International Journal of Public Health (2020) 65:1045–1055
https://doi.org/10.1007/s00038-020-01444-w

REVIEW

Inventory of marketing techniques used in child-appealing food and beverage research: a rapid review

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Received: 2 February 2020 / Revised: 14 July 2020 / Accepted: 16 July 2020 / Published online: 25 August 2020

Abstract

Objectives Restrictions on child-appealing food and beverage marketing have been prioritized globally. However, the concept of "child-appealing marketing" has not been consistently defined, leading to variability in policies and research. The objective of this review was therefore to generate an inventory of the marketing techniques that have been used in research to identify child-appealing marketing.

Methods Based on WHO guidelines, this review identified primary research that analyzed child-appealing marketing techniques, using the OVID Medline database and hand searches in Google Scholar and PubMed. All marketing techniques were extracted, counted, and synthesized into an inventory, organized thematically and by popularity.

Results From 133 publications, 1421 marketing techniques were extracted (mean 10.7/publication; range: 1–66). The final inventory included 117 techniques; the "use of characters, children, and actors" was the most popular theme.

Conclusions The inventory and categorization generated by this research can be used for informing future research and for alerting policy-makers globally to the breadth of child-appealing food and beverage marketing techniques, helping move toward a consistent and comprehensive definition of child-appealing marketing in regulations aimed at restricting this type of marketing.

Keywords Marketing to children · Persuasive marketing techniques · Food and beverage marketing · Marketing restrictions · Public health policy · Children's nutrition

Introduction

Children's exposure to marketing for unhealthy food and beverage products is a global public health concern (World Cancer Research Fund International 2020). Given the susceptibility of children to the persuasive effects of marketing and its influence on children's food preferences and consumption behaviors, child-appealing marketing is contributing to the growing burden of childhood overweight, obesity, and diet-related chronic disease (Sadeghirad et al. 2016; World Cancer Research Fund International 2020). In response, many organizations have called for actions to restrict the marketing of unhealthy foods and beverages to children. In 2010, the World Health Organization (WHO) published a comprehensive set of recommendations on the marketing of unhealthy foods to children, and many countries have since introduced voluntary or mandatory restrictions on child-appealing marketing (Obesity Policy Coalition 2018; World Cancer Research Fund International 2020; World Health Organization 2010).

This article is part of the special issue "Market-driven forces and Public Health".

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s00038-020-01444-w) contains supplementary material, which is available to authorized users.

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A key aspect of child-appealing marketing-related policies, however, is how regulators operationalize the concept of child-appealing marketing. This process can be highly subjective and the definition of what types of marketing are considered to be "child-appealing" can produce vastly different policy outcomes. This is particularly concerning given that research evaluating various voluntary codes aimed at reducing unhealthy food and beverage advertising to children, has identified that "loopholes" in definitions of child-appealing marketing exist. These can be exploited by food and beverage manufacturers and have greatly reduced the efficacy of these policies at limiting children's exposure to child-appealing marketing (Galbraith-Emami and Lobstein 2013; Mulligan et al. 2018; Potvin Kent and Pauze 2018).

In order to support and inform child-appealing marketing-related policy efforts, there is a growing body of literature characterizing the extent and nature of child-appealing marketing across various marketing platforms. However, since the concept of "child-appeal" has not been consistently characterized or defined in policy, researchers are left to determine how to define child-appealing marketing for their own purposes. Worth noting as well, is the distinction between the terms "child-directed" and "child-appealing," the first referring only to those products being explicitly targeted at children, while the latter aims to capture advertisements that although not directly targeted at children, may still appeal to them (e.g., adult or teen cartoons, or using animated characters in an adult setting). Learnings from tobacco marketing practices support the need to make this crucial distinction in research and in policy to ensure that all instances of child-appealing food marketing are captured in child-appealing marketing restrictions (Hammond 2000).

While it is expected that variations in methodology for studying child-appealing marketing may exist due to inherent differences in the nature of marketing across different marketing media (e.g., animations on television, but not print media), there is still considerable heterogeneity in the way researchers have defined child-appealing marketing, even within studies of the same media.

Different types of criteria have been used to identify child-appealing marketing in the literature, drawing on different aspects of the advertisement. Many studies have defined child-appealing marketing using audience-based criteria, such as the type of channel/website (e.g., on a cartoon network), airing time (e.g., aired during "after-school" time), viewership properties (e.g., percentage of child viewership), or shelf-placement (Berry and McMullen 2008; Cheyne et al. 2013; Horsley et al. 2014; Potvin Kent et al. 2014; Potvin Kent and Pauze 2018; Thompson et al. 2008). Other studies have used content-based criteria to define child-appealing marketing, such as requiring the display of specific persuasive techniques or marketing elements (hereafter referred to simply as "marketing techniques") for a marketing instance or food product to be considered child-appealing. Within these analyses, there is variation in both the nature of the techniques incorporated in the criteria, as well as how the criteria are applied (e.g., the number of techniques required to be displayed for a product to be considered child-appealing). There have also been studies combining audience-based and content-based methodologies, typically using audience-based criteria to derive a sample of marketing media (e.g., hours of recorded television from a children's channel), and then conducting in-depth content analyses to identify the presence of multiple marketing techniques within that media sample. In these types of analyses, authors have coded an array of aspects, such as visual appeals (e.g., graphic design, animation); auditory appeals (e.g., jingles, direct audience addresses); appeals to fun, taste, health, and price; themes of fantasy, adventure, or action; and the use of promotional characters or tie-ins to child-appealing media (Hebden et al. 2011; Jenkin et al. 2014; Prowse 2017). However, there is great variation in the number and types of marketing techniques incorporated in the definitions of child-appealing marketing employed by different researchers, as well as the specific terminology or definition used to describe individual marketing techniques. With the diversity present in methodologies for child-appealing marketing research, and the lack of standardized definitions for child-appealing marketing—either for research or policy-related purposes—a thorough consolidation of the current research landscape would facilitate a better understanding of this pervasive marketing practice and potentially lead to the use of a consistent and broadly encompassing definition of child-appealing marketing in the future.

To better understand the diversity in child-appealing marketing research methodologies, an examination of how methodologies differ across several potential sources of variability is warranted. Methodologies may vary based on where the research was conducted, or due to regional differences in marketing practices or policy landscapes. Similarly, there could be differences in how authors define child-appealing marketing based on the type of analysis that was conducted (i.e., content analysis or using content-based criteria), due to variations in the aims and scope of these types of studies. Additionally, given the increasing prioritization of restricting child-appealing marketing, it is plausible that methodologies employed by researchers to study child-appealing marketing have developed over time, along with the evolution of this field of study.

While there have been some reviews summarizing child-appealing marketing in a single marketing platform or in child-related settings (e.g., recreation areas) (Hebden et al. 2011; Prowse 2017), there has been little effort to

synthesize the various marketing techniques that have been used or observed globally to define child-appealing marketing, across multiple major marketing platforms. Moreover, a recent review specifically highlights the need for "harmonizing (and formalizing) research strategies for defining and classifying marketing techniques" (Elliott and Truman 2019).

As such, the objectives of this review were to generate an inventory of the marketing techniques that have been used to identify child-appealing marketing in research to date, as well as analyze the variability in the number of marketing techniques used to identify child-appealing marketing in research across different marketing platforms, geographic regions, type of analysis, and year of publication.

Methods

Rapid review methodology

Rapid reviews are a type of knowledge synthesis which streamlines or accelerates the methodologies typically used in a systematic review and have been suggested by the WHO to be helpful for strengthening health policies and systems in a practical timeframe (Tricco et al. 2017). Given that the purpose of this review was primarily to generate a standardized inventory of marketing techniques rather than formally evaluate the strength of the literature on this topic, rapid review methodology was deemed appropriate for this research. While there is currently no standardized procedure for conducting rapid reviews, the methodology for this study was adapted from practical guidance published by the WHO (Tricco et al. 2017), and is detailed in the following sections.

Literature search

The Ovid MEDLINE® database was searched using the specific search terms in Table 1. The search was limited to results published in English, from 1999 to June 27, 2019 (capturing the 20 years prior to the search date). The results of the search were uploaded to Endnote X9 software, and duplicates were removed automatically. Supplemental hand searches were conducted in Google Scholar, PubMed, and in the reference lists of identified review papers.

Study selection

The titles and abstracts of all publications returned in the search were screened, and those not relevant to marketing, food, and children were excluded. As well, all publication types except for reviews and primary articles were excluded at this time (e.g., commentaries, editorials). Reviews were retained to hand search the reference lists for additional relevant publications but were later excluded from the final sample of included publications. The abstracts and/or full texts of the remaining publications were assessed based on the following inclusion criteria: (1) the authors must have conducted a content analysis of actual advertising to identify the presence of marketing techniques or have published a set of specific marketing techniques that were used as criteria to define child-appealing marketing (i.e., content-based criteria); (2) researchers analyzed marketing occurring on television, product packaging, internet (e.g., company websites, social media), or print materials. Given that the aim of the current research was to capture the marketing techniques employed in actual child-appealing marketing, experimental research with exposure to simulated child-appealing marketing as an intervention was excluded (e.g., exposing children to child-appealing vs. non-child-appealing products to assess taste preference). As part of the expedited rapid review methodology, all screening was completed by a single reviewer. A summary of the study selection process is shown in Fig. 1, based on the PRISMA reporting guidelines for systematic reviews and meta-analyses (Moher et al. 2009).

Data extraction

The included articles were screened, and all marketing techniques reported by the authors were recorded, verbatim. Techniques were recorded if they were present in the authors' marketing coding frameworks or definitions of "child-appealing" marketing, or if they were identified as being present in the advertisements or on the food products that were analyzed in the study based on the results presented in the study. Other extracted data included: the marketing platform (i.e., television, internet, packaging, print materials), publication year, the geographic region the marketing occurred (i.e., North America, South and Central America, Europe, Asia, Africa, Oceania), and the type of marketing analysis (i.e., content analysis only, content-based criteria, or both). Again, all extraction was completed by a single reviewer.

Data analysis

The number of marketing techniques extracted from each publication was counted, and the number of publications using each count of marketing techniques was calculated. In order to characterize the variability in marketing technique use, the mean ($\bar{x}$) and standard deviation (SD) of the number of marketing techniques used across studies were

Table 1 Search conducted in the Ovid MEDLINE® database

Topic 1: Marketing	"marketing/," "advertising as a topic/," "social marketing/," "market*," "Direct-to-Consumer Advertising/," "advertis*," "marketing strategy*," "marketing technique," "persuasive marketing," "persuasive advertising"	Search terms combined with the operator: "OR"	Search terms combined with the operator: "AND"
Topic 2: Foods and beverages	"food/," "bread/," "candy/," "chocolate/," "dairy products/," "fast foods/," "fruit/," "meals/," "meat/," "nuts/," "seeds/," "vegetables/," "beverages/," "carbonated beverages/," "energy drinks/," "fruit and vegetables juices/," "milk/," "food," "beverage," "snacks/," "snack," "breakfast cereal," "juice," "soft drink," "candy," "junk food"	Search terms combined with the operator: "OR"	
Topic 3: Children	"child/," "child, preschool/," "parents/," "child*," "kid," "adolescent/," "teenager," "youth," "young people," adolescent," "boy," "girl," "parent*," "school aged"	Search terms combined with the operator: "OR"	

The formal literature search conducted in the Ovid MEDLINE® database was built using a combination of search terms related to the three main topics of this review: marketing, foods and beverages, and children. Search terms within a topic were combined using the operator "OR" and search terms between topics were combined using "AND." Search terms ending in "/" indicate that this term was searched as a subject heading (i.e., Mesh term). Search terms without a "/" were searched as a text word in the title, abstract and author-provided keywords. The use of a "*" indicates truncation

calculated by marketing platform, geographic region, analysis type, and year of publication (in 5-year intervals).

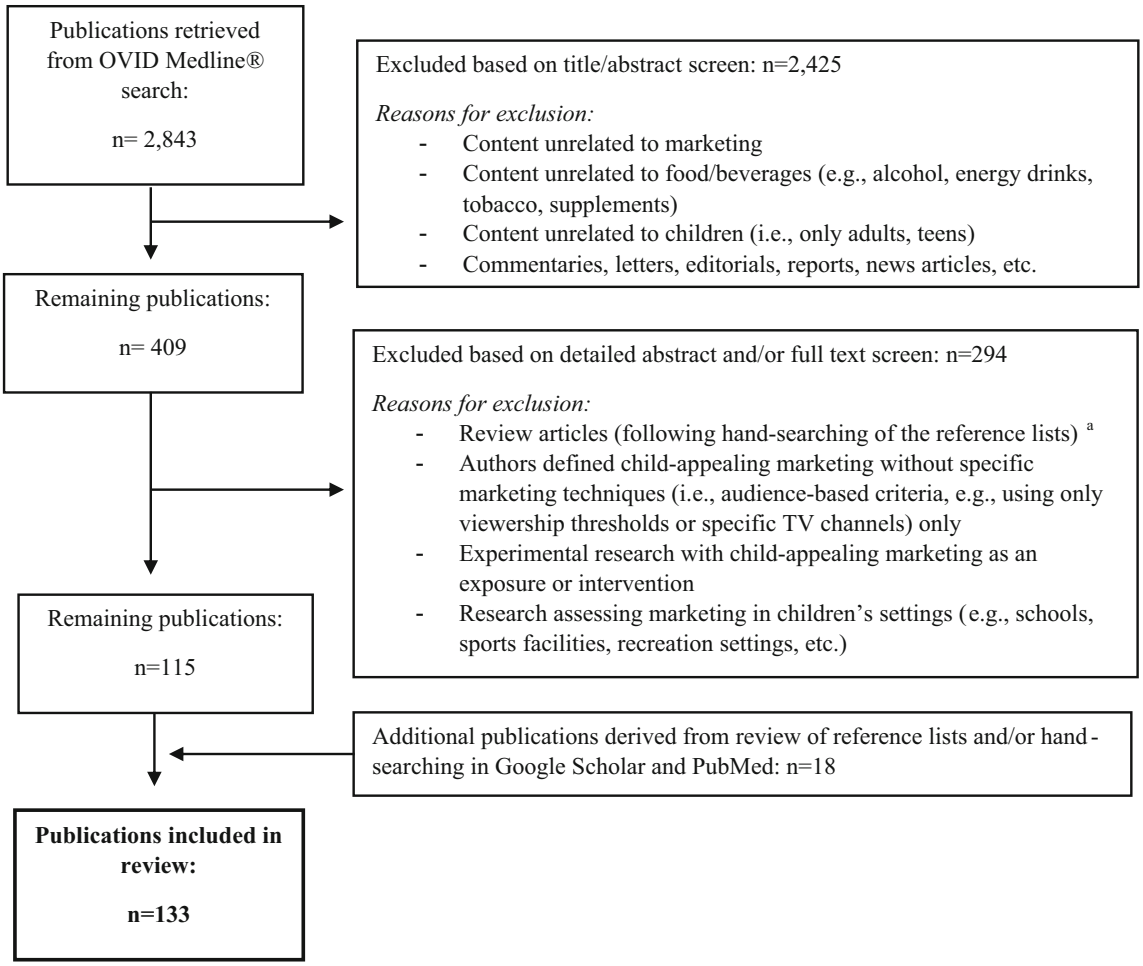
In order to summarize and harmonize the nature of the marketing techniques extracted from these publications, an inventory of marketing techniques was synthesized from the master list of extracted techniques by pooling together similar techniques (e.g., "allusions to fun or play" and "children having fun") and organizing them thematically (e.g., product-related elements, audiovisual elements, premiums, and giveaways). Upon completion of the inventory, the number of times each marketing technique was used in the included publications was counted. Given that marketing techniques were extracted verbatim from the publications, depending on how different authors defined their techniques, some individual extracted techniques may fall into more than one "pooled" technique in the inventory, or vice versa. For example, one study may define a single marketing technique as "unusual product taste, color or shape," while another author may define "unusual product taste," "unusual product color," and "unusual product shape" as three separate marketing techniques. This resulted in some individual extracted techniques being counted in more than one technique in the inventory. Similarly, an author may have defined multiple techniques that were pooled into a single marketing technique, and therefore that "pooled" technique could have been counted multiple times for a single publication within the inventory. Therefore, the counts should only be interpreted as a proxy for relative popularity of the marketing technique's use, rather than an actual frequency of use. Given that the nature of child-appealing marketing may vary across different marketing platforms, the top 10 most popular marketing techniques in each marketing platform were tabulated.

Results

In total, 133 publications were included in this review and a complete reference list can be found in Appendix A. The number of extracted marketing techniques per publication ranged from 1 to 66 techniques, with an average of 10.7 techniques used per publication (Fig. 2). Most publications used between 1 and 20 marketing techniques, and very few used more than 30.

Television was the most studied marketing platform in the included publications (n = 67 publications), followed by product packaging (n = 40) (Table 2). Publications analyzing internet marketing, however, assessed the most marketing techniques ($\bar{x}$ (SD): 18.8 (16.8) techniques). Analyses of marketing in Oceania evaluated the highest number of marketing techniques ($\bar{x}$ (SD): 12.6 (15.9)), followed by North American analyses (10.9 (9.3)), the latter being the region where the highest number of studies was reported (n = 60 publications). Publications that used both content-based criteria to define child-appealing marketing and conducted content analyses used the most marketing techniques ($\bar{x}$ (SD): 14.1 (9.4)). Publications between 2005 and 2009 evaluated the most techniques ($\bar{x}$ (SD): 13.4 (12.0)), but the number of publications focused on this topic area more than tripled over the next ten years (2010–2019).

A final inventory of 117 marketing techniques was derived from the master list of extracted techniques (n = 1421 techniques) and is presented in Supplementary



[a]The formal literature search was conducted in the OVID Medline® database by a single researcher. Review articles (n=33) were maintained in the first round of study selection in order to hand-search for additional publications in their reference lists but were excluded from the final list of included publications. Additional hand searches were conducted in Google Scholar and PubMed to supplement the formal search

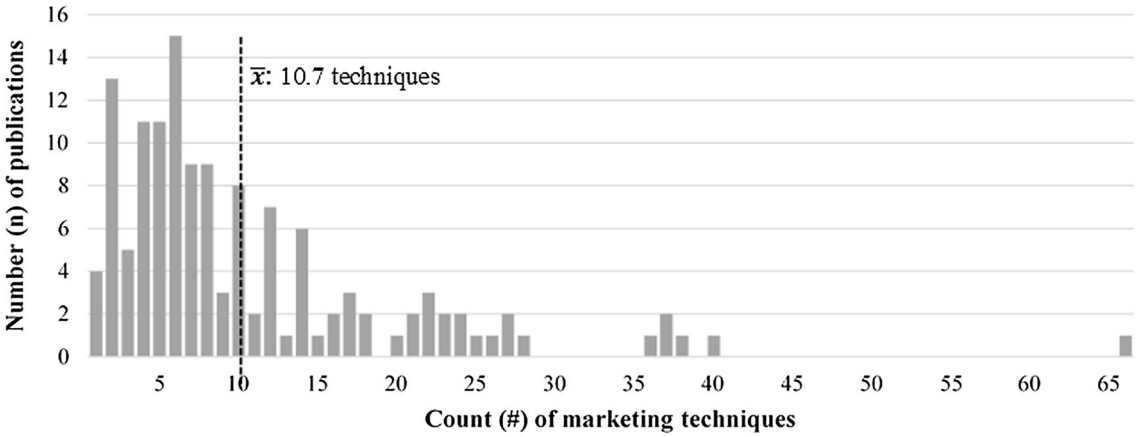
Fig. 1 Rapid review study selection process[a]

Table 1. A summary of the major marketing themes and their popularity is presented in Table 3. Techniques in the inventory were used between 1 and 76 times, with the five most popular techniques being: presence of other cartoons, characters, superheroes, animals, creatures (e.g., fictional or unspecified, i.e., not branded or licensed), $n = 76$ times; nutrition-related claims, $n = 62$; health-related claims, $n = 62$; games, advergames or other interactive activities, $n = 60$; and presence of celebrities and/or athletes, $n = 60$ (Supplementary Table 1). As expected, the relative popularity of marketing technique usage varied by marketing platform (Table 4).

Discussion

This review illustrates the extensive variability in the types of marketing techniques that have been used in research to define child-appealing food and beverage marketing over the last two decades. These results confirm that there is also a large range in the complexity of researchers' marketing coding tools and significant heterogeneity in the types of marketing techniques that are used or identified in different child-appealing marketing analyses.

Results showed that while publications analyzing more traditional marketing platforms (i.e., television and packaging) were most prevalent in the literature, publications analyzing internet as a medium incorporated many more



[a]From the 133 publications included in this review, all marketing techniques mentioned in the methods or results sections of the paper were extracted and counted. A 'count' therefore refers to the number of marketing techniques that were extracted from an individual publication.

Fig. 2 Number of publications using each count of marketing technique[a]

Table 2 Analysis of the number of publications and mean number of marketing techniques used, presented by marketing platform, geographic region, type of analysis, and years of publication

	Publications	No. of marketing techniques used	
	n	$\bar{x}$	SD
Marketing platform			
Internet	19	18.8	16.8
Television	67	10.5	8.3
Packaging	40	8.1	6
Print materials	5	6	1.2
Multiple platforms	2	6	5.7
Geographic region			
Oceania	22	12.6	15.9
North America	60	10.9	9.3
South and central America	12	7.7	7.7
Europe	19	8.9	4.8
Asia	12	8.3	5.5
Africa	1	5	NA
Multiple countries	7	4.3	2.4
Type of analysis			
Content analysis only	79	11.5	11
Content-based criteria	30	5.9	3.4
Both	24	14.1	9.4
Years of publication			
1999–2004	0	NA	NA
2005–2009	29	13.4	12
2010–2014	52	8.7	7
2015–2019	52	11.2	10.6

marketing techniques in their methodologies. This is likely indicative of the complex nature of the internet as a marketing platform, with the potential for engagement techniques and persuasive tactics that have not previously been possible in other forms of media (e.g., advergaming, virtual kids' membership clubs). Interestingly, despite the

Table 3 Marketing technique themes and popularity of their usage

Marketing technique themes	Number of times techniques within theme were used[a]
Use of characters, children, actors	278
Product-related elements	220
Emotional appeals	218
Health and nutrition-related elements	176
Audiovisual elements	173
Premiums and giveaways	162
Consumer engagement techniques	158
Cross-promotion	108
Branding and company-related elements	69
Food consumption and purchasing-related elements	33
School and education related elements	15
Child-protection elements	13

[a]From the 133 publications included in this review, a total of $n = 1421$ techniques were extracted and synthesized into a final inventory of 177 marketing techniques, organized by theme, as presented in this table. The full inventory of marketing techniques is presented in Supplementary Table 1. The counts presented represent the sum of the popularity of the individual marketing techniques within a theme. It is possible that more than one marketing technique extracted from a single publication was counted in a single marketing technique within the inventory, or that one technique was counted multiple times for a single publication. Counts should therefore only be interpreted as a proxy for relative popularity of marketing technique usage in child-appealing marketing research

volume of research pertaining to child-appealing marketing on product packaging, most child-appealing marketing regulations do not include packaging under the scope of their restrictions, making this medium an easy loophole for food and beverage companies to exploit (Obesity Policy Coalition 2018). This is concerning especially given recent evidence that product packaging appears to be children's top source of exposure to food and beverage marketing (Signal et al. 2017). Moreover, research has shown that products displaying child-appealing marketing on their packaging are less healthy than comparable, non-child-appealing products, and should absolutely be considered by policy-makers as they develop child-appealing marketing restrictions (Labonte et al. 2017).

Most of the publications included in this review were from North America and Oceania, and these publications also analyzed the most marketing techniques in their work. However, the large standard deviation around their mean marketing technique usage indicates that there is still much variation in the number of techniques used by those conducting the bulk of the research in this area. Worth noting is that there was not any significant variation in the nature of the marketing techniques used across regions (data not shown), and very few region-specific marketing techniques were identified (i.e., specific cultural references). The results of this review could therefore be a globally relevant resource.

Studies conducting content analyses (using audience-based criteria to derive the analytic sample) used more marketing techniques than those using content-based criteria to define child-appealing marketing (i.e., those using a specific list of marketing techniques to define child-appealing marketing). Given that more marketing techniques are identified from content analyses than are typically used in content-based criteria, researchers and policy-makers could draw on the results of content analyses or the results of this study to broaden their definitions of child-appealing marketing in order to ensure that all marketing instances are captured or covered under restrictions or when conducting research.

This review produced an extensive inventory of marketing techniques (Supplementary Table 1), categorizing the vast diversity of marketing techniques that have been used in this field, and highlighting the complex nature of the types of marketing techniques that are being used by food manufacturers. There were certain techniques that were used more consistently in the literature, such as the presence of various types of characters, the use of giveaways or premiums, appeals to fun, games and activities, and tie-ins with different media or celebrities. These appear to be more traditional child-appealing marketing techniques that are often emphasized and have clearly been priority techniques for attention in this field of research and for policy-makers to date. These are also techniques that can feasibly appear on any marketing medium and were, in fact, found to be popular across all platforms included in this study. Fortunately, these marketing techniques are typically considered within the scope of child-appealing

Table 4 Top 10 most popular marketing techniques, by marketing platform

Marketing platforms and marketing techniques	Number of times technique was used[a]
Television	
Health-related claims (e.g., health claims, health symbols (e.g., Hearts, checks), references to "natural/pure," promotion of improved health outcomes (e.g., growth, weight loss), depicting "healthy" people)	40
Presence of other (e.g., fictional) cartoons, characters, superheroes, animals, creatures, etc. (or unspecified)	35
Fun/play/happiness/humor/pleasure	33
Price related premiums or rebates (e.g., bonus offers, calls to action to encourage purchase)	32
Visual effects (e.g., animation, fast cutting, slow motion, dynamic images)	30
Presence of celebrities and/athletes	30
Nutrition-related claims (e.g., nutrient content, ingredient information)	29
Promotion of product novelty/uniqueness (e.g., trendy/limited edition)	22
Giveaways to be redeemed later (e.g., contests, competitions, coupons, special order items, product samples)	22
Presence of children (e.g., cartoon, child actors)	22
Internet	
Games, advergames or other interactive activities	29
Free downloads for children (e.g., coloring sheets, wallpapers/screensavers, comics, e-books)	19
Nutrition-related claims (e.g., nutrient content, ingredient information)	18
Product directly displayed/promoted (e.g., picture, video)	15
Presence of brand/manufacturer logo	14
Presence of brand/company character, mascot, spokesperson, etc.	14
Giveaways to be redeemed later (e.g., contests, competitions, coupons, special order items, product samples)	13
Giveaways included with purchase (e.g., gifts, toys, collectibles)	12
Viral marketing (e.g., user-generated content, use of hashtags, social sharing buttons, prompts to "share" or communicate with friends, prompting conversation with online communities or other website members)	12
Health-related claims (e.g., health claims, health symbols (e.g., hearts, checks), references to "natural/pure," promotion of improved health outcomes (e.g., growth, weight loss), depicting "healthy" people)	11
Packaging	
Presence of other (e.g., fictional) cartoons, characters, superheroes, animals, creatures, etc. (or unspecified)	32
Tie-ins with movies, TV, toys, etc.	22
Games, advergames or other interactive activities	21
Giveaways included with purchase (e.g., gifts, toys, collectibles)	20
Child-appealing imagery or graphics (e.g., colorful, futuristic, simplified; e.g., on package, website)	20
Presence of licensed characters	20
Unconventional product shape	18
Unconventional product color	18
Presence of celebrities and/athletes	18
Product packaged/promoted explicitly for children (e.g., for lunchbox, "kid sized," unusual package shape, sippy lid, package as activity)	16
Print materials	
Product directly displayed/promoted (e.g., picture, video)	8
Giveaways to be redeemed later (e.g., contests, competitions, coupons, special order items, product samples)	5
Games, advergames or other interactive activities	5
Brand/product incorporated into game/activity/other content (i.e., product/brand placement)	2
Featuring ads from different media	2
Featuring of non-food advertisements	2
Price related premiums or rebates (e.g., bonus offers, calls to action to encourage purchase)	2
Promotion of recipes using product	2
Tie-ins with movies, TV, toys, etc.	1
Presence of other (e.g., fictional) cartoons, characters, superheroes, animals, creatures, etc. (or unspecified)	1
Presence of celebrities and/athletes	1

Table 4 (continued)

Marketing platforms and marketing techniques	Number of times technique was used[a]
Multiple platforms	
Giveaways to be redeemed later (e.g., contests, competitions, coupons, special order items, product samples)	3
Presence of other (e.g., fictional) cartoons, characters, superheroes, animals, creatures, etc. (or unspecified)	3
Games, advergames or other interactive activities	2
Promotion of links to company, brand, or product website	1
Promotion of membership opportunities/kids clubs (e.g., prompts so register/sign in, promotion of member benefits, loyalty programs)	1
Presence of brand/company character, mascot, spokesperson, etc.	1
Free downloads for children (e.g., coloring sheets, wallpapers/screensavers, comics, e-books)	1

[a]From the 133 publications included in this review, a total of $n = 1421$ techniques were extracted and synthesized into a final inventory of 177 marketing techniques, organized by marketing platform, as presented in this table. It is possible that more than one marketing technique extracted from a single publication was counted in a single marketing technique within the inventory, or that one technique was counted multiple times for a single publication. Counts should therefore only be interpreted as a proxy for relative popularity of marketing technique usage in child-appealing marketing research

marketing restrictions, but are missed if certain media (i.e., product packaging) are not included.

Most regulatory definitions of child-appealing marketing use terms such as "child-directed" or "child-targeted" when referring to the types of marketing that would fall under the scope of restrictions or legislation. However, this type of language puts the onus on the regulator or enforcement body to prove that the intent of the marketing was, in fact, to target or direct the content toward children. What is frequently not considered is the existence of marketing that is not directly "targeted" to children (and is therefore not restricted) but would still likely "appeal" to children and exert a persuasive effect. For instance, in our research, nutrition-related claims and health-related claims were among the most popular marketing techniques identified overall in this review and were among the most popular in television and internet marketing, specifically. This is noteworthy as these techniques would not be covered under any child-appealing marketing restrictions as they are not typically considered to be explicitly "child-directed" marketing techniques, despite the persuasiveness of nutrition and health messaging—particularly, marketing targeted to parents looking to provide healthful foods for their children. Since parents are the primary purchasers of food for their children, it is important to consider that parents are an alternative target audience for manufacturers who ultimately want their products to be consumed by children (World Health Organization Regional Office for Europe 2019). This review uncovered several other "parent-appealing" marketing techniques that would not be considered child-appealing (e.g., appeals to product convenience, designated family sections of websites, and downloads for parents). These "parent-appealing" techniques may become increasingly important to monitor in this field, particularly as child-appealing marketing becomes regulated or legislated. Should child-appealing marketing be restricted, manufacturers may choose to market their previously child-appealing products in a manner that appeals directly to their parents, circumventing any regulations while still ensuring that their products are being purchased with children in mind. In order to best protect children from the detrimental effects of advertising, regulatory definitions of child-appealing marketing should therefore adopt language which encompasses the broader concept of child-appeal.

This review also identified several marketing techniques that were relatively less popular in the literature, such as many of the consumer engagement techniques. These tended to appear only in analyses of the internet, which could explain their less frequent overall use. However, many of these techniques (e.g., viral marketing) could readily be extended to other platforms, for example, featuring hashtags, social media handles, or QR codes on product packaging. Moreover, as the internet and social media increase in popularity for children, and therefore for child-appealing marketing, we can likely expect a rise in cross-promotions on the internet, mobile applications, television, and product packaging (Folkvord and van 't Riet 2018; Potvin Kent et al. 2019). Emergent techniques such as these will be particularly important for researchers and policy-makers as the child-appealing marketing landscape continues to evolve and regulations are being developed to restrict such marketing.

When the WHO published their recommendations on marketing to kids nearly 10 years ago, one of their central recommendations was that member countries aim to limit both the exposure and the power of child-appealing marketing (World Health Organization 2010). Marketing power is a combination of the frequency of exposures to a marketing instance, the number of marketing techniques used in a marketing instance, and the nature of the marketing techniques used (Cao and Yan 2016; Eisend and Tarrahi 2016). More powerful marketing is more persuasive to consumers and could increasingly influence children or parents' purchasing and consequently, children's consumption of marketed foods. However, our review did not find any studies that formally quantified marketing power, or the persuasiveness of the overall marketing message. Rather, authors typically evaluated child-appealing marketing on a binary scale (i.e., presence/absence of marketing or marketing techniques, or child-appealing/non-child-appealing product). Future research quantifying child-appealing marketing power may facilitate a better understanding of how child-appealing marketing impacts children, as mentioned in a recent review (Elliott and Truman 2019).

Our study is the first to catalog the marketing techniques used in the children's food and beverage marketing literature; however, it is important to note the limitations of this rapid review. The comprehensiveness of our search may have been limited given that only one database was formally searched. However, in conducting hand searching in two additional databases and in reviewing the references lists of relevant reviews, we hope to have minimized this limitation. Additionally, a single reviewer was used for study selection and data extraction; however, a random sample was double checked to ensure thoroughness. Finally, there was no formal evaluation of study quality or publication bias as would be common place in a systematic review, however, given that the primary goal of this review was to generate an inventory of marketing techniques that have been used in the literature, rather than critically appraise the literature itself, these evaluations were not deemed necessary.

Conclusions

This review presents a systematic and detailed synthesis of the persuasive child-appealing marketing techniques that have appeared in the literature over the past 20 years in multiple major marketing platforms, highlighting the heterogeneity of how child-appealing marketing has been studied to date. This variability is important to consider when interpreting research in this field, as varying definitions of child-appealing marketing could produce inconsistencies in research outcomes and conclusions. The complexity involved with operationalizing child-appealing marketing is an equally important consideration for policy-makers when developing regulations surrounding the restriction of unhealthy food marketing to children. Ultimately, varying regulatory definitions of child-appealing marketing could result in variations in children's exposure to marketing for unhealthy foods and beverages. Similarly, the power of this marketing could result in variations in children's health outcomes. The inventory of marketing techniques generated by this study can serve as a useful tool for informing future research or regulations to restrict child-appealing food and beverage marketing by alerting researchers and policy-makers around the world to the breadth of marketing techniques that have been identified or are emerging in this type of marketing—helping move toward a consistent and comprehensive definition of child-appealing marketing.

Funding This research was funded by the Canadian Institutes of Health Research (CIHR) Frederick Banting and Charles Best Canada Graduate Scholarships Doctoral Award (C.M.); CIHR Frederick Banting and Charles Best Canada Graduate Scholarships Master's Award (C.M.); Ontario Graduate Scholarship (C.M.); CIHR Project Grant (2016PJT-378415) (M.R.L.); Lawson Centre for Child Nutrition Policy and Nutrition Collaborative Grant (M.R.L., M.P.K.).

Compliance with ethical standards

Conflict of interest CM completed a graduate student internship funded by the Government of Canada Mitacs Accelerate program at Nestle Canada, unrelated to this research. MPK reports funding from the Childhood Obesity Foundation, unrelated to this research. MRL reports grants from the Program for Food Safety, Nutrition and Regulatory Affairs at the University of Toronto (with partial funding from Nestlé Canada), unrelated to this research. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results. All other authors have no competing interests to disclose.

References

Berry B, McMullen T (2008) Visual communication to children in the supermarket context: health protective or exploitive? Agric Hum Values 25:333–348. https://doi.org/10.1007/s10460-007-9110-0

Cao Z, Yan R (2016) Health creates wealth? The use of nutrition claims and firm financial performance. J Public Policy Market 35:58–75. https://doi.org/10.1509/jppm.14.142

Cheyne AD, Dorfman L, Bukofzer E et al (2013) Marketing sugary cereals to children in the digital age: a content analysis of 17 child-targeted websites. J Health Commun 18:563–582. https://doi.org/10.1080/10810730.2012.743622

Eisend M, Tarrahi F (2016) The effectiveness of advertising: a meta-meta-analysis of advertising inputs and outcomes. J Advert 45:519–531

Elliott C, Truman E (2019) Measuring the power of food marketing to children: a review of recent literature. Curr Nutr Rep 8:323–332

Folkvord F, van 't Riet J (2018) The persuasive effect of advergames promoting unhealthy foods among children: a meta-analysis. Appetite 129:245–251

Galbraith-Emami S, Lobstein T (2013) The impact of initiatives to limit the advertising of food and beverage products to children: a systematic review. Obes Rev 14:960–974. https://doi.org/10.1111/obr.12060

Hammond R (2000) Tobacco advertising and promotion: the need for a coordinated global response. https://www.who.int/tobacco/media/ROSS2000X.pdf. Accessed 22 Dec 2019

Hebden L, King L, Kelly B (2011) Art of persuasion: an analysis of techniques used to market foods to children. J Paediatr Child Health 47:776–782

Horsley JA, Absalom KA, Akiens EM et al (2014) The proportion of unhealthy foodstuffs children are exposed to at the checkout of convenience supermarkets. Public Health Nutr 17:2453–2458. https://doi.org/10.1017/s1368980013003571

Jenkin G, Madhvani N, Signal L et al (2014) A systematic review of persuasive marketing techniques to promote food to children on television. Obes Rev 15:281–293. https://doi.org/10.1111/obr.12141

Labonte ME, Poon T, Mulligan C et al (2017) Comparison of global nutrient profiling systems for restricting the commercial marketing of foods and beverages of low nutritional quality to children in Canada. Am J Clin Nutr 106:1471–1481

Moher D, Liberati A, Tetzlaff J et al (2009) Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. Ann Intern Med 151:264–269

Mulligan C, Labonte ME, Vergeer L et al (2018) Assessment of the Canadian children's food and beverage advertising initiative's uniform nutrition criteria for restricting children's food and beverage marketing in Canada. Nutrients. https://doi.org/10.3390/nu10070803

Obesity Policy Coalition (2018) Policy brief: restrictions on marketing unhealthy food to children—international comparison. https://www.opc.org.au/downloads/policy-briefs/restrictions-on-marketing-unhealthy-food-to-children-international-comparison.pdf. Accessed 28 Jan 2020

Potvin Kent M, Pauze E (2018) The effectiveness of self-regulation in limiting the advertising of unhealthy foods and beverages on children's preferred websites in Canada. Public Health Nutrition 21:1608–1617

Potvin Kent M, Martin CL, Kent EA (2014) Changes in the volume, power and nutritional quality of foods marketed to children on television in Canada. Obesity 22:2053–2060

Potvin Kent M, Pauze E, Roy EA et al (2019) Children and adolescents' exposure to food and beverage marketing in social media apps. Pediatr Obes 14:e12508

Prowse R (2017) Food marketing to children in Canada: a settings-based scoping review on exposure, power and impact. Health Promot Chronic Dis Prev Can 37:274–292

Sadeghirad B, Duhaney T, Motaghipisheh S et al (2016) Influence of unhealthy food and beverage marketing on children's dietary intake and preference: a systematic review and meta-analysis of randomized trials. Obes Rev 17:945–959. https://doi.org/10.1111/obr.12445

Signal L, Stanley J, Smith M et al (2017) Children's everyday exposure to food marketing: an objective analysis using wearable cameras. Int J Behav Nutr Phys Act 14:137

Thompson DA, Flores G, Ebel BE et al (2008) Comida en venta: after-school advertising on Spanish-language television in the United States. J Pediatr 152:576–581. https://doi.org/10.1016/j.jpeds.2007.09.011

Tricco AC, Langlois EV, Straus SE (2017) Rapid reviews to strengthen health policy and systems: a practical guide. World Health Organization, Geneva

World Cancer Research Fund International (2020) Building Momentum: lessons on implementing robust restrictions of food and non-alcoholic beverage marketing to children. www.wcrf.org/buildingmomentum. Accessed 28 Jan 2020

World Health Organization (2010) Set of recommendations on the marketing of foods and non-alcoholic beverages to children. https://www.who.int/dietphysicalactivity/publications/recsmarketing/en/. Accessed Jan 2020

World Health Organization Regional Office for Europe (2019) Evaluating implementation of the WHO set of recommendations on the marketing of foods and non-alcoholic beverages to children: progress, challenges and guidance for next steps in the WHO European Region