

# The targeting of preschoolers, children, adolescents and adults by the Canadian food and beverage industry on television: a cross-sectional study

A. Pinto, E. Pauzé, M.-H. Roy-Gagnon, L. Dubois, and M. Potvin Kent

**Abstract:** Unhealthy food advertising can negatively impact children's food preferences and nutritional health. In Canada, only companies participating in the self-regulatory Children's Food and Beverage Advertising Initiative (CAI) commit to limiting unhealthy food advertising to children. We analyzed food advertising from 182 Canadian television stations in 2018. A principal component analysis explored patterns of advertising by 497 food companies and their targeting of preschoolers, children, adolescents, and adults. Chi-square analyses tested differences in the volume of advertising between target age groups by heavily advertising food companies and by CAI-participating and non-participating companies. In 2018, Maple Leaf Foods, Boulangerie St-Méthode, Exceldor Foods, Goodfood Market and Sobeys advertised most frequently during preschooler-programming. General Mills, Kellogg's, the Topps Company, Parmalat and Post Foods advertised most frequently during child-programming, while Burger King, McDonald's, General Mills, Kellogg's and Wendy's advertised most frequently during adolescent-programming. CAI-participating companies were responsible for over half of the food advertising broadcast during programs targeted to children (55%), while they accounted for less than half of the food advertising aired during programs targeting preschoolers (24%), adolescents (41%) and adults (42%). Statutory food advertising restrictions are needed to limit food companies' targeting of young people on television in Canada.

## Novelty:

- Advertising from fast food restaurant chains dominated television programming targeted to adolescents in 2018.
- Advertising from breakfast cereal, candy, and snack manufacturers dominated television programming targeted at children in 2018.
- Over 100 Canadian and transnational companies contravened broadcast restrictions on advertising to preschoolers in 2018.

*Key words:* food marketing, childhood obesity, advertising, television, nutrition policy, food companies.

**Résumé :** La publicité sur les aliments malsains peut susciter un impact négatif sur les préférences alimentaires et la santé nutritionnelle des enfants. Au Canada, seules les entreprises participant à l'autoréglementation de l'Initiative de publicité sur les aliments et les boissons pour enfants (« CAI ») s'engagent à limiter la publicité sur les aliments malsains aux enfants. Nous analysons la publicité alimentaire de 182 stations de télévision canadiennes en 2018. Une analyse en composantes principales explore les modes de publicité de 497 entreprises alimentaires et leur ciblage sur les enfants d'âge préscolaire, les enfants, les adolescents et les adultes. Les analyses du chi carré testent les différences de volume de publicité entre les groupes d'âge ciblés par les entreprises alimentaires qui font beaucoup d'annonces publicitaires et par les entreprises participantes et non participantes à CAI. En 2018, les Aliments Maple Leaf, la Boulangerie St-Méthode, Exceldor Foods, Goodfood Market et Sobeys publicisent leurs produits le plus souvent pendant la programmation destinée aux enfants d'âge préscolaire. General Mills, Kellogg's, The Topps Company, Parmalat et Post Foods font de la publicité le plus fréquemment pendant les émissions pour enfants tandis que Burger King, McDonald's, General Mills, Kellogg's et Wendy's font la publicité le plus souvent pendant les émissions pour adolescents. Les entreprises participant à CAI sont responsables de plus de la moitié de la publicité alimentaire diffusée lors d'émissions destinées aux enfants (55 %) alors qu'elles représentent moins de la moitié de la publicité alimentaire diffusée lors d'émissions ciblant les enfants d'âge préscolaire (24 %), les adolescents (41 %) et les adultes (42 %). Des restrictions légales en matière de publicité alimentaire sont nécessaires pour limiter le ciblage des jeunes par les entreprises alimentaires au Canada. [Traduit par la Rédaction]

## Les nouveautés :

- La publicité des chaînes de restauration rapide domine la programmation télévisuelle destinée aux adolescents en 2018.
- La publicité des fabricants de céréales pour petit déjeuner, de bonbons et de collations domine les émissions télévisées destinées aux enfants en 2018.
- Plus de 100 entreprises canadiennes et transnationales enfreignent les restrictions de diffusion sur la publicité destinée aux enfants d'âge préscolaire en 2018.

*Mots-clés :* marketing alimentaire, obésité infantile, publicité, télévision, politique nutritionnelle, entreprises alimentaires.

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## Introduction

Childhood is a critical period for developing the foundation for life-long health and wellbeing (Gluckman et al. 2015; Irwin et al. 2007). Excess weight in childhood that extends into adulthood has been reported to impact one's quality of life and achievements in education and employment over the life-course, in addition to increasing rates of cardiovascular disease, type 2 diabetes and hypertension (Bancej et al. 2015; Pabayo et al. 2012). In Canada, childhood obesity affects over 30% of children aged 5–17 years (Roberts et al. 2012). In addition, research reveals that more than 55% of Canadian children and adolescents' daily calorie consumption originates from ultra-processed, nutrient poor foods and drinks (Moubarac 2017). The current nutritional environment has been described as obesogenic as children are bombarded by marketing for unhealthy foods and beverages that are high in sugar, fat, and salt (Reisch et al. 2013; Smith et al. 2019). Multiple systematic reviews have illustrated the influential role of food marketing on children's food preferences, purchases, requests, consumption and risk of obesity (Andreyeva et al. 2011; Boyland et al. 2015; Cairns et al. 2013; Dalton et al. 2017; Longacre et al. 2017; McGinnis et al. 2006; Norman et al. 2016; Sadeghirad et al. 2016; Smith et al. 2019). The health impacts of food marketing and the far-reaching health effects of unhealthy diets has prompted the World Health Organization (WHO 2010) to endorse a set of recommendations to reduce the marketing of foods high in saturated fats, trans fats, free sugars, or sodium to children. The WHO has also urged governments around the world to adopt these recommendations at a national level (WHO 2010).

Despite concerns over the volume and nutritional quality of foods being marketed to Canadian children, an attempt to introduce federal statutory restrictions to food marketing in Canada failed to pass (Mulligan et al. 2020). Bill S-228 (*The Child Health Protection Act*), which sought to restrict unhealthy food and beverage marketing to children under 13 years old, in various media and settings, encountered a heavy amount of lobbying which, according to the media, ultimately led to the Bill to not be passed by the Senate (Crowe 2019; Robertson and Curry 2019; Senate of Canada 2017). What remains in Canada, at the national level, is self-regulation of food and beverage marketing to children as dictated by the advertising and food industries (Ad Standards 2018b, 2020; Mulligan et al. 2018; Prowse 2017). The Canadian Children's Food and Beverage Advertising Initiative (CAI), which launched in 2007, is a voluntary program led by 16 food and beverage corporations who have committed to improve the healthfulness of food marketing to children in Canada (Advertising Standards Canada 2009). Ten CAI-participating companies have pledged not to advertise directly to children under 12 years old on television as well as in other media and in settings such as schools (Ad Standards 2018b). The remaining 6 companies have pledged to only advertise foods whose nutrient composition complies with the CAI's Uniform Nutrition Criteria, which were developed by the CAI-participating companies and introduced in 2015 (Ad Standards 2014). These criteria outline the permitted levels of saturated fat, sugar, sodium and total calories, specific to 8 categories (e.g., milk and alternatives, meals on the go, etc.), for advertised foods to be considered "better-for-you" (Ad Standards 2014). Each corporation also establishes their own child audience thresholds (i.e., the proportion of the viewing audience of children under 12 years old that must be met before pledges apply), which range from 25% to 35% (Ad Standards 2018b; Pinto et al. 2020; Potvin Kent et al. 2018). Both CAI-participating and non-participating companies must also adhere to the *Broadcast Code for Advertising to Children* (hereafter referred to as the Children's Code), which outlines the permitted level of advertising and depiction of foods and beverages advertised during children's programming in broadcast media (Ad Standards 2020). Specifically, the Children's Code allows no more than 8 min of advertising per hour of children's programming (which is defined by the broadcaster as directed to children under

12 years old) and prohibits any advertising to children of pre-school age (0–5 years old) (Ad Standards 2017, 2020). Advertised foods must also be presented in serving sizes appropriate for children and must not portray snacks as replacements for meals nor discourage foods in line with *Canada's Food Guide to Healthy Eating* (e.g., fruits and vegetables) (Ad Standards 2020).

These voluntary and self-regulatory initiatives, however, have been ineffective in protecting children from unhealthy food advertising on television in Canada, Australia and the United States (US) (Kelly et al. 2019; Harris and Kalnova 2018; Pinto et al. 2020; Potvin Kent et al. 2011a, 2011b, 2014, 2018; Powell et al. 2011, 2013). In the US, 60% of preschoolers' food advertising exposure and nearly 70% of children's food advertising exposure originated from signatories of self-regulatory food marketing initiatives (Harris and Kalnova 2018). Studies have also revealed that 88%–98% of these signatories' food advertisements broadcast to and viewed by US children promoted products high in saturated fat, sugar and/or sodium (Powell et al. 2011, 2013). In 2019, Australia was shown to have the fourth highest rate of food advertising targeted on popular children's channels among 22 countries, of which more than half promoted unhealthy foods (Kelly et al. 2019). In Canada, research has demonstrated that the CAI has had little impact on the advertising practices of some participating companies. For instance, some CAI-participating companies advertised more frequently on Canadian child specialty television stations between 0600 h and midnight in 2011, after the introduction of the CAI, compared with 2006, before the introduction of the self-regulatory pledges (Potvin Kent et al. 2014). Research also reveals a clear dichotomy between CAI compliance evaluated and reported by industry and university researchers. For example, Potvin Kent et al. (2018) identified over 30 instances of non-compliance of the CAI in 2016, while Ad Standards reported 100% compliance during the same year (Potvin Kent et al. 2018). Other criticisms raised against the CAI include their unreasonably high child audience thresholds and the healthfulness of advertised products that fail to pass the nutrition standards of other nations (Potvin Kent et al. 2018). Although CAI-participating companies are responsible for more advertising to children than non-participating companies in Canada (while non-participating companies are responsible for advertising more to adolescents and adults), research also shows modest decreases in food advertising by CAI-participating companies have been replaced with unhealthy food advertising by non-participating companies (Potvin Kent et al. 2014). In fact, companies that often advertise to children on television have reportedly chosen not to participate in the CAI (Potvin Kent et al. 2014). Companies manufacturing soft drinks, breakfast cereals, candy and chocolate, and/or snack foods and several fast food companies have consistently been reported to advertise heavily to children and adolescents, nationally and/or internationally despite participation in these self-regulatory initiatives (Cairns et al. 2013; Federal Trade Commission 2012; Kelly et al. 2019; McGinnis et al. 2006; Potvin Kent and Wanless 2014; Potvin Kent et al. 2014, 2018).

It is apparent that advertising by food companies who deliberately target children varies and non-compliance with industry-led programs is present (Federal Trade Commission 2012; Kelly et al. 2019; Potvin Kent and Wanless 2014; Potvin Kent et al. 2014, 2018). However, there is no available research that has examined which food companies advertised heavily to Canadian preschoolers and adolescents on television. This study aimed to identify which food companies advertise during television programs specifically targeted to preschoolers, children, adolescents and/or adults in 2018. To help assess the impact of the CAI, this study also sought to identify differences in the volume of advertising between CAI and non-participating companies during programs aimed at preschoolers and children. It was hypothesized that fast food restaurant chains that produce kid's meals (e.g., Happy Meal, King Jr. Meals) and food companies that manufacture items such as sugary cereals, candy

and packaged snacks, would advertise more frequently during programs targeted to children and adolescents than during programs targeted to other age groups. It was also predicted that CAI-participating companies would be responsible for more advertising during programs targeted to preschoolers and children compared with non-participating companies.

## Materials and methods

We conducted a cross-sectional analysis of the Canadian Radio-television and Telecommunications Commission's (CRTC) television program logs. Program logs are open-access monthly television programming records. All Canadian television broadcasters are required to report elements of programming and advertising in compliance with the *Television Broadcasting Regulations*, 1987, as a condition of their CRTC licensure (CRTC 2016). Our study analyzed data across 182 commercial television stations that broadcast food advertising between January 1st and December 31st, 2018, from 0600 h to midnight and reported food company names in full (i.e., no abbreviations or acronyms). All television stations included in our analysis are provided in Supplementary Table S1.<sup>1</sup> In 2018, 273 commercial television stations reported advertising in the CRTC logs. Of these, we excluded 71 stations with incomplete and/or unclear reporting of food company names (i.e., these stations only reported the first 2 letters of the company's name), 18 stations without food advertising, 1 station with missing target age data and 1 station that was discontinued in 2019. It should be noted that the 71 television stations that had incomplete reporting of company names were excluded to confidently report the names of food companies advertising to children in 2018.

The program logs and their data handling have been described in detail elsewhere (Pinto et al. 2020). In brief, our study examined advertising spots including any food-related commercial messages, giveaways, local advertising, merchandising, solicitation messages and sponsorship messages. Advertisements promoting food and beverage products, fast food restaurants, sit-down restaurants, food delivery services, food retailers, dieting products, and meal kits were considered food-related advertisements (Pinto et al. 2020). The targeted age group of advertisements was inferred from that of the programs during which they aired. The target age group of a program is selected and reported by broadcasters from one of the following standardized target audience categories: preschoolers (0–5 years old), children (6–12 years old), adolescents (13–17 years old) or adults (18 years and older).

For our analysis, food companies referred to individual subsidiary companies (e.g., KFC, Taco Bell, and Pizza Hut instead of Yum! Brands); however, among cases where only the parent organization was reported, food advertisements were reported under 1 of the following parent organization names: MTY Food Group, Recipe Unlimited, and Yum! Brands. Advertisements by 9 companies that manufactured both food and non-food products (i.e., Mars Inc., Unilever Canada, Nestle Canada, Loblaw's Companies, Hain-Celestial, Federated Cooperatives Ltd., J.M. Smucker, Shoppers Drug Mart and Walmart Canada) and did not specify the advertised product were excluded from the primary analysis. Finally, food companies were classified as to whether they participated in the CAI in 2018 (Ad Standards 2018b).

## Statistical analysis

Age-specific frequencies of advertisements were calculated for each food and beverage company to describe differences in advertising across age groups. Principal component analysis (PCA) was performed to identify food and beverage companies with similar patterns of advertising across age groups. We standardized the frequency of food advertisements by food company by subtracting the mean number of food ads and dividing by the standard

deviation of food ads for each age group, to normalize the data for the PCA. The 4 target age groups were inputted as 4 separate variables in the PCA. Pearson's chi-square was used to test differences in the frequency and proportion of advertisements broadcast by the 14 most heavily advertised food companies among target age groups identified in the PCA as well as compare the volume of advertising by CAI-participating and non-participating companies. Statistical significance level was set at  $\alpha < 0.05$  and significant results were reported with exact *p*-values. We performed a sensitivity analysis to assess our treatment of unclear advertising data by including advertisements from companies that manufacture both food and non-food products with missing product information in the PCA and chi-square analyses. The sensitivity analysis further served to identify if patterns of food advertising by companies changed after repeating the PCA and chi-square tests with advertisements reporting only the names of companies that often advertise both food and non-food products (e.g., Unilever Canada), which were excluded from our primary analysis. All descriptive statistics and PCA were conducted using SAS software version 9.4 (SAS Institute Inc., Cary, N.C., USA) for Windows (SAS Institute Inc. 2013). PCA visualization was conducted in R version 3.6.2 (R Foundation for Statistical Computing, Vienna, Austria), using RStudio version 1.2.5033 (RStudio, Boston, Mass., USA) and ggplot2 and ggrepel packages (R Development Core Team 2019; R Studio Team 2019; Slowikowski 2019; Wickham 2016).

## Results

### Descriptive statistics

In 2018, 497 subsidiary food companies were responsible for 5 039 488 food advertisements broadcast from 0600 h to midnight across 182 Canadian television stations. An additional 2037 food advertisements were broadcast by unknown subsidiary companies. All subsidiaries that advertised in 2018, and their age-specific ad frequencies, are provided in the supplementary materials (Supplementary Table S2<sup>1</sup>). Of the 497 known subsidiary food companies, 120 advertised during preschooler-targeted programming, 121 advertised during child-targeted programming, 153 advertised during adolescent-targeted programming, and all 497 advertised during adult-targeted programming. Of those same companies, there were 184 sit-down restaurant subsidiaries, 162 food and beverage manufacturing subsidiaries, 94 food retailer subsidiaries, 48 fast food subsidiaries (including the parent company Yum! Brands), 4 meal kit subsidiaries, 2 diet product subsidiaries, 2 fast food/restaurant parent companies (i.e., MTY Food Group and Recipe Unlimited) and 1 food delivery subsidiary.

### Principal components analysis

The PCA identified food subsidiary companies that had similar patterns of advertising with respect to target age groups. Three principal components accounted for 93% of the variability among food companies (eigenvalues and scree plot available in Supplementary Table S3<sup>1</sup> and Supplementary Fig. S1<sup>1</sup>). Principal component 1 (PC1) reflected all target age groups and explained 60.4% of the variability in the food companies. Principal component 2 (PC2) reflected advertising to preschoolers compared with adolescents and explained an additional 19.1% of the variability. Finally, principal component 3 (PC3) reflected the advertising to preschoolers, adolescents and adults compared with children, and contributed 13.1% of the overall variation. Visualizations of component loadings are provided in Supplementary Figs. S2 and S3<sup>1</sup>.

As illustrated in the PCA plots (Figs. 1 and 2), food advertisements by General Mills, McDonald's Canada, Tim Hortons, Burger King and Kellogg's were heavily broadcast during programs targeted to each of the 4 age groups (i.e., PC1) in 2018. High scores

<sup>1</sup>Supplementary data are available with the article at <https://doi.org/10.1139/apnm-2020-0621>.

Fig. 1. Distribution of food companies between principal component 1 and principal component 2. [Colour online.]

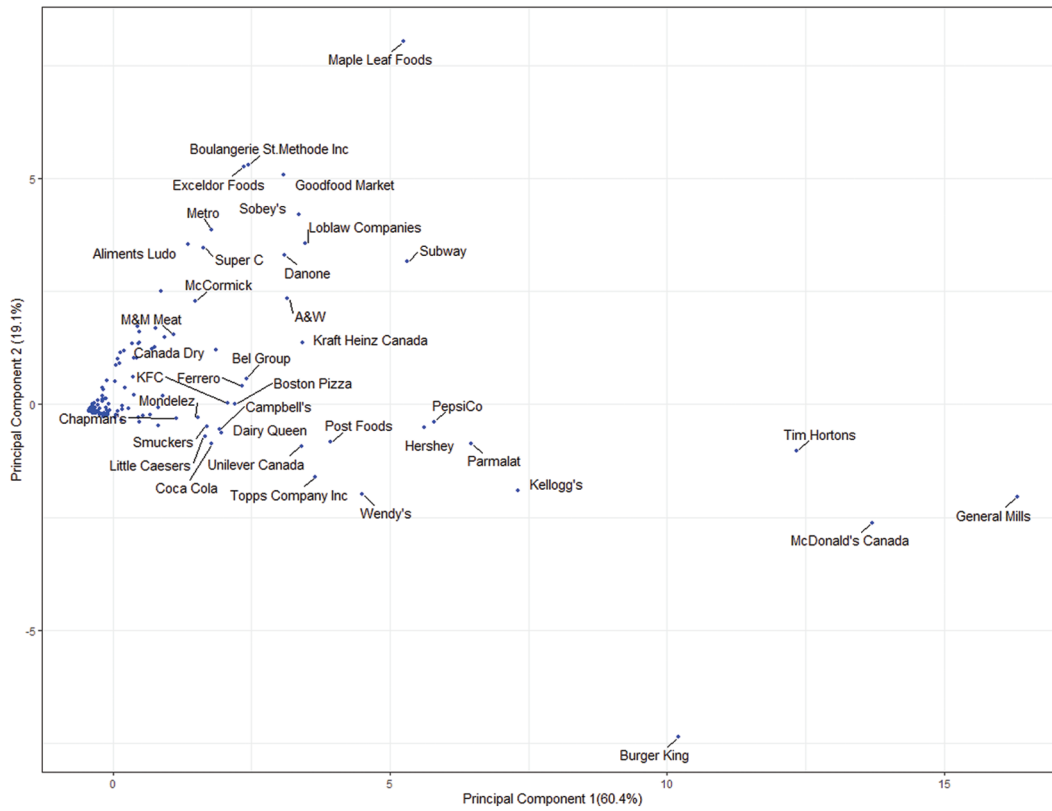
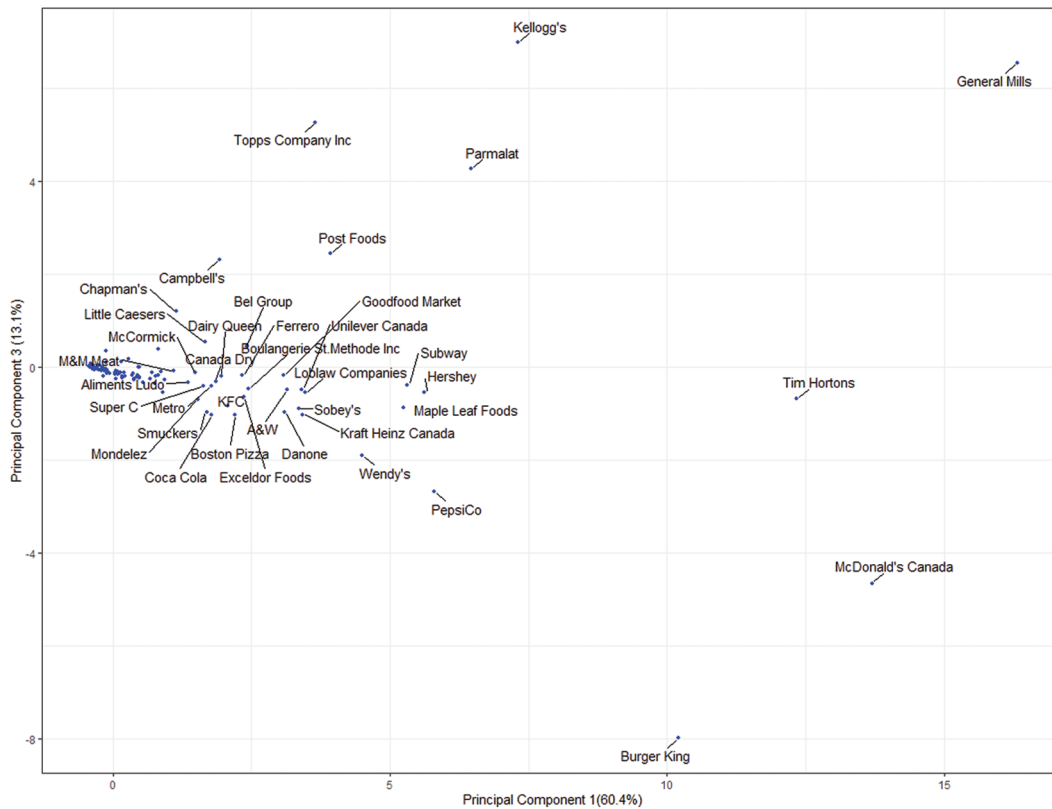


Fig. 2. Distribution of food companies between principal component 1 and principal component 3. [Colour online.]



Appl. Physiol. Nutr. Metab. Downloaded from cdsciencepub.com by 74.12.13.154 on 08/10/23

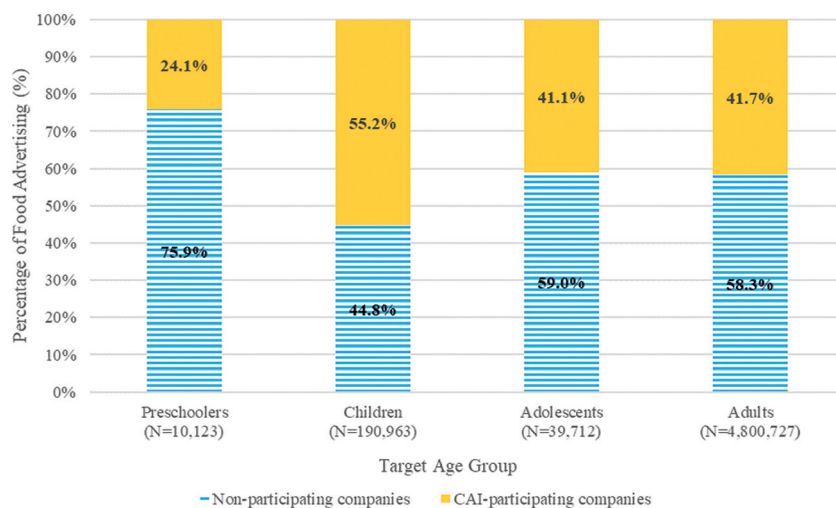
**Table 1.** Age-specific frequency and proportion\* of food ads by the 14 top advertising food companies, airing from 0600 h to midnight on 182 Canadian television stations in 2018.

Company	Food advertisements by target age group			
	Preschoolers	Children	Adolescents	Adults
Boulangerie St-Méthode	434 (4.3)	518 (0.3)	43 (0.1)	15 178 (0.3)
Burger King	11 (0.1)	2795 (1.5)	7831 (19.7)	89 020 (1.9)
Exceldor Foods	428 (4.2)	38 (0.0)	26 (0.1)	20 274 (0.4)
General Mills	348 (3.4)	33 082 (17.3)	3586 (9.0)	224 980 (4.7)
Goodfood Market	434 (4.3)	1840 (1.0)	144 (0.4)	29 900 (0.6)
Kellogg's Canada	62 (0.6)	22 575 (11.8)	528 (1.3)	116 902 (2.4)
Maple Leaf Foods	695 (6.9)	2112 (1.1)	519 (1.3)	42 175 (0.9)
McDonald's Canada	224 (2.2)	7330 (3.8)	4379 (11.0)	410 902 (8.6)
Parlat Canada	131 (1.3)	16 367 (8.6)	973 (2.5)	93 581 (2.0)
Post Foods	57 (0.6)	9655 (5.1)	520 (1.3)	85 428 (1.8)
Sobeys	385 (3.8)	965 (0.5)	438 (1.1)	56 736 (1.2)
Tim Hortons	232 (2.3)	11 871 (6.2)	2294 (5.8)	403 213 (8.4)
The Topps Company Inc.	18 (0.2)	15 754 (8.3)	466 (1.2)	222 (0.0)
Wendy's	20 (0.2)	2466 (1.3)	1808 (4.6)	146 682 (3.1)
Other companies <sup>†</sup>	6644 (65.6)	63 595 (33.3)	16 157 (40.7)	3 065 534 (63.9)
<b>Total</b>	<b>10 123 (100)</b>	<b>190 963 (100)</b>	<b>39 712 (100)</b>	<b>4 800 727 (100)</b>

Note: Values are presented as n (%).

\*Proportion of food ads calculated within target age groups.

<sup>†</sup>All companies and age-specific ad frequencies are found in Supplementary Table S2.<sup>1</sup>

**Fig. 3.** Age-specific distribution of food advertising airing between 0600 h and midnight on 182 Canadian television stations in 2018 by Children's Food and Beverage Advertising Initiative (CAI) participation. [Colour online.]

for PC2 indicated that Maple Leaf Foods, Boulangerie St-Méthode, Exceldor Foods, Goodfood Market and Sobeys advertised heavily during programs targeted at preschoolers, while low scores for PC2 indicated that Burger King, McDonald's Canada, General Mills, Kellogg's and Wendy's advertised heavily during programs targeted to adolescents (Fig. 1). Finally, high scores for PC3 revealed that General Mills, Kellogg's, the Topps Company, Parlat and Post Foods advertised heavily during programs targeted to children compared with all other age groups. In both PCA plots, we observed a distinct clustering of companies around the origin point (0,0), which demonstrated no appreciable differences in the volume of advertisements between the target age groups by these food companies.

The 14 companies identified in the PCA, and included in the chi-square analysis, accounted for 47% of the overall food

advertising in 2018. Results of the chi-square test ( $\chi^2 = 352\ 826.0$ ;  $df = 39$ ;  $p < 0.0001$ ) revealed that the number of advertisements promoting these 14 food companies significantly differed between target age groups. Among all food companies (Table 1), those advertising the most per age group were Maple Leaf, which contributed 7% of the food advertisements broadcast during programs targeted to preschoolers; General Mills, which contributed 17% of the food advertisements broadcast during programs targeted to children; Burger King, which contributed 20% of the food advertisements broadcast during programs targeted to adolescents; and Tim Hortons, which contributed 8% of the food advertisements broadcast during programs targeted to adults. Notably, only the Topps Company (a manufacturer of candy and gum) advertised more frequently during programs targeted to younger people, aged 17 years or younger, in 2018, compared with adult programming.

**Table 2.** Age-specific frequency and proportion of food advertising airing between 0600 h and midnight on 182 Canadian television stations in 2018 by CAI company.

	Food advertisements by target age group			
	Preschoolers	Children	Adolescents	Adults
<b>Companies who have pledged not to advertise to children under 12 years old</b>				
Coca Cola Ltd.	4 (0.2)	421 (0.4)	640 (3.9)	89 780 (4.5)
Ferrero Canada Ltd.	97 (4.0)	2208 (2.1)	383 (2.4)	83 420 (4.2)
Hershey Canada Inc.	131 (5.4)	5566 (5.3)	1407 (8.5)	162 381 (8.1)
Kraft Heinz Canada	184 (7.6)	1295 (1.2)	543 (3.3)	123 292 (6.2)
Maple Leaf Foods Inc.	695 (28.8)	2112 (2.0)	519 (3.2)	42 175 (2.1)
Mars Canada Inc.	5 (0.2)	941 (0.9)	245 (1.5)	48 832 (2.4)
Mondelez Canada	27 (1.1)	447 (0.4)	321 (2.0)	87 369 (4.4)
Nestle Canada	10 (0.4)	63 (0.1)	34 (0.2)	32 340 (1.6)
PepsiCo Canada ULC	104 (4.3)	466 (0.44)	1073 (6.6)	278 661 (13.9)
Unilever Canada	49 (2.0)	3490 (3.3)	1027 (6.3)	106 399 (5.3)
<b>Total</b>	<b>1306 (54)</b>	<b>17 009 (16)</b>	<b>6192 (38)</b>	<b>1 054 372 (53)</b>
<b>Companies who pledged to advertise “healthier” products only to children under 12 years old</b>				
Campbell Company of Canada	29 (1.2)	7233 (6.9)	162 (1.0)	26 634 (1.3)
Danone Inc.	317 (13.1)	769 (0.7)	450 (2.8)	67 936 (3.4)
General Mills Canada Corp.	348 (14.4)	33 082 (31.4)	3586 (22.0)	224 980 (11.3)
Kellogg’s Canada	62 (2.6)	22 575 (21.4)	528 (3.2)	116 902 (5.9)
McDonald’s Restaurants of Canada Ltd.	224 (9.3)	7330 (7.0)	4379 (26.9)	410 902 (20.6)
Parmlat Canada	131 (5.4)	16 367 (15.5)	973 (6.0)	93v581 (4.7)
WhiteWave Foods*	0 (0)	1045 (1.0)	30 (0.2)	3253 (0.2)
<b>Total</b>	<b>1111 (46)</b>	<b>88 401 (84)</b>	<b>10 108 (62)</b>	<b>944 188 (47)</b>
<b>All CAI-participating companies</b>	<b>2417 (100)</b>	<b>105 410 (100)</b>	<b>16 300 (100)</b>	<b>1 998 837 (100)</b>

Note: Values are presented as *n* (%). CAI, Children’s Food and Beverage Advertising Initiative.

\*WhiteWave Foods is a subsidiary company of Danone Inc.

Over 95% of the food advertisements by the Topps Company were broadcast during programs targeted at children in 2018.

#### CAI-participating vs. non-participating companies

Overall in 2018, CAI-participating companies were responsible for significantly less food advertisements ( $\chi^2 = 15163.1$ ;  $df = 3$ ;  $p < 0.0001$ ) broadcast during programs targeted to preschoolers (24%), adolescents (41%) and adults (42%) compared with non-participating companies. CAI-participating companies, however, were responsible for more than half of the food advertising broadcast during programs targeted to children (55%) compared with non-participating companies in 2018 (Fig. 3).

Among the CAI-participating companies, all 10 companies who pledged to abstain from advertising directly to children under 12 years old on television, when children make up 25%–35% or more of the viewing audience, broadcast food and/or beverage advertisements during programs that broadcasters have identified as targeted to preschoolers and children (Table 2).

#### Sensitivity analysis

The inclusion of broadcast advertisements with absent product information, by 9 companies who manufacture both food and non-food products, generated considerable differences in the PCA results for 3 companies: Unilever Canada, J.M. Smucker and Walmart Canada. Specifically, PC1 scores for these 3 companies increased, which suggested that they were more heavily advertised across programs for each of the target age groups, in 2018. Unilever Canada shifted from the 16th highest company for PC1 to the 6th highest; Walmart shifted from 67th highest company for PC1 to 16th highest; and J.M. Smucker shifted from 33rd highest company for PC1 to 18th highest. Notably, Unilever Canada’s score also advanced for PC2, shifting from the 8th highest advertising company during adolescent-programming to the 6th highest. No substantial differences were identified for other food companies nor did the proportion of advertising attributed to CAI-participating versus non-participating companies change.

#### Discussion

Overall, our study illustrates the wide variability in advertising practices by Canadian food companies that targeted younger people (17 years and under) on television in 2018. Although we identified 497 Canadian food subsidiary companies, youth-targeted television food advertising is saturated by a select group of companies. Specifically, preschooler-targeted advertising is dominated by companies that often sell healthier food products such as meat/poultry producers and supermarket chains, while child- and adolescent-targeted advertising are dominated by sugary cereal and snack manufacturers and large fast-food chains, respectively. These findings are in line with the existing body of Canadian and international literature on children’s food advertising (Czoli et al. 2020; Kelly et al. 2019; Pinto et al. 2020; Potvin Kent et al. 2014); however, we are the first to identify the companies that target Canadian preschoolers and adolescents on television. Even as advertising in digital media is increasing (Federal Trade Commission 2012), our results indicate that Canadian food companies continue to use traditional television to advertise extensively during programs targeted to preschoolers, children, and adolescents in 2018. Previous research investigating food advertising using measured viewership data has also found that traditional broadcast television remains a major source of food advertising exposure among young people in Canada (Czoli et al. 2020; Potvin Kent et al. 2018).

#### Big food

Findings from this study demonstrate that a large proportion of food and beverage television advertising in Canada is produced by a handful of large national, multinational, and transnational corporations. This is consistent with international research, which has also shown that a few transnational food corporations are responsible for much of the television food advertising targeted to children and adolescents globally (Kelly et al. 2019). Similar to our study, McDonald’s, General Mills, Kellogg’s, Post Foods and Restaurant Brands International (the parent company of Tim

Hortons, Burger King, and Popeyes) were identified as being among the companies advertising the most during on popular children's television stations across 22 countries (Kelly et al. 2019; Potvin Kent et al. 2014). Although not apparent in our study, companies such as Danone Inc., Mars Inc., and Nestle S.A. have been reported to advertise heavily during popular children's television stations, internationally (Kelly et al. 2019). Our results also differed from previous Canadian research, which found the subsidiaries Mr. Sub, KFC, Pizza Hut, Taco Bell and Harvey's advertised substantially to children and adolescents on television, in 2011 (Potvin Kent et al. 2014). For KFC, Pizza Hut and Taco Bell, this may be the case because some of their advertising in the current study was likely classified under their parent company Yum! Brands. This may also be the case for Harvey's, which may have some ads classified under its parent company Recipe Unlimited.

As hypothesized, the majority of food companies that advertised heavily during television programs targeted to children and adolescents in 2018 were large fast food chains producing kids' meals (i.e., McDonald's, Burger King and Wendy's) as well as manufacturers of sugary cereals, candy and packaged snacks that heavily promote these products to children (i.e., General Mills, Kellogg's, Post Foods, and the Topps Company) (Potvin Kent and Pauzé 2018; Potvin Kent et al. 2011a, 2011b, 2014, 2017, 2018; Powell et al. 2013). Notably, The Topps Company, which manufactures candy and gum, placed 95% of its food ads on child-targeted programs. The differences in the age-specific proportions of advertising by some of these companies also demonstrate that their advertising is disproportionately higher during programs targeted to children and adolescents compared with adults. For instance, the proportion of food ads by General Mills and Kellogg's during child targeted programs was 4 and 5 times higher than their advertising during adult-targeted programming, respectively. Of note, the proportion of food ads by Burger King broadcast during adolescent-targeted programming was 10 times higher than that broadcast during adult-targeted programming.

Our findings lend support to other findings in the literature that reveal that large transnational companies monopolize the media channel primarily used to reach young people (i.e., television) (Kelly et al. 2019; Potvin Kent et al. 2014). The playing field, however, is not level. The observed variations in advertising practices reveal some companies are not overtly advertising to children by placing ads on preschooler and children's programming while others are advertising heavily during such programming. In particular, our results indicate that products by General Mills, Kellogg's, and Post Foods saturate the food advertising broadcast during children's programs while Coca Cola, Mars Inc., Dominos Pizza, Johnsonville, Baskin Robbins, Harvey's, Popeye's and Mondelez, have limited their advertising during these programs. While these companies may still reach children when they are watching programs targeted at older age groups, it is clear that federal regulation, which restricts food advertising to children on television, could help to level the playing field between companies (Nestle, 2012; Potvin Kent et al. 2017).

### Impact of the CAI

Currently, the only national policy regarding the restriction of unhealthy food and beverage marketing to children under 12 years in Canada is the voluntary industry-led self-regulatory CAI. Preschoolers are also protected by the *Broadcast Code for Advertising to Children* (i.e., the Children's Code), which states that advertising, of any kind, is not permitted to this age group (0–5 years old) (Ad Standards 2017, 2020). Contrary to our hypothesis, CAI-participating companies are doing a better job than non-participating companies at limiting or refraining from broadcasting advertisements during programs targeted to preschoolers. Less than 1 in every 4 food ads broadcast during preschooler-programming came from CAI-participating companies in 2018. These results, however, further confirm the ineffectiveness of

the Children's Code in protecting preschoolers from commercial advertising, as any advertising to this age group is prohibited, regardless of CAI-participation (Ad Standards 2017; Pinto et al. 2020). Our results also demonstrated that, as predicted, CAI-participating companies advertise more during programs that broadcasters deem to be targeted to children than non-participating companies. Taken together, these results replicate past Canadian research that has consistently demonstrated the ineffectiveness of the CAI in protecting children (aged 6–12 years) from food and beverage advertising on television (Pinto et al. 2020; Potvin Kent et al. 2011a, 2011b, 2014, 2018).

Despite the commitments of the 10 CAI companies that pledged to not advertise to children aged under 12 years entirely when children comprise 25%–35% or more of the viewing audience, these companies are all responsible for advertising during programs that the broadcaster identified as targeted to preschoolers and/or children. Consequently, these 10 CAI companies contravened the Children's Code's restriction on advertising to preschoolers. In addition, these companies were also responsible for more than half of all the CAI advertisements broadcast during programs targeted to preschoolers. Among these 10 companies, Maple Leaf Foods advertised the most on programming targeted to preschoolers while Hershey Canada, Unilever Canada, Maple Leaf Foods and Ferrero Canada advertised the most on programming targeted to children between the ages of 6 and 12 years.

The remaining 6 CAI-participating companies, which pledged to only advertise “better-for-you” foods, are responsible for the majority of CAI advertising (84%) broadcast during programs targeted to children. These 6 CAI-participating companies have committed to advertise only healthier food products that meet the nutrient content requirements they established themselves when children make up 25%–35% or more of the audience. Some criticism has been levied at the definition of “better-for-you” as defined by the CAI's Uniform Nutrition Criteria (Potvin Kent et al. 2018). For instance, sugary breakfast cereals such as Chocolate Lucky Charms (35 g of sugar/100 g) and Froot Loops (38 g of sugar/100 g), produced by General Mills and Kellogg's, respectively, are listed among products permitted for advertising to children (Ad Standards 2018b; General Mills 2020; Kellogg's 2020). Notably, these 2 companies were found to have advertised the most among CAI-participating companies and all companies during programming intended for children aged 6 to 12 years in 2018. While we cannot speak to the healthfulness of the products advertised by these CAI-participating companies (as the analyzed CRTC data does not specify which products were advertised), previous research has shown that products advertised to children by CAI-participating companies are less healthy than those advertised by non-participating companies (Potvin Kent et al. 2018).

Our results also show that the voluntary nature of the CAI is problematic. For instance, of the 497 subsidiary food companies identified as advertising in our sample, only 16 participate in the CAI. Over 100 of the Canadian food subsidiary companies that advertised during programs targeted to preschoolers and children in 2018 have opted not to participate in the CAI. The number of fast food companies that were found to heavily advertise to younger people (9 companies) also draws particular attention to the lack of fast food corporations that participate in the CAI, especially given the fact that fast food restaurant promotions predominate the food advertising that is broadcast on children's specialty stations (Potvin Kent et al. 2014, 2018). McDonald's is the only fast food company that currently participates in the CAI and has committed to advertising only “better-for-you” food products to children under 12 years old on television (Ad Standards 2018b). Although Tim Hortons and Wendy's were found to advertise highly to all age groups on television, including children and adolescents, these companies have chosen not to participate in the CAI since its inception. This predominance of fast food advertising on television is concerning given that menu items for

children sold by large fast food restaurant chains in Canada are often nutritionally poor and contain excessive amounts of sodium and added sugars (Scourboutakos et al. 2016; Semnani-Azad et al. 2016). These findings, in addition to the associations established between fast food advertising and risks of obesity among children (Andreyeva et al. 2011; Smith et al. 2019), lead one to conclude that federal regulation of fast food advertising to children in Canada is required.

The exclusion of adolescents in the CAI's target age restrictions further underlines the limited scope of the CAI. We found CAI-participating companies PepsiCo and Coca Cola placed more food ads during adolescent-targeted programming than either preschooler- or child-targeted programs, in 2018. In addition, the proportion of McDonald's ads during adolescent-targeted programming was more than double that during preschooler- or child-targeted programs. It is evident that CAI-participating companies are able to target impressionable young people by shifting their advertising to those who fall outside of the CAI's target age restriction. This is problematic as the available literature suggests that adolescents, while more critical of advertising than younger children, are nevertheless vulnerable to advertising appeals that target their developmental concerns (e.g., popularity, appearance, etc.) (Story and French 2004). Furthermore, the foods that are advertised to adolescents are most often of poor nutritional quality (Czoli et al. 2020). Adolescents are targeted by companies due to their purchasing power as adolescents contribute billions of dollars to the consumer market annually (Federal Trade Commission 2012; Lapierre et al. 2017; Pinto et al. 2020). Advertising expenditure data from the US reveals most television advertising to adolescents was spent by quick service/fast food restaurants (\$130 millions) and carbonated beverage companies (\$62 million), in 2009 (Federal Trade Commission 2012). Likewise, Canadian research has reported that fast food and sugary beverages (e.g., soft drinks, energy drinks, juices) were the 2 food categories to which Canadian adolescents were the most exposed on television in 2016 (Czoli et al. 2020). It should be noted that Canadian research has shown that ultra-processed foods that are high in sugar, sodium and saturated fat comprise a significant proportion of young people's diets. In 2015, nearly 60% of children's (9–13 years old) and approximately 55% of adolescents' (14–18 years old) daily energy intakes were derived from ultra-processed foods in Canada (Moubarac 2017). The types of food products and the amount spent on advertising these products to adolescents is concerning given that poor nutrition in adolescence has been associated with an increased risk of chronic disease in later life (e.g., obesity, coronary heart disease, osteoporosis) (Neumark-Sztainer et al. 2002).

### Broadcasting codes

The results of our study illustrate the incoherence between advertising and food industry-led self-regulation in Canada. Although both the *Broadcast Code for Advertising to Children* (Children's Code) and the CAI aim to guide advertisers and broadcasters on the permitted levels of advertising during children's programming on television, both initiatives have diverging definitions on what constitutes child-targeted programming and advertising. In particular, the Children's Code defines children's programming according to the broadcaster's target age identification, while the CAI defines children's programming according to child audience measures (Ad Standards 2018b, 2020). These inconsistencies make it difficult to monitor and hold advertisers or broadcasters accountable for non-compliance. In our study, we identified 120 food subsidiary companies who aired food advertising during programs targeted to preschoolers, despite the Children's Code restriction on advertising to preschoolers. Ad Standards, however, has not reported any instances of non-compliance regarding advertising to preschoolers in their 2018 Complaints Report (Ad Standards 2018a). As aforementioned, our results

revealed that all 10 CAI-participating companies who have committed to abstain from advertising directly to children (under 12 years old), when they constitute 25%–35% or more of the viewing audience, aired advertisements during television programs that broadcasters have identified as preschooler- or child-targeted. Although these ads are not definitive cases of non-compliance with the CAI, due to differences in defining 'child-directed advertising', research using audience viewership data has also identified that many of these CAI-participating companies continue to advertise to children even on programs where their pledges to refrain from advertising would apply (Potvin Kent et al. 2018). These instances of non-compliance, however, are rarely reported by industry review (Ad Standards 2018a; Potvin Kent et al. 2018). The discrepancy between industry-led and externally conducted monitoring of compliance stresses the need for independent monitoring and further emphasizes the ineffectiveness of self-regulation in limiting food advertising to children.

### Strengths and limitations

To our knowledge, this is the first study to comprehensively investigate all food companies that specifically advertised to preschoolers, children, adolescents, and adults on television in Canada. The use of publicly available data allowed us to examine differences in advertiser practices using a full year of advertising data across 182 Canadian television stations. Notably, the use of a PCA, which is novel to this field of research, also enabled us to explore food company advertising practices while accounting for the higher volume of advertising during adult-targeted programs. We are also the first to identify the food companies that advertise to preschoolers and adolescents on television in Canada. Finally, no study to date has evaluated the frequency of advertising by CAI-participating companies during broadcaster-defined children's programming. As such, our study is the first to identify the discontinuity between broadcast and food advertising self-regulatory frameworks that concern advertising to children in Canada.

Our analysis, however, has a few limitations. First, as broadcasters self-select the target age group of programs, the results of our study can only be interpreted in terms of potential exposure. In other words, we do not know if children actually saw these advertisements. It is plausible, if not likely, that children and adolescents are watching programs that broadcasters have identified as targeting older audiences. Likewise, as we were unable to assess program viewership, we cannot assert that the food advertisements broadcast during programs targeted to children and preschoolers by the 10 CAI-participating companies who pledged to abstain from advertising to children aged under 12 years are definitive cases of non-compliance with the CAI. Our results, also, cannot speak to the healthfulness of these advertisements, due to the absence of reporting of the actual product and the nutrient information of advertised products in the CRTC logs. Consequently, we were also unable to examine the commitments of CAI-participating companies who pledged to advertise only "better-for-you" products, as we could not conduct a nutritional analysis of the food and beverage products that were specifically promoted. Finally, due to the quality of reporting by broadcasters, our findings may not be representative of food advertising across all Canadian television stations and the advertising frequency attributed to many companies is likely underestimated. For instance, 1303 032 food advertisements (nearly 21% of food advertising broadcast in 2018) from 71 major network stations including CTV, V, Discovery and TSN did not adequately report the full names of food companies in 2018. These stations and food advertisements were, therefore, excluded from our analyses. Some advertisements by the 9 companies producing food and non-food products, including some participating in the CAI (e.g., Mars Inc., Nestle Canada, Unilever Canada), were also excluded due to inadequate reporting. It should be noted that the

reporting of full company names for advertisements is required by law under the *Broadcasting Act*, and as such our research has also revealed statutory violations by 71 stations.

## Conclusion

Our study contributes to the existing body of literature that demonstrates Canada's voluntary self-regulatory programs are insufficiently protecting young people from food and beverage advertising on television (Czoli et al. 2020; Pinto et al. 2020; Potvin Kent and Wanless 2014; Potvin Kent et al. 2011a, 2011b, 2014, 2018). Federal statutory restrictions and independent monitoring of food marketing to children in Canada is necessary to hold the advertising and food industries accountable for non-compliance with the Children's Code and to limit the targeting of advertising to preschoolers, children, and adolescents by food and beverage corporations.

## Conflict of interest statement

E.P. received a small honorarium from the Stop Marketing to Kids Coalition (a group of non-governmental health organizations) for offering technical expertise, in 2018. E.P. is also supported by Office of Nutrition Policy and Promotion for contract work related to food marketing to children, outside of the submitted work. M.P.K. has previously completed a small paid contract for the World Health Organization-Europe Office. A.P. received salary support from Health Canada to conduct this research, in 2019. This funder played no role in the conceptualization of this study; the analysis or interpretation of the data; the preparation of the manuscript; or the decision to publish it.

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