

# FOOD MARKETING EXPOSURE AND POWER AND THEIR ASSOCIATIONS WITH FOOD-RELATED ATTITUDES, BELIEFS, AND BEHAVIOURS: A NARRATIVE REVIEW



World Health  
Organization



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# Executive summary

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Healthy dietary practices are initiated early in life and form the foundation for good nutrition and healthy development. Our food environment, which includes the nature and extent of food marketing, influences food values and impacts dietary practices. Food marketing has long been recognized to impact on food preferences and consumption patterns, but despite numerous calls to action to protect children from the harmful impact of food marketing by reducing the power of and exposure to marketing, children continue to be exposed to it. The development of an evidence-informed policy guideline through the WHO guideline development process will help more countries to put in place effective actions to protect children from the harmful impact of food marketing.

As part of the guideline development process, WHO commissioned two systematic reviews, one on the effectiveness of policies to restrict food marketing and another on the impact of food marketing on children. Alongside these, the WHO Nutrition Guidance Expert Advisory Group (NUGAG) Subgroup on Policy Actions requested an update of an earlier descriptive review on the extent and nature of food marketing, and on the associative and qualitative effects of food marketing on eating-related attitudes, beliefs and behaviours from 2009. This publication synthesizes the evidence from that update, and also informs the WHO guideline on policies to restrict food marketing. The update uses a structured narrative review approach, and is based on articles published between 2009 and 2020 which were retrieved by the searches for the two above-mentioned systematic reviews but were not considered eligible for inclusion in either of those reviews (typically because of reasons related to study design or absence of appropriate comparator groups).

Included studies comprised both content analysis research (i.e. research that considers where food marketing occurs, how much there is, for which brands/products and what creative content and marketing techniques are used) and consumer research (i.e. research that explores individuals' beliefs, attitudes, perceptions and behavioural responses to food marketing) from high-income countries (HICs) and low- and middle-income countries (LMICs). A total of 143 content analysis studies (of which 43 related to exposure, 25 to power and 75 to both exposure and power) and 36 consumer research studies (of which 16 were associative and 20 were qualitative) were included in the update.

This review provides evidence that food marketing continues to be prevalent everywhere and predominantly promotes foods that contribute to unhealthy diets. When reported, the proportion of food marketing promoting such foods was generally greater than 50%, and in some studies over 90%. The most frequently marketed food categories included fast food, sugar-sweetened beverages, chocolate and confectionery, salty/savoury snacks, sweet bakery items and snacks, breakfast cereals, dairy products and desserts. There was good evidence to suggest that food marketing promoting less healthy foods was prevalent in settings where children gather (e.g. schools, sports clubs) and, in the context of food marketing through the medium of TV, more frequent during children's typical viewing times, during school holidays, on children's channels or around children's programming relative to other time periods, channels or programming genres. Some evidence indicated social inequality in exposure to food marketing.

Studies related to the power of food marketing reported use of a wide range of creative strategies likely to appeal to, and resonate with, young audiences. These included the use of celebrity/sports endorsements; promotional characters; promotions, gifts/incentives and tie-ins; competitions; games; colour, visual imagery and novel designs; animation, dynamic elements and special effects; branding; persuasive appeals; health/nutrition claims and disclaimers; and various other engagement techniques. Some studies suggested that use of such strategies was more frequent or extensive in food marketing directed towards children than in marketing aimed at adults. Strategies likely to appeal to children were also used more frequently to promote foods that contribute to an unhealthy diet (compared with healthier products), and during school holidays (compared with other days).

Studies which examined the impact of food marketing on diet-related outcomes focused on commercial TV viewing or TV advertisements, often in conjunction with other mediums such as video games, billboards and social media platforms. Among the findings related to beliefs and attitudes was that, among adolescents, exposure to marketing of foods that contribute to unhealthy diets was positively associated with descriptive norms about consumption of such foods. The findings related to the relationship between attitudes and behaviour included that the entertaining dimension of advertising and the level of emotional arousal (e.g. positive feelings of happiness and satisfaction) children experienced after exposure influenced frequency of consumption of foods that contribute to unhealthy diets, and that as adolescents' positive perceptions towards food advertising increased, daily frequency of consumption of foods that contribute to unhealthy diets also increased. In terms of the findings related to behavioural and health impacts, studies reported significant positive associations between frequency of food advertising for particular products or level of exposure to food marketing and habitual consumption of advertised foods or less healthy foods. Some studies indicated that engagement with marketing (e.g. actively watching YouTube brand videos or "liking", "sharing" or "commenting on" posts online) was associated with greater impacts on consumption than exposure alone.

Qualitative studies that reported on food attitudes, beliefs, knowledge and norms, found that most children had good knowledge of food brands and were able to recognize advertised food products in the supermarket. A number of explicit marketing techniques were identified that appeal to and engage young people with marketing. The deceptive nature of food marketing, in relation to the techniques used was considered a concern. The findings related to awareness of, attitudes to, and perspectives on food marketing exposure and its regulation included reports of platforms and media via which children and adolescents were exposed to food marketing, concern about the volume of exposure, and support for greater regulation. Finally, among the findings related to the impact of food marketing were reports that food marketing influenced behaviours of children and adolescents, including purchasing and consumption.

The findings of the update are consistent with those of the earlier review and the two systematic reviews and show that, despite numerous calls for action, food marketing remains persuasive and pervasive. Such marketing is predominantly for foods that contribute to unhealthy diets, targets children and adolescents through its physical placement and scheduling, employs a range of creative strategies that authors reported were likely to appeal to, and resonate with, young audiences, and influences beliefs, attitudes and behaviours.

# 1. Background

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Healthy dietary practices are initiated early in life and form the foundation for good nutrition and healthy development. Our food values, preferences and dietary practices are shaped by our food environment, which in turn is largely governed by availability and cost (whether and where foods are available and at what price) but also how foods are marketed and labelled. As a key component of the food environment, food marketing has been shown to impact strongly on food preferences and consumption patterns. Children in particular have been identified as being particularly susceptible to the messages used in marketing communications and it is now widely acknowledged that exposure to food marketing is a risk factor for the development of childhood obesity (1, 2). However, despite numerous calls for action to protect children from the harmful impact of food marketing – by restricting its extent and power – children everywhere continue to be exposed to sophisticated and persuasive marketing techniques to the potential detriment of their health (3).

WHO is currently developing an evidence-informed policy guideline to help more countries to put in place effective actions to protect children from the harmful impact of food marketing. This work is being undertaken in accordance with the WHO guideline development process (4), and with the support of the WHO Nutrition Guidance Expert Advisory Group (NUGAG) Subgroup on Policy Actions, which was established by the WHO Department of Nutrition and Food Safety (NFS) in 2018.

To inform and underpin the guideline development, WHO has commissioned two systematic literature reviews, one on the effectiveness of policies to restrict food marketing (5), and another on the impact of food marketing on children (6). In addition, the NUGAG Subgroup on Policy Actions has requested an update of an earlier descriptive review published by WHO in 2009, of the evidence on the extent and nature of food marketing, as well as the associative and qualitative effects of food marketing on eating-related attitudes, beliefs and behaviours (1). This document represents the response to the NUGAG Subgroup's request and summarizes the findings of the updated descriptive review. It should be noted that this new descriptive review is not intended to be a comprehensive review of the existing literature; its purpose is rather to supplement the commissioned systematic review on the impact of food marketing on children and to synthesize the available evidence from studies on food marketing that were not eligible for inclusion in either of the two above-mentioned systematic reviews.

## 2. Rationale and objectives of the review

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The overarching aim of this structured, concise narrative review was to update a previous review on the extent, nature and effects of food marketing (1), and to provide additional information for the NUGAG Subgroup on Policy Actions which is tasked with formulating the WHO guideline on policies to protect children from the harmful impact of food marketing.

The review thus aimed to examine the literature published from January 2009 onwards on:

- food<sup>1</sup> marketing to which children are exposed,
- food marketing power, and
- associations between food marketing and eating-related attitudes, beliefs and behaviours among children.

Additional objectives of the review were to:

- consider the evidence for the pathways through which food marketing, or policies to restrict food marketing, may influence the outcomes of interest<sup>2</sup> specified in the two WHO-commissioned systematic literature reviews mentioned above (i.e. on the *effectiveness of policies* and the *impact of marketing* on children); and
- inform interpretation of the findings of the two commissioned systematic reviews.

In the context of this type of research, “exposure” to marketing refers to the communication channels, times and settings in which children see and experience marketing – often television – and is usually described in terms of the reach and frequency of a particular message (7). The “power” of marketing is characterized by the message content. The impact of marketing is a function of both exposure and power, and may be increased by the use of a range of creative strategies. Creative strategies that are frequently used to increase the impact of messages, in particular on children, include use of graphics and visuals designed to appeal to children; use of cartoons and brand equity characters; use of humour, fun and fantasy; movie and sports celebrity endorsements; and tie-ins with competitions and entertainment events (7).

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<sup>1</sup> Food marketing in the context of this review refers to the marketing of both foods and non-alcoholic beverages.

<sup>2</sup> Critical outcomes of interest for the commissioned systematic reviews included: exposure to and power of marketing, food preference, food choice, food purchasing/sales, and dietary intake; important outcomes of interest for the commissioned systematic reviews included: pester power, body weight, risk of diet-related noncommunicable diseases, dental caries, product change and unintended consequences.

## 3. Methodology

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This descriptive review used a structured narrative review methodology, an established method for reviewing published evidence on the effects of food marketing (2, 8, 9). Narrative reviews provide a synthesis of literature relevant to a wider topic, but, unlike systematic reviews, need not have a specific research question, nor involve systematic literature searches or explicit inclusion/exclusion criteria.

### 3.1 Data sources

The articles that were included in this review were identified by the literature search conducted for the two WHO-commissioned systematic reviews. A total of 31 063 articles were retrieved in the systematic review search and screened for eligibility for inclusion in either systematic review. Articles that were not eligible for inclusion in either systematic review (due to, for example, an ineligible study design or comparator group) were then screened for suitability for this review. Thus, any article reporting on “exposure”, “power”, associative effects or qualitative effects of food marketing was considered suitable, unless it was an opinion piece, discussed marketing but did not report any primary data, and/or was published before 2009.

The following examples serve to illustrate the article selection process in greater detail. If a study reported on food marketing exposure or power before and after implementation of a policy to restrict food marketing then it would have been included in the commissioned systematic review on the *effectiveness of policies*. However, if a study reported on food marketing exposure or power at a single point in time or in the absence of a policy to restrict food marketing, then it would have been considered for inclusion in the present narrative review. Similarly, if articles reported data from a study comparing the impact of exposure to food marketing with exposure to less or no food marketing on an outcome of interest, it would have been eligible for inclusion in the commissioned systematic review on the *impact of marketing*. However, if a study looked for an association with an outcome of interest (e.g. a cross-sectional survey which explored whether there was a correlation between the number of hours children spent viewing commercial television per week and their frequency of consumption of fast food), but without the inclusion of a control or comparator group, it would have been considered suitable for inclusion in the present narrative review. As a general rule therefore, and as per the previous descriptive review (1), the evidence provided by observational and correlation studies conducted without a control or comparator group formed the basis of this narrative review, whereas studies which had comparator groups (i.e. designed to examine the question of causality) formed the basis of the more rigorous, systematic literature reviews and were reviewed separately. Because no separate searches were conducted for the purposes of this review, its findings should be interpreted as a thorough overview rather than as an exhaustive account of the available evidence relating to the exposure to and power and impact of food marketing on children.

While qualitative research findings were excluded from the commissioned systematic reviews, they were considered relevant to this review and by extension to the development of the WHO guideline by the NUGAG Subgroup on Policy Actions. WHO considers qualitative research appropriate where it supports understanding of the extent to which the potential benefits and

harms of an intervention are important to people, the extent to which certain interventions are more or less acceptable or more or less feasible, and the potential consequences for equity (see Chapter 5: page 183 of the *WHO Handbook for Guideline Development*) (4). As qualitative research studies on eating-related beliefs, attitudes and behaviours meet these criteria in relation to both the *effectiveness of policies* and the *impact of marketing reviews*, both quantitative and qualitative studies were included in this narrative review.

### 3.2 Data synthesis

Research which explores food marketing exposure and power, and associations between food marketing and eating-related attitudes, beliefs and behaviours tends to fall into two broad categories:

1. **Content analysis research:** this considers when and where food marketing occurs, how much there is, which brands/products are promoted and what creative content and marketing techniques are used.
2. **Consumer research:** this explores individuals' beliefs, attitudes, perceptions and behavioural responses to food marketing.

As content analysis research speaks to the review aims related to food marketing exposure and power, and consumer research to the aims related to associations between food marketing and eating-related attitudes, beliefs and behaviours, the results were structured under these two categories.

In the case of content analysis research, information was extracted on the study country, marketing medium, data source, characteristics and size of the marketing sample, study design and key findings. For consumer research studies, information was extracted on the study country and population (including equity characteristics), sampling procedure, study design, outcomes measured, analysis methods and key findings. Two reviewers independently assessed studies for their suitability for inclusion and cross-checked the extracted information.

### 3.3 Definition of foods that contribute to unhealthy diets

The studies included in this review used varying terms to describe, and varying criteria to define, foods that contribute to unhealthy diets. In the main part of this review, such foods are referred to as "foods that contribute to unhealthy diets" or "less healthy foods", or where appropriate, the term used in the original study is retained but identified by the use of quotation marks.

## 4. Results

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A total of 179 studies were assessed as being of relevance to the topic of this narrative review. The majority (n=143) were content analysis studies, of which 43 only described exposure to food marketing, 25 only examined the power of food marketing, and 75 explored both exposure and power (see **Annex 1**). Thirty-six consumer research studies were identified, 16 of which reported associations between food marketing and various outcomes of interest, including beliefs and attitudes, the relationship between attitudes and behaviour, and behavioural and health impacts (see **Annex 2**). The remaining 20 studies explored the impacts of food marketing on beliefs, attitudes, perceptions and behavioural responses to food marketing using qualitative study designs (see **Annex 3**).

### 4.1 Content analysis research

#### 4.1.1 Exposure to food marketing

##### *Characteristics of included studies*

We identified 118 articles on the topic of exposure to food marketing; roughly a third (36.4%) dealt solely with exposure whereas nearly two thirds (63.6%) reported on both exposure and power (see **Annex 1**). Studies were published between 2009 and 2020.

*Geographical representation:* The majority of studies (n=87) assessed the extent of food marketing in a single high-income country (HIC) only (Argentina (10, 11), Australia (12–30), Austria (31), Belgium (32, 33), Canada (34–37), Chile (38), Greece (39, 40), Hungary (41), Iceland (42), Ireland (43, 44), Malta (45), New Zealand (46–52), Norway (53), Singapore (54), Slovenia (55, 56), Spain (57, 58), Sweden (59, 60), Switzerland (61), the United Kingdom (9, 62–67), the USA (68–95)).<sup>1</sup> There were two multi-country studies where all countries were HICs (96, 97). Twenty-five studies were conducted in a single low- or middle-income country (LMIC) only (Brazil (98, 99), China (100), Columbia (101), Costa Rica (102), Fiji (103), Guatemala (104, 105), Honduras (106), India (107), Lebanon (108), Malaysia (109, 110), Mexico (111–113), Nepal (114), Peru (115, 116), Russian Federation (117), South Africa (118, 119), Sri Lanka (120), Thailand (121, 122)); one multi-country study included only LMICs (123). Three studies reported data from both HICs and LMICs—one from across the Asia–Pacific region (124) while two took a more global perspective (3, 125).

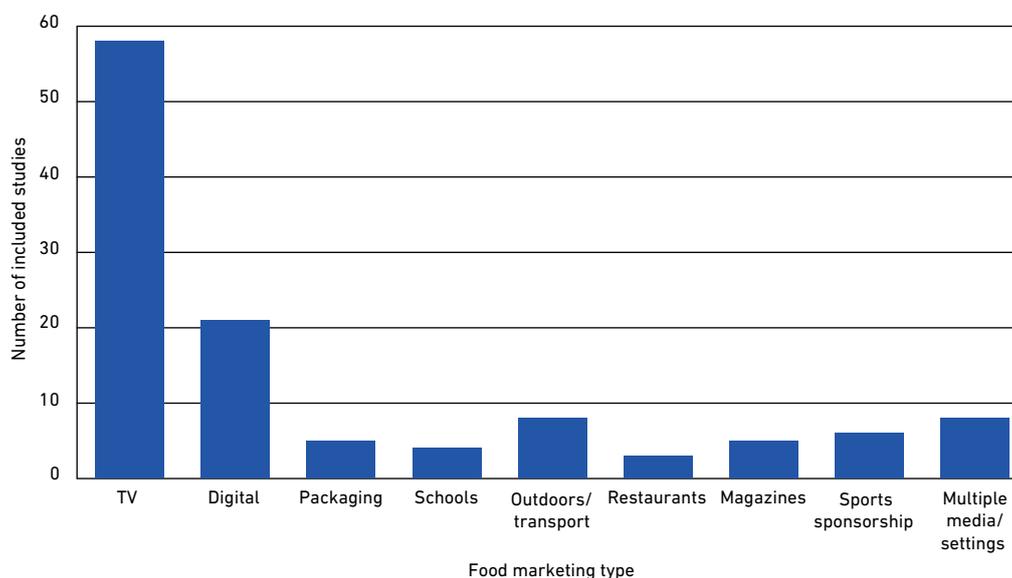
*Marketing media and settings:* Around a half of all included exposure studies (n=58, or 49.2%) described the nature and extent of food marketing aired on television channels (3, 9–12, 16, 20, 25, 26, 30, 31, 38–40, 42, 44, 45, 49, 54, 55, 57–59, 61–63, 67, 69, 71, 74–77, 81, 83, 85, 86, 89, 96, 98–102, 106–109, 111, 112, 114, 115, 117, 118, 120, 121, 124, 125). Twenty-one studies covered digital media (13–15, 17, 28, 33–35, 41, 51, 52, 65, 68, 73, 80, 82, 88, 90, 97, 110, 122), five focused on product packaging/in-store advertising (23, 32, 66, 93, 104) and four described food marketing in schools (36, 43, 50, 87). Food advertising in outdoor spaces or in public transport was the subject of eight studies (24, 27, 72, 78, 79, 113, 119, 123), while three studies examined exposure to food marketing in restaurants (84, 94, 105). Other forms of food marketing covered by the

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<sup>1</sup> Country income level groupings (as high-income or low- and middle-income) are based on the World Bank classification for the year the study was published.

included studies were print media (i.e. magazines (18, 47, 56, 64, 70)) and sports sponsorship (19, 21, 22, 29, 46, 95). Eight studies looked at exposure to food marketing across multiple media and/or settings (37, 48, 53, 60, 91, 92, 103, 116); see **Fig. 1**.

**Fig. 1. The types of food marketing described in included studies of exposure (total number of included studies = 118)**



### Key findings

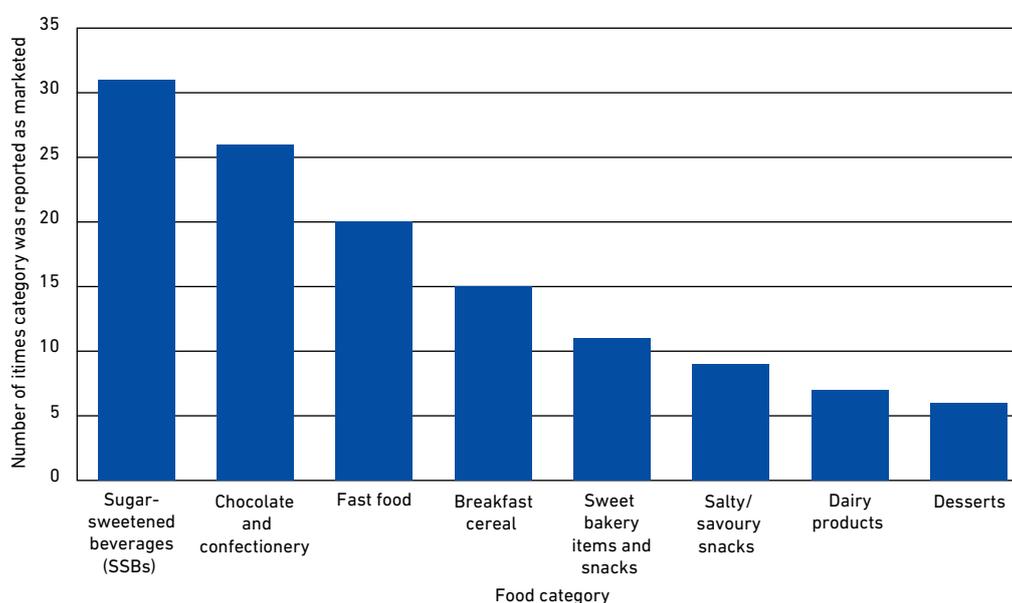
The cumulative evidence gathered as part of this narrative review suggests that across all platforms, food marketing is not only prevalent but mostly promotes foods that contribute to unhealthy diets. Frequently used definitions and descriptors for such foods in reviewed studies included “unhealthy”, “foods high in fats, sugars and/or salt (HFSS)”, “not permitted”, “less healthy”, “junk food”, “energy-dense nutrient poor (EDNP)”, “non-core”, “ultra-processed”, “not meeting nutritional quality standards”, “discretionary”, “high in” or “rich in” undesirable nutrients, and “low in nutritional quality”.

Across the included exposure studies which reported exposure data by food type, the proportion of food marketing that was identified as being for foods that contribute to unhealthy diets was typically between 31% and 93%; (9, 11, 18, 23–27, 29–31, 33, 34, 38, 44, 50, 52, 54, 55, 58, 63, 64, 66, 71, 72, 82, 88, 89, 91–93, 96, 100, 102, 103, 106, 108, 110, 111, 114, 117, 123, 125); however, only two of the studies reporting a proportion within this range gave a figure of less than 50% (24, 38), with the bulk of the studies reporting a predominance (> 50%) of less healthy foods in the marketing mix. A number of studies simply noted that less healthy foods featured more frequently (3, 16, 28, 35, 48, 49, 57, 60, 68, 73, 90, 98, 109), that the advertising of fruits and vegetables was scarce (9, 25, 31, 61, 65, 70, 71, 115), or that there were few nutrition-related public service announcements/little health education content (71, 82).

There were some notable exceptions. One study from Norway found that just 4% of television food advertisements and 2% of internet advertisements were for foods that contribute to unhealthy diets (53), and a study from the USA found that “low-nutrition food commercials” were less prevalent than “general-nutrition food commercials” (81). Furthermore, several studies which analysed food appearances within children’s TV programming schedules demonstrated that healthier foods appeared frequently (42, 59, 67), sometimes more frequently than less healthy foods (59, 67).

**Fig. 2** suggests that the food category marketed most often was sugar-sweetened beverages (SSBs), followed by confectionery products. Fast foods and breakfast cereals also ranked high in the list of most frequently marketed foods. There was some evidence that the types or categories of food marketed differed across platforms. For example, a study which assessed multimedia environments, reported that sweets and sugary drinks were more frequently marketed on TV whereas the promotion of sweets and fast food restaurants was more likely to be seen on Facebook and in outdoor advertising (116). One study also noted that “incidental” foods (i.e. those appearing alongside the “primary” marketed product(s) in advertisements) tended to be healthier than the primary product, which is suggestive of marketers seeking to portray less healthy foods in a healthier context (62).

**Fig. 2. Most frequently marketed food types (expressed as the number of times a given food category was reported as being marketed across different locations and settings in the subset of included exposure studies which reported on the types of food marketed)**



Several studies provided evidence that marketing for foods that contribute to unhealthy diets was prevalent in settings where children gather (e.g. schools, sports clubs) (19, 21, 22, 29, 36, 37, 43, 50, 78, 79, 84, 87, 104, 119, 123) and, in the case of TV advertising, more frequent during children’s typical viewing times, during school holidays, on children’s channels and/or around children’s programming (9, 10, 12, 20, 25, 26, 38, 39, 45, 47, 49, 55, 57, 58, 71, 74, 83, 99–102, 106, 108, 109, 112, 124) relative to other time periods, channels or programming genres. Similarly, a significantly higher proportion of less healthy branded food references were found in magazines targeting children and adolescents compared with magazines with broader and popular appeal (47). In contrast, a comparison of TV advertisements broadcast during or around programmes “of particular of appeal to” children with those aired at other times found no real differences in the proportion of advertising for less healthy foods; this was true of both countries in which this study was conducted (Canada and the United Kingdom) (96). Furthermore, a study from New Zealand noted that sponsorship of sports organizations by less healthy food and beverage brands was uncommon (46).

A number of studies noted that food marketing was frequently targeted at children (13, 15, 17, 38, 51, 89, 94, 97, 120). One study found that as many as 95.2% of all TV food advertisements

were child-oriented (69). Moreover, food marketing featuring child-directed strategies (see Power of food marketing, below) was typically dominated by marketing for foods that contribute to unhealthy diets. According to one study, 89.2% of products in a Belgian supermarket with clear child-directed strategies were promoting less healthy foods (32). A Canadian study found that adolescents were more likely than younger children to be exposed to food marketing while using their favourite social media application (83% versus 55%,  $p=0.003$ ; odds ratio (OR), [95% confidence interval (CI)] = 3.8 [1.5–9.5]) (35).

There was some evidence of social inequality in food marketing exposure, in that there appears to be a trend towards greater exposure to food advertisements, and to advertisements for less healthy foods in particular, among less affluent compared with more affluent communities and areas. Two studies, one from the United Kingdom on television advertising (63) and one from Australia on advertising on a metropolitan train network (27), found that the proportion of advertising that was for “discretionary products” was highest in areas rated as being of lower socioeconomic status (SES). One study noted that exposure to incentives such as coupons, as well as exclusive beverage contracts, was greater in students attending schools with a predominantly middle or low SES student body than those attending schools with a student body drawn from more affluent (high SES) backgrounds (87). Another study reported that food marketing was more widespread in fast food restaurants located in public housing development neighbourhoods than it was in comparison neighbourhoods (94). In New Zealand, it was found that the proportion of “junk food” advertisements was significantly higher around schools with the greatest number of socioeconomically deprived children (50).

#### 4.1.2 Power of food marketing

##### *Characteristics of included studies*

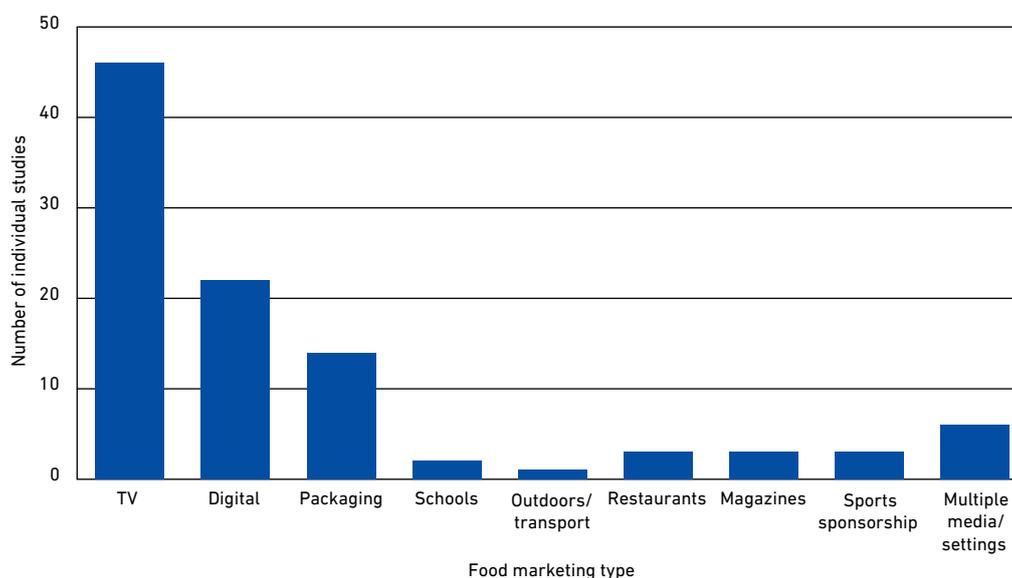
We identified a total of 100 studies published between 2009 and 2020 that reported on the power of food marketing, 25 of which dealt solely with the topic of power and 75 of which reported on both exposure and power (see **Annex 1**).

*Geographical representation:* Again, the majority of studies were from HICs; 72 studies reported on food marketing power in a single HIC country (Argentina (10, 11, 126), Australia (13–21, 23, 26, 28, 29, 127, 128), Austria (31), Belgium (32, 33), Canada (37, 129–131), Chile (132), Greece (39), Hungary (41), Iceland (42), Ireland (44), Malta (45), New Zealand (47, 49–52), Norway (53), Spain (57, 133, 134), Sweden (59, 60, 135), Switzerland (61), the United Kingdom (65, 136, 137), the USA (68, 69, 71–74, 76, 80–85, 87, 89, 91–94, 138–143)) and two multi-country studies included HICs only (97, 144). In contrast, there were 23 studies reporting data from LMICs (Brazil (98, 145), China (100), Costa Rica (102), Guatemala (104, 105, 146, 147), Honduras (106), India (107, 148, 149), Malaysia (109, 110), Nepal (114), Peru (115, 116, 150), Russian Federation (117), South Africa (118), Sri Lanka (120), Thailand (121, 122)). Three studies reported data from both HICs and LMICs, one focusing on the Asia–Pacific region (124), while the other two included countries from multiple regions (3, 125).

*Marketing media and settings:* The majority of included power studies ( $n=46$ ) focused on television advertising (3, 10, 11, 16, 20, 26, 39, 42, 44, 45, 49, 57, 59, 61, 69, 71, 74, 76, 81, 83, 85, 89, 98, 100, 102, 106, 107, 109, 114, 115, 117, 120, 121, 124, 125, 127, 133–140, 143, 149). The power of food marketing delivered via digital media was analysed by 22 studies (13–15, 17, 28, 31, 33, 41, 51, 52, 65, 68, 73, 80, 82, 97, 110, 118, 122, 129, 141, 145) and the power of product packaging and/or in-store promotions by 14 studies (23, 32, 93, 104, 126, 128, 130–132, 142, 146–148, 150). Six power studies investigated multiple media and/or settings (37, 53, 60, 91, 92, 116) and three

described the power of sports sponsorship (19, 21, 29). As shown in **Fig. 3**, only a few studies explored the power of food marketing in magazines (18, 47, 144), restaurants (84, 94, 105), schools (50, 87), or in outdoor environments (72).

**Fig. 3. The types of food marketing described in included studies of power (total number of included studies = 100)**



### Key findings

Authors of the included studies identified a wide range of creative features and strategies that were likely to appeal to, and resonate with, young audiences. Many were common to several marketing platforms and included:

- celebrity/sports endorsements (32, 52, 91, 92, 136)
- promotional characters (10, 11, 42, 49, 51, 73, 93, 94, 97, 98, 100, 109, 110, 114, 126, 132, 136, 140, 146)
- product claims (32)
- promotions, gifts/incentives and tie-ins (10, 26, 39, 49, 52, 73, 87, 97, 98, 100, 114, 116, 138, 143, 146)
- competitions (15, 52, 73, 116, 142)
- games (15, 51, 73, 80, 126, 129, 141, 142)
- colour, visual imagery and novel designs (32, 72, 97, 121, 122, 148)
- animation, dynamic elements and special effects (69, 73, 110, 114, 145)
- prominent food cues (69, 80)
- branding (13, 18, 19, 28, 29, 33, 47, 65, 73, 97, 122, 138, 141, 145)
- product association (13)
- salient themes (e.g. masculinity, sporting prowess) or contexts (e.g. social) (14, 33, 65, 116, 135)

- persuasive appeals (e.g. fun, taste) (11, 44, 45, 61, 65, 74, 76, 83, 110, 115–117, 127, 131, 133, 134, 143, 144, 148, 149)
- emotional appeals (115, 143)
- health/nutrition claims and disclaimers (23, 47, 85, 105, 110, 118, 120, 128, 130, 132, 135, 137, 140, 146–148)
- depiction of physical activity (137, 139)
- engagement techniques (13, 14, 80, 97, 122, 129, 134, 145)
- interactive or downloadable content (17, 51, 82, 129)
- children's language, voices, and child-related messages/fonts (11, 98, 148)
- large portion sizes (74).

A number of studies observed that these recognized strategies were more pervasive in food marketing directed at children than in food marketing aimed at adults or in marketing of non-food items (10, 51, 74, 76, 89, 127, 134, 136, 138, 143). Child-directed strategies were also more frequently employed to promote less healthy as opposed to healthier products (42, 102, 125, 127, 137, 150) and featured more prominently in TV programming broadcast during school holidays than during term time (109). A few studies analysed the mix of creative strategies used by different marketing formats. For instance, one study found that use of competitions was greater in outdoor advertising and family bonding themes were especially prevalent in TV advertising (116), while another reported some similarities between TV and digital media in terms of the types of persuasive techniques used (41).

A number of studies examined the extent and role of strategies aimed at mitigating the impact of food marketing on children. One such study noted that 10% of a sample of advergames notified the user of the commercial nature of the material (68); another found that for every 63 food advertisements aired on television there was one nutrition-related public service announcement (71). A Canadian study reported that young adults (18–24 years) were more likely to report having seen an educational message in conjunction with TV advertising than adolescents (12–17 years) (37). One study reported that 99.5% of soft drink adverts did not display the advertising licence number and none of the confectionery adverts displayed the warning messages as required by law in Thailand (122).

## 4.2 Consumer research

### 4.2.1 Effects of food marketing: associative studies

#### *Characteristics of included studies*

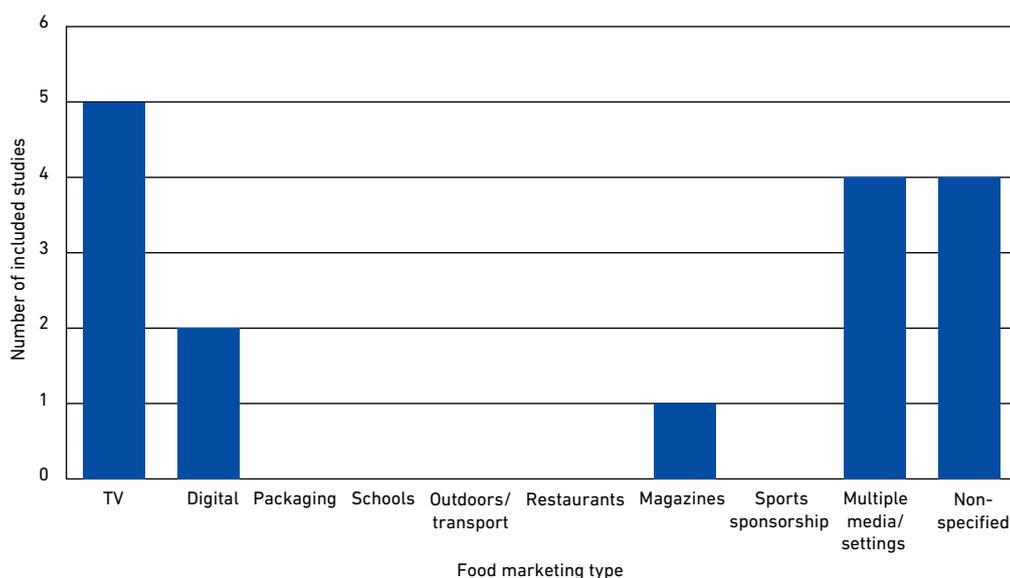
We identified 16 relevant articles published between 2009 and 2018 which reported associations between food marketing and at least one of the predefined outcomes of interest (specified as part of the protocol for the commissioned systematic review on the impact of marketing (6); see **Annex 2**).

*Demographic characteristics:* Ten studies were conducted in HICs, including nine single-country studies (Australia (151–153), Greece (154), Saudi Arabia (155), the USA (156–159)) and one multi-country study where all countries were HICs (160). Six studies were conducted in five different LMICs (Brazil (161), Chile (162), India (163), Mexico (164, 165), Turkey (166)). Study populations included children and adolescents up to the age of 18 years, as well as young adults (18–24 years).

*Methodologies used by included studies:* Included studies most commonly employed non-randomized observational designs, in particular, cross-sectional surveys (151, 153–155, 157, 159–164, 166). In one study, the cross-sectional survey was supplemented with a time-use diary (156). One study conducted interviews with mothers for the purposes of completing a questionnaire (165). Two studies used non-randomized experimental designs (152, 158). All included studies relied on a design that involved measurement at a single time point; no repeat cross-sectional studies suitable for this narrative review were identified.

*Marketing media and platforms:* Around one third of the included associative studies (n=5) investigated the effect of commercial TV viewing or TV advertisements (155, 156, 161, 164, 165). Other included studies explored the impact of other types of food marketing, such as digital media (n=2) (151, 152) or magazines (n=1) (158). Four associative studies investigated multiple media and/or settings (153, 157, 159, 162), while the remainder (n=4) did not specify the type of food marketing investigated (154, 160, 163, 166). See **Fig. 4**.

**Fig. 4. The types of food marketing described in included associative studies (total number of included studies = 16)**



### Key findings

*Beliefs and attitudes:* In at least one study, adolescents' exposure to marketing for foods that contribute to unhealthy diets was positively associated with their descriptive norms about consumption of such foods (i.e. those behaviours they perceived to be normal), particularly for what the authors termed "distal" reference groups (i.e. students at school) compared with "proximate" reference groups (i.e. close friends and family members) (157). This study also found that attention to advertising was positively associated with descriptive norms for family, close friends and students at school. Another study explored the impact of marketing themes on male adolescent attitudes towards advertisements and found that, generally, participants showed a greater preference for (more non-zero attitudes found) non-alcoholic beverage advertisements than tobacco advertisements, and that sports themes generated more positive attitudes towards advertisements whereas themes of sex appeal had the opposite effect (158). Attitudes to advertising were found to differ by residential location in a study conducted in Chilean schoolchildren; a greater proportion of children from middle-low

SES backgrounds from Santiago “liked” food advertisements on television compared with those from similar backgrounds in other city locations (162); however this differential was not observed for middle-high SES participants from different cities.

*Relationship between attitudes and behaviour:* Several studies explored the relationship between attitudes to food marketing and food consumption patterns and other behaviours. One study reported that the frequency of consumption of foods that contribute to unhealthy diets was influenced by the entertaining dimension of advertising and the level of emotional arousal children experienced after exposure (e.g. positive feelings of happiness and satisfaction) (154). Another study found that, while parental consumer attitudes were not associated with their child’s taste preferences, children of parents who trusted food advertisements (who were more likely to have lower levels of education) were significantly more likely to consume processed foods ( $\beta=1.21$ ,  $p=0.001$ ) (160). In a study conducted in India, parents ranked brand and taste as the equal second most important factors involved in the selection of food items for the household, behind nutrition. This particular study also found that both male and female parents held the perception that too much advertising was directed towards children (163). Using data from a study, authors were able to demonstrate a significant linear relationship between adolescents’ positive perceptions of food advertising and daily frequency of consumption of foods that contribute to unhealthy diets ( $\beta=0.10$ ,  $p<0.01$ ) (159). A similar association was found with trust in food advertising, such that, as participants trust increased so did their frequency of consumption of foods that contribute to unhealthy diets ( $\beta=0.08$ ,  $p=0.01$ ) (159).

*Behavioural and health impacts:* Included associative studies provided some evidence that food marketing influences eating behaviours. Notably, several studies reported statistically significant positive associations between the frequency of food advertising for particular products or level of exposure to food marketing and the habitual consumption of advertised foods or less healthy foods (151, 164, 165). For example, one study (151) reported that purchasing food online, watching food brand YouTube videos and seeing favourite foods advertised on social media were all positively associated with less healthy food and drink scores ( $\beta=0.71$ ,  $p=0.009$ ;  $\beta = 0.80$ ,  $p=0.003$  and  $\beta = 0.86$ ,  $p=0.015$  respectively). Another study reported a strong positive correlation between the frequency of broadcast food advertising and the mean weekly food consumption of children ( $r=0.79$ ,  $p<0.001$ ) (164). A third study reported a moderate–strong positive correlation between the frequency of foods advertised on television and consumption of these items by children ( $r=0.66$ ,  $p<0.001$ ) (165).

Some studies suggested that engagement with marketing (e.g. actively watching YouTube brand videos or “liking”, “sharing” or “commenting on” posts online) was associated with greater impacts on consumption than exposure alone (151, 152). For example, when controlling for demographic variables and significant others’ acceptance of energy drink consumption, one study found that engagement with digital marketing was associated with increased energy drink consumption (OR=1.47 [95% CI, 1.02–2.10],  $p=0.04$ ); however, the association between mere exposure to digital marketing and energy drink consumption was not found to be statistically significant (OR=1.08 [95% CI, 0.67–1.75],  $p=0.78$ ) (153). Positive correlations were also found between television viewing habits and the prevalence of dental caries; specifically, those who watched commercial TV channels were 1.73 (95% CI, 1.00–3.02,  $p=0.051$ ) times more likely to have caries than those who did not (161). One study reported that children’s commercial TV viewing at time 1 was significantly associated with increased body mass index (BMI) at time 2 (5 years later), with the effect robust after adjustment for exercise and eating while viewing (156). The relationship was not found for non-commercial viewing time.

#### 4.2.2 Effects of food marketing: qualitative studies

##### *Characteristics of included studies*

We identified 20 articles which reported findings of qualitative studies investigating the impact of food marketing (see **Annex 3**).

*Demographic characteristics:* Studies were published between 2009 and 2020 and included 12 studies conducted in HICs (Australia (152, 167), Canada (168), France (169), Israel (170), New Zealand (171, 172), Sweden (173), the United Kingdom (174, 175), the USA (176, 177)), and eight studies conducted in LMICs (Brazil (178–180), Egypt (181), Iran (Islamic Republic of) (182), Pakistan (183), Turkey (184, 185)). Across most included studies, study populations ranged in age from 3–15 years; some studies included participants in young adulthood (aged 17–29 years), and some relevant caregivers (i.e. parents, teachers).

*Methodologies used by included studies:* Most studies used semi-structured guides for work involving focus groups which comprised parents, teachers and/or children and young people (167, 172, 176, 178, 180, 181, 184). In one study the whole family participated in the group (174). One study used photovoice images as stimulus material for the focus group discussions (177), another used cereal packages (173), and a third offered snack foods before a group discussion (169). Other studies used semi-structured guides to conduct individual interviews (170, 171, 179, 182, 183, 185), and one used print food advertisements as a prompt (170). One study used both focus groups and individual interviews (175). Another exposed participants to two websites and social media sites before completing a semi-structured interview (152).

Analytical approaches adopted included variations of thematic analysis (167–172, 174–177, 179, 183), lexical analysis (178), an interpretative approach (184), content analysis (152, 182) and critical discourse analysis (173). Three studies did not report the specific analysis approach taken (180, 181, 185).

##### *Key findings*

*Food attitudes, beliefs, knowledge and norms:* Evidence collated as part of this narrative review suggests that children have an active role in influencing family food choices, as well as being independent food purchasers with a good knowledge of food brands (178, 180). Children were described as being able to recognize advertised food products in the supermarket (185). Similarly, adolescents had good knowledge about energy drink products and could identify them by brand name (167).

One study noted that not only did children have good knowledge of food brands but they also understood the purpose of branding and the use of factors such as name, logo and colour to help a product get recognized. This same study also reported that child participants' food brand selection did not appear to be affected by social considerations or peer pressure (e.g. children did not select brands to attract attention or recognition among their peers) (169).

*Power of food marketing:* A number of studies identified marketing techniques that are considered to appeal to and engage young people in food marketing; these included promotional characters, toys, playful visuals, colourful packaging, brand imagery and fun themes (168, 175, 176, 183). One study asked children which marketing tactics they were aware of, and their responses included "making adverts fun"; catchy songs or slogans; imagery; free toys; competitions; price; health and nutrition claims; and sports sponsorship (171).

Adolescents commented on the importance of product packaging, the use of humour and the projected image of the product (172) while young adults noted that they were more likely to be interested in advertisements that were considered credible, entertaining, informative,

relevant to them and contained offers (181). In one study, young adults reported that exposure to brand websites and social media pages had improved their feelings towards brands, specifically when that content referenced corporate social responsibility initiatives, community involvement and sponsorship (152). The use of a superhero theme for one brand was appealing to some participants (152).

*Awareness of, attitudes to, and perspectives on food marketing exposure and its regulation:* In one study, children (unprompted) identified TV as a medium for food marketing and recalled having seen marketing in a number of different locations/media (171). Parents of adolescents reported that their child was exposed to food adverts on several platforms and teenagers themselves reported seeing energy drink advertising in various media, with some finding the volume of advertising annoying (167).

A common theme across multiple studies was concern about the volume of young people's food marketing exposure and there was considerable support for greater regulation. One study reported that parents were particularly concerned about TV advertising and believed governments should do more to regulate advertising (174). In this particular study, parents also reported feeling responsible for their child's exposure and for taking concerted action to minimize that exposure through the imposition of screen time limits and not taking their children shopping, as well as attempting active mediation of effects by encouraging media literacy skills and discussing advertising intentions with their children (174). Concerns about exposure to a large number of TV advertisements were also expressed by the fathers of children in Brazil, who again supported greater regulation of advertising of foods that contribute to unhealthy diets (183). In another study, parents were reported as having a negative attitude towards the food industry, believing it to be manipulative and exploitative (175), while in another parents said they were "not impressed" by food advertisements and called for a reduction in the volume of advertising (185). According to one study, children themselves believed that "junk food" should not be advertised to them and that advertisers should be more truthful (171). There was one exception, a study from Turkey, which found that parents showed only modest concern about food advertising aimed at children (184).

Concerns were also raised about the "deceptive" nature of some food marketing. One study described how food marketing techniques can create "health halos" around products, citing the disingenuous use of visuals of fruit, health claims, cross-branding with healthier foods and natural imagery which participants felt were designed to foster beliefs in parents about the health status of certain foods (176). In another study, parents voiced concerns that children are vulnerable and are manipulated by packaging claims that are distracting and misleading (168).

*Impact of food marketing:* Most of the included qualitative studies concluded that food marketing was believed to be impactful on the eating and eating-related behaviours of children and young people. This view was expressed by both parents and children themselves. Children in one study reported that food adverts were a stimulus that increased desire to eat all kinds of foods (not just less healthy foods) (178) and in another reported that they had both the financial means and the desire to buy products advertised on television (180). Children from New Zealand said seeing food marketing made them hungry, although they reported not often asking for advertised items from parents (171). Adolescents also admitted being hungry and tempted by food adverts (170). Teenagers surveyed as part of a study from the USA acknowledged that food marketing influences their purchase behaviours (177) and in another study, also conducted in teens, advertising was identified as an influence on energy drink liking and consumption (167).

Several studies found similar beliefs among parents. In one, parents reported that advertising for foods that contribute to unhealthy diets negatively affects children's eating habits by drawing attention to less healthy foods and changing their buying patterns in favour of those foods (183). Another demonstrated that caregivers also believed children and their food preferences are influenced by food advertising, particularly when foods are paired with toys (179). In one study, parents reported that their children had wanted to purchase the food products shown in advertisements (185) while in another, children said they had previously chosen a cereal for the toy regardless of its taste (173). Advertising of less healthy foods was identified by young adolescents as a barrier to greater consumption of fruits and vegetables (182). Conversely, in just one included study parents reported believing food advertising had no effect on food preferences or product requests; furthermore, the child participants of this study did not report having learned anything about food from food advertising (184).

Child participants also recognized the role of social networks in amplifying the effects of food marketing. In one study, they reported being affected by advertisements that are liked and commented on by friends on Facebook (181). Young adults also noted that positive comments on social media influenced their brand attitudes (152).

## 5. Discussion

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This review identified and synthesized a large body of recent (2009–2020) evidence on the extent and nature of food marketing, on associations between food marketing and diet-related beliefs, attitudes and behaviours, and on young peoples' views on food marketing and its impact.

Consistent with the findings of the commissioned systematic literature reviews on the *effectiveness of policies* and the *impact of marketing* (5, 6), this review reveals that food marketing continues to be pervasive and persuasive. Building on the findings of the previous review, which was published in 2009 and covered studies published up to the end of 2008 (1), the more recent evidence summarized here confirms that food marketing is prevalent across multiple different media and platforms and that this marketing is dominated by that for foods that contribute to unhealthy diets (with healthier foods either underrepresented or absent from most marketing campaigns). Children report that they see a high volume of food marketing and recognize the brands and products they see marketed.

The techniques most frequently used in food marketing and which are designed to appeal most to children (e.g. themes of humour, free gifts) clearly have persuasive power – studies have shown this creative content was well recalled and influences young people's food behaviours and choices. As in the 2009 review (1), the cumulative evidence suggests that food marketing drives cravings and feelings of hunger in children, with several studies reporting associations between food marketing exposure and children's frequency of consumption of foods that contribute to unhealthy diets. However, and in common with the findings of the previous review (1) and with the latest impact of marketing systematic review (6), few if any studies have fully explored the nature of these associations and adequately adjusted for potential confounders, although some analyses have identified a possible role for sociodemographic characteristics, particularly SES and age. These shortcomings in the evidence base limit the conclusions that can be drawn at the present time. It is imperative that future research addresses this.

This current review extends the findings of the 2009 review (1) by adding evidence and perspectives on more contemporary types of marketing, reflecting the growth in internet use and food marketing via digital and social media over the last decade. As well as providing data on the extent and nature of marketing via digital media (which shows a high prevalence of food marketing in online spaces frequented by children), the new evidence that has emerged demonstrates that digital technology has facilitated greater engagement of young people with food marketing. Engagement techniques (e.g. enticements to like or share online content) were frequently identified in the food marketing to which children are likely to be exposed and studies suggest that this engagement amplifies the impact of marketing beyond that of just passive exposure. Engagement of peers with food marketing (e.g. positive comments) was also found to influence young people's attitudes and behavioural responses to commercial content, implying that social networks can also amplify the effects of marketing. In addition, evidence compiled as part of this review suggests a role for food marketing in the development of food-related norms in young people, a finding which is consistent with that of a recently published review on the sociocultural impacts of food marketing (186).

Whilst the 2009 review (1) noted some concerns from parents about children's dietary quality and pestering behaviours in relation to food, this review adds evidence that parents are now also concerned about their children's high levels of habitual food marketing exposure and the role that this plays in shaping their choices and intake. Studies reported that parents believed that governments should do more to restrict young people's exposure to food marketing.

## 6. Conclusion

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Despite the endorsement of the 2010 WHO set of recommendations on the marketing of foods and non-alcoholic beverages to children, and the implementation of voluntary pledges and mandatory regulations (5), evidence suggests that food marketing remains prevalent globally and across many platforms (e.g. TV, digital media, outdoor, in-store) (6). There is also evidence that food marketing continues to be dominated by the promotion of foods that contribute to unhealthy diets, such as “fast food”, sugar-sweetened beverages, chocolate and confectionery, salty/savoury snacks, sweet bakery items and snacks, breakfast cereals, dairy products and desserts. Moreover, food marketing strategies continue to target children and adolescents by various means, including for example, by positioning marketing in and around schools, on websites popular with young people and through the scheduling of advertising in and around child-directed programming, despite the fact that one of WHO’s main recommendations endorsed in 2010 was “to restrict marketing in places where children gather”.

More worrying is the apparent continued and extensive use of persuasive marketing techniques, techniques that are evolving and making use of all the opportunities that digital marketing platforms can offer. Celebrity/sports endorsements, promotional characters, cross-promotions/tie-ins and gift incentives are all techniques designed to foster interaction with digital marketing content and are particularly salient and engaging for young audiences. Evidence is emerging that food marketing exposure and power influences not only children’s food-related beliefs and attitudes (e.g. norms), and their food behaviours (e.g. frequency of product consumption) but also their health outcomes (e.g. BMI, prevalence of dental caries). Qualitative evidence confirms that young people are aware of food marketing, have good knowledge of food brands, find the techniques used engaging and persuasive, and believe that it affects their food behaviours, and more specifically, that it drives hunger, craving, purchasing and consumption. Recognizing the potential harms of the current high levels of exposure to food marketing across multiple platforms, both young people and their parents support greater regulation of this activity. This narrative review provides further evidence that strengthens the rationale for action to restrict food marketing to which children are exposed.

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## Annexes

Annex 1: Content analysis research

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Adams 2009 (96) Countries: Canada, United Kingdom	TV	Secondary data obtained from audience research bureaux (Attentional, Taunton, United Kingdom)	TV food advertising over 1 week (24 hours per day) on popular free-to-air channels in Canada and all commercial terrestrial channels in the United Kingdom	Canada: 2 315 food ads United Kingdom: 1 365 food ads	Ads "of particular appeal to children" determined by proportion of child viewers for each ad Advertised foods categorized as "less healthy" using United Kingdom nutrient profile model (NPM)	52–61% of ads were for "less healthy products"; 5–11% of ads were "of particular appeal to children"; and 5–6% of ads would have been prohibited under new national regulations No evidence that proportion of food ads for "less healthy" products differed between food ads that were and were not of particular appeal to children in either country
Adams 2011a (62) Country: United Kingdom	TV	Primary data collection	Free-to-air TV channel "ITV1" (north-east region of England only) TV food advertising over 1 week (2008) on the commercial station with the highest overall viewing figures in the United Kingdom (ITV1)	652 food ads	Foods shown in ads classified as "primary" or "incidental" Nutritional content of all advertised foods determined and compared	Identified 1 007 primary and 960 incidental foods Almost two thirds of food ads did not include any incidental foods Incidental foods tended to be "healthier" than the primary foods Food ads tended to advertise "less healthy" foods that were frequently categorized as "foods and drinks high in fat and/or sugar"
Adams 2011b (63) Country: United Kingdom	TV	Secondary data obtained from audience research bureaux (Attentional, Taunton, United Kingdom)	All TV ads broadcast in one United Kingdom region over 1 week (6–12 July 2009) across a total of 207 channels	91 518 food ads	Socioeconomic differences in exposure to TV food advertising Nutritional content defined by the United Kingdom NPM	66.2% food ads were for HFSS foods Exposure to all food ads and HFSS food ads specifically was greater among the least than among the most affluent viewers

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Aerts 2019 (32) Country: Belgium	Packaging of foods sold in supermarkets	Primary data collection	All supermarket products using child-directed strategies or cues sold in two stores owned by Belgium's largest supermarket chain	372 products	Products organized into food categories, United Kingdom NPM applied, and marketing cues coded	Hard sweets ("candy") made up largest group of individual products sold (18.0%), followed by biscuits ("cookies") (17.5%), soft sweets ("candy") (15.9%) and dairy produce (14.2%) 89.2% of products with child-directed strategies were "less healthy" Presence of marketing strategies associated with higher product "unhealthiness" Average of 3.9 food promotion techniques were used per package (e.g. endorsements, claims, product illustrations, geometric designs)
Allemandi 2017 (10) Country: Argentina	TV	Primary data collection	Ads aired on five free-to-air TV channels and the three most popular children's cable networks in Argentina between 07:00 hours to 22:00 hours for 6 weeks during the period from December 2013 to January 2014	3 576 food ads	Ads classified by target audience, type of product, advertised food categories and advertising strategies used NOVA <sup>a</sup> system was used to classify products according to industrial food processing level and the WHO/PAHO NPM was used to analyse nutritional quality	2 462 ads aired during general audience programmes, 1 114 during children's programmes Processed and ultra-processed foods were more frequently advertised during children's programmes than during general audience programmes (98.9% of all ads, excluding alcohol were for processed and ultra-processed foods during children programmes) versus 93.7% during general audience programmes) The top five food categories were desserts (21.6%), dairy products (17.4%), non-alcoholic sugary beverages (13.6%), fast-food restaurants (13.3%) and salty snacks (8%) Special promotions and the appearance of cartoon characters more frequent in ads targeting children than in those aimed at a general audience (33.5% versus 8.2%, and 44% versus 4.6%, respectively)
An 2014 (68) Country: USA	Advergames	Primary data collection	Gaming websites most visited by children in the USA, as defined by Alexa (www.alexa.com) (n=131)	180 food advergames	Examined brand exposure context, ad disclosure type, and nutritional content of the food products (assessed using the 2006 criteria provided by the United States Institute of Medicine of the National Academies)	Most frequently featured foods high in calories and with low nutritional value "Cookies and crackers" (35.0%) were most frequently featured, followed by sweets ("candy") and chewing gum (16.7%), cereals (15.6%) and soft drinks (6.7%) 10% of advergames notified user of commercial nature

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Arora 2018 (12) Country: Australia	TV	Primary data collection	Ads aired on three Sydney free-to-air TV channels, selected based on Australian Television Audience Measurement (OzTAM) data with general popularity between 06:30 hours and 23:00 hours on 2 weekdays and 1 weekend day during 1 week of the school term and 1 week of the school holidays during the period June 2016 and January 2017	916 food ads	Food ads categorized according to the time they were aired and their sugar and acid content  For each channel, school holiday data was compared with school term data	40% of food ads featured dietary items that were high in either sugar or acid content, or both  Ads featuring items high in sugar and/or acid were broadcast more frequently during children's viewing times than other times, and also more frequently during school term compared with school holidays
Barquera 2018 (113) Country: Mexico	Ads outside schools (e.g. poster, banner, billboard)	Primary data collection	Ads displayed in 100-m-diameter buffer zone around a random sample of 60 elementary schools identified through the Ministry of Education school registry in two cities (data collected between October 2012 and March 2013)	278 food ads	Food ads classified by food category and compliance with WHO/PAHO nutrient profile recommendations and the local food industry self-regulatory marketing code of conduct	50.7% of ads were for SSBs, followed by sweet breads and snacks (15.8%) and sweets ("candy") and chocolates (9.4%)  The number of ads was higher around public schools than private schools  Printed posters were the most common type of marketing medium (97%)  Promotions, such as special prices or gifts, were included on 30% of printed posters  Food advertising practices were often in compliance with industry recommendations (83%) but less so with WHO/PAHO recommendations (32%)
Barroso 2011 (69) Country: USA	TV	Primary data collection	Early Saturday morning TV aired by three broadcast network categories (United States English language, United States Spanish language, and Mexican Spanish language) during 6 weeks of Spring 2010 (total of 18 hours monitored)	83 food ads	Assessed number, type (food-related versus non-food-related), target audience, persuasion tactics used, and compliance with current United States dietary guidelines of food ads	Most food ads (95.2%) were child-oriented (71.1% targeted children only, 4.8% targeted adults, and 24.1% targeted both)  Most advertised categories were fast food (24.1%), cereals/breads (21.7%), SSBs (16.9%), and candy/sweets (15.6%)  The majority of the foods advertised did not meet the current United States dietary guidelines  The three most commonly employed persuasion tactics were narration (n=58), animation/special effects (n=57), and product displayed throughout ads (n=53)

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Basch 2014 (70) Country: USA	Magazine ads	Primary data collection	Ads in 116 issues of two popular parenting magazines, selected based on data from GfK Mediamark Research and Intelligence with an estimated combined readership of over 20 million (data collected over a five-year period from January 2007 to January 2012)	19 879 ads in total, of which 2 101 were food-based (10.6%)	Assessed content of food ads and type of products advertised, categorized according to USDA food categories	One third of food ads (32.5%) were for baked goods, snacks, and sweets Less than 3% of food ads were for fruits and/or vegetables Two thirds of the breakfast cereals advertised were low in nutritional quality (64.6%) Beverages comprised 11% of food ads, with fruit juices contributing the highest proportion in this category
Bell 2009 (71) Country: USA	TV	Primary data collection	TV ads aired on Saturday mornings and weekday afternoons on 12 networks catering to Spanish-language, children, youth, Black youth, and general audiences during 2005–2006 (216 hours monitored in total)	1 162 food ads	Ads categorized according to the nature of the item promoted, the selling propositions used, and any nutritional claims made	Food ads were especially prevalent in Saturday programming schedules and children's networks (31.7% of all ads) English- and Spanish language ads did not differ in their likelihood of being a food ad (20.0% and 17.5% of ads respectively) 70% of food ads were for items high in sugar or fat More than a quarter of food advertisements were for fast-food restaurants and 1.7% for fruits and vegetables Ratio of nutrition-related public service announcements to food ads was 1:63
Boelsen-Robinson 2016 (73) Country: Australia	Ads on Facebook, websites and mobile phone apps	Primary data collection	Ads and promotional activities for the three top-selling food brands, identified from the Global Market Database (McDonald's, Coca-Cola and Cadbury Dairy Milk) appearing on social media platforms were audited on a weekly basis in June and July 2013	21 promotional activities	Measured marketing strategies employed, targeted audiences, connectivity to children and adolescents, and whether marketing aligned with industry self-regulatory codes	Evidence of strategic targeting of both children and adolescents The majority of activities were targeted to adolescents with frequent use of indirect product association, engagement techniques and branding All promotional activities technically met self-regulatory codes (usually due to media-specific age restrictions) but a number directed "unhealthy" food or beverage marketing to children

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Boyland 2011 (9) Country: United Kingdom	TV	Primary data collection	TV ads aired by 14 of the most popular commercial channels broadcasting, as selected based on data from Ofcom and Childwise children's family viewing between 06:00 hours and 22:00 hours on 1 weekday and 1 weekend day every month during the period from January to December 2008	18 888 food ads	Measured frequency of food ads and the balance of advertising of healthy/core and unhealthy/non-core foods and assessed differences in children's viewing times, channel types, programme types, and broadcast month	12.8% of all ads were food ads (3.6 per hour) 2 317 (12.3%) of food ads were generic supermarket ads Food ads promoting non-core foods (56%) were greater than for miscellaneous (25.9%) or core (18.1%) foods Proportion of food ads higher during peak children's viewing times than non-peak (15.0% versus 12.7%) Fruit and fruit products ranked 21st (0.9% of all food ads) and vegetables ranked 24th (0.5%) in a list of 29 of the most frequently advertised products
Bragg 2017 (72) Country: USA	Outdoor advertising (e.g. signs, front of store displays)	Primary data collection	All outdoor ads in a 1.6 km <sup>2</sup> area of Lower East Side, a neighbourhood located in New York City where more than 60% of residents identify as Chinese American	1 366 ads in total, of which 407 were food ads	Quantified the number and type of food ads, as well as the nature of the marketing themes employed (e.g. references to Asian cultures, health, various languages, children)	Food ads were the largest ad category (29.7%) 66.9% of beverages featured were sugar-sweetened and 50.8% of food ads promoted fast food 54.9% of food/beverage ads targeted Asian Americans through language, ethnicity of person (s) in the ad or inclusion of culturally-relevant images 50.2% of ads were associated with local/small brands
Bragg 2018 (95) Country: USA	Sports sponsorship on TV, YouTube and sports organization websites	Primary data collection	Food sponsors and ads featured on TV, YouTube channels and the websites of sports organizations during 2006–2016 (sports organizations included the 10 organizations with the highest numbers of 2–17-year-old viewers of televised events, as selected based on Nielsen audience data)	44 food sponsors, 273 food ads	Assessed sponsorship/ad frequency, and "healthfulness" of each advertised food product (according to the United Kingdom NPM)	18.8% of all sponsors were food sponsors The National Football League had the most food sponsors (n=10), followed by the National Hockey League (n=7) and Little League (n=7) Of the 273 food ads, 76% promoted "unhealthy" food items and 52.4% SSBs

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Britto 2016 (98) Country: Brazil	TV	Primary data collection	TV food ads directed at children and aired by six pay-television broadcasters in Brazil during July 2015 (school holidays), from 8:00 hours to 12:00 hours, 14:00 hours to 18:00 hours, and 17:00 hours to 23:00 hours	190 food ads	Examined food ads according to food category and marketing techniques	The main food items advertised were UPFs; no ads for fresh food Most of the food ads (64.3%) used children's language and characters, 43.0% used songs in children's voices, and 21.4% linked gift distribution to food
Brownbill 2018 (14) Country: Australia	Facebook	Primary data collection	Facebook posts made by six of the most popular SSB Facebook pages, as identified through Socialbakers (data were collected for a 6-month period, 1 January 2015 to 30 June 2015)	Almost 1.9 million engagements across the six pages	Conducted quantitative analysis of explicit marketing techniques and thematic analysis of implicit marketing messages	Most posts (70%) encouraged followers to do something (e.g. like, share) Content by sports and energy drink brands were heavily dominated by "sporting prowess" and "masculinity" themes while content by Coca-Cola shared the message of "having fun with friends" and "happiness"
Bugge 2016 (53) Country: Norway	Ads on TV, websites, Facebook, YouTube, magazines, cinema	Primary data collection	Ads on various media channels widely used by children in Norway, selected based on information from Mediebar, Statistics Norway (2013) and TNS Gallup 2012 (TV: the most watched television channels among children and youth; internet: 23 most visited sites; Facebook: avatars created for two adolescent profiles; YouTube: ads; magazines: ads in 30 popular magazines and comics for children; cinema: ads shown before movies popular with youth)	1 968 TV food ads, 6 internet food ads, 88 Facebook food recommendations, 2 magazine food ads, 11 cinema food ads	Assessed frequency of ads for HFSS foods and compared findings with those from international studies	Majority of ads were consistent both with consumer preferences for healthy food and the government's nutrition policy "Unhealthy" food ads constituted only a small proportion of all food ads on TV and the internet (4% and 2%, respectively); however, 3 out of every 4 ads screened before children's movies were for "unhealthy" products and 4 out of every 7 ads before teen movies were for "unhealthy" products

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Busse 2016 (115) Country: Peru	TV ads and product placement within TV programmes	Secondary data from previous research <sup>b</sup>	25 programmes aired on public and cable TV channels in Peru, and popular among children, recorded in time slots when children were most likely to watch TV (Mondays to Thursdays from 18:00 hours to 23:00 hours; Fridays from 14:00 hours to 23:00 hours; and Saturdays and Sundays from 8:00 hours to 18:00 hours)	1 016 TV ads 25 TV programmes and 896 thirty-second time slots showing foods	Assessed frequency of food ads and characteristics of food content appearing in TV programmes (including use of persuasive appeals)	17% of all ads were for foods (n=170), and 28% of all monitored content in programmes watched by children included foods  Sweets and non-alcoholic beverages featured in 47.6% of food ads; there were no ads for fruit and vegetables  The two most frequently used product appeals were flavour/taste/smell/texture (33.5%) and newness (27.1%), and the two most frequently used emotional appeals were mood alterations (18.2%) and achievement/enabement (14.7%)  28.4% of the time slots featured food, of which fruit and snacks both appeared around 11%; eating behaviour displayed for 20.4% of the monitored time
Busse 2018 (116) Country: Peru	Ads on TV, Facebook, outdoor spaces (billboards), and posters/banners in convenience stores ("bodegas")	Secondary data from previous research on TV ads; <sup>c</sup> primary data collected from Facebook and billboards	TV: ads shown on weekdays (between 15:00 hours and 22:00 hours) and weekend days (between 14:00 hours and 23:00 hours) during a one-week period on three free-to-air and six cable channels (monitoring periods included both child- and adolescent-targeted as well as general-audience TV programming) Facebook: all posts on 48 pages of food brands over a month-long period Outdoors: billboards at 51 top locations with the heaviest traffic in the city of Lima Convenience stores: posters or banners found in "bodegas"	799 TV food ads, 515 Facebook food ad posts, 51 billboard food ads, and 519 poster food ads at bodegas	Assessed types of food products featured in advertising, as well as persuasive techniques used and portrayals of eating behaviours	Food ads comprised 13.6% of all TV ads, 53.86% of all Facebook posts, 14.1% of all billboards, and 69.1% of all ads in bodegas  Sweets and sugary drinks were the most frequently advertised categories on TV and point-of-purchase locations (50.1% and 77.3%, respectively), while sweets and fast-food restaurants were the most frequent categories on Facebook and outdoor advertising spaces (45.6% and 66.7%, respectively)  Flavour/taste/smell/texture was the most common persuasive appeal across media  The nutritional quality of the product was a common appeal on TV advertising (43.8% of all ads) and point-of-purchase locations (33.3%), whereas the competitive/unique appeal was prominent only on outdoor advertising (21.8%)  Over 77% of the food and beverage TV ads showed at least one portrayal of eating behaviour

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Carter 2013 (46) Country: New Zealand	Sport sponsorship (featured on websites, official sponsor, or partner, naming rights of teams or tournaments)	Primary data collection	Websites of 58 national sporting organizations and 250 regional sporting organizations, selected based on Sport and Recreation New Zealand data (n=308) monitored between November and December 2010	74 websites	Conducted a review to identify the characteristics and extent of food brand sponsorships and associated marketing; sponsors classified as "healthy" or "unhealthy" using nutrient criteria for energy, fat, sodium and fibre levels Supplemented with data from key informant semi-structured interviews conducted between August and November 2010 (n=18)	Food and beverage sponsorship was not common; 76% of websites displayed no logos Logos of food or beverage company sponsors appeared 186 times on 74 websites and represented 131 individual food or beverage companies or brands (including bars and restaurants, food companies, brands, quick service restaurants and supermarkets) Of the 36 individual food and beverage companies featured on the 74 websites, 25 were classed as "healthy", 10 as "unhealthy", and 1 was not classified as either "healthy" or "unhealthy" Interviews revealed that although many sports organizations felt concerned about associating themselves with "unhealthy" foods or beverages, others considered sponsorship income more important
Cauchi 2017 (45) Country: Malta	TV	Primary data collection	Ads aired on 7 national free-to-air channels on 7 consecutive days between 07:00 hours and 22:00 hours during March 2014, with a focus on ads aired during peak children's viewing times	6 431 ads (of which 1 730 were food ads)	Food ads were classified as "core" or "non-core" and by the use of persuasive techniques; variations in advertising patterns by station, viewing times, and day of the week were also analysed	Foods were the most heavily advertised product category (26.9%) The proportion of "non-core" food ads was significantly greater during peak children's viewing times than non-peak viewing times (52% versus 44.6%) "Taste", "enjoyment" and "peer status" were the primary persuasive appeals used in adolescent and child-focused ads

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Chacon 2015 (104) Country: Guatemala	Outside-of-store marketing (e.g. posters, stickers, free-standing signs, banners, painting on walls, flags), in-store marketing (e.g. display racks, refrigerators, containers, shelves), and child-oriented marketing (e.g. packaging)	Primary data collection	All food stores located within a 200 m <sup>2</sup> radius of two pre-schools and two primary schools (n=55)	55 stores surveyed, 321 snack food ads	Assessed type of snack foods and beverages advertised to children and whether there was an association with proximity to schools	20.3% of the 55 stores had no food advertising Where food advertising was present, most ads were for sweetened beverages (37%) and soft drinks (30%) 29% of in-store food ads were child-oriented 100% of ads for atoles (a traditional fortified cereal-based drink), 94.1% of cereal ads and 71.4% of ads for ice cream/frozen desserts were child-oriented There were more child-oriented ads in stores that were closer (<170 m) to schools compared with stores that were farther away
Chapman 2014 (64) Country: United Kingdom	Print media (magazine food ads and editorial or wider content within magazines)	Primary data collection	Eleven of the most popular children's magazines purchased at four separate time points in 2012	508 food references (i.e. direct food advertisement and covert advertising apparent in editorials or wider general magazine content)	Assessed children's exposure to HFSS food and drink, with particular focus on foods containing free sugars and foods with low pH (high acidity)	Of the food references observed, 73.6% were for foods detrimental to oral health owing to their high sugar and/or acid content and 5.9% were considered "unhealthy" due to their fat or salt content 20.5% of references were for "healthy" foods 36.4% of magazines came with free sweets Direct advertisements for food/drink only accounted for 9.6% of the total number of references
Cheyne 2013 (73) Country: USA	Digital advertising on cereal brand websites (including advergames)	Primary data collection	Websites of child-directed cereals available at a major grocery store chain between October 2008 and March 2009	17 child-directed cereal brand websites, which included 452 child-oriented pages and 165 games (67% of which were advergames)	Assessed content of each website by coding the following elements: (a) included features (such as games, videos, quizzes); (b) branding (e.g. spokes-characters, the product's package); (c) product representation; and (d) claims made on the website (e.g. about eating a healthful breakfast, the product itself)	Cereal websites almost exclusively promote high-sugar cereals Games featured on a third of pages, videos featured on 10% of pages Spokes-characters appeared in 79% of videos, 67% of branded food items, 44% of product packages and 4% of brand logos Of websites, 29% included polls and/or quizzes, 24% included online cross-promotions, 12% had licensed characters and 12% had sweepstakes for online prizes

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Coates 2019 (65) Country: United Kingdom	Influencer marketing, food and beverage cues featured in influencer YouTube videos	Primary data collection	Video content of two YouTube influencers popular with children (identified based on information from Childwise, 2016) aged between 5–15 years, which in 2017 featured a total of 380 YouTube videos, lasting 119.5 hours	3 571 food and beverage cues (average of 29.9 per hour)	Assessed frequency and nature of food cues featured in influencers' YouTube content (including in explicit influencer marketing campaigns) Food cues were categorized by product type and classified as "healthy" or "less healthy" according to the United Kingdom NPM, and coded for branding status, and other factors related to their display (e.g. description)	Only 7.4% of videos did not feature any foods Of the 3 571 cues, 9.4% were for cakes (n=337) and 8.9% were for fast foods; fruits and vegetables featured less often (6.5% and 5.8%, respectively) Overall, featured foods were more frequently classified as "less healthy" (49.4%) than "healthy" (34.5%); 93.8% were not explicitly marketed "Less healthy" foods were more often branded, presented in the context of eating out, described positively, not consumed, and featured as part of an explicit marketing campaign
Colby 2017 (74) Country: USA	TV ads and TV product placement within TV programmes	Primary data collection	Primetime TV (traditional commercial, race specific and children's programming) recorded over a 3-week period (total of 72 hours of TV)	3 784 "unhealthy" messages and 1 175 "healthy" messages	Descriptive analysis of the frequency and type of food messaging in TV programming (children's compared with adults') and advertising Messages categorized by healthfulness (i.e. as "healthy" or "unhealthy") and by social norm	88 "unhealthy" food messages per hour in children's programming, compared with 45 per hour in adults' Messaging targeting youth more frequently presented non-nutrient dense foods as fun, consumed in excessive portions, and consumed by normal weight individuals, compared with messaging targeting adults The most frequent social norm message in all programming was normal weight individuals eating non-nutrient dense foods

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Correa 2019 (38) Country: Chile	TV ads	Primary data collection	Ads aired on four broadcast and four cable channels with the largest youth audiences between 06:00 hours and 00:00 hours during two random composite weeks during April–May 2016	44 890 ads (of which 6 976 were food ads)	Content analysis of marketing strategies used and nutritional quality (as defined by Chile's initial regulation of marketing of HEFSS foods) of products promoted Statistical analysis of exposure to TV advertising (based on television ratings data)	Food ads represented 16% of all advertising; 34% of food ads featured an HEFSS product HEFSS ads were seen by more children and contained more child-directed marketing strategies than ads without HEFSS foods 31% of children's and 8% of the general audience's HEFSS advertising exposure could be reduced if advertising of HEFSS foods was restricted in programmes where children aged 4–12 years made up 20% of the audience Restricting HEFSS advertising in accordance with the newest restriction between 06:00 hours and 22:00 hours captures 80% of all audience exposure
Costa 2013 (99) Country: Brazil	TV ads	Primary data collection	Food advertising during children's programming on three Brazilian free-to-air broadcast stations recorded between 08:00 hours and 18:00 hours on 10 weekdays and weekends in 2009 (n=126 hours)	189 food ads	Food advertising was categorized according to the food group classification developed by the Food Guide for the Brazilian Population Annual exposure to food advertising was estimated based on the assumption that Brazilian children watched an average of 5 hours of TV per day (obtained from the literature)	The majority of food ads were for "sugars and sweets" (48.1%) and "oils and fats" (29.1%) The broadcast station with the highest audience (Channel A) aired more food ads than the other stations (Channel A: 63.5% of ads were food ads compared with 12.2% and 24.3% on Channels B and C, respectively), including for "sugar and sweets" (A: 59.2% of food ads; B: 43.5%; C: 21.7%) Annual average exposure to food ads among children was estimated at 2 735.5 ads, of which 2 106.3 ads would be for "sugars and sweets" and "oils and fats"

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Elsey 2016 (75) Country: USA	TV ads and product placements within TV programmes	Secondary data obtained from Nielsen	Occurrences of, and child/adolescent exposure to, food, beverage and restaurant brand appearances on prime-time TV described as "any occasion in which a brand/product is presented or used visually and/or audibly within a programme" viewed by a nationally representative panel of approximately 20 000 TV-viewing households between 2009 and 2014	13 801 food brand appearances in 2009, 13 001 in 2010, 17 558 in 2011, 15 743 in 2012, 12 348 in 2013 and 10 486 in 2014	Exposure to food brand appearances by product category, company, brand and year were compared with exposure to traditional ads for top brands	Food brand appearances peaked in 2011 (n=17 558) and declined through 2014 (n=10 486); exposure to food brand appearances peaked in 2012 (at 62.2 for children and 109.9 for adolescents) and then declined through 2014 Whereas "regular carbonated beverages" brands dominated before 2012, other sugary drinks and quick-serve restaurant brands accounted for over one third of food brand appearances viewed by children in 2013 and 2014 During the study period, 954 companies had brand appearances, but just four were responsible for over half of exposures: The Coca-Cola Company, Dr Pepper Snapple Group, PepsiCo and Starbucks Approximately half of all food brand appearances were viewed on reality TV programmes and one sitcom During each year in the period 2009–2013, brand appearance exposure exceeded traditional ad exposure for at least one brand
Emond 2015 (76) Country: USA	TV ads	Primary data collection	Ads for children's packaged foods and beverages aired over network, cable and syndicated television identified through AdScope, Kantar Media for 12 months during 2012–2013	342 ads promoting 51 unique children's food or beverage products	The target audience of each ad was defined as children or parents based on ad content, where parent-directed ads included emotional appeals related to family bonding and love Ad characteristics and patterns of airtime were compared across target audiences, and the proportion of total airtime devoted to ads targeting parents was computed	49% of foods were advertised directly to parents Parent-directed ads featured nutrition and health messaging and an active lifestyle more often than child-directed ads, whereas child-directed ads highlighted fun and product taste more frequently The products with the most amount of airtime over the study year were ready-to-eat cereals, SSBs and children's yogurt, and the proportion of total advertisement airtime for those products directed at parents was 24.4%, 72.8%, and 25.8%, respectively

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Fleming-Milici 2013 (77) Country: USA	TV ads	Secondary data obtained from Nielsen	TV ads viewed on national broadcast and cable television by a representative Nielsen panel of television-viewing households comprising Hispanic and non-Hispanic preschoolers (2–5 years), children (6–11 years), and adolescents (12–17 years) during 2010	Hispanic preschoolers, children and adolescents viewed 4 218, 4 373, and 4 542 food ads, respectively	Ads categorized by product category, television-viewing times by age and language preference	Hispanic preschoolers, children and adolescents viewed, on average, 11.6 to 12.4 television food ads per day; the majority of these ads (75%–85%) appeared on English-language television Fast food represented a higher proportion of food ads on Spanish-language television Hispanic preschoolers saw more Spanish-language food ads than did Hispanic children and adolescents Compared with non-Hispanic youth, Hispanic children and adolescents viewed 14% and 24% fewer food ads overall, respectively
Flowers 2010 (97) Countries: United Kingdom, Hungary	Advergaming	Primary data collection	Advergaming by some of the world's leading "junk food" producers featured between April and May 2009, and in March 2010	27 advergaming	Analysis investigated children's accessibility to the games; brand immersion and identification (i.e. logos, colours and integration of products in games); and promotional incentives and interactive brand extensions (i.e. discounts, competitions, screensavers and other features)	Hungarian youth were approached by advertisers in a similar fashion to those in the United Kingdom All sites used brand identities, such as colours, brand characters or cartoon figures, or logos more or less intensively, and many games incorporated product integration Most sites contained promotional tie-ins, such as links to main corporate sites or to other product lines, and many offered opportunities for e-newsletter subscriptions and social media connections
Freeman 2014 (15) Country: Australia	Facebook food brand pages	Primary data collection	Marketing on the most popular food brand Facebook pages as identified from Socialbakers, collected for the period from the day the page was launched through 19 February 2013	27 food brand Facebook pages	Content analysis of the amount, reach, and nature of energy-dense, nutrient-poor (EDNP) food marketing on Facebook	Widespread use of marketing features unique to social media that increase consumer interaction and engagement; common techniques were competitions based on user-generated content, interactive games and apps Four pages included apps that allowed followers to place an order directly through Facebook Adolescent and young adult Facebook users appeared most receptive to engaging with this content

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Gatou 2014 (39) Country: Greece	TV ads	Primary data collection	Six free-to-air TV-channels selected based on AGB Nielsen Media Research were recorded during children's peak viewing times on 2 weekdays and 2 weekend days in the period May–June 2010 (n=166.7 hours)	4 977 ads	Ads were coded according to the date, day, length, type of programme in which they appeared, type of product advertised and promotional technique used Food ads were subdivided according to their sugar and/or acid content (using specific nutrient profiles processed by the European Commission) as "potentially harmful" or "non-harmful" to teeth	Food ads had an average frequency of 8.0 per hour during children's peak viewing times with highest frequency (11.4 per hour) on weekends during child-focused programmes 44.7% of foods ads were deemed to be harmful to teeth, and were more likely to be shown during child-focused programmes and to promise a free gift with purchase The most commonly advertised food product during children's programmes was confectionery (27.7% of all foods ads aired during children's programmes)
Gunderson 2014 (106) Country: Honduras	TV ads	Primary data collection	Ads aired on four TV stations (one broadcast station and three cable networks) selected based on information from the Brazilian Institute of Public Opinion and Statistics (IBOPE) between 13:30 hours and 17:30 hours on weekdays during 1 week in May and June 2012 (n=80 hours)	1 120 product ads (of which 397 were food ads)	Advertised products were categorized as food or non-food items, with food items further classified as "healthy" or "unhealthy" using the classification scheme developed by Ramirez-Ley et al. (2009) <sup>d</sup> Ads were also coded according to their target audience, i.e. children only, adults only or both	35.4% of all product ads were for food 30.2% of food ads were for "healthy" foods and 69.8% for "unhealthy" foods The "unhealthy" foods were only advertised on cable network channels Ads for "unhealthy" foods appeared to be targeted at children more so than at adults (92.1% of ads for "unhealthy" foods were directed at children only) Cable television programming during after-school hours advertised primarily "unhealthy" foods

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Gupta 2017 (107) Country: India	TV ads	Primary data collection	Ads shown on the three most frequently watched TV channels (as reported by 400 school-going adolescents surveyed in Delhi) by young adolescents between 20:00 hours and 22:00 hours on 6 days during April and August 2011 (36 hours in total)	403 food-related ads	Analysed frequency and typology of food ads (foods, beverages, or food outlets)	58.4% of food-related ads were for foods, 26.7% for beverages and 15.3% for food outlets Among the food-specific ads, 69.3% were for "candies", chocolate and confectionary and 14.8% for salty snacks Sugar-sweetened soft drinks accounted for 85% of beverage ads
Hebden 2011 (16) Country: Australia	TV ads	Secondary data obtained from an advertising information company	Ads broadcast on six subscription TV channels most popular with children (based on Australian Television Audience Measurement (OzTAM) data) between 7:00 hours and 20:30 hours over 4 days in February 2009	316 food ads	Advertised foods were coded as "core/healthy", "non-core/unhealthy" or "miscellaneous/other" and according to marketing techniques employed (e.g. promotional characters, premium offers, and nutrition claims)	Food ads were broadcast at a mean rate of 1.0 per hour per channel 72% of advertised foods were classified as "non-core", with a mean rate of 0.7 non-core food ads broadcast per hour per channel The frequency of "non-core" food ads differed significantly across channels Persuasive techniques were used to advertise "non-core" foods less frequently than "core" and "miscellaneous/other" foods
Herrera 2018 (78) Country: USA	Outdoor advertising around schools (e.g. signs, front of store displays)	Secondary data from Outdoor MEDIA (Measuring and Evaluating the Determinants and Influence of Advertising) study	Ads located within a half-mile of 47 schools in central Texas, dichotomized into two groups: ≥60% Hispanic students or "Hispanic schools" (n=21) and <60% Hispanic students or "non-Hispanic schools" (n=26)	5 653 food ads (3 628 of which were outside Hispanic schools)	Ads were coded by price, price promotions (deals) or whether they were free-standing or attached to establishments	The mean number of outdoor food ads was higher in the vicinity of Hispanic schools (172.8) than around non-Hispanic schools (77.8) There were more price promotions and free-standing ads around Hispanic schools than there were around non-Hispanic schools

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Hillier 2009 (79) Country: USA	Outdoor advertising (including billboards, bus bench and shelter ads and store window posters)	Primary data collection	"Unhealthy" ads within a 1 000–2 000 ft radius of "child-serving institutions" (e.g. schools, libraries) in Austin, Los Angeles and Philadelphia, recorded within a 60-day period between June and September 2005	38 ads in Austin, 187 ads in Los Angeles, and 460 ads in Philadelphia	Assessed the location and content of outdoor advertisements in Austin, Los Angeles, and Philadelphia using GIS and hotspot analysis methods	"Unhealthy" ads were clustered around child-serving institutions in Los Angeles and Philadelphia but not in Austin  Percent of Black residents was a significant positive predictor of clustering in Philadelphia and percent White was a negative predictor of clustering in Los Angeles
Hofmeister-Toth 2011 (47) Country: Hungary	Advergames	Primary data collection	50 advergames integrated in 11 food company websites analysed between 25 September and 8 October 2010 (selection of companies based on the popularity of food brands among Hungarian children)	50 advergames (equalling approximately 500–750 minutes of gameplay)	Content coded for style of advergence, brand presentation, rewards offered and interactive features	Similar to online ads, advergimes used techniques including brand signs, names, colours and characters and prizes
Hope 2013 (103) Country: Fiji	TV ads, street advertising and sponsorship of events	Primary data collection	Ads shown on Fiji's 2 free-to-air terrestrial television channels between 6:00 hours and 21:00 hours on 2 weekdays and 2 weekend days; street ads along Suva city's main road (1.4 km) and within a 805-m radius of participating primary and secondary schools (surveyed on a single day); sponsorship of events by "junk food" products (assessed over a 12-month period)	123 TV food ads, 182 street ads for "junk food", 14 events sponsored by "junk food" products	Products classified as either "unhealthy/junk food" or "healthy" according to the Food Standards Australia New Zealand (FSANZ) Nutrient Profiling Calculator	Of 123 TV food ads, 79.7% were for "junk food"  Levels of street advertising for "junk food" were high  14 events sponsored by "junk food" products were found to have taken place in the 12-month period of investigation; the majority targeted children, families or schools

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Horsley 2014 (66) Country: United Kingdom	Foodstuffs displayed at the checkout	Primary data collection	Convenience supermarkets from the three leading national supermarket chains were selected on the basis of proximity to the town hall in Sheffield and surveyed between 20 February and 20 March 2012	13 convenience stores (total number of foods displayed not reported)	Cross-sectional survey of types and price of products displayed at checkouts Nutritional values of displayed foods were designated as "healthy", "unhealthy" or "unclassifiable" using the United Kingdom's Food Standards Agency Nutrient Profiling score	The most frequently displayed "healthy" product was sugar-free chewing gum On average, when chewing gum was not included as a foodstuff, 89% of the products on display were classified as unhealthy using the FSA's criteria One store was a notable outlier, providing only fruit and nuts at its checkout
Huang 2012 (54) Country: Singapore	TV ads and sponsorship of TV programmes	Primary data collection	Ads aired during 98 hours of children's television programming as classified by Media Corporation of Singapore and local newspaper listings and broadcast by free-to-air stations recorded over 2 weeks in August 2007	441 food ads	Content analysis to assess the extent and nature of food ads and to compare the nutritional quality of advertised foods against the prevailing nutritional standards Foods advertised were considered "healthy" if they met the criteria of the Healthier Choice Symbol in Singapore	Average of 4.5 food ads per hour, 39% of which were considered "healthy", while 56% were not (the Healthier Choice Symbol criteria were not applicable to the remaining 5% of food ads, which were primarily for infant formula) Sweets ("candy"), confectionery and fast food ads accounted for 46% of all food ads Significantly more "unhealthy" food ads were screened on weekends compared with weekdays

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Hurwitz 2017 (80) Country: USA	Food company websites (including advergames)	Secondary data based on an earlier cross-platform study <sup>e</sup> in which websites were manually screened	Food marketing on top food company websites monitored during November 2013 (n=95)	15 child-targeted websites; 86 advergames On child-directed websites (n=15) researchers clicked every visible link on each homepage, and played advergames for 1 minute or one level and watched videos for 2 minutes	Measured the prevalence of child-oriented websites and assessed the content and gaming features on these sites, as well as the nutritional profile of foods promoted	Games were the most common feature on websites (13 of the 15 child-oriented websites included games) Pictures advertising articles (such as branded food items and mobile applications (apps)), and videos were the next most common features on websites Most games played music, kept scores and featured multiple levels, and almost half included invitations to continue playing, companion advertisements bordering the game and were constructed so children's primary goal was to manipulate pieces of food
Jaichuen 2018 (121) Country: Thailand	TV ads	Primary data collection	Ads on four free-to-air TV channels shown between 6:00 hours and 10:00 hours and 15:00 hours and 20:00 hours on weekends, and between 15:00 hours and 20:00 hours on weekdays for 2 weeks in March 2014 (344 hours in total) Ads on 3 digital TV channels recorded during 1 week (24 hours per day) in October 2014 (504 hours in total) Children's, youth and family TV programmes all included	1 359 food ads on free-to-air TV; 693 food ads on digital TV	Assessed ad rates, and nutritional quality ("core"/"non-core") and content of food ads	On free-to-air TV channels, the average rate of "non-core" food ads was 2.9 per hour per channel; the most frequently advertised food products were SSBs; the rates of ads containing promotional characters and premium offers were significantly higher for "non-core" than "core foods" (1.2 versus 0.03 and 0.6 versus 0.0 per hour, respectively) On digital TV channels, the average rate of "non-core" food ads was 1.0 per hour per channel; the most frequently advertised food products were baby and toddler formula milks

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Jaichuen 2019 (122) Country: Thailand	Facebook ads	Primary data collection	Facebook pages of 30 of the most popular food brands with young people in Thailand were identified based on data from Socialbakers and monitored during the month of December 2017	752 posts	Marketing content transcribed and coded for marketing techniques, consumer engagement (number of likes, shares and comments), and compliance with government regulations and the industry's self-regulatory codes	The most common marketing technique was the use of pictures (632 posts), followed by branding elements (569 posts) and hashtags (438 posts) Out of a total of 228 spot advert posts, all confectionery ads and almost all (99.5%) soft drink ads did not display the advertising license number and none of the confectionery ads displayed the warning messages as required by law
Jones 2010 (17) Country: Australia	Food company websites (ads, advergames, social networking)	Primary data collection	Websites of leading Australian food companies that produce and distribute foods that are predominantly consumed by children were selected based on ad spend, consumer trust, and frequency of advertising in a sample of Australian children's magazines and were examined between 5 March to 27 April 2007	Seven websites	The marketing policies and child-targeted internet marketing practices of eight major Australian food companies were coded using similar criteria as those used in the 2006 UK Food Fables Report	Seven of the eight leading Australian food companies had websites or sections of sites that were devoted to children and/or teenagers, with downloadable materials and extensive direct marketing Collection of detailed personal information from children and/or teenagers was evident on five of the seven websites
Jones 2012 (18) Country: Australia	Magazine ads and foods featured in magazines	Primary data collection	All Australian magazines published in 2009 with a target audience which includes children up to the age of 12 were examined (in total, 139 issues of 14 magazine titles)	1 678 references to food	Each food or beverage referenced was classified ("core"/"non-core") based on the Australian Guide to Healthy Eating	Average of 12.1 food references per magazine Of the 1 678 references to food, 269 were of branded food products or brands, of which 83 were clearly ads Approximately 16% of all food references identified were portrayals of branded food products (or food brands); of these 86% were for "non-core" (broadly, less healthy) foods

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Kelly 2010 (43) Country: Ireland	Commercial activity and sponsorship in schools	Primary data collection	331 post-primary schools in Ireland identified from a list of schools provided by the Department of Education and Science website surveyed in 2005 (93.3% state funded, 32.6% disadvantaged status, 62.9% mixed gender)	331 post-primary schools	A staff census survey (completed by the principal or other staff) to investigate the extent and nature of commercial activity in post-primary schools in Ireland, with a focus on food marketing School policies related to commercialism and promoting healthy living to children and respondents' attitudes to these issues were explored	81.4% of schools operated shops or canteens that sell snacks, 44.7% had drinks vending machines and 28.0% had snack vending machines 38% of schools accepted for-profit sponsorship and the primary reason was inadequate funding for equipment (91.6%) The majority (87.3%) agreed with establishing a national voluntary code of practice in relation to industry sponsorship, which is recommended by the Irish National Taskforce on Obesity Few schools have policies that refer to commercial sponsorship (7.0%), but schools would welcome receiving guidance and support in developing such policies
Keller 2011 (61) Country: Switzerland	TV ads	Primary data collection	Children's programmes on six Swiss, one German and one Italian TV station identified through Publisuisse recorded over a 6-month period in 2006 (1 365 hours of recording in total)	3 061 food ads	Content analysis of the type of food promoted and the characteristics of food ads targeting children	Most food ads were for fast food restaurants (24%) or "candies" (31%), followed by cereals (13%) and sweet beverages (14%); hardly any were for vegetables or fruits (3%) Among the most common appeals promised in the food ads targeting children were fun (46%), sport/action (21%), adventure (15%) and taste (8%) Of the food ads targeting children, 54% offered premiums like toys, stickers or small games included in the package
Kelly 2011a (19) Country: Australia	Sports club sponsorship	Primary data collection	Sports clubs (n=108) for the nine most popular sports with children aged 5-14 determined from Australian Bureau of Statistics data randomly sampled from three large geographical areas	58 food company sponsors	Telephone survey to determine the nature (i.e. healthfulness) and extent of food company sponsorship of children's sport	Of all 347 sponsors identified, 58 (17%) were food or beverage companies 50% of food company sponsorship arrangements did not meet criteria for healthy sponsors For most clubs, less than a quarter of their income came from sponsorship A considerable proportion of clubs with food company sponsors had the company's signage on players' uniforms (53%), distributed rewards using the company's name (24%) or gave vouchers to players for the company's products (29%)

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Kelly 2010 (125) Countries: Australia, Brazil, Canada, China, Germany, Greece, Italy, Spain, Sweden, United Kingdom, USA	TV ads	Primary data collection	Ads shown on the three most watched channels by children between 6:00 hours and 22:00 hours on 2 weekdays and 2 weekend days between October 2007 and March 2008 recorded by 13 research groups in 11 countries (2 496 hours of programming in total)	12 618 food ads	Classified food ads as "core", "non-core" or "miscellaneous" (according to Australian dietary standards definitions) and categorized their thematic content (i.e. use of promotional characters and premiums)	"Non-core" foods were featured in 53%–87% of food ads The rate of "non-core" food advertising was higher during children's peak viewing times Most food ads containing persuasive marketing were for "non-core" products
Kelly 2011b (20) Country: Australia	TV ads	Primary data collection	Ads aired on three commercial television channels in Sydney between 6:00 hours and 22:00 hours on 2 weekdays and 2 weekend days during February 2008 (192 hours monitored in total). Australian Television Audience Measurement (OZTAM) data was used to determine peak viewing times	Average of 7 food ads per hour per channel in 2006 and 2007 and 5 food ads per hour per channel in 2008	TV food advertising patterns in 2008 were compared to previously published Australian research data for 2006 and 2007 to examine any changes following policy debates Food ads were classified as "core/healthy", "non-core/unhealthy" or "miscellaneous" based on food groups outlined in the Australian Guide to Healthy Eating; the use of persuasive marketing techniques and premium offers was also assessed	The overall rate of food advertising decreased over time; however, the relative contribution of "non-core" food advertising to overall food advertising remained stable In 2008, the proportion of food ads for "non-core" foods was significantly higher during children's peak viewing times

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Kelly 2011c (21) Country: Australia	Sponsorship of sporting organizations	Primary data collection	Websites of national and state organizations for the nine most popular children's sports determined from Australian Bureau of Statistics data across four Australian states and territories, with data collected between August 2009 and January 2010	55 websites and 443 sponsors	A structured survey tool was used to collect information on the presence of sponsors; their primary product/service and promotional opportunities, and the availability of written sponsorship policies Healthfulness was classed as more "healthy" or "less healthy" using criteria from a Delphi survey	Of the 443 identified sponsors, 38 (9%) were food companies and 15 (3%) were alcohol manufacturers The majority of food company sponsors (63%) and alcohol manufacturers (100%) did not meet criteria for "healthy sponsors"
Kelly 2016 (124) Country: China, Indonesia, Malaysia and Republic of Korea	TV ads	Primary data collection	Ads broadcast on three free-to-air TV channels popular with children (<13 years) across cities within the Asia-Pacific region; channels were recorded for 16 hours per day for 4 days between May and October 2012 (1 152 hours monitored in total)	37 789 ads, of which 27% were for food	Advertised foods were categorized as "core/healthy", "non-core/unhealthy" or "miscellaneous", and by product type Use of promotional characters and premium offers were also recorded	27% of all identified ads were for food/beverages (25% for retail products, 2% for restaurants, 0% for supermarkets) The most frequently advertised food product was SSBs Rates of non-core food advertising were highest during viewing times most popular with children, when between 3 (South Korea) and 15 (Indonesia) non-core food ads were broadcast each hour
Kelly 2015 (123) Country: Mongolia and The Philippines	Outdoor advertising near schools (including billboards, posters, free-standing signs, neon signs, stickers, electronic boards, banners, bus shelter signs and signs on outdoor furniture, bridge/awning signs and painted buildings)	Primary data collection	Area within 500 m of 30 primary schools in two demographically and culturally disparate cities in the Asia-Pacific region (Ulaanbaatar, Mongolia and Manila, The Philippines); schools were randomly selected from lists of all schools within sampled areas	1 459 food ads	Content analysis to describe the size, setting, type and position of the advertisement, and the type of food/drink product promoted ("core/healthy", "non-core/unhealthy" and "miscellaneous")	The density of food advertising was twice as high in the area closest to schools compared to the area further from schools (0.9 versus 0.5 ads per 100 m <sup>2</sup> in Ulaanbaatar and 6.5 versus 3.3 ads per 100 m <sup>2</sup> in Manila) Almost all food ads were for "non-core/unhealthy" foods/drinks (92% in Ulaanbaatar and 85% in Manila); soft drinks were most frequently promoted

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
<p>Kelly 2019 (3) Country: Data from 22 countries (including Australia, Canada, Chile, Costa Rica, Guatemala, Malta, Mexico, New Zealand, and Slovenia)</p>	TV ads	Secondary data from 22 countries that contributed data using the INFORMAS protocol	<p>Data were collected during consecutive hours across recorded days (not limited to children's programmes) and included information on all food ads</p> <p>The total included broadcast time was 11 191 hours, captured between 2008 and 2017</p>	Average frequency of food ads of 3.7 ads per hour per channel	<p>Ads were coded for persuasive marketing techniques, and healthfulness using the WHO Regional Office for Europe NPM</p>	<p>Across countries that also captured non-food ads (n=15), 23% of all TV ads were for foods</p> <p>Overall, there were four times more ads for foods that should not be permitted than for permitted foods</p> <p>During peak viewing times, the frequency of ads for foods that should not be permitted was higher in countries with industry self-regulatory programmes for responsible advertising compared with countries with no policies</p>
<p>Kim 2016 (81) Country: USA</p>	TV ads	Primary data collection	<p>Ads aired on four major children's cable television channels selected based on information on ratings and access provided by Medialife, Cable TV Advertising Bureau, and aired between 15:00 hours and 19:00 hours between 23 August and 5 September 2012</p>	794 children-targeted food ads	<p>Assessed the variety of persuasive appeals in child-targeted food ads, and how central and peripheral cues were differently associated with low-nutrition and general-nutrition food ads</p> <p>Nutrient levels were based on the guidelines for responsible food marketing to children developed by the Center for Science in the Public Interest</p>	<p>Low nutrition food ads accounted for 32.5% of food ads and general nutrition food ads accounted for 67.5%</p> <p>General-nutrition food ads used persuasive appeals with central cues more frequently than low-nutrition food ads</p>

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Korosec 2016 (55) Country: Slovenia	TV ads	Primary data collection	Food ads (and their duration) on seven popular TV channels selected based on information from AGB Nielsen broadcast in 2013; data were provided by an agency that captured television viewing in 450 households (1 300 individual viewers)	93 902 food ads	Identification of the food categories most frequently advertised, evaluation of the nutritional composition of the advertised foods, and comparison of two relevant NPMs (the WHO Regional Office for Europe NPM and the United Kingdom NPM)	Advertising of chocolate and confectionery represented 37% of food-related advertising in all viewing times, and 77% in children's (4–9 years) viewing hours During these hours, 96% of food ads did not pass the criteria for permitted advertising according to the WHO Regional Office for Europe NPM
Kotsaga 2013 (40) Country: Greece	TV ads	Primary data collection	Children's programmes and those watched by family members on public and commercial channels were recorded during four different time periods in 2011 (7 days in summer, 7 days in autumn, 4 weekends in autumn and 5 evenings in winter)	3 238 ads of which 913 were food ads; the total ad time was 25 hours and 28 minutes, of which food ads accounted for 4 hours and 58 minutes	The classification of food categories was based on a previous study and adapted to Greek society	Food ads accounted for 12.5% of the total number of ads in summer, 29.5% in autumn, and 36% in winter Most food ads were shown on commercial channels
Lavrša 2018 (56) Country: Slovenia	Magazines	Primary data collection	All issues of children's and teen's magazines (with a reach of at least 100 000 readers for daily/weekly magazines, and 50 000 readers for monthly/bimonthly magazines) and a selected sample of issues of adult-targeted magazines/newsletters published in Slovenia in 2013 and 2017	175 issues of child-targeted magazines (92 in 2013, 83 in 2017) and 675 issues of adult-targeted magazines and newspapers (345 in 2013, 330 in 2017)	A repeated cross-sectional study compared frequency of food ads in children's and adults' magazines in 2013 and 2017 Magazines were searched for branded food references, which were categorized and evaluated using the WHO Regional Office for Europe NPM	A total of 912 branded food references were identified in 2013, and 1 443 in 2017 There were 151 branded food references in children's and teen's magazines in 2013, and 47 in 2017 In both years, chocolate and confectionery was the most advertised food category in children's and teen's magazines; in adults' magazines the most commonly advertised food category was food supplements In both years, most foods in children's and teen's magazines were classed as "not permitted" (98% in 2013, 100% in 2017)

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Lee 2009 (82) Country: USA	Advergames	Primary data collection	Websites of 150 companies identified as being among the top 25 food companies in six major food categories, the top 10 fast food companies, the top 10 family restaurant companies based on sales in 2005; content assessed between July and September 2006	251 advergames targeting children	Content analysis to examine how food marketers use advergames to promote food products to children and assessment of nutritional content of the food products featured	"Candy and chewing gum" (28.6%) was the most frequently featured food product in advergames, followed by cereals (19.5%), soft drinks (9.5%), and salty snacks (7.5%) 83.8% of the food products advertised in the advergames were classified as low-nutrient foods Children are often invited to "play with" the foods integrated as active game components Fewer than 3% of the games analysed educated children about nutritional and health issues
Li 2016 (100) Country: China	TV ads	Primary data collection	Five television channels most popular with children in Xi'an recorded for 2 weekdays and 2 weekend days between 6:00 hours and 22:00 hours during May and June in 2012	1 409 food ads	Content analysis to determine differences in the proportion of "healthy" food, "unhealthy" food and "miscellaneous" food ads across different TV channels, programmes, dates, viewing periods and types of persuasive marketing tactics used	The average frequency of food ads was 6 per hour per channel 48.1% of food ads were considered to be "unhealthy" "Unhealthy" foods contributed the highest proportion of all food ads containing promotional characters (51.7%) and premium offers (59.1%), and appeared more on non-children's television channels
LoDolce 2013 (83) Country: USA	TV ads	Secondary data from Kantar Media AdScope and Nielsen	Purchased video copies of all ready-to-eat cereal ads that appeared on television between 1 January 2008 and 31 March 2009 and syndicated data on exposure	158 cereal ads	Content analysis of products, messages, creative techniques and eating behaviours presented in ads and exposure analysis to compare children's and adults' exposure to marketing of ready-to-eat cereals	On average, children viewed 1.7 ads per day for ready-to-eat cereals, 87% of which promoted high-sugar products; adults viewed half as many ads, and the ads viewed were equally likely to promote high- and low-sugar cereals 91% of high-sugar cereal ads viewed by children ascribed extraordinary powers to these products, and 67% portrayed healthy and unhealthy eating behaviours

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Macniven 2015 (22) Country: Australia	Sports sponsorship on sports organizations' websites	Primary data collection	Websites of the 53 national sport organizations in Australia receiving government funding and their corresponding state/territory organizations monitored between February 2012 and February 2013	413 websites and 97 food or beverage sponsors	Cross-sectional survey to identify and assess the nature and extent of sponsors Sponsors categorized as "healthy" or "unhealthy" based on criteria developed by health experts from an earlier Delphi survey	63% of food and beverage sponsors were deemed "unhealthy" Cricket had the highest number of "unhealthy" food and beverage sponsors (n=19)
Mchiza 2013 (118) Country: South Africa	TV ads	Primary data collection	Ads aired on four national TV channels between 15:00 hours and 21:00 hours for 7 consecutive days over a 4-week period from 16 April 2011 to 13 May 2011	1 512 ads of which 665 were food ads	Content analysis to: (i) determine frequency of food ads; and (ii) evaluate the content and approach used by advertisers to market their products Ads were coded according to time slots, food categories, food products, health claims and presentation	44% of all recorded TV ads were related to food Nearly 50% of food ads appeared during family viewing time, and the most frequent ads during this time were for desserts and sweets, fast foods, hot beverages, starchy foods and sweetened drinks Health claims were made in 11% of food ads; the most frequently used benefits claimed were "enhances well-being", "improves performance", "boosts energy", "strengthens the immune system" and "is nutritionally balanced"
Mehra 2012 (23) Country: Australia	Packaging of foods sold in supermarkets	Primary data collection	Child-oriented food and beverage products, sold through a major supermarket chain in Adelaide, South Australia in October 2009	157 products marketed to children	Analysis by food category, nutritional value ("core" and "non-core" categories), and marketing techniques used	75.2% of products represented "non-core" foods The most prominent child-oriented products were confectionery and chocolate (27.4%), snacks (17.8%) and dairy core (11.5%) More than 16 unique marketing techniques were used to promote child-oriented food products, with a median of 6.43 marketing techniques per product Claims about health and nutrition were found on 55.5% of "non-core" foods

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Mejia-Diaz 2014 (101) Country: Colombia	TV ads	Primary data collection	Ads broadcast on two national, free-to-air TV channels between 6:00 hours to 12:30 hours on 4 randomly-chosen days during July 2012	364 food ads	Classification of nutritional content of advertised foods according to multiple sources, including the Foods Standards Agency NPM, the WHO/PAHO NPM and Resolution 333 (on nutrition labelling) issued by the Ministry of Health and Social Protection in 2011; comparison of ads in the children's and general frames	56.3% of food ads were shown within the children's viewing times  A higher percentage of ads for foods and non-alcoholic beverages classified as "rich" in sugar, sodium, saturated fat were observed during children's peak viewing times than during general audience programming; in contrast, the percentage of ads for foods and non-alcoholic beverages classified as "rich" in total fat was higher during general audience programming than children's peak viewing times (70.4% versus 29.6%)
Menger-Ogle 2018 (114) Country: Nepal	TV ads	Primary data collection	Ads on three popular children's TV channels in Kathmandu shown during children's programming on 3 weekend days and 6 weekdays over a 20-day span in April 2014 (total of 57 hours of programming monitored).	1 203 food ads	Ads coded for nutrition content (in line with the recommendations of the Interagency Working Group), product category and marketing strategies	1% of airtime during children's programming was dedicated to ads, and 55% of that was dedicated to food ads  Over 70% of food ads aired advertised foods with excessive amounts of saturated fat, sugar and/or sodium; 47.7% of food ads featured products that contained excess sugar  The most prevalent food types shown were ice cream and popsicles (20.7%), energy/nutritional supplements (20.6%) and sweets ("candy") (14.7%)  The three most commonly used marketing strategies featured animated effects (83.2%), movie, cartoon, animated or costumed characters (36.8%), and TV/movie tie-ins (16.5%)
Missbach 2015 (31) Country: Austria	TV ads	Primary data collection	Six TV channels monitored between 6:00 hours and 21:00 hours over four days (2 non-consecutive weekdays and 2 independent weekend days) during February and March 2014 (total of 360 hours)	1 919 food ads	Assessed frequency of ads targeted at children and their healthfulness (based on the Austrian nutrition guidelines and EU Pledge Nutrition Criteria)	15.1% of all food ads were targeted at children, of which 92.4% were for fatty, sweet and salty snacks, while no ads were for vegetables, legumes or fruits  65.9% of child targeted ads originated from companies participating in the EU Pledge, of which 95.9% showed at least one aspect of nonconformity with the EU Pledge Nutrition Criteria

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Moodley 2015 (119) Country: South Africa	Outdoor advertising (e.g. billboards, on bus stops, signs placed along the sidewalk, urban art on streets or buildings, large posters, signage for restaurants) for SSBs and food vendors selling SSBs (e.g. shops, stalls)	Primary data collection	All outdoor SSB advertising and SSB branding in five areas in Soweto during July and August 2013 (total area surveyed = 38.3 km <sup>2</sup> )	145 outdoor ads and 180 vendors	Spatial analysis of the frequency and location of outdoor advertising and the proportion of food vendors selling SSBs	A total of 145 ads for SSBs were found over a driven or walked distance of 111.9 km, and 58% of food vendors sold SSBs  Near schools, the density of ads was 3.6 per km <sup>2</sup> , and 50% of schools had branded advertising of SSBs on their premises
Nasreddine 2019 (108) Country: Lebanon	TV ads	Primary data collection	Three local channels with the highest viewership among 4- to 14-year-olds recorded between 15:00 hours and 22:00 hours on weekdays and between 8:00 hours and 22:00 hours on weekend days from September 2016 through January 2017 (total of 226 hours of TV programmes monitored)	1 393 food ads	Examination of the nutritional content of the advertised food products using the nutrient thresholds specified by the WHO Regional Office for the Eastern Mediterranean NPM and assessment of the proportion of food ads that included health messages	Of 4 510 ads that were broadcast, 30.3% were for foods  The proportion of food ads was highest during children's programmes (43%) compared to general audience (32%) and parental guidance (29%) programmes  Approximately 8 out of 10 food ads were for products that did not meet the standards of the WHO Regional Office for the Eastern Mediterranean NPM  79% of food ads that included a health claim during general audience programmes were for foods that did not meet the criteria of the WHO Regional Office for the Eastern Mediterranean NPM
Ng 2014 (109) Country: Malaysia	TV ads	Primary data collection	11 ethnic-specific popular TV channels recorded for 16 hours per day on randomly selected weekdays and weekend days during both term time and school holidays between November 2012 and August 2013 (total of 88 days)	5 494 food ads	Foods categorized as "core" (healthy), "non-core" (non-healthy) or "miscellaneous" (unclassified) and by viewing time and persuasive marketing techniques identified	17.1% (n=5 494) of all ads were for food; overall the mean rate of food ads was 3.9 per hour per channel  Ads for "non-core" foods were predominant, and rates of "non-core" food ads were greater during school holidays compared to term time (3.53 versus 1.93 food ads per hour per channel)  Sugary drinks were a popular "non-core" product advertised across all broadcast periods and channels  The frequency of "non-core" food ads which featured promotional characters was twice as high during the school holidays than during term time (1.91 versus 0.93 per hour per channel)

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No 2014 (47) Country: New Zealand	Magazines	Primary data collection	Six magazines aimed at children aged 10–17 years with the highest readership as determined based on data from A.C. Nielsen. In total 72 issues were assessed for food references for a one-year period from December 2012 to January 2014	1 105 food references, of which 333 were for branded food products	All foods referenced were classified as “healthy” or “unhealthy” according to a food-based classification system by the Ministry of Health	15 references to foods (and 5 for branded foods) were identified per magazine Branded food references (30% of total) were more frequent for “unhealthy” (4.3%) compared to “healthy” (25%) foods Magazines specifically targeted to children and adolescents contained a significantly higher proportion of “unhealthy” branded food references (72%) compared to the most popular magazines (42%) “Snack items” were marketed most frequently (36%) and “vegetables and fruits” the least (3%) Direct advertisements accounted for 27% of branded food references and 25% of those featured health or nutrition claims
Oates 2010 (67) Country: United Kingdom	Verbal and visual instances of food and drink in TV programmes, ads, sponsorship and trailers	Primary data collection	Children’s TV programming across four popular national channels (CBBC, CBeebies, CiTV, Five) recorded between 7:00 hours and 9:00 hours and 15:00 hours and 17:00 hours for 1 week (Monday to Saturday) in autumn 2008 (total of 84 hours)	1 662 food mentions	Food mentions classified according to food categories utilized by previous researchers	The majority of food mentions were featured in programmes (n=1 236) and were skewed towards healthy (68.7% versus 31.3%) rather than unhealthy foods The most frequently mentioned food category was fruit and vegetables (35.8%), followed by desserts (cakes, pastries, ice cream, 14.7%) and grains (cereals, bread, pasta, rice, 10.4%)
Ohri-Vachaspati 2015 (84) Country: USA	Marketing inside and on the outside of fast food restaurants	Primary data collection	Fast food restaurants located in a nationally representative sample of public middle- and high-school enrolment areas were identified based on information from InfoUSA and Dun & Bradstreet Corporation, and marketing data collected in 2010, 2011 and 2012	6 716 fast food restaurants	Assessment of the extent of child- directed marketing, whether it varied over time (between 2010 and 2012), and whether it differed across different types of neighbourhoods based on their income, racial/ethnic, and urbanicity profiles	31.4% of all chain restaurants used child-directed marketing inside or on their exterior and 20.8% had an indoor display of kids’ meal toys Restaurants in rural (compared to urban) areas, in middle- (compared to high-) income neighbourhoods, and in majority Black (compared to White) neighbourhoods had significantly higher odds of using any child-directed marketing Compared to 2010, there was a significant decline in the use of child-directed marketing in 2011, but the prevalence increased to close to the 2010 level in 2012

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Olafsdottir 2017 (42) Country: Iceland	Verbal and visual appearances of foods in TV programmes (ads were excluded)	Primary data collection	27 hours of children's programmes (n=125), domestic and internationally produced, aired on Icelandic public service TV channels on weekday afternoons and weekend mornings from October 2013 to April 2014 and from March 2015 to February 2016	599 food appearances	Analysis of appearances for frequency and type, context in which high-calorie low-nutrient foods and fruits and vegetables appear, and messages on health and taste	Mean of 5.6 unique food appearances per programme and 22.2 per hour High-calorie low-nutrient foods accounted for 26% of appearances and fruits and vegetables for 23% High-calorie low-nutrient foods were presented as desirable by appearing more frequently with child characters than fruits and vegetables
Olafsdottir 2016 (59) Country: Sweden	Verbal and visual appearances of foods in TV programmes (ads were excluded)	Primary data collection	Most popular children's TV programme in Sweden, broadcast by an ad-free public service channel and watched almost daily by 45% of children under the age of 10 years recorded on 21 occasions over a period of 4 months during winter 2011–2012 (total of 45 hours)	773 food appearances	Analysis of appearances for frequency and type, context in which high-calorie low-nutrient foods and fruits and vegetables appear, and messages on health and taste	High-calorie low-nutrient foods constituted 19% of all food appearances, and fruits and vegetables 39% High-calorie low-nutrient foods appeared more frequently with children than adults, and were more often consumed or actively handled than fruits and vegetables
Parnell 2019 (24) Country: Australia	Bus shelter ads	Primary data collection	Every bus shelter ad within 500 m of a school in five local government areas as identified through information from local governments in the Perth metropolitan region, and Western Australian Department of Education website (photographed in June, September, December 2016, and March 2017)	293 ads (included food, non-alcoholic beverage, alcohol and gambling ads)	Assessment of the volume and type of ads and whether they varied seasonally; categorization of ads as "healthy", "moderate", or "unhealthy" (food and non-alcoholic beverage categorization based on the Australian Dietary Guidelines)	Of the 293 ads, 31% featured "unhealthy" products, 3% "moderate" products and <1% "healthy" products No seasonal variation in the volume of unhealthy ads

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Pérez-Salgado 2010 (112) Country: Mexico	TV ads	Primary data collection	Ads aired by 11 broadcast channels in Mexico City recorded on 1 weekday and 1 weekend day between July and October 2007	9 178 ads	Analysis of the length of ads, nutritional content and type of foods advertised	The time devoted to food ads was greater during children's programming than during programming targeted to the general audience (25.8% versus 15.4%) The most frequently advertised foods were sweetened beverages, sweets and cereals with added sugar Calorie, carbohydrate and fat contents were higher in foods advertised during children's shows The most common marketing strategies were an offer of a gift and association with positive emotions
Potvin Kent 2018a (34) Country: Canada	Digital display advertising on third-party websites	Primary data collection	Food display ads on the 10 most popular third-party websites with adolescents (12–17 years) from June 2015 to May 2016 (websites were identified by generating ComScore's Ad Metrix Advertiser Report for six food-related advertiser categories)	14.4 million food ads	Assessment of the frequency and healthfulness of all food ads using the WHO/PAHO NPM and the United Kingdom NPM	A total of 34 food companies advertised on all 10 websites The most frequently advertised food categories were cakes, biscuits ("cookies"), and ice cream (32.5%); cold cereals (20.5%); restaurants (18.0%); and SSBs (12.0%) Most advertised products (93.3%) were categorized as excessive in either fat, sodium or free sugars according to the WHO/PAHO NPM, and 83.5% of ads were categorized as "less healthy" according to the United Kingdom NPM
Potvin Kent 2018b (35) Country: Canada	Social media marketing (including ads, user-generated content, celebrity-generated content, and marketing embedded in other web-based content)	Primary data collection	101 children and adolescents (7–16 years) recruited from four community centres in Ottawa completed a survey on their media use	215 food marketing exposures	Review of recordings of children's and adolescents' social media app use to identify food marketing exposures and assess healthfulness (using the WHO/PAHO NPM and the United Kingdom NPM)	Overall, 72% of participants were exposed to food marketing Most exposures promoted unhealthy products such as fast food (44%) and SSBs (9%) Adolescents were more likely to be exposed to food marketing than children (83% versus 55%, p=0.003, OR 3.8 (95% CI 1.5–9.5)) On average, children and adolescents see food marketing 30 and 189 times per week, respectively, on social media apps

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Potvin Kent 2019 (36) Country: Canada	Food marketing in schools (including ads, food product displays, fund-raising, exclusive marketing agreements and incentive programmes)	Primary data collection	An online survey was sent to public primary and secondary schools identified based on information from the Canadian Schools Database Directory in Ontario, British Columbia, and Nova Scotia (the most populous provinces) and completed by 154 principals (108 from primary schools and 46 from secondary schools) in spring 2016	154 schools, of which 129 (85%) had at least one type of food marketing	Assessed frequency and type of food marketing occurring in schools, with a focus on: 1. school-level differences (primary versus secondary) 2. province-level differences (Ontario versus British Columbia), and 3. differences by SES	Median number of distinct types of marketing per school was 1 (range 0–6) Most frequent types of marketing were: sale of branded food, particularly chocolate, pizza and other fast food for fund-raising purposes (64% of schools); food ads on school property (26%), and participation in incentive programmes (18%) Primary schools were more likely to report participating in incentive programmes and selling branded food items than secondary schools (25% versus 2% and 72% versus 43%, respectively) Secondary schools were more likely to report food advertising on school property, exclusive marketing arrangements with food companies, and food product displays than primary schools (56% versus 13%, 43% versus 5% and 19% versus 2%, respectively)
Prathapan 2016 (120) Country: Sri Lanka	TV ads	Primary data collection	Ads aired on a random selection of 8 out of a total of 16 available TV channels (after stratifying for language) on 2 consecutive days during weekdays and weekends from the time the telecast opened to the time of closure of the telecast (total of 32 days monitored)	95 food ads	Comparison of the strategies used for promotion of foods and beverages, with foods categorized by product type and healthfulness (based on the fat, sugar and salt content of the foods compared with national values)	Among all food ads, 78% were child-focused, and among these, 74% claimed health benefits Confectionary was one of the most common food types advertised (n=29 out of 95 food ads; 30.5%) Nearly 90% of ads categorized as “unhealthy” targeted children None of the ads contained disclaimers
Qutteina 2019 (33) Country: Belgium	Food images from paid, earned and owned media <sup>1</sup> food marketing appearing on social media platforms	Primary data collection	21 Flemish adolescents (aged 12–18 years) completed a survey before, during and after a “diary study”, which assessed their general social media use. Participants took screenshots of food images they encountered on social media platforms during one week	611 food images	Content analysis of food images for their sources, the presence of core and non-core food, and the marketing strategies employed	Adolescents were mostly exposed to messages of non-core (67% of images) and branded food (49% of images), which was often presented in association with a social context (49% of images) Adolescents often encounter branded food images through peers and social media influencers, the majority of which are earned media food marketing (49% of branded images) or paid media food marketing (40% of branded images)

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Ramos 2015 (57) Country: Spain	TV ads	Primary data collection	Children's commercial television channels ("Disney Channel" and "Boing" from 9:00 hours to 12:00 hours on Saturday and Sunday) and general channels ("Telecinco" and "Antena 3" from 8:00 hours to 9:00 hours and 17:00 hours to 20:00 hours on Monday to Friday) recorded from March to May 2013	52 food ads	Observational descriptive study to examine the strategies used. Nutrition labelling of the advertised products, and breaches of the Self-Regulation Code on Food Advertising aimed at Preventing Obesity and Promoting Healthy Habits in Children were analysed	Advertised products were high in sugars and saturated fats with average levels of fat and salt Figures for fat and saturated fat were similar in food advertised in the morning and in the afternoon, but products that were high in sugars and salt were advertised more in the morning
Rincon-Gallardo Patino 2016 (111) Country: Mexico	TV ads	Primary data collection	600 hours of TV on four national public and free TV channels with the highest national ratings recorded on 40 randomly selected (week, weekend, school and vacation) days, from 7:00 hours to 22:00 hours from December 2012 to April 2013	2 544 food ads	Assessment of the nutritional quality of foods using the Mexican, WHO Regional Office for Europe NPM and United Kingdom NPM	20.7% of the total ads shown were food ads More than 60% of the foods advertised did not meet any nutritional quality standards 64.3% of the products did not comply with the Mexican nutritional standards, compared with 83.1% and 78.7% with the WHO Regional Office for Europe and United Kingdom NPMs, respectively The most frequently advertised food groups were beverages (24.6%), chocolate and confectionery sugar (19.7%), cakes, sweet biscuits and pastries (12.0%), savoury snacks (9.3%), breakfast cereals (7.1%), ready-made food (6.4%) and dairy products (6.0%)

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Roberts 2013 (25) Country: Australia	TV ads	Secondary data purchased from a national media monitoring agency	Two months of data on ads broadcast (and expenditure) on four free-to-air national television stations purchased from a national media monitoring agency with both analogue and digital signals in five major Australian cities; data collected 24 hours per day for 61 complete and sequential days, from 1 September 2010 to 31 October 2010 (n=1 464 hours)	93 284 food ads	Content analysis assessed healthfulness of foods against the Australian Guide to Healthy Eating	Of 642 687 ads, 93 284 ads (14.5%) were for food. Most advertised foods were non-core foods (63%), with few ads for fruits and vegetables (6%). Ads for non-core foods were significantly more frequent during prime time viewing periods (71% vs 60%).  High levels of advertising for fast food (28%) and non-core beverages (24%).  The expenditure on food advertising for the 2-month dataset was AUD 233 823 360.
Roberts 2014 (26) Country: Australia	TV ads	Secondary data purchased from a national media monitoring agency	Two months of data on ads broadcast (and expenditure) on four free-to-air national television stations with both analogue and digital signals in five major Australian cities; data collected 24 hours per day for 61 complete and sequential days, from 1 September 2010 to 31 October 2010 (n=1 464 hours)	93 284 food ads	Content analysis to classify the advertised products into food groups according to the Australian Guide to Healthy Eating and whether they were scheduled in children's popular viewing times, also assessed whether they included a premium offer (free incentive)	The majority (63%) of food ads included non-core foods; during children's popular viewing times, this figure was significantly higher at 65% versus 61% outside these times.  Within children's popular viewing times, the percentage of ads was higher for quick-service restaurants (30% vs 26%) and unhealthy beverages (3% vs 2%).  15% of all ads were for sugar-sweetened soft drinks. Premiums were still apparent (10% vs 8%) despite being restricted by the codes.
Romero-Fernández 2013 (58) Country: Spain	TV ads	Primary data collection	80 hours of 4 general TV station broadcasts in Spain (two national, two regional) recorded during children's viewing time in May and June 2008	486 food ads	Each product was classified by food category and as healthy or less healthy according to the United Kingdom NPM	A total of 486 ads were broadcast for 96 different products, with a mean frequency of 5.1 ads per product.  61.5% of ads were for less healthy foods.  All (100%) of the breakfast cereals and 80% of the non-alcoholic drinks and soft drinks were less healthy.  Of the total sample of ads, 59.7% were for less healthy products, a percentage that rose to 71.2% during children's reinforced protection viewing time.

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Sahin 2013 (85) Country: USA	TV ads	Primary data collection	This data represented a composite week of television programming from 13 most watched commercial broadcast and cable networks (n=1 638 hours of television programming). Data were collected in different days throughout the months of May–September 2005	8 854 food ads, of which 744 were breakfast cereal ads targeting children and teens	Systematic analysis of the content of cereal ads to determine nutritional information presented in the ads and the presence of health disclaimers (e.g. "healthy breakfast")	38 unique "sugary breakfast cereal products" were identified in the analysed cereal ads Overall, cereals portrayed as healthy and balanced in the disclaimers did not reflect the nutritional composition of a healthy and balanced breakfast as recommended by the dietary guidelines
Sainsbury 2017 (27) Country: Australia	Advertisements on train stations and surrounding (including commercial billboard or poster, temporary flyers, branded furniture, vending machines, and experiential displays promoting a product, service or brand)	Primary data collection	All 178 train stations on the Sydney metropolitan train network, surveyed over 1 week in February (summer) and 1 week in July (winter) 2016	1 915 food ads	Assessment of the extent of advertising and the nutritional quality of advertised products against the Australian Guide to Healthy Eating	The majority of food ads were for unhealthy products: 84.3% were classified as discretionary foods, 8.0% as core foods and 7.6% as miscellaneous foods Snack foods and SSBs were the most frequently advertised products, regardless of season Coca-Cola and PepsiCo were the largest advertisers on the network, contributing 10.9% and 6.5% of total ads respectively There was no difference in the mean number of food and beverage ads by area SES, but the proportion of advertising that was for discretionary foods was highest in low SES areas (41.9%)
Sandberg 2011 (60) Country: Sweden	TV and internet ads	Primary data collection	TV ads were collected from programmes most likely watched by Swedish children. Ads were recorded during one week in November 2005 and one week in March 2007 (n=144 hours) 181 websites were analysed in 2005 to identify internet ads. 60% of the sample consisted of websites from the food industry and 40% of websites frequently visited by children	TV ads: n=3 662 Internet ads: not reported	Content analysis of the nature, number and placement of ads on TV and the internet The healthfulness of products was determined by an unhealthy food index	A considerable proportion of marketing directed at children was for unhealthy items (TV: 21% in 2005, 24% in 2007; internet: 52% in 2005, 57% in 2007)

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Scully 2015 (44) Country: Ireland	TV ads	Primary data collection	5 weekdays of children-specific television broadcasting from 07:00 hours to 17:00 hours recorded in July 2012, totalling 60 hours and 322 ads	101 food ads	Food ads were coded based on type of product, nutritional content (on the basis of the food pyramid), intended age group and portrayed outcome of consumption ("positive" (e.g. enjoyment, winning a race or prize, aid to other people and feeling better following the cue) or "negative" (e.g. pain or personal harm, disgust or physical grimacing or crying, excessive consumption, vomiting and harm to other people))	66.3% of food ads promoted foods that should be eaten in moderation Most frequently advertised foods were fast food products (27.3%), sweets/candy (21.6%) and dairy products (17.0%) 54.7% of ads were adult specific, 27.3% were children specific All food and beverage ads were associated with a "positive" outcome (e.g. pleasure)
Signal 2017 (48) Country: New Zealand	Food marketing across multiple media and settings (including packaging, signs, instore marketing, print media, screen, merchandise)	Primary data collection	168 children (mean age 12.6 years, SD = 0.5) in Wellington wore a wearable camera on four consecutive days (Thursday to Sunday), capturing images automatically every seven seconds; data were collected over a 12-month period from July 2014 to June 2015	27.3 non-core food marketing exposures a day, 12.3 core food marketing exposures a day	Foods featured in images were manually coded as either recommended (core) or not recommended (non-core) to be marketed to children (using the WHO Regional Office for Europe NPM) by setting, marketing medium, and product category	On average, children were exposed to non-core food marketing 27.3 times a day across all settings, more than twice their average exposure to core food marketing (12.3 per day) Most non-core exposures occurred at home (33%), in public spaces (30%) and at school (19%) Food packaging was the predominant marketing medium (74% and 64% for core and non-core foods) followed by signs (21% and 28% for core and non-core) Sugary drinks, fast food, confectionary and snack foods were the most commonly encountered non-core foods marketed

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Speers 2011 (86) Country: USA	TV product placement	Secondary data from Nielsen	Data were purchased on the number of food appearances within TV shows during prime-time programming from January 2008 through December 2008 and on the number of brand appearances and TV ads viewed by the average child (aged 2–11 years); average adolescent (aged 12–17 years); and average adult (aged 18–49 years)	35 000 food appearances	Food appearances in TV shows were analysed by product category and company and child, adolescent, and adult exposure examined and compared with exposure to TV ads	Regular soft drinks, traditional restaurants (i.e. not quick service restaurants), and energy/sports drinks made up 60% of all brand appearances in shows  Coca-Cola products accounted for 70% of child exposure and 61% of adolescent exposure to brand appearances. One show, American Idol, accounted for more than 95% of these exposures. Exposure of children to Coca-Cola products through TV ads was much less common.
Tan 2018 (110) Country: Malaysia	Video ads and overlay ads on YouTube	Primary data collection	The top 25 most popular child-centric YouTube channels were identified based on SocialBlade.com and ranked by view  The top 10 most-viewed videos for each of the 25 channels were then selected to be included in the sample (n=250)  All videos were recorded over a period of 3 weeks in October 2017 (54 hours and 35 minutes)	71 food ads	Analysed for type of product promoted and ad format (in video vs. overlay)  Food ads were further coded based on food category and persuasive marketing techniques used	56.3% of food ads promoted noncore foods, which were more commonly delivered as videos rather than “overlay ads”  These ads employed persuasive marketing techniques, including taste appeal (42.3%), uniqueness/novelty (32.4%), the use of animation (22.5%), fun appeal (22.5%), use of promotional characters (15.5%), price (12.7%), and health and nutrition benefits (8.5%)

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Terry-McElrath 2014 (87) Country: USA	School-based commercialism (including exclusive beverage contracts; corporate food vending; posters/advertisements; use of food coupons as incentives; event sponsorships; and fast food available to students)	Secondary data collection	Annual nationally representative cross-sectional studies (6 years of data (2007–2012) from 2 parallel surveys conducted through the “Bridging the Gap research programme” in public elementary, middle, and high schools) Elementary school data were collected through the Food and Fitness study at the University of Illinois at Chicago; middle and high school data were collected through the Youth, Education, and Society study at the University of Michigan	Not reported	Prevalence estimates of school-based commercialism exposure Changes over time between 2007–2012, and differences by student body SES or racial/ethnic composition	All schools had one or more types of school-based commercialism and exposure increased significantly with grade level. The most frequent type of commercialism in elementary school students was food coupons used as incentives, for secondary students exclusive beverage contracts. Exposure to elementary school coupons, as well as middle and high school exclusive beverage contracts, was significantly more likely for students attending schools with mid or low (vs high) student body SES
Ustjanauskas 2014 (88) Country: USA	Websites	Secondary data obtained from comScore	Syndicated data provided information on visitors to children’s websites and also on display ads featured Display ads on 72 popular children’s web sites were measured during a 12-month period (July 2009 through June 2010)	3.4 billion food ad views (“impressions”)	Ads were classified according to food category, nutritional quality (Interagency Working Group nutrition standards) and companies’ participation in food industry self-regulation % of ads meeting government-proposed Interagency Working Group nutrition standards was calculated	More than two thirds (n=49) of websites displayed ads for food products 83% of ads viewed featured on just 4 websites Breakfast cereals and fast food were advertised most often (64% of ads viewed) Most ads viewed (74%) promoted brands approved by companies for child-directed advertising, but 84% advertised products that were HFSS Ads for foods designated by companies as healthier dietary choices appropriate for child-directed advertising were least likely to meet Interagency Working Group nutrition standards

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Vandevijvere 2017a (49) Country: New Zealand	TV ads	Primary data collection	Three major free-to-air channels (those with the highest children's audience) were selected Eight days (four weekdays and four weekend days) were randomly selected over a 3-month period from 1 June 2015 to 31 August 2015, excluding school holiday periods Television programming was recorded from 06:00 hours to 00:00 hours for each day. A total of 432 hours was collected	1 807 food ads	Ads were coded for product type, food product type, and the use of any promotional strategies Healthfulness of food products were classified according to two systems: the WHO Regional Office for Europe NPM and the New Zealand Ministry of Health Food and Beverage Classification System	The majority of foods advertised were unhealthy. Mean number of unhealthy food ads per hour 9.1 (SD 5.2) 68.5% of food ads included at least one food not permitted to be marketed to children according to the WHO Regional Office for Europe NPM One third of unhealthy food ads included a promotional character and one third a premium offer About 88% of unhealthy food ads were shown during children's peak viewing times If unhealthy food ads were to be restricted during times when at least 25% of children are watching television, this would reduce the average unhealthy food advertising impact by 24% during weekdays and 50% during weekend days If the WHO Regional Office for Europe NPM instead of the current nutrient profiling model were used to restrict unhealthy food advertising to children, the average impact would be reduced by 24% during weekdays and 29% during weekend days
Vandevijvere 2017b (51) Country: New Zealand	Websites	Primary data collection	The most popular websites among New Zealand children and adolescents aged 6–17 years in January 2014 were selected (n=110) Additional food brand websites were selected based on the frequency of marketing of food brands through other media (n=70)	Not reported	Characteristics of websites assessed included the target audience (children aged 6–12 years, adolescents aged 13–17 years and general population) and a range of marketing techniques Advertised foods classified according to the New Zealand Ministry of Health Food and Beverage Classification System, and by food category	The extent of food marketing on popular non-food websites was low However, there was a wide range of marketing techniques on food brand websites, including advection (advertising + education) (87%), viral marketing (64%), cookies (54%), free downloadable items (43%), promotional characters (39%), designated children's sections (19%) and advergames (13%) Most techniques appeared more frequently on websites specifically targeting children and adolescents, than on other websites targeting the general public

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Vandevijvere 2018a (50) Country: New Zealand	Advertisements around schools (including billboards, posters, free standing signs, neon signs, stickers, electronic boards, banners, bus shelter signs and signs on outdoor furniture, bridge/awning signs and painted buildings)	Primary data collection	"Buffer zones" created 500m around a sample of 950 schools across the country using ArcGIS (37.5% of total) One third of schools were in each tertile of socioeconomic deprivation (higher, medium, lower proportions of children from lower socio-economic communities) Data was collected between July and November 2016	30 494 food ads	Cross-sectional survey, covering the entire New Zealand territory Convenience, fast food and takeaway outlets were mapped Foods advertised were classified according to the NZ Food and Beverage Classification System, and the WHO Regional Office for Europe NPM Presence of promotional characters and premium offers also recorded	30 494 food ads, of which 14 310 were for "junk foods" About 65% of foods were not permitted to be marketed to children by the WHO Regional Office for Europe NPM The proportion of junk food ads was significantly higher around schools with the highest compared to the lowest number of socio-economically deprived children (50.7% vs. 37.4%) SSBs (n=4 584, 20.4%) and fast food (n=4 329, 19.2%) were most frequently marketed
Vandevijvere 2018b (52) Country: New Zealand	Advertising on Facebook and YouTube	Primary data collection	Facebook and YouTube pages of popular food and beverage brands in New Zealand were selected based on information from Socialbakers (n=45) Numbers of page "likes" on Facebook and channel subscribers on YouTube were used as a measure of popularity Facebook posts of 45 companies over two months (October–November 2016) and YouTube channels of 15 companies over two years (2015–2016) were analysed	762 Facebook posts, 300 YouTube videos	Products analysed for frequency, nutritional quality (Ministry of Health Food and Beverage Classification System) and use of activities, promotional strategies (e.g. cartoons) and premium offers (e.g. competitions)	28% of Facebook posts were videos and 63% contained at least one occasional (i.e. unhealthy) food Promotional strategies were used in 41% of posts, with a famous sportsperson/team being the most frequently used Premium offers were used in 34% of posts, with competitions being the most frequently used It was estimated some posts could potentially reach 10% of New Zealand adolescents The 15 food brands selected posted about 300 videos on their YouTube channels About 84% of videos contained food marketing and 77% of products marketed were occasional Promotional strategies and premium offers were used in 61% and 24%

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Vassallo 2018 (28) Country: Australia	Instagram posts	Primary data collection	Food brands identified based on sales data and checked for the presence of an Instagram account. If the account had at least 100 000 followers (in November 2015), it was included in the study Final sample – 12 months of Instagram posts of 15 accounts from 15 March 2015 to 15 March 2016	Average of 245 Instagram posts per brand	Content analysis to investigate the frequency of images and videos posted by the most popular EDNP food and beverage brands on Instagram and the marketing strategies used in these images, including any healthy choice claims	Average of 245 Instagram posts per brand for the year Each brand used 6 to 11 different marketing strategies in their Instagram accounts There was a high level of branding, although not necessarily product information on all accounts, and there were very few health claims
Vilaro 2017 (89) Country: USA	TV ads	Primary data collection	32 hours of children's television programming (network and cable) broadcast in the North Central Florida area Time slots were recorded over four days in February 2013 and included Saturday between 7:00 hours and 12:00 hours and Wednesday and Friday between 8:00 hours and 12:00 hours Recording times fit the audience criteria of at least 25% of viewers between the ages of 2 and 11 years	155 food ads	Content analysis assessed overall ad exposure, the nutritional content of food ads using the United Kingdom NPM and assessed presence of persuasive techniques	Most food ads, 54.6%, represented unhealthy products and 95.48% of food ads contained at least one persuasive technique The number of persuasive techniques was not significantly different for healthy and unhealthy food ads, but food ads aimed at children used significantly more than those targeting adults Saturday morning children's programming showed significantly fewer food ads compared to weekday morning

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Watson 2014 (30) Country: Australia	TV ads	Secondary data obtained from Ebiqity (an independent monitoring company)	Three Sydney television channels during a two-week period, including one week of school term and one week of school holidays (11 July 2011 – 24 July 2011) Ads aired between 6:00 hours and 21:00 hours were analysed	1 733 food ads, 116 unique food ads	Foods categorized as passing or failing the nutrient profiling criteria (FSANZ) and compared to the criteria set by companies in the voluntary industry codes for marketing to children (the Responsible Children's Marketing Initiative)	Of the 116 unique food ads, 61% failed nutrient profiling and were considered "unhealthy" foods Of the ads that passed nutrient profiling, 64% were promoting core foods, while 93% of those that failed nutrient profiling were promoting non-core foods 63% of ads that met the nutrition criteria outlined in the grocery manufacturers' company action plans passed nutrient profiling Only one ad for fast food passed the fast food company criteria and nutrient profiling
Watson 2016 (29) Country: Australia	Sponsors of children's sport development programme websites	Primary data collection	Websites of junior development sport programmes associated with sporting organizations that received funding from the Australian Sporting Commission were analysed (n=56)	11 sponsors were food, beverage, alcohol or gambling companies	Food sponsors analysed for healthfulness and types of promotion Sponsors were considered unhealthy if they were alcohol or gambling companies or sold food and/or beverages that failed independent nutrition criteria Unhealthy food and/or beverage products were those that failed the nutrient profiling criteria used in the FSANZ Nutrition, Health and Related Claims Standard	4.5% of all sports sponsors were food, beverage, alcohol or gambling companies, of which 91% were unhealthy Surf lifesaving (n=4) and athletics (n=3) websites had the highest number of unhealthy sponsors Promotions associated with unhealthy sponsorship included logo placement on homepages (100%), naming rights (31%), logo on sport uniforms (27%) and branded participant packs (31%)

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<p>Weatherspoon 2013 (90) Country: USA</p>	<p>Advergames</p>	<p>Primary data collection</p>	<p>143 websites that marketed foods to children (aged 2–11 years) via advergames and had at least 30 visitors per month were assessed from August 2009 to July 2020</p>	<p>439 foods</p>	<p>Foods were classified as meeting or not meeting nutrition recommendations for the USDA, FDA, Center for Science in the Public Interest and the Institute of Medicine</p>	<p>Websites advertised 439 foods, with an average of 3.06 unique foods per advergame Proportions of meals and snacks meeting USDA and FDA recommendations were similarly low Inconsistencies in recommendations was evidenced by only a small proportion of meals and fewer snacks meeting the recommendations of all the agencies per their guidelines Most (65–95%) beverages advertised in advergames did not meet some of these recommendations</p>
<p>Wiggers 2019 (37) Country: Canada</p>	<p>Marketing and educational messaging across various media (including TV, digital and print media)</p>	<p>Primary data collection</p>	<p>An online survey was conducted between 6 November 2015 and 22 December 2015 with Canadian youth and young adults aged 12–24 years who were recruited from a national online panel</p>	<p>2 023 youth and young adults</p>	<p>Online survey in which respondents were asked about their exposure to energy drink marketing and educational messages that warn about the potential health risks of energy drinks</p>	<p>Over 80% of respondents reported ever seeing energy drink marketing through at least one channel, most commonly television (58.8%), posters or signs in a convenience or grocery store (48.5%) and online ads (45.7%) The mean number of marketing channels selected was 3.4 (SD = 2.9) out of ten Respondents aged 18–19 years (vs. 12–14 and 15–17) and 20–24 (vs. 12–14 and 15–17) reported seeing a significantly higher number of marketing channels Overall, 32% of respondents reporting ever seeing an educational message about energy drinks; the most frequently reported sources of exposure were at school (16.2%), online (15.0%), and on television (12.6%) Respondents aged 18–19 (vs. 12–14, 15–17 and 20–24) and 20–24 (vs. 15–17) were significantly more likely to report having seen an educational message</p>
<p>Zamora-Corrales 2019 (102) Country: Costa Rica</p>	<p>TV ads</p>	<p>Primary data collection</p>	<p>TV programming on four channels (two national and two cable) recorded for four weekdays and four weekend days, between 06:00 hours and 00:00 hours between September and November 2016 (n=288 hours of children's programming, 288 hours of family programming)</p>	<p>1 862 food ads</p>	<p>Examined the frequency and nutrient profile of products advertised (foods were classified into one of 17 food groups, and into permitted/non-permitted according to the WHO Regional Office for Europe NPM) and identified persuasive marketing techniques used</p>	<p>Mean (SD) food ads/hour was greater on cable than national channels (3.7 (0.4) v. 2.8 (0.4)) and during children's peak viewing hours (4.4 (0.4) v. 2.9 (0.3)) Of the food ads classified with the WHO Regional Office for Europe NPM (n=1 473, 71.1%), 91.1% were non-permitted to be marketed to children The food groups most frequently advertised were ready-made/convenience foods (16%), chocolates/confectionery/desserts (15%), breakfast cereals (14%), beverages (15%), edible ices (9%) and salty snacks (8%) Non-permitted food ads were more likely to use promotional characters, brand benefit claims, and nutrition and health claims than permitted food ads</p>

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Bernhardt 2013 (138) Country: USA	TV ads	Secondary data from an ad agency	All nationally televised ads for the top 25 quick service restaurants (based on Quick Service Magazine and system-wide sales were obtained from an ad agency from July 1 2009 to June 30 2010 (n=1 135)	92 unique quick service restaurant children's meal ads	Content coding (including visual and audio assessment) of branding, toy premiums, movie tie-ins, and depictions of food; ads advertising meals for children compared with adult ads from the same companies	Almost all of the 92 quick service restaurant children's meal ads that aired during the study period were attributable to McDonald's (70%) or Burger King (29%); 79% of 25 000 television placements aired on just four channels (Cartoon Network, Nickelodeon, Disney XD, and Nicktoons)  Visual branding was more common in children's ads vs. adult ads, with food packaging present in 88% vs. 23%, and street view of the quick service restaurant present in 41% vs. 12%.  Toy premiums or giveaways were present in 69% vs. 1%, and movie tie-ins present in 55% vs. 14% of children's vs. adult ads  The audio script for children's ads emphasized giveaways and movie tie-ins whereas adult ads emphasized food taste, price and portion size
Boylard 2012 (136) Country: United Kingdom	TV ads	Primary data collection	Popular national commercial television channels broadcasting children's/family viewing recorded on one weekday and one weekend day every month between January and December 2008 from 06:00 hours to 22:00 hours (n=5 233.5 hours)	18 888 food ads	Ads were coded for peak/non-peak children's viewing time, representation of core (healthy)/non-core (unhealthy)/miscellaneous foods, and use of persuasive appeals, premium offers, promotional characters (brand equity and licensed characters), celebrity endorsers and website promotion in food ads	Food ads were broadcast at an average rate of 3.6 per hour  Promotional characters, celebrity endorsers and premium offers were used more frequently to promote non-core than core foods, even on dedicated children's channels  Brand equity characters featured on a greater proportion of food ads than licensed characters  A food brand website was promoted in a third of food ads (websites are not covered by the statutory regulation on food advertising)

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Brady 2010 (129) Country: Canada	Websites sponsored by food manufacturers	Primary data collection	All food and beverage manufacturers participating in the Children's Food and Beverage Advertising Initiative were identified and a list of websites sponsored by each of these companies compiled through an examination of the outer packaging of their products	24 websites from 10 companies that promote food products to children	Sponsors of websites were coded for target market appeals, engagement, awareness, and influencing children's brand preferences and consumption norms	Of the 24 websites analysed, the majority targeted children below age 12 (83%) An array of innovative online marketing techniques, most notably free website membership (63%), leader boards (50%), advergames (79%), and branded downloadable content (76%), were used to encourage children's engagement with branded food and beverage promotions
Bragg 2013 (92) Country: USA	Athlete endorsements in TV ads, radio advertisements, and newspaper and magazine advertisements	Primary data collection	100 professional athletes were selected on the basis of their endorsement value and prominence in their sport; selection based on information from Bloomberg Businessweek's 2010 Power 100 database, and AdScope and Nielsen	62 advertised food products and 46 advertised beverages	Assessed the (1) prevalence of ads, (2) nutritional profile of foods (assessed using the United Kingdom NPM) and beverages (based on the percentage of calories from added sugar) and (3) youth exposure to athlete endorsements of foods	Professional athletes were associated with 44 different food or beverage brands during 2010. 79% of food products were EDNP, and 93.4% of beverages had 100% of calories from added sugar Adolescents saw more athlete endorsements of food than children

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Bragg 2016 (91) Country: USA	Ads featuring music celebrity endorsements	Primary data collection	A list of music celebrities associated with the 2013 and 2014 Billboard Hot 100 Chart was compiled. (n=163) Data on celebrity endorsements were gathered from official company websites, YouTube commercials, an advertising database, and media reports Teen Choice Award nominations (2000–2014) were used to measure the celebrities' popularity among adolescents	107 food endorsements	Determined the number and type of music celebrity endorsements, evaluated the nutritional quality of endorsed foods (using the United Kingdom NPM) and non-alcoholic beverages (based on calories from added sugar), and assessed how popular the music celebrities were among adolescents and the general public.	65 celebrities were collectively associated with 57 different food and beverage brands owned by 38 parent companies Of the 65 celebrities, 81.5% had ≥1 Teen Choice Award nomination 71% of non-alcoholic beverage references promoted SSBs 80.8% of the endorsed foods were EDNP
Castonguay 2013 (140) Country: USA	TV ads that feature trade/licensed characters familiar with children	Primary data collection	Children's programming aired between 7:00 hours and 22:00 hours on the most popular broadcast and cable channels during 2011 was sampled to form a composite weekday and weekend day; for each channel, 1 episode of every children's programme that aired on a weekday or Saturday was digitally recorded over a 3-month period (n=94.5 hours)	577 food ads	Assessed which foods were most frequently promoted to children in TV ads that featured trade or licensed characters, or health messages (present when a food was claimed to be healthy, physical activity was depicted, or the product was associated with fruit) A product's nutritional quality was determined using the United States Department of Health and Human Services' categorizations	Nearly three quarters (73%) of food ads targeting children used a familiar character The majority of these ads (72%) promoted foods of low nutritional quality, yet 53% employed a health-related message

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Castonguay 2015 (139) Country: USA	TV ads	Primary data collection	Programmes that were aired between 7:00 hours and 22:00 hours were selected; for each channel, a composite weekday and weekend day was collected such that one episode of each children's show that regularly airs on each of the networks sampled was digitally recorded once over a three- month period during each year (n=70.5 hours of children's programming in 2009 and 55 hours of children's programming in 2013)	534 food ads in 2009; 354 food ads in 2013	A content analysis examined depictions of physical activity in food advertising and compared food ads aired in 2009 and 2013; nutritional content was categorized according to its fit with an evaluative food rating scheme devised by the United States Department of Health and Human Services	The frequency with which physical activity was depicted in ads for high-sugar foods increased over time (6.6% of food ads in 2009, 20.1% in 2013) Sugared beverages, sugared cereal, restaurants/ fast food, sugared snacks, dairy products, and salty snacks, represented 90.4% of all food ads in 2009 and 93.5% of all food ads in 2013

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
<p>Chacon 2013 (146) Country: Guatemala</p>	<p>Packaging of foods sold in supermarkets</p>	<p>Primary data collection</p>	<p>All child-oriented snacks found in stores inside and within 200 square meters from four schools in an urban community (n=55 stores) were counted and purchased the first time they were found in a store and counted but not purchased when found in subsequent stores Snacks were classified as child-oriented if the package had any promotional characters, premium offers, children's television/movie tie-ins, sports references, or the word "child"; 2 334 snack food packages were counted of which 826 (35%) were child- oriented; of these, 106 were purchased and analysed</p>	<p>106 child-oriented packages</p>	<p>Quantified marketing techniques used in child- oriented snack food packages and classified healthfulness of product as "healthy" or "less- healthy" according to an NPM</p>	<p>Most snacks (97.1%) were classified as "less-healthy" The most commonly used technique was promotional characters (92.5%), of which 32.7% were brand- specific characters Premium offers were found in 34% of packages and were mostly for collectibles (50%) Most marketing techniques were located on the front and covered nearly 25% of the package surface Nutrition labels were found on 86% of packages and 41% had a nutrition-related health claim</p>
<p>Culp 2010 (147) Country: USA</p>	<p>Food industry branding strategies on websites promoted on children's TV networks</p>	<p>Primary data collection</p>	<p>Websites advertised during 17 hours of programming for each of two children's networks that aired from August 2006 through March 2007 (composite week composed of the 5 weekdays and 1 weekend day for each network over the 8-month time period) (n=290 web pages and 247 unique games on 19 internet sites)</p>	<p>99 food ads in which a company's website was promoted</p>	<p>Quantified the branding strategies and strategies to encourage children to explore and to extend their visit length used on food company websites and whether nutritional or physical activity promotion content was available to mitigate the effects of any unhealthful messages</p>	<p>Games were the most predominant promotion strategy used and were found on 81% of websites All games had at least one brand identifier, with logos used most frequently On average, websites contained 1 "healthful" message for every 45 exposures to brand identifiers</p>

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
De Iulio 2010 (144) Countries: France, Germany, Italy	Magazine ads	Primary data collection	Food ads that appeared from 1950 to 2005 in Le Journal de Mickey (France), Micky Maus (Germany) and Topolino (Italy) (the comics most read by French, Italian and German children) were sampled	A sample of 330 food ads from a total of 2 255 food ads	Socio-semiotic analysis of the discursive strategies and the elements of advertising language involved, including graphic composition (colours, lettering, layout), verbal language (slogans, headlines, body copy), visual language (design, photography, computer-generated graphics), and narrative structure	Advertising discourse targeting children emphasises the pleasure dimension of consuming foods, linking the products with fun and play; for adults, it emphasises taste, norms and expectations
Elliot 2012a (131) Country: Canada	Packaging of foods sold in supermarkets	Primary data collection	Child-targeted food products were purchased from two major grocery store chains which were the largest in terms of revenue and number of stores; data were collected over a 12-month period in 2009	354 child-targeted supermarket products	Content analysis assessed product packaging, marketing appeals, type, and nutritional quality (products were classified as of poor nutritional quality if more than 20% of their calories were derived from sugar)	Kellogg's was the dominant brand (approximately 8% of the sample) 64% of child-targeted foods were dry goods, of which 21% were fruit snacks, 19% were cookies/biscuits, and 14% cereal Approximately 9% of the products were directed solely at children; 10% were directed at teenagers; 27% might appeal to both children and teenagers, and 55% made a specific appeal to parents on the package

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Elliot 2012b (130) Country: Canada	Packaging of foods sold in supermarkets	Primary data collection	Child-targeted food products were purchased from two major grocery store chains which were the largest in terms of revenue and number of stores; data were collected over a 12-month period in 2009. Only "fun foods" were purchased for analysis, those that uniquely target children through the use of cartoon images, direct appeals to fun or play, the foregrounding of unusual shapes, colours or tastes.	354 child-targeted supermarket products, of which 82 were "better-for-you"	Content analysis assessed product packaging, marketing appeals, type, and nutritional quality (products were classified as products of poor nutritional quality if more than 20% of their calories were derived from sugar); the types of appeals of "better-for-you" packaged foods and regular child-targeted foods were compared	23% of the sample was classified as "better-for-you" due to the brand's emphasis on being "healthy," "natural," "organic" or "environmental" 91% of the "regular" child-oriented foods were HFSS, whereas only 65% of the "better-for-you" products were HFSS While "better-for-you" products fared better nutritionally (particularly for fat or sodium), high levels of sugar were evident in both categories
Gómez 2017 (11) Country: Argentina	TV ads	Primary data collection	Children's cable channels and children's TV programmes	100 food ads	A descriptive and cross-sectional study classified the healthfulness of products advertised according to the nutrient profiling system of FSA and the marketing techniques used (emotional appeal, product characteristics, visual elements, and sound and audio elements)	25% of the foods were categorized as healthy The most used marketing techniques were fun/happiness (83%), fantasy and imagination (59%), palatability (54%), cartoon or animated characters (55%), music/jingles (97%) and messages aimed at children (83%)

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Harris 2010 (93) Country: USA	Packaging and cross promotions in supermarkets	Primary data collection	On three occasions (February of 2006, 2007 and 2008) researchers visited one branch of a large supermarket chain and purchased all foods that included a cross-promotion on the package	397 food products, 296 separate promotional agreements	Product packaging and cross promotions categorized by promotional partner, food category, targeted age group, promotion type, product nutrition (classified as either "healthy" or "unhealthy" based on Nutrition Standards for Foods in Schools guidelines developed by the Institute of Medicine), and company policies on marketing to children	The number of products with youth-oriented cross-promotions increased by 78% from 2006–2008 Overall, 71% of cross-promotions involved third-party licensed characters and 57% appealed primarily to children under 12 years of age Only 18% of products met accepted nutrition standards for foods sold to youth, and nutritional quality declined during the period examined Food manufacturers with policies limiting marketing to children represented 65% of all youth-oriented cross-promotions, their use of cross-promotions increased significantly, and the nutritional quality of their products did not improve Some media companies did reduce the use of their properties on food promotions
Horta 2018 (145) Country: Brazil	Facebook brand pages of UPF	Primary data collection	Sixteen UPF brand pages on Facebook selected from 250 pages that were the most liked by Brazilians (234 pages were excluded because they related to other products); data collected for one month, from 23 September to 23 October 2015	Sixteen UPF brand pages	The number of posts, likes, "shares", and "comments", and the mean number of likes, shares and comments per post were collected and fifteen marketing techniques used by brands in the year from September 2014 to October 2015 were analysed	Among the ten Facebook pages most liked by Brazilians, two are UPF brands: Coke (93 673 979 likes) and McDonald's (59 749 819 likes) Regarding the number of people talking about the pages, McDonald's led with 555,891 commentaries All pages used marketing techniques, which included photos, user conversations, presence of brand elements and links Videos were observed on 93.8% of the pages; promotions on 68.8%; and celebrities on 62.5%

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Jiménez-Morales 2019 (133) Country: Spain	TV ads	Primary data collection	Food ads most viewed by children aged 4–12 years identified through Kantor Media, Infoadex Mosaico	100 campaigns	Mixed method study integrating quantitative techniques to analyse audiences and qualitative ones to study the advertising discourse used in low nutritional value food campaigns in relation to the PAOS Code	Low nutritional value product advertising focuses its discursive strategy on words and semantic fields linked to happiness, action, fun
Kontsevaya 2020 (117) Country: Russian Federation	TV ads	Primary data collection	The 5 most popular TV channels among children and adolescents (under 16 years of age) were recorded for two weekends and two weekdays between 6:00 hours and 22:00 hours during March–May 2017 (n=320 hours)	2 247 food ads	Quantified frequency, healthfulness and promotional techniques of food ads, which were categorized by food categories and as “permitted” or “not permitted” for advertising to children in accordance with the WHO Regional Office for Europe NPM	The most common food categories advertised were beverages (except juices, milk drinks and energy drinks) (24.1%); yoghurts and other dairy foods (15%); and chocolate and confectionery (12.3%) A majority (64.2%) of food and drink products advertised would not be permitted for advertising to children according to the WHO Regional Office for Europe NPM The most frequently used persuasive appeals in the food ads were low price (15.4%), product novelty (11.8%) and enjoyment (10.0%)

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Lee 2014 (94) Country: USA	Point-of-purchase marketing in restaurants (food products available, pricing, promotion and placement of restaurants)	Primary data collection	All restaurants within an 800-meter radius of 13 public housing developments and 4 comparison neighbourhoods were audited; data were collected between March 2003 and March 2004	136 restaurants were assessed, including 61 fast food restaurants and 72 table service restaurants	The Restaurant Assessment Tool measured the food product itself, pricing, promotion and placement of restaurants; the availability and price of healthy beverages, the ratio of healthy to total entrées and obesogenic promotion materials were compared by restaurant type and neighbourhood type (e.g. lower SES vs. higher SES)	Restaurants in public housing development neighbourhoods had fewer healthy entrées than comparison neighbourhoods Fast food restaurants had cheaper beverages and more children's meals, supersize drinks, free prize with purchase, supersize items, special characters, and more items geared to driving than table service restaurants
Leon-Flandez 2018 (134) Country: Spain	TV ads	Primary data collection	Five TV channels with the highest child-audience ratings (under 12 years) were recorded over 7 days during a child-audience time slot (8:00 hours to 22:00 hours) plus the 22:00 hours to 00:00 hours time slot from January to April 2012 (n=420 hours)	4 212 food ads, of which 2 582 were targeted at children	Primary appeal, persuasive and nutritional marketing techniques, and links to Internet were recorded and foods classified according to their nutritional quality using an international codification system (core and non-core) and the United Kingdom NPM	The primary persuasive appeals used in child targeted food ads were taste (36.1%), fun (28.3%) and health/nutrition (19.8%) Persuasive and nutritional marketing techniques and links to Internet were used in 61%, 68.5% and 65.2% of ads, respectively; these techniques were more common during weekdays, enhanced protection time slots and on channels with particular appeal to children and more than two thirds of food ads using these techniques were for unhealthy products

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Mazariegos 2016 (105) Country: Guatemala	Fast food restaurant ads (toy giveaways, time to delivery and price incentives)	Primary data collection	Meals from one restaurant (conveniently selected) from each of the 6 major fast food chains in Guatemala City that offered children's combo meals (purchased between 12:00 hours and 15:00 hours over a 2 week-period)	A total of 114 combo meals	Assessment of the frequency of lunch combo meals and those that were child-oriented; comparison of the nutritional quality of combo meals with and without health claims (classified as "healthy" or "less healthy" using the United Kingdom NPM); comparison of toy giveaways and price incentives	Of 114 combo meals, 18.4% were children's combo meals Five children's combo meals (24%) had nutrition information, all of which were classified as "less healthy", and three had a health claim On average, children's combo meals were US\$1.93 less expensive than purchasing children's meal items individually Time to delivery was 1.44 minutes faster for children's combo meals compared to purchasing meal items individually
Mediano Stoltze 2018 (132) Country: Chile	Packaging of foods sold in supermarkets	Primary data collection	Photographs of beverages in six urban supermarkets (representing five different supermarket chains) in Santiago taken between February and April 2015	1 005 beverage packages	Content analysis for use of a variety of child-directed, health-oriented and other marketing strategies (e.g. sales promotions), with analysis by product category, total sugar content, energy content and tax status (beverages with added sugars are taxed at different rates)	Beverages using child-directed characters or nature/fruit references were higher in total sugar and energy than beverages not using these strategies Of the beverages taxed at the highest rate (greatest amount of added sugars), 49% used nutrition and health appeals and 80% used nature or fruit appeals Plain waters and plain milks were less likely than other selected product categories to use health-oriented appeals or multiple front of packaging strategies in combination

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Pavleen 2013 (148) Country: India	Packaging	Secondary data informed by a prior phase of study	Brands were selected using proportionate sampling from the reported frequencies of purchasing by mothers in a prior phase one of the study; data collected from food packages	107 food packages	Analysis of product packages of brands for use of marketing tactics (e.g. including bright colours, spokes/cartoon characters, cartoonish scripts/ crayoned fonts, discounts and premiums)	Of the packaged foods, 22.4% were confectionery, 22.4% baked foods, 5.6% ready-to-cook foods, 24.3% snacks, 17.8% beverages and 7.5% ice creams Most of the marketers used at least one promotional element on food packages to attract children; 77.6% used bright pack colours, 71% used captions about flavour, and 31.8% used nutrition claims Indian and multinational companies differed with respect to use of "cartoonish scripts or crayoned fonts" and "nutritional claims"; no significant differences were observed for the use of other strategies
Perry 2018 (147) Country: Guatemala	Packaging of foods sold in supermarkets	Primary data collection	Child-oriented ready-to-drink fruit drinks, milks and carbonated beverages (purchased from three convenience stores and one supermarket in Guatemala City in January 2016)	89 beverages	Assessment of front-of-package marketing strategies (spokes-characters, cartoons, celebrities, or health-related images) and classification of beverages as healthy or less healthy according to the United Kingdom NPM	Most beverages were fruit drinks (58%), milk (17%), carbonated beverages (17%), rice/soya products (6%), water (1%) and energy drinks (1%) 64% of beverages had health claims Of beverages with a nutrition facts label (96%), nearly all (89%) were classified as less healthy There was no association between the presence of health claims and NPM score
Pettigrew 2012 (127) Country: Australia	TV ads	Secondary data (data purchased from a leading Australian media monitoring agency)	All food ads screened on the four national commercial free-to-air television stations with both analog and digital signals were captured between 1 September 2010 and 31 October 2010, providing 61 days of continuous data	93 284 food ads	Measured the use of negative themes and the emotional use of food in food ads and coded food ads for healthiness according to the Australian Guide to Healthy Eating (core or non-core)	16% of ads contained negative themes, with mood enhancement and food craving being the most commonly depicted negative themes Ads with negative themes were more likely to be for non-core foods and to be aired during children's popular viewing times than at other times

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
<p>Piaggio 2017 (126) Country: Argentina</p>	<p>Packaging of foods sold in supermarkets</p>	<p>Primary data collection</p>	<p>Convenience sample of food products collected in supermarkets in May 2016. Food products included grocery, dairy, frozen foods, beverages and refrigerated products, categorized as "fun foods", based on packaging</p>	<p>95 food products</p>	<p>Identified food and beverage products targeting children in supermarkets and characterized the advertising via packaging, and analysed nutritional composition using the WHO/PAHO NPM</p>	<p>The most widely used advertising technique was the inclusion of fictional characters, either of the own brand or of cartoons and children's films Almost half of the products included games in the package itself or links to web pages to access online games or raffles All the products were "ultra-processed", 97% of which had an inadequate nutritional composition according to the WHO/PAHO NPM. Nutritional claims were used in a high proportion</p>
<p>Prell 2011 (135) Country: Sweden</p>	<p>TV ads</p>	<p>Primary data collection</p>	<p>Television broadcasting recorded during peak viewing times of children aged between 3 and 12 years on the most popular children's commercial channels for two weekdays between 17:00 hours – 22:00 hours and two weekend day between 7:00 hours – 10:00 hours in November 2007. In total 66 hours of television recordings were available.</p>	<p>82 food ads of which 58 ads using a health discourse</p>	<p>Health messages in ads during children's peak viewing times were analysed by examining how food is articulated in the health discourse using "discourse theoretical tools"</p>	<p>Health messages were found to be salient features in TV food ads and health arguments are used with all type of foods, including in "low nutrient foods that are high in fat, sugars and sodium". Physical, mental and social health aspects were present in 71% of the ads Three health discourse types were defined: 1) medical (food as protection and treatment), 2) hedonic (food as feeling good) and 3) social (food as caring)</p>

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Pulker 2018 (128) Country: Australia	Packaging	Primary data collection	Packaging information from five high-market-share food manufacturers and one retailer (obtained from supermarket and manufacturers' websites)	230 packaged foods, of which 215 were UPF	Examination of ingredients lists for the presence of added sugar; classification of the extent of food processing using the NOVA <sup>a</sup> system; categorization of packaging information using a taxonomy of nutrition and health information; assessment of compliance of statements and claims with the Australia New Zealand Food Standards Code and with Health Star Ratings	94% of products were classified as UPF Almost all UPF (95%) contained added sugars, which were described in 34 different ways 56% of UPF had nutrition claims (18% of which were compliant with regulations); 25% had health claims (79% of which were compliant); and 97% employed common food marketing techniques Packaging of 47% of UPF was designed to appeal to children
Song 2014 (142) Country: USA	Packaging of foods sold in supermarkets	Primary data collection	Comprehensive list of all cereals available for purchase in three branches of a large mainstream urban grocery store based on store visits	127 cereal boxes	Classification of cereals as either child targeted or adult-targeted; coding for presence of health-related textual messages, non-health related textual messages, and graphical elements; and calculation of nutrient profiling index scores	69% of cereal packaging was adult targeted and 31% child targeted Adult-targeted cereal featured significantly more well-being statements than child-targeted cereal The majority of child-targeted cereals featured engagement activities such as games and contests (66.7% on the back and 15.4% on the side panel), while almost no adult-targeted cereals used either the back panel (2.3%) or side panel (0%) for similar purposes The majority of child-targeted cereals (66.7%) showed artificially coloured or sweetened cereals compared with only 12.5% of adult-targeted cereals Adult-targeted cereals were healthier, based on nutrient profiling index scores, (mean = 52.59, SD = 9.67) than child-targeted cereals (mean = 46.65, SD = 12.71)

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Soni 2014 (149) Country: India	TV ads and brand sponsorship of programmes	Primary data collection	Programmes and ads aired on five popular children's networks were recorded from 9:00 hours to 21:00 hours for ten weekdays and weekends each	114 food ads	Content analysis of TV programmes and food ads broadcast on children's networks to identify the nature of themes/appeals used in food ads with segmentation of ads on the basis of target audience (child/adult)	61% of food ads targeted child audiences and 39% general audiences Child-targeted food ads included confectionery (16.7%), ice creams and dairy products (10.5%), baked products (14.9%) and ready-to-cook food items (12.3%) Grazing was the most frequently used appeal in all food ads (82.5%) 66.7% of all food ads did not feature any health-related message
Trujillo-Espino 2018 (150) Country: Peru	Packaging of foods sold in supermarkets	Primary data collection	Packaging of food products aimed at children (non-alcoholic beverages, baking products, cereals, candies and snacks) Data were collected from three supermarkets and two markets in Lima between May and June 2016	346 food products	Cross-sectional assessment of the relationship between nutritional content and promotional techniques used on the packages of products targeted at children; nutritional content was classified based on the traffic light system of the FSA and the FAO while promotional techniques were classified based on a Consumers International classification	32.7% of products were candies, 26.6% baking products, 15.6% non-alcoholic beverages, 15.0% cereals, and 10.1% snacks 96.7% of products were classified as unhealthy On average, products used 2.9 (SD: 1.2) promotional techniques There were positive linear relationships between the number of promotional techniques used and calorie, sodium and carbohydrate contents

Study details	Marketing medium	Data source	Sample characteristics	Sample size	Study design	Key findings
Whalen 2018 (137) Country: United Kingdom	TV ads	Primary data collection	Television recordings from commercial channels with the greatest viewing share for children aged 4–15 years/5–16 years recorded on one weekday and one weekend day from 06:00 hours to 22:00 hours over 12 months of 2008 and six months of 2010 (n=5 233.5 hours from 2008 and 1 931.5 hours from 2010)	2008: 18 888 food ads 2010: 6 664 food ads	Coding and analysis of food ads in channels popular with children to explore depictions of physical activity and use of health-claims and themes (for unhealthy, healthy and miscellaneous products) with measurement of differences across channel types, viewing times and health-related messages over time to identify any changes following legislative action	18.8 percentage point increase in physical activity depiction in food ads from 2008 (4.4%) to 2010 (23.2%) In 2010, 81.1% of food ads depicting physical activity were for non-core foods 4.1 percentage point increase in appearance of health claims in food ads from 2008 (20.7%) to 2010 (24.8%) In 2010, 58.3% of food ads featuring health claims were for non-core foods In 2010, health-related appeals were used in 17.1% of food ads during peak child-viewing times and 33.0% of food ads shown during peak child-viewing times on dedicated children's channels
Wicks 2009 (143) Country: USA	TV ads	Primary data collection	Pooled sample of programmes, including those that are child-rated and those targeting general and "mature audiences" collected from November 2004 to February 2005 and from January to May 2006 from seven broadcast television networks and two cable networks recorded from 14:00 hours to 22:00 hours (n=504 hours of programming for each year)	3 893 food ads	Content analysis of emotional appeals, production techniques, and types of disclaimers (defined as the first disclaimer presented simultaneously in the ad's audio and visual portions) appearing in food television ads	The most frequently advertised food categories in the sample were pizza/fast food (27.92%), sweets (15.16%), breakfast foods (14.44%), family restaurants (9.25%), and convenience meals/entrees (7.89%); fruits/vegetables were the least frequently advertised category (0.4%) More emotional appeals and production techniques were used in ads appearing in child-rated programmes (mean = 2.703, SD = 1.20) than general or mature audience programmes The most frequently used appeals in ads with dual-modality disclaimers in child-related programmes were taste/flavour (37.6%), action/adventure (10.5%), trickery/deceit (10.2%), speed/strength (9.1%), mood alteration (8.9%), and premium offers (6.8%)

- EDNP: energy-dense, nutrient-poor; EU: European Union; FAO: Food and Agriculture Organization of the United Nations; FSA: Food Standards Agency; FSANZ: Food Standards Australia New Zealand; GIS: geographic information system; HEFSS: high in energy, saturated fats, sugars and/or salt; HFSS: high in fat, sugar and salt; INFORMAS: International Network for Food and Obesity/Non-communicable Diseases Research, Monitoring and Action Support; NPM: nutrient profile model; PAHO: Pan American Health Organization; PUPF: processed and ultra-processed foods; SES: socioeconomic status; SSBs: sugar-sweetened beverages; UPF: ultra-processed foods; USDA: United States Department of Agriculture; WHO: World Health Organization
- <sup>a</sup> NOVA is a food classification that categorizes foods according to the extent and purpose of food processing, rather than in terms of nutrients.
- <sup>b</sup> Source: Busse P, Díaz R What are the television viewing and eating habits of children in Peru? *Global Health Promot.* 2014;23 (1):50–60. doi:10.1177/1757975914547923.
- <sup>c</sup> Sources: Busse, 2016 (115) and CONCERTV. Estudio cuantitativo sobre consumo televisivo y radial en niños, niñas y adolescentes. [Quantitative study on television and radio use among children and adolescents.] Consejo Consultivo de Radio y Televisión. 2014 (<http://www.concertv.gob.pe/investigacion/estudios-cuantitativos/2014-estudio-cuantitativo-sobre-consumo-televisivo-y-radial-en-ninos-ninas-y-adolescentes/>, accessed 16 November 2021).
- <sup>d</sup> Ramírez-Ley K, De Lira-García C, de las Cruces Souto-Gallardo M, Fernanda Tejeda-López M, Castañeda-González LM, Bacardi-Gascón M et al. Food-related advertising geared toward Mexican children. *J Public Health.* 2009;31 (3):383–388. doi.org/10.1093/pubmed/fdp058.
- <sup>e</sup> Hurwitz LB, Alvarez AL, Zupancic H, Rouse TH, Morales E, Lauricella AR et al. Content analysis across new media platforms. In: Exposure, engagement, creation, and interaction: Measuring young people's media behaviors in the digital era. San Juan, Puerto Rico: Symposium conducted at the International Communications Association Conference. 2015.
- <sup>f</sup> Owned media is marketing content owned by an individual, paid media is content that has been paid for in order to reach an audience and earned media is content that has been created by others (e.g. reviews and posts).

Annex 2: Consumer research: Associative effects

Study details	Study population characteristics	Media	Sampling procedure	Study design	Outcome(s) of interest	Outcome measurement	Key findings
Zimmerman 2010 (156) Country: USA	Number: 2 037 Gender: mixed but exact proportions not reported Age: 0–12 years BMI/weight status: not reported SES: not reported but model adjusted for mother's education Ethnicity: not reported but model adjusted for child ethnicity	TV	Panel survey	Questionnaire and time use diary data from two time points used to regress BMI z-scores on TV viewing, sociodemographic variables, mother's BMI and BMI from time 1	BMI z-score change	Parent-reported child height and weight	In children $\leq 6$ years, commercial TV viewing at time 1 significantly associated with BMI at time 2 In children $> 6$ years, commercial viewing at time 2 associated with BMI at time 2 Results remained robust after additional adjustment for example for exercise and eating while watching TV
Al-Jaaly 2016 (155) Country: Saudi Arabia	Number: 1 519 Gender: 100% girls Age: 13–18 years BMI/weight status: not reported SES: not reported Ethnicity: not reported	TV ads	Subjects selected at random from 20 schools (middle and secondary) in the city of Jeddah	Cross-sectional survey used to assess the effect of media advertising on eating behaviours	Dessert consumption How often respondents joined their families to go food shopping Practice of following a food diet Whether or not respondents believed that television advertising influences their eating habits	Self-report	Significant correlation between dessert consumption and the belief that advertising exposure had a negative effect on their nutritional habits ( $p = 0.035$ ) Respondents who recognized the negative impact of food ads on their food behaviour rarely joined their families to go food shopping Strong correlation between the practice of following a food diet and belief in the effect of advertisements when exposed to them

Study details	Study population characteristics	Media	Sampling procedure	Study design	Outcome(s) of interest	Outcome measurement	Key findings
Bacardi-Gascón 2013 (164) Country: Mexico	Number: 721 mothers; number of children not reported, but 421 children had their weight measured Gender: 100% female (all mothers); 52% of children weighed were girls Age: mothers: mean age 29 years (range, 19–51 years); children: mean age 49 months (SD, 18) BMI/weight status: mothers: 34% overweight, 27% obese; children: 20% at risk of overweight, 11% overweight, 10% obese SES: 71% of households had less than 500 dollars of monthly income Ethnicity: not reported	TV ads	Women with children under 6 years of age were recruited at education and health facilities	Cross-sectional survey used to examine the relationship between mean consumption of advertised foods and the frequency of broadcasted advertising (measured separately for both mothers and children)	Frequency of consumption of advertised food by mother and child and TV ads	Self-report/parent-report for children	Positive association between children's weekly mean consumption of advertised food and the frequency of broadcast food advertising ( $r=0.79$ , $p < 0.001$ )

Study details	Study population characteristics	Media	Sampling procedure	Study design	Outcome(s) of interest	Outcome measurement	Key findings
Baldwin 2018 (151) Country: Australia	Number: 417 Gender: 53.0% girls Age: 10–16 years BMI/weight status: not reported SES: socioeconomic advantage measured using residential postcode: 115 most disadvantaged, 187 middle, 115 least disadvantaged Ethnicity: not reported	Social media	Sample quotas used based on age, sex and SES	Linear regression conducted to measure any association between social media behaviours and food/drink scores after controlling for age, sex and SES	Social media and food/beverage intake	Social media questions: frequency of checking Facebook and YouTube; if participants had; ever "liked" food/ drink companies/ brands on Facebook; shared food/drink brand content on social media; ever entered a competition sponsored by a food/drink brand on social media Frequency of food/ drink intake was dichotomised into "less than weekly" and "at least weekly" Unhealthy food and drink scores were calculated by allocating 1 point for every unhealthy food/ drink consumed at least weekly	Children who watched brand videos had greater combined unhealthy food and drink scores than those who did not ( $\beta=0.80$ , $p=0.003$ ) Seeing advertisements for favourite foods was associated with greater combined unhealthy food and drink scores ( $\beta=0.86$ , $p=0.015$ ) Children who ordered food online had greater combined unhealthy food and drink scores than those who did not ( $\beta=0.71$ , $p=0.009$ )

Study details	Study population characteristics	Media	Sampling procedure	Study design	Outcome(s) of interest	Outcome measurement	Key findings
Beaudoin 2014 (157) Country: USA	Number: 1 436 Gender: 49.2% boys Age: 13–17 years BMI/weight status: mean BMI 22.02 kg/m <sup>2</sup> (SD, 5.08) SES: parental education report – 0.1% kindergarten, 0.3% elementary school, 4.9% middle school/junior high school, 31.6% high school, 24.6% junior college/two-year degree, 24.6% four-year college degree, 10.2% master's degree, 2.1% doctoral degree Ethnicity: 65.9% White, 13.3% Black, 13.9% Hispanic, 4.0% Asian, 2.9% other	TV, video games, internet	Survey Sampling International provided the survey sample; stratified random sampling was used to approximate the United States census for the study's population	Cross-sectional survey used to measure descriptive norms, advertising exposure and attention, and unhealthy food consumption	Descriptive norms (family, close friends and student norms), advertising exposure and attention for four unhealthy food contexts	Self-report	Advertising exposure was positively associated with descriptive student norms Advertising attention was positively associated with descriptive family, close friend and student norms
Buchanan 2017 (152) Country: Australia	Number: 60 Gender: 45% males Age: 18–24 years, mean 20 years BMI/weight status: not reported SES: not reported but majority had an education level of bachelor's degree (38 out of 60) Ethnicity: not reported	Internet, social media	Recruited participants through flyers handed out in university lectures and community colleges, at bus-stops, community centres, local sports clubs and a local theme park; through social media; and by snowball sampling	Pre-test post-test experimental study Experimental group was exposed to two energy drink websites and social media sites while the control group was exposed to two nut bar brand websites and social media sites Participants were asked about their consumption intentions of energy drink and nut bar products before and after exposure	Whether or not participants selected an energy drink or nut product from a range of food and drink items	Self-report	Participants in the exposure condition had significantly enhanced intention to consume energy drinks at post-test Control group participants had enhanced intentions to consume nut bar products post-test

Study details	Study population characteristics	Media	Sampling procedure	Study design	Outcome(s) of interest	Outcome measurement	Key findings
Buchanan 2018 (153) Country: Australia	Number: 359 Gender: not reported, but mixed Age: 18–24 years BMI/weight status: not reported SES: mainly from middle-socioeconomic backgrounds Ethnicity: not reported	Digital marketing, other marketing (broadcast, print media, in-store, sponsorship, endorsement)	Recruited young adults aged 18–24 years through ads in lectures and student online learning platforms at a university in New South Wales, and through distribution of flyers at a community college, library, youth centre, community centre, sports clubs, and a shopping centre	Cross-sectional questionnaire recorded exposure and engagement with marketing activities of energy drinks to regress on energy drink use. Attitudes toward, subjective norms about, and perceived behavioural control over energy drink use were included as mediators to see whether they mediated the association between digital marketing engagement and energy drink use	Energy drink use; categorized as energy drink “users” and “non-users”	Self-report	After controlling for covariates (age, sex, SES, student and work status, and perceived significant others’ acceptance of their energy drink use), engagement with digital marketing significantly increased the likelihood of consuming energy drinks (OR=1.47 [95% CI, 1.02–2.10, p=0.04], while exposure to digital marketing did not (OR=1.08; [95% CI, 0.67–1.75], p=0.78). Attitudes, subjective norms and perceived behavioural control all significantly mediated the association between digital marketing engagement and energy drink use
Díaz-Ramírez 2013 (165) Country: Mexico	Number: 365 mothers and children Gender: children: not reported Age: mothers: not reported; children: 8 months–5 years BMI/weight status: not reported SES: not reported Ethnicity: not reported	TV	Mothers of children aged 8 months to 5 years recruited at education and health facilities participating in the study (sampling procedure not reported)	Cross-sectional study to assess the association between TV ads aired, foods consumed by mothers and their children and BMI using structured interviews with mothers and recordings of two national broadcast channels between June and October 2011.	Frequency of foods advertised on TV and frequency of consumption of those foods in both mothers and children	Interview responses	Significant positive correlation between frequency of foods advertised on TV and consumption of those foods by children (r=0.66, p=0.0001)

Study details	Study population characteristics	Media	Sampling procedure	Study design	Outcome(s) of interest	Outcome measurement	Key findings
Friedman 2018 (158) Country: USA	Number: 1 220 Gender: 100% boys Age: 11–16 years, mean 13.9 years (SD, 0.06) BMI/weight status: not reported SES: not reported Ethnicity: 68.2% non-Hispanic White, 16.2% non-Hispanic Black, 2.8% non-Hispanic other, 5.3% non-Hispanic multiracial, 4.7% Hispanic/Latino, 2.8% don't know/refused	Print media ads	Baseline data from a prospective cohort study	Participants were shown ads for non-alcoholic beverages which contained different themes – sporting venue, sex appeal, femininity, masculinity, athleticism, presence of tobacco/drink and were asked to rate their attitudes towards the ads they had been shown	Attitudes towards advertisements	Enjoyable, likable and appealing ratings were measured; ratings as being zero or greater than zero	For non-alcoholic beverages, sex appeal resulted in lower percentage of non-zero attitudes and sports themes resulted in a significantly higher percentage of non-zero attitudes
Jilani 2018 (160) Countries: Belgium, Cyprus, Estonia, Germany, Italy, Hungary, Sweden	Number: 1 407 Gender: 51% boys Age: 6–11.8 years, mean 8.8 years (SD, 1.1) BMI/weight status: 22.4% overweight/obese SES: 5.5% low education, 42.9% medium education, 51.6% high education (highest level attained) Ethnicity: not reported	Non-specific advertisements	Participants recruited as part of the IDEFICS (Identification and prevention of Dietary and lifestyle health Effects In Children and infantS) multicentre study	Using questionnaires, parents were asked whether they “trust in products that they know from advertisements” and completed food frequency questionnaires for their children’s diet	Parental consumer attitudes, children’s taste preferences towards sweet, fat or umami foods, and children’s food consumption of sweet and fatty foods and beverages	Children reported taste preferences for sweet, fat and umami tastes Parent reported to what extent they trusted advertised products, and completed a food frequency questionnaire for their children’s diet	No association between trusting ads and children’s sweet, fat or umami taste preferences Non-significant association between trusting ads and children’s sweet and fatty food and beverage consumption ( $\beta=0.97$ ; 95% CI, 0.45–2.40) Significantly higher frequency of consumption of processed foods in children whose parents trust ads than in those whose parents do not ( $\beta=1.21$ ; 95% CI, 0.49–1.93)

Study details	Study population characteristics	Media	Sampling procedure	Study design	Outcome(s) of interest	Outcome measurement	Key findings
Lioutas 2015 (154) Country: Greece	Number: 211 Gender: 49.3% boys Age: 6–12 years, mean 8.79 years (SD: 1.75) BMI/weight status: not reported SES: parental education – 31.9% post-secondary education, 42.9% secondary education Ethnicity: not reported	Non-specific ads	Random sample of elementary schools in the region of Thessaly, stratified by geographical area within the region	Children were clustered into three groups: unhealthy eaters, healthy lifestyle followers, and children with obesity using questionnaire responses Children also answered how frequently they consume unhealthy foods and answered questions regarding their attitudes towards food ads	Frequency of consuming unhealthy foods and children's response to food advertising	In the advertising questionnaire, children's responses to questions about their attitudes to food advertising was scored on four factors: "motivational factor", "psychological factor", "entertainment", and "understanding of persuasive intent"	Frequency of unhealthy eating for unhealthy eaters is influenced by entertaining attributes of ads For obese children, motivational strength of ads predicted unhealthy food consumption ( $\beta=0.45$ , $p=0.025$ ) For healthy lifestyle followers, unhealthy food consumption was higher for those with little understanding of advertising's persuasive intent ( $\beta=0.21$ , $p=0.028$ )
Malik 2012 (163) Country: India	Number: 200 Gender: 34.5% boys Age: 7.5% <25 years, 27.5% 25–30 years, 27.0% 30–35 years, 38.0% >35 years BMI/weight status: not reported SES: household income – 13.5% 1–3 Lakh, 43.0% 3–5 Lakh, 14.0% 5–8 Lakh, 29.5% ≥8 Lakh Ethnicity: not reported	Non-specific ads	Stratified non-probability sampling from the National Capital Region and Jaipur	Questionnaire used to assess parents' perceptions of child-directed food advertising practices	The relationship between key factors for choosing food for children (brand, price, taste, nutrition) and household income The relationship between the gender of the respondent and the perception that too much advertising is directed towards children	Self-reported choice of key factors for choosing food for children, household income, gender	No significant relationship between the key factors of importance for purchasing food items for children and household income No significant relationship between gender of the respondent and the perception that too much advertising is directed towards children
Olivares 2011 (162) Country: Chile	Number: 1 048 Gender: 53% boys Age: 8–13 years, mean 11.9 years BMI/weight status: not reported SES: mixture of middle-high and middle-low SES Ethnicity: not reported	TV and other media	Respondents were taken from three cities: Arica, Santiago and Chillán In each city, 150 schoolers of middle-high SES and 150 of middle-low SES were sampled	Cross-sectional survey used to assess children's attitudes towards food and beverage advertising	Proportion of students who like food and drinks shown in TV ads	Self-reported preferences	Among middle-low SES participants, a greater proportion of students from Santiago liked food and drinks ads they watched on TV compared with students from other cities while no such effect was observed among in middle-high SES participants

Study details	Study population characteristics	Media	Sampling procedure	Study design	Outcome(s) of interest	Outcome measurement	Key findings
Tavares 2016 (161) Country: Brazil	Number: 294 Gender: not reported Age: 12 years BMI/weight status: not reported SES: not reported Ethnicity: not reported	TV	Not reported	Cross-sectional observational study to assess the influence of TV advertising on the prevalence of dental caries	Amount of time spent watching TV (specifically whether respondents watched commercial TV channels and whether they watched TV between 9:00 hours and 12:00 hours) Prevalence of dental caries	Responses to a structured questionnaire Self-reported TV viewing time and prevalence of caries	Those who watched commercial TV channels were 1.73 (95% CI, 1.00–3.02; p=0.051) times more likely to have caries Those who watched TV between 9:00 hours and 12:00 hours were 1.66 times more likely to have caries but this was non-significant (95% CI, 0.95–2.90; p=0.077) Positive correlation between time spent watching TV and prevalence of caries
Thai 2017 (159) Country: USA	Number: 1 384 Gender: 49.8% boys Age: 13.2% 12 years, 20.3% 13 years, 17.3% 14 years, 17.4% 15 years, 19.7% 16 years, 12.1% 17 years BMI/weight status: 4.2% underweight, 67.7% healthy weight, 15.7% overweight, 12.4% obese SES: parental education – 1.5% less than a high school degree, 16.5% a high school degree or GED, 35.4% some college but not a college degree, 46.7% 4-year college degree or higher Ethnicity: 65.6% non-Hispanic, 9.8% Hispanic, 19.9% non-Hispanic Black, 4.7% other	TV, magazines, radio, internet and billboards	Panel survey	Cross-sectional survey measured perception of and trust in food advertising, sociodemographic variables and frequency of consumption of EDNP foods, to assess whether perception towards and trust in food advertising predicts consumption of EDNP foods	Daily frequency of consumption of EDNP foods and drinks	Self-report over the last 7 days	As positive perceptions of food advertising increased, daily frequency of consumption of EDNP foods and drink increased ( $\beta=0.10$ , $p<0.01$ ) Greater levels of trust in food advertising associated with greater daily frequency of consumption of EDNP foods and drinks ( $\beta=0.08$ , $p=0.01$ )

Study details	Study population characteristics	Media	Sampling procedure	Study design	Outcome(s) of interest	Outcome measurement	Key findings
Tokuç 2009 (166) Country: Turkey	Number: 1 018 Gender: not reported; Age: not reported; conducted in primary schools BMI/weight status: not reported SES: not reported Ethnicity: not reported	Brand logos (media not specified)	Not reported	Cross-sectional study to assess food knowledge and preferences, ability to recognize brand logos and nutritional habits of the participants	Brand logo recognition score, eating behaviours, food knowledge	Not reported	Correlation between higher brand logo recognition and poorer eating behaviours and food knowledge

BMI: body mass index; CI, confidence interval; EDNP: energy-dense, nutrient-poor; OR, odds ratio; SD, standard deviation; SES: socioeconomic status

**Annex 3: Consumer research: Qualitative effects**

Study details	Study population characteristics	Sampling procedure	Study design	Outcome(s) of interest	Analysis method	Key findings
Abrams 2015 (176) Country: USA	Number: 30 Gender: 93% female Age: mean age 34.4 years (SD, 5.36) BMI/weight status: not reported SES: not reported Ethnicity: predominantly White	Parents or primary caregivers of preschool children recruited via flyers distributed in day care centres and other preschool settings	90-minute focus groups using a semi-structured moderator's guide and snack packages (real and mock) as stimuli	Food choice (parent on behalf of child)	Thematic analysis	The following themes emerged from the data: (a) characters and colours cue fun for kids but "unhealthy" to parents; (b) health claims and "natural" design are meaningful; (c) visual realism means healthier options; (d) brand trust and perceived healthfulness; and (e) ignorance is bliss  Parents associated aspects that most appeal to their preschool children – the characters and other playful visuals – with higher sugar content and artificial ingredients; however, parents were also easily led to believe the product was healthier based on visuals of fruit, more realistic pictures, health claims, cross-branding with healthier foods, and visuals suggesting the product is more "natural"
Atik 2013 (184) Country: Turkey	Number: 46 (39 children, 3 teachers, 4 mothers) Gender: children, 53.8% girls; teachers: not reported Age: children, 7–11 years; mothers: 37–42 years BMI/weight status: not reported SES: mixture of "lower" and "higher" income level Ethnicity: not reported	Mothers: Not reported Children: only recruited those between the age of 7 and 11 years	Focus groups and interviews, conducted separately with children and with parents/guardians Children's sessions included projective techniques including drawing, word association and sentence completion, and role playing	Children: Attitudes to ads (whether they wanted to buy advertised foods) Mothers: Opinion on food ads	Interpretative approach	Children: Very few children stated that they learned something about food from TV advertising Mothers: Mothers only showed modest concerns about food advertising aimed at children The majority believed that ads had no effect on a child's food preference Mothers also reported that if a child does request a food advertised, it is only momentary

Study details	Study population characteristics	Sampling procedure	Study design	Outcome(s) of interest	Analysis method	Key findings
Bibeau 2012 (177) Country: USA	Number: 16 (7 adults, 9 teenagers) Gender: 100% female Age: adults: mean age 43 years (SD, 13.4); teenagers: mean age 15.3 years (SD, 0.9) BMI/weight status: adults: mean BMI 36.4 (SD, 11.9); teenagers: mean BMI 22.7 (SD 8.8) SES: not reported Ethnicity: African American	Advisory board of teenagers and adults recruited additional participants; recruitment involved partnering with an all-girl, public, college preparatory high school	Photovoice and focus groups using a semi-structured guide Before the focus group, participants were asked to photograph images to answer "What influences teen girls to eat what they do?"	Perception of food marketing environment and how it influences teenagers' food purchasing behaviour	After three transcripts were read, a code book was developed to capture the main themes of topics addressed in the discussion	Main themes identified: (1) convenience and availability of food products influences teen eating behaviours and purchases; (2) low-price food and beverages influences teen eating behaviours and purchases; (3) food advertisements influence teen purchases; (4) insufficient nutrition education influences teen eating behaviours; (5) new food products from preferred sources influences teen purchases; (6) food that tastes good influences teen eating behaviours; and (7) food available at school influences teen eating behaviours and purchases
Buchanan 2017 (152) Country: Australia	Number: 60 Gender: 55% females Age: 18-24 years (mean, 20 years) BMI/weight status: not reported SES: not reported but majority were educated to degree level (63.3%) Ethnicity: not reported	Recruitment through flyers handed out at universities and community colleges, bus-stops, community centres, local sports clubs and a local theme park and via social media, supplemented with snowball sampling	Participants were exposed to two websites and social media sites of either an energy drink (experimental group) or nut bar (control group) brand, and then asked to complete a semi-structured interview	Perception and attitudes of brands and products	Content analysis	Participants in the experimental group reported that being exposed to the brand website and social media page had improved their feelings towards the brands Elements which changed attitudes towards the brands were: corporate social responsibility initiatives, community involvement and sponsorship Participants also valued product nutritional information on their website The use of a superhero theme for one brand was appealing to some participants Positive comments on social media also influenced participants' attitudes

Study details	Study population characteristics	Sampling procedure	Study design	Outcome(s) of interest	Analysis method	Key findings
Bunting 2013 (172) Country: New Zealand	Number: 36 Gender: 50% females Age: 16–35 years BMI/weight status: not reported SES: income bracket ratings from 1–5000 NZD to 70000+ Ethnicity: not reported	Participants recruited at three public venues in Auckland Inclusion criteria included aged between 16 and 35 years and consumption of energy drinks at least twice per month	Used six focus groups, stratified by age into three groups: 16–21 years, 22–28 years, 29–35 years	Perceptions of caffeinated energy drinks	Thematic analysis	The following themes emerged: advertising, age, alcohol, brand, efficacy, energy seeking, gender, health, peer influence, product attributes and safety  Those in the oldest age group showed awareness of targeted marketing towards specific groups, in particular young consumers  In the 16–21 age group, participants discussed product packaging, use of humour and the projected image of the product
Costa 2014 (167) Country: Australia	Number: 40 Gender: 80% boys Age: 12–15 years BMI/weight status: not reported SES: not reported Ethnicity: not reported	Recruited through convenience sampling of one public co-educational school (n=22) and one independent Catholic all-boys secondary school (n=18)	Used 20–40 minute focus groups comprising 5–8 participants, drawn from the same school and same school year (6 groups in total) Seven semi-structured interview questions were developed	Knowledge of energy drinks, prior consumption behaviour, and perceptions of energy drinks and consumers	Thematic analysis	Five themes emerged: knowledge about energy drinks brands and content, use, reasons for use, physiological effects, and influences on energy drinks use  Most participants could identify energy drinks by brand name, although some participants had difficulty differentiating energy drinks from non-caffeinated sports drinks and some confused energy drinks with other drinks packaged in a similar way  Advertising was identified as an influence on energy drink use  Energy drink advertising was reported to appeal to adolescents  Participants reported seeing energy drinks advertising in various media; some participants found the amount of advertising annoying, but it was reported that the advertising was effective at increasing participants' liking for energy drinks

Study details	Study population characteristics	Sampling procedure	Study design	Outcome(s) of interest	Analysis method	Key findings
Den Hoed 2013 (168) Country: Canada	Number: 60 Gender: 55% females Age: not reported BMI/weight status: not reported SES: mixture of lower and higher education backgrounds Ethnicity: not reported	Parents who were the primary shopper for the family were recruited from three major urban centres in Canada	One-to-one interviews using a semi-structured interview guide Parents were asked: "What do you think of child-oriented fun foods?" and "Do you agree with the idea of creating and promoting child-oriented fun foods?"	Opinion of "fun" foods and promotion of such foods (fun foods were defined as foods marketed to children as "fun" to eat)	Thematic analysis using an iterative process in keeping with grounded theory	Findings presented two frameworks: (1) communication quality; (2) nutritional quality <i>Communication quality</i> Some parents said that fun foods provide fun messages, and helpful messages to parents; however, more prevalent comments were that the message of fun foods were part of companies' selfish goals and that the messages targeted a vulnerable audience (children to manipulate parents) Parents took issue with distracting messages on the packaging, preventing the food to be thought of as food and also raised concerns that messages on packaging was deceptive <i>Nutritional quality</i> Parents highlighted that "fun" foods were very unhealthy and that the packaging was harmful by making the foods look attractive to children; however, a number of parents said that not all fun foods were junk, but healthier options were framed as exceptions Once parents mentioned that fun foods can be healthy, they gave positive views of fun food packaging
Gaber 2014 (181) Country: Egypt	Number: 40 Gender: not reported Age: 17–29 years BMI/weight status: not reported SES: not reported Ethnicity: not reported	Participants (all frequent users of Facebook) recruited from two Egyptian cities (Cairo and Alexandria) using purposive sampling	Moderated focus groups (four in total)	How young people perceive social media advertising and factors affecting consumers' attitudes towards advertising	Not reported	Five factors were identified: (1) <i>Brand familiarity</i> (participants were more likely to engage with ads for their favourite brands to find out about new offers and promotions); (2) <i>Incentives</i> (participants are interested in ads when they contain offers); (3) <i>Relevance</i> (ads which are relevant to participants are more likely to increase the chance of engagement); (4) <i>Referrals from friends</i> (participants are affected by ads which are liked and commented on by friends on Facebook); (5) <i>Advertising value</i> (if an ad is credible, entertaining and informative, participants' attitude towards the ad will improve)

Study details	Study population characteristics	Sampling procedure	Study design	Outcome(s) of interest	Analysis method	Key findings
Hemar-Nicolas 2015 (169) Country: France	Number: 64 Gender: 64% girls Age: mean age: 8 years 8 months BMI/weight status: not reported SES: mixture of upper- and lower-middle classes Ethnicity: not reported	Children enrolled in elementary school	In peer groups (consisting of friends), children took part in 10 snack times where products were offered - branded products were offered for 5 snack times and removed for the other 5 times At the end of each snack time, the researcher conducted a 30-minute group discussion, using an interview guide	The role played by food brands when consumed within children's peer group	Thematic analysis	Children had good knowledge of food brands and reported that the purpose of a brand was to help a product be recognized by name, logo, and colour Children did not consider the social value of food brands; food brand selection was not determined by a desire to attract peers' attention and social recognition
Kashif 2014 (183) Country: Pakistan	Number: 32 Gender: 100% males Age: not reported BMI/weight status: not reported SES: respondents were faculty and management staff of a large private sector university Ethnicity: not reported	Purposeful sampling: respondents were fathers with at least one child aged between 8–14 years	One-to-one semi-structured interviews	Fathers' awareness and knowledge of children information-seeking behaviour, their opinions of the influence of TV advertising on children, their thoughts on impact of TV ads on children's buying of unhealthy products, the respondents' understanding of TV advertising in Pakistan, and suggested changes by informants in the policies to regulate TV advertising in Pakistan	Thematic analysis	Six themes emerged from the data: (1) <i>Role of TV advertising</i> (fun themes in TV ads attract children; children are lured to buy unhealthy food products and can use pester power to buy these); (2) <i>Quantity of ads</i> (fathers believe that children are exposed to a large number of TV ads which negatively affect their eating habits); (3) <i>Negative impact of TV food ads</i> : (respondents were concerned that children pay attention to buying unhealthy products which they see through TV ads); (4) <i>Changing buying patterns</i> (respondents mention that children want to buy foods which their friends have bought); (5) <i>Positive impact on children</i> (respondents believe that TV ads are a source of information and education for children); (6) <i>Advertising changes</i> (respondents suggested changes to child-directed TV ads with greater regulation of unhealthy food advertising)

Study details	Study population characteristics	Sampling procedure	Study design	Outcome(s) of interest	Analysis method	Key findings
Mazzonetto 2014 (178) Country: Brazil	Number: 71 Gender: 59% girls Age: 8–10 years (mean: 9.5 years) BMI/weight status: not reported SES: 80% of families had an average income of up to 2040 Brazilian reais; 51% of mothers and 55% of fathers had less than 11 years of education Ethnicity: not reported	All participants were children in Florianópolis (sampling not reported)	Moderated focus groups (maximum of 6 children) using a semi-structured script; pictures of different foods were used to stimulate discussion	Motivations for eating EDNP foods and for eating fruit and vegetables; behaviour as buyers and as influencers of food purchases	Lexical analysis using the descending hierarchical classification method	Findings indicated two main classes of data: (1) <i>Choosing what to buy: children as buyers and as influencers of food purchases</i> (children have an active role in influencing family food choices and also make independent food purchases); (2) <i>Children choose what to eat: influences on food choices</i> (the pleasantness of taste and appearance of food influence food choices; food ads and TV programmes were mentioned as stimuli which increases desire to eat all kinds of foods, not just EDNP foods and health concerns of EDNP were also mentioned as an influence on food choice)
Motta-Gallo 2013 (179) Country: Brazil	Number: 14 Gender: 92.9% females Age: 27–62 years (two ages not reported) BMI/weight status: not reported SES: mixed Ethnicity: mixture of White, Brown and Black	Caregivers with more than one child (7–9 years old) were randomly selected from 29 families of 2nd grade students	One-to-one interviews lasting 15–30 minutes using open-ended questions	Food preferences of children; consumption demands of children	Thematic analysis	Children are influenced by TV ads; however, family income is still a strong influence on food choice Food preferences of children are influenced by what is advertised on TV and which foods have toys Respondents also reported that children spend a large amount of time watching TV and eat meals while watching TV

Study details	Study population characteristics	Sampling procedure	Study design	Outcome(s) of interest	Analysis method	Key findings
Newman 2014 (174) Country: United Kingdom	Number: 14 families (16 parents, 29 children) Gender: 13 mothers, 3 fathers, 16 boys, 13 girls Age: parents: not reported; children: 5–14 years (mean 8.62, SD, 2.32) BMI/weight status: not reported SES: not reported Ethnicity: not reported	Initially recruited from contacts known to the authors, followed by online recruitment (family forum websites) and snowballing	50–90 minute family focus groups facilitated using cards illustrating different forms of marketing communications and the most popular food brands to children The lead author acted as the moderator	Beliefs about, and behaviours and responses to food marketing communications	Cyclical process of analysis used to generate themes	Parents take responsibility for protecting children from food marketing, with greatest concern regarding TV marketing Parents also believed the government could do more to regulate advertising Parents reduce children's exposure to food marketing in the home by restricting commercial media channels and limiting screen time (particularly regarding TV) Parents also aimed to restrict out-of-home exposure by not taking their children shopping Parents also employed active mediation to reduce the impact of food marketing by increasing children's media literacy and understanding of the adverts' intentions
Powell 2011 (175) Country: United Kingdom	Number: Phase 1: 12 children; Phase 2: 6 children; Phase 3: 5 parents Gender: not reported, but mixed reported, but mixed Age: Phase 1: 3–4 years (4 children), 5–6 years (4 children); Phase 2: 3–4 years (2 children), 5–6 years (2 children), 7–8 years (2 children); Phase 3: not reported BMI/weight status: not reported SES: similar across participants (but not reported) Ethnicity: same across participants (but not reported)	Children and parents attending a nursery (selection strategy not reported)	Phase 1: 15-minute focus groups with children of the same age and who were familiar with each other; children were presented with images of food products Phase 2: individual interviews with six children who were asked to draw what they would like for lunch; the drawings were then shown to their parents Phase 3: face-to-face interviews with parents	Promotional techniques which attract attention in children Parents: Feelings towards the food industry	Thematic analysis	Children aged 3–4 are attracted by cartoon characters and toys; those aged 5–6 years are attracted by the same and toys which are part of a running collection, while those aged 7–8 years are attracted by entertaining and "cool" toys Method of persuasion used by children differs by age: 3–4 year-olds are unable to negotiate with parents and instead use behavioural and emotional means; 7–8-year-olds use more developed, rationalised methods of persuasion Parents cited cartoon characters, toys and TV ads as reasons for why food promotions are successful when targeting children Parents had a negative attitude towards the food industry - viewed as manipulative and exploitative

Study details	Study population characteristics	Sampling procedure	Study design	Outcome(s) of interest	Analysis method	Key findings
Rakhshanderou 2014 (182) Country: Iran (Islamic Republic of)	Number: 31 Gender: 54.6% boys Age: 11–14 years BMI/weight status: not reported SES: not reported Ethnicity: not reported	Male and female students in middle schools in a central region of Tehran were selected by convenience sampling	30–40-minute one-to-one semi-structured interviews	Determinants of fruit and vegetable consumption	Content analysis	<p>Several environmental and personal determinants were identified</p> <p><i>Environmental factors</i> included the availability of fruit and vegetables at home – which increased eating of fruit and vegetables, whereas availability of unhealthy options creates a barrier to fruit and vegetable consumption</p> <p>Economic factors were also identified as a barrier against fruit and vegetable consumption; advertising of unhealthy options was also included as a factor</p> <p>Subjective norms generated by family, friends, health professionals and media encourage compliance and reinforcement by others and was identified as an important motivational factor (in particular modelling behaviour of family and friends who eat fruit and vegetables can persuade increased fruit and vegetable consumption)</p> <p><i>Personal factors</i> included knowledge regarding benefits of fruit and vegetables and being able to prepare fruits and vegetables, both of which increased consumption</p> <p>Outcome expectancy also determined consumption –perceived susceptibility and severity of diseases was another factor which increased fruit and vegetable consumption</p>

Study details	Study population characteristics	Sampling procedure	Study design	Outcome(s) of interest	Analysis method	Key findings
Rodrigues 2012 (180) Country: Brazil	Number: 111 Gender: 53.2% girls Age: 7–10 years BMI/weight status: not reported SES: included children from one public and one private school; household income was estimated by parental occupation; private school students had higher household income than public school students Ethnicity: not reported	Participants were children from one public and one private school from Florianópolis	Focus groups	Eating habits, consumer behaviour, and TV-watching habits	Not reported	Children reported watching TV when possible and having money with the desire to spend it on products advertised on TV ads Public school children reported buying sweet and savoury snacks more frequently than private school children, and had greater freedom to shop, with greater parental control on eating and buying habits exerted on private school children
Sari 2018 (185) Country: Turkey	Number: 20 parents reported Gender: not reported Age: parents: not reported BMI/weight status: not reported SES: monthly income of family ranged from 1500–5000 Turkish Lira Ethnicity: not reported	Parents who had children aged 7–11 years and who were residing in Ataşehir in Istanbul selected at random	One-to-one interviews with parents	Children's consumption behaviours	Not reported	The number of parents who reported that their children showed an interest in different ads were: 10 for milk products, 3 for meat products, 4 for chocolate, 2 for biscuits, 1 for chips Parents reported that their children were able to recognize milk, offal and chocolate products shown on ads in the supermarket All families reported that children want to purchase the food products shown in ads 14 out of 20 parents said they were not impressed by food adverts and all parents wished for inspection of ads and reduced amount of time food adverts are shown

Study details	Study population characteristics	Sampling procedure	Study design	Outcome(s) of interest	Analysis method	Key findings
Signal 2019 (171) Country: New Zealand	Number: 33 Gender: 54.4% girls Age: 11–13 years (mean 12 years) BMI/weight status: not reported SES: number of children from high, medium and low decile schools was 10, 12 and 11 respectively Ethnicity: European (n=14), Māori (n=11), Pacific (n=8)	Schools in Wellington were randomly selected after stratifying by school decile and student ethnicity	Qualitative study using 30–60-minute semi-structured interviews	Nutrition knowledge, awareness of engagement with food advertising, what they would do about food advertising	Thematic analysis	<p>Children understood the difference between unhealthy and healthy foods/beverages</p> <p>Children recognized the purpose of food marketing was to encourage them to buy the product</p> <p>Children reported believing messages in food marketing only sometimes; they also reported that seeing food ads made them hungry</p> <p>The majority of children reported buying unhealthy foods and most children reported sometimes buying foods which they saw on TV</p> <p>Children said that they did not or only sometimes asked parents to buy foods seen in ads and many said that junk food should not be advertised to children</p> <p>Marketing tactics mentioned by children included: making ads fun; catchy songs or slogans; imagery; free toys; competitions; price; health and nutrition claims; sports sponsorship</p> <p>When asked what they would change about food advertising, children gave the following responses: truthful advertising; provision of nutrition information; remove billboards and signs; promote healthy food</p>

Study details	Study population characteristics	Sampling procedure	Study design	Outcome(s) of interest	Analysis method	Key findings
Sparrman 2009 (173) Country: Sweden	Number: 16 Gender: 50% boys Age: 8–9 years BMI/weight status: not reported SES: parental occupations ranged from unemployment to academic research Ethnicity: not reported	Participants recruited through their after-school centre	Four 4.5–5.5-minute focus groups; 18 different cereal packages were used during the focus groups	Social and cultural values about marketing with “insert toys”	Critical discourse analysis in combination with strategies from talk- in-interaction	The following themes were identified: (1) Being seen by the market and lured into consumption: children demonstrated awareness that manufacturers include toys to make money on them, and that this is also done to “trick” parents and to tempt children; some children reported choosing a cereal for the toy regardless of its taste, others chose based on taste and the toy (2) Childish children and over-competent adults: grown-ups pick cereals based on the ones they like (not for toys or picture); there was also evidence of differences between children of different ages regarding the ability to resist a toy (3) “Anti-adult” features: Children’s needs are not contradicted by adults’ care, but rather between agentive children and obligated adults (4) Pester power from children’s perspectives: nagging can be evaluated in relation to what is obtained; the relationship between nagging and regret suggests that a child cannot nag for an infinite number of things (5) Gendering toys: useability of a gendered toy is limited for the opposite gender

Study details	Study population characteristics	Sampling procedure	Study design	Outcome(s) of interest	Analysis method	Key findings
<p>Te'Eni-Harari 2020 (170) Country: Israel</p>	<p>Number: 82 Gender: 59.8% girls Age: 12–17 years (mean 14.09, SD 1.56) BMI/weight status: BMI reported by 36 interviewees (mean 21.39, SD 4.05) SES: not reported Ethnicity: not reported</p>	<p>Recruited from five schools in different regions of Israel</p>	<p>25–40-minute semi-structured individual interviews Respondents were presented with four print food ads as a prompt; two ads did not contain a model (one was of a 30% fat ice cream, the other a 0% fat ice cream), while the other two ads included models, one of average-weight and one thin model (for 30% fat ice cream)</p>	<p>Adolescents' perceptions of and reactions to food ads, the products, and models within them Gender differences in adolescents' perceptions of and reactions to food ads</p>	<p>Thematic analysis</p>	<p>The following themes were identified: Adolescents' perceptions of food ads: participants reported being exposed to food ads on several platforms, and many were sceptical regarding these ads; however many admitted to being tempted and hungry after seeing the ice cream ads "Perception of food products in food ads": adolescents reported that ads tend to show unhealthy foods; when shown the 30% fat ice cream ad, this was viewed as unhealthy and most would not eat it while the 0% fat ice cream was viewed as healthy but flavourless "Perceptions of models in food ads": models in food adverts were seen as unrealistically "perfect" and adolescents agreed that food ads exaggerate appealing model appearances; when shown the 30% fat ice cream ad featuring an average-weight model, respondents said this was refreshing, but would deter people from buying the product; when shown the same ad but with a thin model, adolescents were critical that the model was unrealistic "Gender differences in perceptions of food ads": females were more likely to admit comparing themselves to thin models</p>

BMI: body mass index; EDNP: energy-dense, nutrient-poor; SD, standard deviation; SES: socioeconomic status



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