ORIGINAL RESEARCH



Prevalence of food and beverage brands in "made-for-kids" child-influencer YouTube videos: 2019–2020

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Summary

Background: Child health experts raise numerous concerns about the negative effects of children's exposure to unhealthy digital food marketing, including advertising and branded product placements on child-oriented videos.

Objectives: YouTube banned food advertising on "made-for-kids" channels in 2020, but research is needed to assess food-related appearances on increasingly popular child-influencer videos.

Methods: Content analysis examined a sample of videos (n=400) uploaded in 2019–2020 by popular child-influencers on YouTube "made-for-kids" channels. We identified and coded all branded and non-branded food-related appearances (i.e., food, beverages, restaurants), ads, promotions, and sponsorship disclosures, and compared 2019 to 2020.

Results: Two-thirds of videos (n=260) had at least one food-related appearance, including branded product appearances (n=153), other brand appearances (n=60), and non-branded food-related appearances (n=203). Branded products appeared 592 times (M=3.9/video), including candy brands (42% of appearances) and sweet/salty snacks, sugary drinks, and ice cream (32% combined). Total food-related appearances did not change (2019–2020), but candy brand appearances increased significantly. Videos with non-branded healthy food category appearances also increased, but 70% also showed unhealthy branded and/or unbranded foods. Just one video disclosed a food-brand sponsorship.

Conclusions: Additional policies are needed to protect young children from potential exposure to unhealthy branded foods on popular YouTube child-influencer channels.

KEYWORDS

children, digital marketing to children, food advertising, food and beverage ads, food marketing, influencer promotion, kid-influencer, social media, videos

1 | INTRODUCTION

Frequent and widespread exposure to food marketing increases children's preferences, purchase requests, attitudes, and consumption of the mostly nutrient-poor, energy-dense products promoted.¹ Food and beverage companies have extended their reach to young people by marketing on digital media^{2,3} where children as young as age

3 increasingly spend their time.⁴ Viewing YouTube videos is one of the most popular online activities among children ages 6–8,^{4,5} and food marketing to children on YouTube, including advertisements, child-influencer endorsements, and branded products placed within videos, raises numerous concerns among child health experts.^{6,7}

An analysis of advertisements that appeared in videos uploaded in 2017 on the 10 most popular "child-centric" YouTube channels

found that 38% of ads were for food or beverages, with over one-half promoting energy-dense, low-nutrient foods. In response to concerns about the lack of policies to protect children from exposure to unhealthy food ads on YouTube and other social media, in January 2020 Google, YouTube's parent company, implemented a ban on all food and beverage advertising on videos and channels in which children under the age of 13 are the primary audience (i.e., "made-forkids" videos/channels). In the same year, Google agreed to restrict all ads for products that are high in fat, salt or sugar (HFSS) from being shown to children under age 18 in the European Union and the United Kingdom. 11

However, these bans do not cover influencer marketing, a newer form of marketing in which companies pay social media celebrities with large fan bases ("influencers") to endorse products in their online videos or posts. 12 Currently, influencer marketing represents a \$13.8 billion industry and is estimated to grow. 12 A subset of influencers are children ("child-influencers" or "kid-influencers"). Their videos show them engaging in child-oriented activities, such as imaginative play with costumes and props, playing with toys, making food, or doing projects with parents or other children. ¹³ Child-influencers have their own channels on YouTube and other social media platforms, where they regularly post videos that are frequently viewed by other children. 14 In the United States, 27% of 5- to 8-year-olds reported following or subscribing to certain YouTube personalities, celebrities, or influencers. In a UK study, 34% of children ages 5 to 7 said they watch YouTube influencers.5 Children's exposure to social media influencer endorsements and placements of branded products (i.e., influencer holding a branded food) increases positive attitudes toward and consumption of the branded unhealthy products promoted. 15,16

Experts also raise concerns about companies' ability to market high-calorie, low-nutrient foods to young children by paying childinfluencers to feature and endorse products in their videos. 17,18 Many of the largest US food companies participate in food industry selfregulatory programs and pledge that they will only advertise products that meet nutrition criteria in advertising directed to children under age 12.^{19,20} Some forms of child-directed marketing are also directly prohibited by these pledges. For example, participating companies commit that they will not pay or seek product placements (i.e., "insertion of a product into entertainment/editorial programming in an incidental prop-like manner") in any medium directed to children under 12. However, companies can still market to children using paid product integrations (i.e., placements in which a product is incorporated into the script, storyline, dialogue, or action), including childdirected influencer promotions, as long as the products marketed meet CFBAI nutrition criteria.²⁰ Moreover, not all food companies participate in industry self-regulatory programs.

A few studies have examined the presence of food and beverages within influencer videos aimed at children. One study of videos created in 2017 by two YouTube influencers popular among Australian children found that over 90% showed food or beverage products and less-healthy foods were more likely to be branded compared to healthier food.²¹ A 2019 analysis of videos on five popular US

YouTube child-influencer channels found that 43% contained branded or unbranded food and drinks, with the majority showing unhealthy branded items. However, these studies were conducted prior to YouTube's ban on food and beverage advertising in made-for-kids videos in 2020. It is important to understand whether food and beverage companies have expanded their use of product placements or integrations within child-influencer videos in response to restrictions on advertisements.

In this content analysis, we examined all foods, beverages and restaurants that appeared (i.e., food-related appearances) during YouTube videos posted on the most popular child-influencer channels in 2019 and 2020, as well as video-ads and other promotions in the videos. This study quantifies the prevalence and types of food-related appearances on YouTube child-influencer videos and changes from 2019 to 2020, following implementation of the ban on food ads in made-for-kids YouTube videos. It also examines the video advertisements that appeared on these channels to monitor Google's food and beverage advertising ban on "made for kids" channels. These findings will identify whether additional policies are needed to limit food, beverage, and restaurant marketing via child-influencer YouTube videos.

2 | METHODS

We identified and coded all branded and non-branded food-related appearances within a sample of 400 videos posted in 2019 and 2020 (200 each year) by the top child-influencers on YouTube made-for-kids channels. We also identified video-ads and other promotions that appeared during the videos. In addition, we assessed differences in number of appearances and content of videos posted in 2019 versus 2020.

2.1 | Sample of videos

We started with a list of the top made-for-kids YouTube channels in July 2020 available from Social Blade, a publicly available website that tracks social media analytics and statistics. From this list, we identified US child-influencer channels according to the following criteria: (a) channel consisted of non-animated videos; (b) the main character was the same child/children across all videos on the channel; (c) the "Location" was listed as US; and (d) all video titles and dialogue were in English or video titles were in English and another language and the 20 most recently uploaded videos had English dialogue. This procedure resulted in 13 child-influencer channels for review. See Table S1 for list of channels, subscribers, and video views.

The number of videos uploaded to these 13 child-influencer channels over the same 4-month period (July 1 to October 31) totalled 570 in 2019 and 604 in 2020. Systematic sampling with a random start was used to select every third video (ordered by date posted) to obtain a random sample of 200 videos each year for the content analysis.²³



2.2 | Codebook development

The lead researcher (FF) and research assistant (LP) created an initial codebook by adapting codes from previous content analyses of food and beverage brand appearances in movies²⁴ and social media videos,²¹ and utilizing the World Health Organization's guide²⁵ for analysing branded product presence in YouTube social media influencer videos.

LP selected a sub-sample of videos (n=40) with at least one food-related appearance that were posted on the child-influencer channels in this study but were not part of the final sample. She examined the videos to better understand how food appearances are presented in these channels and to consider codes to add or adjust. After her review, FF and LP met to discuss and modify the codebook and code definitions.

Then LP trained another research assistant (HE) and both researchers coded 20 videos with at least one food-related appearance. These videos met the eligibility criteria for the study but were not included in sample of 200 videos per year that were randomly selected for inclusion in the study. This procedure allowed researchers to finetune the codes and the language in the codebook and ensure that the coders independently made the same decisions on how to code prior to reliability testing using the actual sample of videos.

For training purposes, coders followed the same procedures that they would follow when coding the actual sample of videos used in the study. They opened each of the videos on YouTube, viewed the video, and paused to code as needed. Before each video was viewed, coders set their browsers to incognito to prevent potential targeted advertising based on coders' past browsing history. This process was repeated three times. After each round of test coding, FF, HE and LP met to clarify areas of confusion or disagreement and the codebook was modified accordingly. By the third round, agreement was high between coders and the coders felt confident the language in the codebook was sufficient to assist them in making decisions about how to code.

Upon finalization of the codebook, LP selected 10% of the videos included in the study sample to assess interrater reliability, and both LP and HE coded all videos in this sub-sample. Percent agreement was 80% or higher for each code. Then each coder independently coded one-half of the remaining videos, using the same procedures. Coding was conducted from November to December 2020.

2.3 | Food-related appearance codes

All unique food-related appearances were coded as one of three types: (1) branded product appearances for food, beverages, and restaurants (i.e., any branded products present in the videos), (2) other brand appearances (i.e., other food-related brand mentions, including logos on non-food items and verbal mentions), or (3) non-branded food-related appearances (i.e., unpackaged or non-branded packaged foods). Of note, we used the term "product appearance" (versus product placement) as in the absence of disclosures of sponsored content

we could not determine whether products shown in the videos were paid for or commissioned by a company (i.e., product placements or integrations), or whether the influencers chose to include products without compensation.

If a brand was shown or mentioned more than once in the video, each type of appearance was coded, but not the number of times it appeared.^{21,24} For example, if a "Kit Kat" candy bar was shown five times in the video, it was counted as one branded product appearance. If the word "Kit Kat" was also stated by a character in the video one or more times, it was also counted as one other brand appearance.

Food-related appearances were coded as follows:

Branded product appearances: included instances when an actual food product with an identifiable brand name was shown. Coders indicated the brand name and description of the product (e.g., Snickers, single-serve candy bar; Coke, cans of Coke). If the same brand was shown on different types of products (e.g., Hershey's chocolate syrup and Hershey's chocolate bar), both products were counted as separate product appearances. In addition to brand name and description, coders also coded the brand's parent company and whether it participated in one of the two US food industry self-regulatory programs: the Children's Food and Beverage Advertising Initiative (CFBAI) and the Children's Confectionary Advertising Initiative (CCAI). 19,20 All product appearances, including those for healthy products, such as fruit, vegetables, plain milk, and water, were coded as branded product appearances if items were packaged/labelled with an identifiable brand name.

The centrality of branded product appearances was coded based on previous content analyses of product appearances in movies²⁴ and social media influencer videos.²¹ and protocol created by experts for the World Health Organization that provides a specific guide for analysing branded product presence in YouTube social media influencer videos.²⁵ WHO coding guidance and Coates and colleagues include measures of whether the product is consumed. 21,25 Sutherland and colleagues also include "suggested use" to describe handling or preparation that indicates the character has or may consume the product.²⁴ Researchers included this additional level as the storylines in the videos often included the presentation of branded products in this manner (e.g., character is shown about to eat or drink product, but the camera cuts to another scene). Therefore, the centrality of branded product appearances was coded in this study as follows: (a) character consumed, if one of the main characters was shown consuming the product in the video; (b) suggested consumption, if it was not shown being consumed, but the storyline, handling, or preparation suggested the product was to be consumed or had been consumed (e.g., character is shown about to eat or drink product, but the camera cuts to another scene, product is shown in the hands of a character, but it is not shown consumed); or (c) appearance only, if the product was shown but not handled by any character (e.g., sitting on a table or counter).

Researchers categorized all branded product appearances as one of the following: candy, sugary drinks, diet soda, sweet/salty snacks, ice cream/sweet toppings (e.g., ice cream, sprinkles, chocolate syrup,

whipped cream), sugary cereal, fast food (pizza, fried chicken, and hamburgers), healthy (fruit, vegetables, plain milk, water), and "all other" (e.g., plain cereals, tomato sauce, vegetable oil, mayonnaise, lunch meat, baby food, prepared packaged meal/entree).

Other brand appearances: included instances when a food-related brand, but not the actual food product, was shown or mentioned in the video. Coding was adapted from the WHO social media coding guide and Coates et al. (2020). 21,25 Other brand appearances included: (a) brand logos that appeared in the video thumbnail (i.e., the still image that appears beside the video's title when searching YouTube videos); (b) brand logo that appeared on nonfood products (e.g., Wendy's sticker, McDonald's toy, Burger King storefront); and (c) verbal mentions of a brand by a character with or without showing the actual product. Coders also coded the brand's parent company and whether it participates in a US food industry self-regulatory program.

Non-branded food-related appearances: included instances when a food or beverage appeared without a package or the package did not show a recognizable brand name. If a branded product was shown, but only a portion of the label appeared and/or the brand on the packaging was not written in English, it was also coded as a nonbranded food-related appearance. For these appearances, coders indicated the food category to which it belonged using the same categories assigned to branded product appearances (e.g., fast food, sweet/salty snacks, candy, or fruit). Each category that appeared was counted as one non-branded food-related appearance. For example, pizza shown without a package was coded as one nonbranded fast-food appearance and a non-packaged cupcake or tray of cupcakes was counted as one non-branded sweet/salty snack appearance. Coders did not record the number of non-branded foods that appeared within each category or the number of times the food appeared. See Table S2 for a summary of details coded for all food-related appearances in videos.

2.4 Other marketing codes

In addition to food-related appearances, we also identified other types of marketing shown during the videos, including video-ads and promotions for all types of products and disclosures, as follows:

2.4.1 | Video-ads

Coders recorded the number of video-ads and the types of products advertised in each video-ad, including ads for non-food products. YouTube places video-ads that can appear any time during a video. Hese ads are purchased by advertisers and are not part of the child-influencer video content. Child-influencers do not choose advertisers or advertising content. Coders were instructed not to skip video-ads even if given the option, and they captured screenshots of all food-related video-ads. Coders did not count other types of ads, including display ads (i.e., visual ads that appear on the right-hand side of the

screen while the video is playing) or banner ads (i.e., visual ads that appear on the video while it is playing).

2.4.2 | Promotions and disclosures

In addition, coders indicated if the child-influencer's Instagram handle (account name) appeared on the screen at any time during the video, promotions for apps or mobile games made by the child-influencer (i.e., voiceovers and images showing how to download the app/game), and disclosures of sponsored content (i.e., text and/or voiceover stating that the video is sponsored by a company or a paid promotion/ad for a product that was shown or mentioned). Coders recorded the name of the app/game and the type of disclosure.

2.5 | Analysis

All analyses were conducted using SPSS (version 26). Two-proportion z-tests identified significant differences in the proportion of food-related appearances each year by type of appearance, branded product usage, and food category, with Bonferroni corrections to adjust for multiple comparisons.

3 | RESULTS

The 400 videos sampled ranged from 1.7 to 29.6 minutes in length (M=7.46 min, median = 4.68 min). Sixty-five percent (n=260) had at least one type of food-related appearance (see Table 1). Branded food product appearances were found in 38% of videos analysed (n=153), other brand appearances in 15% (n=60), and non-branded food-related appearances in 51% of videos (n=203). Many videos had more than one type of food-related appearance, including 103 videos (26%) that contained both branded product and non-branded food-related appearances. There were no significant differences between 2019 and 2020 in numbers of appearances. In addition, at least one video-ad was shown during 94% of videos (n=376) and 28% (n=112) had some type of promotion.

3.1 | Branded appearances

The 153 videos with branded food product appearances averaged almost four different brands per video (M=3.87, SD=4.70), totalling 592 appearances for 2019 and 2020 combined (see Table 2). Candy comprised the majority of branded product appearances (42%), followed by sweet/salty snacks, sugary drinks, ice cream/toppings, and healthy products. Healthy product categories (including bottled water, carton of plain milk, container of strawberries) made up 9%. Fast food, sugary cereal and diet soda brands appeared infrequently, making up just 6% of product appearances combined. There was no difference in the total number of branded product appearances during videos

TABLE 1 Videos with food-related appearances by type.

| | Total (<i>N</i> = 400) | | ${\bf 2019~(n=200)}$ | | ${\bf 2020~(n=200)}$ | | 2019 vs. 2020 diff (p-value) | |
|---|-------------------------|-----|----------------------|-----|----------------------|-----|------------------------------|--|
| Total food-related appearances (# of videos, % of total videos) | 260 | 65% | 125 | 63% | 138 | 69% | 0.171 | |
| Any branded product appearances | 153 | 38% | 74 | 37% | 79 | 40% | 0.611 | |
| Any other branded appearances | 60 | 15% | 29 | 15% | 41 | 21% | 0.114 | |
| Any non-branded food-related appearance | 203 | 51% | 92 | 46% | 111 | 56% | 0.057 | |
| Non-branded food related appearances only | 100 | 25% | 46 | 23% | 54 | 27% | 0.358 | |

TABLE 2 Branded food-related product appearances.

| | Total | Total N = 592 (100%) | | 2019 N = 302 (100%) | | | 2019 vs. 2020 diff |
|--|--------|----------------------|-----|------------------------|-----|----------|--------------------|
| Total branded product appearances (# of appearances, % of total appearances) | N = 59 | | | | | 0 (100%) | р |
| Product category | | | | | | | |
| Candy | 246 | 42% | 109 | 36% | 137 | 47% | 0.006 |
| Sweet/salty snacks | 69 | 12% | 36 | 12% | 33 | 11% | 0.834 |
| Sugary drinks | 61 | 10% | 32 | 11% | 29 | 10% | 0.810 |
| Ice cream/sweet toppings | 58 | 10% | 34 | 11% | 24 | 8% | 0.222 |
| Healthy (fruit, vegetables, plain water, milk) | 51 | 9% | 34 | 11% | 17 | 6% | 0.019 |
| Fast food, sugary cereal, diet soda | 37 | 6% | 19 | 6% | 18 | 6% | 0.897 |
| All other | 70 | 12% | 38 | 13% | 32 | 11% | 0.562 |

Note: Boldface indicates significantly higher proportion after Bonferroni correction (p < 0.007) to adjust for multiple comparisons.

uploaded in 2019 versus 2020. Candy represented a significantly higher proportion of branded appearances in 2020 (47%) than in 2019 (36%), but there were no other differences by category.

Across both years, a main character consumed the product in approximately one-third of appearances, consumption was suggested in approximately one-quarter, and 42% of branded products in videos were shown with no indication of consumption (see Table 3). By category, more than one-half of ice cream/ sweet toppings; over 40% of fast food, sugary cereal and diet soda and healthy food; and approximately one-third of sweet/salty snack and sugary drink appearances and "all other" appearances were shown being consumed. Just 19% of candy appearances were shown in the videos being consumed, but another one-third were shown as suggested for consumption.

A significantly higher proportion of branded products were shown being consumed (38% versus 25%) and suggested for consumption (33% versus 19%) in 2020 as compared to 2019. Conversely, the number of branded product appearances only (shown with no indication of consumption) declined from 55% of appearances in 2019 to 29% in 2020. By category, the proportion of appearances showing no indication of consumption was significantly lower in 2020 as compared to 2019 for candy (31% versus 70%), sweet/salty snacks (24% versus 42%) and sugary drinks (17% versus 53%). Therefore, in these categories a greater proportion of product appearances were shown as either being consumed or suggested for consumption in 2020 versus 2019.

More than one-half of all branded product appearances (56%, n=331) were from companies that participate in either the CFBAI or CCAI industry self-regulatory programs. These products included mostly candy (40%), sugary drinks (20%), and sweet/salty snack (18%) brands. Brands with the most product appearances included Coke (n=34), M&M (n=22), Hershey's (n=15) and Kit Kat (n=10).

In the 60 videos with other food-related brand appearances there was a total of 153 appearances, with brand logos on non-food products (e.g., toys, stickers, restaurant signs) making up more than one-half (see Table 4). Over one-quarter were food, beverage or restaurant brand names mentioned verbally (e.g., "Mmm Pepsi." "I like Froot Loops!") by the child-influencer or another main character (e.g., parent or sibling), and 18% appeared in video thumbnails. Brands on non-food products represented a significantly higher proportion of other brand appearances in 2020 (68%) than in 2019 (42%); and the proportion of verbal brand mentions decreased over the same period.

Other food-related brand appearances were mostly for sugary drinks (34%), candy (29%) and sweet/salty snacks (16%), with fast food, ice cream/sweet toppings, sugary cereal and diet soda making up 15% combined. The majority were from parent-companies in the CFBAI or CCAI self-regulatory programs, including 86% of brands shown on non-food products (n=71), 82% of verbal mentions (n=36), and 96% of thumbnail appearances (n=26). The most common brands on other types of brand appearances were Coke (n=16), McDonald's (n=11), Pringles (n=7) and Pepsi (n=7).

TABLE 3 Centrality of branded food product appearances.

| | Total | | 2019 | 2019 | | | 2019 vs. 2020 diff |
|--|---------|-----|---------|------|---------|-----|--------------------|
| Total branded product appearances (# of appearances, % of total appearances) | N = 592 | | N = 302 | | N = 290 |) | р |
| Appearance only | 251 | 42% | 167 | 55% | 84 | 29% | <0.0001 |
| Suggested consumption | 154 | 26% | 58 | 19% | 96 | 33% | 0.0001 |
| Character consumed | 187 | 32% | 77 | 25% | 110 | 38% | 0.0006 |
| Candy | n = 246 | | n = 109 | | n = 137 | | |
| Appearance only | 119 | 48% | 76 | 70% | 43 | 31% | <0.0001 |
| Suggested consumption | 80 | 33% | 21 | 19% | 59 | 43% | 0.00004 |
| Character consumed | 47 | 19% | 12 | 11% | 35 | 26% | 0.0019 |
| Sweet/salty snacks | n = 69 | | n = 36 | | n = 33 | | |
| Appearance only | 23 | 33% | 15 | 42% | 8 | 24% | <0.0001 |
| Suggested consumption | 19 | 28% | 10 | 28% | 9 | 27% | 0.4801 |
| Character consumed | 27 | 39% | 11 | 31% | 16 | 48% | 0.0643 |
| Sugary drinks | n = 61 | | n = 32 | | n = 29 | | |
| Appearance only | 22 | 36% | 17 | 53% | 5 | 17% | 0.0018 |
| Suggested consumption | 20 | 33% | 9 | 28% | 11 | 38% | 0.2099 |
| Character consumed | 19 | 31% | 6 | 19% | 13 | 45% | 0.0139 |
| Ice cream/sweet toppings | n = 58 | | n = 34 | | n = 24 | | |
| Appearance only | 24 | 41% | 11 | 46% | 13 | 38% | 0.0485 |
| Suggested consumption | 3 | 5% | 1 | 4% | 2 | 6% | 0.1814 |
| Character consumed | 31 | 53% | 12 | 50% | 19 | 56% | 0.0005 |
| Healthy (fruit, vegetables, plain water, milk) | n = 51 | | n = 34 | | n = 17 | | |
| Appearance only | 22 | 43% | 14 | 41% | 8 | 47% | 0.3446 |
| Suggested consumption | 6 | 12% | 4 | 12% | 2 | 12% | 0.5000 |
| Character consumed | 23 | 45% | 16 | 47% | 7 | 41% | 0.3446 |
| Fast food, sugary cereal, diet soda | n = 37 | | n = 19 | | n = 18 | | |
| Appearance only | 9 | 24% | 6 | 32% | 3 | 17% | 0.1446 |
| Suggested consumption | 13 | 35% | 6 | 32% | 7 | 39% | 0.3192 |
| Character consumed | 15 | 41% | 7 | 37% | 8 | 44% | 0.3192 |
| All other | n = 70 | | n = 38 | | n = 32 | | |
| Appearance only | 36 | 51% | 24 | 63% | 12 | 38% | 0.0162 |
| Suggested consumption | 10 | 14% | 6 | 16% | 4 | 13% | 0.3483 |
| Character consumed | 24 | 34% | 8 | 21% | 16 | 50% | 0.0055 |

Note: Boldface indicates significantly higher proportion after Bonferroni correction (p < 0.002) to adjust for multiple comparisons.

TABLE 4 Other food-related brand appearances.

| | Total | Total | | | 2020 | | 2019 vs. 20 | 20 diff |
|---|----------------|-------|--------|---------------|------|--------|-------------|---------|
| Total other food-related brand appearances (# of appearances, % of total appearances) | N = 153 (100%) | | N = 84 | N = 84 (100%) | | (100%) | р | |
| Category | | | | | | | | |
| Brands on non-food products | 82 | 54% | 35 | 42% | 47 | 68% | 0.001 | |
| Verbal brand mentions | 44 | 29% | 34 | 40% | 10 | 14% | <0.001 | |
| Brands in video thumbnails | 27 | 18% | 15 | 18% | 12 | 17% | 0.936 | |

Note: Boldface indicates significantly higher number of brands after Bonferroni correction (p < 0.017) to adjust for multiple comparisons.



 TABLE 5
 Non-branded food-related appearances.

| | Total (<i>N</i> = 400) | | 2019 | ${\bf 2019~(n=200)}$ | | n = 200) | 2019 vs. 2020 diff (p-value) |
|--|-------------------------|-----|------|----------------------|-----|----------|------------------------------|
| Total videos with non-branded food appearances (# of videos, % of total videos) ^a | 203 | 51% | 92 | 46% | 111 | 56% | 0.057 |
| Category | | | | | | | |
| Healthy (fruit, vegetables, plain water, milk) | 140 | 35% | 57 | 29% | 83 | 42% | 0.006 |
| Candy | 55 | 14% | 24 | 12% | 31 | 16% | 0.307 |
| Sweet and salty snacks | 57 | 14% | 27 | 14% | 30 | 15% | 0.667 |
| Fast food &/or sugary cereal | 33 | 8% | 18 | 9% | 15 | 8% | 0.582 |
| Ice cream/toppings | 27 | 7% | 13 | 7% | 14 | 7% | 0.841 |
| Sugary drinks | 11 | 3% | 6 | 3% | 5 | 3% | 0.757 |
| All other | 66 | 17% | 30 | 15% | 36 | 18% | 0.418 |

^aCategory numbers do not add up to the total because some videos had non-branded food appearances for foods in more than one category.

 TABLE 6
 Videos with promotions or disclosures of sponsored content.

| | Total (N = 400) | | 2019 | $\frac{\text{2019 (n} = \text{200)}}{}$ | | (n = 200) | 2019 vs. 2020 diff (p-value) | |
|---|-----------------|-----|------|---|----|-----------|------------------------------|--|
| Total videos with promotions/disclosures (# of videos, % of total videos) | 112 | 28% | 50 | 25% | 66 | 33% | 0.078 | |
| Instagram handle | 68 | 17% | 36 | 18% | 32 | 16% | 0.532 | |
| App/game promotion | 13 | 3% | 0 | | 13 | 7% | <0.001 | |
| Disclosure of sponsored content | 32 | 8% | 13 | 7% | 19 | 10% | 0.267 | |

Note: Boldface indicates significantly higher proportion after Bonferroni correction (p < 0.013) to adjust for multiple comparisons.

3.2 | Non-branded food-related appearances

Non-branded candy and sweet/salty snacks each appeared in 14% of videos (Table 5). As with branded product appearances, non-branded fast food and sugary cereal appearances were less common. Non-branded ice cream/topping appeared in 7%, and just 3% had sugary drinks. We did not identify any non-branded diet soda appearances.

In contrast to low incidence of branded product appearances for healthy categories, 35% of all videos sampled (n=140) contained healthy non-branded food-related appearances. However, more than two-thirds (70%) of these videos also showed unhealthy products (branded or non-branded). Sixty-three (45%) contained branded product appearances, and 52% contained non-branded appearances in one or more unhealthy category (candy, sweet/salty snacks, sugary drinks, ice cream/toppings, fast food, sugary cereal and/or diet drinks). Videos with healthy non-branded foods also increased significantly from 2019 (29%) to 2020 (42%), but there were no other significant differences between years.

3.3 | Advertisements and promotions

The 376 YouTube videos (94%) with video-ads averaged almost three ads each (M = 2.78, SD = 2.35), with up to 16 ads on one video. However, only five video-ads promoted food products, primarily for adult-oriented products (energy bar, fast food, soup, and a plant-based egg

product). Just one ad was for a child-oriented food product (Finders Keepers chocolate candy). As the video-ads were not part of the content of the child-influencer videos and were placed by advertisers at the time the content analysis was conducted (not the time the videos were posted), we did not compare video-ads by year.

The most common type of promotion was for the child-influencer's Instagram handle, which was shown at least once during 68 videos (17% of the total) (see Table 6). Promotion of the child influencer's online or mobile app or game appeared at the end of 13 videos (3%) uploaded in 2020 but did not appear in any videos uploaded in 2019. Disclosures of paid endorsements/sponsored content appeared in 8% of videos (32 videos). However, just one video disclosed a paid endorsement for a food brand (Lunchables on Ryan's World, uploaded in 2019). The rest of sponsored content disclosures were for toy brands/companies or movies.

4 | DISCUSSION

This study found extensive food-related appearances in videos posted by top child-influencers on YouTube channels specifically designated for viewers under the age of 13. Two-thirds of videos examined featured at least one food-related appearance, and 38% contained at least one branded food, beverage, or restaurant product appearance. Of the 592 branded product appearances found, three-quarters featured candy, sweet/salty snacks, sugary drinks, or ice cream. As of

June 2020, total video views for the analysed channels in this study exceeded 155 billion.²² Therefore, potential exposure to unhealthy branded foods by child viewers appears to be quite high. Moreover, young children's time on YouTube has increased considerably and companies' use of influencer-based marketing is projected to increase.^{4,12}

These findings support previous analyses of YouTube influencer videos showing that food-related products are frequently present, often branded, and mostly unhealthy. One study found higher incidence of YouTube influencer videos with food or beverages present (90% vs. 65% in our study), but videos from just two influencers were analysed. Another study found somewhat lower incidence of YouTube child-influencer videos featuring food or drinks (43%). However, that study examined a subset of the most-viewed videos and videos that showed foods in video thumbnails, whereas our study used systematic sampling to obtain a representative sample of all videos posted on the most popular YouTube child-influencer channels in 2019 and 2020. Our study differed from previous studies by focusing on child-influencers, rather than adult-influencers with child followers and examining a larger number of YouTube child-influencer channels. And the study of the previous studies by focusing on child-influencers, rather than adult-influencers with child followers.

This study also expands upon previous research to further assess the centrality of branded product appearances in videos that are popular with children. We found that more than one-half of branded product appearances showed the food being consumed (32%) or suggested consumption (26%), and these percentages increased significantly from 2019 to 2020. This finding raises concerns as children are likely to imitate the behaviour of a character or other children they like. ^{29,30} Further, research has found that children who viewed a character engaging with a brand in a movie storyline were more likely to remember, have positive attitudes toward and choose to consume that brand compared to visual-only product placement. ^{29,31} Moreover, more than 150 food-related brands were present in the videos in other ways, including verbal mentions by child-influencers, brand logos on toys or stickers, and logos in video thumbnails.

This study also compared prevalence of food-related appearances in 2020, following implementation of the ban on food and beverage advertising on YouTube made-for-kids channels, versus 2019. Although total numbers of appearances did not change significantly, there were some notable differences between years. First, appearances for candy brands increased. The number of videos showing healthy non-branded products (e.g., fruits, vegetables, plain milk, or water) also increased. However, more than two-thirds of these videos also showed branded or unbranded unhealthy products. As such, the potential for these videos to convey positive messages about healthy foods to child viewers was likely offset by the presence of unhealthy products. Previous studies have not analysed the combination of food-categories and branded versus non-branded product presence per YouTube child-influencer video. 14,21

Finally, this study examined other types of promotional content present during child-influencer videos. At the time data were collected, approximately three video-ads were shown per video viewed. Five of these video-ads promoted food or beverage products, even though Google's policy bans food or beverage advertising on YouTube "made-for-kids" channels/videos. ¹⁰ In addition, 20% of the videos encouraged children to seek related content on other platforms, including child-influencers' Instagram accounts and apps or games. Although all of these videos were categorized by YouTube for audiences under age 13, Instagram requires users to be age 13 or older to create an account. ³² Instagram is a popular platform for unhealthy food and beverage brand promotion and has been scrutinized for content that is harmful to children. ^{33,34} A previous study also found high rates of pop-up and unlock to play ads, including food ads, on apps and games for young children. ³⁵ Moreover, despite the frequency with which branded food and beverage products appeared in videos, just one contained a disclosure that the video content was sponsored by a food-related brand.

4.1 | Study limitations

There are limitations to this research. Systematic sampling allowed us to identify a representative sample of videos that included approximately one-third of the total population of videos from both years, but social media marketing changes rapidly and findings may differ if we had included more videos uploaded over a longer time period. However, these channels are representative of the most popular You-Tube channels. Each had 3.2 to 58.5 million subscribers and up to 40.4 billion total video views each. Nine also ranked among the top-50 most viewed US YouTube channels (including non-children's channels) in July 2020.36 As done in previous research by Coates and colleagues²¹ and following protocol created by experts for the World Health Organization for analysing branded product presence in You-Tube social media influencer videos, 25 we also measured unique foodrelated appearances not the number of the times each appearance occurred per video or the length of time per appearance. Therefore, our findings do not indicate total potential exposure time for foodrelated appearances. However, our measure of the centrality of a branded product appearance reflected the influencer's level of engagement with the product, which has been shown to indicate potential influence of the branded product appearance.^{29,31} In addition, we did not evaluate the nutrient profile of the food and beverage products in the videos. However, we categorized branded products into categories that prior research on food marketing to children has determined to contain primarily either high-calorie, low-nutrient products (e.g., fast food, sweet/salty snacks, sugary drinks), or healthy products (water, fruit, vegetables, plain milk).³⁷

Given the large number of food-related product appearances, we expected that many of these videos would also include disclosures of a financial relationship between a food brand and the child-influencer. However, we identified only one disclosure. This finding aligns with a previous study that found disclosures for relationships with brands in only 10% of sponsored content on YouTube. ³⁸ Future research should investigate why child-influencers included branded products in their videos without compensation or whether these videos did not comply with required disclosure policies for influencer product placements/

integrations, sponsorships and endorsements.^{20,39-42} Additional research is also required to determine how child-influencer endorsements affect young children, as most studies to date have examined effects on children older than 8 years.^{15,43,44}

4.2 | Policy implications

The findings in this study also have implications for policies to protect young children from digital marketing promoting unhealthy foods. Our analyses show that current US food industry self-regulation does not protect children from potential exposure to unhealthy food and beverage brands while viewing child-influencer videos on YouTube. More than one-half of the branded product appearances, including candy, sugary drinks, and sweet/salty snacks, and the majority of other brand appearances in these videos featured brands from companies that participate in US food industry self-regulation and pledge to not advertise unhealthy foods to children.

Moreover, the frequent appearances of food-related brands in child-influencer videos indicates that Google's policy restricting food advertising to children on YouTube does not address a prominent means through which children are exposed to unhealthy food brands on this platform. Further, we identified five video-ads that promoted food or beverage products and thus may violate Google's policy to not allow food and beverage advertisements on "made-for-kids" channels.

As noted, we cannot determine whether child-influencers received compensation from companies to include branded products in their videos (such as direct payments or free products) or whether they included branded products in their videos for other reasons. Of note, if the child-influencers did receive compensation and did not disclose that relationship, they would be violating sponsorship disclosure regulations as required by the US Federal Trade Commission. ⁴² In the UK and the US, influencers have been investigated for failing to report that they received compensation. ^{42,45} However, even if the child-influencer and the brand had no financial relationship and these branded appearances did not technically violate government or industry self-regulatory policies, the potential for exposure and the possibility of accompanying negative effects remains.

Moreover, current government and industry policies regarding influencer marketing focus on disclosures to inform viewers that an influencer was paid or received free products in exchange for promoting the advertiser's products. ^{20,40,42,46,47} However, studies conducted with children ages 9–14 showed that disclosures were ineffective at reducing the impact of food and beverage brand influencer marketing on children's attitudes and consumption, and may even increase consumption and/or positive attitudes about the product. ^{15,16,43} Given that before age 12 children cannot effectively defend against advertising influence ⁴⁸ and that child-influencer product presentations are woven into the script of child-influencers whom child viewers trust, it is unlikely that any type of disclosure would eliminate the negative impact of these branded messages aimed at young children.

Therefore, more effective policies are needed to reduce the overall presence of branded foods and beverages on child-influencer channels and protect children from potential exposure to these messages that can harm their health.² Government, media, and food industry policies can play a role.² Google could establish a policy to prohibit influencers on YouTube "made-for-kids" channels (including YouTube Kids) from including branded food or beverages in their videos. Companies participating in industry self-regulation could also request that Google create such a policy, especially if child-influencers are including branded products in videos without expressly obtaining companies' consent

In addition, US restrictions against "host-selling" on television should be extended to digital marketing. Host-selling is "the use of program characters or show hosts to sell products in commercials during or adjacent to the shows in which the character or host appears." Legal scholars have also called for modifications to child-actor regulations to protect child-influencers themselves from this potentially exploitative practice, including safeguards for their financial and mental health. 50

5 | CONCLUSION

Though still emerging, evidence of the negative effects from influencer promotion of food-related brands on children's consumption and attitudes, together with their widespread use and the frequency that young children visit child-influencer channels, raise numerous public health concerns. Appropriate safeguards must be enacted to protect children from influencer marketing for nutritionally poor food and beverages that can harm their health.

AUTHOR CONTRIBUTIONS

FFM and JH contributed to conceptualizing and designing the study. LP refined coding categories with input from FFM and coded the data with the assistance of Hebaq Elmi. FFM and LP conducted analyses. FFM drafted the manuscript and JH provided edits and feedback. All authors reviewed and approved the final manuscript.

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CONFLICT OF INTEREST

No conflict of interest was declared.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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