



## Nutritional Epidemiology

## Broadcast Television Is Not Dead: Exposure of Children to Unhealthy Food and Beverage Advertising on Television in Two Policy Environments (Ontario and Quebec). An Observational Study

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### ABSTRACT

**Background:** Food marketing can influence children's dietary behaviors. In Canada, Quebec banned commercial advertising to children under the age of 13 y in 1980, whereas advertising to children is self-regulated by industry in the rest of the country.

**Objectives:** The objective of this study was to compare the extent and power of food and beverage advertising on television to children (age: 2–11 y) in two different policy environments (Ontario and Quebec).

**Methods:** Advertising data for 57 selected food and beverage categories were licensed from Numerator for Toronto and Montreal (English and French markets) from January to December 2019. The 10 most popular stations for children (age: 2–11 y) and a subset of child-appealing stations were examined. Exposure to food advertisements (ads) was based on gross rating points. A content analysis of food ads was conducted, and the healthfulness of ads was assessed using Health Canada's proposed nutrient profile model. Descriptive statistics were tabulated for the frequency of and exposure to ads.

**Results:** On average, children were exposed to 3.7 to 4.4 food and beverage ads per day, exposure to fast-food advertising was highest (670.7–550.6 ads per year), advertising techniques were used frequently, and the majority (>90%) of advertised products were classified as unhealthy. On the top 10 stations, French children in Montreal were most exposed to unhealthy food and beverage advertising (712.3 ads per year), although they were exposed to fewer child-appealing advertising techniques compared with those in other markets. On the child-appealing stations, French children in Montreal were least exposed to food and beverage advertising (43.6 ads per year per station) and child-appealing advertising techniques compared with the other groups.

**Conclusions:** The Consumer Protection Act appears to positively impact exposure to child-appealing stations; yet, it does not sufficiently protect all children in Quebec and requires strengthening. Federal-level regulations restricting unhealthy advertising are needed to protect children across Canada.

**Keywords:** marketing, food advertising, food policy, children, television

## Introduction

Between 1975 and 2016, the worldwide prevalence of childhood obesity increased by more than 8-fold, creating a public health crisis, with 330 million children (between the age of 5 and 19 y) being overweight or having obesity [1]. In Canada, the rates of childhood obesity have significantly increased over

the past 40 years; ~18.3% of children are currently overweight, and 10.6% of children ) have obesity [2]. The burden of obesity on the healthcare system has been estimated to be between \$5 billion and \$7 billion [3]. Obesity is a complex and multifactorial condition, and increased dietary intake and unhealthy food habits are known to be its primary contributing factors [4]. Children in Canada are not meeting the recommendations set by

*Abbreviations used:* Ad Standards, Advertising Standards Canada; CAI, Canadian Children's Food and Beverage Advertising Initiative; CPA, Consumer Protection Act; GRP, gross rating points.

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Canada's Food Guide and their diets consist of high levels of ultraprocessed foods that are high in saturated fat, sugar, and sodium [5].

The marketing of unhealthy foods and beverages is a contributing factor to childhood obesity and poor diet quality [6, 7]. The WHO has defined marketing as “any form of commercial communication or message that is designed to, or has the effect of, increasing the recognition, appeal, and/or consumption of particular products and services” [8]. Research has consistently demonstrated that food marketing can influence children's attitudes, preferences, and consumption of unhealthy food and beverage products [7]. There is also strong evidence that the relationship between exposure to food marketing and children's diet-related behaviors is causal in nature [6].

Although recently there has been a shift toward advertising on digital media, food and beverage companies continue to advertise their products to children on television [9–11]. This is unsurprising considering that children (aged 2–11 y) in Canada watch >10 h of broadcast television each week despite changes in screen habits to digital devices such as tablets and smartphones [12,13]. The majority of food products marketed to children on television are dense in energy and poor in nutrients [11]. This is problematic because a plethora of marketing techniques are used to increase the power of these advertisements (ads), generating a greater appeal to children [14].

Canada is unique in its policy approach to food advertising. In Canada (outside of Quebec), food and beverage advertising is mostly self-regulated by Advertising Standards Canada (Ad Standards) as well as the food and beverage industry. The Broadcast Code for Advertising to Children, administered by Ad Standards (a self-regulatory body), limits advertising to children aged <12 y and includes some specific food advertising provisions, including that healthy foods cannot be disparaged and that snacks cannot be presented as meal replacements [15]. In addition, a group of large Canadian food and beverage corporations created the Canadian Children's Food and Beverage Advertising Initiative (CAI) in 2007 [16]. Currently, there are 16 participating corporations that have voluntarily pledged to either abstain from advertising to children aged <12 y or only advertise “better-for-you” products, according to CAI-established nutrition criteria [16]. A complete list of the CAI's participants can be found on Ad Standard's website [15], and a more detailed summary of all food marketing regulations in Canada can be found in a scoping review conducted by Prowse [17] in 2017. However, studies have demonstrated that these self-regulatory actions do not adequately protect Canadian children from unhealthy food advertising [18–21] despite high compliance by all participants, as reported by Ad Standards in 2019 [22]. In particular, the healthfulness of foods advertised during programs with high child viewership is poor, and Canadian children continue to be targeted by up to 11 food ads per hour on child-specialty stations [11, 19, 23]. In contrast, since 1980, the province of Quebec has banned commercial advertising directed at children aged <13 y in various media and child settings through the Consumer Protection Act (CPA) [24]. In order to determine whether commercial advertising is directed at children, the nature of the product, the manner in which the ad is presented, and the time and place when the ad is shown are all taken into account [25]. Previous research has shown that the CPA has decreased the frequency of promotional techniques that

appeal to children in ads particularly on French-language television stations in Quebec [26]. However, a recent study, published in 2021, showed that the frequency of ads viewed by children in the province has remained high and that children in Quebec continue to be targeted by food advertisers on television [27]. The products advertised to children in Quebec are also only marginally healthier [28]; thus, there appear to be significant gaps in the CPA's ability to protect children in Quebec from unhealthy food and beverage advertising.

The impact of food marketing is considered to be a function of both exposure and power [8]. Exposure refers to the reach and frequency of the advertising message, whereas power refers to the content and design of the message [8]. To date, there has been very little research that has examined the impact of the CPA on the power of television ads, and none has done so in the past 10 years or using full-year data. Because the CPA is being proposed as a policy model to emulate, it is essential that the impact of this policy be understood [29, 30]. The objective of this study was to compare the extent and power of food and beverage advertising on television on children's preferred stations in two different policy environments in Canada: Ontario, where advertising is self-regulated by industry, and Quebec, where advertising is regulated by government. It was hypothesized that children in Quebec would be exposed to fewer food ads and fewer child-appealing advertising techniques compared with children in Ontario. It was also hypothesized that children watching television in French in Quebec would be exposed to fewer and less powerful food and beverage ads compared with children watching English-language television in Quebec.

## Methods

### Sampling

Data on television (both broadcast and cable) advertising from January to December 2019 were licensed for a fee from Numerator, a company that provides advertising monitoring and audience profiling services in Canada. Numerator uses television viewership data from Numeris, a company which maintains a stratified sample of households, where each member wears a portable recording device that records the number of ads and programs viewed by each individual. These data are then weighted by Numerator by age and sex so that the viewership of specific ads and programs can be determined using demographic characteristics.

For this study, advertising data were collected for 3 media markets—Toronto (located in the province of Ontario, where self-regulation by industry exists), Montreal English, and Montreal French (located in the province of Quebec, where advertising is regulated by the government). These cities were selected because they are the largest English- and French-language television markets in Canada and within Quebec, respectively. Both English and French markets were selected in Montreal because previous research has shown that the CPA has a greater impact on French-language television than on English-language television [26]. Numeris' panel size for children aged 2 to 11 y was 175 children for Toronto, 86 children for Montreal English, and 92 children for Montreal French. This specific age group was selected because this is the standard age group set by Numerator and used by the broadcasting industry. A total of 57 selected food

and beverage categories were included because they are frequently advertised to children, are seen as problematic from a health perspective, and/or are health promoting. To facilitate analysis, food and beverage products were reclassified into 14 larger categories: 1) bread, 2) sweet baked or desserts, 3) candy and chocolate, 4) breakfast food, 5) dairy, 6) condiments, 7) entrees, 8) fruits or vegetables, 9) beverages, 10) miscellaneous, 11) snacks, 12) water, 13) fast-food restaurants, and 14) nonfast-food restaurants. A detailed description of each food and beverage category is provided in [Supplementary Table 1](#).

Given that Numerator data examine unequal numbers of television stations in each media market, the analysis was based on the top 10 most popular stations for children aged 2 to 11 y (i.e., stations with the greatest gross rating points [GRPs] by program from 18:30 to 23:00) in each market, including both conventional and specialty channels. A secondary analysis was conducted on child- and adolescent-appealing specialty stations (hereafter referred to as child-appealing stations) in the 3 media markets. Adolescent specialty channels were also included in this analysis because the exposure of children to food and beverage advertising on these stations was meaningful. These specialty stations were considered child appealing because a large share of their programming focused on movies and shows intended for children (e.g., cartoons) and/or adolescent-appealing or targeted programming (e.g., shows and reality television about teens or celebrities and comedy shows that are animated or based on viral videos). In Toronto and Montreal English, this subset of stations included the Disney Channel, Teletoon, MTV, Much, and YTV, whereas in Montreal French, this subset included Télétoon and Vrak.

### Frequency of and exposure to food and beverage advertising

The frequency of food and beverage advertising and the exposure of children were examined over a 24-h period for 2019 in its entirety. The frequency of food and beverage ads was measured based on the weighted frequency of the number of times the ad was broadcast on television across the entire year. Ads featuring multiple products were weighed based on the number of products featured, up to a total of 3 products, and ads that featured  $\geq 4$  products were limited to a weighting multiplier of 3. For example, if a single ad featured 4 products and was broadcast a total of 1000 times, its overall frequency was calculated as 3000. The exposure to food and beverage ads was determined based on GRPs for children aged 2 to 11 y. GRP is a measure that indicates the reach of an ad based on the percentage of individuals who watched a given ad based on the total population. The exposure to an ad per child is then determined by dividing the GRP by 100.

### Advertising techniques

To assess power, the advertising techniques featured in each ad were coded by 2 research assistants. During their training process, the intercoder reliability rate was calculated based on the number of total agreements and the total number of variables [31], and a rate of 0.93 was obtained. Any conflicts regarding the presence of advertising techniques were decided based on a consensus between the 2 coders and/or resolved

through consultation with a third reviewer. The following advertising techniques (selected based on previous research) [32] were coded for: the presence of a child actor, child-appealing product (a product that appeals to children because of the type or nature of the product [e.g., candy or mini snacks] or its shape, color, and/or design), child-appealing characters (e.g., cartoon characters, animals, or imaginary, fantasy, or virtual creatures), child language (e.g., “hey kids”), child-appealing special effects (e.g., lettering and animation), child themes (e.g., fantasy, magic, and mystery), spokes characters (i.e., brand-owned characters), licensed characters (e.g., Spiderman), cross-promotions to movies or television shows watched by children, child incentives (e.g., toys, books, and collectibles), and situations featuring a parent-child relationship or other authority-based relationship (i.e., coach-child or teacher-child). The presence of teen actors, teen language (e.g., “hey dude”), teen music (e.g., rap), teen themes (e.g., socializing, school-related activities, sports or extreme sports or risk-taking behavior, popular music or culture, and video games), teen incentives (e.g., gift card to a movie theater), and teen humor (e.g., boy wiping out on a skateboard) were also assessed. Finally, we examined the presence of contests or sweepstakes, celebrity endorsements (e.g., musical groups, film stars, and athletes), and health or nutrition claims. A complete description of the examined advertising techniques is available in [Supplementary Table 2](#).

### Nutrition information

Nutritional information was collected for each advertised product from the following sources, in order of priority: 1) the Food Label Information Program 2017 dataset (a database housed at the University of Toronto of previously collected nutrition data for products and restaurant meals) [33]; 2) the company’s Canadian website; 3) the product’s Nutrition Facts table; 4) the company’s American website; and 5) the Canadian Nutrient File [34]. Each food and beverage ad was then classified as either unhealthy or healthy according to Health Canada’s proposed nutrient profile model [35], which classifies products based on the levels of fat, sugar, and sodium in each product (this guideline was used for the purpose of this study, although these have not yet been formally adopted by the government). For this classification, the presence of 1 product considered to be unhealthy resulted in the entire ad being classified as such.

### Data analysis

Data extractions and aggregation were conducted using Numerator’s AdQuest software and Excel. Descriptive statistics were tabulated for the frequency of and exposure to ads. The exposure to food and beverage advertising per child was presented overall, by station, by food and beverage category, by marketing technique, and by nutrient classification (unhealthy compared with healthy). Because exposure is based on average frequency (GRP), no statistical regression was possible to compare the results across the markets. The average exposure per station was also calculated to facilitate comparisons across the markets.

**Table 1**

Exposure of children and frequency of food and beverage advertisements on the top 10 most popular stations for children aged 2 to 11 y and on child-appealing stations across media markets in Montreal and Toronto in 2019

Toronto			Montreal English			Montreal French		
Station	Frequency, n (%)	Exposure, ads per child per year	Station	Frequency, n (%)	Exposure, ads per child per year	Station	Frequency, n (%)	Exposure, ads per child per year
Top 10 most popular stations for children								
CBC	42,672 (8.1)	64.3	CBC	37,728 (6.8)	84.2	SériesPlus	48,986 (13.7)	39
Citytv	56,887 (10.8)	257.4	CTV Comedy	56,703 (10.2)	84.3	Z	57,019 (15.9)	61.2
CTV Comedy	56,703 (10.8)	138.5	CTV	38,599 (6.9)	417.8	Reseau Des Sports	26,215 (7.3)	107.9
CTV	45,295 (8.6)	198.3	Food Network	71,387 (12.8)	55.9	Ici Radio-Canada Tele	28,079 (7.8)	314.2
CTV 2	47,099 (8.9)	69.6	Global	54,549 (9.8)	171.8	Télé-Québec	27,943 (7.8)	207.7
Global	53,986 (10.2)	140.8	Much	84,728 (15.2)	62.9	V	27,279 (7.6)	202.3
CTV Sci Fi	61,568 (11.7)	84.8	CTV Sci Fi	61,568 (11.1)	121.5	Télétoon Français	24,858 (6.9)	60.5
SportsNet	49,654 (9.4)	176.8	TSN5	14,848 (2.7)	57.4	TVA	31,239 (8.7)	452.3
TSN4	45,981 (8.7)	157.1	Teletoon	67,984 (12.2)	135.6	TVA Sports	28,422 (7.9)	75.9
YTV	67,530 (12.8)	198.8	YTV	67,530 (12.2)	176.2	Canal Vie	57,779 (16.1)	99.2
Total	527,375 (100.0)	1,486.1	Total	555,624 (100.0)	1367.6	Total	357,819 (100.0)	1,620.2
Average per station	52,737.5	148.6	Average per station	55,562.4	136.8	Average per station	35,781.9	162.0
Child-appealing stations								
Disney Channel	26,168 (8.2)	52.3	Disney Channel	26,168 (8.2)	36.7	Télétoon Français	24,858 (41.3)	60.5
Much	84,728 (26.6)	47	Much	84,728 (26.6)	62.9	Vrak	35,335 (58.7)	26.7
MTV	72,599 (22.8)	35.2	MTV	72,599 (22.8)	14.8			
Teletoon	67,984 (21.3)	84.8	Teletoon	67,984 (21.3)	135.6			
YTV	67,530 (21.2)	198.8	YTV	67,530 (21.2)	176.2			
Total	319,009 (100.0)	418.1	Total	319,009 (100.0)	426.3	Total	60,193 (100.0)	87.2
Average per station	63,801.8	83.6	Average per station	63,801.8	85.3	Average per station	30,096.5	43.6

ads, advertisements.

Source of data: Numerator, 2019. Analysis based on the 57 selected food and beverage categories.

## Results

In 2019, Toronto had a total frequency of 527,375 food and beverage ads, Montreal English had 555,624 ads, and Montreal French had 357,819 ads on the top 10 most popular stations among children (Table 1). On average, children were exposed to 148.6 food and beverage ads per station per year in Toronto, 136.8 in Montreal English, and 162.0 in Montreal French. Among the top 10 most popular child stations in Toronto, the stations on which children were most exposed to food and beverage advertising were Citytv, YTV, and CTV. In Montreal English, the top 3 stations with the highest exposure to food and beverage advertising were CTV, YTV, and Global, whereas in Montreal French, TVA, Ici Radio-Canada, and Télé-Québec were the stations with the highest exposure rates.

When we examined the child-appealing stations exclusively (Table 1), overall, children from the Montreal French market had the lowest average exposure per station to food and beverage advertising at 43.6 ads per child per year compared with 83.6 ads per child per station in Toronto and 85.3 ads per child per station in Montreal English. On the child-appealing stations, children aged 2 to 11 y were most exposed on YTV (198.8 and 176.2 average ads per station per year in Toronto and Montreal English, respectively) and Teletoon (84.8 and 135.6 average ads per station per year in Toronto and Montreal English, respectively). In Montreal French, children aged 2 to 11 y were most exposed on Télétoon (60.5 average ads per station per year).

When absolute values were compared, children were most exposed to fast food on the top 10 most popular children’s stations in all 3 markets (670.7 ads per child per year in Toronto, 550.6 ads per child per year in Montreal English, and 583.2 ads per child per year in Montreal French) (Table 2). The category with the lowest exposure across the 3 markets was water (5.7 ads per child per year in Toronto, 5.9 ads per child per year in Montreal English, and 7.1 ads per child per year in Montreal French). Other healthier food and beverage categories, such as fruits and vegetables, were also among the categories with the

lowest exposure (26.4 ads per child per year in Toronto, 19.8 ads per child per year in Montreal English, and 29.8 ads per child per year in Montreal French).

The exposure of children by food and beverage category exclusively on child-appealing stations is shown in Table 3. Breakfast food advertising was the category with the highest exposure in Toronto (118.5 ads per child per year) and Montreal English (118.6 ads per child per year) when the absolute values were compared, whereas exposure to fast-food restaurant advertising in Montreal French dominated (39.8 ads per child per year; 99.5 weighted ads per child per year) on these stations.

The analysis of the advertising techniques used in food and beverage ads (Table 4) on the top 10 most popular child stations across the 3 markets revealed that the most frequently occurring techniques were calls to action (identified in 31.1%–37.8 % of ads), the use of child-appealing products (identified in 27.9%–42.1% of ads), and the use of health appeals (identified in 30.4%–31.3% of ads). Licensed characters were the least frequently used advertising technique across the 3 markets and were identified in only 0.3% to 0.5% of all ads. When the absolute values were compared, children aged 2 to 11 y in Toronto were most exposed to calls to action (555.3 ads per child per year), the use of child-appealing products (492.8 ads per child per year), and the use of health appeals (453.1 ads per child per year). The exposure profile was similar in Montreal French, where children were most exposed to health appeals (490.6 ads per child per year), calls to action (454.6 ads per child per year), and child-appealing products (358.5 ads per child per year). In Montreal English, the advertising techniques with the highest exposure were the use of child-appealing products (562.6 ads per child), calls to action (469.4 ads per child), and child-appealing special effects (461.7 ads per child). Despite this similarity, the Montreal French market had lower exposure to child-appealing advertising techniques on their top 10 stations, including the use of child actors, child-appealing products, child-appealing characters, the use of child language, child-appealing special effects, child themes, the use of spokes characters, licensed

**Table 2**

Frequency of food and beverage advertisements and exposure to these advertisements by food and beverage category for children aged 2 to 11 y on the top 10 most popular stations across media markets in Montreal and Toronto in 2019

Food and beverage category	Toronto		Montreal English		Montreal French	
	Frequency, n (%)	Exposure, ads per child per year	Frequency, n (%)	Exposure, ads per child per year	Frequency, n (%)	Exposure, ads per child per year
Bread	3075 (0.6)	13.0	2761 (0.5)	6.3	6727 (1.9)	70.8
Sweet baked or desserts	15,381 (2.9)	30.6	23,422 (4.2)	39.7	7754 (2.2)	27.8
Candy and chocolate	41,238 (7.8)	91.9	52,721 (9.5)	116.7	25,349 (7.1)	82.0
Breakfast food	32,641 (6.2)	109.5	51,854 (9.3)	151.1	23,160 (6.5)	85.1
Dairy	36,681 (7.0)	95.9	43,178 (7.8)	103.8	38,549 (10.8)	187.1
Condiments	6471 (1.2)	29.1	5002 (0.9)	12.6	4510 (1.3)	21.1
Entrees	15,882 (3.0)	38.6	17,461 (3.1)	36.8	13,301 (3.7)	80.6
Fruits or vegetables	9041 (1.7)	26.4	7594 (1.4)	19.8	7864 (2.2)	29.8
Beverages	29,868 (5.7)	83.5	32,942 (5.9)	86.1	27,776 (7.8)	116.8
Miscellaneous	18,119 (3.4)	45.7	15,974 (2.9)	46.5	16,009 (4.5)	83.9
Snacks	48,687 (9.2)	128.2	57,593 (10.4)	133.5	39,605 (11.1)	128.2
Water	2547 (0.5)	5.7	3958 (0.7)	5.9	2438 (0.7)	7.1
Fast-food restaurants	230,320 (43.7)	670.7	221,503 (39.9)	550.6	129,266 (36.1)	583.2
Nonfast-food restaurants	50,451 (9.6)	154.8	35,737 (6.4)	93.1	31,524 (8.8)	179.8
Total	527,375 (100.0)	1486.1	555,624 (100.0)	1367.6	357,819 (100.0)	1620.2

ads, advertisements.

Source of data: Numerator, 2019. Analysis based on the 57 selected food and beverage categories.

**Table 3**

Frequency of food and beverage advertisements and exposure to these advertisements by food and beverage category for children aged 2 to 11 y on child-appealing stations across media markets in Montreal and Toronto in 2019

Food and beverage category	Toronto		Montreal English		Montreal French		
	Frequency, n (%)	Exposure, ads per child per year	Frequency, n (%)	Exposure, ads per child per year	Frequency, n (%)	Exposure, ads per child per year	Weighted exposure, ads per child per year <sup>1</sup>
Bread	1678 (0.5)	2.2	1678 (0.5)	2.1	819 (1.4)	1.0	2.5
Sweet baked or desserts	16,898 (5.3)	20.4	16,898 (5.3)	23.4	1589 (2.6)	3.2	8.0
Candy and chocolate	32,957 (10.3)	39.1	32,957 (10.3)	47.9	5542 (9.2)	5.0	12.5
Breakfast food	44,806 (14.0)	118.5	44,806 (14.0)	118.6	5785 (9.6)	11.9	29.8
Dairy	30,726 (9.6)	49.1	30,726 (9.6)	44.8	8114 (13.5)	8.5	21.3
Condiments	1229 (0.4)	1.2	1229 (0.4)	1.4	136 (0.2)	0.6	1.5
Entrees	9216 (2.9)	8.5	9216 (2.9)	6.5	1755 (2.9)	1.8	4.5
Fruits or vegetables	782 (0.2)	2.2	782 (0.2)	1.6	853 (1.4)	1.6	4.0
Beverages	14,183 (4.4)	7.1	14,183 (4.4)	6.8	3680 (6.1)	4.3	10.8
Miscellaneous	6705 (2.1)	8.4	6705 (2.1)	8.4	3104 (5.2)	3.8	9.5
Snacks	34,024 (10.7)	49.8	34,024 (10.7)	45.6	5107 (8.5)	6.4	16.0
Water	1486 (0.5)	0.7	1486 (0.5)	0.9	0.0	0.0	0.0
Fast-food restaurants	125,206 (39.2)	110.9	125,206 (39.2)	116.9	25,481 (42.3)	39.8	99.5
Nonfast-food restaurants	7199 (2.3)	9.5	7199 (2.3)	10.2	1518 (2.5)	3.3	8.3
Total	319,009 (100.0)	418.1	319,009 (100.0)	426.3	60,193 (100.0)	87.2	218.0

ads, advertisements.

Source of data: Numerator, 2019. Analysis based on the 57 selected food and beverage classes.

<sup>1</sup> Weighted exposure: weighted exposure based on the number of stations analyzed; the data of both English markets include data from 5 stations, whereas Montreal French data include data from 2 stations.

characters, and child incentives, compared with their counterparts in Montreal English and Toronto. Exposure to adolescent language, music, themes, incentives, and humor was also lower in Montreal French than in Montreal English and Toronto.

An examination of the child- and adolescent-appealing stations (Table 5) revealed that the most used advertising techniques in both the English markets were the use of child-appealing products (51.8%), followed by child-appealing special effects (39.0%) and child-appealing characters (34.5%). When the absolute values for the most used advertising techniques (i.e. child-appealing products, special effects and characters) were compared, the exposure of children to these techniques was higher in the Montreal English market (262.4 ads per child per year, 225.8 ads per child per year, and 196.9 ads per child per year respectively) than in the Toronto market (257.0 ads per child per year, 215.7 ads per child per year, and 189.5 ads per child per year respectively).

According to Health Canada's nutrient profiling model, >90% of the total ads across the 3 markets were classified as unhealthy (Table 6). On the top 10 most popular stations among children in both the English markets, children were exposed to >650 ads per child per year that were classified as unhealthy (670.1 ads per child in Toronto and 669.9 ads per child in Montreal English), and in the Montreal French market, they were exposed to 712.3 ads per child per year. Moreover, across only

the child-appealing stations, >97% of food and beverage ads were classified as unhealthy across all 3 markets (97.3% in both Toronto and Montreal English and 97.4% in Montreal French). The frequency of broadcast of unhealthy ads to children on the top 10 main stations for children can be found in [Supplementary Table 3](#).

## Discussion

### Overall results

Overall, our results demonstrated that the exposure of children to food and beverage advertising on the top 10 television stations watched by children aged 2 to 11 y was high across all the markets. Children were exposed to 1368 to 1620 food and beverage ads on television in 2019, which translates to 3.7 to 4.4 ads per day on average per child. When exposure to advertising on television is combined with exposure to food and beverage advertising in other media and settings, it becomes evident that children are likely being exposed to very high levels of unhealthy food and beverage marketing overall. For instance, on social media, recent evidence from Ontario, Canada, has suggested that children aged 7 to 11 y are being exposed to an estimated 1560 ads per year [36].

In our study, children had the highest exposure to the fast-food restaurants, nonfast-food restaurants, and snack food

**Table 4**

Frequency of advertising techniques used in food and beverage advertisements and exposure to these techniques by children aged 2 to 11 y on the top 10 most popular stations across media markets in Montreal and Toronto in 2019<sup>1</sup>

Advertising techniques	Markets					
	Toronto		Montreal English		Montreal French	
	Frequency, n (%)	Exposure, ads per child per year)	Frequency, n (%)	Exposure, ads per child per year)	Frequency, n (%)	Exposure, ads per child per year)
Child actor	112,585 (22.0)	313.8	132,525 (24.5)	341.5	60,211 (17.7)	275.3
Child-appealing product	174,486 (34.1)	492.8	228,262 (42.1)	562.6	94,763 (27.9)	358.5
Child-appealing characters	125,267 (24.5)	392.3	157,916 (29.2)	423.3	47,128 (13.9)	191.4
Child language	34,483 (6.7)	96.5	53,406 (9.9)	141.0	9321 (2.7)	41.2
Child-appealing special effects	136,427 (26.6)	412.6	172,321 (31.8)	461.7	60,763 (17.9)	251.0
Child themes	66,231 (12.9)	206.4	94,481 (17.4)	259.8	25,221 (7.4)	106.9
Use of spokes characters	92,735 (18.1)	290.1	125,165 (23.1)	323.2	43,597 (12.8)	187.2
Use of licensed characters	1428 (0.3)	6.5	2802 (0.5)	10.3	957 (0.3)	2.9
Cross-promotions	7225 (1.4)	34.6	6934 (1.3)	23.6	7067 (2.1)	35.2
Child incentives	5626 (1.1)	19.2	7335 (1.4)	21.3	1351 (0.4)	4.5
Adolescent actor	66,742 (13.0)	195.0	77,738 (14.4)	229.7	45,036 (13.3)	220.1
Adolescent language	9718 (1.9)	38.8	16,044 (3.0)	55.9	1430 (0.4)	7.4
Adolescent music	16,231 (3.2)	59.0	23,286 (4.3)	70.2	384 (0.1)	2.7
Adolescent themes	90,051 (17.6)	291.3	102,693 (19.0)	296.9	59,326 (17.5)	277.6
Adolescent incentives	2966 (0.6)	9.4	4098 (0.8)	13.1	709 (0.2)	3.8
Adolescent humor	14,636 (2.9)	47.7	22,294 (4.1)	69.1	5244 (1.5)	21.7
Contest or sweepstakes	15,398 (3.0)	53.0	14,374 (2.7)	45.9	8916 (2.6)	42.7
Celebrity endorsement	22,068 (4.3)	74.6	21,117 (3.9)	56.1	11,259 (3.3)	44.4
Parent-child situations	98,947 (19.3)	245.7	109,172 (20.2)	251.7	56,149 (16.5)	260.1
Health appeal	160,200 (31.3)	453.1	167,004 (30.8)	422.3	103,324 (30.4)	490.6
Price promotion	136,219 (26.6)	406.4	124,190 (22.9)	302.4	61,737 (18.2)	277.7
Call to action	193,843 (37.8)	555.3	190,462 (35.2)	469.4	105,634 (31.1)	454.6

ads, advertisements.

<sup>1</sup> Analysis based on 57 selected food and beverage categories.

categories, whereas exposure to the fruits or vegetables and water categories was rare. From a public health perspective, the exposure of children to unhealthy food and beverage advertising is concerning because this exposure can normalize unhealthy diets; shape dietary preferences which may persist into adulthood [37]; negatively influence consumption; and increase the risk of obesity and other diet-related diseases in children [7, 38]. The exposure of children to fast-food advertising, which ranged from 550.6 to 670.7 ads per child per year, is worrisome given the nutritional profile of most fast-food products and evidence that has suggested that children who consume fast food are more likely to experience excess weight or obesity and/or hypertension [39].

Overall, the food and beverage advertising viewed by children on the top 10 stations was powerful because the advertising techniques used—such as calls to action; the use of child-appealing products, characters, and special effects; and health appeals—were common. The vast majority (>90%) of ads in each market were also classified as unhealthy according to the Health Canada's nutrient profiling model, indicating that they featured products high in saturated fat, total sugars, or salt. Such results, previously observed in the literature [19, 21, 23, 27, 28, 36], suggest that self-regulation in Canada (i.e., the CAI) is ineffective and that the CPA in Quebec needs to be strengthened to protect children from unhealthy food and beverage advertising on television.

### Differences between markets

In contrast to the current study's hypothesis, the exposure of children to food and beverage advertising on the top 10

television stations most frequently watched by children (aged 2–11 y) was substantially higher in the Montreal French market than in the English markets despite a higher frequency of food and beverage ads among both the English markets. The children in the Montreal French sample viewed 1620.2 food and beverage ads per child in 2019 compared with 1486.1 ads per child in the Toronto and 1367.6 ads per child in the Montreal English markets. Children in the Montreal French market were also more exposed to food and beverage ads classified as unhealthy (712.3 ads per child per year) compared with those in the Toronto (670.1 ads per child per year) and Montreal English markets (669.9 ads per child per year) across the same television station types. These results suggest that the CPA in Quebec is likely not having an impact on television stations with a general appeal. One of the blind spots of the CPA is that it only applies to stations for which children aged <13 y consist of ≥15% of the viewing audience and was not designed to restrict unhealthy food and beverage advertising to children [25]. In contrast to previous results, the average exposure of children to food and beverage advertising on the 2 Montreal French child-appealing stations was much lower (43.6 ads per child per year) compared with that on the 5 Toronto (83.6 ads per child per year) and Montreal English stations (85.3 ads per child per year). Moreover, children in the Montreal French market were much less exposed to food and beverage ads classified as unhealthy (114.0 weighted ads per child per year) compared with those in the Toronto (268.6 ads per child per year) and Montreal English markets (271.0 ads per child per year) on the child-appealing stations. This suggests that the CPA is only effective in reducing the exposure of children to unhealthy food and beverage advertising on child-appealing

**Table 5**

Frequency of advertising techniques used in food and beverage advertising to children aged 2 to 11 y and their exposure on child-appealing stations across media markets from Montreal and Toronto in 2019<sup>1</sup>

Advertising techniques	Markets						
	Toronto		Montreal English		Montreal French		
	Frequency, n (%)	Exposure, ads per child per year	Frequency, n (%)	Exposure, ads per child per year	Frequency, n (%)	Exposure, ads per child per year	Weighted exposure, ads per child per year <sup>2</sup>
Child actor	86,018 (28.1)	138.9	86,018 (28.1)	147.5	6720 (11.8)	8.1	20.3
Child-appealing product	158,768 (51.8)	257.0	158,768 (51.8)	262.4	19,906 (34.9)	28.3	70.8
Child-appealing characters	105,607 (34.5)	189.5	105,607 (34.5)	196.9	7958 (14.0)	11.5	28.8
Child language	47,235 (15.4)	88.9	47,235 (15.4)	98.2	1432 (2.5)	1.2	3.0
Child-appealing special effects	119,587 (39.0)	215.7	119,587 (39.0)	225.8	11,124 (19.5)	12.8	32.0
Child themes	77,833 (25.4)	165.5	77,833 (25.4)	171.5	3818 (6.7)	4.9	12.3
Use of spokes characters	76,283 (24.9)	143.5	76,283 (24.9)	145.9	7579 (13.3)	10.1	25.3
Use of licensed characters	3456 (1.1)	10.5	3456 (1.1)	10.8	178 (0.3)	0.0	0.0
Cross-promotions	3416 (1.1)	4.6	3416 (1.1)	4.7	823 (1.4)	1.0	2.5
Child incentives	4689 (1.5)	11.8	4689 (1.5)	11.0	267 (0.5)	0.2	0.5
Adolescent actor	58,137 (19.0)	107.3	58,137 (19.0)	109.0	7951 (13.9)	14.3	35.8
Adolescent language	16,354 (5.3)	49.7	16,354 (5.3)	53.1	443 (0.8)	1.1	2.8
Adolescent music	22,405 (7.3)	60.4	22,405 (7.3)	62.3	203 (0.4)	0.1	0.3
Adolescent themes	73,228 (23.9)	133.8	73,228 (23.9)	136.3	12,141 (21.3)	23.4	58.5
Adolescent incentives	3349 (1.1)	7.0	3349 (1.1)	6.5	199 (0.3)	0.5	1.3
Adolescent humor	20,706 (6.8)	49.3	20,706 (6.8)	50.6	1233 (2.2)	1.5	3.8
Contest or sweepstakes	9069 (3.0)	14.3	9069 (3.0)	17.0	718 (1.3)	0.7	1.8
Celebrity endorsement	11,182 (3.6)	8.7	11,182 (3.6)	7.7	1448 (2.5)	2.6	6.5
Parent-child situations	60,371 (19.7)	57.9	60,371 (19.7)	55.2	6305 (11.1)	10.2	25.5
Health appeal	89,462 (29.2)	127.3	89,462 (29.2)	126.4	17,784 (31.2)	29.7	74.3
Price promotion	60,101 (19.6)	57.8	60,101 (19.6)	58.5	7640 (13.4)	11.2	28.0
Call to action	93,853 (30.6)	98.5	93,853 (30.6)	109.3	15,516 (27.2)	24.3	60.8

ads, advertisements.

<sup>1</sup> Analysis based on 57 selected food and beverage categories.

<sup>2</sup> Weighted exposure: weighted exposure based on the number of stations analyzed; data from both English markets include data from 5 stations, whereas Montreal French data include data from 2 stations.

stations that are exclusively in French. This inequity between language groups in Quebec has previously been demonstrated in research on food and beverage advertising and reinforces the existence of a leaky border in media, which is exacerbated by differing food and beverage advertising policies in Quebec and in the rest of Canada [26, 28]. English-speaking children in Quebec are exposed to the same television stations as English-speaking children from Ontario. French-speaking children in Quebec watch different channels, and companies may be making greater efforts to respect the CPA on these stations. Government advertising regulations that apply to all of Canada would improve this inequity. The recent introduction of Bill C-252 (The Child Health Protection Act) in 2021 in the federal House of Commons, which

would restrict advertising of foods and beverages high in sugar, fat, and/or sodium to children aged <13 y across a variety of media and settings, is a step in the right direction and represents a potentially equitable approach to marketing restrictions for all of Canada [40].

The findings from the current study also highlight the need for advertising restrictions based on nutrient profiling (as has been proposed but not finalized by Health Canada). The CPA does not consider the healthfulness of advertised products because it was originally conceived to reduce the commercialization of childhood [25]. This gap highlights a significant loophole in the CPA’s advertising restrictions. Other countries, such as Chile and the United Kingdom, have included

**TABLE 6**

Frequency of “healthy” and “unhealthy” advertisements according to Health Canada’s nutrient profiling model, viewed by children aged 2 to 11 y on the top 10 most popular stations for children and on child-appealing stations across media markets from Montreal and Toronto in 2019<sup>1</sup>

Markets	Frequency, n (%)	Exposure, Ads per child per year
Top 10 most popular stations for children		
Toronto		
Healthy	21,442 (8.2)	54.3
Unhealthy	240,178 (91.8)	670.1
Montreal English		
Healthy	19,354 (6.4)	56.1
Unhealthy	282,662 (93.6)	669.9
Montreal French		
Healthy	15,716 (8.6)	73.6
Unhealthy	167,708 (91.4)	712.3
Child-appealing stations		
Toronto		
Healthy	5016 (2.7)	4.4
Unhealthy	178,244 (97.3)	268.6
Montreal English		
Healthy	5016 (2.7)	4.4
Unhealthy	178,244 (97.3)	271.0
Montreal French		
Healthy	843 (2.6)	6.0 <sup>2</sup>
Unhealthy	32,160 (97.4)	114.0 <sup>2</sup>

ads, advertisements.

<sup>1</sup> Analysis based on 57 selected food and beverage categories.

<sup>2</sup> Weighted exposure based on the number of stations analyzed; data on both English markets include data from 5 stations, whereas Montreal French data include data from 2 stations.

healthfulness criteria into their regulations for food and beverage advertising and banned the advertising of products rich in fat, sugar, or sodium [41, 42]. Evidence has shown a reduction in unhealthy food and beverage advertising [43] and an improvement toward more favorable, healthier product formulations [44] following the implementation of Chile’s regulation.

Another notable difference between the Montreal French and English markets was regarding breakfast food advertising, a category that consists primarily of cold breakfast cereals. The exposure of children in the Montreal French market was lower across the top 10 most popular stations (85.1 ads compared with 109.5 ads in Toronto and 151.1 ads in Montreal English) and much lower on child-appealing stations (29.8 weighted ads compared with 118.5 ads in Toronto and 118.6 ads in Montreal English). Lower levels of breakfast cereal advertising have been observed in previous Canadian studies that examined the exposure of children in Quebec [26]. These results potentially showed the impact of the CPA because this legislation prohibits all commercial advertising that is child directed. Because sugary breakfast cereals are frequently child targeted [45], companies that manufacture these products are presumably refraining from advertising these products on French-language television in Quebec.

The power of food and beverage advertising differed between the markets examined, with children in the Montreal French market exposed to less powerful food and beverage ads compared with children watching English-language television in Quebec, as hypothesized. Although few differences were noted between the 2 English markets, children in Quebec watching television in French were exposed to fewer advertising techniques, including the use of child actors, child-appealing products, characters, language, and special effects, themes, the use of spokes characters, licensed characters, and child incentives, on the top 10 most popular stations and on the child-appealing

stations. These findings are consistent with previous studies that compared television advertising in Quebec with that in Ontario using monthly data [26]. Child targeting under the CPA is determined by examining the nature of the product advertised, the manner of presentation, and the time and place the ad is shown [25]. The manner of presentation includes elements such as child language and music; the use of characters that appeal to children, such as imaginary creatures and heroes; and child-parent situations [25]. These results point toward the impact of the CPA, once again, on French-language television stations only. Interestingly, exposure to adolescent language, music, themes, incentives, and humor was also less common in the Montreal French market than in the Montreal English and Toronto markets, which suggests that companies are restricting their use of child-appealing techniques and techniques that may appeal to adolescents in order to ensure their compliance with the CPA. This could be considered an unintended, although positive, outcome of the CPA. Overall, the CPA proved effective in curtailing child-specific content, demonstrating its value in prohibiting certain advertising techniques and reducing the overall power of food and beverage advertising.

### Strengths and limitations

This study is the first to examine broadcast and cable television advertising of food and beverages to children aged 2 to 11 y in both Toronto (Ontario) and Montreal (Quebec) using full-year data. The use of full-year data enabled a comprehensive assessment of food and beverage advertising on television in 3 markets, minimizing biases due to holidays or other seasonal events that might impact marketing campaigns. Other strengths of this study include the evaluation of a broad range of stations in 3 different markets in Canada, in Quebec and Ontario, analyzing the presence of 22 advertising techniques, and the nutrient profile of products featured in ads. Lastly, the method used by

Numeris to collect the data, using Portable People Meter devices, is considered the gold standard for measuring the exposure of individuals to television advertising because it is not dependent on participants' recall [46].

In terms of study limitations, data were collected only in 2 major cities in Canada, and thus, this study provides neither a complete evaluation of the country nor a full assessment of the efficacy of the CPA inside the province of Quebec. The database licensed from Numerator does not provide individual-level data on exposure to advertising. It was not possible to compare the exposure of children according to sociodemographic characteristics. The unit of analysis, GRP, is an average estimate of viewership, which does not allow for statistical testing of differences between cities. Another limitation is regarding missing nutritional information. Health Canada's nutrient profiling model was successfully applied to only 48.6% of ads because many products (particularly fast-food and nonfast-food products) were seasonal and/or discontinued. As a result, nutritional data were not available on company websites or in stores, and similar products in the Canadian Nutrient File were not available. Additionally, information on serving size or ingredients was not available for most nonfast-food restaurant products, which prevented the classification of these products using the Health Canada's nutrient profiling model. Finally, the profiling model was not applied to brand ads that did not feature actual food or beverage products.

In conclusion, although the CPA in Quebec appears to confer some protection to children watching child-appealing stations in French in Quebec, this legislation could be strengthened by considering where children are actually exposed to unhealthy food and beverage advertising. Here, a watershed time of 21:00 on all stations (child-appealing stations and those that appeal to general audiences), as has been proposed in the United Kingdom, is recommended. The inclusion of healthfulness criteria to what is defined as "healthy/unhealthy" would also help strengthen the CPA so that children can be protected from advertising of food and beverages that are high in sugar, fat, and salt. In Canada, self-regulation by the industry is not sufficiently protecting children from unhealthy food and beverage advertising. Comprehensive marketing regulations designed and implemented by the government and monitored by an independent third party that restricts unhealthy food and beverage marketing to children across a variety of media and child settings, as has been proposed in Bill C-252, are needed. A whole-country approach is the only means to guard against the leaky border of media and protect our children's health from coast to coast.

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## Author responsibilities

The authors' responsibilities were as follows – MPK, JSG: designed the study; MPK: supervised data collection and

analysis; JSG, MB, LR, DW: collected the data on advertising techniques; JSG, EP, LR, MB, MP: collected the nutrition data; ML, CM, LV, MW: conducted nutrient profiling; JSG: performed analysis; MPK, JSG: drafted the manuscript; and all authors: read and approved the final manuscript.

## Disclosures

EP received a small honorarium from the Stop Marketing to Kids Coalition in 2018, a coalition of nongovernmental health organizations, for reviewing policy recommendations and supporting evidence. EP, JS, and CM were also employed by Health Canada in 2020, on a casual basis, to support research on food marketing in Canada.

## Data availability

The data described in the manuscript, code book, and analytic code will not be made available because it was licensed from Numerator and the contract does not allow data sharing.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.tjn.2022.09.002>.

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