (NCDs), are long-term conditions that progress slowly and constitute the leading causes of global morbidity and mortality. The most common NCDs include cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes, collectively responsible for about 75% of deaths worldwide (GBD, 2021). In Canada, NCDs pose a substantial burden, with nearly half of adults reporting one or more chronic conditions in 2023, and obesity and hypertension being particularly prevalent (Statistics Canada, 2025). Stroke and diabetes accounted for nearly 44% of deaths, highlighting the pressing need for prevention (Statistics Canada, 2025).

A critical driver of NCDs is childhood obesity, a multifactorial condition shaped by genetics, behaviour, socioeconomic context, and the environment. Global prevalence is estimated at 8.5% among children and adolescents (Zhang et al., 2024), while in Canada, about 30% of children aged 5 to 17 were overweight or obese in 2017 (PHAC, 2018). Obesity in childhood predisposes individuals to type 2 diabetes, cardiovascular diseases, and other complications that frequently persist into adulthood (Simmonds et al., 2016). This growing epidemic reflects shifts in dietary habits, characterized by the frequent consumption of calorie-dense, nutrient-poor ultra-processed foods (UPFs), which account for over half of the caloric intake among Canadian children (Polsky et al., 2020).

Children's eating patterns are strongly shaped by family influences and the wider food environment. Parents exert both direct and indirect influence through food provision, modeling, and attitudes toward nutrition (Scaglioni et al., 2018). At the structural level, food environments determine the accessibility, affordability, and promotion of foods (Turner et al., 2018), with obesogenic settings dominated by aggressive marketing of energy-dense products (Gauthier &

Krajicek, 2013). Food marketing is a major commercial determinant of health, exploiting children's limited capacity to critically assess advertising (Smith et al., 2019). Exposure to persuasive marketing during childhood fosters unhealthy dietary preferences, brand loyalty, and long-term risks of obesity and NCDs (Swinburn et al., 2019).

Television remains a dominant marketing channel. In Canada, food companies spent CAD \$628.6 million on advertising in 2019, with 68% allocated to television (Potvin Kent et al., 2022). Fast-food chains accounted for over half of this spending, and most promoted products were classified as unhealthy under the World Health Organization (WHO)'s standards (Kelly et al., 2019). In 2019, children were exposed to an average of 6.1 food advertisements (ads) per day, the vast majority featuring unhealthy products (Potvin Kent et al., 2023). Persuasive strategies—including characters, animations, jingles, and promotions—are routinely employed to capture children's attention (Boyland et al., 2025). However, regulatory definitions of “child-targeted” advertising remain inconsistent, often based on narrow concepts of marketing techniques directed at children, limiting policy effectiveness (Garde et al., 2018).

Evidence consistently shows that exposure to unhealthy food advertising increases consumption among both adults and children (Boyland et al., 2025). Yet, significant research gaps remain. Most studies focus on explicitly child-targeted advertising, neglecting the influence of non-child-targeted ads to which children are also widely exposed. Moreover, little is known about children's own perceptions of advertising techniques, as most classifications are made by adults. Another underexplored area is the indirect influence of parents' exposure to unhealthy food marketing, which may shape both their own and their children's dietary practices.

Globally, regulatory responses vary. The WHO has urged governments to implement mandatory, comprehensive restrictions on unhealthy food marketing to children under 18 (WHO,

2010, 2023b). In Canada, food advertising remains primarily self-regulated under the 2023 industry-led Code for the Responsible Advertising of Food and Beverage Products to Children, which applies only to audiences under 13 and lacks independent enforcement. Research indicates that self-regulation has been ineffective in reducing children's exposure to unhealthy advertising (Potvin Kent & Pauzé, 2018). By contrast, Quebec's Consumer Protection Act (CPA) prohibits all commercial advertising directed at children under 13. Studies show that Quebec children are exposed to fewer food ads than those in Ontario, although they are still subject to significant advertising on generalist channels (Potvin Kent et al., 2023).

These gaps underscore the need for research examining both child- and non-child-targeted advertising under different regulatory environments. This study therefore investigates three core questions: (1) the frequency of child- versus non-child-targeted advertising in Quebec and Ontario; (2) children's perceptions of advertising and the features that elicit positive attitudes and behaviours; and (3) whether parental exposure to unhealthy food marketing is associated with children's consumption and requests across different countries. Together, these questions provide a basis for evaluating the adequacy of current policies and for developing more comprehensive strategies to reduce the impact of unhealthy food marketing on children and families.

Chapter 2: Literature Review

Chronic diseases

Chronic diseases, also known as non-communicable diseases (NCDs), are conditions that persist over a long duration and typically progress slowly (CDC, 2024). Unlike infectious diseases, NCDs are not caused by pathogens and do not spread from person to person (Ambrosio et al., 2015; WHO, 2013). NCDs can lead to limitations in daily activities and may cause residual

disability (CDC, 2024). Chronic diseases encompass a wide range of health conditions, with the most prevalent being cardiovascular diseases (including heart disease and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease (COPD) and asthma), and diabetes (Goodman et al., 2013).

These diseases are the leading causes of death and disability worldwide, significantly impacting individuals and healthcare systems. As of recent reports, chronic diseases are responsible for approximately 75% of all deaths worldwide, a figure that has been rising over the past decades (GBD, 2021). This increase is particularly notable in low- and middle-income countries, where health systems often struggle to manage both infectious diseases and the growing burden of NCDs. In 2021, 18 million people died prematurely (before the age of 70 years old) from an NCD, and 82% of these premature deaths occurred in low- and middle-income countries (WHO, 2024).

In Canada, NCDs are also a major health concern. In 2023, almost half (46.1%) of Canadian adults reported having one or more selected chronic diseases, with arthritis (20.6%) and high blood pressure (19.9%) being among the most common (Statistics Canada, 2025). Additionally, risk factors such as overweight and obesity were prevalent in 35.5% and 30.2% of people, respectively (Statistics Canada, 2025). In 2023, stroke and diabetes were the leading causes of death in Canada, together accounting for 43.7% of deaths (Statistics Canada, 2025).

The rise in NCDs has complex implications for life expectancy. While global health advancements have led to increased life spans, the growing prevalence of NCDs means that more individuals are living longer with chronic conditions (WHO, 2024). This underscores the importance of effective management and prevention strategies to ensure that increased longevity is accompanied by quality health.

Childhood obesity

Childhood obesity has emerged as a significant public health concern worldwide, affecting millions of children across different socioeconomic and geographic contexts. It is defined as a condition characterized by an excessive accumulation of body fat in individuals under 18 years of age, posing significant health risks (Daley & Balasundaram, 2023). It is commonly assessed using the Body Mass Index (BMI), a calculation that relates weight to height. For children and adolescents, BMI percentiles are employed to account for age and sex differences in body composition (De Onis et al., 2007). A child is classified as having overweight if their BMI is at or above the 85th percentile but below the 95th percentile for their age and sex. Obesity is defined as a BMI at or above the 95th percentile for age and sex (De Onis & Lobstein, 2010). The World Health Organization (WHO) defines overweight and obesity as "abnormal or excessive fat accumulation that presents a risk to health" (WHO, 2020). It is important to note, however, that while BMI is a useful screening tool, it does not directly measure body fat. Therefore, additional assessments, such as skinfold thickness measurements, dietary evaluations, and physical activity assessments, may be necessary to fully evaluate a child's health status (Dietz, 2023).

Childhood obesity is a multifaceted condition resulting from the interplay of various factors, including genetic predisposition, behavioural patterns, environmental influences, and socioeconomic conditions (Government Office for Science, 2007). Genetics plays a significant role in a child's susceptibility to obesity. Children with a family history of obesity are more likely to develop the condition themselves. Specific genetic disorders can lead to severe obesity in childhood, although these cases are relatively rare. Moreover, certain genes may influence behaviours related to eating and physical activity, further contributing to weight gain (Alfano et

al., 2022). Obesity is increasingly recognized as a condition influenced by hereditary factors. Studies on rare cases of monogenic obesity have highlighted the crucial role of hypothalamic circuits and the brain-adipose axis in maintaining energy balance, regulating appetite, and controlling hunger and satiety (Fatima et al., 2022; Rohde et al., 2019). For instance, specific mutations in the leptin gene have been linked to excessive food intake, leading to significant weight gain (Rohde et al., 2019). Furthermore, exposure to an obesogenic environment during conception, pregnancy, or lactation has been associated with higher body weight and long-term metabolic disturbances in offspring. This phenomenon suggests that susceptibility to obesity may be transmitted across generations through epigenetic modifications rather than solely through traditional genetic inheritance (Sivakumar et al., 2024).

Dietary habits significantly impact the development of obesity. Regular consumption of high-calorie foods rich in sugars, unhealthy fats, and sodium—such as fast foods, baked goods, and sugary beverages—can lead to excessive weight gain. These foods are often calorie-dense yet nutrient-poor, contributing to an energy imbalance (Vallianou et al., 2025). Physical inactivity is another critical behavioural factor. With the increasing prevalence of sedentary activities like watching television, playing video games, and using computers, children's energy expenditure has decreased. This reduction in physical activity contributes to an energy imbalance, promoting weight gain (Rakić et al., 2024).

The environment in which a child grows up can significantly influence their risk of obesity. Factors such as the availability and marketing of unhealthy foods, lack of safe spaces for physical activity, and limited access to affordable, nutritious foods contribute to the development of obesity. Communities with limited resources may lack recreational facilities or have higher concentrations of fast-food outlets, making healthy lifestyle choices more challenging (Booth et

al., 2009). Socioeconomic status (SES) is closely linked to childhood obesity rates. Families with lower SES may face barriers such as food insecurity, limited access to healthcare, and reduced opportunities for physical activity (Anderson et al., 2022; Fradkin et al., 2015). These challenges can make it more difficult to maintain healthy eating and exercise habits, thereby increasing the risk of obesity. Psychosocial elements, including stress, low self-esteem, and family dysfunction, can contribute to obesity. Children experiencing these issues may turn to food for comfort or may lack the support needed to engage in healthy behaviours (Feretzakis et al., 2024).

A comprehensive analysis encompassing data from 154 countries, involving over two thousand studies from January 2000 to March 2023, estimated the global prevalence of obesity among children and adolescents to be 8.5% (Zhang et al., 2024). Recent trends indicate a rise of childhood obesity in low- and middle-income countries, data from Zhang et al. (2024) showed the prevalence of obesity among children and adolescents to be an average of 8.50% in upper-middle income countries, 6.35% in lower-middle income, and 3.60% in low income countries, ranging from as low as 0.36% in Vanuatu to as high as 28.35% in Puerto Rico (Zhang et al., 2024).

High-income countries continue to report significant rates of childhood obesity. A study analyzing birth cohorts from six high-income countries found that the weighted prevalence of childhood obesity ranged from 2.6% to 15.8% (White et al., 2022). The analysis from Zhang et al. (2024) showed that the prevalence of childhood and adolescent obesity in high-income countries was an average of 9.29%, ranging from as low as 2.22% in Belgium to as high as 18.57% in the United States (US) (Zhang et al., 2024). In Canada, approximately 30% of Canadian children aged 5 to 17 had overweight or obesity in 2017 (PHAC, 2018), and the review

from Zhang et al. (2024) of studies from the year 2000 to March 2023 showed the prevalence of children and adolescents with obesity in Canada to be an average of 10.43% (Zhang et al., 2024).

Children with obesity are at a higher risk for several health conditions, including type 2 Diabetes Mellitus. Excess weight can lead to insulin resistance, increasing the likelihood of developing type 2 diabetes during childhood or adolescence (Shaw, 2007). Additionally, obesity during childhood can lead to cardiovascular diseases, and is associated with elevated blood pressure and cholesterol levels, which are risk factors for cardiovascular diseases (McPhee et al., 2020; Raj, 2012). Furthermore, research shows an association between childhood obesity and respiratory diseases. Conditions such as asthma are more prevalent among children with obesity (Peters et al., 2018; Santamaria et al., 2012). Moreover, orthopedic complications are also linked with obesity during childhood, the excess weight places additional stress on bones and joints, leading to musculoskeletal discomfort and orthopedic problems (Nowicki et al., 2019). Finally, children with obesity may experience psychological effects, as the condition is associated with low self-esteem, depression, and social isolation due to stigma and bullying (Haqq et al., 2021; Pont et al., 2017).

The ramifications of childhood obesity often extend into adulthood, children with obesity are more likely to have obesity as adults, perpetuating the associated health risks (Simmonds et al., 2016). These individuals also face a higher likelihood of developing NCDs such as type 2 diabetes, cardiovascular diseases, and certain cancers at younger ages (WHO, 2020). Childhood obesity has also been linked to an elevated risk of autoimmune conditions, including multiple sclerosis, Crohn's disease, arthritis, and type 1 diabetes (Marcus et al., 2022). Severe obesity in early childhood can drastically reduce life expectancy. For example, research has found that a four-year-old boy with severe obesity who continues this trajectory into adulthood may have life

expectancy of just 39 years, approximately half that of a healthy-weight peer (Wiedemann et al., 2024).

Thus, the rise in childhood obesity has led to an increased prevalence of NCDs, which once were primarily seen in adults but are now increasingly diagnosed in younger populations, leading to premature morbidity and mortality (Marcus et al., 2022). Beyond physical and mental health consequences, obesity has led to higher healthcare utilization and costs. Children with obesity are more likely to require medical services for obesity-related conditions, including hospital admissions, outpatient visits, and emergency care (Marcus et al., 2022; Peters et al., 2018). A systematic review found that obesity and overweight were positively associated with increased healthcare utilization in children across various outcome measures (Hasan et al., 2020).

The economic impact of obesity in Canada has been projected to reach CAD\$22.97 billion as of 2021. This includes losses in government revenue, with CAD\$9.4 billion attributed to reduced direct tax income due to lower workforce participation and CAD\$2.37 billion in lost indirect tax revenue from decreased consumer spending. Additionally, obesity-related healthcare expenditures are estimated at CAD\$7.88 billion per year, while disability costs amount to CAD\$3.69 billion annually (Kotsopoulos & Connolly, 2024). A 1% reduction in obesity prevalence is estimated to result in annual net fiscal gains of CAD\$229.7 million, which points to the importance of preventing obesity (Kotsopoulos & Connolly, 2024).

Children's eating habits

Children's dietary habits are fundamental in shaping their growth, cognitive development, and long-term health. Globally, these habits exhibit significant variations influenced by socioeconomic status, cultural norms, and regional food availability (Martín-Rodríguez et al., 2022). Recent data from the World Health Organization (WHO) highlight concerning trends in

adolescent dietary behaviours across 44 countries (Rakić et al., 2024). Less than 40% of adolescents consume fruits or vegetables daily, with this percentage decreasing as age increases. Conversely, the intake of sweets and sugary beverages remains high, with approximately 25% of adolescents reporting daily consumption of sweets or chocolate, and 15% reporting daily consumption of sugary soft drinks (Rakić et al., 2024). Notably, these unhealthy eating patterns are more prevalent among adolescents from lower socioeconomic backgrounds, who are less likely to consume fruits and vegetables and more likely to consume sugary drinks daily (Rakić et al., 2024).

Children's eating habits are shaped by a complex interplay of genetic, familial, and socioeconomic factors. Recent research indicates that genetic factors significantly contribute to children's food preferences and eating behaviours. A study involving twins demonstrated that up to 74% of variations in picky eating can be attributed to genetics, suggesting that certain children may be inherently predisposed to selective eating habits (Nas et al., 2025). While environmental factors also play a role, the substantial genetic component implies that some aspects of children's eating behaviours may be less amenable to change through parenting practices alone (Nas et al., 2025).

Additionally, the family setting plays a pivotal role in shaping children's dietary patterns. Parental behaviours, attitudes toward food, and the overall family health habits can either promote or hinder healthy eating habits (Scaglioni et al., 2018). Furthermore, socioeconomic factors significantly influence children's diets. Families with higher socioeconomic status (SES) often have better access to nutritious foods and greater nutritional knowledge, leading to healthier eating habits in their children (Scaglioni et al., 2018). In contrast, lower SES is frequently associated with increased consumption of energy-dense, nutrient-poor foods due to

factors such as limited financial resources and reduced availability of healthy food options (Scaglioni et al., 2018). This disparity underscores the need for public health interventions that address economic barriers to healthy eating.

Moreover, children's own behaviours and characteristics, such as their appetites and self-regulation abilities, also influence their eating habits. For example, children with lower self-regulation may be more susceptible to overeating when exposed to palatable foods (Scaglioni et al., 2018). Parental feeding strategies often adapt in response to these child characteristics, with parents exerting more control over children who exhibit less interest in food and being more permissive with those who are highly food responsive (Scaglioni et al., 2018).

In low-income countries, children's diets are often characterized by limited diversity and insufficient nutrient intake. Factors such as food insecurity, economic constraints, and limited access to a variety of foods contribute to these patterns (Jones, 2017). Conversely, high-income countries face challenges related to the overconsumption of ultra-processed foods (UPFs) (Monteiro et al., 2013). In Canada, children's eating habits mirror broader trends observed in other high-income countries. While specific recent data are limited, concerns have been raised about the increasing consumption of processed foods and declining physical activity levels among Canadian youth (Moubarac et al., 2017). Research suggests that Canadian children's diets, similarly to those observed in many other nations, are increasingly dominated by UPFs, significantly altering traditional eating patterns and posing substantial risks to their health and development (Marino et al., 2021; Moubarac et al., 2017). These highly processed products contribute to 49.1% of total caloric intake among children aged 2-5 years and 54.2% among those aged 6-12 years (Polsky et al., 2020; Statistics Canada, 2020). UPFs are rich in added sugars, unhealthy fats, and sodium while lacking essential nutrients such as fiber, vitamins, and

minerals (Monteiro et al., 2019). These foods have been linked to adverse health outcomes, including rising childhood obesity rates, cardiovascular issues, and dental problems (Mescoloto et al., 2023). Recent studies have established a correlation between the high intake of UPFs and adverse metabolic outcomes in children, including increased body mass index (BMI), elevated waist circumference, and markers indicative of insulin resistance (Vallianou et al., 2025). Factors such as socioeconomic status, parental education levels, and aggressive marketing strategies contribute to the widespread consumption of these products among youth (Vallianou et al., 2025).

Parental influence on children's eating habits

Parental influence is one of the most critical determinants of children's eating habits. Parents shape children's eating habits through direct and indirect methods. Direct influence includes providing meals, grocery shopping, and setting rules about food consumption. Indirect influence occurs through role modeling, and the attitudes parents express toward food (Scaglioni et al., 2018). Research indicates that children are more likely to adopt healthy eating patterns if their parents consume fruits, vegetables, and minimally processed foods (Patrick & Nicklas, 2005).

Parenting style encompasses the attitudes, beliefs, and behaviours of caregivers, serving as a comprehensive framework for understanding parental warmth and control in shaping children's behaviours (Engineering National Academies of Sciences, 2016). Parental feeding practices vary widely and can be categorized into authoritarian, authoritative, permissive, and neglectful styles (Hughes et al., 2016). The authoritative approach balances structure with responsiveness, allowing children to express their preferences while maintaining parental guidance. In contrast, the authoritarian style enforces rigid rules with minimal encouragement of

independence. The permissive style, on the other hand, is characterized by a lenient approach where children receive minimal structure or boundaries in decision-making – in contrast to the neglectful style which is characterized by parents providing little emotional support, limited supervision, and minimal involvement in the child's daily life, including food-related practices (Lopez et al., 2018). Authoritative feeding practices have been linked to healthier dietary habits in children (Arlinghaus et al., 2018). In contrast, restrictive or controlling feeding practices may lead to overeating or unhealthy relationships with food (Lopez et al., 2018).

Economic status influences food access and nutritional quality. Low-income families may have limited access to fresh produce and rely more on processed, calorie-dense foods (French et al., 2019). In high-income households, parental education and financial resources enable healthier dietary choices, while in low-income families, food insecurity can lead to malnutrition or reliance on less nutritious options (French et al., 2019). In 2023, approximately 24.7% of children (aged 17 and under) in Canada lived in households experiencing moderate or severe food insecurity – indicating they lacked reliable access to sufficient, nutritious food (Statistics Canada, 2022). Moreover, cultural norms and traditions shape dietary preferences. In some cultures, parents encourage traditional diets rich in whole foods, while in others, the globalization of fast food has altered children's eating patterns (Adair & Popkin, 2005; Harrell et al., 2016).

Parental involvement in children's eating habits is most relevant and predominant during early childhood. From birth through early childhood, parents are the primary providers and role models for their children's eating behaviours. They not only supply the types of foods available but also model eating habits that children are likely to emulate. Introducing healthy foods during the first two years of a child's life is crucial for their optimal growth, development, and long-term

health (WHO, 2009). This period, often referred to as the "first 1,000 days," encompasses conception through a child's second birthday and is recognized as a critical window for establishing dietary patterns and metabolic health (Darling et al., 2020). The WHO emphasizes that optimal nutrition during the first two years lowers morbidity and mortality, reduces the risk of chronic diseases, and fosters better overall development. Introducing a variety of nutrient-dense foods helps ensure that infants receive essential vitamins and minerals necessary for brain development, immune function, and bone growth (WHO, 2023a).

Early dietary experiences significantly influence taste preferences and eating habits later in life. Exposing infants to a wide range of flavors and textures, particularly vegetables and fruits, before the age of one increases the likelihood of acceptance and preference for these foods as they grow (Pérez-Escamilla et al., 2017). Repeated exposure to healthy foods, even those initially rejected, can promote acceptance and establish a foundation for lifelong healthy eating behaviours (Pérez-Escamilla et al., 2017). Introducing appropriate complementary foods alongside continued breastfeeding around six months of age is vital to prevent both undernutrition and overnutrition (WHO, 2023c). The early introduction of processed or sugary foods can contribute to childhood obesity (Cantoral et al., 2016). A study focusing on socially vulnerable Brazilian children found that the introduction of UPFs before two years of age was associated with increased rates of overweight and anemia (Gomes et al., 2024). Furthermore, research revealed that children aged 3 to 5 who consumed higher amounts of UPFs exhibit poorer locomotor skills (Vernarelli et al., 2022). Additionally, adolescents aged 12 to 15 with high UPF consumption demonstrate reduced cardiovascular fitness (Vernarelli et al., 2022). Data from 2014 found that, in Brazil, 75% of the preschool-aged children studied had received one or more UPFs in their diet by the 6th month of life (Longo-Silva et al., 2017). In 2018, UPFs

represented one-third of the dietary energy intake of children aged from 6 to 24 months in Brazil (Spaniol et al., 2020). In Canada, a cohort study showed that among preschool-aged children, UPFs contributed to almost half of their daily energy intake, and higher UPF intake was positively associated with higher BMI and an increased odds of living with overweight or obesity (Chen et al., 2025).

As children grow, they begin to assert more independence over their food choices. Around the ages of three to four, children start exhibiting greater independence in their eating behaviours, establishing preferences and limits regarding the foods they are willing to consume (Kostecka et al., 2021). During this stage, they actively engage in exploring different foods, becoming acquainted with a variety of tastes, textures, and flavors. Initially, their dietary choices are largely influenced by the options available at home, where parents and caregivers play a central role in shaping their exposure to different foods (Kostecka et al., 2021). During middle childhood (approximately 5 to 12 years), this independence over food choices becomes more pronounced. Children in this age group begin to make simple food decisions, influenced by factors such as peer interactions, exposure to food marketing, and experiences in school settings (Kostecka et al., 2021). Despite this growing autonomy, parents continue to play a critical role by guiding food choices, providing healthy options, and fostering an environment that supports nutritious eating habits (Mahmood et al., 2021).

Therefore, for the optimal development of healthy eating habits in children—particularly those that persist into adulthood—it is essential for parents to actively participate in both providing nutritious foods and modeling healthy dietary behaviours. However, data shows that in high-income countries, UPFs constitute a significant portion of daily energy intake among adults. For instance, in Canada, adults consume, on average, 45.2% of their total daily energy from

UPFs (Hamel et al., 2024). This consumption is slightly higher among males (49.4%) compared to females (47.6%) (Hamel et al., 2024). In contrast, low-income countries tend to have lower UPF consumption due to limited availability and higher reliance on traditional, minimally processed foods. However, as these countries undergo economic transitions and urbanization, the intake of UPFs is rapidly increasing, leading to shifts in dietary patterns and associated health outcomes (Monteiro et al., 2013). In Brazil, in 2018, UPFs accounted for an average 17.6% of total energy intake among men and 19.2% among women, aged 30 to 49 years (Nilson et al., 2023).

Parents are not immune to the influence of unhealthy food marketing and the broader obesogenic environment, which shapes their own dietary choices and, consequently, those of their children (Gauthier & Krajicek, 2013). The widespread promotion of high-calorie, nutrient-poor foods through multiple channels—such as television, social media, and in-store advertising—normalizes unhealthy eating patterns, making it increasingly difficult for parents to consistently model and provide nutritious meals (Taillie et al., 2019). Moreover, the structural factors that contribute to an obesogenic environment, including the affordability and accessibility of UPFs, further constrain parents' ability to make optimal dietary choices for their families (Moran et al., 2019). Expecting parents to single-handedly shield their children from these influences overlooks the reality that both adults and children are constantly bombarded with messages that encourage the consumption of unhealthy foods (Driessen et al., 2022; Sadeghirad et al., 2016).

Food environment

Food habits are heavily impacted by the food environment surrounding individuals. Food environments encompass a range of physical, social, economic, cultural, and political factors that

shape the accessibility, availability, and adequacy of food within a given community or region (Glanz et al., 2005; Rideout et al., 2015). Early conceptual work by Glanz et al. (2007) introduced the notion of the nutrition environment at both the neighborhood level—termed the "community food environment"—and the in-store level, referred to as the "consumer food environment." According to their work, food environments can be categorized into four primary components: community, consumer, organizational, and information environments (Figure 1) (Glanz et al., 2007). The 'community environment' refers to the spatial distribution of food outlets and the types of food available in proximity to individuals. In contrast, the 'consumer environment' pertains to factors influencing individual food choices, such as cost and nutritional value. The 'organizational environment' encompasses the various institutions individuals are part of, including workplaces and households. Lastly, the 'information environment' comprises food-related messaging from media and advertisements, both promoting healthy and unhealthy options (Glanz et al., 2005).

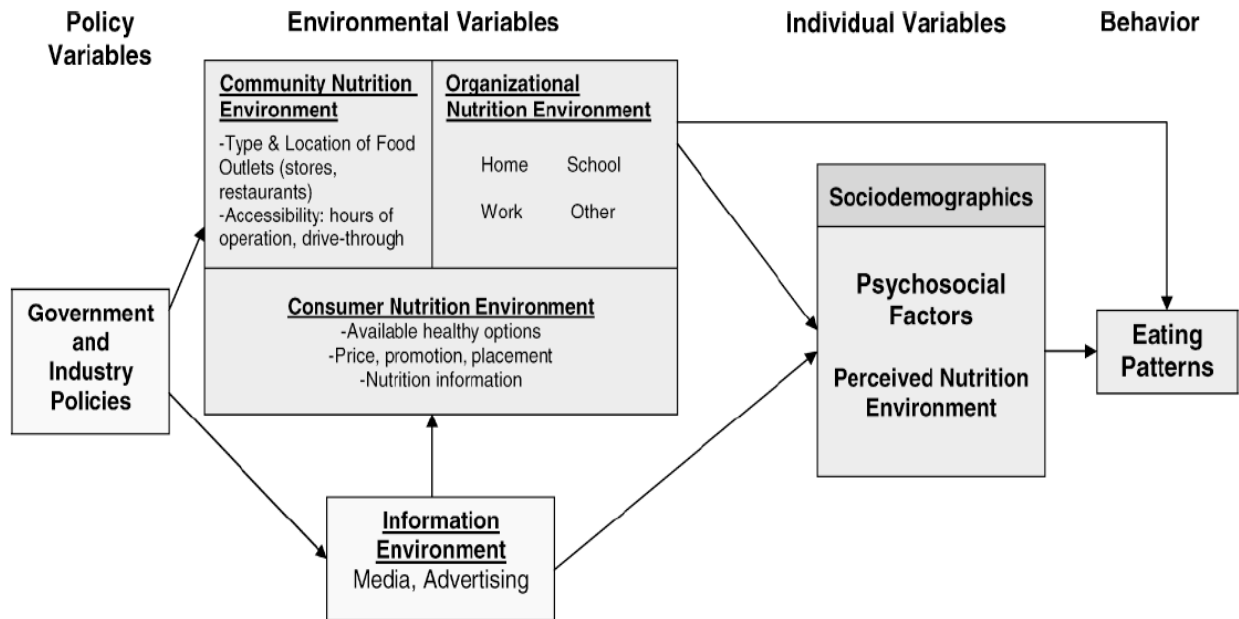


Figure 1. Model of Nutrition Environments. From *"Healthy nutrition environments: Concepts and measures"* (p.331) by Glanz et al. (2005).

Beyond the concepts of community and consumer food environments as proposed by Glanz et al., food environments are a more complex construct within the food system. To add to the previous definition, food environment has also been defined as the set of conditions, opportunities, and pressures surrounding individuals that is not limited to a specific community or region (Swinburn et al., 2013). As such, understanding the structural drivers of food acquisition, consumption, and nutrition is essential. The Global Panel on Agriculture and Food Systems for Nutrition (Global Panel) and the Food and Agriculture Organization of the United Nations (FAO) add to that by emphasizing that food environments encompass the foods available to individuals in their daily lives, as well as their nutritional quality, safety, pricing, convenience, labeling, and promotion (FAO, 2016; Global Panel, 2016).

Turner et al. (2018) propose a more complex and broader definition of food environment, identifying it as a key part of the larger food system (Turner et al., 2018). They apply a socio-ecological perspective to distinguish two primary domains that constitute the food environment:

the "external domain" and the "personal domain." Each domain consists of distinct, measurable dimensions (Figure 2) (Turner et al., 2018). The external domain includes structural factors that exist independently of individuals, while the personal domain reflects elements shaped by individual experiences and behaviours. Within these domains, key dimensions have important roles in influencing food habits: availability (external domain) refers to the presence of food in a given area, while accessibility (personal domain) considers factors like distance, time, and mobility that affect an individual's ability to obtain such food. Availability always precedes accessibility, as food cannot be accessed if it is not first available. Similarly, prices (external domain) represent the cost of food, whereas affordability (personal domain) depends on purchasing power, which is influenced by fluctuations in availability and accessibility. Other key dimensions include vendor and product properties (external domain), which influence availability and accessibility, and will shape convenience (personal domain), or how easily food can be obtained. Lastly, marketing and regulation (external domain) interact with personal preferences, cultural norms, and knowledge to shape desirability (personal domain), ultimately influencing food choices (Turner et al., 2018).

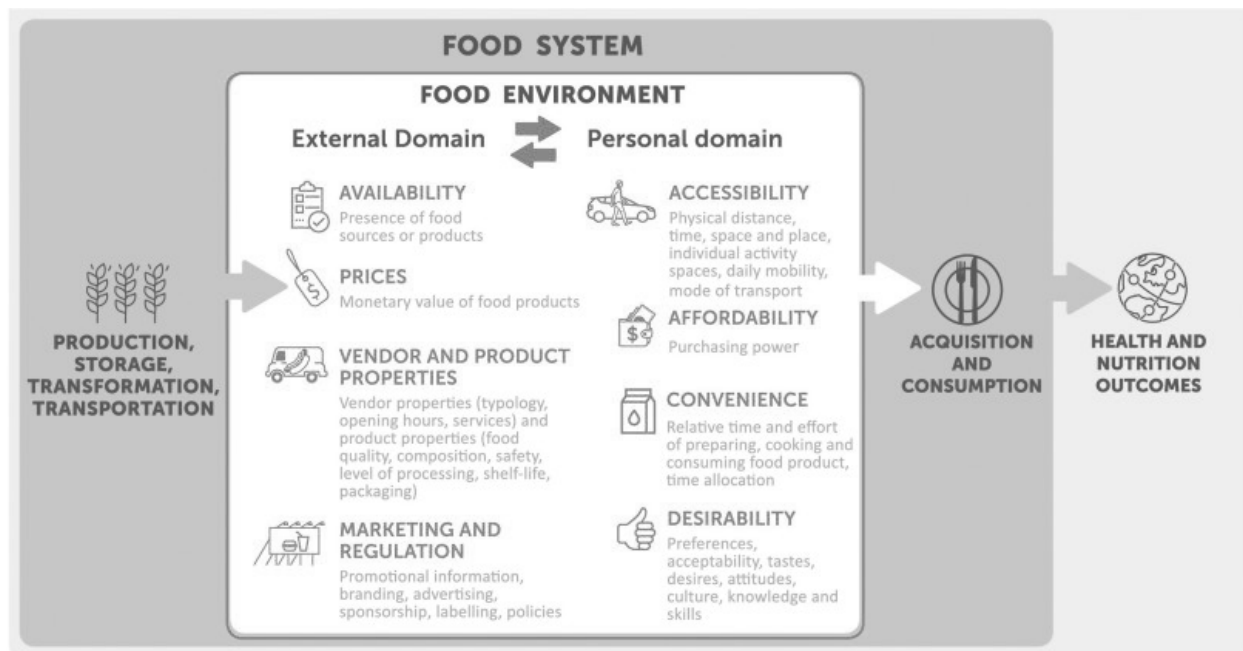


Figure 2. Conceptual framework of food environment. From “*Concepts and critical perspectives for food environment research: A global framework with implications for action in low- and middle-income countries.*” (p.96) by Turner et al. (2018).

The impact of the food environment

The food environment is greatly responsible for dietary behaviours and, consequently, health outcomes as demonstrated in the models above (Glanz et al., 2005; Turner et al., 2018). The main public health concern are the obesogenic environments which are characterized by an abundance of energy-dense, nutrient-poor foods, aggressive marketing strategies, and limited access to fresh, healthy foods (Gauthier & Krajicek, 2013).

Research indicates that environments dominated by fast-food outlets and convenience stores, as opposed to supermarkets and fresh food markets, are associated with poor dietary choices and higher obesity rates (Caspi et al., 2012). Limited access to affordable and nutritious food options, often referred to as food deserts, exacerbates reliance on UPFs (Walker et al., 2010). Additionally, food marketing is one of the major contributors to dietary behaviours, particularly in obesogenic environments where unhealthy foods are aggressively promoted. Marketing strategies, including television commercials, social media promotions, and product

placements, disproportionately favor high-calorie, low-nutrient foods (Boyland & Halford, 2013). A recent systematic review and meta-analysis have shown that frequent exposure to such advertisements influences consumer preferences and purchasing behaviours, often leading to increased consumption of unhealthy foods (Boyland et al., 2025).

Children are particularly vulnerable to the influence of obesogenic food environments due to their developing cognitive and behavioural patterns. The dietary habits established in childhood often persist into adulthood, making early-life exposure to unhealthy food environments a critical public health concern (Scaglioni et al., 2018). Children are highly susceptible to persuasive food marketing due to their limited ability to critically evaluate advertising messages (Smith et al., 2019).

Commercial determinants of health

The evolution of the food industry has been deeply intertwined with human civilization, shaping societies, economies, and public health. The early 20th century saw the expansion of mass food production, fueled by urbanization and changing consumer demands. Big food companies such as Heinz, Kellogg's, and Nestlé pioneered large-scale food manufacturing, introducing processed and packaged foods that catered to growing urban populations (Igumbor et al., 2012). The mid-20th century marked a significant expansion of UPFs. The post-war economic boom, coupled with technological advancements, led to an increased supply of cheap, calorie-dense foods (Nestle, 2013b). Intense marketing strategies played a pivotal role in promoting UPFs. Companies invested heavily in advertising, targeting children and families through television commercials, product placement, and endorsements (Moss, 2014).

The concept of the commercial determinants of health (CDoH) highlights how the practices of multinational corporations, including marketing strategies, political lobbying, and

supply chain management, shape consumer choices and dietary behaviours (Kickbusch et al., 2016). CDoH encompasses the strategies and tactics employed by private-sector entities to market and encourage the consumption of products and behaviours that negatively impact public health (Kickbusch et al., 2016). These determinants operate through multiple channels, including the production and marketing of goods, political engagement, and economic policies that affect access to and affordability of food products (Maani et al., 2020).

Marketing is a fundamental business function that plays a crucial role in connecting products and services with consumers; it is one of the most important types of CDoH. Marketing can be defined as the process of creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large (Kotler & Keller, 2016). Marketing could be divided into four main elements, often referred to as the 4Ps: product (the goods or services offered to meet customer needs), price (the cost consumers pay for a product, influenced by market demand, competition, and perceived value), place (the distribution channels used to deliver the product to consumers), and promotion (the communication strategies, such as advertising and public relations, used to attract and retain customers) (Xia, 2023).

Another important area of CDoH is political lobbying. Corporations actively engage in this to shape regulatory environments in ways that favor business interests, often at the expense of public health (Gilmore et al., 2015). For instance, the food and beverage industry has been known to resist policies that seek to limit the availability of unhealthy products, such as sugar taxes, front-of-package labeling, and restrictions on marketing to children (Mialon et al., 2015). Industry lobbying often manifests in direct financial contributions to policymakers, the use of third-party organizations to advocate for industry-friendly policies, and the establishment of

corporate social responsibility (CSR) initiatives that create a favorable public image while distracting from harmful business practices (Fooks et al., 2013). In combination, these efforts influence the availability and affordability of processed and UPFs, shaping long-term dietary habits and nutritional patterns.

The globalization of food supply chains has contributed to the widespread availability of such foods, leading to shifts in dietary patterns worldwide (Swinburn et al., 2019). Large multinational corporations dominate food production and distribution, often prioritizing cost efficiency over nutritional quality (Monteiro & Cannon, 2012). This economic model has resulted in the proliferation of calorie-dense, nutrient-poor foods that contribute to rising obesity rates and diet-related NCDs (Monteiro et al., 2018).

Children are particularly susceptible to the influence of CDoH due to their cognitive development, limited ability to critically assess marketing messages, and reliance on caregivers for food choices (Smith et al., 2019). The food industry specifically targets children through various marketing strategies that shape dietary habits early in life, often leading to long-term health consequences. Food marketing directed at children is a significant concern, as young audiences are less capable of recognizing persuasive intent and are more likely to develop brand loyalty from an early age (Smith et al., 2019). Moreover, the normalization of processed food consumption contributes to a cycle of unhealthy eating behaviours that persist across generations (Swinburn et al., 2019).

Food Marketing

Food marketing is a vast field that encompasses various strategies used by food companies to promote their products to different audiences. Food marketing can be defined as any type of commercial communication, message, or practice that promotes a food product,

service, or brand, with the aim or effect of increasing its visibility, attractiveness, and consumer uptake (WHO, 2023b). Examples of food marketing would include: the McDonald's restaurants consistently using its golden arches and the slogan "*I'm Lovin' It.*"; the Coca-Cola logo or product appearing in movies and TV shows; a Cheerios commercial emphasizing its health benefits; or Red Bull sponsoring extreme sports events.

Types of food marketing

Television (TV) advertising refers to the promotion of products, services, or brands through many forms of promotional strategies used to influence consumer attitudes and behaviours. It includes traditional TV commercials (i.e., advertising), product placement in TV shows (e.g., characters eating branded snacks), sponsorships (e.g., a food brand sponsoring a children's program), and branded content or integrated marketing, where the brand appears within the content in non-commercial formats (Martinho, 2020).

Television advertising takes place across multiple media platforms, each with different levels of effectiveness and audience reach. Broadcast television (e.g., CBC, CTV, CityTV) reaches a broad audience and is ideal for mass marketing campaigns, which includes prime-time commercials (e.g. aired during peak viewing hours when audience engagement is highest), and daytime TV ads (e.g. target specific demographics such as stay-at-home parents or retirees). Furthermore, cable and satellite TV networks offer more specialized audiences based on channel categories (e.g., sports, news, entertainment), and advertisers can target their messages to specific viewer interests, increasing relevance and effectiveness (Freeman et al., 2014).

With the rise of digital streaming platforms like Netflix, Hulu, and YouTube TV, advertisers have adapted their strategies to target audiences in new ways. Some platforms offer

ad-supported content, where commercials are embedded before or during shows, ensuring visibility even in the age of on-demand viewing (Dixon et al., 2017).

Common television marketing techniques include the use of emotional appeals in ads that evoke emotions such as happiness, nostalgia, excitement, or fear to create strong connections with the audience (Pettigrew et al., 2013). Another frequently used technique is celebrity endorsements (where celebrities endorse products to increase product desirability), which are used to build credibility and influence consumer trust (Coates et al., 2019). Repetitive messaging reinforces recognition and recalls by strategically placing the same commercial multiple times within a short period to strengthen consumer memory (Harris et al., 2009). Jingles and catchy slogans may be used to make ads more engaging and easier to remember, as brands often create signature jingles that consumers associate with their products (Nestle, 2013a). Finally, limited-time offers and promotions, such as television ads including urgent calls to action, such as “limited-time discounts” or “call now” messages, to encourage immediate consumer response (Campos et al., 2011).

Digital marketing uses online platforms such as social media, websites, search engines, and email to promote products and brands through targeted, data-driven strategies, including Search Engine Optimization (SEO) – that is, the process of optimizing a website and its content so that it appears higher in search engine results –, Pay-Per-Click (PPC) – which is a form of paid digital marketing where advertisers pay a fee each time their ad is clicked –, and influencer partnerships (Chaffey & Ellis-Chadwick, 2019; Freberg et al., 2011). Beyond digital spaces, marketing also relies on packaging, which shapes consumer perceptions through design and functionality (Simmonds & Spence, 2017; Su & Wang, 2024), and in-store strategies like product placement, point-of-purchase displays, and sensory cues that drive impulse buying (Fam et al.,

2011; Grewal et al., 2017). Sponsorships and event marketing further enhance brand visibility and consumer engagement through partnerships in sports, entertainment, and community initiatives (Cornwell, 2020; Jensen & Hsu, 2011; Sarpong & PraiseGod Zungu, 2025). Together, these techniques demonstrate the wide range of channels through which food marketing influences consumer behaviour.

Exposure to and the power of food marketing

Understanding the difference between exposure and power is essential to comprehending the effectiveness of marketing campaigns. Exposure refers to the frequency and reach of product placements in media content, such as a brand appearing multiple times in a popular TV show or film which have high exposure, increasing familiarity and recall (Whang & Lee, 2025). On television, exposure refers to the reach and frequency of television advertisements. It measures how often and how widely a commercial is seen by audiences (Kelly et al., 2015). On the other hand, power relates to how effectively the marketing message influences consumer attitudes and behaviour. In other words, power pertains to the persuasive impact of the advertisement. It depends on the emotional appeal, message strength, and the creative execution of the commercial (Cairns et al., 2013).

Exposure to food advertising on television

Television remains one of the most powerful platforms for food advertising. As of 2023, global television consumption patterns have shown variability across different regions and age groups. In the United Kingdom, people 4 years and older viewed an average of 2.5 hours of TV per day, while children aged 4 to 15 years old viewed an average of 38 minutes per day (Ofcom, 2024). In the United States, the population aged 15 years and older spent an average of 2.7 hours watching TV per day (U.S. Bureau of Labor Statistics, 2024). In low-income countries such as

Chile and Mexico, people spent over 5 hours a day watching TV in 2022 (CNTV, 2023; IFT, 2023). In Mexico, children between 4 and 12 years old spent 5.3 hours per day watching TV in 2022 (IFT, 2023). In Chile, children aged 4 to 12 years old viewed 2.4 hours per day of TV (CNTV, 2024). In Canada, in 2019, the average TV viewing time was 24.5 hours per week for individuals aged 2 and older, and 17.3 hours per week for children aged 2 to 11 (CRTC, 2019).

Billions of dollars are spent on food advertising on TV every year. Fast-food restaurants consistently lead in television advertising expenditure. For instance, in the United States, food advertising accounted for a significant portion of the US\$3.9 billion spent on TV advertising in 2021 (Statista, 2025). In 2021, the leading brands advertising on TV in the US were PepsiCo (US\$524 million), Kellogg (US\$331 million), and Coca-Cola (US\$293 million) (Nielsen, 2021).

In Canada, broadcast television continues to be the medium with the highest advertising investments from the food industry. In 2019, advertisers spent an estimated CAD\$628.6 million on food advertising across various media in Canada. Television accounted for the largest share, comprising 67.7% of the total expenditure, followed by digital media with 11.8% (Potvin Kent et al., 2022). Fast food restaurants accounted for 51% of the spending in Canada, across all media, and 77% of the total expenditure was devoted to advertising "less healthy" products on television (Potvin Kent et al., 2023). Furthermore, from the total spending on food advertising across media in Canada, CAD\$57.2 million was spent advertising child-targeted food and beverage products. Television accounted for 77% of these expenditures, followed by digital media with 18%. The food categories with the highest expenditures targeting children were candy/chocolate (30%) and restaurants (16%) (Potvin Kent et al., 2023).

In Canada, in 2019, the average rate of television food and beverage advertisements was 11 advertisements per hour (Kelly et al., 2019), and on children's channels specifically, the

average was 7.3 ads per hour (Potvin Kent et al., 2023). When examining children's actual exposure, in 2019, it was found that children viewed on average 6.1 food and beverage ads per day in Canada (Potvin Kent et al., 2023). In the US, in 2022, children aged 6 to 11 years old were exposed to 1046 food and beverage ads per year (Powell et al., 2024). In countries with statutory food advertising regulations, the average frequency of food and beverage advertising on TV is much lower. For example, in Chile in 2016, the average was 1 ad per hour on broadcast TV and 0.9 ads per hour on child/teen cable TV (Correa et al., 2018). In Mexico, in 2019 (post-regulation full implementation), the average of food and beverage ads on TV was 2.4 ads per hour, and 1 unhealthy food and beverage ad per child per day (Carpentier et al., 2020).

The majority of promoted food and beverage products on television are considered unhealthy (Potvin Kent et al., 2023; Potvin Kent et al., 2023). When advertisements are classified according to the WHO Nutrient Profiling Model (WHO, 2015), around 89% of television ads in Canada are considered unhealthy (high in salt, sugar, and fat). For every television ad classified as healthy, there are 12 food ads classified as unhealthy (Kelly et al., 2019), and most are advertised using multiple marketing techniques appealing to children, such as the use of child-appealing products, special effects, characters, and child actors (Potvin Kent et al., 2023).

Marketing techniques used in television food advertising targeting children

Food and beverage advertising aimed at children makes use of various persuasive techniques intended to attract children's attention, enhance brand recognition, and create positive emotional connections with products (Boyland et al., 2025). Research has consistently highlighted how such strategies are tailored to children's developmental characteristics, often capitalizing on their cognitive immaturity and limited understanding of commercial intent (Cairns et al., 2013).

Among the most prevalent techniques are the use of vivid colours, animated figures, catchy jingles, humor, and fast-paced editing – elements that are particularly engaging for young audiences (Boyland & Tatlow-Golden, 2017; Mulligan et al., 2020). Additionally, promotional tactics such as giveaways, contests, collectibles, and tie-ins with popular media franchises are commonly employed to enhance product desirability (Mulligan et al., 2020). Emotional appeals that associate food products with fun, joy, or social belonging further contribute to their effectiveness (Letona et al., 2014). Children are impressionable and often believe the messages presented in food advertisements. Many ads use cartoon characters and bright colors to promote sugary snacks and fast food, which can create early associations between these foods and positive emotions (Potvin Kent et al., 2023). Additionally, food advertising frequently uses misleading health claims—such as “low-fat,” “sugar-free,” “natural,” “organic,” or “high in protein”—to portray products as healthier than they truly are. These claims can obscure the presence of added sugars, unhealthy fats, artificial sweeteners, or excessive sodium, leading consumers to believe they are making nutritious choices when the products remain highly processed or nutritionally poor (Kossiva et al., 2024; Ludwig & Willett, 2013; Nestle, 2018; Smith-Spangler et al., 2012). These advertising strategies are especially potent among younger children, who often struggle to distinguish advertising from regular programming and to critically evaluate its persuasive intent (Lapierre, 2015; Rozendaal et al., 2011).

The definition of what constitutes a "child-targeted" advertisement has been a subject of academic and regulatory debate. Researchers often define child-targeted advertising based on the use of specific techniques that are empirically shown to appeal to children, such as the presence of child actors, animation, or child-friendly themes (Mulligan et al., 2020). In contrast, the food industry frequently adopts a much narrower definition, often relying on metrics such as the

percentage of the audience that is under a certain age (usually 12 or 13 years) to determine whether an ad is child-targeted (Garde et al., 2018). In countries with mandatory policies, such as Chile, food advertising is considered child-targeted based on the marketing techniques presented such as cartoons, characters, fantasy themes, child-oriented language or music, or depictions of children's daily lives (Reglamento Sanitario de Los Alimentos, 2024). It also includes when the advertising takes place in programs or on websites targeting children, or when these programs or websites attract an audience of children under 14 greater than 20%. Additionally, the regulation in Chile prohibits interactive applications, games, and contests linked to UPF products (Reglamento Sanitario de Los Alimentos, 2024). Consequently, many advertisements that attract children's attention fall outside the scope of voluntary industry pledges or broad regulations (Elliott & Truman, 2019). This has been a persistent issue in global and national efforts to regulate food marketing to children, leading public health experts to advocate for exposure-based criteria or stricter technique-based criteria rather than audience-based definitions (Alfraidi et al., 2023; Boyland & Harris, 2017; Carpentier et al., 2020).

Understanding the marketing techniques that appeal to children is essential for both research and regulatory efforts. Nonetheless, there remains limited knowledge about which types of advertisements are most appealing to children. Regulatory frameworks frequently emphasize 'child-targeted' advertising, even though there is insufficient evidence to conclude that advertisements not specifically directed at children may also appeal to them.

Impact of television food advertising

A large body of evidence has illustrated the influence of television food advertising on food choices, consumption, and eating habits of both adults and children. Food advertisements significantly shape adult and children's food preferences, often promoting processed and high-

calorie foods, as presented by a systematic review and meta-analysis (Boyland et al., 2025). This systematic review and meta-analysis with studies from 2014 to 2024 indicates that exposure to advertising for unhealthy food products leads to increased consumption of these items among adults and children (Boyland et al., 2025).

Impact on adults. Moreover, a cross-sectional study conducted in three European countries with participants aged 8 to 21 years old showed that exposure to unhealthy food advertisements was positively associated with unhealthy food intake (Giese et al., 2015). This is particularly concerning for individuals who are already at risk of diet-related health issues, such as obesity and cardiovascular disease. Repeated exposure to food advertisements has been linked to higher caloric intake, particularly from fast food and sugary beverages. A study found that women aged 15-49 years old who are frequently exposed to food advertising consume more unhealthy snacks, leading to weight gain and associated health risks (Goryakin et al., 2015). Advertisers use psychological techniques to trigger impulsive eating behaviours among adults. Furthermore, stress and emotional eating are often exacerbated by food marketing campaigns that associate certain foods with comfort and relaxation (Tomiya et al., 2011).

Impact on children. Studies consistently show that children are disproportionately exposed to advertisements for ultra-processed and high-sugar foods, and these exposures influence their food preferences, consumption patterns, and pester power (Boyland et al., 2025). Another systematic review also points to the fact that emotional appeals, celebrity endorsements, and sensory-focused marketing (e.g., imagery of melting cheese or sizzling food) can lead to cravings and unplanned food consumption in children (Boyland et al., 2016). A meta-analysis found a strong correlation between food advertising exposure and increased intake of unhealthy snacks and sugary drinks among children (Cairns et al., 2013). Another meta-analysis of 39

studies from the last three decades, carried out with children and adolescents aged 2 to 18 years, measured the effect of food advertising on food consumption. It concluded that children exposed to food advertising ingested 60Kcal more on average than the group exposed to non-food-related advertisements (Russell et al., 2018). The frequent marketing of fast food and energy-dense snacks contributes to poor dietary habits during a critical period of growth and development (Larson et al., 2016; Tsochantaridou et al., 2023).

Children are highly impressionable, and their food choices are heavily influenced by advertising. An observational study indicated that food marketing affects children's taste preferences and increases their preference for high-fat, high-sugar, and high-sodium foods (Boyland et al., 2011). This early exposure creates long-term eating patterns that can lead to obesity and other health complications (Teegarden et al., 2009). Young children lack the cognitive ability to recognize the persuasive intent of advertisements, making them particularly vulnerable to marketing strategies (Lapierre, 2015; Smith et al., 2019). In addition, experimental evidence has suggested that the advertising of unhealthy food has a greater impact on children's food choices than their parents' recommendations (Ferguson et al., 2012). Furthermore, another experimental study carried out with 23 children aged 8 to 14 years went further and analyzed the effect of television advertising on the ventromedial prefrontal cortex of children – the region responsible for self-control and evaluation of value and compensation (Bruce et al., 2016). After exposure to food or non-food commercials, each child had to assign values to food images, representing the flavour and wholesomeness, and subsequently chose one of the foods shown at the end of the experiment. The study noted that participants exposed to food advertising chose food based more on the scale of the flavour alone than children exposed to advertising for other products. Moreover, among participants exposed to food advertising, the ventromedial prefrontal

cortex region was more stimulated during the choice of food than among participants in the group exposed to advertising of non-food products, revealing that food advertising can alter the neurologic mechanisms of food choice in children (Bruce et al., 2016).

Additionally, many food advertisements feature thin, fit, or muscular individuals consuming unhealthy products, which creates the misleading impression that frequent consumption of processed foods is compatible with maintaining an ideal body. This inconsistency can lead to body dissatisfaction and lower self-esteem, particularly for individuals who experience difficulties with weight management (Blomquist et al., 2020). Children who have overweight or obesity are especially vulnerable to these effects. Media representations that stigmatize larger body sizes often frame them as undesirable or unhealthy, which can increase experiences of bullying and social exclusion, and lead to reduced self-confidence (Fruh et al., 2021). Over time, the psychological distress associated with such stigmatizing portrayals may negatively affect self-worth and mental health.

Theoretical framework – Hierarchy of effects of food marketing on children

The AIDA model (Attention, Interest, Desire, Action) is a widely used framework in marketing that explains the stages consumers go through before making a purchase decision. The model begins with Attention, where marketers use eye-catching visuals, bold headlines, and engaging advertisements to capture consumer interest in a crowded marketplace (Kotler & Keller, 2012). The next stage, Interest, involves sustaining consumer engagement through informative content, storytelling, and product demonstrations (Kotler & Keller, 2012). Once interest is established, marketers focus on Desire by emphasizing a product's unique benefits, using techniques like celebrity endorsements, customer testimonials, and exclusivity to create emotional appeal (Kotler & Keller, 2012). Finally, the Action stage encourages consumers to

make a purchase through persuasive call-to-action (CTA) buttons, limited-time offers, and simplified checkout processes (Kotler & Keller, 2012). The model is extensively used in digital and traditional marketing, including social media campaigns, television commercials, and sales strategies.

The marketing of unhealthy food to children has become an increasing concern in public health. Kelly et al. (2015) examined the mechanisms through which food marketing influences children's eating behaviours (Kelly et al., 2015). Their conceptual framework aligns with classical advertising theories, such as the AIDA model, and introduces a “hierarchy of effects,” that describes how food marketing influences children across multiple stages—from cognitive responses, such as attention and brand awareness, to preferences and, ultimately, consumption behaviours (Kelly et al., 2015).

The literature also identifies multiple channels through which food marketing reaches children, including television advertising, digital media, packaging, and in-store promotions (Kelly et al., 2015). The exposure versus power paradigm, as previously explained, distinguishes between the frequency of marketing messages and their persuasive impact. This differentiation is crucial in understanding how marketing influences children at different cognitive and behavioural levels (Kelly et al., 2015).

Kelly et al (2015) propose a structured hierarchy of food promotion effects, which is instrumental in assessing the strength of evidence linking marketing exposure to dietary outcomes. The hierarchy consists of four primary levels:

- I. Awareness and Familiarity – children recognize and recall food brands due to frequent exposure to advertisements. This stage involves cognitive processing

where brand recognition begins to develop (Harris et al., 2009; Voorveld et al., 2011).

- II. Attitudes and Preferences – repeated exposure creates positive associations with unhealthy foods, leading to increased preference over healthier alternatives (Dixon et al., 2007; Howard et al., 2012).
- III. Pestering and Purchase Requests – marketing influences children to request or demand unhealthy foods, affecting household food purchasing behaviours (Cairns et al., 2013).
- IV. Consumption and Diet-Related Health Outcomes – ultimately, marketing leads to increased consumption of energy-dense foods, contributing to poor dietary patterns and obesity (Boyland et al., 2016).

The hierarchy of effects proposed in the paper is significant because it provides a structured approach to understanding how food marketing affects children. It moves beyond simplistic cause-and-effect assumptions by illustrating a stepwise process through which marketing influences behaviour (Kelly et al., 2015). This framework supports policy discussions by identifying which stages of influence are most susceptible to intervention. Furthermore, it emphasizes the necessity for policy interventions that target multiple levels of the hierarchy.

Adopting the logic model by Kelly et al (2015) as the theoretical framework for this dissertation is essential because it provides a structured model to identify and address existing research gaps in unhealthy food advertising to children. This framework systematically categorizes the effects of food marketing, allowing for a comprehensive assessment of where evidence is robust and where critical knowledge gaps persist (Kelly et al., 2015). By applying this framework, the dissertation can move beyond fragmented findings and instead establish a

coherent analysis of how food advertising influences children's dietary behaviours. Without a conceptual framework like this one, research risks overlooking key mechanisms of influence or failing to capture the full extent of marketing's cumulative effects on children's health.

Furthermore, this model is crucial in distinguishing between well-researched areas, such as television advertising exposure, and less-explored domains, such as the role of advertising power (persuasive techniques) in shaping long-term dietary habits. Additionally, grounding the dissertation in this model strengthens its relevance for policy discussions, as it offers a rigorous way to assess the effectiveness of current marketing regulations and identify where stronger interventions are needed.

Food advertising regulations around the world

Given the significant role that unhealthy food marketing plays in shaping children's dietary behaviours and contributing to rising rates of obesity and NCDs, it becomes pertinent to explore the regulatory and policy responses designed to mitigate these impacts.

Governments, public health institutions, and international organizations have increasingly recognized the need to regulate the marketing of unhealthy food products—especially to vulnerable populations such as children. For example, the WHO has been recommending that governments implement comprehensive food marketing regulations, particularly those aimed at protecting children from the influence of unhealthy food and non-alcoholic beverages marketing since 2010 (WHO, 2010). The WHO recommends that these regulations be mandatory rather than voluntary, comprehensive in scope (including digital media, television, and in-store promotions), be enforced by a responsible authority to ensure compliance and accountability (WHO, 2012), and target children under the age of 18 (WHO, 2023b).

Food marketing regulations refer to governmental or institutional policies aimed at controlling the advertisement, promotion, and sales tactics used by food and beverage companies (Alfraidi et al., 2023). Food marketing regulations typically aim to limit the exposure of unhealthy food products to children and adolescents; encourage healthier eating behaviours; reduce the prevalence of obesity and diet-related NCDs; and promote the availability and consumption of healthier food alternatives.

The implementation of such regulations is important not just to protect children from unhealthy advertising and to reduce rates of obesity and NCDs, but also empower consumers to make informed choices. In addition to this, the regulations ensure a fair and equitable environment for customers, especially parents who are central decision-makers in their households regarding food purchasing and consumption, and who may otherwise face structural disadvantages when exposed to pervasive marketing of unhealthy food products (Driessen et al., 2022). Parents, particularly those from lower socioeconomic backgrounds, may be disproportionately affected, as they often have fewer resources and more limited access to healthy food alternatives, while their children are more exposed to targeted advertising (Ruggles et al., 2023; van Ansem et al., 2014). By introducing mandatory restrictions, governments can reduce the asymmetry of information and influence between consumers and the food industry.

Many countries have implemented statutory food marketing regulations. Table 1 contains examples of some countries' policies on food marketing to children. Rather than mandatory policies, many countries have relied on self-regulatory food marketing policies developed by the food and beverage industry (Taillie et al., 2019). While statutory regulations are established by governments and are mandatory in nature—usually involving penalties for non-compliance—self-regulatory codes are developed by industry or associations tied to the food advertising

and/or the food industry itself (Sharma et al., 2010). Self-regulation typically consists of voluntary codes of conduct that lack binding legal authority or enforceable sanctions. Unlike regulations or legislation, which are enforced by independent authorities, self-regulation often relies on third-party complaints, and there are no penalties for breaches (Sharma et al., 2010). Countries that rely on self-regulatory approaches include Canada, the United States, Australia, Ireland, New Zealand, Italy, Spain, and Germany (Taillie et al., 2019).

Furthermore, while regulations or legislation are designed and implemented by governments, self-regulatory systems are characterized by conflicts of interest, as those responsible for regulation are often the same actors who benefit from food marketing, either through the sale of advertising space or the promotion of food products (Sharma et al., 2010). Multiple studies have shown that self-regulation in food marketing has been largely ineffective in protecting children from exposure to unhealthy food advertising (Boyland & Harris, 2017). In the U.S., over 80% of food ads aimed at children in 2013 promoted nutritionally poor products, with little improvement since 2007 (Kunkel et al., 2015), despite the creation of the Children's Food & Beverage Advertising Initiative, in 2006, and the Children's Confection Advertising Initiative (CCAI), in 2016 – both self-regulatory initiatives with 27 leading food, restaurant and confectionary companies together (BBB National Programs, 2025). In Canada, companies participating in the CAI, a self-regulatory initiative introduced in 2007, actually aired more unhealthy food ads than non-participating companies, both on television and on children's websites (Potvin Kent et al., 2011b; Potvin Kent & Pauzé, 2018). Similarly, in Australia, vague standards and permissive criteria allowed continued marketing of unhealthy foods to children (Hebden et al., 2010), despite a self-regulation implemented in 2021 (AANA, 2021). Across

contexts, these findings highlight the limitations of voluntary industry measures and the need for stronger, mandatory regulations.

Table 1. Countries with statutory food marketing regulations.

Country	Year of implementation	Type of restriction	Media/setting	Target population (years old)
Chile (Government of Chile, 2018)	2016 (updated 2018)	- Food Labeling: implementation of front-of-package (FOP) warning labels – black, octagonal warning labels on products high in sugar, calories, sodium and/ or saturated fat (HFSS). - TV and online: ban on advertising of products high in sugar, calories, sodium and/ or saturated fat during child-focused TV and digital media, at cinemas and in locations that attract a high proportion of children. Sponsorships are also banned. Prohibition on child-targeted advertising techniques, such as cartoon characters or licensed characters. - In 2018, the regulation was updated to a total TV advertising ban of unhealthy products between 6:00 am and 10:00 pm, and a ban of the sale or free distribution of ultra-processed products at schools and nurseries.	TV Cinema Online Schools	<14
United Kingdom (Government of United Kingdom, 2021)	2025	- Television: HFSS product advertisements are prohibited before 9pm on all Ofcom-regulated TV services, including on-demand programme services. - Online: ban on paid-for HFSS product advertising, encompassing social media, search engines, and other digital platforms.	TV Online	<16
Mexico (Etiquetado frontal de alimentos y bebidas, 2021; Reglamento de Control Sanitario de Productos y	2014 (updated 2025)	- Television: advertising of HFSS foods is restricted between 2:30 pm and 7:30 pm on weekdays and 7:00 am and 7:30 pm on weekends. Ban on advertising on TV broadcasting during films rated to children. - Online: advertising online, including social media, requires permits and is subject to content restrictions, especially for products with warning labels. - Schools: The sale and promotion of HFSS products and sugary drinks are banned within schools, with mandates to offer healthier alternatives and access to drinking water.	TV Cinema Online Schools	<13 <18 (some states such as Oaxaca)

Servicios, 2022)		• Packaging: Use of characters, animations, and interactive elements on packaging of products with warning labels is prohibited. Black octagonal warning labels for excess sugar, calories, sodium, or saturated fat, and the presence of artificial sweeteners and caffeine. • Sales: prohibition of sales of HFSS products to minors, are enforced in certain states like Oaxaca.		
South Korea (Statutes of the Republic of Korea, 2021)	2010 (updated 2021)	• Television: ban on advertisements for specified foods (HFSS and high-caffeine) from 5:00 PM to 7:00 PM. Ban during children's programs, regardless of the time slot. And ban of cartoons, animations, or toys in ads targeting children. • Radio and online: ban on advertisements offering free gifts or toys with the purchase of unhealthy foods. • Schools and Surrounding Areas: establishment of "Children's Food Safety and Protection Zones" within 200 meters of schools, where sales of certain foods are prohibited.	TV Radio Online Schools	<18
Turkey (Taillie et al., 2019)	2011 (updated 2018)	• Television and radio: foods in the "red category" are prohibited at the beginning, during, or end of children's programs. Foods classified into color coded categories: red category (high in fats, trans fatty acids, sodium, or sugars); orange category (subject to restrictions if foods exceed category-specific thresholds for energy, total fat, saturated fat, total sugar, free sugar, non-sugar sweeteners for milk drinks, or salt); and green category (unrestricted).	TV Radio	<18
Taiwan (Taillie et al., 2019)	2016	• Television: prohibition of advertisements for HFSS products on children's TV channels between 5:00 PM and 9:00 PM. Ban on advertisements that portray these foods as suitable meal replacements. Prohibition of the use of toys or gifts as promotional incentives for purchasing these food products.	TV	<12

Food advertising regulations in Canada

In Canada, food advertising is primarily self-regulated. The Code for the Responsible Advertising of Food and Beverage Products to Children was introduced in 2023 by a coalition of industry organizations, including the Association of Canadian Advertisers (ACA), the Canadian Beverage Association (CBA), Food, Health & Consumer Products of Canada (FHCP), and Restaurants Canada (ACA et al., 2023). It was designed to regulate how food and beverage companies advertise to young audiences as well and was implemented to restrict food and beverage advertising directed primarily at children under 13 unless the products meet a nutritional criterion (ACA et al., 2023). Advertisers must assess whether an ad is primarily child-targeted by examining the product's intended use, presentation style, and where or when the ad appears (ACA et al., 2023). This code was created to replace the Canadian Children's Food and Beverage Advertising Initiative (CAI), launched in 2007.

Though the Code for the Responsible Advertising of Food and Beverage Products to Children establishes nutrition thresholds and prohibits ads directed at children under 13 years, it relies on Ad Standards, a self-regulatory body, rather than the government to conduct enforcement, raising concerns about accountability and compliance. The code lacks mechanisms for transparent, independent evaluation of its impact on advertising exposure and content. This code also has a narrow definition of child-targeted ads, based only on audience metrics and explicit targeting language. Marketing content using child-appealing techniques (e.g., bright visuals, characters, playful tones) may be used without technically targeting children as long as children are not the primary intended audience, allowing companies to exploit marketing strategies that still appeal to children. Thus far, no research has evaluated the effectiveness of the Code for the Responsible Advertising of Food and Beverage Products to Children, however

many studies have shown that self-regulatory practices are not effective (Boyland, et al., 2022; Mulligan et al., 2018; Potvin Kent & Pauzé, 2018)

The Canadian Children's Food and Beverage Advertising Initiative (CAI) was a voluntary, industry-led program designed to promote healthier food and beverage advertising aimed at children under 12. The CAI involved the participation of only 16 major food companies, which pledged to either restrict advertising to children under 12 years or to promote only "healthier for you" products. The CAI covered various media, including TV, radio, print, digital, and product placement in child-focused spaces like schools (Ad Standards, 2007). A key element of CAI was its nutrition criteria, which imposed advertising restrictions according to the product's content of sugars, fats, and sodium while encouraging products rich in vitamins, minerals, and fiber (Ad Standards, 2019b). The CAI was heavily criticized for having weak enforcement mechanisms to ensure adherence across participating companies and media channels (Mulligan et al., 2018; Potvin Kent et al., 2018). Although the CAI included a variety of media, it did not address child-directed marketing on product packaging, sponsorships, in-store promotions, or online content not clearly labeled as child-targeted (Mulligan et al., 2018). Much research demonstrated the ineffectiveness of the CAI, as over two-thirds of child-targeted products from participating companies failed to meet the CAI nutritional standard, and many products lacked sufficient information (e.g. nutrient value, serving size, etc.) for evaluation (Mulligan et al., 2018). Other studies comparing ad exposure in Ontario (where self-regulation via the CAI existed) and Quebec (where mandatory legislation- the Consumer Protection Act- exists) found that children from Ontario reported significantly more exposure to unhealthy food marketing online, including greater exposure to child-appealing techniques, whereas children in

Quebec had less exposure indicating that Quebec's regulatory approach was more effective (Vergeer et al., 2025a).

Television broadcasters must also adhere to the Broadcasting Code for Advertising to Children (commonly referred to as the "Children's Code"), which aims to ensure that advertisements directed at children are not misleading and are age-appropriate by restricting the types of products that can be advertised to children and ensuring that commercials are clearly distinguishable from programming (Ad Standards, 2019a).

Despite such policies, research suggests that current regulations may be insufficient, as unhealthy food advertisements continue to air during peak viewing times for children, and digital marketing presents new regulatory challenges (Boyland & Harris, 2017; Potvin Kent et al., 2012; Potvin Kent & Pauzé, 2018). Self-regulation of food and beverage advertising to children in Canada has proven ineffective in reducing children's exposure. For example, studies reveal that most ads targeting children on television promote foods high in fats, sugar, and sodium (Kelly et al., 2019; Potvin Kent et al., 2023), suggesting that companies exploit loopholes in self-regulation standards to continue targeting young audiences with unhealthy options.

In contrast, the province of Quebec has the Consumer Protection Act (CPA), legislation that prohibits all commercial advertising targeting children under the age of 13 years. This comprehensive legislation applies to all forms of media and encompasses direct and indirect advertising methods, such as television advertising, product placements, and sponsorships (Consumer Protection Act, 1980). Child targeting is determined by the nature and intended purpose of the advertised product, the marketing techniques used, and the time and place it is shown (i.e., if children make up 15% or more of viewership) (Government of Quebec, 2012). The enforcement of the CPA is overseen by the *Office de la Protection du Consommateur* (OPC),

which investigates complaints and ensures that advertisers comply with the law. While the CPA does not include a formal pre-clearance system, enforcement has been strengthened over the years through legal precedents and public awareness initiatives (Paquette & de Oliveira, 2016).

Research evaluating the CPA's effectiveness has shown mixed results. For instance, studies have found that children in Quebec are exposed to significantly fewer food advertisements on television compared to their counterparts in provinces governed by self-regulatory systems, such as Ontario (Dhar & Baylis, 2011; Potvin Kent et al., 2011a; Potvin Kent et al., 2023). Moreover, a study with television data from the entire year of 2019 observed that food advertising targeting children was substantially less frequent in Quebec-based programming (Potvin Kent et al., 2023). However, despite these regulatory efforts, children in Quebec are still exposed to a substantial amount of unhealthy food advertising on non-child-specialty channels (Pauzé et al., 2021) and on child-specialty channels that are not specifically targeted at them (Potvin Kent et al., 2023).

In 2016, at the federal level, Health Canada announced its intention to propose regulations aimed at limiting advertisements for unhealthy food products directed at children under 13 years old. These proposed regulations would apply to all forms of media, including television, radio, digital platforms, social media, print, and product packaging, with the goal of mitigating the influence of unhealthy marketing on children's dietary habits (Health Canada, 2023). Health Canada's proposed policy, developed in 2023-2024, sought to reduce children's exposure to persuasive food advertisements solely on TV and in digital media, platforms where children are frequently exposed to unhealthy food advertising. These proposed regulations aim to restrict child-targeted food and beverage ads featuring products containing added sodium, free sugars, or fats that surpass the thresholds established for "low in" nutrient content claims for

sodium, sugars, and saturated fats (Health Canada, 2023). They were sent to the Prime Minister's Office for approval in 2024 and were not published in Canada Gazette I before the prorogation of Parliament in January 2025.

Recently, two bills were considered in Parliament that would restrict food marketing to children in Canada however, neither was passed. The first bill was Bill S-228 (known as the Child Health Protection Act), aimed at amending the Food and Drugs Act to prohibit food and beverage marketing directed at children (Bill S-228, 2016). Introduced in the Senate by Senator Nancy Greene Raine in 2015, the bill sought to ban the marketing of unhealthy food and beverages (identified based on their content of sodium, sugars, and saturated fats) directed at persons under 17 years of age. The restrictions would have applied to various media, including television, digital platforms, packaging, and settings such as schools (Bill S-228, 2016). Despite passing both the Senate and the House of Commons, Bill S-228 did not become law due to the dissolution of Parliament in 2019 (Bill S-228, 2016). The bill faced significant lobbying from industry stakeholders, which some suggested contributed to delays in its final approval (Mulligan et al., 2021). The second bill proposed was Bill C-252 (also known as the Child Health Protection Act), which would also have been an amendment to the Food and Drugs Act, and was introduced as a Private Member's Bill by MP Patricia Lattanzio in 2022 (Bill C-252, 2021). Bill C-252 aimed to limit the advertising of unhealthy food and beverages to children under 13 across various media, including television, online platforms, and product packaging. This bill also focused on the nutritional content of the food product advertised, prohibiting promotion of food products that exceed the recommended intake for children of sugars, saturated fat, or sodium (Bill C-252, 2021). The bill included provisions for ongoing monitoring and revisions to address emerging advertising strategies and technologies. Even though it garnered strong support from

public health advocates and passed third reading in the House of Commons, Bill C-252 did not advance past the third reading in the Canadian Senate before the prorogation of Parliament in January 2025 (Parliament of Canada, 2025).

Gaps in research

A review of the literature reveals significant gaps in the evidence base that hinder the development of effective and well-informed public policies to address this public health issue. Firstly, the influence of unhealthy food advertising on children is well-documented and firmly established in the scientific literature (Boyland et al., 2016; Kelly et al., 2015; Smith et al., 2019). However, most studies—as well as the resulting public policies and interventions—focus primarily on child-targeted advertising, with an emphasis on the marketing techniques used to attract this age group.

Relatively little is known about non-child-targeted food advertising and its impact on children's health. An example of a non-child-targeted ad would be an advertisement featuring an adult eating a meal from a fast-food restaurant in an office setting; it would not contain any elements typically considered as appealing to children—there would be no animated visuals, playful music, or cartoon characters – and the ad would not show any children, toys, prizes, or collectible items. It is undeniable that children are also exposed to advertising that is not specifically targeted at them. For this reason, it is important to examine the frequency of such advertisements and compare it with the frequency of explicitly child-targeted advertising to assess the relevance of studying the impact of all forms of food advertising on children.

Furthermore, evaluating the differences between regulatory environments is essential to understanding whether existing policies are having a tangible effect on reducing children's exposure to persuasive food marketing. Comparing a self-regulatory context such as Ontario to a

more restrictive environment like Quebec, which has implemented the Consumer Protection Act (CPA) to prohibit commercial advertising directed at children under 13 years, offers a valuable opportunity to assess whether the frequency and persuasive power of child-targeted versus non-child-targeted ads differ across jurisdictions. Such comparisons are critical to informing future public policy, as they can provide evidence on the effectiveness of regulatory approaches in mitigating children's exposure to unhealthy food advertising.

In addition, while considerable attention has been paid to the techniques used to capture children's attention in advertising, there is limited understanding of what actually attracts children from their own perspective. What elements in a commercial appeal to them, and what motivates them to want to consume or purchase a product? Addressing these questions requires research that engages directly with children and incorporates their viewpoints on advertising. Moreover, it is crucial to compare child-targeted and non-child-targeted advertising to determine whether focusing solely on advertisements aimed at children is sufficient to safeguard their health. This analysis is also essential to evaluate the potential significance of future studies aimed at determining the impact of non-child-targeted advertising on children's health.

Another important point to consider is that research on food and beverage marketing to children lacks a standardized definition or framework to universally outline what constitutes "child-targeted" advertising. Different countries and regulatory bodies use varying criteria—such as audience composition, placement, or content features—leading to inconsistencies across studies and policies (Garde et al., 2018; Taillie et al., 2019). Also, research that takes a child-centered perspective is limited: most classifications of child-targeted marketing are made by adults (researchers, policymakers, or industry self-regulators), not by children themselves. Yet, children may interpret marketing cues differently. There's a lack of research exploring how

children perceive the intended audience of ads and whether their views align with regulatory definitions (Boyland & Tatlow-Golden, 2017; Elliott & Truman, 2019). Lastly, there is a need for mixed methods approaches – few studies combine quantitative exposure data with qualitative insights into how children interpret advertising. Integrating these approaches could yield a more comprehensive understanding of what constitutes child-targeted content and why it is effective.

Another important area of discussion is the influence of parents on children's eating habits. Although this influence is scientifically well-established (Mahmood et al., 2021; Scaglioni et al., 2018), there is a notable lack of research on the relationship between parents' exposure to unhealthy food advertising and their children's dietary patterns. Parents play a fundamental role in shaping their children's eating habits, particularly in the case of younger children, whether through the availability of certain foods at home or through the nutritional education they provide. However, if these same parents are themselves influenced by food advertising (Pettigrew et al., 2013), it is crucial to understand the extent to which this exposure may affect the eating behaviours they model and promote for their children. This dual influence, where both children and parents are exposed to similar unhealthy food marketing, underscores the need for policies that do not only protect children directly but also support parents in fostering healthier food environments. For example, in Chile, comprehensive food marketing regulations go beyond restrictions on child-targeted advertising by also limiting the broader public's exposure to unhealthy food marketing (Government of Chile, 2018). These policies include mandatory front-of-package warning labels, restrictions on marketing during certain hours of television programming, and bans on advertising unhealthy foods in schools and during programs with high child viewership—even if the ads are not explicitly targeted at children (Carpentier et al., 2023). Such regulations indirectly support parents by reducing their own

exposure to unhealthy food marketing, which may in turn affect the foods they purchase and serve at home. Involving parents in educational campaigns, media literacy initiatives, and consultations around advertising policies can also enhance the effectiveness of these interventions. Public health strategies should consider parents not only as protectors of children's health but also as a target group in need of protection and support themselves. By limiting the exposure of both children and their caregivers to persuasive marketing of ultra-processed foods, public policies can better address the root causes of poor dietary behaviours across generations.

Research questions

Given the above, this research used a mixed methods approach to examine:

1. What is the frequency of non-child-targeted versus child-targeted food and beverage advertising on children's television stations, and does it differ in the two different policy environments in Canada (Quebec and Ontario)?
2. What are children's perceptions of child and non-child-targeted food advertising, and, most importantly, what features of advertisements elicit positive attitudes and behavioural outcomes?
3. Is parents' exposure to unhealthy food marketing related to children's consumption and requests for unhealthy food and beverages, and do these behavioural outcomes vary across different countries?

These research questions extend beyond addressing gaps in the literature; they have direct implications for public policy. Understanding the frequency and characteristics of child- and non-child-targeted food advertising under different regulatory environments can inform the effectiveness of existing policies and the need for stronger enforcement or reform. Gaining insight into children's perceptions of advertising and the specific techniques that influence their

attitudes and behaviours can help policymakers and public health advocates refine criteria for what constitutes child-targeted marketing. Finally, examining the influence of parental exposure to food marketing on children's dietary behaviours across countries offers valuable evidence for developing policies that consider the broader family environment. Collectively, these questions contribute to evidence-based recommendations for strengthening food marketing regulations to better protect children's health.

Hypotheses

Based on the existing literature and identified research gaps, it was hypothesized that:

- 1) Non-child-targeted advertising will be more prevalent in Quebec (due to the Consumer Protection Act) than in the environment with self-regulation (i.e. Ontario).
- 2) The marketing techniques employed in food and beverage advertisements would differ between the two environments, with more child-targeted marketing techniques found in Ontario.
- 3) Parents' self-reported exposure to unhealthy food marketing would be positively associated with children's consumption and requests for unhealthy food and beverages.
- 4) Children's consumption and requests for unhealthy food and beverages would likely vary by country.

Chapter 3: Methodology and Results

Methodology Summary and Research Sequence

This dissertation comprises three interconnected studies that collectively explore the impact of non-child-targeted food and beverage advertising on children. This section outlines the overarching methodological framework, the researcher's role within the project, the knowledge translation activities undertaken, and a detailed presentation of the methodology, findings, and interpretation of each individual study.

A mixed-methods design was employed to address the three research questions, offering both breadth and depth to the investigation. The first (RQ1) and third (RQ3) research questions were addressed through quantitative methods, while the second (RQ2) involved qualitative data collection and analysis. These studies were conducted in a sequential manner, allowing each phase to build upon the insights generated by the previous one. The use of mixed methods provided the opportunity to integrate multiple data sources and perspectives, resulting in a richer and more holistic understanding of the research topic.

The quantitative components (RQ1 and RQ3) assessed the prevalence and patterns of food and beverage marketing techniques, the nutritional quality of advertised products on Canadian child-focused television stations, and the frequency of parental exposure to unhealthy food marketing alongside the association to child food-related behaviours. In contrast, the qualitative component (RQ2) offered in-depth exploration of children's perspectives, examining how they interpret and respond to both child-targeted and non-child-targeted advertising. This qualitative insight was instrumental in contextualizing and interpreting the patterns observed in the quantitative findings.

Taken together, the three studies aim to address critical gaps in the existing literature. These include: (a) providing frequency-based data on the volume and nature of food and beverage marketing exposure (RQ1 and RQ3); (b) offering direct insights into children's perceptions and experiences with food advertising (RQ2); and (c) evaluating the differences in children's responses to child-targeted versus non-child-targeted advertising using both quantitative and qualitative approaches (RQ1 and RQ2). The integration of these methods supports a comprehensive understanding of how various forms of marketing influence children's food-related attitudes and behaviours, ultimately informing more effective policy and public health interventions.

Study 1: Child and non-child-targeted food and beverage advertisements on child television in two policy environments in Canada

Approach

The initial study examined the frequency and distribution of child-targeted and non-child-targeted food and beverage advertising on children's television channels within two distinct regulatory contexts in Canada—Ontario and Quebec. The analysis revealed that child-targeted marketing techniques appeared more frequently on Ontario-based child channels compared to those in Quebec. Nonetheless, across both provinces, child-targeted techniques were more frequently employed than non-child-targeted approaches. The study also identified a troubling volume of advertisements promoting unhealthy food products deemed problematic due to their associations with poor nutritional quality and childhood obesity. This reinforces longstanding concerns regarding the influence of unhealthy food marketing on children's health outcomes. A particularly noteworthy finding was the presence of alcohol advertisements on French-language child stations. While these advertisements were not directly aimed at children, their presence

raises questions about the effectiveness of Quebec's current regulatory framework. Therefore, although Quebec's CPA appears to reduce children's exposure to child-targeted food and beverage advertising techniques—in comparison to children in Ontario—it provides less comprehensive protection against children's exposure to harmful advertising content, such as alcohol advertising.

These results contribute valuable evidence to ongoing policy discussions and underscore the need for more robust regulatory measures. Specifically, the findings support the implementation of federal-level policy that mandates restrictions on unhealthy food advertising to children, alongside rigorous monitoring and enforcement mechanisms to ensure compliance. Moreover, these findings serve as a foundation for future research. They offer a basis for formulating new hypotheses and conducting controlled experimental studies to assess the influence of non-child-targeted food and beverage advertising on children's dietary preferences and consumption patterns. Such future work is essential for advancing evidence-based policies aimed at reducing children's exposure to marketing that promotes unhealthy eating behaviours.

Author's Contribution

My contribution included the development of the research question and study design with the help of my supervisor, collection of data with the help of lab partners, data cleaning, analysis, interpretation of the data, and drafting of the tables and manuscript.

Knowledge Translation

This research was published in the *Appetite* journal in 2025. The final article was disseminated to members of Health Canada and the Heart and Stroke Foundation and was also shared through the author's social media channels. Part of the study also was presented at the 2023 ISHS Research Day at the University of Ottawa in Ottawa, Ontario, on April 4, 2023.



Child and non-child-targeted food and beverage advertisements on child television in two policy environments in Canada

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ABSTRACT

While the impact of child-targeted unhealthy food advertising is well-established, children are also exposed to non-child-targeted advertisements. Studying the frequency and effects of both is essential to fully understand advertising's influence on children's health. This study aimed to analyze the frequency of non-child-targeted versus child-targeted food and beverage advertising on children's television stations in two different policy environments in Canada: Ontario and Quebec. This cross-sectional study analyzed advertisements on popular children's television channels in Ontario (hereafter referred to as "English stations") and Quebec (hereafter referred to as "French stations"), recording 648 h of programming across six days in November 2022. The study classified food and beverage products as "of concern from an advertising perspective" based on Health Canada's suggested protocol for classifying food products according to their fat, sugar, and sodium levels. Descriptive statistics were tabulated for the frequency of advertisements and marketing techniques classified as child-targeted and non-child-targeted. The study observed 34,351 ads, with food and beverage ads comprising a larger share on French (25.7 %) than English (11.2 %) stations. Child-targeted ads were more prevalent on English (57.9 %) than French (25.9 %) stations, with child-targeted marketing techniques being notably more frequent on English than on French stations. Advertisements for foods classified as "of concern from an advertising perspective" from a nutritional perspective were highly prevalent on both English (98.9 %) and French stations (88.8 %). These findings suggest that neither self-regulation in Ontario nor statutory regulation in Quebec is sufficiently limiting advertising to children, specifically of unhealthy food and beverage advertising.

1. Introduction

Over recent decades, children's diets globally have shifted towards increased consumption of ultra-processed foods and foods high in fats, sugars, and salts (HFSS) – at the expense of fresh, whole foods (Bonaccio et al., 2022; Marino et al., 2021). The prevalence of HFSS in children's diets is associated with poor nutrition, higher risks of early-onset non-communicable diseases (NCDs) that affect long-term health outcomes, such as obesity, cardiovascular issues and type 2 diabetes (James

et al., 2017). This dietary shift is driven by many factors including exposure to unhealthy food marketing (Freudenberg, 2021). Frequent exposure to unhealthy food advertising is associated with higher consumption of HFSS foods, especially among children (Andreyeva et al., 2011; Boyland & Halford, 2013; Cairns et al., 2013; Dalton et al., 2017). Research has shown that food advertising can induce cravings, increasing the consumption of advertised products (Boyland et al., 2024; Chambers et al., 2015) while also promoting behaviours such as snacking between meals and overeating. These behaviours contribute to

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excessive caloric intake and weight gain over time (Harris et al., 2009).

Television (TV) remains a dominant medium for food and beverage advertising, especially advertising aimed at children. On average, on summer 2024, Canadians (aged 2+ years old) watched 14.7 h of linear TV weekly, while in Quebec (where the majority of the population speaks French), the population aged 2+ years old who watch French stations watch an average of 20.1 h per week (Loup, 2024). In addition to this, Canadian children (under 13 years old) watch 14.2 h of linear TV weekly (Bush, 2024). Food and beverage advertising on TV primarily promotes unhealthy products, such as sugary cereals, sugary sweetened beverages and fast food (Pinto et al., 2020; Potvin Kent et al., 2023a; Potvin Kent et al., 2023b).

Children are more vulnerable to marketing strategies than adults due to their limited ability to understand the persuasive intent of advertisements (ads) (Carter et al., 2011; Packer et al., 2022; Rozendaal & Buijzen, 2023), which leads them to associate advertised products with positive experiences and emotions (Packer et al., 2022). In Canada, research shows that more than 90 % of the food advertisements seen by children promote HFSS products (Potvin Kent et al., 2023a). Advertisers, also often use a variety of marketing techniques such as the use of cartoon characters, catchy jingles, and appeals to emotion (Potvin Kent & Pauzé, 2018), which effectively capture children's attention and enhance advertisement recall (Shuja et al., 2016). Another aspect of food and beverage advertising to children involves "pester power", which refers to when children repeatedly ask parents for something until they get it (McDermott et al., 2006). Young children (younger than 8 years old) view advertising as trustworthy and fun due to their inability to detect persuasive intent (Harris et al., 2021). This association fosters a positive emotional connection with the brand, leading to an increased likelihood of children requesting the brand's products, according to parents (Folkvord et al., 2016; Smith et al., 2019).

In light of the evidence linking food and beverage advertising to unhealthy dietary patterns and NCDs, public health organizations recommend stronger regulations to limit the marketing of unhealthy foods and beverages, particularly to children (WHO, 2023a; 2023b). Several countries such as the United Kingdom, and Chile have implemented policies to restrict food and beverage advertising during children's programming, yielding promising results in reducing exposure and improving dietary behaviors (Government of Chile, 2018; Government of United Kingdom, 2021). Canada has two distinct food marketing regulatory environments. In Quebec, the *Consumer Protection Act* (CPA) prohibits commercial advertising directed at children under 13 years of age. This regulation applies to all forms of advertising and media, and covers direct and indirect advertising (such as product placement and sponsorships) (Consumer Protection Act, 1980). The CPA's classification of "child-targeted" is determined by the nature and intended purpose of the advertised product, the marketing strategies used, and the time and place it is shown (i.e., if children make up 15 % or more of viewership) (Government of Quebec, 2012). For instance, television advertisements targeting children often feature characters (cartoons, superheroes, animals, creatures, etc.), emotional appeals, animation and child actors (Mulligan et al., 2020).

Conversely, the rest of Canada operates under a mostly self-regulatory system, which explicitly does not apply to the province of Quebec. Broadcasters commit to adhering to the Broadcasting Code for Advertising to Children (also known as 'Children's Code'). This code aims to ensure that advertisements directed at children are not misleading and are age-appropriate by restricting the types of products that can be advertised to children and ensuring that commercials are clearly distinguishable from programming (Ad Standards, 2019a). Two industry-led voluntary initiatives have been implemented to restrict marketing to children. In 2007, the Canadian Children's Food and Beverage Advertising Initiative (CAI) was created, which was a voluntary, industry-led program to promote healthier food and beverage advertising aimed at children under 12 years old. The CAI involved 16 major food companies that agreed either to restrict advertising to

children under age 12 or to promote only healthier products. The CAI covered various media, including TV, radio, print, digital, and product placement in child-focused spaces like schools (Ad Standards, 2007). The CAI developed nutrition criteria that included both positive and negative nutrients, which imposed advertising restrictions according to the product's content of sugars, fats, and sodium while encouraging products rich in vitamins, minerals, and fiber (Ad Standards, 2019b). In 2023 (following the completion of this study), the Code and Guide for the Responsible Advertising of Food and Beverage Products to Children (the "Food and Beverage Advertising Code") was developed by the Association of Canadian Advertisers (ACA), the Canadian Beverage Association (CBA), Food, Health & Consumer Products of Canada (FHCP) and Restaurants Canada (ACA, CBA, FHCP, & Restaurants Canada, 2023). This code was created to replace the CAI in July 2024. The Food and Beverage Advertising Code was designed to regulate how food and beverage companies advertise to young audiences as well, and was implemented to restrict food and beverage advertising directed primarily at children under 13, unless the products meet nutritional criteria based on sodium, sugars and saturated fat content (ACA, CBA, FHCP, & Restaurants Canada, 2023). Advertisers must assess whether an ad is primarily child-directed by examining the product's intended use, presentation style, and where or when the ad appears and advertising is screened using a pre-screening process (ACA, CBA, FHCP, & Restaurants Canada, 2023).

Despite this, research suggests that current regulations and self-regulation may be insufficient, as unhealthy food advertisements continue to air during peak viewing times for children, and digital marketing presents new regulatory challenges (Boyland & Harris, 2017; Potvin Kent et al., 2012; Potvin Kent & Pauzé, 2018). For example, studies reveal that most ads targeting children on television promote HFSS foods (Potvin Kent et al., 2012; Potvin Kent et al., 2023a; Potvin Kent & Pauzé, 2018), suggesting that companies exploit loopholes in self-regulation standards to continue targeting young audiences with unhealthy food options.

In 2016, Health Canada announced its intention to propose regulations targeting food and beverage advertisements to children under 13 years old, focusing specifically on reducing exposure to ads for HFSS products. This proposal would restrict food and beverage ads aimed at children on all media (TV, radio, digital, social media, print, and packaging) where children are especially susceptible to marketing that could influence unhealthy dietary habits (Health Canada, 2024b). The proposal would restrict ads according to the nutritional content of saturated fat, sodium and sugars of the products (Health Canada, 2023a). The proposed regulation is part of Health Canada's Healthy Eating Strategy, a commitment to protecting children's health, and it is still being developed (Health Canada, 2023b). In addition, a Canadian legislative proposal is in progress, the Bill C-252 or Child Health Protection Act. The bill aims to limit unhealthy food and beverage advertising to children under 13 on media including television, radio, online, packaging, etc (Bill C-252, C-252, 2021). The bill includes provisions for monitoring and revising regulations to adapt to emerging advertising strategies and technologies (Bill C-252, C-252, 2021). At this time, the bill has received widespread support from public health advocates, but it did not pass its third reading in the Senate of Canada.

Current and proposed regulations focus only on advertising classified as specifically targeting children, even though they are not limited to advertising on children's television channels. Research shows that even in regulated environments, children are still exposed to advertising not specifically targeting them (Carpentier et al., 2020; Prowse, 2017). As Canada is currently considering restricting only unhealthy child-targeted advertisements to children, this study aimed to analyze the frequency of non-child-targeted versus child-targeted food and beverage advertising on children's television stations in two different policy environments in Canada, Ontario and Quebec. The initial hypothesis from this study was that non-child-targeted advertising is more prevalent in Quebec than in Ontario; and that the marketing techniques

employed in food and beverage advertisements would differ between the two provinces. In addition to linguistic differences, it was expected for the advertising practices to vary due to Quebec's unique regulatory environment, particularly its stricter consumer protection legislation, which influences how advertisers design and deliver marketing content. This study will contribute valuable evidence to ongoing policy discussions and underscore the need for more robust and uniform regulatory measures.

2. Methods

This cross-sectional study analyzed data from children's television stations in two advertising policy environments in Canada: the provinces of Ontario and Quebec.

2.1. Sampling

In line with Canada's self-regulatory initiatives and Quebec's legislation, the study defines "children" as individuals under 13 years of age, specifically those between 2 and 12 years old. The three most frequently viewed children's television stations in Canada, both in English and French, were examined – Disney (English), Teletoon (English), and YTV (English), as well as Disney (French), Télétoon (French), and Vrak (French). The English stations originated in Toronto (Ontario) while the French stations originated in Montreal (Quebec). The programming of each of these stations was recorded from 6:00 to 24:00 over six days (three weekdays and three weekend days) chosen randomly in November 2022. November was selected because this month reflects typical advertising trends and it minimizes the impact of specific holidays (such as Easter, Christmas, etc.) that could substantially alter the programming schedule and the advertisements broadcast. A total of 648 h of television programming were recorded and analyzed.

Although this study does not involve direct interaction with children, it examines their possible exposure to persuasive food marketing and is guided by ethical principles recognizing children's unique vulnerability and rights under the United Nation Convention on the Rights of the Child (UN, 1989), including the right to health and protection from exploitation. The monitoring and recording of television content were conducted in accordance with fair dealing/fair use provisions for research purposes. All data were securely stored, with access restricted to the research team to ensure confidentiality and adherence to ethical standards.

2.2. Data collection

Once the recordings were completed, all recorded material was audited to verify accuracy and quality of video and audio. Prior to data collection, all coders underwent standardized training. Inter-coder reliability was subsequently assessed by calculating the overall agreement rate, based on the proportion of total agreements relative to the total number of variables (Multon & Coleman, 2018). This process yielded a reliability rate of 0.7. Following this assessment, a review was conducted to resolve any discrepancies and ensure consistency in coding. For all advertisements, the following information was extracted and used in this study: recording date, time of the advertisement, language, station, timing on programming, and type of advertisement (i.e. food or beverage ad; non-food or beverage ad). During this stage, food and beverage advertisements were individually identified, and all other advertisements were identified as "non-food or beverage ad". No further information was collected for non-food or beverage ads. For food or beverage ads, the following information was also collected: brand or company name; product name and description; and food category.

Food category was determined based on the product advertised (e.g. alcohol; breads, flatbreads; breakfast cereals; candy and chocolate bars; coffee; cookie and granola bars; delivery app (apps that offer delivery from food outlets, but it was not an advertisement from the food outlet)

or; fast food and sit-down restaurants; fresh and frozen vegetables; fresh or frozen meat; frozen desserts; milks (dairy and plant based); muffins and pastries; peanut butter; pizza; potato chips, corn chips, rice cakes, crackers; processed cheese; ready-to-eat dishes; seasonings and spices; sugary drinks; supermarket; yogurt and kefir; and others). For advertisements with multiple products of different food categories, the food category of the least healthy product (based on the nutritional content) was used in the analysis.

The following marketing techniques were also assessed for all food or beverage ads (for further description of each marketing technique please consult the [Supplementary Material Table 1](#)): presence of children; presence of teenagers; adult-child situations; adult-teenager situations; use of child language (e.g. simplified vocabulary, imaginative and playful words, playful rhymes and songs, etc.); use of teen language (e.g. slang and trends, quotes from social media, pop culture or social media references, etc.); child themes (e.g. fantasy, magic, mystery, animals, etc.); child visual design (e.g. bright and primary colors, cartoon characters, playful lettering, etc.); teenager themes (e.g. high school, social media, 'hanging-out', popularity, etc.); teenager visual design (e.g. graffiti, tattoos, smartphone/technology, etc.); unusual product appearance (e.g. animal shaped crackers, etc.); unusual product flavour (e.g. 'birthday cake' flavor cookies, apple pie yogurt, cheesecake yogurt, etc.); appeals to fun/cool; presence of branded characters; presence of licensed characters; presence of other cartoon characters; celebrities/public figures; cross-promotions; games or activities; price promotions, incentives or giveaways; calls-to-action; appeals to health or nutrition; promotion of product convenience; displays of corporate social responsibility; special effects; songs or music; partnership with another brand; and presence of advercation (in the context of food marketing, "advercation" denotes a specific promotional strategy that integrates educational elements into advertising content, this technique may include the dissemination of historical background, nutritional information, or scientific explanations related to the featured food or beverage product).

These marketing techniques were selected based on several evidence-based sources to ensure comprehensive and relevant coverage of food and beverage marketing's impact on children (Kelly et al., 2019; Mulligan et al., 2020; Potvin Kent et al., 2024; Potvin Kent et al., 2022a). These sources highlighted consistent, high-impact techniques used in child-appealing advertising across diverse environments, which allowed researchers to identify and track the most influential marketing methods that children encounter. Therefore, for the selection of the marketing techniques analyzed on this study a few frameworks were combined: the standardized protocol from INFORMAS (International Network for Food and Obesity/Non-communicable Diseases (NCDs) Research, Monitoring and Action Support) (Kelly, 2017), Health Canada's framework for monitoring food marketing to children (Health Canada, 2022), and the inventory of child-appealing marketing techniques (Mulligan et al., 2020). The data collection was carried out independently by six trained researchers.

2.3. Child-targeted vs non-child-targeted

Each ad was classified as "child-targeted" or "non-child-targeted". It was classified as "child-targeted" if it contained one or more of the following marketing techniques: child themes; presence of children; child visual design; use of child language; presence of branded characters; presence of licensed characters; and presence of other cartoon characters. If an advertisement did not contain any of those marketing techniques it was classified as "non-child-targeted" as it did not specifically target children. The definition of "child-targeted" was based on the above mentioned literature review for the selection of marketing techniques to be analyzed, as well as the guidelines of how to apply the Consumer Protection Act implemented in Quebec (Government of Quebec, 2012), which both describe these techniques as appealing to children. The CPA suggests several criteria to determine whether an

advertisement is directed at children under 13 years old. Ads are considered child-targeted if they employ elements that are especially appealing to children, which may include animated characters, cartoons, or child-friendly themes that aim to attract young audiences (Government of Quebec, 2012). The marketing techniques classified as “child-targeted” were techniques that appealed directly to children, and the “non-child-targeted” were techniques that would appeal to more age groups than children (e.g. presence of teenagers – could appeal to children, but also appeal to teenagers; appeal to fun/cool – could appeal to children, but also appeal to teenagers and adults; etc.).

2.4. Time of broadcast

Initially, when information was collected from all advertisements, coders indicated the time slot for when the ad was broadcasted. Each slot represented 1 h of recording starting at 6:00 (06:00–06:59; 07:00–07:59; 08:00–08:59; etc.) for a total of 18 time slots. Later, to facilitate analysis, the time slots were aggregated to form six broadcast times as follows: 6:00–9:00; 9:00–12:00; 12:00–15:00; 15:00–18:00; 18:00–21:00; 21:00–24:00.

2.5. Healthfulness of products and marketing restriction to children

Nutritional information for each advertised food and beverage product was systematically collected from a hierarchy of sources, in the following order of priority: (1) the manufacturer’s official Canadian website, (2) the product’s Nutrition Facts label, (3) the manufacturer’s American website, and (4) the Canadian Nutrient File database (Health Canada, 2015). The data extracted included: ingredient list, serving size (g or ml), energy content (kcal), total fat, saturated fat, trans fat, cholesterol, sodium, total carbohydrates, fibre, sugars, protein, as well as binary indicators (yes/no) for the presence of free sugars, non-sugar sweeteners, added fats, and added sodium. This nutritional information was subsequently analyzed to determine whether they should be categorized as “of concern from an advertising perspective” (hereafter referred to as “of concern”), based on Health Canada’s suggested protocol for classifying food products (Health Canada, 2023a). This protocol evaluates products according to their fat, sugar, and sodium levels. While these guidelines were utilized in the study, they have not yet been officially implemented.

The advertisements were classified into one of three categories: “food of concern,” “likely to be of concern,” or “not of concern.” Advertisements were categorized as “food of concern” if the product contained added fat, sodium, or free sugars that exceeded Health Canada’s thresholds. Specifically: if it contained more than 2 g of saturated fat per reference amount or per 100 g, or more than 15 % of total energy from saturated fat; if it contained more than 140 mg of sodium per reference amount or per 100 g, or more than 140 mg of sodium per 50 g if the reference amount is ≤ 30 g or 30 ml; or if it contained free sugar in the ingredient list and it contained more than 5 g of sugar per reference amount or per 100 g, or more than 5 g of sugar per 50 g if the reference amount is ≤ 30 g or 30 ml (Health Canada, 2023a).

Products with incomplete nutritional information (e.g., missing serving size information on nutritional facts table or missing information on sodium, sugar or saturated fat from the nutritional facts table) were categorized based either on the product’s food category, as defined in Health Canada’s Table of Reference Amounts (Health Canada, 2024a), or on the brand, if more than 50 % of the brand’s products were classified as “subject to restrictions” according to Health Canada’s protocol (Health Canada, 2023a). Products with incomplete nutritional information and determined to be unhealthy, were classified as “likely to be of concern.” The classification was guided by the assumption that products belonging to categories or brands with a high proportion of items exceeding nutrient thresholds would likely also exceed those thresholds. Advertisements were then categorized as “not of concern” if the product nutritional content did not exceed any of the thresholds

—such as whole fruits and vegetables. If an advertisement featuring multiple products included even one product classified as ‘food of concern’ or ‘likely to be of concern,’ the entire advertisement was categorized accordingly.

2.6. Data analysis

Descriptive analyses were used to determine the frequency of advertisements. Frequencies were presented overall, and by language, station, food and beverage category, marketing technique, time of broadcast, and marketing restriction classification. The relative and absolute differences between provinces (English or French) were also calculated, using Ontario (English) as the comparator group.

3. Results

A total of 34,351 advertisements were observed (20,010 ads on English stations and 14,341 ads on French stations) across the 648 h of programming. Food and beverage advertising comprised 11.2 % of the total advertising on English child stations and 25.7 % on French stations, a difference of 1439 ads (Table 1). Child-targeted advertisements accounted for 57.9 % of food and beverage advertising on English stations, and 25.9 % on French stations, corresponding to a difference of 343 ads. The ratio of child-targeted to non-child-targeted advertisements was 1.4:1 on English stations and 0.4:1 on French stations.

Table 2 highlights that while child-targeted marketing techniques were less common than non-child-targeted techniques, they still dominated food and beverage advertising on both English and French child stations. However, there was a notable difference in the prevalence of these techniques on French stations compared to English stations. Child visual designs (53.8 % and 23.0 %, respectively), child themes (46.3 % and 19.5 %, respectively), and child language (41.1 % and 22.5 %, respectively) were the most frequent techniques in both markets. Non-child-targeted techniques frequently included health/nutrition appeals (65.5 % and 33.2 %, respectively), fun/cool appeals (53.9 % and 24.8 %, respectively), and special effects (49.7 % and 66.9 %, respectively).

On English stations, food and beverage advertising, including child-targeted advertising was concentrated in the late evening after 21:00 (Table 3). In contrast, on French stations, it was more evenly distributed throughout the programming schedule, but more predominant in the early evening (between 18:00 and 21:00).

Table 4 shows child-targeted and non-child-targeted food advertisements by food categories on English and French child stations. On English stations, the majority of child-targeted food and beverage advertising promoted breakfast cereals (71.8 %), while non-child-targeted ads primarily featured yogurt and kefir (30.4 %) and fast food/sit-down restaurants (29.2 %). On French stations, breakfast cereals also dominated child-targeted ads (24.9 %), followed by supermarket ads (14.4 %). Non-child-targeted ads featured fast food/sit-down restaurants (28.5 %) and alcohol (13.9 %). Alcohol was not advertised on English child stations but made up 10.3 % of food and beverage advertising on French child stations.

Both child-targeted and non-child-targeted food and beverage advertising in both English and French markets showed a high prevalence of advertisements that were classified as “food of concern” (Table 5). On English stations, 96.2 % of child-targeted ads were classified as “food of concern” and 2.7 % classified as “likely to be of concern” (98.9 % both categories together). For non-child-targeted ads, 71.7 % were classified as “food of concern” and 16.8 % as “likely to be of concern” (88.5 % both categories together). On French stations, 88.5 % of child-targeted ads were for “food of concern” and 0.3 % for “likely to be of concern” (88.8 % both categories together); and 61.9 % of non-child-targeted ads were for “food of concern” and 19.3 % for “likely to be of concern” (81.2 % both categories together).

Table 6 also shows that, similarly to Table 3, food and beverage advertising for products classified as of concern was heavily

Table 1

Types of advertisements on English and French child stations, November 2022.

Type of advertisement	English			French			Abs diff
	N	% (SE)	Ads/hour/station	N	% (SE)	Ads/hour/station	
Food or beverage advertisement	2240	11.2 (0.2)	2.3	3679	25.7 (0.4)	3.8	−1439
<i>Child-targeted</i>	1297	57.9 (1.0)	1.3	954	25.9 (0.7)	1.0	343
<i>Non-child-targeted</i>	943	42.1 (1.0)	1.0	2725	74.1 (0.7)	2.8	−1782
Non-food or beverage advertisement	17,770	88.8 (0.2)	18.3	10,662	74.4 (0.4)	11.0	7108
Total	20,010	100.0 (−)	20.6	14,341	100.0 (−)	14.8	5669

Weighted data; N = count; SE= Standard Error; Abs diff = absolute difference (English as reference).

Table 2

Marketing techniques in food advertisements on English and French child stations, November 2022.

Child-targeted marketing techniques	English		French		Abs diff	Non-child-targeted marketing techniques	English		French		Abs diff
	N	% (SE)	N	% (SE)			N	% (SE)	N	% (SE)	
Child themes	1038	46.3 (1.1)	717	19.5 (0.7)	321	Presence of teens	416	18.6 (0.8)	619	16.8 (0.6)	−203
Presence of children	792	35.4 (1.0)	207	5.6 (0.4)	585	Adult-child situations	741	33.1 (1.0)	710	19.3 (0.7)	31
Child visual design	1206	53.8 (1.1)	847	23.0 (0.7)	359	Adult-teen situations	275	12.3 (0.7)	390	10.6 (0.5)	−115
Use of child language	920	41.1 (1.0)	828	22.5 (0.7)	92	Use of teen language	18	0.8 (0.2)	129	3.5 (0.3)	−111
Branded characters	138	6.2 (0.5)	135	3.7 (0.3)	3	Teen themes	499	22.3 (0.9)	588	16.0 (0.6)	−89
Licensed characters	349	15.6 (0.8)	0	0.0 (−)	349	Teen visual design	0	0.0 (−)	570	15.5 (0.6)	−570
Other cartoon character	718	32.1 (1.0)	181	4.9 (0.4)	537	Songs or music	731	32.6 (1.0)	343	9.3 (0.5)	388
						Special effects	1114	49.7 (1.1)	2460	66.9 (0.8)	−1346
						Unusual product appearance	481	21.5 (0.9)	6	0.2 (0.1)	475
						Unusual product flavour	360	16.1 (0.8)	125	3.4 (0.3)	235
						Appeals to fun/cool	1208	53.9 (1.1)	912	24.8 (0.7)	296
						Celebrities/public figures	15	0.7 (0.2)	446	12.1 (0.5)	−431
						Cross-promotions	126	5.6 (0.5)	34	0.9 (0.2)	92
						Advercation	0	0.0 (−)	0	0.0 (−)	0
						Partnership with other brand	19	0.8 (0.2)	34	0.9 (0.2)	−15
						Displays of social responsibility	3	0.1 (0.1)	24	0.7 (0.1)	−21
						Product convenience	91	4.1 (0.4)	456	12.4 (0.5)	−365
						Appeals to health or nutrition	1468	65.5 (1.0)	1220	33.2 (0.8)	248
						Calls to action	797	35.6 (1.0)	976	26.5 (0.7)	−179
						Price promotions, incentives, giveaways	184	8.2 (0.6)	463	12.6 (0.5)	−279
						Games or activities	77	3.4 (0.4)	30	0.8 (0.1)	47

Weighted data; N = count; SE= Standard Error; Abs diff = absolute difference (English as reference).

Table 3

Child-targeted and non-child-targeted food advertisements on English and French child stations by time of broadcast, November 2022.

Ad type	Time of broadcast	English		French		Abs diff	Total	
		N	% (SE)	N	% (SE)		N	% (SE)
Child-targeted	6:00–9:00	101	7.8 (0.7)	148	15.5 (1.2)	−47	249	11.1 (0.7)
	9:00–12:00	63	4.9 (0.6)	138	14.5 (1.1)	−75	201	8.9 (0.6)
	12:00–15:00	164	12.6 (0.9)	154	16.1 (1.2)	10	318	14.1 (0.7)
	15:00–18:00	139	10.7 (0.9)	146	15.3 (1.2)	−7	285	12.7 (0.7)
	18:00–21:00	172	13.3 (0.9)	209	21.9 (1.3)	−37	381	16.9 (0.8)
	21:00–24:00	658	50.7 (1.4)	159	16.7 (1.2)	499	817	36.3 (1.0)
	Total	1297	100.0 (−)	954	100.0 (−)	343	2251	100.0 (−)
Non-child-targeted	6:00–9:00	0	0.0 (−)	304	11.2 (0.6)	−304	304	8.3 (0.5)
	9:00–12:00	0	0.0 (−)	281	10.3 (0.6)	−281	281	7.7 (0.4)
	12:00–15:00	0	0.0 (−)	420	15.4 (0.7)	−420	420	11.5 (0.5)
	15:00–18:00	2	0.2 (0.1)	485	17.8 (0.7)	−483	487	13.3 (0.6)
	18:00–21:00	2	0.2 (0.1)	631	23.2 (0.8)	−629	633	17.3 (0.6)
	21:00–24:00	939	99.6 (0.2)	604	22.2 (0.8)	335	1543	42.1 (0.8)
	Total	943	100.0 (−)	2725	100.0 (−)	−1782	3668	100.0 (−)

Weighted data; N = count; SE= Standard Error; Abs diff = absolute difference (English as reference).

concentrated after 21:00. on English stations. While on French stations, it was more evenly distributed throughout the day, but the advertising “likely to be of concern” were more prevalent after 18:00.

4. Discussion

Overall, food and beverage advertising were more predominant on French child stations than on English stations, representing 25.7 % of the

total advertising on French child stations, and 11.2 % on English stations. However, child-targeted advertisements were more prevalent on English child stations (57.9 %) than on French stations (25.9 %). Our findings confirmed our hypothesis that non-child-targeted advertising was more prevalent in Quebec than in Ontario. As anticipated, the marketing techniques employed in food and beverage advertisements differed between the two provinces. Although child-targeted marketing techniques were prominent in both provinces, they were more

Table 4

Child-targeted and non-child-targeted food advertisements by food categories on English and French child stations, November 2022.

Food Category	Child-targeted advertisements					Non-child-targeted advertisements				
	English		French		Abs diff	English		French		Abs diff
	N	% (SE)	N	% (SE)		N	% (SE)	N	% (SE)	
Alcohol	0	0.0 (0.0)	0	0.0 (0.0)	0	0	0.0 (0.0)	379	13.9 (0.7)	-379
Breads, flatbreads	2	0.2 (0.1)	0	0.0 (0.0)	2	7	0.7 (0.3)	49	1.8 (0.3)	-42
Breakfast cereals	931	71.8 (1.2)	238	24.9 (1.4)	693	36	3.8 (0.6)	89	3.3 (0.3)	-53
Candy and chocolate bars	16	1.2 (0.3)	70	7.3 (0.8)	-54	0	0.0 (0.0)	76	2.8 (0.3)	-76
Coffee	0	0.0 (0.0)	2	0.2 (0.1)	-2	20	2.1 (0.5)	36	1.3 (0.2)	-16
Cookie and Granola Bars	34	2.6 (0.4)	54	5.7 (0.7)	-20	125	13.3 (1.1)	236	8.7 (0.5)	-111
Delivery app	0	0.0 (0.0)	90	9.4 (0.9)	-90	77	8.2 (0.9)	280	10.3 (0.6)	-203
Fast food and sit-down restaurants	43	3.3 (0.5)	2	0.2 (0.1)	41	275	29.2 (1.5)	777	28.5 (0.9)	-502
Fresh and frozen vegetables	0	0.0 (0.0)	79	8.3 (0.9)	-79	0	0.0 (0.0)	73	2.7 (0.3)	-73
Fresh or frozen meat	13	1.0 (0.3)	0	0.0 (0.0)	13	9	1.0 (0.3)	38	1.4 (0.2)	-29
Frozen desserts	0	0.0 (0.0)	0	0.0 (0.0)	0	0	0.0 (0.0)	41	1.5 (0.2)	-41
Milks (dairy and plant based)	0	0.0 (0.0)	0	0.0 (0.0)	0	0	0.0 (0.0)	11	0.4 (0.1)	-11
Muffins and pastries	32	2.5 (0.4)	61	6.4 (0.8)	-29	0	0.0 (0.0)	15	0.6 (0.1)	-15
Peanut Butter	0	0.0 (0.0)	47	4.9 (0.7)	-47	0	0.0 (0.0)	4	0.1 (0.1)	-4
Pizza	26	2.0 (0.4)	0	0.0 (0.0)	26	0	0.0 (0.0)	69	2.5 (0.3)	-69
Chips and crackers	0	0.0 (0.0)	83	8.7 (0.9)	-83	0	0.0 (0.0)	2	0.1 (0.1)	-2
Processed cheese	0	0.0 (0.0)	0	0.0 (0.0)	0	86	9.1 (0.9)	15	0.6 (0.1)	71
Ready-to-eat dishes	0	0.0 (0.0)	8	0.8 (0.3)	-8	0	0.0 (0.0)	125	4.6 (0.4)	-125
Seasonings and spices	76	5.9 (0.7)	0	0.0 (0.0)	76	19	2.0 (0.5)	9	0.3 (0.1)	10
Sugary drinks	0	0.0 (0.0)	72	7.5 (0.9)	-72	0	0.0 (0.0)	2	0.1 (0.1)	-2
Supermarket	4	0.3 (0.2)	137	14.4 (1.1)	-133	0	0.0 (0.0)	112	4.1 (0.4)	-112
Yogurt and kefir	110	8.5 (0.8)	0	0.0 (0.0)	110	287	30.4 (1.5)	245	9.0 (0.5)	42
Others	10	0.8 (0.2)	11	1.2 (0.3)	-1	2	0.2 (0.1)	42	1.5 (0.2)	-40
Total	1297	100.0 (-)	954	100.0 (-)	343	943	100.0 (-)	2725	100.0 (-)	-1782

Weighted data; N = count; SE= Standard Error; Abs diff = absolute difference (English as reference).

Table 5

Child-targeted and non-child-targeted food advertisements on English and French child stations by product healthfulness, November 2022.

Marketing restrictions		English		French		Abs diff
		N	% (SE)	N	% (SE)	
Child-targeted	Not of concern	14	1.1(0.3)	87	11.2(1.1)	-73
	Food of concern	1248	96.2(0.5)	688	88.5(1.1)	560
	Likely to be of concern	35	2.7(0.4)	2	0.3(0.2)	33
	Total	1297	100.0(-)	777	100.0(-)	520
Non child-targeted	Not of concern	109	11.6(1.0)	501	18.8(0.8)	-392
	Food of concern	676	71.7(1.5)	1655	61.9(0.9)	-979
	Likely to be of concern	158	16.8(1.2)	516	19.3(0.8)	-358
	Total	943	100.0(-)	2672	100.0(-)	-1729

Weighted data; N = count; SE= Standard Error; Abs diff = absolute difference (English as reference).

intensively broadcasted on English child stations, with the most predominant techniques being child visual designs used on 53.8 % of food and beverage advertisements; child themes used on 46.3 % of food and beverage advertisements; and child language used on 41.1 % of food and beverage advertisements. These results are corroborated by other studies which show that on French Quebec television stations, child-targeted marketing techniques are less intensively broadcasted than in other provinces of Canada, but are still common in Quebec (Potvin Kent et al., 2012; Potvin Kent et al., 2023a).

Additionally, the results indicate that most food and beverage advertising on both English and French stations was of concern regardless of whether it specifically targeted children or not. This is particularly concerning, given the influence such advertising has on children's awareness, preferences and consumption (Kelly et al., 2015). Furthermore, almost all food and beverage advertisements on English stations and a quarter on French stations targeting children were for breakfast cereals. Of these, the majority were for sugary breakfast cereals, which have low nutritional value and provide minimal protein, fiber, and essential vitamins, on top of their high sugar content (Chepulis et al., 2020; Harris et al., 2012). Children consuming sugary cereals regularly are more likely to exceed the recommended daily limits for added sugars (Chepulis et al., 2020; WHO, 2015). It is known that

excessive sugar intake in children is linked to an increased risk of obesity, type 2 diabetes, and dental cavities (Magriplis et al., 2021; Prada et al., 2022). Over half of breakfast cereal advertisements (51.9 %) targeted children and contained child-targeted techniques such as child themes (90.3 %), the presence of children (78.5 %), and child visual design (74.3 %) (data not shown). This is similar to other research findings in this area (Potvin Kent et al., 2017).

Child-targeted marketing techniques were more common than non-child-targeted techniques in food and beverage advertising on both English and French stations. Unhealthy food and beverage advertising employs techniques to appeal to children's emotions and connections, causing children to view more frequently advertised products more favourably (Smith et al., 2019). In this context, it is concerning that the most frequent products advertised on child stations in Canada were foods of concern. These advertisements employed marketing techniques specifically targeting children, in addition to marketing techniques not exclusively targeting children, such as appeals to fun/cool and health/nutrition. This creates an environment where children are more likely to view unhealthy products more favourably than healthy products (Boyland et al., 2015; Giese et al., 2015). The prevalence of such marketing techniques that target children on French television, particularly on child stations, raises many concerns given that such practices

Table 6

Child-targeted and non-child-targeted food advertisements on English and French child stations by time of broadcast, November 2022.

Healthfulness	Time of broadcast	Language				Abs diff	Total	
		English		French				
		N	% (SE)	N	% (SE)		N	% (SE)
Not of concern	6:00–9:00	0	0.0 (–)	51	8.7 (1.2)	–51	51	7.2 (1.0)
	9:00–12:00	0	0.0 (–)	43	7.3 (1.1)	–43	43	6.0 (0.9)
	12:00–15:00	0	0.0 (–)	129	21.9 (1.7)	–129	129	18.1 (1.4)
	15:00–18:00	2	1.6 (1.1)	137	23.3 (1.7)	–135	139	19.5 (1.5)
	18:00–21:00	0	0.0 (–)	108	18.4 (1.6)	–108	108	15.2 (1.3)
	21:00–24:00	121	98.4 (1.1)	120	20.4 (1.7)	1	241	33.9 (1.8)
	Total	123	100.0 (–)	588	100.0 (–)	–465	711	100.0 (–)
Food of concern	6:00–9:00	101	5.2 (0.5)	366	15.6 (0.8)	–265	467	10.9 (0.5)
	9:00–12:00	63	3.3 (0.4)	341	14.6 (0.7)	–278	404	9.5 (0.4)
	12:00–15:00	160	8.3 (0.6)	371	15.8 (0.8)	–211	531	12.4 (0.5)
	15:00–18:00	139	7.2 (0.6)	377	16.1 (0.8)	–238	516	12.1 (0.5)
	18:00–21:00	174	9.0 (0.7)	461	19.7 (0.8)	–287	635	14.9 (0.5)
	21:00–24:00	1287	66.9 (1.1)	427	18.2 (0.8)	860	1714	40.2 (0.8)
	Total	1924	100.0 (–)	2343	100.0 (–)	–419	4267	100.0 (–)
Likely to be of concern	6:00–9:00	0	0.0 (–)	16	3.1 (0.8)	–16	16	2.3 (0.6)
	9:00–12:00	0	0.0 (–)	15	2.9 (0.7)	–15	15	2.1 (0.5)
	12:00–15:00	4	2.1 (1.0)	43	8.3 (1.2)	–39	47	6.6 (0.9)
	15:00–18:00	0	0.0 (–)	65	12.5 (1.5)	–65	65	9.1 (1.1)
	18:00–21:00	0	0.0 (–)	199	38.4 (2.1)	–199	199	28.0 (1.7)
	21:00–24:00	189	97.9 (1.0)	180	34.7 (2.1)	9	369	51.9 (1.9)
	Total	193	100.0 (–)	518	100.0 (–)	–325	711	100.0 (–)

Weighted data; N = count; SE = Standard Error; Abs diff = absolute difference (English as reference).

contradict the principles outlined in the Consumer Protection Act. This legislation was designed to shield consumers from unfair marketing tactics, explicitly prohibiting commercial advertising directed at children under the age of 13 (Consumer Protection Act, 1980). Our results, which indicate that a significant amount of advertising targeting children persists on French stations, warrants critical examination, emphasizing potential gaps in the CPA's intent to reduce the power of marketing to children.

On English child stations, child-targeted advertising was concentrated primarily in late evening hours, typically after 21:00, nonetheless child-targeted advertising was present during the day and early evening. In contrast, on French stations, it was more evenly distributed throughout the day, with a peak between 18:00 and 21:00. Despite the provisions of the CPA in Quebec, such advertisements were aired during times of high child viewership, which research indicates peaks in the early morning before school and in the early evening after school. While youth aged 12–17 are more likely to watch television later in the evening, younger children predominantly view it in the afternoon and early evening (Conrad, 2024). The CPA stipulates that child-targeted ads are permissible only when children comprise less than 15 % of the audience. However, ads can still be deemed directed at children if the product and presentation strongly appeal to them, even when children are a minority of the audience (Government of Quebec, 2012). Given that these advertisements were identified as child-targeted based on their marketing techniques and the channels they aired on, their broadcast during peak child-viewing times raises concerns about compliance with the CPA. This may be attributed to the CPA's reliance on consumer complaints for enforcement rather than proactive government monitoring, a mechanism shown to be ineffective.

In addition, results revealed that on French child stations, alcohol advertising constituted 10.3 % of all food and beverage advertisements. Even though none of these alcohol ads were explicitly targeted at children, their presence raises concerns and may highlight a potential unintended consequence of the CPA, which, while regulating child-targeted advertising, overlooks broader content that can appeal to multiple age groups, including children. In Quebec, the regulation regarding promotion and advertising of alcoholic beverages prohibits ads that target minors (ads cannot feature minors or characters associated with minors), encourage irresponsible consumption, or suggest that

drinking boosts social status, athletic performance, or problem-solving abilities (Government of Quebec, 2024). Even though the alcohol ads did not directly target children, research has demonstrated that the portrayal of alcohol in media can shape children and youth's attitudes towards drinking, especially when these advertisements are embedded in programming frequently viewed by younger audiences (Aiken et al., 2018; Sargent & Babor, 2020). Therefore, by limiting the scope of advertising on television, the CPA unintendedly makes room for other advertisements promoting other harmful products that are not specifically targeted at children, such as alcohol. Conversely, alcohol advertising was absent on English stations. In Ontario, the Alcohol and Gaming Commission of Ontario (AGCO) is responsible for the regulation of alcohol sales and promotion, and in the statutory regulation prohibits advertising of alcohol that appeal, either directly or indirectly, to persons under the legal drinking age (19 years old), or that is placed in media that are targeted specifically at people under that age (AGCO, 2024). Again, these results suggest limitations and ineffectiveness of Quebec's current regulation, while demonstrating the effectiveness of alcohol advertising guidelines from the AGCO.

These findings contribute important insights to ongoing discussions surrounding the regulation of food and beverage marketing to children in Canada. While Health Canada's proposed regulations (Health Canada, 2023b) and Bill C-252 (Bill C-252, C-252, 2021) focused on restricting advertisements specifically targeting children, our study underscores a critical gap: children remain significantly exposed to non-child-targeted advertising, particularly for products high in saturated fat, sodium, and sugar. This was especially evident in Quebec, where, despite stricter provincial consumer protection laws, a higher proportion of food and beverage advertising on children's television was not explicitly directed at children. These findings suggest that the current regulatory focus may be too narrow, as it overlooks the broader media environment in which children are exposed to unhealthy food marketing. Furthermore, the differences observed in marketing techniques between provinces highlight how regional policies and linguistic contexts can shape advertising strategies. As Canada moves forward with national regulations, these results suggest the importance of addressing all forms of unhealthy food marketing accessible to children, not solely those explicitly targeted at them.

Efforts to limit child-targeted advertising on regular television have

been implemented in several countries with varying degrees of success. For instance, Sweden and Norway have longstanding bans on all television advertising to children under 12, including on general programming, reflecting a rights-based approach to child protection (Alkharfy, 2011). In the United Kingdom, restrictions are to be implemented in 2025 on all advertising of HFSS, they will be banned on television before 9pm, or in paid online advertising (Government of United Kingdom, 2021). Studies have showed how limiting the advertisements available to children is very efficient, either by increasing the cost of broadcasting ads, or through the ban of advertisements on television. Food marketing raises ethical concerns due to its harmful impact on children's health, and their vulnerability to persuasive tactics, making government-led restrictions a more ethical approach than placing the burden solely on caregivers to limit exposure. Furthermore, Chile has become a global leader in regulating unhealthy food marketing to children through a comprehensive policy implemented in 2016. This framework combines front-of-package warning labels, strict advertising restrictions across media and public spaces, and bans on child-targeted marketing techniques and sales in schools (Government of Chile, 2018). Evidence suggests that Chile's integrated, multi-pronged strategy is more effective in promoting healthier eating habits among children than single-issue interventions (Correa et al., 2019; Taillie et al., 2019).

In addition, these findings serve as a foundation for future research. They offer a basis for formulating new hypotheses and conducting controlled experimental studies to assess the influence of non-child-targeted food and beverage advertising on children's dietary preferences and consumption patterns. Moreover, data on children's television viewership shows that younger children (ages 2–11) are more likely to watch child-focused networks, while older children (ages 12–17) increasingly shift toward general audience channels (Summerfield, 2023). These distinctions matter because both Quebec's legislation and Canada's self-regulations are not limited to advertising on children's television channels but apply based on the content of the advertisement, the nature of the product, and the composition of the audience—regardless of the platform. In Quebec, for instance, an ad is subject to regulation if children comprise at least 15 % of the audience, whether it airs on a child-specific channel or a general one. This highlights the importance of analysing child-targeted and non-child-targeted advertising also on general audience channels. Such future work is essential for advancing evidence-based policies aimed at reducing children's exposure to marketing that promotes unhealthy eating behaviors.

4.1. Strengths and limitations

This study offers several key strengths that contribute to the robustness and reliability of the findings. First, the comprehensive nature of the data collection is notable, as 18-h recordings across six days from six TV stations were analyzed, totalling 648 h of recording. The decision to record during a month free from major holidays further ensures that the data reflects typical advertising patterns, undisturbed by seasonal or event-specific promotions. Additionally, the inclusion of recordings from both weekends and weekdays provides a balanced representation of children's television consumption throughout the week.

A notable strength is that all advertisements, rather than a sample, were analyzed, ensuring completeness. The thorough collection of nutritional information for all advertised products, with the application of Health Canada's proposed nutrient profiling model for those with limited data, ensures high reliability in categorizing the nutritional content. Furthermore, the analysis encompassed a broad range of 28 different marketing techniques, adding depth to the evaluation of marketing strategies used in child-targeted and non-child-targeted ads. The comparison of English and French markets, along with recordings from the top three child-focused stations in both languages, offers valuable insights into both the representativeness of Canadian television and comparability between the two different policy environments in the

country, as well as comparability of two different marketing regulatory environments.

Despite its strengths, the study has some limitations. Although products with incomplete nutritional information were classified using Health Canada's nutrient profiling model, this approach remains a proxy, because it is an estimation based on the food category or brand of the product, introducing potential inaccuracies in the classification process. Only 37 products were classified using the proxy method, however, using the proxy of classification did not compromise the trustworthiness of the data. Furthermore, while the study achieved a high inter-coder reliability rate, the independent nature of data collection could have introduced human error in coding and analysis. The study's findings are limited to the frequency of advertisements, without capturing data on actual exposure or consumption behaviours among children. Information on children's actual viewership of the channels included in the analysis is not available, and it is possible that children are more frequently watching other channels or streaming services. According to measured media data, average weekly broadcast television viewership among Canadian children aged 2 to 11 declined from 20.6 h in 2013–2014 to 17.3 h in 2017–2018 (CRTC, 2019). Additionally, there is no experimental data on how these advertisements influence children's food choices or their perceptions of the ads, leaving a gap in understanding the direct impact of this specific marketing on children's behaviour. Lastly, the analysis is based on data collected during only one month of the year, which limits the study's ability to escalate findings to the full year. However, analysis of full-year data of Canadian television have shown similar results (Potvin Kent et al., 2023a; Potvin Kent et al., 2022b). Only through continuous monitoring of food and beverage advertising could the impact of advertising on children be accurately estimated.

5. Conclusion

In conclusion, the findings of this study highlight that child-targeted marketing techniques were more intensively broadcast on child stations in Ontario than in Quebec; however, child-targeted marketing techniques were more common than non-child-targeted techniques in both provinces. The results show the concerning prevalence of food and beverage advertising targeting children on both child-focused television stations in two policy environments in Canada. While food and beverage ads represent a substantial portion of total advertising on these channels, the high proportion of advertisements of concern from an advertising perspective is particularly troubling, given their known links to childhood obesity and related health issues. Additionally, the presence of alcohol advertisements on French child stations, though not explicitly child-targeted, underscores the limitations of the CPA in comparison to Ontario regulations in effectively shielding young audiences from harmful content. These findings suggest that neither industry-led self-regulation in Ontario or the Consumer Protection Act in Quebec were sufficiently limiting unhealthy food and beverage advertising aimed at children. Mandatory government regulation of legislation at the federal level, coupled with monitoring and compliance checks are recommended.

CRediT authorship contribution statement

Julia Soares Guimarães: Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Meghan Pritchard:** Writing – review & editing, Data curation. **Grace Gillis:** Writing – review & editing, Data curation. **Mariangela Bagnato:** Writing – review & editing, Data curation. **Lauren Remedios:** Writing – review & editing, Data curation. **Soulene Sabir:** Writing – review & editing, Data curation. **Lana Vanderlee:** Writing – review & editing. **Timothy Ramsay:** Writing – review & editing. **Charlene Elliott:** Writing – review & editing. **Monique Potvin Kent:** Writing – review & editing, Supervision,

Conceptualization.

Ethical Statement

- 1) This material is the authors' own original work, which has not been previously published elsewhere.
- 2) The paper is not currently being considered for publication elsewhere.
- 3) The paper reflects the authors' own research and analysis in a truthful and complete manner.
- 4) The paper properly credits the meaningful contributions of co-authors and co-researchers.
- 5) The results are appropriately placed in the context of prior and existing research.
- 6) All sources used are properly disclosed (correct citation). Literally copying of text must be indicated as such by using quotation marks and giving proper reference.
- 7) All authors have been personally and actively involved in substantial work leading to the paper, and will take public responsibility for its content.

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I agree with the above statements and declare that this submission follows the policies of Solid State Ionics as outlined in the Guide for Authors and in the Ethical Statement.

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Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Monique Potvin Kent reports a relationship with Health Canada that includes: consulting or advisory or funding grants. Charlene Elliott reports a relationship with Health Canada that includes: funding grants. Monique Potvin Kent reports a relationship with Heart and Stroke Foundation of Canada that includes: funding grants. Charlene Elliott reports a relationship with Heart and Stroke Foundation of Canada that includes: funding grants. Lauren Remedios reports a relationship with Health Canada that includes: employment. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.appet.2025.108186>.

Data availability

Data will be made available on request.

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Study 2: The power of product: how food advertising affects children's perceptions of child and non-child-targeted food advertising?

Approach

This study examined how children interpret and respond to both child-targeted and non-child-targeted food advertising. A central finding was the significant influence of the product itself on children's reactions to advertisements. Children's attitudes, preferences, and intentions to request or purchase a product were largely shaped by their prior familiarity with and liking for the product, rather than by the presence of specific marketing techniques. Similarly, when asked to identify the intended audience of the advertisements, children tended to base their assessments on who they believed typically consumes the product, rather than on the use of child-appealing techniques within the ads. These results suggest that, within this sample, the intrinsic appeal and recognition of the product played a more decisive role in shaping responses than the advertising format or strategy. The dominance of product familiarity over marketing cues highlights a need to reconsider current regulatory frameworks.

From a policy perspective, these findings have important implications. Regulations aimed at limiting children's exposure to unhealthy food marketing may be more effective if they focus on the nutritional quality of the products being promoted, regardless of whether the advertisements are explicitly designed for children. Current approaches that prioritize the identification of child-targeted techniques may overlook a substantial portion of marketing that still influences children through familiar or appealing products.

As an exploratory study, this research contributes valuable preliminary insights and underscores the importance of examining the role of product-driven influence in food advertising. It also lays the groundwork for future investigations involving larger, more diverse

samples and experimental methodologies to further assess how different elements of food marketing affect children's food choices and consumption behaviours.

Author's Contribution

My contribution included the development of the research question and study design with the help of my supervisor, development of data collection materials, collection of data, data coding with the help of one lab partner, thematic analysis, interpretation of the data, and drafting the manuscript.

Knowledge Translation

This research was published in the BMC Public Health journal in 2025. The final article was disseminated to members of Health Canada, the Heart and Stroke Foundation and the Office de la Protection du Consommateur and was also shared through the author's social media channels. Part of the study also was presented at the 2025 CNS Annual Conference in Montreal, Quebec, on May 8-10, 2025.

RESEARCH

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The power of product: how food advertising affects children's perceptions of child and non-child targeted food advertising?

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Abstract

Background Food advertising shapes children's preferences for unhealthy foods, contributing to poor diets and increased risk of obesity and non communicable diseases. This study explored children's perceptions of child and non-child-targeted food advertising.

Methods Open-ended online interviews with 17 participants, recruited through convenience sampling, were conducted where children were prompted with four advertisements (ads): a child-targeted and non-child-targeted ad for both healthy (plain milk) and unhealthy (chocolate) foods. A thematic analysis was conducted.

Results Most children expressed positive perceptions of the ads, and the reasons children described liking the ads included: (i) people in the ad eating the product, (ii) positive emotional appeal, (iii) pre-existing affinity with the product, and (iv) visibility of the product. However, most children expressed "negative purchase intent" to all ads due to a pre-existing aversion to the product. Many children who expressed pre-existing affinity with the product still expressed negative purchase intent because they preferred other brands or flavours of the product. Most children considered the type of product over the marketing techniques when asked about perceived targeted audience. The main themes found were: (i) product for everyone, and (ii) product for people that like the product.

Conclusions Children's perceptions, purchase intent and perceived targeted audience did not change between child-targeted and non-child-targeted ads. This study underscores the critical role of the product itself in influencing children's responses to ads. It highlights the need for public policies and advertising regulations to focus on restricting promotions of unhealthy products rather than solely addressing marketing techniques or target audiences.

Keywords Food advertising, Children, Interview, Purchase, Thematic analysis, Perceptions

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Background

The World Health Organization (WHO) reported that, in 2022, approximately 20% of children and adolescents aged 5 to 19 years old had overweight, and 8% were living with obesity [1]. Recent trends indicate a global increase in childhood obesity. The average prevalence of obesity among children and adolescents rose from 7.0% during the first decade of the 2000s (2000–2011) to 11.3% in the second decade (2012–2023) [2]. Childhood obesity rates in Canada have reached concerning levels, with approximately 30% of Canadian children aged 5 to 17 have overweight or obesity [3]. Studies indicate that the diets of Canadian children, like those in many other developed countries, are predominantly composed of ultra-processed foods (UPFs), with severe implications for children's health and development [4, 5]. UPFs account for 49.1% of the total caloric intake among Canadian children aged 2–5 years old and 54.2% among Canadian children aged 6–12 years old [6, 7]. UPF products are often high in added sugars, unhealthy fats, and sodium, while being low in essential nutrients, such as fiber, vitamins, and minerals. High consumption of UPFs among children is associated with increased rates of childhood obesity, cardiovascular disease, and dental cavities [8].

Food advertising has played a significant role in driving this dietary shift and maintaining poor dietary intake among children [9, 10]. In Canada, children (2–11 years old) are exposed to almost 2,000 advertisements (ads) for unhealthy foods annually on television [11] and more than 4,000 on digital platforms [12]. These figures reflect the volume of marketing children encounter across media platforms. Extensive research has demonstrated that the majority of food and beverage ads in various media (e.g. television, digital, etc.) are for unhealthy foods [12–15]. This is worrisome as food advertising influences children through a hierarchy of effects that progresses from brand awareness and attitude formation to purchase intent, actual consumption, and post-consumption health impacts, including obesity [9, 16]. In fact, multiple reviews of the literature have shown that children (under the age of 18 years old) exposed to such ads are more likely to choose unhealthy food products over healthier options [9, 10, 14, 17, 18].

Food advertising directed at children employs a diverse range of marketing techniques designed to attract their attention and shape their preferences, consumption behaviors, and brand loyalty [19–21]. Literature has shown that common marketing techniques that appeal to children are the use of characters, including brand mascots, licensed or animated figures, celebrities, influencers appealing to children, and child actors, all of which enhance product appeal [22–24]. Furthermore, research has outlined that marketing campaigns frequently leverage emotional appeals, portraying food products as

sources of fun, excitement, or social benefits, such as increased popularity or happiness [25]. Another key element that could appeal to children involves the integration of audiovisual elements, including music, animation, and child-oriented visual designs, to enhance engagement and influence food preferences [26]. The strategic use of lively music and dynamic animations fosters an entertaining and immersive experience, akin to emotional appeals, that captures children's attention and reinforces the memorability and desirability of the advertised products [19, 25, 27]. However, research is still limited in determining the factors that shape child appeal, especially from the children's perspective. A study looking to determine these factors on digital food marketing found low agreement (based on Fleiss' Kappa and S scores reported in the study) among children, which suggests that the extent to which different marketing strategies appeal to children varies and is not well known yet [28].

The WHO recommends stronger policies to protect children from the harmful impact of food marketing including the enforcement of measures that restrict the promotion of foods high in saturated fat, trans fat, added sugars, or salt to children [29, 30]. These policies, according to the WHO, should be mandatory, apply to children aged 18 and under, and rely on a government-led nutrient profile model to classify foods [29]. Additionally, the policies should be broad enough to prevent marketing from shifting to different platforms or environments and should reduce the persuasive impact of food advertising on children [29]. Numerous countries have implemented policies to limit food and beverage advertising during children's programming. Many countries have focused on restricting unhealthy food advertising that are directed at children. This is the case in Sweden [31], Norway [32] and Chile [33]. The alternative approach is the one taken by the United Kingdom (UK) where, as of January 2026, the government will be implementing regulations banning junk food ads on television before 9 pm and restricting online ads for products high in fat, salt, and sugar regardless of who is targeted in the ad [34].

In Canada, food marketing is primarily self-regulated by the food industry; however, in the province of Quebec, the Consumer Protection Act (CPA) prohibits all commercial advertising targeting children under the age of 13 in all media forms with few exceptions (ads are permitted when the medium or format used is capable of reaching a general audience beyond children, and the content is not specifically crafted to attract children's attention; or if the product or service is intended for teenagers and adults, and does not possess features that appeal to children, the advertisement may be allowed, provided the messaging is not designed to engage children's interest) [35]. At the federal level, in 2016, Health Canada announced plans to regulate ads for unhealthy food products targeting

children under 13 years [36]. The proposed policy aims to reduce children's exposure to child-appealing food ads with products high in sodium, free sugars, or added fats that exceed established nutrient thresholds on television and digital media, however, these regulations have yet to be adopted [36].

Current self-regulatory approaches, proposed Health Canada regulations on food advertising directed at children and the CPA in Quebec primarily address the intent of the advertising (i.e. the child appeal or targeting), the marketing techniques employed, and the time and media through which ads are delivered. However, there are important research gaps regarding what elements make an advertisement appealing to a child from their point of view; and what drives a child's desire to purchase a promoted product. Although a small number of qualitative studies have examined young people's perceptions and attitudes toward food marketing, these have primarily focused on digital platforms, such as social media [37–39]. While these studies offer valuable insights, they differ in scope from the present research, which focuses specifically on television food and beverage advertising. Moreover, existing qualitative studies tend to focus on older children [39] or adolescents [37, 38], whereas the current study addresses an important gap by examining the perceptions, attitudes, and preferences of children aged 6 to 12 years. This age group is particularly relevant given their developmental stage and susceptibility to marketing influences in traditional media formats [40].

A comprehensive narrative review of studies published between 2009 and 2013, examined the influence of food advertising on children. The authors proposed a hierarchy of effects model that outlines a sequential pathway beginning with exposure to advertising and progressing through multiple stages—namely, awareness, attitudes and preferences, purchase intention, actual purchase, and post-consumption effects [16]. The model illustrates how food marketing not only shapes children's immediate preferences but can also contribute to long-term health outcomes [16]. This theoretical framework informed the present study by providing a structured lens through which to explore children's own perspectives on food advertising, thereby addressing an important gap in the literature concerning how children interpret and are affected by various stages of marketing influence. Understanding how children are influenced by food advertising is primordial for developing regulations that protect them from unhealthy food advertising exposure and the resulting health impacts including unhealthy eating habits. Therefore, this study sought to understand children's perceptions of child and non-child-targeted food advertising, and, most importantly, the features of ads that elicit positive attitudes and various behavioural outcomes.

Methods

Study design

This study employed a qualitative methodology, focusing on individual open-ended interviews to explore how food advertising may affect children and how they perceive various ads. Interviews were chosen for their ability to capture children's perspectives in detail, adapt to their communication styles, and interpret non-verbal cues (such as children nodding or shaking their heads to indicate agreement or disagreement when responding to questions), fostering trust and honest responses [41]. Online interviews (using Zoom) were selected as the primary data collection method because the study commenced during the concluding phase of the COVID-19 pandemic. Although in-person activities had resumed by the time the study began, restrictions on conducting in-person research with children remained in place. A notable advantage of online interviews was the ability to include participants from provinces beyond the researcher's location, thereby enhancing the geographical diversity of the participants.

Recruitment and Sampling

A convenience sampling method was utilized, with invitations to participate posted on social media platforms. The inclusion criteria required participants to be English-speakers, between the ages of 6 and 12 years, in good health (no food allergies, or food related health conditions, such as diabetes and celiac disease), and with normal or corrected-to-normal vision, ensuring they could engage with the study materials and interviews. Children aged 6 to 12 years were selected as the target population for this study for both practical and theoretical reasons. This age group comprises school-aged children who generally possess the cognitive and linguistic abilities necessary to attend to interview questions, engage in discussion, and articulate their thoughts in a meaningful way [42, 43]. Their developmental stage allows for a sufficient level of comprehension and reflection on media content, including food advertising, while still being within a critical period of vulnerability to marketing influence [43]. Moreover, this age range aligns with policy and regulatory frameworks, as many food and beverage marketing restrictions—both in Canada and internationally—specifically define children as individuals under the age of 13 [33–35]. Thus, focusing on children aged 6–12 enables the study to generate insights that are directly relevant to current and proposed public health policies aimed at protecting children from the harmful effects of unhealthy food marketing.

Data saturation was assessed iteratively throughout the data collection and analysis process. Saturation was considered achieved when no new themes, perspectives, or relevant information emerged from additional interviews.

In the final interviews, responses began to repeat prior insights, indicating that the data collected was sufficiently rich to address the research questions. This determination aligns with guidance from a systematic review, which found that in qualitative health research, thematic saturation is often reached within a range of 9 to 17 interviews when using empirical data [44]. Based on the literature, the study aimed to include 17 children, which falls within this range and was deemed adequate for capturing the diversity of perceptions and attitudes relevant to this study. The interviews lasted between 20 and 50 min, with an average duration of approximately 35 min, allowing for in-depth exploration of participants' perceptions and experiences. Children unable to maintain attention for this duration were excluded (for example, one participant disengaged midway through the interview and expressed unwillingness to continue responding to questions). Participants received a C\$10 gift card for participation. This study was approved by the University of Ottawa's Health Sciences and Science Research Ethics Board H-04-22-8028, and conducted in accordance with the Declaration of Helsinki.

Parents interested in enrolling their children contacted the research team and received an eligibility survey via email. Eligible participants were sent informed consent (for parents) and assent (for children) forms electronically, alongside a brief study description. Parents were instructed to review the assent form with their child, ensuring the child understood the purpose and voluntary nature of the study. This process was reviewed and approved by the University of Ottawa Research Ethics Board, in accordance with ethical standards for research involving minors. Upon parental authorization, a video call interview was scheduled. Verbal parental consent and child assent were obtained once more at the beginning of the video call after a brief description of the study.

Procedure

The interviews were semi-structured and developed for this study (the interview script can be found in the Additional File 1). Interviews were conducted by the lead researcher (JSG), a female PhD student trained in qualitative research and experienced in teaching pre-school aged children. All interviews were conducted online via Zoom to ensure accessibility and convenience for participants. Children joined the interviews from their homes using a computer or tablet. Prior to the start of each interview, parents were asked to leave the room to help ensure privacy and minimize external influence. In cases where parents preferred to remain present, they were instructed not to assist or interfere with their child's responses in any way, in order to preserve the authenticity and independence of the child's perspective. During the interviews, participants watched four ads: first,

a one-minute child-targeted chocolate advertisement (hereinafter referred to as AD1), followed by questions on awareness, attitudes, purchase intent, and perceived targeted audience. The same process was followed with the three other ads: a 30-second child-targeted milk advertisement (hereinafter referred to as AD2), a one-minute non-child-targeted chocolate advertisement (hereinafter referred to as AD3), and a 30-second non-child-targeted milk advertisement (hereinafter referred to as AD4).

To collect information on participant's awareness, they were asked what product was advertised, which brand created the advertisement (in cases where children did not understand what "brand" was, the questions were rephrased in different ways so they could understand), and whether they had ever seen ads by this brand before. This approach aligns with the logic model developed by Kelly et al. (2015), which outlines brand awareness as the first step in the hierarchy of effects, reflecting the initial impact of advertising on unconscious brand memory [16]. Although the selected advertisements featured brands not commonly available in Canada—minimizing prior familiarity—this measure aimed to explore whether children paid attention to and retained brand-related information following exposure. To gather data on participant's attitudes, they were asked whether they liked the advertisement, their reason for their opinion, and their favorite part of the ad. To investigate participants' purchase intent, they were asked whether they would buy the product, whether they would ask their parents to buy it for them, and what specific aspects of the advertisement made them want to buy the product or ask their parents to buy it for them.

Finally, participants were asked who they thought the product was intended for, to analyse the perceived target audience of the ads. Understanding the perceived target audience of each advertisement was relevant for assessing whether children can accurately identify when an ad is directed at them. This insight is critical because children's ability to recognize targeted marketing influences their interpretation, engagement, and susceptibility to persuasive intent [45]. If children are unable to discern that an advertisement is aimed at them, they may be more vulnerable to its influence [45]. Evaluating children's perceptions of audience targeting helps inform whether existing advertising strategies effectively blur or reveal their intent, and whether children possess the cognitive awareness needed to critically evaluate such content. This has important implications for policy development and regulatory measures aimed at protecting children from harmful marketing.

To collect sociodemographic information and information about participant's screen time habits, parents completed an online survey through SurveyMonkey®. The sociodemographic variables included child's age,

ethnicity and perceived income adequacy. We also queried children's daily screen time habits. Evidence suggests that prolonged daily screen time is associated with increased consumption of unhealthy foods and reduced intake of healthy foods [46, 47]. To collect information on participant's daily screen time, parents answered questions about how often the child uses a tablet, a cell phone/smartphone, and a computer; how often the child watches television; as well as the approximate number of hours per day that the child uses a screen for leisure and for educational purposes.

Advertisements

To examine the influence of product type and marketing strategies on children's responses to food advertisements, the study included four distinct advertisements: (1) a child-targeted advertisement for an unhealthy food product (milk chocolate), (2) a child-targeted advertisement for a healthy food product (plain milk), (3) a non-child-targeted advertisement for an unhealthy food (dark chocolate), and (4) a non-child-targeted advertisement for a healthy food (plain milk). The selection of advertisements representing both healthy and unhealthy foods was intended to allow for comparative analysis across product categories. Product healthfulness was classified using the NOVA classification system, which categorizes foods based on the extent and purpose of processing rather than nutrient content alone [48]. According to this system, plain milk is classified as a minimally processed food (Group 1), while both milk chocolate and dark chocolate are classified as ultra-processed foods (Group 4) due to the presence of added sugars, fats, and other industrial ingredients [48]. This framework provided a consistent and evidence-based method to differentiate between the

healthfulness of the advertised products. Furthermore, the inclusion of both child-targeted and non-child-targeted advertisements aimed to explore whether marketing strategies specifically designed to appeal to children had a greater impact on their awareness, attitudes, purchase intent, and perceived intended audience. This approach is grounded in previous research demonstrating that marketing techniques targeting children—such as the use of animated characters, bright colors, and playful narratives—are particularly influential in shaping children's preferences and behaviors [16, 21].

The classification of ads as either “child-targeted” or “non-child-targeted” was based on literature review of marketing techniques [20–22]. Ads employing features known to appeal to children—such as vibrant settings, engaging music, animation, child actors, child-appealing characters, and child-centric narratives—were categorized as child-targeted (Table 1). Conversely, ads lacking these techniques and instead focusing on elements designed to resonate with adults were classified as non-child-targeted. To minimize bias, all ads were sourced from brands not easily available in Canada. The advertisements used in the interviews were pre-existing television commercials that were publicly available online. Selection criteria included high video quality, English language, and having been aired within the past 10 years to ensure relevance. Three brands were chosen based on their alignment with the study's product categories and marketing techniques observed on the literature: Milka (milk chocolate), Dove (dark chocolate), and Arla (milk). Notably, Arla was the only brand for which both a child-targeted and a non-child-targeted advertisement for the same product were available. The interview sessions were

Table 1 Details of each advertisement

Advertisement	Product (Brand)	Storyline	Marketing techniques	Classification
AD1	Milk chocolate (Milka)	Boy goes to the circus at a school trip and shares a chocolate bar with a circus performer.	Music, yellow school bus, games, circus setting, child actor, adult-child interaction.	Child-targeted
AD2	Plain milk (Arla)	An animated story of a cookie boy who swims in a lake of milk, loses his head because it melts on the milk. His cookie mom repairs his head while the family enjoys some milk. The story is narrated through music.	Animation, cartoon characters, a fun narrative story, music, child-adult interaction.	Child-targeted
AD3	Dark chocolate (Dove)	A woman, portrayed by Audrey Hepburn, is seated on a bus that becomes stuck in traffic. She then engages in a flirtatious exchange with a man driving a convertible. In response to his invitation for her to join him, she accepts—on her own terms—reversing the expected dynamic by positioning him as her chauffeur, while she sits in the back seat enjoying a piece of chocolate during the ride.	Vintage music, celebrity familiar primarily to adults, flirtation.	Non-child-targeted
AD4	Plain milk (Arla)	A man, portrayed as the “milk lover”, incorporates a glass of milk into various adult-oriented activities, including visiting a bar, doing laundry, and riding a bull.	Soft male narrator voice, humor tailored to adult sensibilities, and settings that resonate with adult audiences (e.g. bar, laundry mat).	Non-child-targeted

audio recorded for analysis, with one researcher conducting all interviews to maintain consistency.

The child-targeted advertisement for the unhealthy food depicted a boy in a circus setting, sharing a chocolate bar with a circus performer (more details on Table 1). This advertisement included music, games, a child actor, and adult-child interaction. For the healthy food, the child-targeted advertisement showcased an animated story of a cookie boy who swims in a lake of milk, loses his head, and is repaired by his cookie mother while the family enjoys milk. This ad leveraged animation, cartoon characters, a fun narrative, and child-adult interaction to appeal to children. In contrast, the non-child-targeted advertisement for unhealthy food featured a woman (Audrey Hepburn) in a flirtatious scenario enjoying a piece of chocolate during a car ride. The ad included elements such as vintage music and a celebrity familiar primarily to adults. Finally, the non-child-targeted advertisement for healthy food depicted a man incorporating milk into various adult-oriented activities, including visiting a bar, doing laundry, and riding a bull, all while drinking milk. This ad employed a soft narrator voice, humor tailored to adult sensibilities, and settings that resonate with adult audiences. This deliberate selection process ensured the inclusion of diverse and contextually rich ads, enabling the study to investigate children's perceptions across varied types of advertising.

The advertisements selected for this study varied in duration, with two ads lasting approximately 30 s and the other two approximately one minute. Importantly, ad length was kept consistent within each food category: both healthy food advertisements (one child-targeted and one non-child-targeted) were one minute long, and both unhealthy food advertisements (one child-targeted and one non-child-targeted) were 30 s long. This decision was made to maintain internal consistency when comparing children's responses to ads within each nutritional category. The variation in ad length was due to the limited availability of suitable pre-existing advertisements that met all selection criteria: each ad had to represent one of four categories—child-targeted healthy, child-targeted unhealthy, non-child-targeted healthy, and non-child-targeted unhealthy—and feature brands not available in the Canadian market to reduce the influence of prior exposure or brand recognition. Given these requirements, it was not feasible to standardize ad length across all categories.

Data analysis

First, one researcher (JSG) conducted the interviews, and another researcher (SS) transcribed the audio from all interviews. Second, coding was conducted by two other researchers (JSG and MP). Thematic analysis was used to code and analyze the data, which provides a systematic

approach to interpreting the data by focusing on recurring ideas, meanings, and perceptions articulated by participants [49, 50]. A hybrid coding approach was used, combining both deductive and inductive strategies: deductive codes were initially informed by prior research and theoretical constructs relevant to food advertising—specifically, awareness, attitudes, purchase intent, and perceived target audience—as outlined in Kelly et al.'s (2015) hierarchy of effects model [16]. Simultaneously, the analysis remained open to inductive insights that emerged organically from participants' own language and interpretations. The researchers began by getting familiarized with the data. In the initial coding phase, the researchers systematically examined every line and segment of the transcripts. A quotation was considered "relevant" if it provided meaningful insight into one of the overarching concepts (e.g., awareness, attitudes, purchase intent, and perceived target audience). These were coded without immediate concern for thematic organization to preserve the openness of the analysis. After this, one researcher (JSG) conducted the focused coding and developed the themes. In the focused coding phase, the most salient and recurring initial codes were selected for further development into broader categories and themes. Codes were deemed "most useful" based on their frequency, relevance to the research questions, and conceptual depth. Finally, the researcher grouped related focused codes into themes based on conceptual similarity, their relationship to the research questions, and theoretical coherence. Themes were refined in consultation with co-researchers and were validated through iterative comparison across the data set to ensure consistency and depth. Microsoft 365© tools (Excel and Word versions 2412) were used in the coding and analysis process. Throughout the entirety of this study's process, participants were identified using their unique participation codes, which consisted of the study year combined with their recruitment order (e.g., P2301, P2302, P2303, etc.).

Results

Sociodemographic and screen habits

Overall, 17 participants (11 girls, 6 boys) aged 6–11 years old were interviewed (Table 2). Most participants were between ages 9–11 years (64.7%), Latino (47.1%), and with parents who declared that it was difficult to make ends meet (41.2%). Most children used a tablet several times a day (29.4%); a cell phone or smartphone once a day (23.5%) or several times a week (23.5%); used a computer several times a day (29.4%); and watched television once a day (35.3%). Also, most children used a screen for leisure purposes for either 2–4 h per day (41.2%) or 4–6 h per day (41.2%); and used a screen for educational purposes for 0–2 h per day (47.1%).

Table 2 Sociodemographic information of study participants (N=17)

	Total (%)		Total (%)
Age		Sex	
6–8 years	6 (35.3)	Female	11 (64.7)
9–11 years	11 (64.7)	Male	6 (35.3)
Ethnicity		Income adequacy	
White	5 (29.4)	Very Difficult	(0.0)
Latino	8 (47.1)	Difficult	7 (41.2)
Other	4 (23.5)	Neither easy nor difficult	5 (29.4)
Usage of tablet		Easy	2 (11.8)
Several times a day	5 (29.4)	Very Easy	1 (5.9)
Once a day	1 (5.9)	Refused to answer	2 (11.8)
Several times a week	4 (23.5)	Watch television	
Once or twice a week	4 (23.5)	Several times a day	5 (29.4)
Rarely	2 (11.8)	Once a day	6 (35.3)
Never	1 (5.9)	Several times a week	2 (11.8)
Usage of cell phone/smartphone		Once or twice a week	2 (11.8)
Several times a day	3 (17.6)	Rarely	2 (11.8)
Once a day	4 (23.5)	Never	(0.0)
Several times a week	4 (23.5)	Screen time for leisure	
Once or twice a week	2 (11.8)	0–2 h per day	3 (17.6)
Rarely	2 (11.8)	2–4 h per day	7 (41.2)
Never	2 (11.8)	4–6 h per day	7 (41.2)
Usage of computer		Screen time for educational purpose	
Several times a day	5 (29.4)	0–2 h per day	8 (47.1)
Once a day	4 (23.5)	2–4 h per day	5 (29.4)
Several times a week	4 (23.5)	4–6 h per day	2 (11.8)
Once or twice a week	(0.0)	11 or more hours per day	2 (11.8)
Rarely	4 (23.5)		
Never	(0.0)		

Children's awareness of the advertisements

Overall, the major themes that emerged from the data related to children's awareness were understanding of the ad content, and a lack of brand awareness and/or familiarity with the brand. Examples of quotes for each theme are below:

*"It was about **chocolate**." (P2313, Boy, 9, AD3) – Understanding of the ad content.*

*"No, **I didn't catch the brand**." (P2304, Girl, 11, AD3) – No brand awareness.*

*"I've seen ads about milk, but **I don't know if it was exactly the same company**."*

(P2304, Girl, 11, AD3) – Unfamiliar with the brand

Most of the children were able to clearly articulate the main message of the advertisement and identify the product being promoted and this was consistent for both child-targeted and non-child-targeted ads. However, the child-targeted advertisement AD2 exhibited the lowest occurrence of this pattern, possibly due to the nature of the product being advertised. While the advertisement promoted milk, its main character—a boy made of a cookie—may have led some children to mistakenly perceive cookies as the advertised product rather than milk.

Most children had "no brand awareness" and were "unfamiliar with the brand", as expected due to brands being from out of the country, with one child not knowing the meaning of brand and couldn't answer the questions, even when asked in different ways about who created the ad:

*"Maybe **people that made chocolate and milk**?" (P2303, Girl, 7, AD1).*

Children's attitudes towards the advertisements

The main theme that emerged from the data for children's perceptions of the ads was "positive perception of the ad".

*"Well, **I liked it that it was at a circus, and it was a good background. So, I like this advertisement about the chocolate**" (P2311, Girl, 10, AD1).*

This theme emerged among both child-targeted and non-child-targeted ads. This theme was not commonly expressed in AD2; some children found the cookie character unsettling, describing it as "creepy" or "disturbing" when its head crumbled in the ad. Other participants found the ad confusing due to the focus on the cookie instead of the milk.

*"It was funny, but **not really** [didn't like the ad]. I thought that it was kind of **creepy**." (P2307, Girl, 8, AD2).*

*"**I didn't really like the design of the cookie. The cookie didn't really look. It looked like something else when the head came off, the cookie, it just looked weird like a new one.**" (P2311, Girl, 10, AD2).*

The main reasons children gave for liking the ad was (i) seeing people in the ad eating the product, (ii) positive emotional appeal, (iii) pre-existing affinity with the product, and (iv) visibility of the product. The presence

of these themes was similarly frequent among child-targeted and non-child-targeted ads. However, children described “visibility of the product” and “people in the ad eating the product” more for AD1 (milk chocolate ad), possibly because the person consuming the product was a child actor and that in the end of the ad different flavors of the chocolate appear as options for consumers. Examples of quotes for each theme are below:

*“Because **I like to eat chocolate**. And it tastes good.” (P2314, Girl, 6, AD3) - pre-existing affinity with the product.*

*“Because it has a lot of colors and **like a lot of the chocolate involved in in the in the in the ad**.” (P2311, Girl, 10, AD1) - visibility of the product and pre-existing affinity with the product.*

*“Because they had milk, and **I like milk**.” (P2302, Boy, 8, AD4) - visibility of the product and pre-existing affinity with the product.*

*“When he gave the boy, the chocolate, the milk chocolate. He felt better, and then, **like they were eating it all happy**.” (P2308, Girl, 10, AD1) - people in the ad eating the product and positive emotional appeal.*

*“When **she bit into the chocolate**. It’s kind of like telling everyone like, and **then she smiled** like, it’s good, right?” (P2323, Girl, 9, AD3) - people in the ad eating the product and positive emotional appeal.*

Children’s purchase intent

Overall, the major themes that emerged from the data for children’s purchase intent were “negative purchase intent”, related to “pre-existing aversion to the product” and “preference for other brand/type” regardless of whether the ad was child-targeted or non-child-targeted. Children expressed higher “negative purchase intent” and “pre-existing aversion to the product” for both ads for milk (AD2 and AD4) and AD3 (dark chocolate), however, they expressed higher “positive purchase intent” related to “previous affinity with the product” for AD1 (milk chocolate ad). The prevalence of negative purchase intent on ads that children had a positive perception of was primarily driven by their preference for other brands/type of product. Examples of quotes for each theme are below:

*“Um, **I don’t really like chocolate**” (P2301, Girl, 9, AD1).*

*“Because I don’t, **I don’t like milk**.” (P2308, Boy, 10, AD2).*

*“Cause as I mentioned before, **I don’t like dark chocolate**.” (P2313, Boy, 9, AD3).*

*“**There are other brands. I like the best**” (P2304, Girl, 11, AD1).*

*“I feel like there’s a lot of **other chocolates that are better** with like, like caramel filling, or stuff like that” (P2322, Girl, 11, AD3).*

When children were asked what elements in the ad makes them want to buy the product or ask their parents to buy it for them, they described that it was because people were shown consuming the product and because they had a pre-existing affinity with the product. For children who had negative purchase intent (or no intention of asking their parents to buy it for them), the participants emphasized that they had a pre-existing aversion to the product. Again, these themes did not differ between child-targeted and non-child-targeted ads.

*“When **she opened it. It looks really good**.” (P2305, Boy, 9, AD3).*

*“**I just like chocolate**. And um when I see it, I want it.” (P2310, Girl, 10, AD1).*

*“Cause as I mentioned before, **I don’t like dark chocolate**” (P2313, Boy, 9, AD3).*

Children’s perceived targeted audience

When asked who the product was for, most children considered the type of product over the marketing techniques used in the advertisement. Children described that the product was for everyone or was for people that like the product. Children considered that anyone can drink milk or eat chocolate, and that those products are also for people who already have an affinity with them. These themes also had no difference between child-targeted and non-child-targeted ads.

*“I saw a lot of people drink milk before. So, I think it’s **meant for everyone not specifically kids**.” (P2313, Boy, 9, AD2).*

*“I think it’s **for all ages**, because it’s milk, **everybody can drink milk**” (P2320, Boy, 10, AD2).*

*“**People who like to drink milk**.” (P2311, Girl, 10, AD4).*

*“It could be **for everyone**, depends on what chocolate they like.” (P2322, Girl, 11, AD3).*

Some children considered the product for children and these answers varied between child-targeted ads versus non-child-targeted ads, however, since the nature of the product was so different (AD1 – milk chocolate; and AD3 – dark chocolate), it is possible that these themes were based on the product rather than the advertising techniques. Some children described milk chocolate as a product for children and some children considered dark chocolate for adults. For AD4 (milk, non-child-targeted) only one girl responded that it was for adults (with no

explanation) and two other girls considered it for adults because they are who make the purchases at home. But some children took the question very literally and said that the product was for the main character in the advertisement.

*"I think **mostly kids and like teenagers** will buy it." (P2310, Girl, 10, AD1).*

*"Probably **more towards adults**. because, you know, kids don't eat that much dark chocolate it's all milk these days." (P2308, Boy, 10, AD3).*

Children's screen time habits and purchase intent

Children who expressed favorable reactions to at least one food advertisement—such as "positive perception of the ad", and "positive purchase intent"—were predominantly between 9 and 11 years of age, female, and from households reporting financial difficulties. These children also exhibited high levels of daily screen use, especially for leisure purposes, and engaged with various digital devices, including smartphones, tablets, and television.

Discussion

Overall, most children's perceptions did not differ between the child-targeted ads and non-child-targeted ads. Rather, they differed according to the product advertised. Children's purchase intent did not differ regardless of the target audience of the ad. Many children reported having a pre-existing aversions to milk and dark chocolate, therefore they presented negative purchase intent and did not report the marketing techniques used in the ad as the reason for not desiring to purchase the product. Children who said they did not like milk said they would not buy the product regardless of whether it was a child-targeted ad or non-child-targeted ad. These findings align with previous research indicating that advertisements promoting familiar food products tend to generate notably stronger responses among children, including increased product preference, heightened purchase intentions, and greater likelihood of requesting the advertised items [51]. Similarly, children's perception of the target audience was also related to the product rather than the ad being child-targeted or non-child-targeted. Most children described the product advertised as suitable for anyone or for people who like such products. However, some difference was noted between milk chocolate (AD1) and dark chocolate (AD3) ads because some children considered milk chocolate as a product for children and dark chocolate as a product for adults. Once more, the marketing techniques were not mentioned as a reason for their perception of the target audience.

An important finding from this study is that all participating children expressed "positive perception of the ad"

for at least one advertisement, regardless of whether it was child-targeted or non-child-targeted. Notably, most children expressed a positive perception of two or more ads. The primary reasons for their positive perception were people in the ad eating the product, positive emotional appeals, pre-existing affinity with the product, and visibility of the product. Their positive attitudes toward the ads were thus product-driven, even in cases where they were unfamiliar with the brand. Previous research indicates that children, even when capable of identifying food ads and their persuasive intent, remain receptive to these ads due to their preference for the marketed food items [52].

However, even though most children had positive attitudes towards the ads, most children expressed negative purchase intent, which was also influenced by the product itself. As previously mentioned, some children expressed pre-existing aversion to milk and dark chocolate, leading to negative purchase intent, while others who initially expressed affinity for the product still showed a preference for other brands/products naming brands that they prefer or other flavours that they would prefer buying. The major theme related to the reason for positive purchase intent was people in the ad eating the product and pre-existing affinity with such products. These findings suggest that the product itself and the brand, rather than the specific marketing techniques used, drives children's purchase intent as well. Whether the advertisement targeted children or not was less relevant; familiarity with the product was the critical factor.

The findings suggest that children who responded more favorably to food advertisements—expressing positive perception of the ad, and positive purchase intent—were primarily between the ages of 9 and 11, female, and from households reporting financial difficulties. These children also reported high levels of screen time for leisure, with frequent use of multiple digital devices, including smartphones, tablets, and television. This pattern aligns with existing literature indicating that children from lower socio-economic backgrounds may be more vulnerable to persuasive advertising due to greater media exposure and fewer resources for critical media literacy [10, 53]. Moreover, studies have shown that older children within the pre-adolescent age group demonstrate increasing brand awareness and consumer autonomy, making them more responsive to advertising messages [54, 55]. The combination of age, high screen exposure, and socioeconomic vulnerability may amplify children's receptiveness to marketing cues and reinforce existing consumption behaviors, particularly when exposed to advertisements for familiar foods. These findings underscore the importance of addressing screen time behaviors and socio-demographic factors in future food marketing regulations and interventions.

For the perceived target audience, the findings remained consistent with the effects of food advertising on children: the primary factor influencing children's perceptions was the product advertised, rather than the marketing techniques employed. While the literature [20–22] and policy makers looking to restrict food advertising to children might classify ads AD1 and AD2 as child-targeted and AD3 and AD4 as non-child-targeted, these distinctions were irrelevant to the participants. For instance, children perceived ads for chocolate as suitable for everyone, or they focused on milk chocolate (AD1) as more specifically for kids, while dark chocolate (AD3) was considered more appropriate for adults. Similarly, milk (AD2 and AD4) was viewed as a product for everyone. This perception persisted regardless of the marketing techniques used. Ads AD1 and AD2, which incorporated child-oriented techniques such as animation, music, and the presence of characters appealing to children, did not lead to a stronger identification of the intended audience as children than AD3 and AD4, which employed adult-oriented strategies, such as settings associated with adults (e.g., a bar) or celebrities familiar only to adults. The determining factor for children was the product itself. If the product was commonly associated with kids (e.g., milk chocolate), adults (e.g., dark chocolate), or all age groups (e.g., milk), children assumed the advertisement was directed at the corresponding audience.

These findings suggest a potential mismatch between current food advertising regulations, such as the self-regulatory Code for the Responsible Advertising of Food and Beverage Products to Children, the proposed Health Canada regulations, and Quebec's Consumer Protection Act, which all focus on child-targeted and child-appealing food advertising. Existing policies predominantly focus on identifying ads explicitly directed at children, often based on set list of marketing techniques designed to identify the intention of the ad and the company selling the product. However, if children prioritize the product over the marketing intent, it makes it difficult to reliably determine whether an advertisement targets them. Moreover, as previously noted, children are more likely to desire and consume products they already know and enjoy. The results suggest that food advertising regulations that prioritize the nutritional quality of the advertised products rather than solely focusing on the intent behind the marketing may be more likely to reduce the influence of unhealthy food ads on children's preferences and purchasing intentions. Reducing exposure to unhealthy food and beverage advertising would reduce the stimuli for the consumption of such products. This requires a shift toward regulating ads for products with low nutritional value, accompanied by the implementation of a robust and comprehensive classification

system to assess the healthfulness of such products. This approach aligns with the goals of the United Kingdom's new regulation [34], which will prohibit all paid food and beverage advertising of unhealthy products online and on television before 9pm [34]. Evaluation of such policies will be critical and could provide evidence to encourage other countries to follow suit.

Strengths and limitations

This study presents several notable strengths that increase its validity and richness. Firstly, the inclusion of one-on-one interviews with 17 children aged 6 to 11 years allowed for a comprehensive understanding of children's perspectives. The diverse age range facilitated the capture of a variety of viewpoints, ensuring a more holistic representation of the population. Additionally, the wide range of questions per advertisement permitted a comprehensive exploration of children's perspectives. The inclusion of various scenarios—targeted ads for children, adults, healthy, and unhealthy food products—allowed for a comprehensive examination of the different types of advertising and how it affects children.

Despite these strengths, there are a few limitations that must be acknowledged. One notable limitation is the ethnic composition of the sample. Due to the convenience sampling method, the study included a higher percentage of Latino participants (47.1%) compared to the Canadian population, where Latinos account for only 1.6% [56]. This discrepancy arose from the study's recruitment strategy, which relied on social media posts and the principal investigator's background, potentially influencing the algorithm to deliver posts primarily to Latino users. While this limitation may affect the generalizability of the findings to other ethnic groups, it is important to note that the sample still reflects diverse viewpoints within the Latino community. Future studies should aim to recruit more ethnically representative samples that reflect the broader Canadian population to enhance the generalizability of findings across diverse cultural groups. Employing stratified or purposive sampling methods may help ensure greater diversity in participant demographics, particularly in terms of ethnicity and cultural background.

Another limitation is the socio-economic status of the participants. A significant portion of parents reported financial difficulties, which could be attributed to the study's convenience sampling method. While this may limit the broader applicability of the findings to higher-income groups, it also provides valuable insights into the perceptions of children from lower socio-economic households, an often-underrepresented group in food advertising research. Additionally, future research should consider incorporating socio-economic diversity more systematically. While this study provided valuable

insights from children in lower-income households—an often underrepresented group in food advertising research—additional studies are needed to explore how children from varied income levels perceive and respond to food marketing, particularly given the potential influence of socioeconomic context on media consumption and food preferences.

The online format of the interviews, necessitated by the timing of the study during the end stage of the pandemic, introduced some technical challenges. Variations in internet connection quality at times led to disruptions in the video quality, which may have impacted the participants' engagement with the interview process. Although these issues were beyond the researcher's control, they represent a potential source of bias that could have influenced the children's responses.

One limitation of this study is that pilot interviews were not conducted with children prior to data collection. As a result, the interview guide was not pre-tested for clarity, comprehension, or age-appropriateness, which may have affected the consistency or depth of responses in the initial interviews. Although the selection of ads was reviewed and approved by multiple researchers, post-data collection analysis revealed that children interpreted one advertisement (AD2) differently than anticipated. AD2 featured an unconventional narrative that appeared to influence children's perceptions; several participants reported that they did not enjoy the advertisement, with some even describing it as "creepy." This reaction contrasted with the interpretation of the adult researchers, who did not perceive the advertisement in the same way during the selection process. Although the selection criteria focused on marketing techniques appealing to children, it is possible that a different advertisement with similar marketing techniques might have yielded different results. In AD2, the central character was a cookie-shaped boy, which led some children to interpret "cookies" as the primary product being advertised. Since cookies are typically classified as unhealthy food items, this characterization may have introduced confounding effects in the ad. Additionally, the product selection was based on familiar food items (milk and chocolate), which may have influenced children's preferences. The lack of unfamiliar products in the study presents a limitation, though it is acknowledged that identifying suitable ads for unfamiliar products would have been a difficult task. As a result, we focused on brands that were unfamiliar to children. Future research should seek to include a wider range of healthy and unhealthy food products to further explore children's perceptions and responses across diverse food categories. Lastly, the marketing techniques selected as child-targeted or non-child-targeted were related to the ad and not the products. It is impossible to know, based on this study, if the use of marketing

techniques within the products (e.g. animal shapes, child appealing flavour, etc.) would affect the results and how it would impact children's preferences.

A potential limitation of this study relates to the variation in advertisement length. Two of the ads were approximately 30 s long, while the other two lasted about one minute. However, to minimize the potential impact of this variation, the length of advertisements was matched within food categories: both unhealthy food ads were 30 s in duration, and both healthy food ads were one minute long. This approach aimed to support a balanced comparison of children's responses within each nutritional category. Nonetheless, differences in exposure time may have influenced levels of attention, recall, or engagement, particularly when comparing across categories. These factors should be taken into account when interpreting the findings. Future studies might consider producing or selecting ads of equal length across all categories to eliminate this potential source of variation while still meeting content and targeting criteria.

Conclusions

This study highlights the pivotal role of the product itself in shaping children's responses to ads. The findings demonstrated that children's attitudes and perceptions toward the ads and their desire to purchase or request the products were primarily influenced by their familiarity with and preference for the advertised product. Those outcomes were not to be related to the marketing techniques employed in the advertising. Moreover, children's perception of the intended audience of an advertisement was also guided by the product's typical consumer base on their point of view, rather than by the advertisement's marketing techniques.

These findings underscore that, for this sample of children, the product being advertised outweighed the influence of specific marketing techniques. This insight carries significant implications for public policy and advertising regulations. Efforts to protect children from the promotion of unhealthy eating habits that regulate ads based on the healthfulness of the products themselves rather than focusing on the marketing techniques or the intended target audience of the ads, may be more likely to have a greater effect of reducing marketing influence. Such an approach would more effectively address the root cause of children's vulnerability to unhealthy food marketing and contribute to fostering healthier dietary habits among this demographic.

Abbreviations

WHO	World Health Organization
UPFs	Ultra-processed Foods
Ads	Advertisements
UK	United Kingdom
CPA	Consumer Protection Act

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12889-025-24281-z>.

Additional file 1. Interview script for study: *"The power of product: how food advertising affects children's perceptions of child and non-child targeted food advertising?"*.

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Authors' contributions

Authors JSG and MPK conceptualized the study and recruitment protocol. JSG participated in review of study materials and data collection. SS transcribed the audio. JSG and MP coded the transcripts. JSG wrote the first draft of the manuscript and co-authors MP, SS, LV, TR, CE, and MPK revised it to make the final manuscript. All authors have approved the final manuscript.

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Data availability

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study was approved by the University of Ottawa's Health Sciences and Science Research Ethics Board H-04-22-8028, and conducted in accordance with the Declaration of Helsinki. This statement is included in the manuscript within the methods section. Eligible participants were sent informed consent (for parents) and assent (for children) forms electronically, alongside a brief study description. Verbal parental consent and child assent were obtained once more at the beginning of the video call after a brief description of the study. This too can be found in the methods section.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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Study 3: The relationship between parent’s self-reported exposure to food marketing and child and parental purchasing and consumption outcomes in five countries: findings from the International Food Policy Study

Approach

The third and final study investigated the association between parents' self-reported exposure to unhealthy food and beverage marketing and various outcomes related to children's preferences for, and consumption of, nutritionally poor products. It also explored cross-country differences in these associations across five national contexts. The results indicate that greater parental exposure to unhealthy food marketing is linked to several outcomes that may indirectly elevate children's exposure to unhealthy foods or their marketing. Specifically, higher levels of reported parental exposure were associated with increased likelihood that children possessed toys from fast-food outlets or merchandise branded with logos of unhealthy food products. In addition, children whose parents reported more frequent exposure were more likely to request food items featuring licensed characters or brand mascots, and parents were more inclined to fulfill these requests through purchase. These findings suggest that even when not directly targeted, parental exposure to unhealthy food marketing can influence household food purchasing decisions in ways that impact children's dietary habits and health outcomes.

Importantly, parents may not be fully aware of the extent to which marketing shapes their purchasing behaviours or contributes to their children's familiarity with, and desire for, unhealthy products. As such, these behaviours may unintentionally support the normalization of unhealthy food consumption among children.

The implications of this study are significant for public health policy and regulation. In particular, it underscores the importance of considering the broader effects of food marketing—

not only advertisements explicitly targeting children, but also those that reach adult audiences who make purchasing decisions for children. Regulatory frameworks may need to expand their focus to include general advertising environments that influence caregivers. Furthermore, this exploratory research provides a foundation for future inquiry. It suggests new avenues for hypothesis generation and points to the need for rigorous experimental studies that more directly examine the causal pathways between parental exposure to food marketing and children's consumption patterns and preferences.

Author's Contribution

My contribution included the development of the research question with the help of my supervisor, data cleaning, statistical analysis with help from co-authors, interpretation of the data, and drafting of the tables and manuscript.

Knowledge Translation

This research was published in the Journal of Nutritional Science in 2023. The final article was disseminated to members of Health Canada and the Heart and Stroke Foundation and was also shared through the author's social media channels. Part of the study also was presented at the 2021 INFORMAS eSymposium, online, on October 12, 2021.

RESEARCH ARTICLE

The relationship between parent's self-reported exposure to food marketing and child and parental purchasing and consumption outcomes in five countries: findings from the International Food Policy Study

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Abstract

Food and beverage marketing influences children's food preferences and dietary intake. Children's diets are also heavily influenced by their family environment. The aim of this study was to assess the relationship between parent's self-reported exposure to unhealthy food marketing and a range of outcomes related to children's desire for and intake of unhealthy foods and beverages. The study also sought to examine whether these outcomes varied across different countries. The analysed data are from the International Food Policy Study and were collected in 2018 using an online survey. The sample included 5764 parents of children under 18, living in Australia, Canada, Mexico, the United Kingdom, or the United States. Binary logistic regressions assessed the link between the number of parental exposure locations and children's requests for and parental purchases of unhealthy foods. Generalized ordinal regression gauged the relationship between the number of exposure locations and children's consumption of such items. Interaction terms tested if these associations varied by country. Parental exposure to unhealthy food marketing was positively associated with parents reporting child purchase requests and purchase outcomes; and differed by country. Increased parental exposure to unhealthy food marketing was associated with slightly lower odds of children's weekly consumption of unhealthy foods, and this association varied by country. In conclusion, parental report of a greater range of food marketing exposure was associated with a range of outcomes that would increase children's exposure to unhealthy food products or their marketing. Governments should consider developing more comprehensive restrictions on the marketing of unhealthy foods.

Key words: Children: Food environment: Food policy: Marketing: Parents

Introduction

Children's diets are heavily influenced by their family environment and parents play a critical role in shaping child dietary behaviours.^(1,2) A review published in 2018 showed that parental food habits are the most relevant factor influencing children's food choices.⁽²⁾ An extensive body of research has also shown that unhealthy food marketing influences child

food preferences,^(3,4) immediate intake,^(3,4) request to parents,⁽⁵⁾ and obesity prevalence.^(6,7) Food marketing viewed on television, in digital media, outdoors, and in a variety of settings is predominantly for unhealthy products (e.g. ultra-processed food and beverages that are typically high in sugar, fat, and salt).^(8–10) Food marketing uses numerous advertising techniques that increase its persuasive power. A

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global benchmarking of television advertising conducted across twenty-two countries, found that amongst sixteen countries (including Canada, Australia, Mexico, among others), three out of ten food and beverage advertisements contained promotional characters, and two out of ten contained premium offers (e.g. competitions, games).⁽⁹⁾ Such advertising and the techniques used in this advertising constitute a stimulus for consumption^(4,11–13) and can have a negative impact on both child and adult health.^(7,13,14) A recent study found that a large proportion of adults in Australia, Canada, Mexico, the United States, and the United Kingdom reported being exposed to unhealthy food marketing on television and digital marketing, and to spokes-characters and licensed characters featured in food advertising.⁽¹⁵⁾

The behavioural and health outcomes stemming from exposure to food marketing are directly determined by the food environment in which people are immersed and that varies by country. Policies that restrict unhealthy food marketing can positively impact the food environment.^(16,17) Many jurisdictions have started to implement policies aimed at reducing children's exposure to food marketing, to improve their dietary behaviours, and to reduce and prevent child obesity. In Canada, the province of Quebec implemented regulations to protect children from all commercial advertising in a variety of media and child settings in 1980.⁽¹⁸⁾ The United Kingdom adopted legislation prohibiting food advertising targeting children on television in 2007, specifically targeting children under 16 years.⁽¹⁹⁾ Mexico, for its part, introduced regulations to limit food advertising targeted at children on television and in movie theatres, in 2015,⁽²⁰⁾ and banned characters in unhealthy food packages since 2020.⁽²¹⁾ Other countries, such as the United States, most of Canada, and Australia, primarily rely on voluntary marketing restrictions developed by industry, which has been shown to have no impact.^(22–25) Importantly, most restrictions (government statutory regulations or industry self-regulatory codes) do not specifically aim to reduce adult exposure.

Though much research has demonstrated the relationship between food marketing and children's food intake and other outcomes, very few studies have examined the impact of parental exposure to food marketing on their own purchases or on children's health. Experimental studies have found that advertising and certain marketing techniques can influence the desirability, acceptability, and perceived healthfulness of unhealthy food products among parents,^(26,27) which could in turn influence their purchasing behaviour and their children's food intake. For instance, Pettigrew *et al.*⁽⁵⁾ found that parents with children aged 8–14 years exposed to television and digital energy-dense food advertisements viewed promoted products more positively, wanted to consume these products more, and thought they could be eaten more often when compared to parents who were only exposed to static pictures of the same products.⁽²⁷⁾ Another study found that parental and child exposure to food advertisements were positively associated with child requests for unhealthy food products.⁽⁵⁾ Those findings are relevant because if advertising is able to portray unhealthy foods as more desirable or acceptable to parents then there is reason to think it might influence

their purchases, which in turn might influence child intake. Little is known about whether parental exposure to unhealthy food marketing is associated with other behaviours like child purchase requests and actual purchases that may influence consumption of unhealthy products, such as fast food, sugary drinks, and snacks. However, such parental exposure has been discussed as a proxy for child exposure given that children and parents are frequently in the same environments during exposure.⁽²⁸⁾

The objective of this study was to assess the relationship between parent's self-reported exposure to unhealthy food marketing and children's purchase requests, parental purchases, and children's intake of unhealthy food and beverages. The study also sought to examine whether these behavioural outcomes varied across Australia, Canada, Mexico, the United Kingdom (UK), and the United States (US). We hypothesized that parent's self-reported exposure to unhealthy food marketing would be positively associated with children's ownership of fast-food toys and branded merchandise, purchase requests for unhealthy food with licensed characters or spokes-characters, and parental purchasing of unhealthy foods with licensed characters or spokes-characters, and children's consumption of unhealthy food and beverages. We also hypothesized that these outcomes would likely vary by country.

Methods

Sampling

Data were from the 2018 wave of the International Food Policy Study (IFPS) adult survey, collected in November/December 2018. Online surveys were completed by 22 824 respondents from five countries: Australia, Canada, Mexico, the UK, and the US.⁽²⁹⁾ The sample was recruited from the Nielsen Consumer Insights Global Panel using standardized recruitment sampling across countries. Nielsen drew random samples stratified for age and sex from the online panels in each country. The eligibility criteria included being 18 years of age or older and residing in the target country. All potential respondents were provided with information about the study and were asked to provide consent before participating.⁽²⁹⁾ Ethics approval for the data collection was received by one of the University of Waterloo's Research Ethics Committees (ORE # 21460) and this secondary analysis received clearance from the University of Ottawa's research ethics board (ethics file number H-06-20-5886).

For this study, a subsample from the IFPS was used. Individuals with children under 18 years old were included in the study while those that reported not having children or having children 18 years old or older were excluded.

Parental exposure to unhealthy food and beverage marketing

In the survey, parents were asked whether they had seen or heard any advertisements or promotions for 'unhealthy foods' in the last 30 days (30 d) by media and setting. These included television; radio; online/internet; mobile app/video



game; social media; in a text message; magazine or newspaper; billboard or outdoor sign; on buses, bus stops, and other public transport; in movies or at the movie theatre; at school/campus; signs or displays in supermarkets, convenience stores, or restaurants; at a recreation/community centre; sports event, concerts, or community event; giveaways, samples, or special offers and other. In the survey, 'unhealthy foods' were described as 'processed foods high in sugar, salt, or saturated fat, such as soda/pop, fast food, chips, sugary cereals, cookies, and chocolate bars.' Respondents had the option to select as many locations or sources of exposure as they recalled. A summary exposure measure representing the number of locations parents reported being exposed to unhealthy food marketing was then calculated. This measure, which could range between 0 and 15, was treated as a continuous variable in the modelling analyses.⁽³⁰⁾

Purchasing requests outcomes and purchasing outcomes

Purchase request outcomes included child request of unhealthy food products with (i) licensed characters and (ii) spokes-characters in the last 30 d. Purchase outcomes included children's ownership of toys from fast-food restaurants (any toy that comes with the purchase of a fast-food meal), children's ownership of branded merchandise with logos for unhealthy food products (any item such as clothing, posters, and stickers that show the logo of an unhealthy food or drink brand), and parental purchase of unhealthy food products with (i) licensed characters and (ii) spokes-characters for their child in the last 30 d. For all outcomes, parents responded 'yes', 'no', 'don't know', or 'refuse to answer'. The wording for these measures is available in Supplementary Table 1.

Child consumption of unhealthy food and beverages

To assess children's weekly consumption of unhealthy food and beverages, parents were asked in a typical week how often their children ate or drank the following items: sugary drinks; fast food; sugary cereals; snacks such as chips; desserts, such as cakes, cookies, and ice cream; and candy or chocolate bars. Response options included more than once a day; every day; a few times a week, but not every day; once a week; only on special occasions; and never. To facilitate analyses and the interpretation of our results, responses were collapsed into three categories: high consumption (more than once a day, or every day), moderate consumption (a few times a week, but not every day, or once a week), and low consumption (only on special occasions, or never).

Socio-demographic characteristics

A range of socio-demographic variables based on or adapted from national census measures in all countries were included in the study. Participants self-reported sex at birth (male or female) and age categorized as 18–29, 30–44, 45–59, and ≥60 years old. Education was classified as low, medium, or high following criteria specific to each country, according to the highest level of education completed.⁽²⁹⁾ For instance in

Canada, low meant less than a high school diploma or high school diploma, medium meant trade certificate/diploma/some university (below bachelor's level), and high meant bachelor's degree or more.⁽²⁹⁾ For ethnicity, adapted census measures specific to each country were used, and participants were classified as 'majority' if they identified themselves as 'white', predominantly English-speaking, or non-indigenous (criteria terminology varied by country according to what was most appropriate). For perceived income adequacy, parents self-reported how easy it is for them to 'make ends meet' based on their monthly income (very difficult, difficult, neither easy nor difficult, easy, or very easy). Parents reported the age of each child under the age of 18 for up to 10 children. Data were coded such that three binary variables were created denoting the presence of any children under the age of 6, children aged 6–12 years, and children aged 13–17 years.

Statistical analysis

Statistical analyses were conducted using Stata 14.2. Descriptive analyses (percentages and means) were used to describe the sample characteristics and variables of interest. Binary logistic regressions were used to evaluate the association between parental exposure and country with the dichotomous outcome variables (child ownership of toys from fast-food restaurants, child ownership of products with unhealthy food brand logos, child food purchase requests, and parental purchase of unhealthy food products with licensed characters or characters created by the company). After testing for proportional odds, it was observed that the effects of the country variable and exposure on ordinal outcome variables (children's weekly consumption of unhealthy food and beverages) were not consistent across the different thresholds. As a result, generalized ordinal logistic regression was used to assess the association between parental exposure and country with the ordinal outcome variables. Interaction terms were then included in models to test if the association between parental exposure and examined outcomes differed by country. While the cross-sectional design of this study limits our ability to infer a causal relationship between exposure and outcomes, examining whether these associations are consistent across different contexts will help to evaluate whether these associations are likely to be causal. Country-stratified binary logistic and ordinal regressions were then conducted to assess how the relationship between parental exposure and examined outcomes differed between countries. All models used Canada as the country of reference.

Models were adjusted for child age and parental sex at birth, age (categorical), perception of income adequacy, education, and ethnicity. The *P*-values from the regression models used the Benjamini–Hochberg procedure to control the false discovery rate which was applied to decrease the number of Type 1 errors (false positives). Data were weighted with post-stratification sample weights constructed using a raking algorithm with population estimates from the census in each country based on age group, sex, region, ethnicity (except in Canada), and education (except in Mexico).⁽²⁹⁾ All analyses applied the complex survey analysis commands.



Results

Sample characteristics

A total of 22 824 participants responded to the IFPS surveys. Respondents that reported not having children or only having children 18 years old or older were excluded from the dataset (n 16 019 participants excluded). Also excluded from analyses were participants who responded 'don't know' or 'refuse to answer' to questions pertaining to child ownership of toys from fast-food restaurants and branded merchandise with logos for unhealthy food products, child request of unhealthy food products with licensed characters or spokes-characters, parental purchase of unhealthy food products with licensed characters or spokes-characters, or weekly consumption of unhealthy food and beverages; and those for whom level of education and ethnicity were coded as 'not stated', or perceived income adequacy level coded as 'don't know' or 'refuse to answer' (total of n 1041 participants excluded). The final analytical sample size was 5764 parents. Table 1 describes the sample characteristics, stratified by country (unweighted sample characteristics can be seen in Supplementary Table 2). The differences in socio-demographic characteristics and the prevalence of outcomes between parents in the analytical sample and those excluded were not statistically significant (data not shown). As such, we opted against imputing missing values in our analysis.

Purchase request and purchase outcomes

As shown in Fig. 1, overall, more than half of parents (55.2 %) reported that their children owned toys from fast-food companies; 44.9 % reported that their children requested unhealthy food products with spokes-characters in the previous 30 d; in addition, 41.2 % of parents reported they purchased unhealthy food products with spokes-characters for their children. Amongst the five countries, Mexican parents consistently reported the highest levels of ownership of fast-food toys, child requests, and parental purchases of food products with spokes-characters (62.9, 68.1, and 60.5 %, respectively). The US had the highest percentage of parents reporting that their child owned branded merchandise from a food company (24.8 %).

Child intake of unhealthy food and drink products

Weekly consumption of unhealthy food and beverages among participants' children is shown in Fig. 2. Overall, 48.9–60.6 % of parents declared that children had a 'moderate' (a few times a week, but not every day and once a week) consumption of sugary drinks (48.9 %), fast-food (50.2 %), sugary cereals (54.4 %), snacks such as chips (60.6 %), desserts, such as cakes, cookies and ice cream (60.5 %), and candy or chocolate bars (59.4 %). The food consumed in 'high' amounts (more than once a day, or every day) most frequently within a country was snacks (26.9 % in the UK), followed by sugary drinks (20.4 % in the US), desserts (19.0 % in the UK), sugary cereals (18.2 % in Mexico), candy or chocolate bars (17.3 % in the UK), and fast food (12.0 % in the US).

Country-level differences — purchase request and purchase outcomes

Overall, across the five countries, parents were exposed on average to marketing in 2.5 locations (SD = 2.9, Median = 2, IQR = 4), in Australia they were exposed to 2.0 locations (SD = 2.7, Median = 1, IQR = 3), in Canada to 1.7 locations (SD = 2.4, Median = 1, IQR = 3), in Mexico to 3.6 locations (SD = 3.1, Median = 3, IQR = 4), in the UK to 1.6 locations (SD = 2.2, Median = 1, IQR = 2), and in the US to 2.5 locations (SD = 2.8, Median = 2, IQR = 4).

The relationship between the number of locations where parents were exposed, country and purchase request, and purchase outcomes is presented in Table 2. In Australia, parents were less likely to report child ownership of fast-food toys (AOR = 0.760; CI = 0.602–0.958) than in Canada. In addition, child requests for unhealthy food with spokes-characters (AOR = 0.673; CI = 0.515–0.879), and purchase of unhealthy food products with spokes-characters (AOR = 0.598; CI = 0.454–0.788) were lower in Australia than in Canada. Conversely, compared to parents in Canada, those in the US and Mexico were more likely to report child ownership of branded merchandise with logos for unhealthy food products (AOR = 1.852; CI = 1.369–2.504 and AOR = 1.587; CI = 1.184–2.127, respectively), child requests for unhealthy food with licensed characters (AOR = 2.130; CI = 1.651–2.747 and AOR = 3.171; CI = 2.500–4.022, respectively), and spokes-characters (AOR = 1.778; CI = 1.386–2.280 and AOR = 3.800; CI = 3.007–4.803, respectively), and purchase of unhealthy food products with licensed characters (AOR = 2.122; CI = 1.612–2.794 and AOR = 2.416; CI = 1.866–3.127, respectively) and spokes-characters (AOR = 1.734; CI = 1.345–2.234 and AOR = 3.026; CI = 2.390–3.831, respectively).

Relationship between exposure and examined outcomes

In the adjusted models with the full sample, parental exposure to a greater number of locations was associated with all purchase request and purchase outcomes (Table 2): child ownership of happy meal or fast-food toys (AOR = 1.100; CI = 1.069–1.132); child ownership of branded merchandise with logos for unhealthy food products (AOR = 1.136; CI = 1.106–1.166); child request for unhealthy food with licensed characters (AOR = 1.206; CI = 1.175–1.239); child request for unhealthy food with spokes-characters (AOR = 1.214; CI = 1.179–1.249); parental purchase of unhealthy food products with licensed characters (AOR = 1.125; CI = 1.096–1.154); and parental purchase of unhealthy food products with spokes-characters (AOR = 1.152; CI = 1.121–1.184). Table 3 presents the association between children's weekly consumption of unhealthy food, and number of locations of parental exposure, and differences between countries. Parental exposure to a greater number of locations was associated with lower odds of parents reporting children's moderate or high consumption of sugary drinks (AOR = 0.962; CI = 0.937–0.987), fast-food (AOR = 0.946; CI = 0.922–0.970), sugary cereals (AOR = 0.959; CI = 0.932–0.987), and candy (AOR = 0.972; CI = 0.947–0.998), compared to low consumption. Parental exposure to a greater number of locations also was

**Table 1.** Sample characteristics of parents from the IFPS (2018), weighted (*n* 5764)

Variable	Total (<i>N</i> 5764)			Australia (<i>N</i> 819)			Canada (<i>N</i> 774)			Mexico (<i>N</i> 2028)			United Kingdom (<i>N</i> 1102)			United States (<i>N</i> 1041)		
	% (n)	CI (95 %)		% (n)	CI (95 %)		% (n)	CI (95 %)		% (n)	CI (95 %)		% (n)	CI (95 %)		% (n)	CI (95 %)	
Sex																		
Male	46.3 (2769)	44.8–47.8		42.9 (358)	39.1–46.7		48.7 (361)	44.6–52.8		47.0 (1045)	44.4–49.6		45.6 (518)	42.1–49.2		46.8 (487)	43.0–50.5	
Female	53.7 (2995)	52.2–55.2		57.1 (463)	53.3–60.9		51.3 (413)	47.2–55.4		53.0 (983)	50.4–55.6		54.4 (584)	50.8–57.9		53.2 (554)	49.5–57.0	
Age																		
18–29 years old	18.1 (1067)	17.0–19.4		17.0 (131)	14.3–20.2		15.7 (93)	12.6–19.5		20.9 (475)	19.0–22.9		17.6 (212)	15.1–20.5		16.3 (156)	13.7–19.3	
30–44 years old	52.8 (3137)	51.2–54.3		57.1 (443)	53.3–60.8		55.2 (430)	51.0–59.3		48.7 (1081)	46.1–51.3		52.3 (573)	48.7–55.8		55.6 (610)	51.9–59.3	
45–59 years old	26.0 (1381)	24.6–27.4		22.8 (211)	19.9–26.0		26.3 (227)	23.0–29.9		28.1 (445)	25.6–30.8		27.3 (279)	24.2–30.7		22.8 (219)	19.7–26.3	
60+ years old	3.1 (179)	2.6–3.7		3.1 (34)	2.1–4.4		2.7 (24)	1.7–4.4		2.3 (27)	1.5–3.4		2.8 (38)	1.9–4.0		5.3 (56)	3.9–7.2	
Education																		
Low	30.2 (1041)	28.6–31.8		29.7 (165)	25.9–33.7		28.9 (124)	24.6–33.6		15.3 (274)	13.4–17.4		40.0 (219)	36.2–43.9		49.1 (259)	45.3–52.9	
Medium	19.9 (1226)	18.8–21.1		33.2 (270)	29.7–36.9		36.4 (293)	32.7–40.3		12.0 (208)	10.3–13.9		24.0 (288)	21.3–26.9		7.0 (167)	6.0–8.3	
High	49.9 (3497)	48.4–51.4		37.1 (384)	33.7–40.8		34.7 (357)	31.3–38.3		72.7 (1546)	70.3–75.1		36.0 (595)	33.0–39.1		43.9 (615)	40.4–47.4	
Ethnicity																		
Majority	75.0 (4555)	73.6–76.4		68.5 (653)	64.4–72.4		73.8 (567)	70.0–77.2		75.7 (1663)	73.0–78.2		84.6 (960)	81.6–87.2		69.9 (712)	66.5–73.2	
Minority	25.0 (1209)	23.6–26.4		31.5 (166)	27.6–35.6		26.2 (143)	22.8–30.0		24.3 (385)	21.8–27.0		15.4 (142)	12.8–18.4		30.1 (329)	26.8–33.5	
Income adequacy																		
Very difficult	9.0 (428)	8.1–10.0		9.5 (69)	7.4–12.1		8.2 (53)	5.9–11.2		10.6 (176)	8.9–12.5		6.8 (61)	5.1–9.1		8.6 (69)	6.5–11.2	
Difficult	23.9 (1297)	22.6–25.2		21.1 (157)	18.0–24.6		19.2 (139)	16.1–22.8		30.3 (592)	28.0–32.8		23.9 (239)	20.9–27.1		17.5 (170)	14.8–20.6	
Neither easy nor difficult	34.2 (1968)	32.8–35.7		31.9 (261)	28.4–35.6		35.4 (267)	31.5–39.5		38.2 (789)	35.7–40.7		32.2 (347)	28.9–35.6		30.1 (304)	26.8–33.7	
Easy	22.2 (1406)	21.0–23.4		24.8 (222)	21.7–28.2		24.2 (199)	21.0–27.7		17.3 (384)	15.5–19.2		25.6 (316)	22.6–28.7		24.0 (285)	21.1–27.1	
Very easy	10.7 (665)	9.8–11.7		12.7 (110)	10.3–15.5		13.0 (116)	10.8–15.6		3.6 (87)	2.8–4.6		11.6 (139)	9.6–13.9		19.8 (213)	17.0–23.0	

CI, confidence interval.

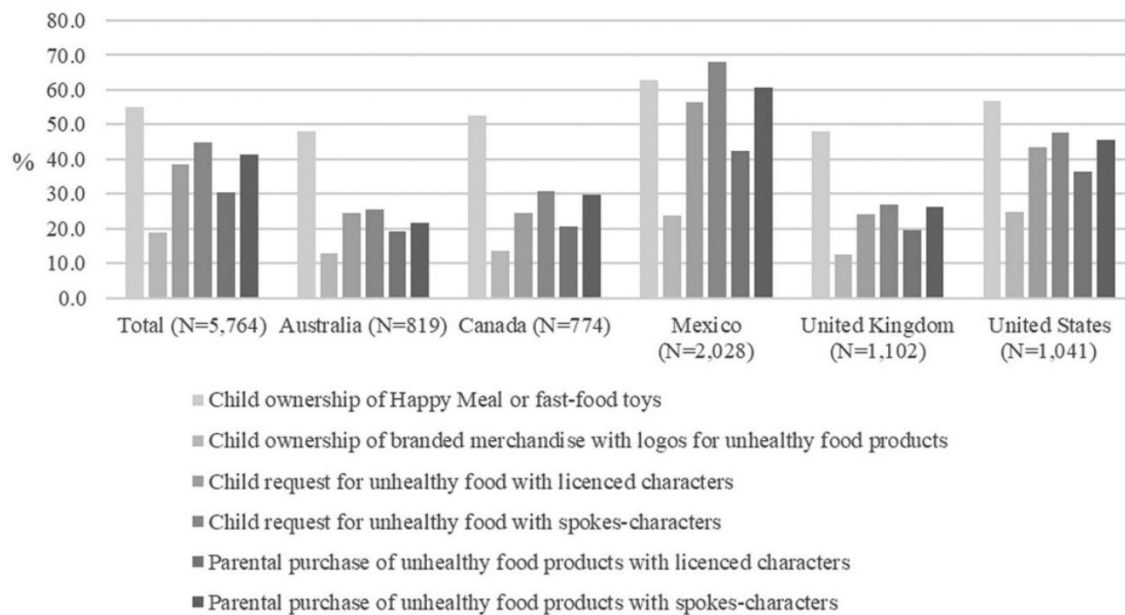


Fig. 1. Purchase intent and purchase outcomes in the last 30 d, overall, and by country (*n* 5764).

associated with lower odds of parents reporting children's high consumption of fast-food (AOR = 0.937; CI = 0.903–0.973), sugary cereals (AOR = 0.958; CI = 0.931–0.985), snacks (AOR = 0.954; CI = 0.924–0.984), dessert (AOR = 0.958;

CI = 0.928–0.990), and candy (AOR = 0.951; CI = 0.921–0.982), compared to low or moderate consumption.

Models testing the interaction between country and parental exposure to unhealthy food marketing, and its association with

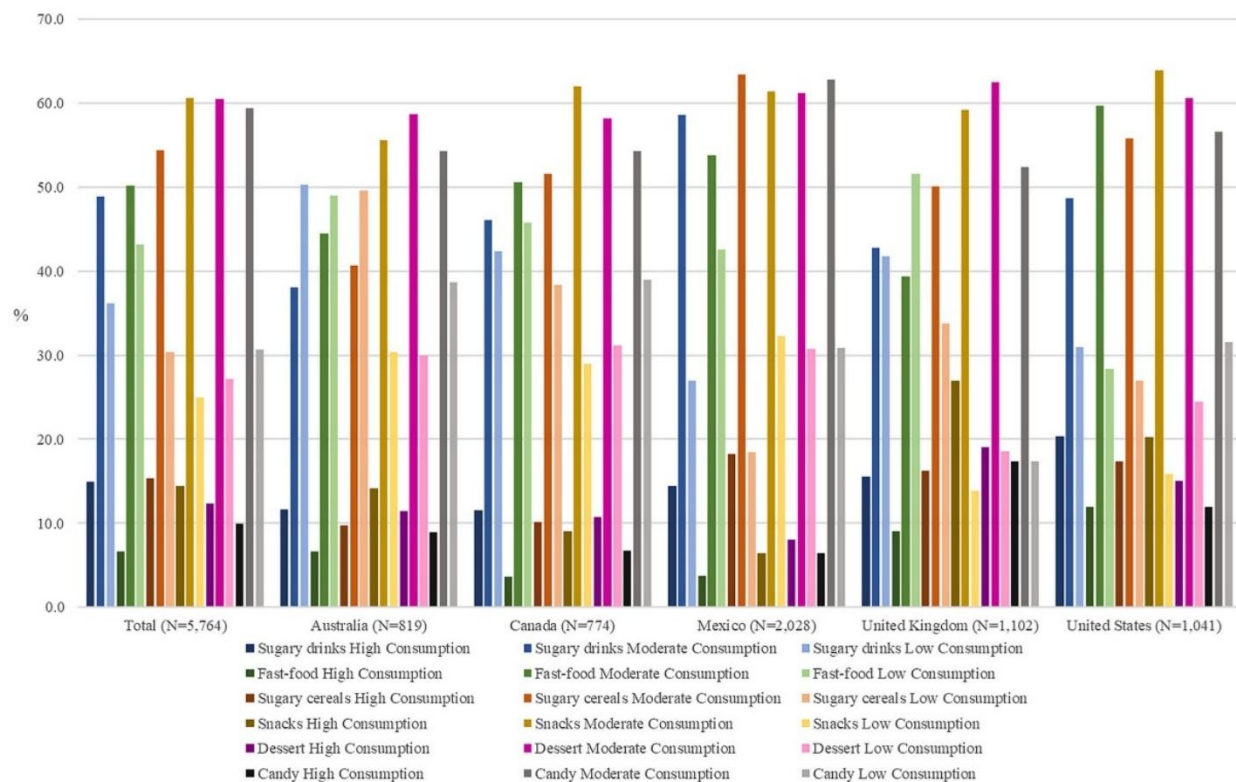


Fig. 2. Child intake of unhealthy food and drink products during the week, overall, and by country (*n* 5764).

**Table 2.** Binary logistic regression for child purchase request and parental purchase (*n* 5764)

	Child ownership of happy meal or fast-food toys		Child ownership of branded merchandise with logos for unhealthy food products		Child request for unhealthy food with licenced characters	
	AOR	CI (95 %)	AOR	CI (95 %)	AOR	CI (95 %)
Number of locations of parental exposure	1.100*	1.069–1.132	1.136*	1.106–1.166	1.206*	1.175–1.239
Country (Canada as reference)						
Australia	0.760*	0.602–0.958	0.865	0.614–1.217	0.896	0.681–1.178
United Kingdom	0.864	0.687–1.086	0.979	0.714–1.344	1.084	0.835–1.408
United States	1.155	0.911–1.466	1.852*	1.369–2.504	2.130*	1.651–2.747
Mexico	1.249	1.001–1.558	1.587*	1.184–2.127	3.171*	2.500–4.022
	Child request for unhealthy food with spokes-characters		Parental purchase of unhealthy food products with licenced characters		Parental purchase of unhealthy food products with spokes-characters	
	AOR	CI (95 %)	AOR	CI (95 %)	AOR	CI (95 %)
Number of locations of parental exposure	1.214*	1.179–1.249	1.125*	1.096–1.154	1.152*	1.121–1.184
Country (Canada as reference)						
Australia	0.673*	0.515–0.879	0.860	0.640–1.157	0.598*	0.454–0.788
United Kingdom	0.881	0.685–1.134	1.023	0.769–1.360	0.873	0.675–1.129
United States	1.778*	1.386–2.280	2.122*	1.612–2.794	1.734*	1.345–2.234
Mexico	3.800*	3.007–4.803	2.416*	1.866–3.127	3.026*	2.390–3.831

AOR, adjusted odds ratio; CI, confidence interval.

* *P*-value considered significant ($P < 0.05$) according to the Benjamini–Hochberg method; adjusted for the presence of children aged 5 years and under, 6–12 years, and 12–17 years, perceived income adequacy, and parental sex, age, ethnicity, and education.

the purchase request and purchase outcomes; and child's intake of unhealthy food products, are presented in the Supplementary Material, Tables 3 and 4. According to these

models, the association between parental exposure and all examined outcomes varies between some countries. Country-stratified models are presented in Table 4. In these

Table 3. Generalized ordinal logistic regression for intake of unhealthy food and drink products during the week (*n* 5764)

Predictor	AOR	CI (95 %)	AOR	CI (95 %)	AOR	CI (95 %)
	Sugary drinks		Fast-food		Sugary cereals	
Moderate or high consumption (low consumption as reference)						
Number of locations where parents are exposed to unhealthy food marketing	0.962*	0.937–0.987	0.946*	0.922–0.970	0.959*	0.932–0.987
Country (Canada as reference)						
Australia	1.350*	1.072–1.699	1.108	0.881–1.393	1.614*	1.281–2.034
United Kingdom	0.985	0.788–1.232	1.262	1.011–1.576	0.826	0.658–1.037
United States	0.670*	0.527–0.852	0.510*	0.401–0.648	0.668*	0.522–0.855
Mexico	0.505*	0.405–0.630	0.975	0.789–1.205	0.406*	0.322–0.514
High consumption (low and moderate consumption as reference)						
Number of locations where parents are exposed to unhealthy food marketing	0.983	0.955–1.011	0.937*	0.903–0.973	0.958*	0.931–0.985
Country (Canada as reference)						
Australia	0.996	0.692–1.433	0.554*	0.325–0.944	1.111	0.736–1.678
United Kingdom	0.687*	0.450–0.964	0.340*	0.212–0.546	0.578*	0.395–0.847
United States	0.554*	0.397–0.774	0.336*	0.213–0.531	0.661*	0.453–0.964
Mexico	0.756	0.546–0.105	1.045	0.631–1.732	0.533*	0.375–0.757
	Snacks		Dessert		Candy	
Moderate or high consumption (low consumption as reference)						
Number of locations where parents are exposed to unhealthy food marketing	0.978	0.952–1.004	0.986	0.960–1.012	0.972*	0.947–0.998
Country (Canada as reference)						
Australia	1.004	0.787–1.279	0.912	0.711–1.168	0.967	0.767–1.218
United Kingdom	0.411*	0.314–0.540	0.520*	0.400–0.674	0.329*	0.256–0.424
United States	0.473*	0.362–0.617	0.740*	0.573–0.956	0.769*	0.605–0.978
Mexico	1.137	0.908–1.423	1.069	0.852–1.340	0.709*	0.570–0.882
High consumption (low and moderate consumption as reference)						
Number of locations where parents are exposed to unhealthy food marketing	0.954*	0.924–0.984	0.958*	0.928–0.990	0.951*	0.921–0.982
Country (Canada as reference)						
Australia	0.614*	0.422–0.893	0.945	0.659–1.355	0.733	0.472–1.138
United Kingdom	0.260*	0.186–0.365	0.498*	0.363–0.684	0.323*	0.218–0.480
United States	0.449*	0.316–0.640	0.759	0.544–1.058	0.614*	0.405–0.930

AOR, adjusted odds ratio; CI, confidence interval; *p*, *P*-value.* *P*-value considered significant according to the Benjamini–Hochberg method; adjusted for the presence of children aged 5 years and under, 6–12 years, and 12–17 years, income adequacy, and parental sex, age, ethnicity, and education.



Table 4. Adjusted odds ratios describing the association between the number of locations parents reported exposure to unhealthy food marketing and examined outcomes, stratified by country (*n* 5764)

Outcomes	Canada AOR (95 %CI)	Australia AOR (95 %CI)	United Kingdom AOR (95 %CI)	United States AOR (95 %CI)	Mexico AOR (95 %CI)
Child ownership of Happy Meal or fast-food toys	1.049 (0.978–1.125)	1.219 (1.137–1.308)*	1.134 (1.059–1.215)*	1.143 (1.075–1.215)*	1.053 (1.011–1.097)*
Child ownership of branded merchandise with logos for unhealthy food products	1.210 (1.114–1.315)*	1.274 (1.162–1.397)*	1.245 (1.154–1.344)*	1.127 (1.068–1.189)*	1.070 (1.032–1.108)*
Child request for unhealthy food with licenced characters	1.237 (1.139–1.344)*	1.313 (1.224–1.408)*	1.355 (1.258–1.459)*	1.201 (1.128–1.280)*	1.128 (1.087–1.170)*
Child request for unhealthy food with spokes-characters	1.267 (1.170–1.372)*	1.293 (1.201–1.393)*	1.323 (1.233–1.420)*	1.229 (1.153–1.310)*	1.127 (1.081–1.175)*
Parental purchase of unhealthy food products with licenced characters	1.140 (1.062–1.225)*	1.241 (1.154–1.335)*	1.263 (1.171–1.362)*	1.165 (1.097–1.237)*	1.051 (1.016–1.088)*
Parental purchase of unhealthy food products with spokes-characters	1.177 (1.091–1.271)*	1.218 (1.131–1.311)*	1.255 (1.163–1.354)*	1.184 (1.114–1.259)*	1.089 (1.047–1.132)*
<i>Children's weekly consumption</i>					
<i>Moderate or high consumption (low consumption as reference)</i>					
Sugary drinks					
Fast-food	0.927 (0.861–0.998)	0.939 (0.883–1.000)	0.892 (0.831–0.957)*	0.970 (0.912–1.030)	0.990 (0.948–1.033)
Sugary cereals	0.935 (0.873–1.002)	0.928 (0.876–0.984)*	0.874 (0.815–0.938)*	0.892 (0.825–0.963)*	0.981 (0.946–1.018)
Snacks	0.948 (0.886–1.014)	0.934 (0.875–0.997)	0.889 (0.835–0.946)*	0.978 (0.918–1.014)	0.970 (0.922–1.021)
Dessert	0.958 (0.891–1.031)	0.901 (0.831–0.976)*	0.905 (0.842–0.973)*	0.959 (0.903–1.019)	1.014 (0.977–1.053)
Candy	0.957 (0.886–1.032)	0.937 (0.872–1.008)	0.992 (0.914–1.077)	0.977 (0.916–1.043)	1.001 (0.962–1.040)
<i>High consumption (low and moderate consumption as reference)</i>	0.947 (0.883–1.016)	0.930 (0.865–1.001)	1.016 (0.943–1.093)	0.939 (0.886–0.996)*	0.996 (0.959–1.035)
Sugary drinks					
Fast-food	0.963 (0.871–1.066)	0.937 (0.871–1.001)	0.947 (0.882–1.017)	0.933 (0.882–0.987)*	1.029 (0.980–1.080)
Sugary cereals	0.934 (0.827–1.054)	0.927 (0.854–1.005)	0.843 (0.766–0.928)*	0.888 (0.819–0.965)*	1.000 (0.919–1.088)
Snacks	0.929 (0.843–1.025)	0.929 (0.859–1.005)	0.889 (0.835–0.946)*	0.944 (0.886–1.005)	0.992 (0.950–1.035)
Dessert	0.964 (0.908–1.023)	0.915 (0.854–0.980)*	0.858 (0.792–0.931)*	0.894 (0.839–0.953)*	1.049 (0.984–1.118)
Candy	0.976 (0.887–1.074)	0.941 (0.881–1.005)	0.898 (0.831–0.970)*	0.896 (0.824–0.975)*	1.018 (0.967–1.071)

AOR, adjusted odds ratio; CI, confidence interval.

* *P*-value (*P* < 0.05) considered significant according to the Benjamini–Hochberg method; models included the number of locations of parental exposure and were adjusted for the presence of children aged 5 years and under, 6–12 years, and 12–17 years, perceived income adequacy, and parental sex, age, ethnicity, and education.

adjusted models, parental exposure to unhealthy food advertising was positively associated with all purchase requests and purchase outcomes in all five countries, except for child ownership of fast-food toys in Canada. However, the association between parent's self-reported exposure and children's weekly food intake differed by country in some instances. In Australia, the United Kingdom, and the United States, parents reporting exposure to unhealthy food marketing in a greater number of locations were less likely to report greater consumption of certain food categories among their children. In Canada and Mexico, the number of locations parents reported being exposed to unhealthy food marketing was not associated with children's food intake of any unhealthy food category.

Discussion

Summary of findings

Over half of parents across all countries reported that their children owned toys from fast-food companies. Mexico and the US had a high prevalence of parents reporting child purchase request and parental purchase outcomes. Parents in Mexico and the US also reported the highest weekly

consumption of unhealthy food and beverage products among their children. The data also revealed that in each country, the number of locations where parents reported being exposed to unhealthy food marketing was positively associated with child purchase request and parental purchase outcomes. In addition, our results showed that parental exposure to a greater number of locations was associated with slightly lower odds of children's weekly consumption of unhealthy foods in some countries while no association was found in others. These findings were consistent with our initial hypotheses, with the exception of parent's self-reported exposure to unhealthy food marketing being negatively or not at all associated with children's consumption of unhealthy food and beverages.

Though this is the first study to our knowledge to examine the association between parent's exposure alone on child behavioural outcomes, a significant body of evidence has shown that child exposure to food and beverage marketing and child food intake have a causal association.⁽³¹⁾ A systematic review of twenty-two articles and a meta-analysis of eighteen papers published in 2016 concluded that food advertising influences children's food intake.⁽¹²⁾ Moreover, some research has shed light on the influence of food marketing and



packaging on parental choices, purchase intentions, and product and brand perceptions. For instance, nutrition-related claims on beverages can lead parents to choose less healthy options for their children and misinterpret the healthiness of fruit drinks.⁽³²⁾ Another paper demonstrates that food packages featuring smiling faces activate child-related thoughts in adults, leading to expectations of happiness and increased likelihood of purchasing the product for children.⁽³³⁾ Additionally, adults perceive cereals with cartoon characters as less suitable.⁽³⁴⁾ Lastly, one study highlighted the impact of conventional confectionery advertisements on parents, showing that exposure increases preference for the advertised product, distorts perceptions of healthiness and sugar content, and boosts brand attitude.⁽³⁵⁾

Our findings did not demonstrate a positive association between parental exposure to unhealthy food marketing and child food intake. In fact, in some countries, parents reporting exposure to more marketing locations were less likely to report higher child consumption of unhealthy food categories. There are several reasons why a positive association might not have been observed as expected. Firstly, food choices are influenced by a multitude of factors, including cultural, social, economic, and individual preferences.⁽³⁶⁾ Unhealthy food marketing is just one of many influences on food choices, and its impact may vary depending on the context and individual characteristics.⁽³⁷⁾ Additionally, diverse parenting styles play a role, as some parents may actively promote healthier diets, mitigating the influence of marketing on their children's food intake.⁽³⁸⁾ Moreover, the complex determinants of diet quality factors make it challenging to isolate the specific influence of marketing on child food intake.⁽³⁹⁾ These unexpected findings may also be related to our sub-optimal measures. First, it's essential to acknowledge that our reliance on self-reported exposure introduces a potential bias, as individuals might underreport their exposure to unhealthy food and beverage marketing due to memory lapses or social desirability. Furthermore, the omission of assessing the intensity and frequency of exposure leaves us with an incomplete understanding of the true impact. The inherent disparity between the broad nature of our exposure measure, which encompasses a wide range of unhealthy food marketing, and the specific categorization of child food consumption variables (e.g. candy, snacks) could potentially confound the association we are trying to establish. Moreover, assuming that exposure's influence remains consistent across various settings like television and outdoor environments might oversimplify the complex dynamics at play. Additionally, our measure assumes a homogenous level of exposure influence across all children, overlooking the intricate variations in dietary habits within families with multiple children. This could be particularly problematic when one child's consumption drastically differs from another's, leading to inaccurate parental responses in our consumption measure. In light of these limitations, it is imperative to interpret our findings cautiously and consider avenues for refining our measurement strategies to better capture the nuanced relationship between unhealthy food marketing exposure and child consumption patterns. Nevertheless, our findings did show an association between parental marketing exposure with

child purchase request and parental purchase of unhealthy food, both precursors to child consumption. As a result, parental exposure may potentially be considered a proxy for child exposure as has been previously concluded.⁽²⁸⁾

Our findings also demonstrated that purchase requests, parental purchase, and children's consumption of unhealthy foods and beverages vary by country. When compared to Canada, Mexico and the US had a higher probability of child request and parental purchase of unhealthy food products with licensed characters and spokes-characters. While it is important to note that individual factors and cultural contexts can contribute to differences in food purchasing behaviours, several other factors may help explain why these results were observed in those countries. A contributing factor is the pervasive presence of unhealthy food marketing and advertising targeted towards children in Mexico^(9,40) and the US.⁽⁴¹⁾ In 2015, Mexico, implemented a set of regulations aimed at limiting unhealthy food advertising to children under age 12 both in television and movie theatres.⁽²⁰⁾ Research evaluating Mexico's policy, however, has found that child exposure to unhealthy food products has not been reduced, as advertisers are shifting their marketing techniques towards the general public and families,^(42,43) and shifting the focus to other media.^(11,44,45) Furthermore, Mexican regulations, at the time of this study, did not likely lead to substantial improvements in children's consumption as the nutrition quality standards in the Mexican food marketing regulations are based on an industry derived criteria, which are much weaker than the standards applied in other countries, such as in the UK.⁽⁴³⁾ Previous IFPS studies have similarly shown that Mexico is the country with the highest self-reported exposure to marketing strategies, and the most unfavourable food environment.^(15,46–48) It should be noted, however, that Mexico revised its marketing restrictions in 2020 and has since banned cartoon characters on product packaging and has adopted more stringent nutritional standards.⁽²¹⁾ Moreover, our results reflect the scenario in Mexico in 2018, before the changes in marketing regulations in the country in 2020. Additionally, despite the well-established evidence, there is a concerning lack of regulations in the United States to curtail the promotion of unhealthy foods through advertising.⁽⁹⁾ This regulatory gap allows for the widespread marketing of products that contribute to poor dietary habits and undermines efforts to promote healthier food choices.⁽¹⁶⁾

Other factors influencing the high purchase of unhealthy food products in Mexico and the United States are socioeconomic disparities, cultural norms, and the broader food system context. Research suggests that lower-income individuals and families may have limited access to affordable, nutritious food options, leading to a higher reliance on cheaper, energy-dense, and nutrient-poor foods.^(49–51) This disparity in food access and affordability can contribute to the consumption of unhealthy food products.⁽⁴⁹⁾ These factors influence the types of foods that are accessible, affordable, and prominently available in the food environment.⁽⁵¹⁾ In both countries, the food system context can contribute to the abundance and easy availability of unhealthy food options. Recent and future actions and regulations seeking to improve the



food environment in the five countries examined appear warranted.^(16,21) Governments need to continue to monitor the food environment in their countries so that effective policies can be developed that foster health eating habits among children.

Strengths and weaknesses

Our research is innovative in that it compared the relationship between parents' self-reported exposure to food marketing and child and parental behavioural outcomes in a diverse international sample of adults. The strengths and limitations of the IFPS design have been reported elsewhere.⁽⁵²⁾ In particular, this study is subject to limitations common to survey research, as previously mentioned in the discussion. The self-reporting of marketing exposure in a period of 30 d could introduce recall bias and likely only capture a small portion of actual exposure.⁽⁵³⁾ The survey also did not measure the extent of marketing exposure such as the number of times a person was exposed to a particular media/setting. Additionally, the use of an online survey might have also created coverage bias, since in Mexico 35 % of households do not have internet access.⁽⁵⁴⁾ In addition, this is a cross-sectional analysis and cannot be used to infer causal associations between predictors of interest and outcomes. The recruitment method used non-probability-based sampling; therefore, the findings do not provide nationally representative estimates. For example, although the data were weighted by age group, sex, region, ethnicity (except in Canada), and education (except in Mexico), the Mexican sample had notably higher education levels than census estimates. The survey questionnaire also does not allow us to establish a direct association between food marketing policies implemented (or not) in these countries and the outcomes evaluated. Another relevant weakness is that the variable of child ownership of branded merchandise with logos of unhealthy food products did not specify if those products were purchased or free merchandise received by children or parents. Also, we did not look into the exposure to any specific marketing techniques that parents were exposed to (e.g. use of animation/cartoon, giveaways, child-appealing packaging, etc.), which would most likely influence outcomes.⁽⁵⁵⁾ Future studies could improve these findings by exploring a causal association of parental exposure to food marketing and child and parental purchasing and consumption outcomes.

Conclusion

We found that higher parental reporting of exposure to food and beverage marketing was associated with a range of outcomes that would increase children's exposure to unhealthy food products or their marketing. The former also increased the likelihood that children owned toys from fast-food restaurants and branded merchandise with logos for unhealthy food products, that children would request unhealthy food products with licensed characters or spokes-characters, and that parents would purchase those same products. Parents may be unaware of the impact of unhealthy food marketing on their own purchasing behaviours for their children; however, such behaviours

have a potentially large impact on child health. Governments should consider monitoring unhealthy food marketing to parents given the potential health impact this exposure has on children and their health. We also call for more comprehensive restrictions on the marketing of unhealthy foods such that multiple media channels and marketing techniques are included, and restrictions are based on stringent nutrient profiling of products.

List of abbreviations

AOR, adjusted odds ratio
IFPS, International Food Policy Study
IQR, interquartile range (IQR)
NCD, noncommunicable diseases
SD, standard deviations
UK, United Kingdom
US, United States

Supplementary material

The supplementary material for this article can be found at <https://doi.org/10.1017/jns.2023.88>

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Not applicable.

JSG performed the statistical analysis and wrote the first draft of the manuscript. DH conceived, designed, and executed the International Food Policy Study. AJ, SB, MPK, LV, GS contributed to the preparation of the survey and design of the study. MPK supervised the statistical analysis. EP, MPK, AJ, SB, GS, LV, and DH revised the manuscript critically for intellectual content. All authors read and approved the final manuscript.

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from the University of Ottawa's research ethics board (ethics file number H-06-20-5886).

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Chapter 4: Discussion

This research demonstrated that non-child-targeted food and beverage advertising impacts children. The first study highlighted how the frequency of non-child-targeted food and beverage ads was similar to child-targeted ads on children's specialty TV stations in English, and how it differed between two policy environments in Canada. Complementing this, the second study showed that children's perceptions, purchase intent, and perceived targeted audience did not change between child-targeted and non-child-targeted ads. Finally, the last study demonstrated how parental exposure to unhealthy food marketing is positively associated with parental reporting of child purchase requests and purchase outcomes of unhealthy food products, and that it differs by country. The three studies collectively offer a comprehensive view of how unhealthy food and beverage marketing affects children directly and indirectly in the Canadian context, drawing attention to policy weaknesses, children's perceptions, and parental influence.

Summary of Findings by Study

Table 2 summarizes the findings of the three studies in this thesis and the policy implications of each of them.

Table 2. Summary of the studies and policy implications of the results.

Study	Main findings	Policy implications
Study 1 - Child and non-child-targeted food and beverage advertisements on child television in two policy environments in Canada	Higher overall frequency of ads on English stations (Ontario). English (Ontario): 11.2% of total ads were for food and beverages French (Quebec): 25.7% of total ads were for food and beverage Higher frequency of child-targeted ads on English stations (Ontario). Higher frequency of non-child-targeted ads on French stations (Quebec). Presence of alcohol ads on French stations (Quebec).	Quebec: Suggests the CPA reduces direct targeting but does not limit overall exposure to food advertising. Presence of alcohol ads on child specialty stations in Quebec is concerning. Indicates a need for better monitoring and enforcement. Ontario: Suggests that self-regulation is not effectively protecting children. Children in both provinces are still widely exposed to food marketing. Stronger, federally enforced regulations may be needed to reduce children's total exposure. Policies should address not just who the ads target, but how often children are exposed to them.
Study 2 - The power of product: how food advertising affects children's perceptions of child and non-child-targeted food advertising?	Children consider the product over the marketing techniques. Pre-affinity or familiarity with the product was more relevant than the marketing techniques. There were no notable differences between child-targeted vs. non-child-targeted ads.	Regulations should not focus solely on child-targeted techniques, as non-child-targeted ads can be just as influential. Familiar and well-known products still influence children, even without child-targeted marketing techniques. Policies should consider exposure to food ads, not just ad content or design. Broad restrictions on unhealthy food marketing are needed, regardless of whether the ad is child-targeted or not.

Study	Main findings	Policy implications
Study 3 - The relationship between parent's self-reported exposure to food marketing and child and parental purchasing and consumption outcomes in five countries: findings from the International Food Policy Study	Higher parental exposure to unhealthy food marketing was associated with greater purchase requests by children and purchase outcomes.	Parents are influenced by unhealthy food marketing, which in turn affects children's food requests and consumption. Policies should target marketing aimed at both children and parents, not just child-targeted ads. Comprehensive regulations are needed across platforms and media to reduce overall exposure. Parental education and media literacy can help reduce marketing influence at home. Self-regulation is insufficient; stronger government-led policies with enforcement are necessary.

Study 1

This study investigated the frequency and nature of food and beverage advertising on children's television stations in two distinct regulatory environments in Canada: Quebec and Ontario. The findings supported the hypothesis that non-child-targeted advertising is more common in Quebec, where specific advertising legislation exists, compared to Ontario, where advertising is self-regulated by industry. Notably, food and beverage advertising was more frequent on French-language child stations (25.7%) than on English-language stations (11.2%). However, child-targeted advertisements were significantly more prevalent on English stations (57.9%) than on French ones (25.9%).

Although both provinces had advertising that featured child-oriented marketing techniques, these techniques appeared more frequently on English child stations from Ontario. This trend aligns with previous research showing that child-targeted advertising in Quebec, while less frequent than in other provinces, remains prevalent (Potvin Kent et al., 2012; Potvin Kent et al., 2023).

A considerable proportion of advertisements across both English and French stations promoted foods classified as unhealthy, regardless of whether they were explicitly directed at children. This finding is similar to other research that found that food and beverage advertising on television, in Canada, is mostly for unhealthy products (Czoli et al., 2020; Kelly et al., 2019; Potvin Kent et al., 2023), which raises concerns due to the established impact of such marketing on children's preferences and consumption patterns (Boyland et al., 2016; Boyland et al., 2022; Kelly et al., 2015; Smith et al., 2019). Breakfast cereals dominated child-targeted food advertising, particularly on English stations. This is concerning as breakfast cereals marketed to children tend to contain higher levels of added

sugars compared to those marketed to adults, promoting high-sugar products that offer minimal nutritional value (Chepulis et al., 2020; Harris et al., 2012). Breakfast cereals marketed to children are higher in sugar and sodium by weight, often exceeding WHO recommendations, than cereals not marketed to them (Potvin Kent et al., 2017). These products are one of the top contributors of free sugars in children's diets in Canada, alongside sugary beverages and baked goods (Langlois et al., 2019) which, in turn, is concerning due to its impact on children's health, leading to obesity, type 2 diabetes, and dental caries (Magriplis et al., 2021; Prada et al., 2022).

A notable finding was the presence of alcohol advertisements on French children's stations, accounting for 10.3% of food and beverage ads. Although these ads did not directly target children, their inclusion in child-viewed programming is troubling, as research indicates that media portrayals of alcohol can influence youth attitudes and future consumption behaviours (Aiken et al., 2018; Sargent & Babor, 2020). In Quebec, alcohol advertising is regulated under the Consumer Protection Act (CPA) and the *Loi sur les permis d'alcool*, RLRQ c P-9.1, which restricts direct marketing of alcohol to minors under the age of 18 (Consumer Protection Act, 1980; Government of Quebec, 2024). However, the CPA's narrow focus on child-targeted ads may inadvertently permit exposure to harmful content (such as alcohol), since an advertisement of a product not intended for children can be broadcast in a media for children if "the message is not designed to arouse the interest of children" (Government of Quebec, 2012). In contrast, Ontario's Alcohol and Gaming Commission prohibits any alcohol advertising in medium directed toward underage audiences (AGCO, 2024), a measure that proved effective in this context, as no alcohol ads appeared on English children's stations. These findings highlight critical limitations in Quebec's

regulatory framework and point to the need for broader, more comprehensive advertising policies. Such policies should not only evaluate marketing techniques and messages but also consider the nutritional value and harmfulness of products, ensuring that ultra-processed foods and alcohol are not advertised to children. In addition, restrictions should be based on time of day rather than child-specific audience metrics, since children are regularly exposed to media aimed at general audiences (Carpentier, Stoltze, et al., 2023).

Study 2

This study underscores the central role that the product itself plays in shaping children's responses to food and beverage advertisements. The findings provide meaningful insights into children's attitudes, including their perceptions of the ads, their purchase intent, and how they determine the target audience. A prominent theme was that children's purchase intentions were often negative, largely due to pre-existing aversions to the product or a preference for alternative brands or flavours. Importantly, their attitudes remained consistent regardless of whether the advertisement was child-targeted or not. This pattern suggests that product familiarity and personal preference outweighed the influence of specific marketing techniques.

Across all interviews, children demonstrated a positive perception of at least one advertisement, with many responding favourably to two or more. The main reasons cited for these positive reactions included seeing people consume the product, emotionally engaging content, familiarity with the product, and seeing the product advertised. Even when children were unfamiliar with the brand, they remained receptive to the ad if the product was appealing.

Despite generally positive views of the advertisements themselves, most children still expressed reluctance to request or purchase the products. Some disliked the items altogether, while others preferred competing brands or specific flavours. Where positive purchase intent was reported, it was largely attributed to the depiction of consumption in the advertisement or prior positive associations with the product. Children's identification of an ad's intended audience was also based primarily on the product rather than on marketing techniques. They tended to associate products like milk chocolate with children, dark chocolate with adults, and items like plain milk with all age groups.

These results challenge current food advertising regulations, which typically focus on restricting unhealthy food and beverage products featuring marketing techniques aimed at children. If children's responses are driven more by the product than by the advertising approach, regulatory frameworks may need to shift toward restricting advertisements for nutritionally poor products regardless of their apparent target audience. This approach, supported by a robust food classification system, would align with more comprehensive policies like those recently proposed and soon to be adopted in the United Kingdom that restrict the advertisement of HFSS products on television and on-demand services before 9:00 p.m., and a total ban on paid-for online ads of such products (Government of United Kingdom, 2021).

Study 3

This study examined parental exposure to unhealthy food marketing and its association with children's food-related behaviours across multiple countries (Australia, Canada, Mexico, the United Kingdom, and the United States). More than half of parents reported that their children owned toys from fast-food chains, with particularly high rates of

child purchase requests and subsequent parental purchases observed in Mexico and the United States. These two countries also reported the highest frequency of weekly consumption of unhealthy food and beverage products among children.

A consistent pattern emerged across all countries: the number of locations where parents reported encountering unhealthy food marketing was positively associated with both child purchase requests and parental purchases. Interestingly, greater parental exposure was not consistently associated with children's unhealthy food intake. In some countries, increased parental exposure was even linked to slightly reduced odds of weekly unhealthy food consumption, though this pattern was not universal.

While previous research has demonstrated a causal link between children's exposure to food marketing and increased food intake (Norman et al., 2016), this study did not find a direct association between parental exposure and child consumption. However, the association between parental exposure and both child request behaviour and parental purchasing suggests that parental exposure could serve as a proxy for child exposure, as supported by earlier findings (Barber et al., 2017).

Cross-country comparisons revealed notable differences. Compared to Canadian children, children in Mexico and the United States were significantly more likely to request, and parents more likely to purchase, unhealthy products marketed with licensed or brand characters. Several factors may explain these differences, including the widespread and aggressive marketing of unhealthy foods in those countries (Batis et al., 2016; Kelly et al., 2019; Powell et al., 2010). Although Mexico introduced regulations in 2015 to limit unhealthy food marketing to children under 12 years in traditional media, evidence suggests that marketers have shifted their marketing strategies toward broader audiences and digital

platforms, weakening the effectiveness of these regulations (Barquera et al., 2018; Munguía-Serrano et al., 2020; Rosillo & Nencheva, 2018; Théodore et al., 2017). Moreover, the Mexican nutrition criteria underpinning the policy are industry-led and less stringent than international standards, such as those in the United Kingdom (Government of United Kingdom, 2021; Théodore et al., 2017). These findings underscore the influence of national food environments, where limited access to healthy, affordable options often leads to increased reliance on ultra-processed foods (Bessems et al., 2020; Bolt-Evensen et al., 2018; Hemmingsson, 2018).

Scope and Nature of Exposure to Unhealthy Food Advertising

Study 1 established the marketing characteristics of unhealthy food and beverage advertising on children's television stations in both Ontario and Quebec, and how, regardless of regulatory framework (self-regulation in Ontario and statutory regulation in Quebec), children are at risk. It revealed that a high volume of food and beverage ads is still present, particularly those deemed unhealthy, and that a significant portion of these ads used child-targeted marketing techniques, particularly in English-language programming. Furthermore, Study 3 expanded this picture by examining parents' exposure to unhealthy food marketing across various media, revealing that parental exposure to food marketing impacts the family food environment beyond children's direct exposure by influencing child purchase requests and parental purchasing behaviours. Taken together, these two studies demonstrated that exposure to unhealthy food advertising is not limited to children's programming, nor does it only affect children directly—it also shapes parental decision-making, which in turn affects children's diets.

Previous research has shown a decline in both the average volume of food-related television advertising and the amount of time children spend watching television. For instance, a study with television data from 2017 revealed that children in Canada were exposed to an average of 10.9 food and beverage advertisements on television per hour (Kelly et al., 2019), and research in 2019 revealed that children were exposed to 7.8 food and beverage advertisements per hour (Potvin Kent et al., 2023). This trend aligns with broader shifts in media consumption, while overall screen time remains high, children now spend less time on traditional broadcast television and more on streaming services and online video platforms such as YouTube (Mann et al., 2025). This shift can be attributed to several factors, including the widespread availability of smartphones and tablets, increased internet accessibility, and the growing appeal of interactive and on-demand content (Qi et al., 2023). Based on the findings from Study 1, it was observed that food and beverage advertising on children's television channels was present at an average rate of 3.1 advertisements per hour. While Canadian children aged 2 to 11 watch approximately 2.5 hours of traditional television daily, on average (CRTC, 2019), focusing solely on child-targeted channels likely underestimates their true exposure to food marketing. A more comprehensive analysis published in 2023, which examined food advertising across Canada's most-watched television networks—including both child-focused and general audience programming—found a significantly higher average of 7.8 food and beverage advertisements per hour in 2019 (Potvin Kent et al., 2023). These findings suggest that children are regularly exposed to food advertising outside of child-specialty channels, highlighting the need for broader monitoring and regulatory approaches.

Research conducted in 2022 revealed that children aged 6 to 11 were exposed to an average of 3.92 food advertisements per hour on digital platforms (Potvin Kent et al., 2024), and it is known that children aged 8 to 12 years spend over four hours per day on these platforms in Canada (Rideout et al., 2022). This suggests that children may potentially be exposed to at least 23.4 food advertisements daily across children's television and digital media alone, not accounting for the time spent watching general audience channels and advertising in other media and settings. These findings underscore the importance of analyzing all food marketing content—particularly unhealthy food advertising—given the extensive and complex nature of children's exposure, which far exceeds the narrow focus of most current studies and policies.

In addition, findings from Study 3 showed that parents' exposure to unhealthy food marketing was associated with both child purchase requests and parent-child purchase outcomes. Although a direct link between such exposure and children's actual consumption of unhealthy foods was not established, the associated behaviours can potentially serve as proxies for eventual dietary intake. In line with that, prior studies have demonstrated that parents can be influenced by unhealthy food advertisements to purchase such products (Dixon et al., 2011) and may come to perceive these products more positively (Pettigrew et al., 2013). Additionally, other research has shown that parents may feel hindered in their efforts to provide a healthy diet for their children due to the pervasive nature of unhealthy food marketing to which their children are exposed (Driessen et al., 2022). Therefore, it is essential that the analysis and monitoring of unhealthy food marketing—used to inform policies aimed at protecting children's health—extend beyond child-targeted content to encompass all food marketing that children and their parents are exposed to.

Children's Perception and Engagement with Food Advertising

Building upon the quantitative insights from Study 1, Study 2 offered a valuable qualitative perspective by exploring how children interpret and respond to both child-targeted and non-child-targeted food and beverage advertisements. The findings indicated that children often rely more on their existing familiarity with, and preferences for, specific products than on the visual or thematic content of advertisements to assess their relevance. Although many children expressed positive emotional responses to the advertisements, a notable portion indicated no intention to purchase the advertised products. This resistance was frequently attributed to other brand preferences, aligning with previous research demonstrating that children's food choices are heavily influenced by prior exposure and product familiarity (Mura Paroche et al., 2017).

Brand loyalty, a central construct in marketing, is particularly salient in the context of children, where it can be cultivated early and persist into adolescence and adulthood. This loyalty is often fostered through repeated exposure to branded food advertisements (Lapierre et al., 2011). Factors, such as cognitive development, play a critical role in children's susceptibility to marketing messages. Specifically, children under the age of 12 generally lack the cognitive capacity to understand the persuasive intent of advertising and are more likely to accept such messages at face value (Packer et al., 2022). Consequently, sustained exposure to food marketing—particularly when presented through engaging formats and persuasive techniques identified in Study 1—can forge strong brand associations. Research has demonstrated that children are capable of recognizing and forming attachments to brands from a very early age, with evidence suggesting that brand recognition can begin as early as three years old (Aktaş Arnas et al., 2016; Watkins et al., 2016). At this developmental stage,

children start to associate logos and brand mascots with specific products, often linking them to feelings of fun, taste, or reward (Lapierre et al., 2011). These associations may evolve into brand preferences and, over time, into brand loyalty, thereby shaping both immediate food choices and long-term consumption habits (Boyland & Tatlow-Golden, 2017).

Moreover, the combined findings from Study 1, which documents the high prevalence of food and beverage marketing in children's media, and Study 3, which examines the role of parental exposure in shaping household purchasing behaviours, suggest that children are not merely passive recipients of advertising. Instead, their interpretations are shaped by a complex constellation of individual cognitive processes, familial influences, and broader environmental factors. These results highlight that food marketing exerts influence not only through direct child engagement but also by reinforcing existing product familiarity and operating within the wider socio-familial context (Harris et al., 2017).

Limitations of Current Food Marketing Regulations

Together, Studies 1, 2, and 3 highlighted the ineffectiveness of current regulatory approaches. Study 1 showed that both self-regulation in Ontario and statutory legislation in Quebec fail to significantly limit children's exposure to unhealthy food advertising. Additionally, findings from Study 2 indicated that children are influenced by both child-targeted and general audience advertisements, suggesting that policies limited to restricting child-targeted advertising are insufficient—a conclusion that aligns with previous research (Lavriša et al., 2020). Lastly, Study 3 reinforced this by showing that parental exposure to unhealthy food marketing also influences children's food requests and consumption patterns, indicating that broader systemic exposure—not just child-specific content—is impactful. Despite growing awareness of the harmful effects of food marketing on children's dietary

behaviours and health outcomes, current regulatory frameworks remain limited in scope, enforcement, and effectiveness. While several countries have adopted policies aimed at reducing children's exposure to unhealthy food and beverage advertising, such as Mexico and the UK (Taillie et al., 2019), these measures often fall short due to loopholes, insufficient monitoring, and a narrow focus on specific media platforms (Chung et al., 2022). These limitations undermine the overall objective of protecting children from persuasive marketing practices that promote nutritionally poor food products.

A central weakness in many existing regulations is their reliance on self-regulatory approaches led by the food and advertising industries. For instance, in Canada, research has shown that self-regulatory systems such as the Canadian Children's Food and Beverage Advertising Initiative (CAI) have failed to substantially reduce children's exposure to unhealthy food marketing (Boyland & Harris, 2017; Boyland & Tatlow-Golden, 2017; Potvin Kent et al., 2018; Potvin Kent & Pauzé, 2018). Companies often define "child-targeted advertising" in narrow terms, allowing many advertisements to bypass regulation despite being clearly appealing to children. The Code for the Responsible Advertising of Food and Beverage Products to Children uses the following criteria to determine whether or not an advertisement is directed to children under thirteen years of age: "(a) the nature and intended purpose of the food or beverage product advertised; (b) the manner of presenting such advertisement; and (c) the time and place it is shown" (ACA et al., 2023). It is also specified that Ad Standards is responsible for evaluating whether an advertisement targets children by considering the interplay among all three criteria, as no single criterion is necessarily conclusive when assessed in isolation (ACA et al., 2023). However, the code lacks clarity regarding the interpretation and application of its criteria. It does not provide concrete

examples or detailed explanations of how each criterion is assessed—for instance, what constitutes the 'nature' of a product primarily directed at children under the age of thirteen, how the 'manner' of an advertisement is defined as child-targeted, or which contextual factors, such as time and placement, are considered indicative of targeting a child audience. A further limitation of the Code for the Responsible Advertising of Food and Beverage Products to Children is its lack of guidance on how to integrate multiple criteria when determining whether an advertisement is child-targeted (ACA et al., 2023). In contrast, the Guide to the Application of Sections 248 and 249 of the Consumer Protection Act provides a structured approach, facilitating more consistent assessment and interpretation, which is essential for both research and regulatory evaluation (Government of Quebec, 2012). Furthermore, digital platforms—where children spend increasing amounts of time—are often poorly regulated or entirely exempt from existing policies (Potvin Kent et al., 2024).

Furthermore, results from Study 2 indicated that whether an advertisement is explicitly targeted at children does not significantly influence their desire to consume the advertised product. Instead, the key factor influencing children's interest was their familiarity with the product and their preexisting preference for it. Together, the three studies highlighted the major limitation of current regulation: their focus on advertising specifically directed at children.

When discussing the impact of unhealthy food marketing on children, it is essential to consider their exposure to all forms of food marketing, regardless of whether the advertisement is child-targeted or in media directed at children. Currently, the CPA covers all media (e.g. radio, television, online, mobile phones, printed, and promotional items) “used to distribute or broadcast commercial” (Government of Quebec, 2012). Similarly, the Code for

the Responsible Advertising of Food and Beverage Products to Children also applies to “all advertising featuring a food or beverage product, directed to residents of Canada, in any media” (ACA et al., 2023). However, both focus on media directed at children, or state that children need to represent a significant portion of the audience. For instance, the CPA states that it is considered a medium directed at children if children represent at least 15% of the audience (Government of Quebec, 2012). On the other hand, the Code for the Responsible Advertising of Food and Beverage Products to Children prohibits advertising on “media primarily directed to children” but does not define what this means (ACA et al., 2023). The code also prohibits food and beverage advertising in elementary or middle schools, with the exception of charitable or not-for-profit initiatives or causes (ACA et al., 2023). Furthermore, many regulations only apply to ads explicitly targeting children, using child-targeted marketing techniques (e.g. cartoon characters, themes, etc.) or broadcast during children’s programming. However, it is known that children frequently consume content for general audiences or media that is indirectly targeted at them (Pauzé et al., 2021). Under the CPA in Quebec, advertisements for products directed at children are permissible if children constitute less than 15% of the total audience and if the message is not designed to appeal to children. Moreover, even when children make up more than 15% of the audience, such advertisements may still be allowed provided they do not contain explicit content or messaging that directly appeals to children (Government of Quebec, 2012). However, this creates a gap that allows harmful advertising to be broadcast on media directed at children, which was observed in Study 1, with children’s French stations in Quebec broadcasting alcohol advertising.

Additionally, even where regulations exist, they are often poorly enforced, with limited funding, weak monitoring systems, and insufficient penalties (Dhuria et al., 2024).

For example, in Brazil, the Consumer Protection Code considers child-targeted food marketing as abusive and illegal (Código de Defesa Do Consumidor, 1997), but the lack of enforcement mechanisms and clear guidelines has led to low compliance (Monteiro et al., 2018). For example, in 2018, the top three tv channels in Brazil displayed 0.9 food and beverage ads per hour, 90% of which promoted unhealthy foods, and 10.1% of those were specifically targeted towards children (Guimarães et al., 2022).

Lastly, another relevant gap in the current regulations is the age range. Worldwide, many policies only protect younger children (e.g., under 12 or 13 years old) (Taillie et al., 2019), leaving adolescents—who are equally impressionable—vulnerable to the impact of unhealthy food and beverage marketing (Qutteina et al., 2021). Despite their increasing cognitive maturity, teenagers are still developing critical thinking and self-regulation skills, which makes them susceptible to marketing techniques that exploit emotional and social appeals (Packer et al., 2022). Research suggests that even when adolescents possess a higher level of understanding about advertising, this awareness does not shield them from its influence on their brand or product preferences (Packer et al., 2022). A systematic review also found consistent evidence that exposure to marketing of HFSS foods significantly affects adolescents' food preferences, purchase intentions, and dietary behaviours (Smith et al., 2019). These findings challenge the notion that older youth are less affected by marketing and underscore the need for policies that extend beyond child-focused protections to also include adolescents. The WHO has emphasized the need for regulatory measures to ensure that those under 18 years of age are not subjected to food marketing practices (WHO, 2023b).

Toward Effective Food Marketing Policies: Lessons and Strategies

Despite existing limitations, the implementation of some regulatory measures is preferable to the absence of any action. The implementation of the CPA in Quebec has shown its potential to restrict food marketing to children. Even though children's exposure to unhealthy food and beverage advertising remains high in Quebec, research evaluating its impact has shown that Quebec children are exposed to less food advertising on television compared to their counterparts in other Canadian provinces (Potvin Kent et al., 2023; Potvin Kent et al., 2023), with possible reductions in the consumption of fast food among young children in the province (Dhar & Baylis, 2011). Although challenges remain, such as enforcement and monitoring – since current regulations rely on third-party complaints – and marketing migration to digital platforms, policy interventions such as the CPA and Health Canada's proposed policy hold potential benefits. However, limiting advertising exposure alone is not sufficient. Marketing strategies are coordinated, strategic, and deployed through a variety of media, including product packaging, sponsorships, and point-of-sale promotions, among others. Therefore, policies must extend beyond the screen and address the multifaceted nature of food marketing. This is not to suggest that such policies are not beneficial—on the contrary, each policy has its merits and contributes to protecting children's health. What is at the center of this thesis's discussion is the fact that individuals, including children, are surrounded by a complex food environment that influences dietary behaviours through multiple factors, including food availability, accessibility, price, affordability, vendor and product properties, convenience, desirability, and marketing and regulations (Turner et al., 2018). Consequently, actions that focus on only one aspect of this multifaceted system are likely to have limited effectiveness (Ahern et al., 2011; Igumbor et al., 2012; Pérez-Ferrer et

al., 2019). Even in a scenario where all unhealthy food advertising is removed from children's television channels, children would still be exposed to unhealthy food marketing through various other platforms (e.g. general audience television channels, social media, food packaging, in-store promotions, or restaurant marketing). Additionally, their parents would continue to be exposed to unhealthy food marketing, which—as demonstrated in Study 3—also influences children's eating behaviours. While it is evidently impossible to create a protective bubble that shields all citizens from negative influences on their dietary health, what is essential is the necessity of implementing a comprehensive combination of policies and actions that, when integrated, offer protection and health promotion from multiple angles. This is the essence of public and population health: the pursuit of promoting and safeguarding the health of the population across various dimensions, ensuring equitable and universal care (Edemekong & Tenny, 2025). Comprehensive strategies to improve food intake could include mandatory front-of-pack nutrition labelling, school-based nutrition education, taxes on sugar-sweetened beverages, and restrictions on in-store promotions of unhealthy products (Boyland et al., 2016; Swinburn et al., 2019).

The WHO has consistently emphasized the urgent need to restrict the marketing of unhealthy food and beverage products to children as a critical strategy for addressing the global rise in childhood obesity and diet-related noncommunicable diseases. In its 2010 Set of Recommendations on the Marketing of Foods and Non-alcoholic Beverages to Children, the WHO urged member states to reduce both the exposure of children to, and the power of, marketing of foods high in saturated fats, trans fats, sugars, and salt (WHO, 2010). Over the years, the organization has not just recognized children's vulnerability to food marketing, but also called for the implementation of comprehensive policy frameworks that encompass all

media platforms and settings where children are likely to be exposed to such marketing—including television, digital media, and schools – and has advocated for statutory regulations over voluntary approaches due to the limited effectiveness of industry self-regulation (WHO, 2023b). These recommendations underscore the importance of government-led action to protect children's health and support healthier food environments.

Moreover, parents and caregivers play a crucial role in shaping children's food choices, as demonstrated in Study 3. Exposure to marketing influences not only children's preferences but also household purchasing decisions. Interventions should therefore incorporate support for parents through public health campaigns, access to affordable healthy foods, and improved food literacy (Silva et al., 2023). Additionally, as digital marketing becomes increasingly sophisticated, there is an urgent need for regulation that addresses algorithm-driven personalization and influencer advertising—areas that remain largely unregulated and highly effective at engaging young audiences (Amson et al., 2025; Montgomery et al., 2019).

Chile as a case study

There are existing examples of such multi-level efforts that have proven effective, notably in Chile, where a complex network of public policies has been implemented to restrict the marketing of unhealthy foods. Chile's law prohibits advertising of high in fat, sugar, or salt (HFSS) products to children under 14 across all forms of media, including television, radio, websites, and packaging (Law of Advertising Food, 2015). The regulation included three phases of implementation: Phase 1 implemented in 2016, Phase 2 implemented in 2018, and Phase 3 implemented in 2019.

The first phase introduced front-of-package warning labels in the shape of black octagonal labels indicating "high in" sugar, sodium, saturated fat, or calories for products exceeding set thresholds (Corvalán et al., 2019). In addition, it introduced advertising restrictions, prohibiting advertising of "high in" products to children under 14 years old in media made for children or in programs for which children comprised at least 20% of the audience, also banning child-targeted marketing techniques such as cartoon characters and toys (Law of Advertising Food, 2015; Taillie et al., 2019). Lastly, it introduced school environment regulations, banning the sale, promotion, or free distribution of "high in" products in schools and nurseries (Law of Advertising Food, 2015; Taillie et al., 2019). After the implementation of those three actions, research indicated significant declines in the purchase of energy-dense foods, sugar, saturated fat, and sodium, which were largely driven by reductions in "high-in" food and beverage purchases, with partial compensation from increases in "not-high-in" purchases (Taillie et al., 2021). Also, the regulations have been associated with a shift in consumer behaviour, with people becoming more aware of warning labels and making healthier choices (Taillie et al., 2021). Additionally, children's exposure to TV ads for regulated foods and drinks, including those featuring cartoon characters, showed a considerable decline (Carpentier et al., 2020; Correa et al., 2020).

The second phase of the policy framework introduced more rigorous nutrient thresholds (reducing the allowable levels of calories, sugars, sodium, and saturated fats) and extended advertising limitations to prohibit all advertising of "high-in" products on television between 6:00 a.m. and 10:00 p.m., with the objective of minimizing children's exposure during peak viewing times (Law of Advertising Food, 2015). Evidence indicates that this phase led to a further reduction in children's exposure to advertisements for unhealthy foods

(Carpentier, Stoltze, et al., 2023). These findings highlight the importance of implementing comprehensive restrictions on unhealthy food marketing—encompassing content, timing, and placement—to ensure effective protection. Moreover, banning child-targeted elements in all marketing content for unhealthy products, regardless of airtime, may offer a more robust strategy for addressing the broad range of programming viewed by children (Carpentier, Stoltze, et al., 2023). In a similar vein, the United Kingdom adopted a time-based regulatory approach in January 2026, with a ban on the advertisement of HFSS products on television and on-demand services before 9:00 p.m., and a total ban on paid-for online ads, aimed at encompassing children's total viewing exposure (Conway, 2024).

The third phase in Chile further tightened nutrient thresholds – implementing the most stringent limits for calories, sugars, sodium, and saturated fats in both solid and liquid foods – and mandated that all food producers, including small and medium enterprises, comply with the labelling and advertising regulations. The implementation of the regulation also prompted changes in product composition by food manufacturers. According to a 2021 report by the FAO, around 15% of the products evaluated were reformulated post-regulation, resulting in the removal of the "high in" label on the products (Corvalán et al., 2021).

Other interventions

As previously discussed, effectively addressing the public health challenge of poor dietary intake and childhood obesity linked to the influence of unhealthy food marketing requires a comprehensive, multi-level approach. In addition to regulatory measures targeting food advertising, other types of interventions may also yield meaningful public health benefits. One such approach involves incentivizing healthy food purchases, for example, through government subsidies for nutritious foods or taxes on unhealthy products.

Government subsidies for healthy foods – such as fruits, vegetables, whole grains, and dairy – can play a critical role in countering the influence of unhealthy food marketing on children by making nutritious options more accessible, affordable, and appealing (Comini et al., 2024; Huangfu et al., 2024). This economic strategy helps shift dietary behaviours by reshaping food environments and addressing financial barriers, especially for low-income families who are disproportionately targeted by unhealthy food advertising (Huangfu et al., 2024; Vergeer et al., 2025b). Subsidies can take various forms, such as direct price reductions, tax credits or rebates for purchasing healthy foods, support to schools to provide healthier meals, and incentives for retailers to stock and promote healthier options in underserved areas. By making healthier foods more affordable, governments can reduce consumption of highly marketed, energy-dense, nutrient-poor foods often promoted to children through food marketing (Comini et al., 2024; Huangfu et al., 2024). This has been implemented in other countries with positive results. In the United States, the Supplemental Nutrition Assistance Program (SNAP) includes initiatives like the Healthy Incentives Pilot (HIP), which provides SNAP recipients with a 30% rebate on purchases of fruits and vegetables. A study found that HIP participants consumed significantly more fruits and vegetables compared to non-participants (Bartlett et al., 2014). In the United Kingdom, the Healthy Start initiative provides vouchers to low-income pregnant women and families with children under four to purchase fruits, vegetables, and milk. Research shows that recipients increase their consumption of healthy foods and reduce purchases of processed items (McFadden et al., 2014).

Also, the taxation of unhealthy foods can increase their price and discourage consumption. In Mexico, an 8% tax on non-essential energy-dense foods (NEDFs) that

exceed 275 calories per 100 g was implemented in 2014 (Junquera-Badilla et al., 2025). Data showed reductions in taxed food purchases in the first year of this tax being implemented, ranging from 5.1 to 10.2%, with the highest reductions among low-income households and high NEDF consumers (Batis et al., 2016). Furthermore, an observational study reported a 3% reduction in the prevalence of overweight and obesity in girls aged 10–18 years old two years after the implementation of the sugar-sweetened beverages tax, implemented in Mexico in 2014 (Gracner et al., 2022). In Canada, in 2022, Newfoundland and Labrador became the first Canadian province to implement an excise tax of CAD 0.20 per litre on sugar-sweetened beverages, including ready-to-drink soft drinks, sweetened juices, and fountain drinks (Government of Newfoundland and Labrador, 2022). A study showed that, one year after implementation, retail sales of taxed beverages fell by approximately 12% in the province—an 11.6% per-capita reduction—compared to a 6.7% decline in the neighbouring Maritime provinces without such a tax (Prowse et al., 2025). Additionally, adults reported a 24% lower likelihood of consuming a taxed sugary beverage (Prowse et al., 2025). Despite these findings, the provincial government is expected to repeal the levy, apparently in response to sustained public opposition over several years (Government of Newfoundland and Labrador, 2025).

Evidence from simulation modelling suggests that implementing a dual strategy—taxing unhealthy food products while subsidizing healthier alternatives—can produce more substantial dietary benefits than employing either intervention in isolation (Eyles et al., 2012). In Australia, a comprehensive modelling analysis evaluated the cost-effectiveness of fiscal measures such as levies on sugar, saturated fat, salt, and sugar-sweetened beverages, paired with subsidies for fruits and vegetables. The findings indicated that this combined

fiscal strategy could prevent approximately 470,000 disability-adjusted life years (DALYs) and generate notable reductions in healthcare expenditures (Cobiac et al., 2017). Similarly, a recent policy simulation in the United States examined the effects of expanding subsidies for minimally processed foods alongside taxes on ultra-processed items. The results showed that a sugar-content tax on sugar-sweetened beverages would significantly reduce both volume and calorie purchases, while subsidies targeted at nutritious items would increase the purchase of fruits, vegetables, and healthier beverages, without significantly affecting overall caloric intake (Valizadeh & Ng, 2024).

A comprehensive, multi-level approach to improve food environments is demonstrated in the NOURISHING framework, introduced by the World Cancer Research Fund International in 2013 (Hawkes et al., 2013; Vlad et al., 2023). Designed to assist governments in promoting healthier diets and reducing obesity and non-communicable diseases (NCDs), the framework provides a set of policy tools and resources to support the collection, monitoring, benchmarking, and evaluation of national diet-related policy actions (Hawkes et al., 2013; Vlad et al., 2023). It is organized around three core domains—food environments, food systems, and behaviour change communication—and incorporates a wide range of strategies, including setting standards for nutrition labelling, using economic instruments to influence affordability and purchasing, ensuring the provision of healthy foods in public institutions, restricting food advertising, strengthening food supply chains, and advancing nutrition education and public awareness initiatives (Hawkes et al., 2013; Vlad et al., 2023). In conclusion, effectively addressing the influence of unhealthy food marketing on children's dietary behaviours necessitates a comprehensive, multi-level policy approach that extends far beyond singular interventions. While regulatory measures, such as those in

Quebec, show promise in reducing exposure in specific contexts, the multifaceted nature of food marketing demands comprehensive policy approaches that address multiple levels of influence. Furthermore, future efforts must actively incorporate support for parents and caregivers, recognizing their crucial role in shaping food choices. Ultimately, safeguarding public health requires a harmonious combination of policies and actions, working in concert to create a protective food environment that promotes healthier choices from multiple angles and dimensions.

Potential contributions

This thesis offers insights across three key domains—policy development, societal impact, and academic research—by conducting a multidimensional analysis of food and beverage marketing that affects children. The study enhances our understanding of how marketing techniques for unhealthy food products shape children's dietary behaviours, both overtly and subtly.

Policy Implications

The findings provide empirical evidence that can inform and refine regulatory strategies surrounding food marketing in Canada and other regions. By comparing the prevalence and characteristics of both child-targeted and general audience advertising within children's television programming under two distinct regulatory regimes in Canada, the research identifies notable shortcomings in current policy approaches. These findings suggest that policies that narrowly define advertisements explicitly aimed at children may fall short in adequately shielding this population from exposure to unhealthy food promotion (Boyland et al., 2016).

Moreover, the study demonstrates that advertisements not specifically targeted at children can still hold strong appeal for them, thereby challenging the assumptions upon which many regulatory approaches are based. These results offer compelling justification for policymakers to expand existing frameworks, encompassing all food marketing content that children are likely to encounter, regardless of the intended audience. This aligns with recommendations from international public health organizations, such as the World Health Organization (WHO, 2023b), advocating for comprehensive limitations on unhealthy food marketing across media platforms.

Another key insight involves the indirect effect of parental exposure to food advertising. Evidence from my research suggests that children's eating habits may be influenced not only by their own exposure but also by that of their parents. As such, policy design could benefit from adopting a broader, family-centred approach that addresses marketing exposure at the household level. Policies such as those implemented in Chile, or the measures proposed in the UK to restrict all food and beverage advertising during specific times of the day, aim to protect not only children but also adolescents and adults within the family unit.

Societal Contributions

The implications of this research extend to public health and social equity, particularly in its exploration of non-child-targeted advertising and its unrecognized influence on children. By drawing attention to environmental and structural drivers of unhealthy eating, this work supports more effective public health messaging and family-focused education, especially in communities where dietary health is a pressing concern (Mahmood et al., 2021).

Additionally, the study incorporates the perspectives of children in evaluating the appeal of various advertisements. This participatory approach deepens our understanding of the factors that shape children's food preferences and lends support to policies that prioritize children's voices in the regulatory process. In doing so, the research promotes child-centred policymaking that upholds children's rights to a supportive and health-enhancing food environment as recommended by UNICEF (UNICEF, 2019).

The examination of how parents and children respond to food advertising also encourages broader societal dialogue around collective responsibility for fostering healthy eating habits. The study reinforces the idea that families, public institutions, the media, and governments must work collaboratively to create environments conducive to healthier dietary choices (Scaglioni et al., 2018).

Research Contributions

This work makes several important contributions to the academic literature on food marketing, particularly in areas that remain underexplored. First, by examining non-child-targeted advertisements and comparing them to explicitly child-targeted content, the thesis shifts the analytical lens beyond advertiser intent. This contributes to a growing body of work advocating for exposure-based assessments of children's vulnerability to food marketing (Smith et al., 2019).

Second, the qualitative component that captures children's interpretations of advertisements represents a valuable methodological contribution. Focusing on children's voices allows for a more accurate reflection of how they process marketing messages and lays the groundwork for future interventions that are developmentally appropriate and culturally relevant. Third, the inclusion of cross-national data on parental exposure to food

advertising and its influence on children's eating behaviours offers a fresh and global perspective. This comparative approach enriches our understanding of how cultural and regulatory differences can shape the effects of marketing, and it opens new paths for international policy analysis and culturally informed strategies (Pérez-Ferrer et al., 2019).

Collectively, these findings provide a solid empirical basis for future interdisciplinary inquiries at the intersection of media exposure, dietary behaviour, and public health policy. The integration of both quantitative and qualitative methods serves as a valuable approach for researchers seeking to address multifaceted public health challenges through diverse methodological lenses.

Strengths and Limitations

This thesis has several notable strengths. First, it makes a valuable contribution to the existing literature by addressing critical gaps in research concerning the impact of food marketing on children, particularly in the context of non-child-targeted advertising. While much of the prior research has focused on direct marketing to children, this thesis expands the scope to consider how broader marketing techniques may indirectly influence children's food choices and consumption behaviours. Additionally, through Study 3, this research offers novel insights into the relationship between parental exposure to food marketing and children's purchase outcomes—a connection that has been largely underexplored in previous studies. This finding advances the understanding of the complex dynamics within the family food environment and provides a foundation for future investigations into the indirect pathways through which marketing may affect children. Another key strength of this thesis lies in its mixed-method design, which provided a comprehensive understanding of food marketing from multiple perspectives: environmental exposure (Study 1), children's

perceptions (Study 2), and parental experiences across countries (Study 3). This triangulation enhanced the validity of the conclusions.

In Study 1, the extensive and systematic data collection process—648 hours of programming across multiple television stations, recorded over both weekdays and weekends—allowed for a robust analysis of marketing frequency and techniques. By examining all advertisements during a non-holiday period, this study minimized temporal biases and captured typical advertising patterns in the month examined. The dual-language analysis of English and French-Canadian stations also offered valuable insight into two distinct policy environments (statutory vs. self-regulation). The inclusion of a broad set of 28 marketing techniques and the use of Health Canada’s nutrient profiling model further strengthened the depth and reliability of the findings.

Study 2’s in-depth interviews with 17 children aged 6–11 provided rich qualitative data about children’s perceptions and attitudes toward food marketing. The inclusion of various advertisement types (child-targeted, non-child-targeted, healthy, and unhealthy) allowed for a nuanced exploration of children’s responses. This approach illuminated not only which features children found appealing or off-putting, but also the contextual and cognitive processes that shape their interpretations of food advertising.

Study 3 expanded the scope of the thesis by incorporating international data on parents' self-reported exposure to food marketing and its association with children’s dietary behaviours. This cross-country analysis enabled the exploration of marketing influence in diverse media and policy environments. The use of a large online survey allowed access to a broad demographic sample and enabled weighting for variables such as age, sex, region, and education, enhancing the comparability of data across Canada, the UK, and Mexico.

Each study offered unique insights; however, each also presented limitations that must be acknowledged. In Study 1, while Health Canada's nutrient profiling model enabled classification of products with missing nutritional data, it remains a proxy measure and may introduce classification inaccuracies, particularly where detailed product information was unavailable. Moreover, although a complete analysis of all advertisements ensures comprehensive coverage, manual coding, even with high inter-coder reliability, carries the risk of human error or subjective bias in interpreting marketing techniques.

Study 2 was limited by its convenience sampling strategy, which resulted in an overrepresentation of Latino children and families from lower socio-economic backgrounds. While this demographic group offers important and often underrepresented perspectives, the findings may not be generalizable to the broader Canadian population. Notably, the research was conducted during the COVID-19 pandemic, necessitating methodological adaptations that influenced data collection procedures. Specifically, the qualitative study had to be conducted online, which restricted opportunities for in-person observation and may have impacted the depth and spontaneity of participant responses. The study's online format also introduced an additional limitation of variable internet quality that occasionally disrupted the flow of interviews. Also, certain advertisements elicited unanticipated reactions from children (e.g., AD2) – some children perceived the advertisement as unsettling or unusual and interpreted the featured product as being cookies – underscoring the complexity of message interpretation and suggesting that researchers' assumptions about appeal may not align with children's actual perceptions.

Study 3, while offering international comparisons, was limited by its cross-sectional and self-reported survey design, which precludes causal inferences. Recall bias may have

influenced parents' reports of marketing exposure over a 30-day period, and the lack of detail on specific marketing techniques limited the depth of the analysis. The non-probability-based online sampling method also introduced coverage bias, particularly in Mexico, where a significant proportion of households lack internet access. Furthermore, some demographic discrepancies—such as higher-than-average educational attainment among Mexican respondents—could affect generalizability. The study also did not distinguish between free and purchased branded merchandise, nor did it examine how specific marketing features (e.g., animation, packaging) influenced behavioural outcomes.

Future research

While the findings offer compelling evidence, future research is essential to further the understanding of how non-child-targeted food advertising influences children's and adolescents' eating behaviours and food preferences. While this thesis provides initial evidence of the indirect effects of such advertising, experimental studies are crucial to establish causal relationships and determine the specific mechanisms through which non-child-targeted marketing impacts youth dietary outcomes. This type of evidence is especially critical in informing public health policies aimed at protecting children from harmful marketing practices that contribute to poor dietary patterns and the rising prevalence of diet-related health issues.

Moreover, future studies should extend the scope of investigation to include adolescents, a demographic group that has received comparatively less attention in the literature but is highly susceptible to marketing influences. Adolescents are in a developmental stage characterized by increased autonomy, identity formation, and exposure to a wider array of media and marketing content, including that which is not explicitly

targeted at children (Qutteina et al., 2019). As such, they represent a key group for understanding the broader implications of non-child-targeted food advertising. Research focusing on adolescents can provide critical insights into how food marketing tactics shape their dietary norms and behaviours. Addressing this gap is vital for developing comprehensive food marketing regulations that are inclusive of all age groups vulnerable to persuasive marketing techniques, as recommended by the WHO.

In addition, future research should apply the same research questions and theoretical frameworks used in this thesis to investigate other marketing strategies beyond traditional advertisements. Newer forms of marketing—such as product placement in video games, influencer promotions on social media platforms, and algorithmically driven digital advertising—are increasingly used by the food industry to reach young audiences. These marketing forms are often unregulated and more integrated into entertainment content, making them particularly difficult for young people to recognize (Coates et al., 2019). Studying the impacts of these marketing techniques on children's and adolescents' food choices using both qualitative and experimental methods could provide more comprehensive evidence to guide policy development and regulation in the evolving media landscape.

Conclusion

This thesis set out to examine how unhealthy food and beverage marketing that is not specifically targeted at children affects children, and to provide evidence that can inform public policy. Across three studies, the findings show that both children and parents are influenced by food marketing, whether or not the advertisements are explicitly child-targeted. Children demonstrated positive reactions to both child- and non-child-targeted ads, often driven by familiarity with the product rather than by the marketing techniques themselves.

Parents' exposure to unhealthy food marketing was also associated with increased purchase requests and behaviours among children, highlighting the indirect pathways through which marketing affects young audiences.

These findings expose critical gaps in current regulatory frameworks. In Canada, self-regulation at the federal level and statutory regulation in Quebec (through the Consumer Protection Act) differ in approach but share limitations—particularly in addressing children's total exposure across media platforms. Regulations that focus solely on child-targeted content fail to consider how advertising embedded in general media and non-child-oriented messaging also shapes children's food preferences.

To effectively reduce children's exposure to unhealthy food marketing, policy must move beyond narrow definitions and adopt broader, exposure-based strategies. This includes addressing advertising across television, digital media, packaging, and retail environments. Evidence from countries like Chile and the United Kingdom shows that comprehensive policy packages—such as marketing restrictions, front-of-pack labelling, and fiscal measures—can lead to meaningful improvements in population diets.

Additionally, the thesis emphasizes the importance of considering parents as part of the solution. As gatekeepers of the home food environment, their susceptibility to marketing and their influence on children's consumption must be recognized in policy design. Educational campaigns, food literacy initiatives, and accessible healthy food options are essential complements to regulatory action.

In conclusion, food marketing is a complex and persistent public health challenge that requires coordinated, multi-level policy responses. This thesis contributes evidence to support

stronger, more comprehensive regulations that reflect the diverse ways in which marketing reaches and influences children and families.

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Appendices

Supplementary material from Study 1

Supplementary material. Table 1. Description and classification of all marketing techniques analyzed.

Marketing technique	Description	Classification*
Adult-child situations	Situations that play on the parent-child relationship or other authority-based relationship (e.g., coach-child, teacher-child).	Non-child-targeted
Adult-teen situations	Situations that play on the parent-teen relationship or other authority-based relationship (e.g., coach-teen, teacher-teen).	Non-child-targeted
Advercation	Information about the company or its foods is presented as educational material (e.g. historical facts, nutrition explanation, science information).	Non-child-targeted
Appeals to fun/cool	Advertisement (ad) makes appeals to the product being fun or funny, having fun while eating the product, humour or coolness/novelty (e.g. a cookie diving into milk, brand character suggesting that the people that eat the product belongs to his group of “tigers”).	Non-child-targeted
Appeals to health or nutrition	Explicit appeals related to the healthfulness or nutritional quality of the product, its ability to promote wellness, growth, strength, or physical activity (e.g. low fat, sugar or sodium; person eating the product while/after doing exercise).	Non-child-targeted
Branded characters	Company- or brand-owned characters or spokespersons.	Child-targeted
Calls-to-action	Ad encourages consumers to perform an action (e.g. buy the product, participate in a campaign, visit a website, etc.).	Non-child-targeted
Celebrities/public figures	Actors, athletes, musicians, social media influencers, or other public figures.	Non-child-targeted
Child themes	Themes that are commonly associated with children (e.g. fantasy, magic, zoo animals, virtual worlds, etc.).	Child-targeted
Child visual design	Designs, colours, images, or other elements of audiovisual design that are commonly associated with children (e.g. bright and primary colors, pastel shades, cartoon characters, stars, rainbows, balloons, playful lettering, etc.).	Child-targeted
Cross-promotions	Cross-promotions to movie, sports, TV shows, etc. (e.g. the ad features aspects of a well-known fictional world, with or without specifically including the fictional characters; ad mentioned a movie that will be soon released; ad connects with major league sport events, such as NHL, NFL, etc.).	Non-child-targeted
Displays of corporate social responsibility	Appeals to sustainability, philanthropy or contributing to other social causes.	Non-child-targeted
Games or activities	Presence of games or activities on the advertisement (e.g. family playing board games, people playing poker, children playing soccer). <i>Note: this does not include sports events (NHL, NFL, FIFA World Cup, etc.), those are included in “cross-promotions”. This also does not include contests or giveaways.</i>	Non-child-targeted
Licensed characters	Licensed characters from children’s and teens’ TV shows, movies, books, etc.	Child-targeted

Marketing technique	Description	Classification*
Other cartoon characters	Generic cartoon characters (e.g. cartoon children/teens, animals, or imaginary/virtual creatures, etc.) that are not branded or licensed characters, celebrities, or cross-promotions to other media.	Child-targeted
Partnership	Partnership with other brand (e.g. other food and beverage brand shown, delivery app brands, etc.). <i>Note: this do not include sports events (NHL, NFL, FIFA World Cup, etc.), those are included in “cross-promotions”.</i>	Non-child-targeted
Presence of children	Ad features children (12 years and younger)	Child-targeted
Presence of teens	Ad features teens (13-17 years)	Non-child-targeted
Price promotions, incentives or giveaways	Ad includes price-promotion or premiums (e.g. discounted prices, contests, prizes, or giveaways available with or without purchase, etc.).	Non-child-targeted
Promotion of product convenience	Specific promotion of the product being convenient (e.g. for snacking, packing in lunches, quickness, easy preparation, etc.).	Non-child-targeted
Songs or music	Ad features songs, music, jingles, or other audio that is predominant.	Non-child-targeted
Special effects	Ad features special effects, fast-cutting or animation.	Non-child-targeted
Teen themes	Themes that are commonly associated with teenagers (e.g. high school, social media, popularity, fashion, risk-taking, independence, etc.).	Non-child-targeted
Teen visual design	Designs, colours, images, or other elements of audiovisual design that are commonly associated with teenagers (e.g. colors like black, neon shades, and metallics; prints featuring pop culture references; urban aesthetic; filters or visual effects mimicking social media, etc.).	Non-child-targeted
Unusual product appearance	Product’s shape or colour is unconventional or unusual for that type of product (e.g. crackers or pasta have a shape other than their usual square or round shape or are multi-colored rather than their usual plain/brown colour).	Non-child-targeted
Unusual product flavour	Product’s flavour is unconventional or unusual for that type of product, or a flavour that is not a ‘real’ or ‘discernable’ flavour (e.g. birthday cake flavoured cookies or cereal, cherry or vanilla flavour coke-based drinks, etc.).	Non-child-targeted
Use of child language	Language that is associated with children, that is frequently used by children or that is directed at children (e.g. simplified vocabulary, imaginative and playful words, playful rhymes and songs, etc.).	Child-targeted
Use of teen language	Language that is associated with teenagers, that is frequently used by teenagers or that is directed at teenagers (e.g. slang and trends, quotes from social media, pop culture or social media references, etc.).	Non-child-targeted

* “Child-targeted”: marketing techniques that appealed directly to children; “non-child-targeted”: marketing techniques that would appeal to more age groups than children (e.g. presence of teenagers – could appeal to children but also appeal to teenagers; appeal to fun/cool – could appeal to children, but also appeal to teenagers and adults; etc.).

Supplementary material from Study 2

Informed consent form and assent form



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Title of the study: The impact of adult-targeted food and beverage advertising on children

Julia Soares Guimarães, PhD candidate
Faculty of Health Sciences
University of Ottawa

Monique Potvin Kent, PhD
Associate Professor
School of Epidemiology and Public
Health
Faculty of Medicine
University of Ottawa
600 Peter Morand Cres.
Room 301J
Ottawa, Ontario, K1G5Z3

Invitation to Participate: My child and I are invited to participate in the above-mentioned research study conducted by Julia Soares Guimarães (PhD Candidate) of the Faculty of Health Sciences at the University of Ottawa, under the supervision of Dr Monique Potvin Kent, Associate Professor, of the School of Epidemiology and Public Health at the University of Ottawa. This project is part of Julia Soares Guimarães' PhD thesis.

Purpose of the Study: The purpose is to examine the impact of junk-food advertising on children's awareness of brands, attitudes towards advertising, and intent to purchase food brands or products.

Eligibility criteria:

- My child and I must be able to read, understand and speak English;
- My child must be between the ages of 6 and 11;
- My child must have normal or corrected-to-normal vision;
- My child must be able to sit through and pay attention to the session for 45-60 minutes.

Participation: My participation consists of answering one short survey regarding my child's screen time. Completing this survey will take about 5 minutes. This survey will be available through a link that will be send to my email.

In addition to completing this survey, my child's participation will include attending one session of 45 minutes online, through Zoom or Microsoft Teams. The research team will email me the date and time for the session. At this session, my child will participate in watching two short advertisement videos (one minute each) and answering a few questions afterward about the advertisements. Questions will focus on participants' awareness, attitudes, and purchase intent towards a child-targeted

and an adult-targeted food advertisement. This session will be recorded.

Benefits: My participation and that of my child will provide valuable information on the impact of food and beverage advertising to children. This information may inform government policies restricting food and beverage marketing.

Risk: Neither I or my child will be at risk by participating in this study. None of the questions posed to children should make them feel uncomfortable. My child does not have to answer any questions or take part in the study they do not feel comfortable. During the recording of the session, my child will have the camera turned off and the username changed to the study ID provided at the moment.

Confidentiality and anonymity: The information that my child and I provide will only be used for the study. Our anonymity will be protected in the following manner: each individual participating in the study will be assigned a unique participant number (study ID). The document linking our identities and this number will be stored under lock and key at the University of Ottawa, will be kept separately from survey responses and will only be accessible to the Primary Investigator and her research team. Our names will not be included in any written reports and our identity will not be revealed in any situation. The recording of my child during the discussion group will not be shared or published.

Conservation of data: Data collected will be kept in a secure manner. All electronic data will be kept on a secured computer and will be protected with a password. The only people who will have access to the research data are the Principal Researcher named above and her research team. If a Research Assistant, student, or volunteer participates in this project, they will be asked to sign a confidentiality agreement beforehand and will be under the responsibility of the primary investigator. The data will be kept for a period of 10 years after the end of the project. The research team's notes which may include my name and contact information will be kept in a locked cabinet which will be located in the Principal Researcher's locked workspace which is only accessed by members of her research team. These notes will be destroyed once the study is completed.

Result dissemination: The results of this study will be shared with policymakers, presented at conferences, and may be published in a scientific journal. If I am interested in knowing the results, the researchers can provide a summary upon request once the study is completed.

Voluntary Participation: I understand that my child and I are under no obligation to participate and if we choose to participate, we can withdraw from the study at any time and/or refuse to answer any questions, without suffering any negative consequences. If we choose to withdraw, all data gathered until the time of withdrawal will be kept or destroyed according to our wishes.

Compensation: My child will be compensated with a \$10 gift card from Amazon for the participation in the study. The gift card will be sent to my e-mail. My child will receive the gift card even if my child chooses to withdraw from the study.

I can also contact the Principal Researcher named above (Julia Soares Guimarães) directly if I have any questions about the study. If I have any questions regarding the ethical conduct of this study, I may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa ON K1N 6N5 Tel.: (613) 562-5387 Email: ethics@uottawa.ca

By signing this form, I hereby declare that I have read this electronic informed consent, or the contents have been read to me. I have had the time and opportunity to ask questions to the facilitators and researchers of this study and my questions were answered to my satisfaction.

() I declare that I am of legal age and I am legally competent to give my consent to this agreement and to allow my child to be recorded during the session.

Name:

First Name

Last Name

Email

example@example.com

Date

mm-dd-yyyy

Thank you for your time and consideration.

Julia Soares Guimarães, PhD candidate
Faculty of Health Sciences
University of Ottawa



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Assent form: Child, 6-8 years old

Title of the study: The impact of adult-targeted food and beverage advertising on children

Julia Soares Guimarães, PhD candidate
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Monique Potvin Kent, PhD
Associate Professor
School of Epidemiology and Public
Health
Faculty of Medicine
University of Ottawa

Invitation to participate: I am invited to participate in this study.

Why are we doing this project: The goal of this study is to see how food advertising can affect children.

What will I have to do: I will watch two short advertisements and answer a few questions about it. It will take around 45 minutes. I will answer to questions about my opinion, feelings, and purchase intent about the advertisements. The session will be recorded.

My rights: I don't have to participate in this study. If I choose to participate, I can refuse to answer one or more questions or I can stop participating without there being any consequences for me or my parents (I will not be punished).

Risks: I will be at no risk by participating in this study. None of the questions asked to me should make me feel uncomfortable. I don't have to answer any questions if I don't want to.

Privacy: All my information and what I say will only be used for the study. My name will not be revealed in any situation. The recording from the session will not be shared or published.

Compensation: I will be compensated with a \$10 gift card from Amazon for the participation in the study. The gift card will be sent to my parent/guardian via e-mail. I will receive the gift card even if I choose to stop participating in the study.

I have read this form or someone has read it to me. If I did not understand something, I asked the researcher to explain it to me. I can always ask the researcher a question about the study if I don't understand something.

Please check one box:

☐ YES, I want to be in this study and I know I can change my mind later. And I agree to be recorded.

☐ NO, I do not want to be in this study.

Name: First Name Last Name Date: mm-dd-yyyy



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Assent form: Child, 9-12 years old

Title of the study: The impact of adult-targeted food and beverage advertising on children

Julia Soares Guimarães, PhD candidate
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Monique Potvin Kent, PhD
Associate Professor
School of Epidemiology and Public
Health
Faculty of Medicine
University of Ottawa

Invitation to participate: I am invited to participate in this research project.

Why are we doing this project: The goal of this study is to see how food advertising can affect children.

What will I have to do: I will watch two short advertisements and answer a few questions about it. It will take around 45 minutes. I will answer to questions about my awareness, attitudes, and purchase intent about the advertisements. This session will be recorded.

My rights: I am not required to participate in this research project. If I choose to participate, I can refuse to answer one or more questions or I can stop participating without there being any consequences for me or my parents (I will not be punished).

Risks: I will be at no risk by participating in this research project. None of the questions posed to me should make me feel uncomfortable. I do not have to answer any questions if I do not feel comfortable.

Privacy: The information that I provide will only be used for the research project. My name will not be revealed in any situation. The recording from the session will not be shared or published.

Compensation: I will be compensated with a \$10 gift card from Amazon for the participation in the research project. I will receive the gift card even if I choose to stop participating in the research project.

I have read this form or someone has read it to me. If I did not understand something, I asked the researcher to explain it to me. I can always ask the researcher a question about the research project if I don't understand something.

Please check one box:

☐ YES, I want to be in this research project and I know I can change my mind later. And I agree to be recorded.

☐ NO, I do not want to be in this research project.

Name: First Name Last Name Date: mm-dd-yyyy

Parent questionnaire

Date: __/__/__

Child identification number: _____

Q1: How old is your child?	[Numeric]
Q2: What sex was your child assigned at birth?	a. Male b. Female
Q3: Please specify your child's ethnicity.	a. White (European descent) b. East/Southeast Asian (Chinese, Korean, Japanese, Taiwanese descent; Filipino, Vietnamese, Cambodian, Thai, Indonesian, other Southeast Asian descent) c. South Asian (South Asian descent, e.g., East Indian, Pakistani, Bangladeshi, Sri Lankan, Indo-Caribbean) d. Black (African, Afro-Caribbean, African Canadian descent) e. Indigenous (First Nations, Métis, Inuit) f. Latino (Latin American, Hispanic descent) g. Middle Eastern (Arab, Persian, West Asian descent, e.g., Afghan, Egyptian, Iranian, Lebanese, Turkish, Kurdish) h. Refuse to answer i. Other (please specify)
Q4: How often does your child use a tablet?	a) Several times a day b) Once a day c) Several times a week d) Once or twice a week e) Rarely f) Never g) I don't know
Q5: How often does your child use a cell phone/smartphone?	a) Several times a day b) Once a day c) Several times a week d) Once or twice a week e) Rarely f) Never g) I don't know
Q6: How often does your child use a computer?	a. Several times a day b. Once a day c. Several times a week d. Once or twice a week e. Rarely f. Never g. I don't know
Q7: How often does your child use a television?	a. Several times a day b. Once a day

	c. Several times a week d. Once or twice a week e. Rarely f. Never
Q8: In the past week, approximately how many hours per day has your child used a screen (tablet, phone, tv, or computer) for leisure (scrolling through social media, playing games, etc.)?	a. 0 - 1 hours per day b. 2 - 3 hours per day c. 4 - 6 hours per day d. 7 - 10 hours per day e. 11 or more hours per day f. I don't know
Q9: In the past week, approximately how many hours per day has your child used a screen for educational purposes (e.g., homework)?	a. 0 - 1 hours per day b. 2 - 3 hours per day c. 4 - 6 hours per day d. 7 - 10 hours per day e. 11 or more hours per day f. I don't know
Q10: Thinking about your total monthly income, how difficult or easy is it for you to make ends meet?	a. Very difficult b. Difficult c. Neither easy nor difficult d. Easy e. Very easy f. Don't know g. Refuse to answer
Thank you for answering the questions!	

Interview guide

Table 1. General Information

Session number	
Date	____/____/____
Time	
Age	
Participant sex	Male [____], Female [____]
Interviewer name	
Note(s)	

Guide

Hi [name of parent and child]! How are you doing today?

- Ask parent/child to turn camera on if not already on
- Let parent/child know that if there are any Internet issues they can rejoin using same link

My name is [Julia Soares] and I am the Principal Investigator on this study. And I will be your interviewer today. The main reason we are here is to talk about food advertising. Do you know what that is? [allow answer]. You know those commercials for all sorts of products we see on television? That's what we will talk about today.

Nothing about today's visit will harm you in any way. If there is a time when you want to stop participating, just let me know and we can stop, ok? You can also feel free to tell me if there is ever a question you don't want to answer. Or if you have any questions, ok?

I will be recording our meeting, but everything you say will be private. That means, once we are ready to start you will turn off your camera and change your username, so we cannot identify you in the recording.

So, what we are going to do here is simple. First, I will ask you, [Parent/guardian name] to fill out an online survey that I'll send you in a minute. Second, we will watch some advertisements and talk about them, [Child name].

But before we start, let me give you a few quick rules for our interview.

- You don't have to answer every question or you can say "pass" or "I don't want to answer" if you don't want to answer.
- Take time to think before you answer.
- Please, [parent/guardian's name] let [child's name] answer all questions by himself/herself. You can even step outside during the interview and come back in the end if you prefer.
- Tell me if you don't understand me.
- There are no right or wrong answers; all answers are right answers.
- I won't tell other people what you say.

Do you have any questions about what we are going to do today?

[Answer questions.]

Do you want to participate?

[Allow answer]

[In case, participant say they don't want to participate. Thank them for their time and finish session].

Ok, so let's start! I just sent you [parent/guardian's name] the survey. Please let me know when we're done with it. The first question is you Study ID, which is [study ID].

[After they finish the survey]

Great! Thank you! Now, we will begin our interview. So, before I start the recording, please turn off your camera and change your username to your Study ID [give them they study ID].

INTERVIEW

I'll play the first video.

[Advertisement – Chocolate child-targeted advertising]

1. What was the advertisement about? What product was advertised?
2. Who created this advertisement?
3. Have you ever seen ads by this same company before?
4. Did you like the advertisement?
5. Why?
6. What stands out the most to you in the advertisement? Or what was your favorite part?
7. Would you like to buy it? Why?
8. Do you think you might ask your mom or dad to buy this product for you? Why?

9. What specifically in the advertisement makes you want to buy this product or ask your parent to buy it for you?

10. To whom do you think that product is for? Or who can eat that?

11. Is there anything in the advertisement that you did not like? Why?

Ok, now we will watch another video.

[Advertisement – Milk child-targeted advertising]

1. What was the advertisement about? What product was advertised?

2. Who created this advertisement?

3. Have you ever seen ads by this same company before?

4. Did you like the advertisement?

5. Why?

6. What stands out the most to you in the advertisement? Or what was your favorite part?

7. Would you like to buy it? Why?

8. Do you think you might ask your mom or dad to buy this product for you? Why?

9. What specifically in the advertisement makes you want to buy this product or ask your parent to buy it for you?

10. To whom do you think that product is for? Or who can eat that?

11. Is there anything in the advertisement that you did not like? Why?

Ok, now we will watch another video.

[Advertisement – Chocolate adult-targeted advertising]

1. What was the advertisement about? What product was advertised?

2. Who created this advertisement?

3. Have you ever seen ads by this same company before?

4. Did you like the advertisement?

5. Why?

6. What stands out the most to you in the advertisement? Or what was your favorite part?

7. Would you like to buy it? Why?

8. Do you think you might ask your mom or dad to buy this product for you? Why?

9. What specifically in the advertisement makes you want to buy this product or ask your parent to buy it for you?

10. To whom do you think that product is for? Or who can eat that?

11. Is there anything in the advertisement that you did not like? Why?

Ok, now we will watch another video.

[Advertisement – Milk adult-targeted advertising]

1. What was the advertisement about? What product was advertised?
2. Who created this advertisement?
3. Have you ever seen ads by this same company before?
4. Did you like the advertisement?
5. Why?
6. What stands out the most to you in the advertisement? Or what was your favorite part?
7. Would you like to buy it? Why?
8. Do you think you might ask your mom or dad to buy this product for you? Why?
9. What specifically in the advertisement makes you want to buy this product or ask your parent to buy it for you?
10. To whom do you think that product is for? Or who can eat that?
11. Is there anything in the advertisement that you did not like? Why?

Wrap-up

Is there anything we did not talk about that you think is important for us to know about these advertisements? Or any last things you want to say?

[allow answer]

Conclusion

So, with that, we end our session. Thank you for participating and sharing your thoughts and opinions. If you have any follow-up questions about this interview or this project you can contact me using the information on the forms the I sent you [Parent/guardian's name].

I wish you an amazing day!

Thank you!

Interview videos

1. Child-targeted advertisements
 - a. Milka: milk chocolate bar
[Milka: Alpine Milk - YouTube](#)
 - b. Cravendale: milk – Barry the biscuit boy
<https://www.youtube.com/watch?v=hrOvT281d4I>
2. Adult-targeted advertisements
 - a. Dove: dark chocolate bar
<https://www.youtube.com/watch?v=eJt9narRaf4>
 - b. Cravendale: milk – The milk drinker
<https://www.youtube.com/watch?v=B-MliUnwT0Y>



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Study recruitment

Looking for children aged 6 to 11 years old to participate in an online research study on television food advertising!

Aim of study: To see the impact of junk-food advertising on children's awareness of brands, attitudes towards advertising, and intent to purchase food products.

Eligibility criteria:

- Child and I must be able to read, understand and speak English;
- Child must be between the ages of 6 and 11;
- Child must have normal or corrected-to-normal vision;
- Child must be able to sit through and pay attention to the session for 45-60 minutes.

Participation in this study involves the following: Parent/guardian will answer one short survey online regarding the child's screen time. Completing this survey will take about 5 minutes. Your child's participation will include attending one session of 45 minutes online, through Zoom or Microsoft Teams.

At this session, your child will watch two short advertisement videos and answer a few questions afterward about the advertisements they saw.

Parental consent is needed for all children to participate.

Compensation: Your child will receive a \$10 gift card.

Principal Investigator: Julia Soares Guimarães, PhD candidate
Please, send an e-mail to enroll your child.

Eligible participants will be selected based on a first come, first served basis. The ethical aspects of this study were approved by the University of Ottawa Research Ethics Boards

To learn more, please contact the principal investigator, Julia Soares Guimarães.



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Eligibility survey

Study Information

Aim of study: to examine the impact of junk-food advertising on children's awareness of brands, attitudes towards advertising, intent to purchase food brands, their food preferences and intake.

Eligibility criteria:

- Child must be able to read, understand and speak English;
- Child must be between the ages of 6 and 12;
- Child must have normal or corrected-to-normal vision;
- Child must be able to sit through and pay attention to the session for 45-60 minutes;
- Child must **not** have any metabolic illnesses (e.g. diabetes; celiac disease; Crohn's, etc.), or food intolerances or allergies.

Participation in this study involves the following: Parent/guardian's participation consists of answering one short survey (SurveyMonkey) regarding their child's screen time. Completing this survey will take about 5 minutes. This survey will be available through a link that will be sent to their email. Child's participation will include attending one session of 45 minutes online. At the session, the child will watch two short advertisement videos and answer a few questions afterward about the advertisements.

Compensation: Your child will receive a \$10 gift card.

Principal Investigator: Julia Soares Guimarães, PhD (candidate).

Eligible participants will be selected based on a first come, first served basis. The ethical aspects of this study were approved by the University of Ottawa Research Ethics Board.

To learn more, please contact the principal investigator, Julia Soares Guimarães:

Q1: Do you have a child aged 6 to 12 years old?	a. Yes b. No
Q2: Are you and your child able to read and understand English?	a. Yes b. No
Q3: Does your child have normal or corrected-to-normal vision?	a. Yes b. No
Q4: Is your child able to pay attention and participate in a 45 to 60-minute discussion?	a. Yes b. No
Q5: Does your child suffer from metabolic illnesses (e.g. diabetes; celiac disease; Crohn's, etc.)?	a. Yes b. No
Q6: Does your child have any food intolerances or allergies?	a. Yes b. No
A member of the research team will follow-up with you if your child is eligible to participate.	Name: Email Address:

Please leave your full name, email address and your child's full name and age so we may contact you.	Child's name: Child's age:
If your child is eligible to participate (s)he will be invited to participate in an online video call through Zoom or Microsoft Teams. Would you be able to participate?	a. Yes b. No

Supplementary material from Study 3

Supplementary table 1. Outcomes related to purchase and purchase request.

	Outcome	Further description	Question on survey	Possible answers
Purchase request	Child request of unhealthy food products with licensed characters. Child request of unhealthy food products with spokes-characters.	Unhealthy foods include processed foods high in sugar, salt, or saturated fat, such as soda/pop, fast food, chips, sugary cereals, cookies and chocolate bars.	In the last 30 days, have your children asked you to buy any unhealthy food or drinks with characters from movies or TV (e.g., Star Wars, Disney characters)? In the last 30 days, have your children asked you to buy any unhealthy food or drinks with characters created by food companies (e.g., Tony the Tiger, Ronald McDonald)?	
Purchase	Children's ownership of toys from fast-food restaurants. Children's ownership of branded merchandise with logos for unhealthy food products. Parental purchase of unhealthy food products with licensed characters for their child Parental purchase of unhealthy food products with spokes-characters for their child	Toys from fast-food restaurants are any toy that comes with the purchase of a fast-food meal. Merchandise is any item such as clothing, posters and stickers that show the logo of an unhealthy food or drink brand, but not necessarily from the purchase of such item. Unhealthy foods include processed foods high in sugar, salt, or saturated fat, such as soda/pop, fast food, chips, sugary cereals, cookies and chocolate bars.	Do any of your children own any 'Happy Meal' toys or other toys from fast-food restaurants? Do any of your children own any clothing, posters, stickers, or other products that show a logo or brand of unhealthy food or drinks? In the last 30 days, did you buy your children any unhealthy food or drinks with characters from movies or TV (e.g., Star Wars, Disney characters)? In the last 30 days, did you buy your children any unhealthy food or drinks with characters created by food companies (e.g., Tony the Tiger, Ronald McDonald)?	• Yes • No • Don't know • Refuse to answer

Source: Hammond, D. International Food Policy Study: All Country Codebook – 2018 Survey (Wave 2). University Of Waterloo. August 2019.

Supplementary table 2. Sample characteristics of parents from the IFPS (2018), unweighted. (n=5,764).

Variable	Total (N=5,764)		Australia (N=819)		Canada (N=774)		Mexico (N=2,028)		United Kingdom (N=1,102)		United States (N=1,041)	
	% (n)	CI (95%)	% (n)	CI (95%)	% (n)	CI (95%)	% (n)	CI (95%)	% (n)	CI (95%)	% (n)	CI (95%)
Sex												
Male	48.0 (2,769)	46.8 - 49.3	43.7 (358)	40.3 - 47.1	46.6 (361)	43.1 - 50.2	51.5 (1,045)	49.4 - 53.7	47.0 (518)	44.1 - 50.0	46.8 (487)	43.8 - 49.8
Female	52.0 (2,995)	50.7 - 53.2	56.3 (463)	52.9 - 59.7	53.4 (413)	49.8 - 56.9	48.5 (983)	46.3 - 50.6	53.0 (584)	50.0 - 55.9	53.2 (554)	50.2 - 56.2
Age												
18-29 years old	18.5 (1,067)	17.5 - 19.5	16.0 (131)	13.6 - 18.7	12.0 (93)	9.9 - 14.5	23.4 (475)	21.6 - 25.3	19.2 (212)	17.0 - 21.7	15.0 (156)	12.9 - 17.3
30-44 years old	54.4 (3,137)	53.1 - 55.7	54.1 (443)	50.7 - 57.5	55.6 (430)	52.0 - 59.0	53.3 (1,081)	51.1 - 55.5	52.0 (573)	49.0 - 54.9	58.6 (610)	55.6 - 61.6
45-59 years old	24.0 (1,381)	22.9 - 25.1	25.8 (211)	22.9 - 28.9	29.3 (227)	26.2 - 32.6	21.9 (445)	20.2 - 23.8	25.3 (279)	22.8 - 28.0	21.0 (219)	18.7 - 23.6
60+ years old	3.1 (179)	2.7 - 3.6	4.2 (34)	3.0 - 5.8	3.1 (24)	2.1 - 4.6	1.3 (27)	0.9 - 1.9	3.4 (38)	2.5 - 4.7	5.4 (56)	4.2 - 6.9
Education												
Low	18.1 (1,041)	17.1 - 19.1	20.1 (165)	17.5 - 23.0	16.0 (124)	13.6 - 18.8	13.5 (274)	12.1 - 15.1	19.9 (219)	17.6 - 22.3	24.9 (259)	22.3 - 27.6
Medium	21.3 (1,226)	20.2 - 22.3	33.0 (270)	29.8 - 36.3	37.9 (293)	34.5 - 41.3	10.3 (208)	9.0 - 11.7	26.1 (288)	23.6 - 28.8	16.0 (167)	13.9 - 18.4
High	60.7 (3,497)	59.4 - 61.9	46.9 (384)	43.5 - 50.3	46.1 (357)	42.6 - 49.7	76.2 (1,546)	74.3 - 78.0	54.0 (595)	51.0 - 56.9	59.1 (615)	56.1 - 62.0
Ethnicity												
Majority	79.0 (4,555)	78.0 - 80.1	79.7 (653)	76.8 - 82.3	73.3 (567)	70.0 - 76.3	82.0 (1,663)	80.3 - 83.6	87.1 (960)	85.0 - 89.0	68.4 (712)	65.5 - 71.2
Minority	21.0 (1,209)	19.9 - 22.0	20.3 (166)	17.7 - 23.2	26.7 (143)	23.7 - 30.0	18.0 (365)	16.4 - 19.7	12.9 (142)	11.0 - 15.0	31.6 (329)	28.8 - 34.5
Income adequacy												
Very difficult	7.4 (428)	6.8 - 8.1	8.4 (69)	6.7 - 10.5	6.8 (53)	5.3 - 8.9	8.7 (176)	7.5 - 10.0	5.5 (61)	4.3 - 7.1	6.6 (69)	5.3 - 8.3
Difficult	22.5 (1,297)	21.4 - 23.6	19.2 (157)	16.6 - 22.0	18.0 (139)	15.4 - 20.8	29.2 (592)	27.3 - 31.2	21.7 (239)	19.4 - 24.2	16.3 (170)	14.2 - 18.7
Neither easy nor difficult	34.1 (1,968)	32.9 - 35.4	31.9 (261)	28.8 - 35.1	34.5 (267)	31.2 - 37.9	38.9 (789)	36.8 - 41.0	31.5 (347)	28.8 - 34.3	29.2 (304)	26.5 - 32.0
Easy	24.4 (1,406)	23.3 - 25.5	27.1 (222)	24.2 - 30.3	25.7 (199)	22.8 - 28.9	18.9 (384)	17.3 - 20.7	28.7 (316)	26.1 - 31.4	27.4 (285)	24.8 - 30.2
Very easy	11.5 (665)	10.7 - 12.4	13.4 (110)	11.3 - 15.9	15.0 (116)	12.6 - 17.7	4.3 (87)	3.5 - 5.3	12.6 (139)	10.8 - 14.7	20.5 (213)	18.1 - 23.0

CI: Confidence Interval

Supplementary Table 3. Binary Logistic Regression for the interaction between country and parental exposure and purchase request and purchase outcomes (n=5,764)

	AOR	CI (95%)	p	AOR	CI (95%)	p	AOR	CI (95%)	p
Outcome	Child ownership of Happy Meal or fast-food toys			Child ownership of branded merchandise with logos for unhealthy food products			Child request for unhealthy food with licensed characters		
Number of locations of parental exposure	1.04	0.97 - 1.11	0.29	1.21	1.11 - 1.31	0.00*	1.24	1.14 - 1.34	0.00*
Country*exposure to unhealthy food marketing									
<i>Australia vs Canada</i>	1.16	1.05 - 1.28	0.00*	1.05	0.94 - 1.17	0.42	1.06	0.95 - 1.18	0.27
<i>United Kingdom vs Canada</i>	1.10	1.00 - 1.21	0.06	1.03	0.93 - 1.15	0.54	1.09	0.97 - 1.21	0.14
<i>United States vs Canada</i>	1.11	1.02 - 1.22	0.02*	0.94	0.85 - 1.04	0.22	0.98	0.89 - 1.08	0.69
<i>Mexico vs Canada</i>	1.01	0.93 - 1.10	0.78	0.88	0.81 - 0.97	0.01*	0.91	0.83 - 1.00	0.04*
<i>United Kingdom vs Australia</i>	0.95	0.86 - 1.04	0.27	0.99	0.89 - 1.09	0.82	1.02	0.92 - 1.13	0.67
<i>United States vs Australia</i>	0.96	0.87 - 1.05	0.37	0.90	0.82 - 0.99	0.03*	0.92	0.84 - 1.01	0.09
<i>Mexico vs Australia</i>	0.87	0.80 - 0.95	0.00*	0.85	0.78 - 0.92	0.00*	0.86	0.79 - 0.93	0.00*
<i>United States vs United Kingdom</i>	1.01	0.92 - 1.11	0.78	0.91	0.83 - 0.99	0.04*	0.90	0.82 - 0.99	0.03*
<i>Mexico vs United Kingdom</i>	0.92	0.85 - 1.00	0.05	0.86	0.79 - 0.93	0.00*	0.84	0.77 - 0.91	0.00*
<i>Mexico vs United States</i>	0.91	0.84 - 0.98	0.01*	0.94	0.88 - 1.00	0.07	0.93	0.87 - 1.00	0.05
	Child request for unhealthy food with spokes-characters			Parental purchase of unhealthy food products with licensed characters			Parental purchase of unhealthy food products with spokes-characters		
Number of locations of parental exposure	1.26	1.16 - 1.37	0.00*	1.15	1.07 - 1.23	0.00*	1.17	1.08 - 1.27	0.00*
Country*exposure to unhealthy food marketing									
<i>Australia vs Canada</i>	1.01	0.91 - 1.13	0.80	1.09	0.98 - 1.20	0.10	1.04	0.94 - 1.16	0.43
<i>United Kingdom vs Canada</i>	1.05	0.94 - 1.17	0.38	1.10	0.99 - 1.22	0.09	1.07	0.96 - 1.19	0.24

<i>United States vs Canada</i>	0.99	0.89 - 1.10	0.82	1.02	0.93 - 1.12	0.65	1.02	0.92 - 1.12	0.72
<i>Mexico vs Canada</i>	0.89	0.81 - 0.98	0.01*	0.91	0.84 - 0.99	0.03*	0.93	0.85 - 1.01	0.08
<i>United Kingdom vs Australia</i>	1.04	0.94 - 1.14	0.50	1.01	0.91 - 1.12	0.85	1.02	0.93 - 1.13	0.64
<i>United States vs Australia</i>	0.97	0.88 - 1.07	0.60	0.94	0.86 - 1.03	0.18	0.98	0.89 - 1.07	0.61
<i>Mexico vs Australia</i>	0.88	0.81 - 0.95	0.00*	0.84	0.78 - 0.91	0.00*	0.89	0.82 - 0.96	0.00*
<i>United States vs United Kingdom</i>	0.94	0.85 - 1.04	0.21	0.93	0.85 - 1.03	0.15	0.95	0.86 - 1.05	0.34
<i>Mexico vs United Kingdom</i>	0.85	0.78 - 0.92	0.00*	0.83	0.77 - 0.91	0.00*	0.87	0.79 - 0.94	0.00*
<i>Mexico vs United States</i>	0.90	0.83 - 0.97	0.01*	0.89	0.84 - 0.96	0.00*	0.91	0.85 - 0.98	0.01*

*AOR: Adjusted Odds Ratio; CI: Confidence Interval; p: p-value; *p-value considered significant ($p < 0.05$) according to Benjamini-Hochberg method; adjusted for country, the presence of children aged 5 years and under, 6 to 12 years and 12-17 years, perceived income adequacy and parental sex, age, ethnicity, and education. Reference country presented second.*

Supplementary Table 4. Generalized Ordinal Logistic Regression with interaction between country and parental exposure and intake of unhealthy food and drink products during the week (n=5,764)

Predictor	AOR	CI (95%)	p	AOR	CI (95%)	p	AOR	CI (95%)	p
	Sugary drinks			Fast-food			Sugary cereals		
Moderate or high consumption (low consumption as reference)									
Number of locations of parental exposure	0.93	0.87 - 1.01	0.07	0.94	0.87 - 1.00	0.06	0.97	0.90 - 1.04	0.38
Country*exposure to unhealthy food marketing									
<i>Australia vs Canada</i>	1.01	0.91 - 1.11	0.91	0.99	0.91 - 1.09	0.86	0.96	0.88 - 1.06	0.44
<i>United Kingdom vs Canada</i>	0.96	0.87 - 1.06	0.44	0.95	0.86 - 1.05	0.30	0.95	0.86 - 1.04	0.27
<i>United States vs Canada</i>	1.04	0.94 - 1.14	0.45	0.96	0.87 - 1.06	0.44	1.01	0.91 - 1.11	0.88
<i>Mexico vs Canada</i>	1.06	0.98 - 1.16	0.15	1.05	0.97 - 1.14	0.20	1.00	0.92 - 1.10	0.92
<i>United Kingdom vs Australia</i>	0.96	0.87 - 1.05	0.33	0.96	0.87 - 1.05	0.35	0.98	0.89 - 1.08	0.70
<i>United States vs Australia</i>	1.03	0.95 - 1.12	0.47	0.97	0.88 - 1.07	0.50	1.05	0.96 - 1.14	0.33
<i>Mexico vs Australia</i>	1.06	0.98 - 1.14	0.13	1.06	0.99 - 1.14	0.09	1.04	0.96 - 1.13	0.31
<i>United States vs United Kingdom</i>	1.08	0.99 - 1.18	0.09	1.01	0.91 - 1.12	0.84	1.07	0.97 - 1.17	0.19
<i>Mexico vs United Kingdom</i>	1.11	1.02 - 1.20	0.01*	1.11	1.03 - 1.20	0.01*	1.06	0.97 - 1.16	0.17
<i>Mexico vs United States</i>	1.03	0.96 - 1.10	0.48	1.10	1.01 - 1.19	0.03*	1.00	0.92 - 1.08	0.95
High consumption (low and moderate consumption as reference)									
Number of locations of parental exposure	1.00	0.90 - 1.64	0.96	0.97	0.85 - 1.11	0.64	0.95	0.86 - 1.04	0.27
Country*exposure to unhealthy food marketing									
<i>Australia vs Canada</i>	0.95	0.83 - 0.00	0.40	0.98	0.84 - 1.13	0.75	0.97	0.86 - 1.09	0.63
<i>United Kingdom vs Canada</i>	0.96	0.84 - 1.08	0.56	0.91	0.77 - 1.06	0.23	0.95	0.84 - 1.07	0.38
<i>United States vs Canada</i>	0.93	0.83 - 1.10	0.26	0.90	0.78 - 1.05	0.20	0.98	0.88 - 1.10	0.77
<i>Mexico vs Canada</i>	1.03	0.92 - 1.05	0.59	1.06	0.90 - 1.24	0.48	1.05	0.95 - 1.16	0.37

Predictor	AOR	CI (95%)	p	AOR	CI (95%)	p	AOR	CI (95%)	p
<i>United Kingdom vs Australia</i>	1.02	0.92 - 1.16	0.74	0.93	0.83 - 1.04	0.22	0.97	0.88 - 1.08	0.64
<i>United States vs Australia</i>	0.99	0.90 - 1.13	0.77	0.93	0.84 - 1.03	0.15	1.01	0.92 - 1.11	0.80
<i>Mexico vs Australia</i>	1.09	1.00 - 1.08	0.04*	1.09	0.97 - 1.21	0.15	1.08	0.99 - 1.17	0.07
<i>United States vs United Kingdom</i>	0.97	0.89 - 1.19	0.52	1.00	0.89 - 1.11	0.95	1.04	0.94 - 1.15	0.46
<i>Mexico vs United Kingdom</i>	1.07	0.98 - 1.06	0.11	1.17	1.03 - 1.32	0.01*	1.11	1.01 - 1.21	0.03*
<i>Mexico vs United States</i>	1.11	1.03 - 1.17	0.01*	1.17	1.05 - 1.31	0.01*	1.07	0.99 - 1.15	0.10
	Snacks			Dessert			Candy		
Moderate or high consumption (low consumption as reference)									
Number of locations of parental exposure	0.97	0.90 - 1.04	0.40	0.98	0.92 - 1.05	0.59	0.94	0.88 - 1.01	0.08
Country*exposure to unhealthy food marketing									
<i>Australia vs Canada</i>	0.93	0.83 - 1.03	0.18	0.96	0.87 - 1.06	0.43	0.99	0.90 - 1.09	0.89
<i>United Kingdom vs Canada</i>	0.99	0.88 - 1.11	0.85	1.02	0.92 - 1.13	0.67	1.09	0.99 - 1.21	0.07
<i>United States vs Canada</i>	0.99	0.90 - 1.09	0.82	1.00	0.91 - 1.10	0.94	1.00	0.91 - 1.09	0.98
<i>Mexico vs Canada</i>	1.04	0.96 - 1.13	0.29	1.02	0.94 - 1.11	0.61	1.06	0.98 - 1.15	0.16
<i>United Kingdom vs Australia</i>	1.07	0.95 - 1.20	0.30	1.07	0.96 - 1.18	0.24	1.10	1.00 - 1.22	0.05
<i>United States vs Australia</i>	1.07	0.96 - 1.18	0.21	1.04	0.94 - 1.14	0.45	1.01	0.92 - 1.10	0.90
<i>Mexico vs Australia</i>	1.13	1.03 - 1.23	0.01*	1.06	0.98 - 1.16	0.15	1.07	0.98 - 1.15	0.12
<i>United States vs United Kingdom</i>	1.00	0.90 - 1.11	0.99	0.97	0.88 - 1.08	0.61	0.91	0.83 - 1.00	0.05
<i>Mexico vs United Kingdom</i>	1.06	0.96 - 1.16	0.26	1.00	0.92 - 1.09	0.97	0.97	0.89 - 1.05	0.42
<i>Mexico vs United States</i>	1.06	0.98 - 1.13	0.14	1.02	0.95 - 1.11	0.53	1.06	0.99 - 1.14	0.11
High consumption (low and moderate consumption as reference)									
Number of locations of parental exposure	0.98	0.90 - 1.07	0.73	1.05	0.96 - 1.15	0.26	0.95	0.85 - 1.05	0.30
Country*exposure to unhealthy food marketing									

Predictor	AOR	CI (95%)	p	AOR	CI (95%)	p	AOR	CI (95%)	p
<i>Australia vs Canada</i>	0.94	0.84 - 1.04	0.24	0.90	0.80 - 1.00	0.06	1.03	0.90 - 1.18	0.67
<i>United Kingdom vs Canada</i>	0.98	0.88 - 1.10	0.76	0.87	0.78 - 0.98	0.02*	0.95	0.83 - 1.08	0.44
<i>United States vs Canada</i>	0.90	0.81 - 1.00	0.05*	0.85	0.76 - 0.95	0.01*	0.95	0.84 - 1.08	0.45
<i>Mexico vs Canada</i>	1.06	0.95 - 1.18	0.33	0.97	0.87 - 1.07	0.52	1.09	0.96 - 1.23	0.17
<i>United Kingdom vs Australia</i>	1.05	0.95 - 1.16	0.33	0.97	0.88 - 1.08	0.61	0.92	0.82 - 1.03	0.15
<i>United States vs Australia</i>	0.96	0.88 - 1.05	0.38	0.95	0.86 - 1.05	0.28	0.93	0.84 - 1.02	0.13
<i>Mexico vs Australia</i>	1.13	1.03 - 1.24	0.01*	1.08	0.99 - 1.17	0.09	1.06	0.96 - 1.17	0.27
<i>United States vs United Kingdom</i>	0.91	0.83 - 1.00	0.06	0.97	0.87 - 1.08	0.59	1.01	0.91 - 1.11	0.91
<i>Mexico vs United Kingdom</i>	1.07	0.98 - 1.18	0.15	1.11	1.01 - 1.21	0.03*	1.15	1.04 - 1.27	0.01*
<i>Mexico vs United States</i>	1.17	1.07 - 1.29	0.00*	1.14	1.04 - 1.25	0.01*	1.14	1.05 - 1.24	0.00*

*AOR: Adjusted Odds Ratio; CI: Confidence Interval; p: p-value; *p-value considered significant ($p < 0.05$) according to Benjamini-Hochberg method; adjusted for country, the presence of children aged 5 years and under, 6 to 12 years and 12-17 years, perceived income adequacy and parental sex, age, ethnicity, and education. Reference country presented second.*

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Concepts and critical perspectives for food environment research: A global framework with implications for action in low- and middle-income countries

Author:
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