Social Media Conversations about Unhealthy Food and Beverages in Canada:

AN ANALYSIS OF BRANDS FREQUENTLY MARKETED TO CHILDREN

The OUTLIVE Lab

FOOD AND NUTRITION POLICY FOR OBESITY PREVENTION

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BACKGROUND

In Canada, children have relatively poor diets, with low consumption of fruit and vegetables, and high consumption of ultra-processed foods, high in salt, sugars and saturated fat. Child obesity rates have also nearly tripled over the past three decades. Unhealthy food and beverage marketing has a significant influence on children's consumption of unhealthy food and is omnipresent in various child settings and media including on social media. Data on children and their media habits from Ontario show that 44% of children in grades 7-12 report using social media between two and four hours a day, while 20% report using social media for five or more hours per day. Recently, many industries, including the food and beverage industry, have taken to social media as one of their primary methods of marketing. Many studies have shown that most food marketing on social media promotes foods that are high in salt, sugars and saturated fat. A unique and popular feature of social media marketing is user-generated content (UGC), where a user creates and shares brand-related content. Research has demonstrated that nearly one-fifth of advertisements that children are exposed to on social media are classified as UGC. Younger people are very vulnerable to this form of marketing due to increased familiarity and trust in people within their social networks.

According to the WHO, existing regulations worldwide are insufficient in addressing the digital world. Currently in Canada, food marketing to children is mostly self-regulated by the food and beverage industry and the Children's Food and Beverage Advertising Initiative, a pledge developed by 15 large food and beverage companies, which does not include marketing to children on social media.

This study provides unique data on online conversations about food brands that are potentially targeted at children on social media. The aim of this study was to examine the following questions:

1. What is the frequency of social media posts mentioning food brands frequently targeted at children in Canada, and how many people are these posts reaching?

2. How frequently are companies that are promoted to children in Canada posting on their own social media pages, and how many people are these posts reaching?

METHODS

The food categories most frequently advertised to children and adolescents were identified from previous research on child and adolescent exposure to food marketing on social media. These categories were fast food restaurants, sugary drinks (i.e., regular soft drinks, sports drinks, fruit drinks, energy drinks, and iced tea), candy & chocolate, and snacks. Next, the top 10 brands by sales in each of these four food categories were identified using Euromonitor data for a total of 40 brands.

Data were then licensed from Brandwatch, an online digital intelligence agency that tracks posts on digital platforms. To determine the frequency of user-generated posts, the 40 identified brands were tracked on Brandwatch using queries on Twitter, Reddit, Tumblr, and YouTube for January 1-December 31, 2020. To only capture Canadian data, the data that had geographical location tags outside of Canada were excluded in the queries. The following measures were collected for each brand: frequency of mentions, net sentiment, and aggregate reach. On Twitter, two additional measures were collected: impressions and total followers.

Next, posts authored by the companies themselves were examined. A list of the Canadian social media"handles"for the 40 companies associated with the top 40 brands was compiled for Facebook, Instagram, and Twitter, and queries were created for each brand. When analyzing Twitter posts, all posts from 2020 (January 1st-December 31st) were included, and for Instagram and Facebook data, posts were collected in real-time for a three-month period (August-October 2021) due to data availability.

Average mentions per brand, reach per brand, followers per brand (Twitter only), and average impressions per brand (Twitter only) were calculated and all results were compiled in tables.

RESULTS

USER-GENERATED RESULTS

On Twitter, Reddit, Tumblr, and YouTube,

- The top 40 brands were mentioned a total of 16,851,990 times in Canada in 2020. Fast food restaurants was the food category with the highest number of mentions, with 10,195,357 mentions (60.5% of the mentions examined) and a reach of 24,534,044,603 individuals (58.1% of the reach examined). Sugary drinks had 4,935,908 mentions (29.3% of the mentions examined) and a reach of 16,020,928,319 individuals (37.9% of the reach examined).

On Twitter,

- All of the users who Tweeted regarding the top 40 brands had a cumulative following of 383,838,585,065 users and these Tweets had an estimated 491,214,611,655 impressions

- The food category with the most followers and impressions was fast food restaurants, with 325,032,920,942 (84.7%) followers and 402,193,350,209 (81.9%) impressions. Sugary drinks had the second most followers and impressions, with 52,776,303,035 (13.7%) followers and 79,887,186,937 (16.3%) impressions

COMPANY-LEVEL RESULTS

On Twitter,

- The top 40 brands examined Tweeted a total 30,294 times, reaching an estimated 846,646,194 individuals in Canada in 2020. These brands had a cumulative following of 15,746,063 users, and their Tweets were seen an estimated 12,503,230,329 times.

- Fast food restaurants was the food category with the highest number of mentions, with 29,477 (97.3%) mentions and a reach of 833,770,092 (98.5%). The cumulative followers and total impressions of the 10 fast food companies were 15,528,539 (98.6%) followers and 12,455,506,260 (99.6%) impressions.

On Instagram and Facebook,

- Over three months in 2020, the top 40 brands posted 1,484 times on Facebook and Instagram, reaching 16,932,441 users.
- The food category with the most mentions was snacks, which had 537 (36.2%) mentions. This was closely followed by fast food restaurants, which had 508 (34.2%) mentions.
- Snacks only had a reach of 1,667,297 (9.8%), which was behind sugary drinks, with a reach of 2,124,644 (12.5%) and fast food, with a reach of 11,653,545 (68.8%).

STRENGTHS AND LIMITATIONS

To our knowledge, this is the first study that provides a detailed investigation of both user-generated and company-generated conversations surrounding popular brands on social media. The limitations include the need for separate methodologies for the user-generated and company-generated analyses, the potential inclusion of posts that are from outside of Canada, the inability to determine whether specific age groups (i.e., children) were viewing the posts and the inclusion of English-language posts exclusively. Finally, data were likely underestimated due to the inability to capture all variation when creating queries, missing video data from YouTube, and technical issues that prevented the collection of data from certain company accounts.

DISCUSSION

This study demonstrates the pervasiveness of conversations on social media about unhealthy food and beverages and the predominance of fast food and sugary drink marketing on these sites. Overall, these results suggest that a food environment that promotes unhealthy foods and beverages has been created on social media through UGC and by food and beverage companies. Given that children and adolescents are extensive social media users, unhealthy food marketing on this media needs to be restricted via a regulatory approach to protect their health.

1.0 INTRODUCTION

Studies have shown that Canadian children have relatively poor diets, with low consumption of fruit and vegetables, and high consumption of salt, sugars and saturated fats[1–3]. The results of the 2015 Canadian Community Health Survey-Nutrition revealed that ultra-processed foods make up over 50% children and adolescents' average daily energy intake.[4] Obesity is also a worldwide health concern contributing to chronic diseases that can lead to premature death.[2] In Canada, child obesity rates have nearly tripled over the past three decades.[5] According to data collected in 2015 from Statistics Canada, 14% of children aged 2-11 years old had overweight, while 5.8% had obesity.[6] Childhood obesity can cause significant health and mental health issues, including the early development of cardiovascular diseases, diabetes, high blood pressure, and certain cancers which can progress into adulthood.[1,2,7] Children with obesity may also suffer from low self-esteem, depression, and anxiety, all of which can worsen their quality of life.[1,2,7] Obesity is a largely preventable problem, as one of the major contributors to obesity is poor diet.

Unhealthy food and beverage marketing has a significant influence on children's consumption of unhealthy food.[8] According to the World Health Organization (WHO), marketing is defined 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 promoted products and services".[9] Food and beverage brands are marketed in schools, out-of-home (such as on billboards), in retail settings, on product packaging, on television (TV), and more recently, on social media.[1,10–12] Specific marketing techniques are used to attract children including product placement in TV shows and/or movies, sponsorship, celebrity endorsements, the use of spokes-characters, and premiums.[1] Typically, advertised products are very high in saturated fat, sugars, and salt which can severely impact the healthfulness of children's diets and ultimately promote the development of cardiovascular and chronic diseases.[1,9] In fact, there is a strong, causal relationship between food promotion and food-related behaviours in children.[13]

Specifically, advertisements can greatly influence nutritional knowledge, food preferences, purchase requests, and caloric intake.[13] Children and adolescents are more vulnerable than adults to the persuasive messages typically seen in advertising, with younger children at an even higher risk due to their limited cognitive development.[14]

Canadian data on children and their media habits show that the most popular digital device used among children is the smartphone, with 42% of children aged 0-4, 41% of children aged 5-9, and 55% of children aged 10-13 having their own (i.e. not shared) device.[15] Smartphone use is followed closely by tablets and computers, with 29% of children 0-4 years, 30% of children aged 5-9 years, and 40% of children aged 10-13 years having their own computer, and 38% of children aged 0-4 years, 46% of children aged 5-9 years, and 53% of those aged 10-13 years having their own tablet.[15] This access to digital devices can lead to social media use. The WHO reports that in certain countries, such as the UK, as many as 78% of children 10-13 years old reported having a social media account such as Facebook or Instagram.[16] Further, they reported that in Europe, children and adolescents spend an average of 3 hours per day on social media, using a wide variety of social media platforms, such as Facebook, Instagram, Google, and YouTube, with younger children (9-11 years old) using the internet predominantly to view videos on platforms such as YouTube.[16] Canadian data also shows that social media is extremely pervasive, not only among adolescents but also among children.[17] A 2015 report found that one-third of children in grades 4-6 reported having a Facebook account, despite the age restrictions on the website.[17] Furthermore, 44% of Ontario children reported using social media between 2-4 hours a day, while 20% reported using social media for five or more hours per day.[18] Data also suggests that social media use typically increases with age.[16] For example, a survey conducted by the Office of Communications (Ofcom) in the UK, found that while 21% of children aged 8-11 had social media accounts, 71% of children aged 12-15 had such accounts.[19]

Much like other forms of marketing, unhealthy food marketing on social media has been shown to negatively impact children who are exposed to it. Research that has looked at the relationship between social media and brand advertising has found that the marketing techniques used on social media are very effective at creating positive

perceptions of products and persuading children to buy these products.[8,12,19–22] For instance, an Australian study showed that social media usage, particularly YouTube videos containing branded content, resulted in higher consumption of unhealthy food and beverages in children.[8] Other research on social media marketing supports the assumption that consumers wish to have the lifestyles of celebrities and influencers.[20] This phenomenon was observed among children (aged 10-16); when influencers and celebrities shared brand-related content, positive feelings and preferences for the endorsed brands were evoked.[20]

1.1 CHILDREN'S EXPOSURE TO UNHEALTHY FOOD MARKETING ON SOCIAL MEDIA

Recently, advertising expenditures data have demonstrated that social media has become one of the primary methods of marketing.[23] It was predicted that social media alone would account for 13% of the global advertising expenditure by the end of 2019, which is higher than previous years and this number is predicted to rise in the coming years.[23] Further, from a cost perspective, marketing on social media is incredibly cost-effective, with estimates ranging from $3-$10 for every 1,000 people reached, while other marketing mediums cost over $20 for similar reach.[24] Many studies have shown that the majority of food marketing on social media promotes foods that are high in salt, sugars, and saturated fat.[12,20] The WHO Europe for instance, reported that on social media, the types of food advertisements that are reaching the most children featured unhealthy foods, such as sugary drinks, fast foods, and sweets.[16] This trend has also been seen in Canadian research. One study on children and adolescents on social media found that the majority (72%) of participants were exposed to food marketing, and the most frequently advertised food categories were fast food and sugary drinks.[12] Furthermore, it was estimated that on average, children were exposed to 30 instances of food marketing per week on social media, while adolescents were exposed to 189 instances per week.[12] With regard to marketing techniques used on social media, a study conducted in Australia on advertisements for energy-dense, nutrient-poor foods on Facebook found that the techniques used were more interactive and unique to social media, such as games, competitions, and apps.[21] These interactive and unique marketing features often

use artificial intelligence to exploit users' social networks to increase their consumer engagement.[21]

Another unique and popular feature of social media marketing is user-generated content (UGC), where a user shares brand-related content.[21] UGC is difficult to regulate since it is generated by individuals rather than food and beverage companies.[20] Research has found that nearly one-fifth of advertisements that children are being exposed to on social media were classified as UGC.[12] Advertising campaigns that utilize UGC through hashtags, competitions, and other interactive features have been shown to be effective because users are subsequently sharing this content with their network of followers.[20] Research shows that younger people are very vulnerable to UGC, due to increased familiarity and trust in people within their social networks.[20] When one considers this vulnerability to peer influence, the increasing prevalence of children on social media and the children's innate vulnerability to marketing from a cognitive perspective, unhealthy food marketing on social media poses a potentially serious public health risk.

1.2 POLITICAL CONTEXT

In an effort to reduce rates of childhood obesity, the WHO has recommended that Member states adopt regulations that restrict unhealthy food marketing to children, and released a set of recommendations and a framework for implementing these recommendations.[9,25] Currently in Canada, food marketing to children is mostly self-regulated by the food and beverage industry and the Children's Food and Beverage Advertising Initiative, a pledge developed by 15 large food and beverage companies, which does not include marketing to children on social media.[26] In Canada, a Senate private member's bill, Bill S-228 -An Act to amend the Food and Drugs Act (prohibiting food and beverage marketing directed at children)- was introduced in 2016. The goal of the Bill was to protect children under the age of 17 (later amended to age 13) from unhealthy food advertising in various media and settings but it did not receive final approval in the Senate.[27] Since 2015, the Trudeau government has made several commitments to restrict unhealthy food marketing to children. In February 2022, a private member's bill (Bill C-252), similar in scope to Bill S-228, was introduced in the House of Commons. Furthermore, in April 2022 Health Canada committed to introduce

regulations to restrict the marketing of unhealthy food and beverages to children by the Fall of 2023. However, to date a policy gap remains in the regulation of unhealthy food marketing to children and specifically in the regulation of food marketing on social media. According to the WHO, existing regulations worldwide are insufficient in addressing the digital world.[16] The WHO has therefore called upon governments globally to protect children's rights and to prevent their exploitation via marketing in the digital world.[16]

1.3 CURRENT STUDY

Despite children's extensive social media use and exposure to food marketing online, research is lacking on the frequency of unhealthy food and beverage marketing on social media. Few studies have examined either user generated content or company posts on social media. Using data licensed from an online digital intelligence agency, this study provides unique data on online conversations about food brands on social media. The aim of this study was to examine the following questions:

1. *What is the frequency of social media posts mentioning food brands frequently targeted at children in Canada, and how many people are these posts reaching?*

2. *How frequently are companies that are promoted to children in Canada posting on their own social media pages, and how many people are these posts reaching?*

2.0 METHODS

2.1 BRAND SELECTION

The top 40 brands marketed to children were selected using a two-fold approach. First, the top four food and beverage categories advertised to children and adolescents were identified using prior Canadian research on child and adolescent exposure to food and beverage marketing on social media apps.[12] These categories were fast food restaurants, sugary drinks (i.e., regular soft drinks, sports drinks, fruit drinks, energy drinks, and iced tea), candy & chocolate, and snacks.[12] Second, the top 10 brands in each of these four food categories were identified using Euromonitor data. Euromonitor is a market research company that provides data on brand shares (e.g., sales) in various countries from 2015 to 2020. See Table 1 for food categories and their corresponding Euromonitor categories. Since sugary drinks was a category comprised of multiple subcategories in the Euromonitor data (soft drinks, fruit drinks, energy drinks, sports drinks, and sweetened teas), two brands from each subcategory were selected to create a list of 10 brands. See Table 2 for the final list of brands examined.

Table 1. Food category comparison

FOOD/BEVERAGE CATEGORY	EUROMONITOR CATEGORY
FAST FOOD RESTAURANTS	LIMITED-SERVICE RESTAURANTS
Sugary drinks 1. Soft drinks 2. Fruit drinks 3. Energy drinks 4. Sports drinks 5. Teas	1. Soft drinks – carbonates 2. Soft drinks - juices 3. Soft Drinks - energy drinks 4. Soft drinks - sports drinks 5. Soft drinks – RTD (ready-to-drink) teas
Candy & chocolate	Confectionary
Snacks	Savoury Snacks

Table 2. Top 40 brands with the highest brands shares in Canada between 2015 and 2020 from the food categories that children and adolescents were most exposed to on social media, by category

	FAST FOOD RESTAURANTS	SUGARY DRINKS	CANDY & CHOCOLATE	SNACKS
1.	Tim Hortons	Coca-Cola	Cadbury	Lay's
2	McDonald's	Pepsi	Hershey's	Doritos
3.	A&W	Gatorade	Lindt	Ruffles
4.	Subway	Powerade	Kit Kat	Miss Vickie's
5.	KFC	Tropicana	Lindor	Tostitos
6.	Wendy's	Oasis	Laura Secord	Planters
7.	Pizza Pizza	Monster	Ferrero Rocher	Old Dutch
8.	Dairy Queen	Red Bull	Reese's	Ritz
9.	Domino's Pizza	Nestea	Cadbury Dairy Milk	Jack Link's
10.	Burger King	Pure Leaf	Coffee Crisp	Premium

Source: © Euromonitor International

2.2 BRANDWATCH AND ITS DATA COLLECTION CAPABILITIES

Data on engagement analytics spanning 2019-2021 were licensed from Brandwatch, a digital consumer intelligence firm that tracks public online conversations across various digital media platforms. Brandwatch provides extensive consumer data by tracking conversations on news articles; forums; blogs; reviews; and several social media platforms including, Twitter, Reddit, Tumblr, YouTube, Facebook, and Instagram. With the focus of this study being social media, only Twitter, Reddit, Tumblr, YouTube, Facebook, and Instagram were analyzed. In this study, two separate methodologies were used to track user-generated posts and company posts. This is because depending on the platform, Brandwatch had varying degrees of coverage/access (Appendix A). The process for tracking both types of engagement is outlined separately below.

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2.3 USER-GENERATED POSTS

The 40 brands with the highest brand shares from the food categories that children and adolescents were most exposed to on social media were tracked on Twitter, Reddit, Tumblr, and YouTube. Facebook and Instagram were excluded from this analysis, and they required a separate methodology. To collect data on the brands, a "query" was created for each brand. A query is a string of keywords and operators (words such as OR, AND, NOT, etc.) which acts as instructions that tell the platform what to search for in a "mention", which includes any Tweets or other posts on social media that contain the keywords. Queries are used by Brandwatch to compile lists of mentions, called "conversations", for any given timeframe. When collecting conversation on user-generated mentions, a timeframe of one year (January 1-December 31, 2020) was selected. It is important to note that while this is a "user-generated" analysis, all posts from this timeframe were included that contained the keywords, including any mentions by the brand itself. In order to collect data on each brand, queries had to be written for each of the 40 selected brands. The main goal of the queries is to attempt to understand how people may be discussing these brands on social media. Therefore, when writing queries, it was crucial to try to consider all of the variations in the way (the spelling, word order, the nicknames/colloquial names) that people or companies may mention these brands.

Brandwatch provides country location codes to search for mentions within specific countries. To ensure data from other countries were not included, the data that had geotags (geographical location tags; provided when a user identifies their location) outside of Canada were excluded in the queries, but this was only effective for posts with geotags, which was not all posts. As a result, some of the numbers may have been inflated by untagged posts from outside of Canada.

From the queries mentioned above, the following measures were collected for each brand:

Frequency of mentions: This is a measure of the number of times a brand was mentioned on Twitter, Tumblr, Reddit, and YouTube.

Net sentiment: This is a measure to determine the sentiment regarding a brand. This score is calculated by subtracting the number of negative mentions from the positive mentions and dividing by the sum of the negative and positive mentions. It is expressed as a value between -5 to 5. A sentiment of 5 is very positive whereas a sentiment of -5 is very negative.

Aggregate reach: This is an *estimate* of the number of different individuals that have viewed each post/mention.

Impressions: This is a Twitter-specific metric. It is an estimate of the number of times a Tweet has been viewed and is calculated by summing the author's and Retweeter's followers.

Total followers: This is a Twitter-specific metric. It is a sum of all of the followers of those that have Tweeted about a given brand.

All data were organized in an Excel spreadsheet. Data were then presented at the food category level. Average mentions per brand, reach per brand, followers per brand (Twitter only), and average impressions per brand (Twitter only) were calculated and all results were compiled in tables.

2.4 COMPANY-LEVEL POSTS

After the user-generated content was examined, posts authored by the companies themselves were examined. A list of the Canadian social media "handles" for the 40 companies associated with the top 40 brands was compiled for Facebook, Instagram, and Twitter, and queries were created for each brand. If a brand did not have a Canadian account on any of the three platforms, the missing data were noted. See Table 3 for a list of which social media accounts were available for each brand. It should be noted that in one case, one brand (KitKat) had two legitimate Canadian accounts, so both were used. Furthermore, two brands (Premium and Lindor) had no Canadian social media accounts. Only original posts were included in the analysis (no Retweets, shares, comments, etc.). Furthermore, posts had to be in English to be included. As Canada has two official languages, several companies had both English and French text in their posts.

In these cases, posts were included if there was an English version in the post. Reddit and Tumblr were excluded from this analysis as there are no brand-owned pages on these platforms. Furthermore, YouTube was excluded due to technical issues with Brandwatch, resulting in the inability to access the posts on this platform.

When analyzing Twitter posts, all posts from 2020 (January 1st-December 31st) were included, and for Instagram and Facebook data, posts were collected in real-time for a three-month period (August-October 2021) due to data availability. The outcome measures collected from the Twitter accounts included frequency of mentions, aggregate reach, total followers, and total impressions. Follower counts were collected manually and were accurate as of December 2021. Follower counts for Instagram were also collected manually and included in Appendix B. For Facebook and Instagram accounts, only frequency of mentions and aggregate reach were collected. Net sentiment was not collected as it was irrelevant to measure sentiment surrounding a brands' posts about their own products.

Table 3. Social Media Accounts by Platform

	CANADIAN INSTAGRAM	CANADIAN FACEBOOK	CANADIAN TWITTER
FAST FOOD RESTAURANTS			
Tim Hortons	✓	✓	✓
McDonald's	✓	✓	✓
A&W	✓	✓	✓
Subway	✓	✓	✓
KFC	✓	✓	✓
Wendy's	✓	✓	✓
Pizza Pizza	✓	✓	✓
Dairy Queen	✓	✓	✓
Domino's Pizza	✓	✓	✓
Burger King	✓	✓	✓
SUGARY DRINKS			
Coca-Cola	✓	✓	✓
Pepsi	✓	✓	✓
Gatorade	✓	✓	✓
Powerade	✓	✓	✓
Tropicana	✓	✓	X
Oasis	✓	✓	✓
Monster	✓	X	✓
Red Bull	✓	X	✓
Nestea	✓	✓	✓
Pure Leaf	✓	✓	X
SNACKS			
Lay's	✓	✓	✓
Doritos	✓	✓	✓
Ruffles	✓	✓	✓
Miss Vickie's	✓	✓	✓
Tostitos	✓	✓	✓
Planters	✓	✓	X

	CANADIAN INSTAGRAM	CANADIAN FACEBOOK	CANADIAN TWITTER
Old Dutch	✓	✓	✓
Ritz	✓	✓	X
Jack Link's	✓	✓	X
Premium	X	X	X
CANDY & CHOCOLATE			
Cadbury	X	X	✓
Hershey's	✓	✓	X
Lindt	✓	✓	X
Kit Kat (2 accounts)	✓	✓	✓
Lindor	X	X	X
Laura Secord	✓	✓	✓
Ferrero Rocher	✓	✓	X
Reese's	✓	✓	✓
Coffee Crisp	X	X	✓
Oh Henry!	✓	✓	X

3.0 RESULTS

3.1 USER-GENERATED RESULTS

3.1.1 Frequency of brand mentions and aggregate reach

On Twitter, Reddit, Tumblr, and YouTube, the top 40 brands from each of the most promoted food categories to children and adolescents on social media were mentioned a total of 16,851,990 times in 2020 (Table 4). Fast food restaurants was the food category with the highest number of mentions, with 10,195,357 (60.5%) total mentions and a total reach of 24,534,044,603 (58.1%) individuals. Sugary drinks also had a considerable number of mentions and a high reach, with 4,935,908 (29.3%) total mentions and a total reach of 16,020,928,319 (37.9%) individuals. Snacks and candy & chocolate were not as popular as the other food categories, with only 773,279 (4.6%) and 947,446 (5.6%) total mentions, respectively, and total reaches of 676,179,208 (1.6%) and 1,013,843,026 (2.4%), respectively.

Table 4. Frequency of total mentions and total reach for the top 40 brands marketed to children*, by food category on Twitter, Reddit, Tumblr, and YouTube in 2020

FOOD CATEGORIES	MENTIONS n (%)	REACH n (%)
Fast food restaurants	10,195,357 (60.5%)	24,534,044,603 (58.1%)
Sugary drinks	4,935,908 (29.3%)	16,020,928,319 (37.9%)
Snacks	773,279 (4.6%)	676,179,208 (1.6%)
Candy & chocolate	947,446 (5.6%)	1,013,843,026 (2.4%)
Total	16,851,990 (100.0%)	42,244,995,156 (100.0%)

Source: Brandwatch, 2020
*Top 40 brands with the highest brands shares in Canada between 2015 and 2020 from the food categories that children and adolescents were most exposed to on social media in Potvin Kent et al. (2019).
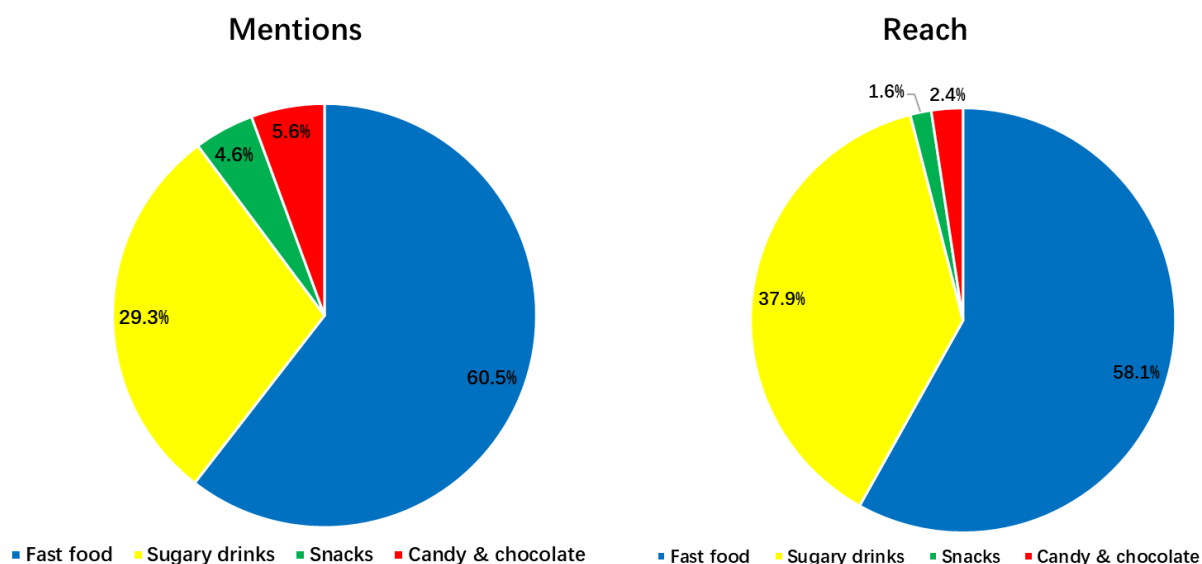
Mentions

Reach

Figure 1. Distribution of total mentions and total reach for the top 40 brands marketed to children in Canada*, by food category, on Twitter, Tumblr, YouTube, and Reddit in 2020

*Top 40 brands with the highest brand shares in Canada between 2015 and 2020 from the food categories that children and adolescents were most exposed to on social media in Potvin Kent et al. (2019).

3.1.2 Net Sentiment

According to the net sentiment scores, posts on candy & chocolate were the most positively rated, with a score of 1.49 (Table 5). Following this category, sugary drinks and snacks scored relatively similarly, with scores of 0.49 and 0.51, respectively. Fast food restaurants had the most negative net sentiment, with a score of -0.78.

Table 5. Average net sentiment scores of the top 40 brands marketed to children[*] by food category on Twitter, Reddit, Tumblr, and YouTube in 2020.

FOOD CATEGORIES	NET SENTIMENT
Fast food restaurants	-0.78
Sugary drinks	0.49
Snacks	0.51
Candy & chocolate	1.49

Source: Brandwatch, 2020
*Top 40 brands with the highest brand shares in Canada between 2015 and 2020 from the food categories that children and adolescents were most exposed to on social media in Potvin Kent et al. (2019).

3.1.3 Twitter Followers and Impressions

All of the users who Tweeted regarding the top 40 brands had a cumulative following of 383,838,585,065 users and these Tweets had an estimated 491,214,611,655 impressions (Table 6). Consistent with other measures, the food category with the most followers and impressions was fast food restaurants, with 325,032,920,942 (84.7%) total followers and 402,193,350,209 (81.9%) total impressions. Following this category, sugary drinks had the second highest number of followers and impressions, with 52,776,303,035 (13.7%) total followers and 79,887,186,937 (16.3%) total impressions. Snacks and candy & chocolate had comparatively low numbers of followers and impressions, with 2,040,651,884 (0.5%) and 3,988,709,204 (1.5%) total followers, respectively, and 3,735,407,514 (0.8%) and 5,398,666,995 (1.1%) total impressions, respectively.

Table 6. Total followers of Twitter users who have Tweeted about the top 40 brands marketed to children*, and Twitter impressions of each mention by food category in 2020

FOOD CATEGORIES	TOTAL FOLLOWERS n (%)	TOTAL IMPRESSIONS n (%)
Fast food restaurants	325,032,920,942 (84.7%)	402,193,350,209 (81.9%)
Sugary drinks	52,776,303,035 (13.7%)	79,887,186,937 (16.3%)
Snacks	2,040,651,884 (0.5%)	3,735,407,514 (0.8%)
Candy & chocolate	3,988,709,204 (1.0%)	5,398,666,995 (1.1%)
Total	383,838,585,065 (100.0%)	491,214,611,655 (100.0%)

Source: Brandwatch, 2020

*Top 40 brands with the highest brand shares in Canada between 2015 and 2020 from the food categories that children and adolescents were most exposed to on social media in Potvin Kent et al. (2019).
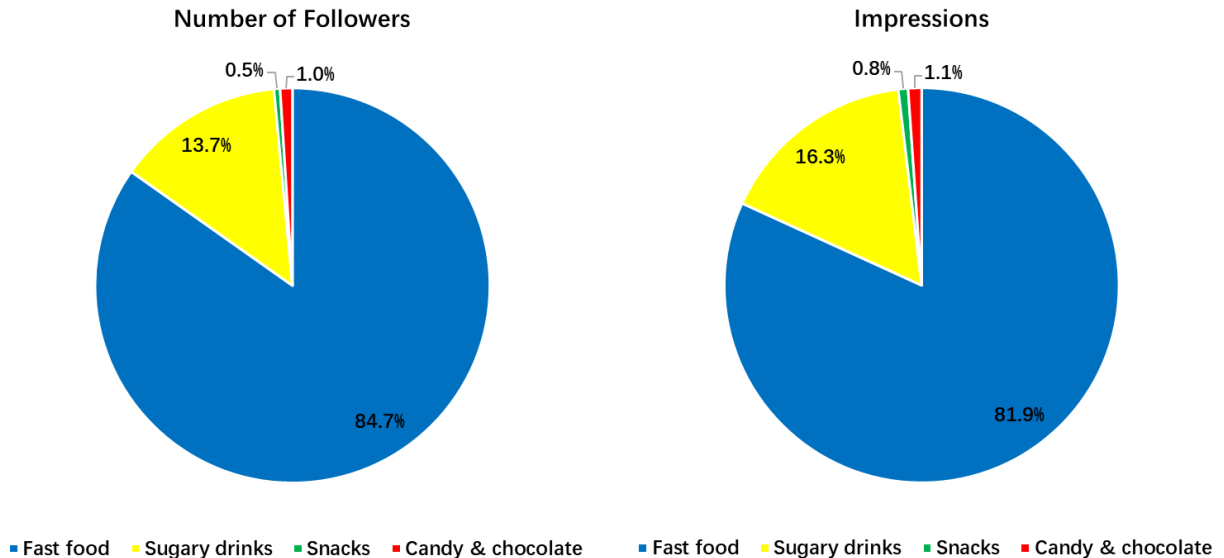

Figure 2. Distribution of total followers of Twitter users who have Tweeted about the top 40 brands marketed to children[*] and Twitter impressions of mentions in Canada, by food category, in 2020

*Top 40 brands with the highest brand shares in Canada between 2015 and 2020 from the food categories that children and adolescents were most exposed to on social media in Potvin Kent et al. (2019).

3.2 COMPANY-LEVEL RESULTS

3.2.1 Company Posts on Twitter

In 2020, the top 40 brands examined Tweeted a total 30,294 times, reaching an estimated 846,646,194 individuals (Table 7). These 40 brands had a cumulative following of 15,746,063 users, and their Tweets were seen an estimated 12,503,230,329 times (Table 8). As shown in Table 7, fast food restaurants were the food category with the highest number of mentions and reach, with 29,477 (97.3%) mentions and a reach of 833,770,092 (98.5%). The cumulative followers and total impressions of the 10 fast food companies were 15,528,539 (98.6) followers and 12,455,506,260 (99.6) impressions (Table 8). The other three categories combined (sugary drinks, snacks, and candy & chocolate) accounted for only 2.7% of the total mentions, 1.5% of the total reach, 1.4% of the total followers, and 0.3% of the total impressions.

Table 7. Annual frequency of Twitter mentions and total reach for the top 40 brands marketed to children*, by food category

FOOD CATEGORIES**	FREQUENCY OF MENTIONS n (%)	TOTAL REACH n (%)
Fast food restaurants	29,477 (97.3%)	833,770,092 (98.5%)
Sugary drinks	501 (1.7%)	8,850,426 (1.0%)
Snacks	273 (0.9%)	3,200,976 (0.4%)
Candy & chocolate	43 (0.1%)	824,700 (0.1%)
Total	30,294 (100.0%)	846,646,194 (100.0%)

Source: Brandwatch, 2021.
*Top 40 brands with the highest brand shares in Canada between 2015 and 2020 from the food categories that children and adolescents were most exposed to on social media in Potvin Kent et al. (2019).
**Refer to Table 3 to see which accounts are available within each category. Also note that during data collection, Brandwatch was unable to collect data from two Twitter accounts within candy & chocolate.
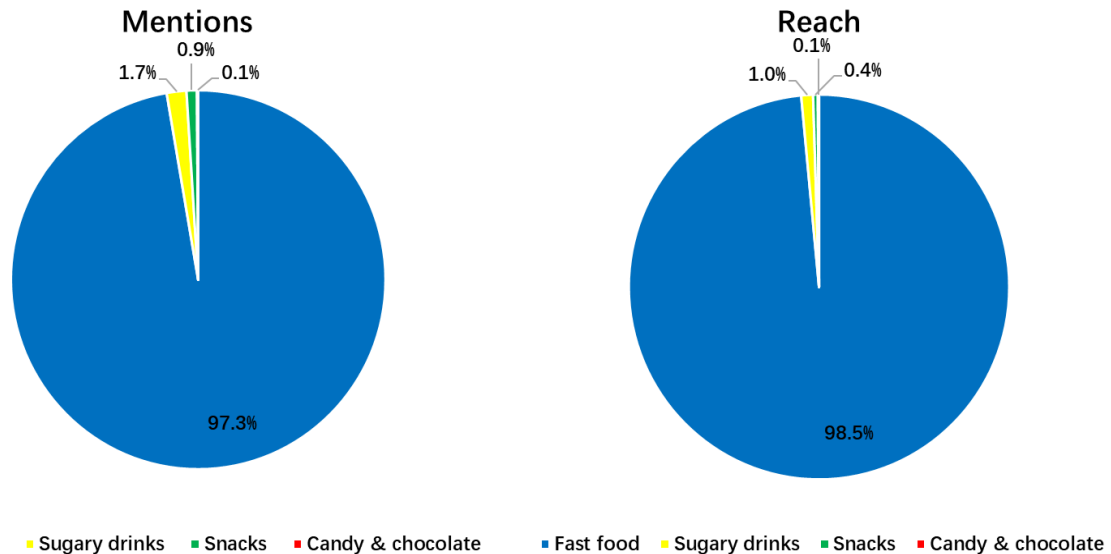
Mentions

0.9%
1.7% 0.1%

97.3%

Reach

0.1%
1.0% 0.4%

98.5%

■ Fast food ■ Sugary drinks ■ Snacks ■ Candy & chocolate   ■ Fast food ■ Sugary drinks ■ Snacks ■ Candy & chocolate

Figure 3. Distribution of the annual frequency of Twitter mentions and total reach for the top 40 brands marketed to children in Canada[*], by food category[**], in 2020

*Top 40 brands with the highest brand shares in Canada between 2015 and 2020 from the food categories that children and adolescents were most exposed to on social media in Potvin Kent et al. (2019).
**Refer to Table 3 to see which accounts are available within each category. Also note that during data collection, Brandwatch was unable to collect data from two Twitter accounts within candy & chocolate.

Table 8. Total Twitter followers and impressions the top 40 brands marketed to children[*], by food category[*]

FOOD CATEGORIES	FOLLOWERS n (%)	IMPRESSIONS n (%)
Fast food restaurants	15,528,539 (98.6%)	12,455,506,260 (99.6%)
Sugary drinks	125,945 (0.8%)	43,612,199 (0.3%)
Snacks	72,761 (0.5%)	3,269,748 (0.0%)
Candy & chocolate	18,818 (0.1%)	842,122 (0.0%)
Total	15,746,063 (100.0%)	12,503,230,329 (100.0%)

Source: Brandwatch, 2021.
*Top 40 brands with the highest brand shares in Canada between 2015 and 2020 from the food categories that children and adolescents were most exposed to on social media in Potvin Kent et al. (2019).
**Refer to Table 3 to see which accounts are available within each category. Also note that during data collection, Brandwatch was unable to collect data from two Twitter accounts within candy & chocolate.
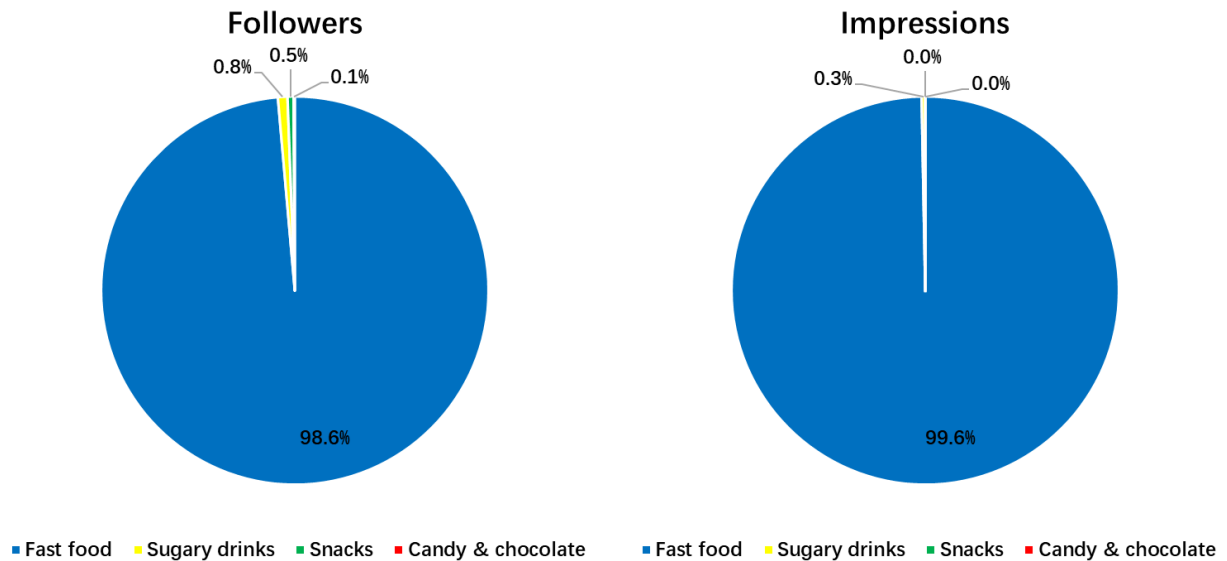
Followers

0.8% 0.5% 0.1%

98.6%

Impressions

0.3% 0.0% 0.0%

99.6%

■ Fast food ■ Sugary drinks ■ Snacks ■ Candy & chocolate   ■ Fast food ■ Sugary drinks ■ Snacks ■ Candy & chocolate

Figure 4. Distribution of Twitter followers and impressions for the top 40 brands marketed to children in Canada[*], by food category[**], in 2020

*Top 40 brands with the highest brand shares in Canada between 2015 and 2020 from the food categories that children and adolescents were most exposed to on social media in Potvin Kent et al. (2019).

**Refer to Table 3 to see which accounts are available within each category. Also note that during data collection, Brandwatch was unable to collect data from two Twitter accounts within candy & chocolate.

3.2.2 Company Posts on Instagram and Facebook

Over the months of August, September, and October 2021, the top 40 brands posted 1,484 times on Facebook and Instagram, reaching 16,932,441 users (Table 9). On Facebook and Instagram, the food category with the most mentions was snacks, which had 537 (36.2%) mentions. This was closely followed by fast food restaurants, which had 508 (34.2%) mentions. Despite the high number of mentions for snacks, this food category only had a reach of 1,667,297 (9.8%), which was behind sugary drinks, with a reach of 2,124,644 (12.5%) and fast food, with a reach of 11,653,545 (68.8%).

Table 9. Total frequency of Facebook and Instagram mentions and total reach for the top 40 brands marketed to children∗, by food category∗∗, in April, May, and June of 2021

FOOD CATEGORIES	FREQUENCY OF MENTIONS n (%)	TOTAL REACH n (%)
Fast food restaurants	508 (34.2%)	11,653,545 (68.8%)
Sugary drinks	174 (11.7%)	2,124,644 (12.5%)
Snacks	537 (36.2%)	1,667,297 (9.8%)
Candy & chocolate	265 (17.9%)	1,486,955 (8.8%)
Total	1,484 (100.0%)	16,932,441 (100.0%)

Source: Brandwatch, 2021.

*Top 40 brands with the highest brand shares in Canada between 2015 and 2020 from the food categories that children and adolescents were most exposed to on social media in Potvin Kent et al. (2019).

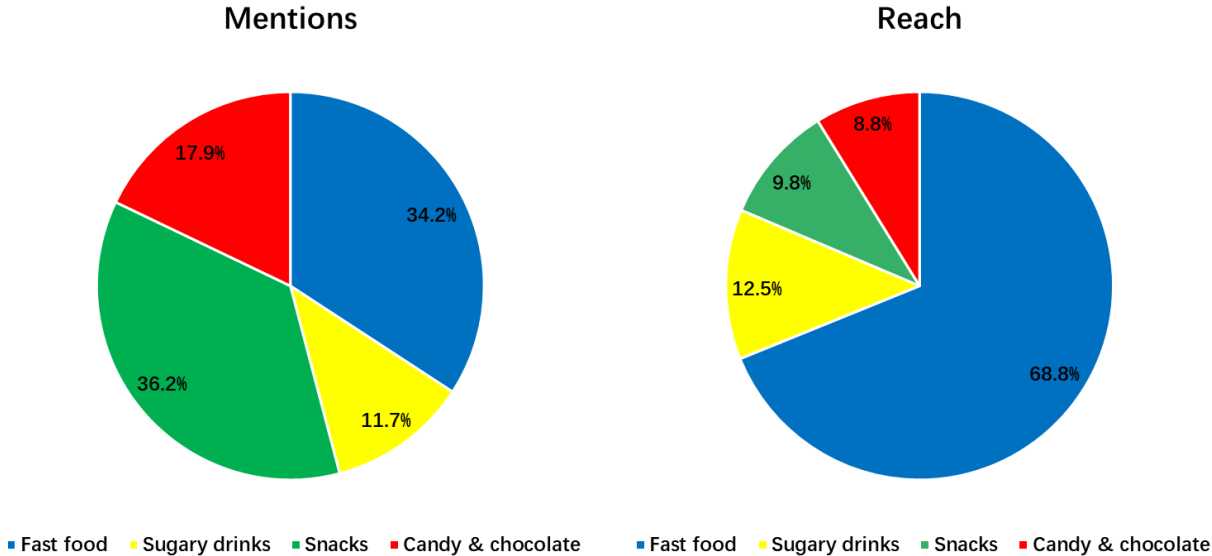**Refer to Table 3 to see which accounts are available within each category.

Figure 5. Distribution of Facebook and Instagram mentions and reach for the top 40 brands marketed to children[*] in Canada, by food category[**], in April, May, and June 2021

*Top 40 brands with the highest brand shares in Canada between 2015 and 2020 from the food categories that children and adolescents were most exposed to on social media in Potvin Kent et al. (2019).

**Refer to Table 3 to see which accounts are available within each category.

4.0 DISCUSSION

There were two main objectives to this study: to determine the frequency of posts for specific brands from food categories that are frequently advertised to children and adolescents on social media and to determine how frequently these brands/companies are posting on social media. The user-generated results will be discussed first, followed by the company-level results.

4.1 USER-GENERATED RESULTS

The results from this analysis demonstrate that the 40 brands with the highest brand shares from the food and beverage categories that children and adolescents are most exposed to on social media are being frequently mentioned on Twitter, Reddit, Tumblr, and YouTube. In 2020, the top 40 brands were mentioned a total of 16,851,990 times. These mentions reached an estimated 42,244,995,156 users. On Twitter, the total followers of every user who has Tweeted about one of the 40 brands was 383,838,585,065 users, and their Tweets were seen an estimated 491,214,611,655 times. These numbers demonstrate how common conversations about unhealthy food and beverage brands are on social media. This is similar to the high frequency of unhealthy food marketing seen on other media examined in Canada including on television, on websites, in movie theatres, and in retail settings.[28–31] Overall, the ubiquity of these types of foods on social media can contribute to these food brands becoming normalized in the diets of adults, adolescents, and children.[32,33] Food environments, which consist of the physical, communication, economic, and social environments that impact food choices, have been shown to influence diet and related outcomes.[34,35] Social media is increasingly being recognized as a component of the food environment that is influencing food preferences and diets,[36] and as such, UGC needs to be considered by public health advocates and policy makers. Extensive research has shown the impact of advertising on food consumption, and more recent research has indicated that UGC is as effective as company advertisements at promoting food and beverage brands.[14,37] The high frequency

of UGC and its reach suggest that individuals are contributing to an unhealthy food environment and the normalization of junk foods.

Our results also clearly point to the popularity of fast food restaurants in conversations on social media across all the social media sites examined. In 2020, fast food restaurants were mentioned 10,195,357 times (60.5% of the total mentions), with posts reaching an estimated 24,534,044,603 users (58.1% of the total reach) on Twitter, Reddit, Tumblr, and YouTube. On Twitter alone, all of the users who Tweeted regarding fast food restaurants had a cumulative following of 325,032,920,942 users (84.7% of the sample), and the Tweets were seen an estimated 402,193,350,209 times (81.9% of the sample). The predominance of posts regarding fast food compared to the other three food categories examined is troubling when one considers that, in all age groups, the consumption of fast food has been shown to be associated with poor diet and health outcomes.[38] Data from 2019 on the consumption habits of Canadians found that 65% of children aged 1-5 years, 71% of children aged 6-12 years, and 75% of adolescents aged 13-17 years consumed at either a limited-service or full-service restaurant within the last week.[38] Not only is the dietary profile of fast food less favourable than other foods, but the consumption of restaurant food has been shown to negatively impact diet on the day following consumption, marked by a decrease in consumption of fruit, vegetables, whole grains, and plant-based foods.[38] A 2021 study on the self-reported consumption of fast food in Canada found that male teens had the highest rates of consumption, with fast food making up 9.3% of their caloric intake.[39] Young boys, aged 2-8 years, reported the second highest consumption, with fast food making up 8.8% of their caloric intake.[39] The association of fast food with poor diet, coupled with the popularity of fast food on social media is a health concern for children and adolescents given their heavy use of this media.[12,39]

Following fast food restaurants, our results showed that sugary drinks was the second most mentioned food category of those examined on social media. The five subcategories that make up sugary drinks category in our analysis, included soft drinks, fruit drinks, energy drinks, sports drinks and sweetened teas. Such beverages pose health risks for children. Sugary drinks, such as soft drinks and fruit juices, are a known

contributor to obesity as they are high in calories yet poor in nutrients.[40,41] They are the number one contributor to sugar consumption in the diets of Canadians, and this comes with its health risks. Excess sugar is linked to increased instances of chronic disease, heart disease, obesity, and cavities.[41] Soft drinks can be especially harmful to younger children, with every sugary drink a child consumes increasing their risk of obesity by 60%.[41] Children also have a unique risk when it comes to energy drink consumption compared to other age groups, as research shows they are at an increased risk of developing caffeine dependency or intoxication as a result of lower caffeine tolerances.[42] The consumption of energy drinks has also been shown to result in more adverse effects in children compared to other populations, with more reports of seizures, diabetes, cardiac problems, mood and behavioural problems.[43] Despite Health Canada banning energy drink advertising to children, their presence on social media is a potential threat to child and adolescent health and statutory policies that seek to limit advertising exposure to children need to be explicitly address social media.

4.2 COMPANY-LEVEL RESULTS

With regard to the company-level analyses, our results clearly demonstrate the extensive social media presence of the 40 brands with the highest brand shares from the top 4 categories that children and adolescents were most exposed to on social media in previous research. On Twitter in 2020, the 40 brands Tweeted a total of 30,294 times, reaching 846,646,194 users. The cumulative followers of all 40 brands was 15,746,063 users, and their Tweets were seen an estimated 12,503,230,329 times. The 40 brands posted a total of 1,484 times on Facebook and Instagram in the three-month period from August-October 2021 and these posts reached an estimated 16,932,441 users. Though more research on child and adolescent exposure to social media marketing is needed, such results point to a need for more regulation. Social media is currently excluded from Ad Standards' self-regulatory Canadian Children's Food and Beverage Advertising Initiative, in which 15 large food and beverage companies have committed to restricting unhealthy food advertising to children.[26,44] Social media has also been excluded in the new self-regulatory Food and Beverage Advertising Code that is slated to be implemented by the summer of 2023. Most social media sites restrict use to those under

13 years, however, this is not effective in keeping children off of these platforms. Research has shown that many children under 13 years make accounts using false birthdays and current research from Canada indicates that 57% of children between the ages of 6 and 10 have social media accounts.[19,45] A recent Canadian study on child and adolescent exposure to food marketing on social media estimated that, despite age restrictions on social media sites, children are being exposed to as many 1,500 food and beverage marketing posts per year while adolescents may view more than 9,000 food advertisements per year on this media.[12] Our results show that food and beverage companies examined are heavily using social media as a means to market their products and that the reach of this form of marketing is very extensive. Restrictions that limit food marketing to children are needed here to protect children given their presence on social media sites.

Our results also clearly show that fast food restaurant companies frequently use social media to promote their brands. On Twitter in 2020, the 10 fast food restaurants examined made up 97.3% of the mentions, 98.5% of the reach, 98.6% of the total followers, and 99.6% of the impressions. On Facebook and Instagram, fast food restaurant mentions (34.2%) came second to snacks (36.2%), however, fast food restaurants accounted for 68.8% of the reach, suggesting that despite the high mentions from the brands in the snack category, the brands may not be as popular as fast food restaurant brands. The frequency of fast food restaurant social media posts is important to consider because fast food marketing has impact. This has been demonstrated repeatedly through research, especially with children, wherein the promotion of fast food brands increases brand recognition and impacts consumption.[13,46] Children who are overweight or obese may also be more impacted than other children. A study conducted on preschoolers in the United States demonstrated that children who had higher BMI's showed a higher recognition for branded food items compared to non-overweight children.[46] The promotion of brands on social media by fast food companies may also be a contributing factor to the popularity of fast food among children and adolescents.

4.3 STRENGTHS AND LIMITATIONS

To our knowledge, this study is the first of its kind to analyze all social media conversations regarding specific food and beverage brands in Canada on Twitter, Reddit, YouTube, Tumbler, Facebook, and Instagram over a one-year period. While prior research has measured child and adolescent exposure to food marketing on social media,[12] the current research is unique as it provides a bird's eye view into all of the conversations on certain brands over a one-year period on a variety of social media sites. Certain limitations must however be acknowledged. Only English-language posts were examined in our research and our data is therefore not representative of the French conversations on these brands. Our data collection was restricted to Twitter, Reddit, Tumblr, and YouTube. Facebook and Instagram. Data on TikTok and Snapchat, social media platforms that are popular with children, were not available. Our queries were also written manually, so it was impossible to include every variation of the brand names that have been used on the internet. It is extremely likely that people have used a variety of spellings when referring to the brand names, but to remain methodologically consistent, only the main variations were included and therefore brand mentions may have been underestimated.

The Brandwatch data does not assess exposure by age and as such, it is unclear which posts are viewed by children and/or adolescents. Another limitation is that we had to use separate methodologies for Facebook and Instagram data. Brandwatch is partnered with Twitter, and therefore had complete access to historical and present data from this site. Brandwatch has different data use agreements with Facebook and Instagram, so this analysis was restricted to company posts and data could only be analyzed in present time. As a result, only three months of data were used in these analyses. These three months may not be representative of the rest of the year and therefore generalizations to the year cannot be made. Also, data from two Twitter accounts (Reese's and Laura Secord) could not be collected due to an error within Brandwatch. Because of this, mentions in this category are underestimated. In the company-level analysis, some brands did not have all three Canadian social media

accounts (Twitter, Facebook, and Instagram), and in two instances, (Premium and Lindor), no Canadian accounts were available.

There were also limitations related to the social media platforms and what data Brandwatch is able to extract from these. As this is a Canadian study, ideally, the only data analyzed would have been from Canada. We were able to filter posts that authors had "geotagged" as being from another country using the Brandwatch country codes provided, however, this does not guarantee that all posts originated in Canada, as many authors do not "geotag" their posts. Therefore, the posts in this study are either tagged as Canadian or untagged. A final limitation related to the social media platforms is that YouTube data were likely underestimated, as Brandwatch only searches media that contains text. YouTube videos likely contain advertisements of their own and paid sponsorships, but these data were not included in the results. Brand images that do not include text may also have been excluded in the other examined social media platforms.

4.4 POLICY IMPLICATIONS

The current research has clearly shown how frequent unhealthy food marketing on social media is across a wide variety of social media platforms. Overall, these results suggest that a food environment that promotes unhealthy foods and beverages has been created on social media through both user generated content and by food and beverage companies. The high frequency of user generated content suggests that individuals are contributing to an unhealthy food environment and the normalization of junk foods. The high frequency of posts by food and beverage companies highlights that this industry is effectively using social media to market unhealthy food products. Given the strong child and adolescent presence on social media sites, regulations aimed at children need to be considered in order to protect child health.

4.5 CONCLUSION

This study demonstrated the pervasiveness of conversations on social media about unhealthy food and beverages and the predominance of fast food and sugary drink marketing on these sites. Despite age limits on social media sites, children are present on these sites and thus are potentially exposed to unhealthy food marketing. This presence on social media, coupled with the fact that children are uniquely vulnerable to peer influence, poses a threat to their health. The restriction of unhealthy food marketing on social media needs to be considered in future regulations.

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Appendix A. Data Coverage on Brandwatch

SOURCE	COVERAGE
Twitter	- Brandwatch is an official partner with Twitter, so it has complete access to all Twitter data, including historical and real-time data.
Facebook	- Brandwatch can only collect Facebook data through channels, which are specific social media profiles that you add to Brandwatch which give you access to posts, comments, and other metrics on any given profile - Limited historical backfill
Instagram	- Like Facebook, Instagram can only be tracked via channels, and has limited historical backfill.
YouTube	- Brandwatch collects YouTube data via third party data providers. - Data is collected from text descriptions of videos, comments under videos, and metadata.
Reddit	- Brandwatch has full access to all active subreddits, with strong historical and real-time data coverage
Tumblr	- Full access to an unfiltered, real-time stream of Tumblr data, with over 100 million mentions spanning back to December 2014.

Source: Brandwatch 2021

Appendix B. Total Instagram Followers as of January 2022.

BRANDS	FOLLOWERS
FAST FOOD RESTAURANTS	
Tim Hortons	446,262
McDonald's	158,128
A&W	44,685
Subway	25,263
KFC	53,928
Wendy's	18,450
Pizza Pizza	18,077
Dairy Queen	36,308
Domino's Pizza	22,734
Burger King	12,252
SUGARY DRINKS	
Coca-Cola	22,604
Pepsi	21,953
Gatorade	12,021
Powerade	600
Tropicana	2,584
Oasis	4,957
Monster	804
Red Bull	153,823
Nestea	14,967
Pure Leaf	3,596
SNACKS	
Lay's	6,741
Doritos	5,305
Ruffles	3,138
Miss Vickie's	3,478
Tostitos	1,633
Planters	4,184
Old Dutch	17,484

BRANDS	FOLLOWERS
Ritz	1,237
Jack Link's	46,286
Premium	N/A
CANDY & CHOCOLATE	
Cadbury	N/A
Hershey's	12,348
Lindt	40,925
Kit Kat (2 accounts)	26,038
Lindor	N/A
Laura Secord	4,065
Ferrero Rocher	155,518
Reese's	19,365
Coffee Crisp	N/A
Oh Henry!	4,422