

THE EXTENT, NATURE AND EFFECTS OF FOOD PROMOTION TO CHILDREN: A REVIEW OF THE EVIDENCE TO DECEMBER 2008

PREPARED FOR THE WORLD HEALTH ORGANIZATION

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December 2009

WHO Library Cataloguing-in-Publication Data:

The extent, nature and effects of food promotion to children: a review of the evidence to December 2008 / by Georgina Cairns, Kathryn Angus and Gerard Hastings.

1.Food. 2.Marketing. 3.Child. 4.Advertising. 5.Food supply. 6.Diet - trends. I.Cairns, Georgina. II.Angus, Kathryn. III.Hastings, Gerard. IV.World Health Organization.

ISBN 978 92 4 159883 5

(NLM classification: QT 235)

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ACKNOWLEDGEMENTS

Our thanks to Dr Louise Hassan for rating studies for quality and potential causality, to Dr Ingrid Holme, Ray Kent and Gill Cowburn for their input and to Aileen Paton for administrative support. Our thanks also to the authors of the previous Institute for Social Marketing reviews on food promotion to children on whose original work this update is based.

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EXECUTIVE SUMMARY

Background

This document reviews evidence to December 2008 on the global extent and nature of food promotion to children, and its effects on their food knowledge, preferences, behaviour and diet-related health outcomes. The review was commissioned by the World Health Organization (WHO) and updates a systematic review of the evidence conducted on behalf of WHO in 2006¹. The 2006 review in turn built on earlier reviews commissioned by the UK's Food Standards Agency² and WHO³. All these reviews were conducted by the Institute for Social Marketing (ISM) at the University of Stirling, and the Open University, United Kingdom of Great Britain and Northern Ireland.

Review methods

Systematic literature review methods were used to identify peer reviewed published literature via systematic searches of academic literature databases. Additional searches were conducted online to identify 'grey' literature. The titles and abstracts yielded by the searches were assessed according to pre-defined relevance criteria for the review. This process identified 115 studies on the extent and nature of food promotion to children and 90 on its effects. The results of the literature search are summarized in the evidence tables in Annexes 2 and 3.

Extent and nature of food promotion to children

Studies examining the extent and nature of food promotion to children consistently conclude that food promotion is the most prevalent marketing category targeting children and young people. Content analysis research finds that the majority of foods and food products promoted are energy dense, high fat, sugar and/or high salt, and in sharp contrast to national and international dietary guidelines. Sugar-sweetened breakfast cereals, soft-drinks, confectionary and savoury snacks are the most frequently advertised categories, with fast-food promotion continuing to gain marketing share. Promotion of unprocessed foods, such as fruit and vegetables, wholegrain and milk is found to be almost zero.

The themes used to promote child-oriented food products to children focus on fun, fantasy, novelty, plus taste. In contrast, parent-targeted marketing of the same child-oriented product emphasizes nutrition and health themes.

Early research focuses on food promotion through television (TV) advertising. More recent research has examined other promotional channels and strategies. Limited trend analysis data suggests that there is a shift of marketing spend from TV

¹ Hastings G et al. (2006). *The Extent, Nature and Effects of Food Promotion to Children: A Review of the Evidence*. Geneva, World Health Organization.

² Hastings G et al. (2003). *Review of Research on the Effects of Food Promotion to Children*. Glasgow, University of Strathclyde, Centre for Social Marketing.

³ McDermott L et al. (2004). *Desk Research to Examine the Effects of Food Marketing on Children*. Glasgow, University of Strathclyde, Centre for Social Marketing.

advertising to other forms of promotion, although TV advertising remains the most dominant medium to date. As well as growth in promotion through emerging promotional platforms, such as the Internet, viral marketing by SMS (short messaging service) and more interactive competitions, games and membership, there is evidence of increasingly sophisticated integrated marketing strategies. Some of the research included in the review notes that the multiple channels and sources complement, and direct activity to, one another. As well as the multiplying benefits of integrated marketing activities, this type of strategy can be used to establish and maintain brand loyalty with multiple relationship-building benefits and reward offers.

The research also recognizes that in addition to explicit child-targeted marketing, children are exposed to a great deal of food promotion through generic medium such as mainstream TV, on-pack promotions and sponsorships. The evidence base for low and middle income countries is less substantial than for developed economies. The research available to date however does indicate that marketing strategies in lower income countries follow very similar patterns to more affluent markets, with the emphasis on low nutritional quality foods, the dominance of TV advertising but increasingly supplemented with other forms of promotion that reinforce marketing objectives and build brand awareness and allegiance.

The evidence also indicates that marketing to children approaches them both as consumers in their own right and as an access point to wider markets. A number of studies report that children have independent spending power and significant influence over household and parental purchasing decisions. In addition, some of the research reviewed highlights the role children play in developing new market opportunities, particularly in low and middle income countries where new market opportunities are being developed. Fast-food and quick service restaurants case study research suggest that children-friendly initiatives have been effective entry strategies in fast growing markets in low and middle income countries.

The effects of food promotion to children

Survey evidence confirms that many forms of food product promotions are popular with, and engage children. On-pack promotions, advertising, free gifts, and many other marketing techniques encourage interest and purchase. Research on recall of food advertisements in particular finds very high levels of awareness and enjoyment. Parents report, and are observed to, frequently accede to purchase requests. There is also some evidence that socially disadvantaged mothers attribute more credibility to food adverts than more privileged peers.

Evidence from more complex studies, assessed as capable of inferring causality, find promotional activity is having an effect on children. Research that has compared the influence of other factors on food behaviours, determinants of behaviour and health outcomes, find that family and parents, peers, other lifestyle factors, as well as socioeconomic status are also important. Nevertheless, the research to date suggest that food promotion has an equally important effect.

The evidence reviewed indicates that food promotion does have

a modest impact on nutrition knowledge, food preferences and consumption patterns. A limited number of studies that have examined exposure to food promotion and diet-related health status such as adiposity find positive associations between exposure to food promotion and adverse health outcomes. The evidence that food promotion influences purchasing behaviour is of modest strength. On balance, the evidence also indicates that the influence extends to category as well as brand level awareness and choices.

In summary, the review confirms that in both developed and developing countries: there is a great deal of food promotion to children. Television advertising is the most dominant promotional channel but the full range of promotion and marketing techniques and strategies are used in, and integrated together, by the food and advertising industries. Children recall, enjoy and engage with the multiple promotions and evocative brand building initiatives they are exposed to. The emergence of new mass media channels such as website and mobile telephone SMS services offer less visible but highly direct targeted marketing opportunities. The evidence base for the effect and reach of these newer promotional channels is quite small, but to date, suggests it is gaining share rapidly and effectively.

The evidence reviewed confirms that the food products promoted continue to represent a very undesirable dietary profile, with heavy emphasis on energy dense, high fat, high salt and high sugar foods, and almost no promotion of foods that public health evidence encourages greater consumption of – for example fruit and vegetables.

Research that has examined associations between food promotion and food behaviours, determinants of behaviour and diet-related health outcomes, finds modest but consistent evidence that the link is causal. This evidence base is drawn from research conducted in the developed world. It is however, reasonable to assume these findings can be extrapolated to low and middle income countries because the research on extent and nature of promotion to children confirms that marketing activity in poorer countries mirrors the activity in more affluent economies. Furthermore, there is evidence that children in emerging markets are targeted both directly as consumers and as a bridgehead to wider society experiencing rapid cultural change. There is also a possibility that with a shorter history of exposure to sophisticated marketing techniques and less regulated marketing controls, children in developing and emerging economies may be more susceptible to the persuasive influences of food marketing and promotions.

1. INTRODUCTION

The report updates three previous systematic reviews of the nature, extent and effects of food promotion to children (Hastings et al., 2003; McDermott et al., 2004; Hastings et al., 2006). The Hastings et al., 2003 review, undertaken for the United Kingdom Food Standards Agency (FSA), was the first ever systematic study of the effects of food promotion on children. The McDermott et al. 2004 systematic review was commissioned by the World Health Organization (WHO) to broaden the evidence base and examine studies on the effects of food marketing to children in developing countries. Finally, the Hastings et al. 2006 review was produced for WHO as a Technical Paper in preparation for the WHO forum and technical meeting of stakeholders on '*Marketing food and non-alcoholic beverages to children*', held in Oslo (May 2006). Since its publication, a number of other reports and review papers on food marketing to children and young people have been published, including a very comprehensive study by the United States of America Institute of Medicine (2006). The growing body of evidence is in broad agreement that food and beverage marketing to children is extensive and does have measurable effects on diet and diet-related outcomes.

Notes and comments on the 2008 update

This document summarizes a review of the extent and nature of food promotion to children, and its effects on their food knowledge, preferences and behaviour for the period 2006 to 2008. The research was undertaken by the Institute for Social Marketing at the University of Stirling and the Open University, the United Kingdom of Great Britain and Northern Ireland, on behalf of WHO in preparation for the WHO Ad-Hoc Expert Group Meeting on '*Marketing of foods and non-alcoholic beverages to children*' held in Geneva (1-4 December 2008).

The same systematic search strategies were used for this update as for the 2006 review undertaken for WHO. Research from low and middle income countries was located through these search strategies. However, a separate search for extent and nature studies from low and middle income countries was not conducted.

2. REVIEW QUESTIONS

The review aimed to examine the extent and nature of food promotion to children and its effects on children. The following research questions were addressed:

Extent and nature of food promotion to children

1. What promotional channels are used by food marketers to reach children?
2. What food items are promoted to children?
3. What creative strategies are used by food marketers to target children?

Effects of food promotion to children

1. How do children respond to food promotion?
2. Is there a causal link between food promotion and children's food knowledge, preferences and behaviour?
3. If food promotion is shown to have an effect on children's food knowledge, preferences and behaviour, what is the extent of this influence relative to other factors?
4. In the studies which demonstrate an effect of food promotion on children's food knowledge, preferences and behaviour, does this affect total category sales, brand switching or both?

3. REVIEW METHODS

This section describes the methods used for the review.

3.1 The systematic review process

Systematic review methods were used to search for, identify, and assess evidence for the review. A systematic review is '*a review of the evidence on a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant primary research*' (Khan et al., 2001). The process involved a number of key stages (see Figure 1).

3.2 The search strategy

As shown in Figure 1, the first task was to develop suitable research questions for the review. These questions are outlined in Section 2. The search strategy for the review was then developed. As this review is an update to a previous review (Hastings et al., 2006, referred to as the "2006 Review" in this Section), adding the evidence published between March 2006 and mid-November 2008, the methodologies to this current review and the previous version are both outlined. Two main approaches were used to search for relevant research, as briefly described below.

3.2.1 PREVIOUS SYSTEMATIC REVIEWS

Two previous systematic reviews provided the starting point for the 2006 Review. The bibliographies of the review of food promotion to children (Hastings et al., 2003) and an additional review focusing on food promotion to children in developing countries (McDermott et al., 2004) were systematically examined. As these earlier reviews had very similar remits to the current review, and applied similar inclusion criteria, all of the studies cited in these earlier reviews were included in the 2006 Review.

In turn, this review includes all the studies included in the 2006 Review.

3.2.2 UPDATE OF DATABASE SEARCHES

New searches were undertaken in November 2008 to identify relevant studies published since March 2006 (the cut-off date for the 2006 Review's literature searches). Two main methods were used: searches of academic databases and searches for 'grey' literature (i.e. unpublished papers or reports of sufficient quality to be reliable and verifiable) via online databases and websites.

(i) Academic databases

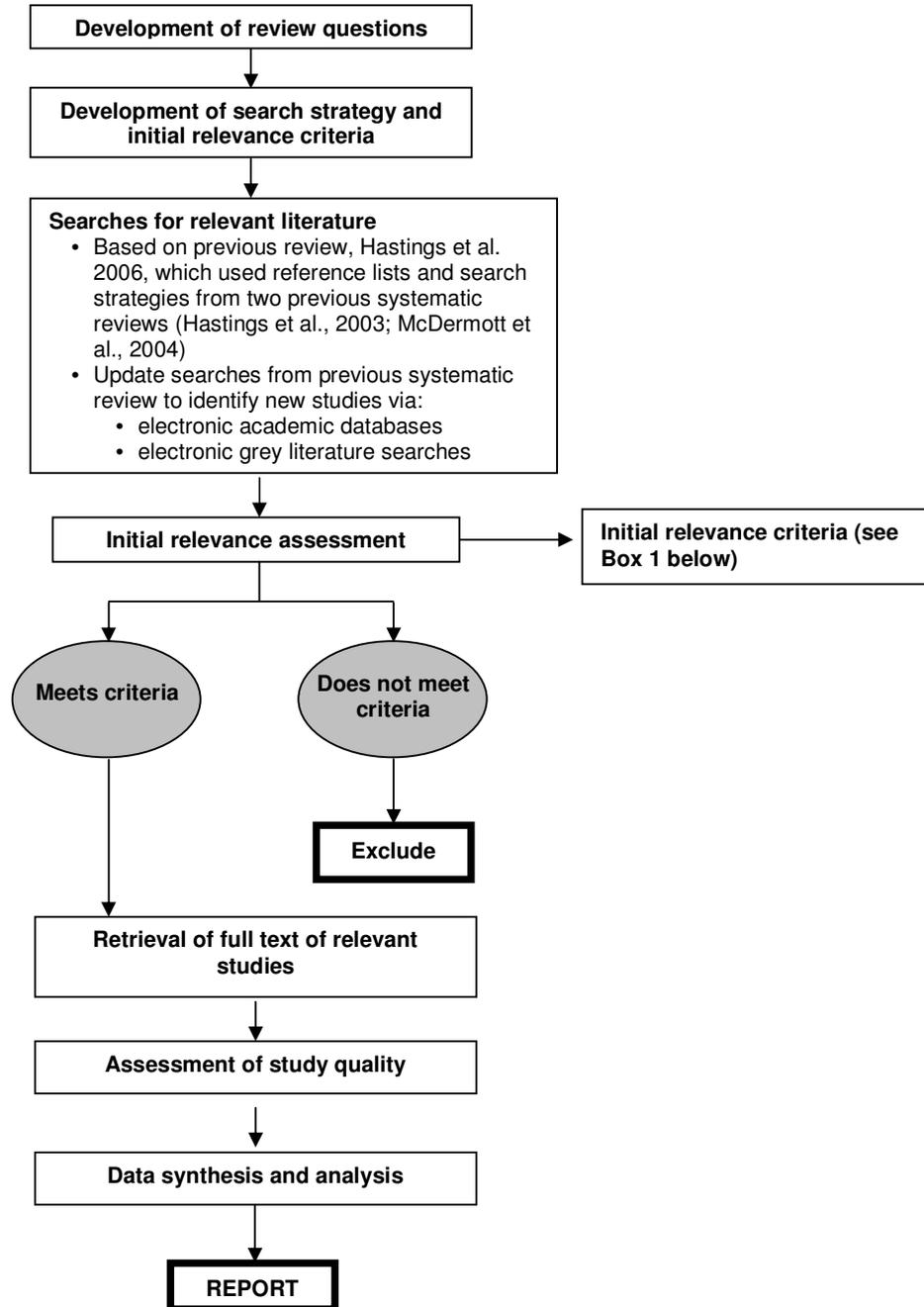
The primary source for literature was academic databases. Systematic searches were undertaken on the 15th November 2008 for the date range 2006 to 2008 in seven academic database interfaces (covering 11 different academic literature databases). Search strategies for the two original reviews

(Hastings et al., 2003 and McDermott et al., 2004) were combined to run more efficient searches and minimize duplicate records. Details of every search were documented fully to provide a transparent and replicable record of the review process. Full details of the strategies used are in Annex 1.

This 2008 search strategy has excluded the *IngentaConnect* and *ScienceDirect* databases as there was a great deal of overlap between all the academic literature databases and these appear to be publishers' databases rather than subject databases. The database *Business Source Elite* was added, as its peer-reviewed content is relevant to the topic, containing business, management and economics literature. An extra *Medline* search using a different interface was also added.

Citations from all the searches were downloaded into ReferenceManager® software for storage and duplicates were deleted. The sample of papers to be assessed against the relevance criteria was 728.

Figure 1: Overview of review process



(ii) Grey literature

A number of online databases and websites previously searched for the 2006 Review were searched for the date range 2006 to 2008 on the 23rd March 2009, including the *Advertising Education Forum* database of research on advertising and children; *ESRC Society Today*, an online electronic database of social science research funded by the Economic and Social Research Council; *WHOLIS* (the World Health Organization Library and Information Networks for Knowledge Database); the *Food and Agriculture Organization* (FAO) of the United Nations' Corporate Document Repository; and the website of the publication *New Internationalist*. Finally, the *LexisNexis Business and News* global database was added as a new resource for this 2008 update. This searches newspapers, wires and business press. Full details of these searches are also provided in Annex 1.

A bibliography provided by WHO of global background material including recent key reading on the amount and effect of food marketing to children, government regulations, monitoring and evaluations, nongovernmental organizations and private sector reports and other relevant resources, was assessed for relevant publications. Internal resources and contacts were also used to highlight key literature.

3.3 Initial relevance assessment

The titles and abstracts generated through the new searches were assessed against relevance criteria to determine whether or not they should be included in the review (see Box 1). The definition of promotion was extended for this update to include advertising via digital media. Although the Internet has been included in the criteria since the 2003 review, promotional channels utilize other digital media such as mobile (cell) phones and SMS or text messaging.

These criteria were applied to the studies yielded by the database searches. This process identified an additional 52 studies on the extent and nature of food promotion to children and an additional 20 examining its effects (see References). These studies were added to the studies already included in the 2006 Review. This resulted in a total of 115 studies on the extent and nature of food promotion to children and 90 on its effects.

Box 1: Initial relevance criteria

The following research is included:

- English or foreign language articles on the extent and nature of food promotion to children.
- English or foreign language articles on the effects of commercial food promotion on children's food knowledge, preferences and behaviour.

Provided that the research meets the initial relevance criteria outlined below:

- has a publication date of 1970 onwards;
- is a primary study or review;
- where the food promotion described derives from a commercial source;
- where terms mentioned correspond to agreed definitions of
 - *Children*: those between the ages of 2–15 years
 - *Food*: any food, non-alcoholic drink but not food supplements, vitamins or infant formula
 - *Promotion*: includes advertising (television, cinema, radio, print and digital media), Internet, packaging and labelling, branding, point-of-sale material, merchandising, film and television programme tie-in characters, and the commercial sponsorship of education material by a commercial source
 - *Food knowledge, preferences and behaviour*:
 - food knowledge includes: perceptions of 'good' and 'bad' foods, perceptions/understanding of a balanced diet, perception/knowledge of the nutritional value of foods, understanding of the composition of foods, and understanding of nutritional concepts
 - food preferences includes: liking for specific foods and preferences between different foods
 - food behaviour includes: food purchasing behaviour, food purchase-related behaviour, food consumption behaviour, and diet and health status.

3.4 Assessment of study quality

For the studies examining the effects of food promotion, a quantitative rating scale was developed to assess the quality of each of the included studies that were capable of demonstrating a potential causal relationship between food promotion and children's food knowledge, preferences and behaviour. Studies were scored, using a scale of 1–5, where 1 = poor and 5 = very good, on five criteria (see Box 2). The minimum a study could score was five and the maximum 25. Studies were scored and banded into three categories: 5–11 = lower scoring studies, 12–18 = medium scoring studies and 19–25 = higher scoring studies.

From the previous reviews, 33 studies were capable of demonstrating a potential causal relationship between food promotion and children's food knowledge, preferences and behaviour, thus scored on quality in the Hastings et al. 2003 review, 5 additional effect studies were scored in the Hastings et al. 2006 review, and in this update, 8 additional effect studies were scored on quality.

For this update, two reviewers conducted the ratings independently. In total, there were three discrepancies between the reviewers, all of which were resolved through discussion and by re-analysis of the studies with input from other academics. These judgements of quality were then used in assessing how much weight to attach to the findings of each study.

Judgements on the strength of evidence for each review question (i.e. whether it was “weak”, “modest” or “strong”) were based on an overall assessment of the cumulative evidence against three criteria: the number of studies indicating a positive effect, the size of the effect reported in the studies, and the methodological quality of the studies themselves.

Box 2: Quality rating criteria for effects of food promotion studies

Effects of food promotion

- Only studies of effects that were capable of demonstrating a potential causal relationship between food promotion and children’s food knowledge, preferences and behaviour were quality assessed (n = 46). These studies were assessed on the following five criteria: the quality of the exposure measure, the quality of the effect(s) measure(s), the appropriateness of the analysis procedures, the extent and thoroughness of the analysis, and the clarity and completeness of data reporting. Where a study was capable of answering more than one specific review question (e.g. if it measured the effects of food promotion on both knowledge and consumption behaviour), a separate rating was obtained in relation to all relevant questions as different effects measures and analyses may have been used.
- The remaining studies, whose results are discussed under the question ‘*How do children respond to food promotion?*’, were not capable of demonstrating a causal relationship, and were mostly simple surveys reporting only descriptive data. An initial relevance criteria assessment was used to determine inclusion or exclusion, but quality rating assessment of these studies was not conducted.

3.5 Other evidence on the extent and nature of food promotion in low and middle income countries

Separate searches were not undertaken for this 2008 update to specifically identify evidence of the extent and nature of food promotion in developing countries due to limited resources. However, the updated searches detailed in Section 3.2 and Annex 1 contained elements of the specific developing countries searches run for the 2006 Review. New research and additional data was identified this way and is reported in Section 4.2.

4. THE EVIDENCE BASE

This section presents the main review findings. Results are grouped into five key sections. Section 4.1 describes evidence of the extent and nature of food promotion to children from the published literature. Section 4.2 draws on the evidence to describe the nature and extent of food marketing in developing countries and rapidly growing markets. Section 4.3 examines any effect that this food promotion is having on children. The final two sections investigate the extent of this effect relative to other factors (Section 4.4) and the effects of food promotion on brand and category sales of food items (Section 4.5).

4.1 The extent and nature of food promotion to children

One-hundred and fifteen studies provided evidence of the extent and nature of food promotion to children and met the inclusion criteria for the review (see Annex 2 for a summary of the studies included). Ninety-nine involved the collection of original data, and the remaining 16 were review articles. Half of the included studies ($n=58$) were conducted wholly in the USA. The remaining studies were undertaken across a range of countries including Australia, Canada, the Islamic Republic of Iran, Italy, Malaysia, the Netherlands, New Zealand, Portugal and the United Kingdom. Publication dates ranged from the early 1970s, many took place in the 1990s, but two thirds were conducted during the 2000s. In the main, the studies used content analyses of television advertising to children. This usually involved viewing recordings (or live monitoring, prior to the invention of video) of television channels which carried advertisements. Recordings were often made during children's programming, for example on Saturday mornings or on weekdays immediately after school.

Results from the studies are briefly summarized below under the three research questions. There is a particular emphasis on the results of the newly included literature published between 2006 and 2008, and changes since the 2006 review (Hastings et al., 2006):

1. What promotional channels are used by food marketers to reach children?
2. What food items are promoted to children?
3. What creative strategies are used by food marketers to target children?

4.1.1 WHAT PROMOTIONAL CHANNELS ARE USED BY FOOD MARKETERS TO REACH CHILDREN?

Television continues to be the main channel used by food marketers to reach children, certainly in terms of expenditure (Federal Trade Commission, 2008). From the most recent wave of literature published between 2006 and 2008 included in this review, over half of the 52 studies examined television advertising. However the dominance of studies of television advertising is much diminished compared to the last review (Hastings et al., 2006), in which only three of the studies did not

examine television advertising (Consumers Union, 1995; Hawkes, 2002; Longman, 2002). Most of the television advertising studies examined adverts that featured during children's programming 'time-slots': Saturday and Sunday morning television and on weekdays after-school. These time-slots were shown to be heavily used by food marketers to promote foods to children. This trend was consistent across countries (see 4.1.2). However, a number of researchers recognize that children still view television programmes not specifically targeted for them (e.g. Gantz et al., 2007). Television adverts were also recorded from broader programming time slots and from commercial broadcast, commercial cable and non-commercial channels.

In the previous review, there was little mention of other forms of above-the-line promotion (i.e. direct advertising) such as the printed media (e.g. comics or magazines), on public signage, through direct mailing or through the Internet (Hastings et al., 2006). In the last couple of years more research has been published in these areas. Some concentrate on one type of media only, such as magazines (Jones & Fabrianesi, 2006; 2008; Kelly & Chapman, 2007), in-store advertising (Mazur et al., 2008) and websites (Alvy & Calvert, 2008; Moore, 2006; 2008; Moore & Rideout, 2007; Weber, Story & Harnack, 2006). Other studies have included multiple media, such as magazine food adverts and the websites the adverts direct readers to (Cowburn & Boxer, 2007). Below-the-line promotional techniques such as sponsorship, point-of-sale, free samples of food items, free gifts/tokens (premiums) with food items, mobile phone messaging, loyalty clubs, interactive food, novel packaging, tie-ins with movies and television programmes, tie-ins with computer software and other forms of wider brand building were examined. In-school marketing was identified as a useful channel for promoting foods to children (Consumers Union, 1995; Consumers International, 1999; Horgen, Choate & Brownell, 2001; Longman, 2002; Molnar et al., 2008). Even in comparison to television, this type of promotion was felt to be particularly effective at reaching children (Consumers Union, 1995).

Twelve studies from the updated 2006 to 2008 literature investigated the Internet as a promotional channel used by food marketers to children, and 11 of these included a content analysis of food companies' websites. An analysis of 44 US food and drinks companies in 2006 found that two-thirds had website space specifically for young people, or an independent website for products that appeal to children, or had 'advergimes' (an internet-based or downloadable videogame promoting a brand-name product by featuring it as part of the game) (Federal Trade Commission, 2008). A study from the USA found nearly three-quarters of food advertisers' websites included advergimes and the same amount had brand-related content (such as wallpaper or screensavers) the child could use after leaving the website. Over half of the websites had television commercials to view, and a number included polls or quizzes the company could use for market research (Moore, 2006; 2008; Moore & Rideout, 2007). Similar techniques have been found worldwide (Lobstein et al., 2008), in the Asia Pacific region (Robinson, 2008), Australia (Kelly et al., 2008a), Malaysia (Ho & Len, 2008) and the United Kingdom (Which?, 2008).

Only a few studies examined changes in the promotional channels used by food marketers over time. The findings from these studies, coupled with original advertising spend data from AC Nielsen, confirm that television was the dominant promotional channel throughout the previous decade. However, advertising spend began decreasing slightly in both relative and absolute terms from 2002. In the USA for example, in 2006, 46% of promotions expenditure by food and drinks companies was on television advertising, and 53% was by television, radio and print advertising combined (Federal Trade Commission, 2008). Five per cent of expenditure accounted for new media promotion. As the authors state, a focus on expenditure data may underestimate the degree to which food and beverage marketers used the Internet to reach children and teens. Quantifying the extent of food marketing to children on the internet the authors calculated that display ads (e.g. banner ads) for food and beverages generated roughly 2 billion impressions⁴ on child-oriented websites and more than 9 billion impressions on teen-oriented websites in 2006 (Federal Trade Commission, 2008). One study looked at potential future trends in food promotion to children including below-the-line marketing activities such as branding, packaging, and the advent of new 'fun' food (Longman, 2000).

Overall, the review found that television continues to be the main channel used by food marketers to reach children. There is evidence that the dominance of television has recently begun to wane, particularly as other media such as the Internet grow.

4.1.2 WHAT FOOD ITEMS ARE PROMOTED TO CHILDREN?

In the 2006 review (Hastings et al., 2006), 25 studies investigated the extent of food promotion to children by comparing it with the promotion of other products directed towards children. These analyses show that only toys threatened the prominence of food in terms of advertising, and then usually only in the run up to Christmas. Perhaps reflecting a change in the research agenda, only one study from the 2006 to 2008 wave of literature compared food promotion to the promotion of other products. 2004 estimates for 2-11 year olds suggest 'games, toys and hobbies' and 'screen/audio entertainment' each represent around a third as much of annual exposure to TV advertising as the share of the 'food products' category (Holt et al., 2007).

Fourteen studies compared the extent of food promotion to children with the extent of food promotion to adults and found that food makes up a far greater proportion of promotions aimed at children than at adults. For example, Chestnutt & Ashraf (2002) examined nearly 250 hours of United Kingdom television and found significantly more food advertising during children's programming (62.5%) than on prime-time television (18.4%). Similarly, in Australia, Neville, Thomas & Bauman (2005) observed that confectionary adverts were three times more likely and fast-food adverts twice as likely to feature during children's programming compared with adult's programming. However, an Australian study found that food adverts taped from all three commercial stations on free-to-air television occurred in similar

⁴ The number of times an online ad is displayed to a website visitor.

proportions during children's and adults' viewing hours (25.5% versus 26.9% of all advertisements respectively) (Kelly et al., 2007). The results of another survey in Australia suggested that adults perceived distinctly different messages in magazine adverts targeting parents compared to the adverts targeting children and the same food products (Jones & Fabrianesi, 2006; 2008). Website analysis found viral marketing (a peer-to-peer promotional technique) was more common on food and drink websites for children and teens than on websites including adult content (Moore, 2006; 2008; Moore & Rideout, 2007).

Eighty-four studies analysed children's food advertisements to determine which sorts of food products were being promoted. Televised children's food promotions were found by virtually every relevant study to be dominated by a 'Big Four' of food items: sugar-sweetened breakfast cereals, confectionary, savoury snacks and soft-drinks. Examples include a study in Portugal (Lemos, 2004) of 504 children's adverts which found 26% were for breads and sugared cereals, 35% were for sweets (chocolates and cookies) and 12% were for soft drinks. Similarly, an American study (Kotz & Story, 1994) found that sugared cereals were the most advertised product (23.0%), followed by candy (15.0%), cereal with sugar as the main ingredient (10.3%), low-sugared cereals (6.0%) and soft-drinks (5.6%). A study from the Islamic Republic of Iran found that the most frequently advertised food items were salty or fatty snacks (e.g. cheese puffs, crisps), biscuits or cakes, and soft drinks (Maryam et al., 2005). A Canadian study of 'regular' foods (not 'junk' foods) on sale in a supermarket repackaged to appeal to children found that 89% (of those with on-pack nutritional data) could be classified as of poor nutritional quality (Elliott, 2008a; 2008b).

Only 16 studies looked at time trends in the types of food being promoted to children. Three of these were published between 2006 and 2008 (Holt et al., 2007; Maher et al., 2006; Warren et al., 2007). Adverts for fast-food outlets were found to have 'significantly' increased their share of children's adverts in recent years. The mix of categories of food adverts seen by children in 2004 was more evenly spread across all food categories than in 1977, when cereals and desserts/sweets dominated (Holt et al., 2007). Maher et al. (2006) found no evidence that food processors and restaurants had changed their promotional messages during children's TV programming slots between 2000 and 2005. Warren et al. (2007) also concluded the same between 2004 and 2006. Advertising spend on fast-food brands in the United Kingdom increased in both relative and absolute terms during the previous decade, mirroring trends in the USA, and fast foods have now displaced breakfast cereals as the most promoted products (Hastings et al., 2003).

Overall, the review found that children's advertising was dominated by food products. The so-called 'Big Five' has replaced the 'Big Four' of pre-sugared breakfast cereals, soft-drinks, confectionary, savoury snacks with the steady increase in fast-food advertising. The advertised diet contrasts strongly with that recommended by the public health community. It is consistently higher in fat, sugar and salt, and healthier food items like fruits and vegetables are significantly under-represented or absent in some markets surveyed.

4.1.3 WHAT CREATIVE STRATEGIES ARE USED BY FOOD MARKETERS TO TARGET CHILDREN?

Sixty-nine studies examined the creative strategies used in food promotions to target children. A wide range of strategies were explored including:

- the use of characterization (e.g. gender and race) and animation
- the use of humour or other themes
- the types of theme appeals or messages used to attract children
- the use of disclaimers that provide information about the products
- the use of premiums and competitions.

In terms of characterization, children's televised food advertising typically featured off-screen male announcers and on-screen male characters. Other adults who appeared on-screen in food adverts tended to be portrayed as either comic-book heroes or villains. The use of animation techniques in television food adverts was found to be particularly strongly associated with children's food adverts in comparison to non-food adverts aimed at children and adult-oriented food adverts. For example, in one early study, over 60% of food adverts to children used some kind of animation, compared with only 1% of toy adverts (Atkin, 1975a/Atkin & Heald, 1977). Animation or mixed formats were also seen to highlight the light-hearted or humorous tone of children's food adverts; much less humour was observed in both non-food adverts aimed at children and adult-oriented adverts. The Batada et al. (2008) analysis of Saturday morning television food advertising found the most commonly used techniques continued to be movie, cartoon, animated or costumed characters (used in 74% of food adverts). Conversely, another television study conducted in the USA (Gantz et al., 2007) evaluated all programming during a set time period and found that a relatively small 11% of food adverts targeting children or teens used a children's TV or movie character.

Theme appeals in children's adverts were examined in 18 studies in the Hastings et al. (2006) review. A further ten studies published between 2006 and 2008 were included in the updated review. Although there is little consensus about the definition of these themes, the review shows that food marketers are generally using appeals based on the following:

- taste (e.g. emphasizing sweetness)
- nutritional or health properties
- the physical appearance or texture of the food
- fantasy and adventure themes
- fun and humour
- price
- novelty

The most popular appeals used in the promotion of foods to children are hedonistic, including taste, humour, action-adventure and fun. For example, an early American study found that although 98% of toy adverts used a serious appeal, over 90% of food adverts used a humorous appeal (Atkin, 1975a/Atkin

& Heald, 1977). Similarly, a more recent study of advertising in the Netherlands found that nearly 90% of children's food adverts used taste as an appeal and around 85% used humour (Buijzen & Valkenburg, 2002). In the Islamic Republic of Iran, one study found that 56% of food adverts to children used 'taste' appeals (Maryam et al., 2005). In general, breakfast cereal adverts alone were found to regularly use nutritional appeals, regardless of whether or not these appeals were deemed to be misleading (Lobstein et al., 2008; Ho & Len, 2008).

Twelve studies examined the nature of disclaimers. Other products advertised to children, such as toys, were much more likely to use disclaimers than were food items and services, although the chief exception to this pattern was breakfast cereals. Where disclaimers were used, adverts for products like breakfast cereals, candy and gum tended to use informative disclaimers (referring to what the product does do), while fast-food restaurants tended to use restrictive disclaimers (referring to what the product does not do) (Muehling & Kolbe, 1998). The recent study by Gantz et al. (2007) into television food advertising to children in the USA found that 22% of food advertising to children or teens included a disclaimer (e.g. "part of a balanced diet" or "enjoy in moderation").

Some research suggests that adverts designed to promote food to children utilize 'pester-power' or 'purchase-influence-attempts'. A commonplace creative strategy employing pester-power identified in the literature is the use of premiums or competition. Prizes include collectibles (e.g. toys), and the use of celebrity figures (although only limited cases). Moore's study of food marketing to children online found that 38% of websites used incentives for product purchases such as access to video-gaming tips after keying in a code from a bought food package (Moore, 2006; 2008; Moore & Rideout, 2007). Six studies examining programme-commercial tie-ins found the boundary between television shows and advert breaks to be unclear. The food products mainly promoted through show sponsorship or utilizing tie-ins, tended to be those categorized as pre-sugared or of low nutritional value (e.g. Consumers International, 1996; Hawkes, 2002).

Time trends, examined in ten studies, suggest that the basic creative strategies used to promote food to children are beginning to change. The increasing use of new media is giving rise to a host of new potential creative strategies. Social networking, viral marketing, instant messaging, virtual worlds (Chester & Montgomery, 2007; 2008), and the evolution of brand-stretching and 'globalization' is allowing promotional messages to cut across many different media and also allowing increased tie-ins with below-the-line marketing activities (Which?, 2008; Lobstein et al., 2008).

This review found that themes of fun and fantasy, or taste and flavourings, rather than health and nutrition, continue (as in the 2006 review) to be used to promote food to children.

4.1.4 CONCLUSION

From the research evidence, children's food promotion has been dominated by television advertising over the past few decades. The majority of this promotes the 'Big Five' group of food products, namely pre-sugared breakfast cereals, soft-drinks, confectionary, savoury snacks and fast-food outlets. There is some evidence that the dominance of television has begun to diminish particularly with the rise of digital media. The importance of strong, global branding reinforces a need for multifaceted communications combining television with merchandising, 'tie-ins' and point-of-sale activity.

The advertised diet contrasts sharply with that recommended by public health advisers. Themes of fun and fantasy, or taste, are used to promote to children. Health and nutrition is not a common theme for promotion, and the recommended diet for long term good health gets little marketing support.

4.2 Food promotion and marketing in developing and middle income countries

This section examines the main strategies and channels used by food marketers in developing countries and 'emerging economies' – countries where increased openness of markets and/or increased personal disposable incomes has been followed by increased activity in food marketing, particularly of added-value foods and globally traded products. The Hastings et al. 2006 review conducted additional desk research on food marketing in developing countries and rapidly growing markets using a variety of data sources (e.g. business and marketing press and journals and commentaries from non-government organizations) to highlight the interaction of modern food marketing strategies and techniques with local cultures and socioeconomic change. Children and young people play a critical role in this change process, and represent an important target market. Research from low and middle income economies found using the search strategies detailed in Annex 1 updates this.

4.2.1 WHAT MARKETING STRATEGIES ARE BEING USED TO PROMOTE FOODS IN DEVELOPING AND MIDDLE INCOME COUNTRIES?

Four marketing strategies were identified:

- (i) widespread adoption of international marketing and promotion techniques
- (ii) marketing strategies that target children and families
- (iii) adaptation of products and services to local markets
- (iv) promotion of a sub-optimal dietary profile

(i) Widespread adoption of international marketing and promotion techniques

Promotional techniques and channels used to market food to children and young people in developing and middle income countries include television advertising, on-pack promotions, cartoon characters and animation, interactive websites, sponsorship of school activities, sports and competitions. Robinson (2008) conducted a cross-sectional content analysis of food product marketing in the Asia Pacific region. The extensive use of sponsorship, advertising, price incentives, free gifts and

on-pack promotions, celebrity endorsements, movie tie ins, language teaching, clubs and party offers, school targeting by the six multinational food and drink companies with greatest market share in the region was reported.

Building brand loyalty

Some techniques, such as free club memberships, and strong logos and characters are particularly effective in building brand value and loyalty. Hawkes (2002) noted Pizza Hut statements on instilling brand loyalty in young children through the use of animated advertisements (Advertising Age, 2000, as cited by Hawkes, 2002). In China, Kentucky Fried Chicken (KFC) created Chicky, a cartoon, baseball-cap-wearing chicken to replace the traditional Colonel Sanders figurehead (Watson, 2000a). Ho & Len (2008) audited the marketing of breakfast cereal products in Malaysia and found extensive use of a brand building techniques, such as sponsorships, cartoon characters and animation.

Television advertising

Television remains a key channel for marketing food to children in many countries. Vignali (2001) stated that the success experienced by McDonald's in East Asia could not have been achieved without appealing to children and teenagers through television advertising. In 2004, Pizza Hut spent approximately \$US 2.5 million on television advertising in India (Exchange for Media, 2004). In Thailand, TV advertising was identified as the most important medium for snack food advertising to the young (Mulchand, 2004, as cited by Hawkes, 2006). Atktas Arnas (2006) analysed advertising content of children's TV programming in Turkey and found 344 out of 755 adverts were for food products. Galcheva, Iotova & Stratev (2008) found 33% of advertising during children's TV time in Bulgaria was for food and beverages. Karupiah (2008) found advertising of food products in Malaysia was most intensive during children's prime time viewing periods, including holidays, school vacation time and weekends. Temple, Steyn & Nadomane (2008) found 17% of South Africa TV advertising during children's programming was for food and beverages.

Sports stars and celebrities

Sponsorship strategies combine the support of global events such as the Olympic Games and the FIFA (Fédération Internationale de Football Association) World Cup, where internationally-known pop celebrities and sports stars cut across national boundaries, with local activity. For example, Hawkes (2002) notes KFC sponsorship of basketball, a sport with many young fans in developing countries, and badminton in Malaysia where it is particularly popular. It seems to be effective: in their study of brand recall from cricket advertising, LODESTAR attributed PepsiCo's higher recognition status in India, than Coca-Cola, to its long established association with the nation's passion, cricket. Endorsement by famous cricketers and its high visibility at matches appears to be more effective than Coca-Cola's greater TV advertising spend (LODESTAR, 2002).

Collectable toys

Fast-food retailers have child-specific menu choices, such as the McDonald's 'Happy Meal' and KFCs 'Chicky Meal', and a mainstay of these is a 'free' toy which is typically part of a collectable set and therefore encourages several restaurant visits. This strategy has been particularly successful in countries where historically there has been a scarcity of manufactured toys. Hawkes notes their presence has generated massive buying activity and even sit-ins when the supply of toys ran out (Hawkes, 2002).

Child-oriented distribution, including targeting of schools

Hawkes (2002) charts the expansion of soft drinks manufacturers into schools in South America with the use of promotional gift packs. This targeting of schools is credited with raising consumption by schoolchildren by 50% in Costa Rica (Panamco, 1998, as cited by Hawkes, 2002). Focusing on the connection with 'place' she notes how buying opportunities have been made available in or near schools or other areas where teenagers congregate, such as cinemas and cafés. Ho & Len (2008) describe the use of school programmes in Malaysia to promote breakfast cereals, Robinson (2008) also found sponsorship of school sports in the Asia Pacific region an integral part of the marketing strategies of multinational food and drink companies.

Interactive websites

A survey of 32 low, lower middle, and upper middle income countries (Lobstein et al., 2008) and the Asia Pacific survey (Robinson, 2008) both note the use of interactive websites offering entertainment such as games, puzzles, cartoons, as well as free offers such as ring tones and competition prizes. The authors report that sites did not require parental consent.

(ii) Marketing strategies that target children and families

Creative strategies known to attract and engage children in the developed world, and described in Section 4.1 are found to be similarly employed in lower income countries. There is strong emphasis on fun, fantasy, excitement as well as novelty in taste and appearance of foods and ingredients (Robinson, 2008; Lobstein et al., 2008; Galcheva, Iotova & Stratev, 2008; Ho & Len, 2008).

Additionally, Ho & Len (2008) and Lobstein et al. (2008) describe marketing appeals to parents of child-oriented products. These messages emphasize nutrition and growth, academic and sporting success and family harmony. Parents may therefore be simultaneously experiencing both health and nutrition reassurance messages from manufacturers and retailers, and demand stimulated by creative messages for the marketed products from their children.

Marketers are recognizing and responding to the growing importance of children as purchase influencers in developing countries. This is particularly marked in China, which has seen a shift from children as the passive recipients of food chosen by their parents/caregivers in the 1960s to a 1990s environment where a Beijing study⁵ credited children with determining 70% of household spending. McNeal & Yeh (1997) found that in the 4–10-year-old age group, food stores were a frequent target for

⁵ Research by James McNeal and colleagues in Beijing, cited in *Asiaweek*, 1 Dec., 1995

children's considerable influence on their parents' purchasing. Ethnological studies by Watson record the important part played by children in the acceptance of western style fast-food chains in the late 1980s. For example, fast-food outlets empowered Chinese youngsters to act as cultural guides to the fast-food experience for their parents and elders (Watson, 2000a). China's adoption of a one child policy in 1979 has resulted in a '4-2-1 indulgence factor' where four grandparents and two parents focus their attention and money for treats on one child. This money and children's own spending money is frequently spent in fast-food outlets (McNeal & Yeh, 1997). The market potential of children in China is enormous. Average child-related consumption was estimated in 2003 to represent one third of household consumption in 85% of households (Ying, 2003, as cited by Chan, 2005).

Other studies note how marketers have identified children in developing and emerging economies as consumers in their own right. McNeal & Yeh (1997) describe how McDonald's and Pizza Hut have relied heavily on children to expand their overseas market in both Europe and Pacific Asia.

Watson (2000a) notes that a 'fun' atmosphere, child-oriented brightly-coloured picture menus and the partial withdrawal of adult supervision helped counteract the traditionally subordinate position of the young in Chinese culture, and promote their freedom to choose. Similarly, Vignali (2001) notes that McDonald's mascot Ronald was paired with a female Aunt McDonald in Beijing, and that each restaurant assigns between five and ten female assistants to take care of children and talk to parents.

As noted above, the marketing of dairy products is substantial (Aktas Arnas, 2006; Karupiah 2008; Temple, Steyn & Nadomane, 2008). In many of these countries milk is not a traditional foodstuff, and the marketing activity noted in these studies may reflect corporate efforts to build new product sectors through children and their families.

(iii) Adapting products and services to local markets

Food marketers aim to create a standardized product, but recognize that the ability to adapt to local environments is also very important: they 'think global, act local' (Vignali, 2001). This affects both the products they develop and the service environment in which these are delivered.

Taste, for instance, is a crucial characteristic of food products, and a study by the American Agricultural Trade Office aimed at promoting American trade noted that suppliers should be aware of the specific taste factors that are successful in winning customers (Baker, 2000). Similarly Vignali notes incidences of McDonald's having to adapt to the needs of specific religious laws, such as abstinence from eating beef by Hindus and pork by Muslims. This adaptation goes beyond religious observance to cater for local tastes, with Teriyaki Burgers sold in Japan and Samurai Pork Burgers with sweet sauce meeting the taste requirements of customers in Thailand (Vignali, 2001). Pizza Hut, the world's largest pizza chain with over 12,500 restaurants across 91 countries first entered India in 1996. More vegetarian

pizza recipes were developed and a number of vegetarian-only outlets opened, the only ones in the world.

Vignali (2001) also notes that the developed country style of fast food is viewed as a high quality product. Lee & Ulgado (1997) utilized a perceived service value questionnaire (measurement of the gap between expectations and perceptions of performance levels) to test for differences in American consumers and those in the Republic of Korea. Low prices were seen as paramount to the American consumer whereas customers in the Republic of Korea placed more weight on service dimensions such as reliability and empathy. The authors also note that while Americans put the emphasis on *fast* food, Asians see eating, especially at a restaurant, as a more social, family-oriented experience (Copelands, 1985, as cited by Lee & Ulgado, 1997; Hall, 1966, as cited by Lee & Ulgado, 1997).

Witkowski and colleagues (2003) of the California State University compared the brand identity of KFC in China and America by surveying 795 students and concluded that Chinese consumers valued different attributes. For example, they found that fast-food restaurants provided a safe environment for Asian women, because they are both alcohol and smoke free (Watson, 1997, as cited by Witkowski, Ma & Zheng, 2003). (KFC is one of the few restaurants in China that does not permit smoking according to Iritani, 2001, as cited by Witkowski, Ma & Zheng, 2003.) Compared to their American counterparts, Chinese consumers were more likely to eat *within* fast-food restaurants and to stay longer. Reasons suggested include a lack of cars, which militate against drive-through facilities; a culture of slower eating; and the higher relative cost of eating at a fast-food restaurant encouraging an inclination to linger. Furthermore, global company outlets are perceived to offer better standards of hygiene and a more relaxed atmosphere than indigenous retailers. Overall, Chinese respondents reported a more positive brand impression of KFC than their American counterparts (Witkowski, Ma & Zheng, 2003).

Food marketers also attract market share with product and service positioning that offers modern, international eating experiences. Being seen to eat in global fast-food chains can enhance status. Anderson & He (1999) cite Lu's 1994 observation, that Chinese teenagers did not like pizza, but would visit Pizza Hut to be seen. Watson (2000b) noted that during McDonald's early years in China, it was promoted as an outpost of authentic American culture, offering authentic American hamburgers. Fast-food outlets can become the place to be seen, offering the food to be seen eating for an age group noted for their susceptibility to peer pressure (Wiener, 2004).

Watson (2000a) has also observed that marketing innovations can trigger cultural change. For example, the introduction of events and services marking traditional western celebrations. Solar birthdays, Thanksgiving, Halloween, Fathers' and Mothers' Day are examples of these previously unknown special occasions that fast-food restaurants have actively introduced to developing economy cultures and have in turn generated important marketing and positioning opportunities. Watson (2000a) notes that birthday parties became so popular in Beijing that KFC had to rapidly build special reserved areas in the

restaurant. McDonald's birthday parties for children were led by Aunt McDonald introducing party-goers to singing 'Happy Birthday' and other novel experiences.

(iv) Promotion of a sub-optimal dietary profile

The cross-sectional surveys of food and marketing activities in 32 low or middle income countries by Lobstein et al. (2008), and the Asia Pacific region by Robinson (2008), found food promotion was heavily concentrated on high fat, salt and/or sugar, with particular focus on salty snacks, sweets/candy and chocolates, sweetened breakfast cereals and soft drinks.

Similarly, content analysis of TV advertising found the emphasis was very heavily concentrated on energy dense, low nutrient foods. In Bulgaria, Galcheva, Iotova & Stratev (2008) found the most commonly advertised products were salty and sweetened snacks and cereals, sweets, soft drinks and juices and salty foods and no commercials for fruit or vegetables. In Malaysia, Karupiah (2008) reported the most frequently advertised foods on children's TV were snacks (34.5%), dairy products (20.3%), sugars and candies (13.4%), biscuits (11.2%), fast food (6.7%), breakfast cereals (6.4%) , beverages (4.1%) as well as a range of other miscellaneous processed products. No fruit or vegetable advertisements were reported. In South Africa, Temple, Steyn & Nadomane (2008) found 55% of TV food advertising was for foods of 'poor nutritional value' and there were no advertisements for fruit or vegetables.

The advertised diet in the low and middle income countries surveyed therefore contrasts sharply with recommended optimal dietary patterns which emphasize generous quantities of fruit, vegetables, complex, unsweetened carbohydrates and moderate intakes of lean protein and calcium sources.

There is evidence that children do not understand the nature of advertising. Chan (2000) tested 448 children aged 5–12 years in China, Hong Kong Special Administrative Region (SAR), and found that only half of those aged 11–12 years understood that television stations get paid to broadcast commercials.

4.2.2 CONCLUSION

Although data are sparse it is clear children in developing and emerging economies are being widely and effectively targeted by energy-dense food promotion, using the same techniques as in developed economies. Cultural and political developments have enabled and facilitated this initially, but marketing and promotion have developed and accelerated the change process. Children are a key target group, both as consumers in their own right, and as a bridgehead into wider society.

4.3 The effects of food promotion to children

This section examines evidence of the effects of food promotion on children. Effects on behaviours (purchase, or purchase requests, consumption patterns), potential determinants of behaviour (preference, attitudes, knowledge, beliefs) and diet-related health outcomes (adiposity, physiological indicators etc) were all considered. Section 4.3.1 reviews the evidence provided by observational and correlation studies, and 4.3.2 reviews studies designed to examine causality. A summary of all the studies included in this section is provided in the data extraction tables in Annex 3.

4.3.1 HOW DO CHILDREN RESPOND TO FOOD PROMOTION?

This section provides an overview of narrative studies and studies that explored the qualitative nature of the associations between food marketing and children's responses. Forty studies are included in this section of the review. Sixteen of these studies were conducted in developing countries including Chile, India, the Islamic Republic of Iran, Saudi Arabia, the Bolivarian Republic of Venezuela and Puerto Rico. A large number of studies were conducted in the USA. Research identified from New Zealand, Australia, Turkey, Canada and the United Kingdom is also included here.

The studies examine nine different types of response to food promotion: recall of food advertising, liking for and attitudes towards food advertising, communication about food advertising, purchase-request behaviour perceived to be triggered by food promotion, responses to free gifts and packaging, food preferences, food purchase behaviour, and food consumption behaviour. Differential responses according to age, gender, socioeconomic status and race were reported in some studies and in many of the studies these factors were recognized as potentially confounding variables. However, no consistent pattern in the analysis of potential confounding factors was apparent and therefore it was not possible to draw any conclusions on the pattern of interactions, except to note that these were recognized in the research but require more robust control and analysis in future research.

Many studies found strong recall of food adverts by children. Hitchings & Moynihan (1998) found that 9–10-year-old English children were able to recall seeing adverts in the past two weeks in seven different food product categories. Barry & Hansen (1973) found second grade black and white children could recall advertising content. Batada et al. (2008) found half of a sample of 58 children could accurately match from memory, and without prompting at least 5 of 10 logos/characters with TV advertisements for breakfast cereals. Studies from the developing world produced similar results and also reported that food adverts tended to be among children's favourites. For example, Olivares et al. (1999) found that 80% of children interviewed in Chile were able to recall food adverts that they liked.

Carruth, Goldberg & Skinner (1991) and Yavas & Abdul-Gader (1993) found that children discussed food promotion with peers and families. Lam (1978); Del Toro & Greenberg (1989); Yavas & Abdul-Gader (1993) found children asked their parents to buy

food they had seen advertised. A further nine studies found that parents believed their children were influenced by food promotion to request specific foods and most acceded to these requests at least sometimes. For example, Musaiger et al. (1986) found children requested food products that they had seen advertised and mothers in lower socioeconomic groups were more responsive to children's requests than more affluent mothers. Aktas Arnas (2006) surveyed 348 mothers and found 33% reported their children requested food products advertised on TV while viewing and 40% requested products during shopping trips, with 9% reporting that refusal could provoke arguments or crying. Chamberlain, Wang & Robinson (2006) examined children's screen media time and food requests in a prospective study which treated screen time as a proxy for TV food advertising exposure. The association between baseline screen viewing and requests for advertised foods at baseline and 7-20 months later was statistically significant, after adjusting for socio-demographic factors.

Four studies observed that free gifts and packaging attributes appeared to attract children's attention and stimulate demand for products (Atkin, 1975b/1978; Donohue, 1975; Carruth et al., 2000; Folta, Bourbeau & Goldberg 2008). Olivares et al. (1999) and Olivares, Yáñez & Díaz (2003) reported that TV advertising of promotions and free gifts prompted purchase and nearly 65% of children interviewed said they continued to purchase these products even when the promotional offer had ended. The authors comment that children's purchase choices are consistent with their advertising preferences and for the food products most frequently advertised on television. Most popular purchases were snacks, fizzy drinks/juice and yoghurt or milk products. Folta, Bourbeau & Goldberg (2008) also found that free gifts increased liking for food products, despite the study sample (average age over 9 years) expressing scepticism of marketing communications.

Several studies explored marketing and children's preferences for food products. Olivares et al. (1999) asked children in Chile about their favourite types of food 'in accordance with their favourite food adverts'. Favourite types of food were snacks (56%), ready meals (22%), home-made meals (22%) and fizzy drinks (just less than 75%). Dixon et al. (2007), in a combination of experimental and cross-sectional research, and Marshall, O'Donohoe & Kline (2007), who used a combination of secondary analysis and qualitative methods, all found TV advertisements increased liking and acceptability of advertised products. Moya de Sifontes & Dehollain (1986) interviewed mothers in the Bolivarian Republic of Venezuela, who reported that children's preferred foods were chocolate drinks, cereals, jelly, pork, sausages and ice cream. The study also found a significant association between the amounts of time children spend watching advertising, and their preferences for commercial foods advertised in the media.

Carruth, Goldberg & Skinner (1991) found 8% of North American students reported that seeing a food advert made them want to get something to eat 'every day'. Sixty six per cent of the sample reported similar responses less frequently and 27% 'never'. Similarly, qualitative research and secondary analysis of data by Marshall, O'Donohoe & Kline (2007) found

children reported watching food adverts made them 'feel hungry' and increased purchase desire/intent.

Purchase behaviour was examined by Olivares et al. (1999) who found that nearly three-quarters of children said that they purchased food or drink products advertised on television with offers of prizes or free gifts. This effect was greater among children from low and middle socioeconomic groups. Olivares, Yáñez & Díaz (2003) found that 34% of children 'always' had the money to buy whatever food and drink products they wished and 64% said they 'sometimes' had the money. Most popular purchase choices were sweet or salty products, and drinks. An Iranian study reported that over 90% of interviewed students reported they selected foods "under the influence of advertised products" (Maryam et al., 2005). Olivares et al. (1999) asked children if they had consumed food or drinks that had been advertised the previous day. Half of 6–8 year olds and two-thirds of 9–11 year olds said that they had consumed advertised products. In a later study by Olivares, Yáñez & Díaz (2003), 40% of children interviewed reported that they had consumed sweet or salty products advertised.

Carruth, Goldberg & Skinner (1991) and Aktas Arnas (2006) both found foods consumed while watching TV were largely those most commonly advertised on TV. Secondary analysis of cross-sectional data by Utter, Scragg & Schaaf (2006), and a large number of similar studies, have found TV viewing time was positively associated with overall consumption of foods most commonly advertised on TV.

However, without some test of validity of TV viewing as a proxy for advertising exposure, these observational studies provide useful contextual data and highlight areas for future research, but do not demonstrate exact correlation of TV viewing and exposure to TV advertising.

Any impact of food consumption patterns is likely to be moderated by parents and other caregivers. Marshall, O'Donohoe & Kline (2007) and Aktas Arnas (2006) for example both found parental control of children's purchase and consumption preferences to be important. However, as outlined above, many children have the financial means to make purchase and consumption decisions. For example, in Olivares, Yáñez & Díaz (2003), 34% of children 'always' had the money to buy whatever food and drink products they wished and 64% said they 'sometimes' had the money independently of their parents/caregivers.

The studies examined in this section indicate that the creative strategies examined in Sections 4.1 and 4.2 have persuasive power. In all the studies that include a note on the content of the food promotion explored in the research, content was predominantly or exclusively for energy dense, processed food products. Children were found to be aware, and to enjoy food promotions. A number of studies found an association between exposure to food marketing and/or food promotion channels with food preferences, purchasing and consumption patterns of the promoted food products.

4.3.2 IS THERE A CAUSAL LINK BETWEEN FOOD PROMOTION AND CHILDREN'S FOOD-RELATED KNOWLEDGE, ATTITUDES, BEHAVIOURS AND HEALTH STATUS?

To answer this question, and in view of the complexity of both the environment in which food promotion occurs and possible food-related intrapersonal responses which may moderate effect, Bradford-Hill's (Bradford-Hill, 1965) principles on inferring causality were used to guide the review process. The approach therefore aimed to establish if the cumulative evidence demonstrated consistency in direction and scale of any correlation found between food promotion and food and health related outcomes across multiple methodologies. In addition, all the research included here met at least one of the following criteria: that exposure preceded effect; that the pattern of the association was incremental/dose-responsive; that the association demonstrated specificity between the independent variable (i.e. food promotion) and the dependent variable (i.e. food-related individual outcome measure); that direction of effects measures were consistent across different sample groups or methods; that on withdrawal of the exposure, the exposure-effect association was reversible.

Experimental studies can provide direct measures of the outcome effects, in response to food promotion while controlling for potential confounding factors and bias, but findings and conclusions inevitably have limited generalizability. Observational and cross-sectional studies offer stronger ecological validity but their real-world setting means control for selection bias and confounding variables is less strong. The strength or significance of the findings from whichever research methodologies are used is a function of the computed statistical significance, the research design, contextual influences, as well as the clarity and accuracy of the reporting of findings and conclusions. Therefore all the papers reviewed here were first screened for their putative ability to infer causality from measured associations using the Bradford-Hill guidelines, and in a second stage, the strength of evidence was reviewed against five criteria of the robustness of the research design, analysis and reporting (see Section 3.4, Box 2), as well as the strength of the statistical test results.

Forty six studies were included on the basis that their design could test causality. All of these were conducted in developed economies, mainly North America and Europe. Twenty nine were experimental studies, one was quasi-experimental, thirteen were cross-sectional and three were observational.

Each of these studies was then judged against the five quality criteria described in Section 3.4 and the results of the statistical analysis.

The results are discussed under the following question headings:

- (i) Does food promotion influence children's nutritional knowledge?
- (ii) Does food promotion influence children's food preferences?
- (iii) Does food promotion influence children's food purchasing and purchase-related behaviour?
- (iv) Does food promotion influence children's food consumption behaviour?
- (v) Does food promotion influence children's diet and health-related variables?

(i) Does food promotion influence children's nutritional knowledge?

Nine studies investigated the influence of food promotion on children's nutrition knowledge. Five were randomized control design, and four were cross-sectional surveys. Two studies were higher scoring and seven were medium scoring. With one exception all were conducted with North American respondent samples. Most were conducted during the 1970s and 1980s.

Five studies found food promotion had an effect on, or was associated with, differences in nutrition knowledge. Two were experimental (Ross et al., 1980/1981; Peterson et al., 1984) and three were cross-sectional (Wiman & Newman, 1989; Gracey et al., 1996; Harrison & Marske, 2005). Three of the five studies provided evidence that exposure to food promotion for 'low nutrition foods' was associated with poorer nutrition knowledge. One study found that television viewing had a significant detrimental effect on nutrition knowledge in relation to foods that are heavily marketed as 'diet' foods (Harrison & Marske, 2005). Peterson et al. (1984) found that exposure to adverts for foods "high in nutritional value" increased nutrition knowledge, although it was not possible to separate out the effects of the adverts from other nutrition messages in the study.

Three studies found no association between exposure to food promotion and children's perceptions of the healthfulness of different foods or what constitutes a healthy diet. Two of these were experimental (Goldberg, Gorn & Gibson, 1978a/1978b Study 1; Goldberg, Gorn & Gibson, 1978a/1978b Study 2) and one was cross-sectional (Atkin, 1975c). The study by Galst (1980) produced inconclusive results.

In two of the studies (one which found an effect and one where the results were inconclusive) it was not possible to separate out the effects of advertising from other exposure variables (Galst, 1980; Peterson et al., 1984). Furthermore, studies which found effects tended to use more detailed knowledge measures than did the studies which did not find effects. It is possible, therefore that the studies were not measuring the same effect.

The weight of evidence suggests that food promotion may have little influence on children's general perceptions of what constitutes a healthy diet, but that it can, in certain circumstances, have an effect on specific types of nutrition knowledge. Overall, the evidence therefore was assessed as modest rather than strong.

(ii) Does food promotion influence children's food preferences?

Eighteen studies investigated the influence of food promotion on children's food preferences. Seventeen were experimental, and one was a cross-sectional study. The studies covered a wide age range, including the 2–15 years age range examined for this review, and some also included young people up to 18 years). The majority of the studies were conducted in North America during the 1980s.

Ten of the studies found that exposure to food promotion had an impact on, or was associated with significant changes in children's food preferences (Goldberg, Gorn & Gibson, 1978a/1978b Study 1; Gorn & Goldberg, 1980a; Heslop & Ryan,

1980; Stoneman & Brody, 1981; Kaufman & Sandman, 1983; Norton, Falciglia & Ricketts, 2000; Borzekowski & Robinson, 2001; Robinson et al., 2007; Chernin, 2008; Halford et al., 2008b). Three of these were rated as high quality experimental studies (Goldberg, Gorn & Gibson, 1978a & 1978b; Stoneman & Brody, 1981; Kaufman & Sandman, 1983). The earlier studies found children were significantly more likely to prefer high fat, salt or sugar foods over lower fat, salt or sugar alternatives after exposure to food adverts. The Robinson et al. (2007) study found a direct preference for branded products over identical but unbranded products in a randomized, blinded case-controlled trial. Three studies found children were more likely to choose an advertised brand than a non-advertised brand of the same product type after exposure to food adverts (Gorn & Goldberg, 1980a; Heslop & Ryan, 1980; Borzekowski & Robinson, 2001). One cross-sectional study found a weak association between television advertising and preferences for specific foods (Norton, Falciglia & Ricketts, 2000).

Six studies (five experimental and one cross-sectional study) did not find statistically significant associations (Goldberg, Gorn & Gibson, 1978a/1978b Study 2; Ritchey & Olson, 1983; Clarke, 1984; Peterson et al., 1984; Gorn & Florsheim, 1985; Neeley & Schumann, 2004).

Overall, the stronger studies found evidence of significant effects and the less robust studies did not. Cumulatively, therefore the research reviewed indicates modest strength evidence that food promotion influences food preferences.

(iii) Does food promotion influence children's food purchasing and purchase-related behaviour?

Eight studies which examined the impact of food promotion on children's food purchasing and purchase-related behaviour were reviewed. Purchase-related behaviour was defined as behaviour intended to influence parents' food purchasing selections. Three were randomized controlled experimental studies, one was a natural quasi-experiment, two were observational studies, and two were cross-sectional surveys. In terms of quality, four were higher scoring, three were medium scoring, and one was lower scoring.

Seven studies found exposure to food promotion was significantly associated with specific purchases or purchase-related behaviours measured in each study. Bridges & Briesch (2006) observational study did not find an association between point of sale promotions or a proxy measure of exposure to advertising and household purchase of child-oriented products. One experimental study (French et al., 2001) found that promotional signage on vending machines significantly increased sales of low fat snacks in secondary schools. This effect persisted, with and without price reductions. This study provided the most robust evidence for a causal link between promotion and actual purchasing behaviour by children. One study was a natural experiment (Goldberg, 1990). This compared the household purchase of breakfast cereals between English-speaking children in Quebec, exposed to American television, and French-speaking children who had access to American television but tended to watch more French-language television. At the time of research (1980), French-language Quebec TV

banned advertising targeting children; and therefore French speaking children were less likely to be exposed to advertising for children's cereals. Regression analysis found exposure to American television was significantly associated with increased household purchase of advertised cereals, independently of income and language variables.

Two experimental studies found that exposure to food promotion increased children's purchase behaviour observed in a natural setting (supermarket shopping with parents) (Galst & White, 1976; Stoneman & Brody, 1982). The former study also found that the more attentive a child was to television advertising, relative to television programmes, the greater the number of attempts to influence parental shopping purchases at the supermarket. One observational study (Reeves & Atkin, 1979) and one cross-sectional study (Atkin, 1975c) also found significant associations between amount of Saturday morning television viewed and frequency of food purchase requests to parents, with 'heavy' viewers in both studies making more requests than 'light' viewers. The Taras et al. (1989) cross-sectional study found a weak association between television watching in general and food purchase requests to mothers.

Overall, the studies provide strong evidence that food promotion influences children's food purchase-related behaviour. Both the methodologically stronger and weaker studies found evidence of effects. One study, found a positive association between purchase of low fat snack sales and low fat food promotion. Other studies identified effects in the direction of increasing purchase requests for foods high in fat, sugar or salt.

(iv) Does food promotion influence children's food consumption behaviour?

Eighteen studies investigated the effects of exposure to food promotion on children's food consumption behaviour. Consumption behaviour was defined as including consumption of food on a single occasion, daily selection of foods for consumption over a short period of time, and self-reported patterns of consumption behaviour. Twelve studies used experimental designs, five were cross-sectional studies and one was a prospective observational study. Two studies scored high on the quality rating, 13 were medium scoring, and three were lower scoring. Fourteen studies were North American and four were European studies.

Six experimental studies using TV advert exposure as the treatment variable found food promotion had a significant effect on children's consumption behaviour. The effects included increased frequency of selecting less healthful food in preference to healthier options (Gorn & Goldberg, 1980b/1982); increased consumption of calories (Jeffrey, McLellarn & Fox, 1982 Study 2/ Fox, 1981; Halford et al., 2007; 2008a; Wiecha et al., 2006), and total increased food intake (Halford et al., 2004; 2007; 2008a).

Five cross-sectional studies (Atkin, 1975c; Bolton, 1983; Ritchey & Olson, 1983; Boynton-Jarrett et al., 2003; Buijzen, Schuurman & Bomhof, 2008) found small associations, of varying degrees of strength, between exposure to television food advertising (as measured using television viewing) and frequency of snacking or consumption of specific foods. The studies were of varying quality. Boynton-Jarrett et al. (2003) found that for each

additional hour of television children viewed per day, daily consumption of fruit and vegetables was reduced by 0.14 servings. Buijzen, Schuurman & Bomhof (2008) found the association between consumption of branded products advertised on TV was moderated by income and by parental communication styles.

A prospective observational study (Wiecha et al., 2006) found a positive association between TV viewing and food calorie intake. Regression analysis of food frequency questionnaires indicated this may be mediated by increased consumption of energy dense, low nutrient foods commonly advertised on TV but the design did not provide direct evidence of this.

Two studies found variations in consumption behaviour, according to exposure to food promotion, but results were not statistically significant (Jeffrey, McLellarn & Fox, 1982 Study 1; Dawson et al., 1988). Four studies produced inconclusive results. In Galst (1980) and Peterson et al. (1984) it was not possible to disentangle the effects of food promotion from other experimental stimuli examined at the same time. Two studies (Cantor, 1981; Gorn & Goldberg, 1980a) found exposure to food promotion under certain conditions had an effect on consumption behaviour but under other conditions it did not, and therefore no overall consistency in direction of the potential effect was apparent.

Overall, the studies provide modest evidence that food promotion does influence consumption behaviour under certain conditions. However, there were some inconsistencies in some studies and some did not find any statistically positive association.

(v) Does food promotion influence children's diet and health status?

Seven cross-sectional studies addressed this question. Four investigated the relationship between television viewing and children's diet (Bolton, 1983; Gracey et al., 1996; Taras et al., 1989; Coon et al., 2001). The other three studies examined health-related variables: two examined the relationship between television viewing and obesity (Dietz & Gortmaker, 1985; Matheson et al., 2004) and one (Wong et al., 1992) examined the relationship between television and video viewing and blood cholesterol levels. One of the studies was higher scoring in terms of quality, five were medium scoring and one was lower scoring.

All four dietary studies found significant associations, of varying strength, between television viewing and dietary intake. Bolton's study (1983), the higher scoring study, found that food advertising exposure as calculated from children's television viewing diaries was significantly related to children's snacking frequency and lower nutrient efficiency of the diet. Coon et al. (2001) found a significant association between the television being on during meals and a poorer quality diet. Others found weak evidence of a relationship between television watching and fat intake (Taras et al., 1989; Gracey et al., 1996).

Dietz & Gortmaker (1985) found a significant relationship between television viewing and obesity. Wong et al. (1992) found a statistically significant relationship between television viewing/video game playing and high blood cholesterol levels.

Overall, there was evidence of small but significant correlation between television viewing and diet quality (four studies), obesity (two studies) and blood cholesterol levels (one study). In six of the studies, the potential effect of food advertising on this relationship could not be disentangled from the general effect of television viewing. The effects may have been attributable to the impact of the advertising seen while watching television, the impact of other messages seen while watching television, such as programme content, or to the sedentary nature of the activity itself (Dietz & Gortmaker, 1985). Alternatively, it is possible that a high level of television viewing acts as a marker for a complex set of attitudes and behaviours within the family, which taken together lead to observed associations between television and children's food-related behaviour and diets (Coon et al., 2001). However, the Bolton study (1983) did measure the specific contribution of food advertising. Detailed television viewing diaries enabled a calculation of the extent to which each subject was exposed specifically to food advertising rather than simply the amount of time the subject spent watching television in general. The results showed that the greater a child's food advertising exposure, the more frequent his or her snacking and the lower the nutrient efficiency of his/her diet.

4.3.3 CONCLUSION

Evidence from simpler, descriptive studies demonstrates that children in both the developed and developing world have extensive recall of food advertising. Food adverts are among their favourite types of advertising, with the most popular being for chocolate, sweets, soft drinks and other foods high in fat, sugar and salt (e.g. snacks, fizzy drinks, and chocolate). Their response to food promotion is carried forward into their communication and shopping behaviours.

Evidence from many of the more complex studies, capable of inferring causality, demonstrate a statistically significant association between food promotion and children's knowledge, attitudes, behaviours and health status. In terms of nutrition knowledge, food advertising seems to have little influence on children's general perceptions of what constitutes a healthy diet, but in certain contexts it does have an effect on more specific nutrition knowledge. There is also evidence that food promotion influences children's food preferences, and encourages purchase and purchase requests to parents for the advertised foods. Food promotion was also found to influence children's consumption and other diet-related outcomes. These effects are significant, independent of other influences and operate at both brand and category level.

None of the more complex studies were undertaken in the developing world. However, surveys from countries in Asia, the Middle East and South America demonstrate that children are influenced to try advertised foods and often request parents to buy advertised foods. Parents – especially those from disadvantaged backgrounds – frequently accede to these requests. Disadvantaged mothers also attribute more importance and credibility to the advertised food products and the advertising messages, than their more privileged peers. Overall children in developed and developing countries are found to respond to food promotion in similar ways. It is therefore highly likely that any evidence of cause and effect from developed countries is

applicable to children in developing and emerging economies also.

4.4 What is the extent of food promotion's influence relative to other factors?

Eight cross-sectional studies investigated the relative magnitude of effect of food promotion or television viewing compared to other potential influential factors on children's dietary status. Research clearly indicates that socioeconomic status is associated with dietary behaviours and outcomes. However, in most of the studies reviewed here, this is treated as a confounding variable and is therefore not discussed here.

Bolton (1983) and Ritchey & Olson (1983) explored the relative influence of parental dietary behaviours and determinants of behaviour on children's behaviours, determinants of behaviour and diet-related outcomes. Bolton (1983) found that parental snacking behaviour, and energy intake and nutrient efficiency of parental diet were significantly associated with children's own dietary behaviours. The authors do not provide all of the data on relative effects, but do note that "the combined direct and indirect effect of food commercial exposure on children's calorific intake and nutrient efficiency was at most half the size of the direct impact of other predictor variables". Ritchey & Olson (1983) found parents' own diet preferences and consumptions, along with TV viewing, was significantly associated with children's self-reported/parental-reported behaviours and preferences, explaining 35% of the variance in children's preferences. In this study also, although TV viewing was associated with children's preferences and other related variables, exact estimates of the contribution TV viewing to the variance of children's preferences was not presented.

Associations between parental supervision and control of children's exposure to food advertising and dietary intake and dietary outcomes were investigated by Bolton (1983), Buijzen, Schuurman & Bomhof (2008) and Norton, Falciglia & Ricketts (2000). Bolton (1983) did not find the association between parental supervision and diet to be statistically significant. However, Buijzen, Schuurman & Bomhof (2008) found advertising exposure and consumption-related family communication styles were significantly associated with consumption of energy dense products and advertised products. Correlation coefficients were stronger between advertising and food consumption than between communication styles and consumption. The reporting of the data analysis confirms the interaction effects, but does not allow the relative influences to be fully disentangled quantitatively. Norton, Falciglia & Ricketts (2000) found parental food provision was significantly associated with preferences but this was less influential than taste, exposure to advertising, and peer behaviours. Again, no standardized regression coefficients were reported so direct quantitative comparison is not possible.

The influence of peers and friends was investigated by Dietz & Gortmaker (1985) and Norton, Falciglia & Ricketts (2000). Dietz & Gortmaker (1985) found no significant association between friendship and weight status, but Norton, Falciglia & Ricketts (2000) found 'peers eat it' was significantly correlated with preference but the magnitude of effect was slightly less than

advertising exposure.

Overall, parental and peer influence appears to have small but significant effect in some circumstances.

Television watching was treated as both a proxy measure of exposure to TV advertising and an independent variable in its own right. Clearly, TV viewing has the potential to influence outcomes in many ways, for example as sedentary activity replacing more active lifestyles, as an activity associated with snacking or 'grazing', as a communication channel for other messages in addition to advertising and so on. Results of studies reviewed are mixed but on the whole find TV viewing correlates with less desirable outcomes such as higher dietary fat intake. Wong et al. (1992) found that time spent watching television and playing video games was a significant and independent predictor of raised cholesterol in children. Dietz & Gortmaker (1985) found that TV viewing was predictive, at marginally significant levels, of obesity and that this effect occurred independently of prior obesity and family socioeconomic characteristics. Coon et al. (2001) found that the television being on during meals had a significant and independent influence on children's diet. However, it was not possible, from the results presented, to judge the strength of the influence of television during meals relative to the other influences examined. Norton, Falciglia & Ricketts (2000) found that television advertising was significantly associated with preferences for a small number of foods, and that this occurred independently of other motivational factors influencing food preferences. A study by Gracey et al. (1996) provided weak evidence that television watching had a small, marginally significant, independent influence on fat intake and nutrition knowledge, but the relative strength of the influence of television watching was not assessed. In summary, television viewing appears to be independently associated with a number of indicators of less optimal diet, dietary determinants and outcomes, in addition to its influences as a main source of food promotion exposure.

Many of the studies reviewed do not provide sufficient data to allow a quantitative assessment of the relative influences. However, the evidence consistently indicates that advertising and other forms of food promotion are significantly influencers of children's food behaviours and dietary outcomes on a magnitude either similar to or greater than other effects investigated.

4.5 Does food promotion affect total category sales, brand switching or both

Six studies examined the relationship between food promotion, brand preferences, and behaviour. Nine studies examined category preferences and behaviour. The latter group of studies looked specifically at whether food promotion caused children to prefer or consume more foods in 'less healthy' categories than foods in a 'more healthy' categories. All the studies were conducted in North America, except one conducted in Europe. Five were higher scoring in terms of quality, nine were medium scoring, and one was lower scoring.

Two of the brand preference studies (Gorn & Goldberg, 1980a; Borzekowski & Robinson, 2001) found that exposure to food promotion significantly increased children's likelihood of selecting

the advertised food over a non-advertised food. Two studies found that promotion had no effect on brand preferences (Clarke, 1984; Gorn & Florsheim, 1985), and one found only very modest effects in favour of the advertised brand (Heslop & Ryans, 1980).

Robinson et al. (2007) found children aged 3-5 years preferred the taste of foods and drinks presented as McDonald's branded products over identical products presented in plain, unbranded packaging. This effect applied both to products sold by McDonald's and products (carrots) not sold by the restaurant chain at the time of the experiment, indicating brand may be a powerful motivational variable across many food categories, and beyond those featured in promotion and advertising.

Of the nine studies which compared children's preferences or behaviour in relation to foods in higher fat, sugar or salt categories versus foods in lower fat, sugar or salt categories, four found that they were more likely to select higher fat, sugar or salt products in a one-off preferences test (Goldberg, Gorn & Gibson, 1978a/1978b Study 1; Stoneman & Brody, 1981; Kaufman & Sandman, 1983) or for a daily snack (Gorn & Goldberg, 1980b/1982). Goldberg, Gorn & Gibson, 1978a/1978b Study 2 found no significant effects on category preferences, but Buijzen, Schuurman & Bomhof (2008) found brand and category preference around promoted food products. Buijzen, Schuurman & Bomhof (2008) also reported that the association between exposure and consumption of branded products was stronger for higher income families, and in lower income families the strength of association shifted to category consumption and exposure to advertising. The researchers hypothesized this may reflect the greater purchasing power of higher income families to respond to specific brand purchase requests, but this pathway was not explicitly tested. Galst (1980), Peterson et al. (1984) and Cantor (1981) investigated the association between promotion and food category preference and consumption, but overall produced inconclusive results: Cantor (1981) found exposure to food promotion under certain conditions increased children's tendency to consume more dessert foods from a 'sweet' category rather than fruit, but under other conditions the effect became non-significant. In addition, Gorn & Florsheim (1985) found no effect on category preferences.

Although no study provides a thorough comparison of the strength of both types of effect, both types of effect have been examined independently, and there is reasonably strong evidence that both occur. The balance of evidence therefore suggests that the effects of food promotion on food behaviours occur at category level as well as encouraging brand switching.

5. DISCUSSION

This review updates the 2003, 2004 and 2006 reviews (Hastings et al., 2003; McDermott et al., 2004; Hastings et al., 2006). It confirms that in both developed and developing countries: (i) there is a great deal of food promotion to children, particularly in the form of television advertising; (ii) this is typically for highly processed, energy dense, unhealthy products with strong, evocative branding; and (iii) that children recall, enjoy and engage with this advertising.

Children across the world therefore, are exposed to marketing that promotes an unhealthy diet, based on high fat, salt and sugar, energy-dense, low micronutrient products. Globalization of trade, and specifically the opening up of massive markets in India, South America and China, enables massive increases in the reach and impact of this marketing activity.

Establishing the effects of all this promotional activity requires complex, resource-intensive research. The evidence base is not complete and perhaps this will always be the case. However, the evidence to date does clearly illustrate that food promotion does influence children's food preferences, purchase behaviour and consumption, and that these effects are significant, independent of other influences and operate at both brand and category level. The evidence is consistent and continues to amass that the marketing trends in the developed world are increasingly used in the developing world. There is no basis on which to infer that children in the developing world will be any less vulnerable to food promotion reach and effects. In fact, the evidence available confirms that they are responsive to promotion and may in fact spearhead marketing-driven cultural innovation and change.

This review almost certainly underestimates the impact of food promotion. The evidence base to date still focuses on television advertising, with relatively less attention given to other forms of advertising and the full marketing mix. Other forms of promotion (e.g. merchandising, packaging, sponsorships), product development, pricing and distribution strategies may each influence consumer responses independently and also as integrated, synergistic mechanisms. Measuring this effect holistically in its real world setting, while adjusting for the myriad of additional influencing factors is unlikely to ever fully capture the cumulative effect. Yet the combination of the full marketing tool box that underpins the most powerful food brands is of course the real strength of a large scale marketing strategy.

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For new studies published between 1st March 2006 and 15th November 2008:

- * indicates those on the extent and nature of food promotion to children
- ** indicates those on the effects of food promotion to children
- *** indicates those on both the extent and nature, and the effects, of food promotion to children.

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ANNEX 1

Record of Searches

Academic Databases

Business Source Elite (15.11.08)

Searched: titles and abstracts

Limits: January 2006 – November 2008, Scholarly (Peer Reviewed) Journals

Search string	Results
(TI children and TI (food OR diet OR nutrition) and TI (marketing OR advertising OR promotion)) OR (AB children and AB (food OR diet OR nutrition) and AB (marketing OR advertising OR promotion))	23

CSA Illumina (includes Eric, Medline and Sociological Abstracts) (15.11.08)

Searched: keywords (Title, Abstract, Descriptors) in All databases

Limits: 2006-2008

Search string	Results
KW=children and KW=(food or nutrition or diet) and KW=(marketing or advertising or promotion)	547

Cochrane Library Search (15.11.08)

Searched: title, abstract and keywords

Limits: 2006-2008

Search string	Results
(children):ti,ab,kw and (food):ti,ab,kw and (marketing or advertising or promotion):ti,ab,kw	72

EBSCOHost (including International Bibliography of the Social Sciences and PsycINFO) (15.11.08)

Searched: titles and abstracts

Limits: January 2006 – November 2008

Search string	Results
(TI children and TI (food OR diet OR nutrition) and TI (marketing OR advertising OR promotion)) OR (AB children and AB (food OR diet OR nutrition) and AB (marketing OR advertising OR promotion))	125

Emerald (15.11.08)

Searched: All fields (excluding fulltext), all content (not just subscribed content)
L: 2006-2008

Search string	Results
children AND (nutrition OR diet OR food) AND (marketing OR advertising OR promotion)	20

Medline via PubMed interface (15.11.08)

Searched: title and abstract
Limits: added to PubMed in the last 30 days

Search string	Results
children[tiab] AND (nutrition[tiab] OR diet[tiab] OR food[tiab]) AND (marketing[tiab] OR advertising[tiab] OR promotion[tiab])	4

Web of Knowledge (including Science Citation Index Expanded, Social Science Citation Index, Arts & Humanities Citation Index) (15.11.08)

Searched: Topic (Title, Abstract, Author Keywords, Keywords Plus®)
Limits: 2006-2008

Search string	Results
Topic=(children AND (nutrition OR diet OR food) AND (marketing OR advertising OR promotion))	323

Online Databases and Websites

Advertising Education Forum (23-24.03.09)

<http://www.aeforum.org>

Search term	Results
2006	136
2007	99
2008	69

Browsed database by “country” (country names as listed in the database). Reviewed all the countries in the database classified as having a low-income, lower-middle income, middle-income or upper-middle income economy according to World Bank Classification (<http://go.worldbank.org/K2CKM78CC0>).

Countries			
Argentina	India	Nepal	Russia
Bolivia	Iran	Pacific Islands	South Africa
Brazil	Latvia	Pakistan	Sri Lanka
Chile	Lesotho	Peru	Taiwan
China	Lithuania	Philippines	Turkey
Cuba	Malaysia	Poland	Uruguay
Ecuador	Mexico	Romania	Venezuela

ESRC Society Today (Economic and Social Research Council) (23.03.09)

<http://www.esrcsocietytoday.ac.uk/ESRCInfoCentre/AdvancedSearchPage1.aspx>

Searched: “ESRC Awards & Outputs”, sorted results by date.
Limits: reviewed the first 106 results (2006-present)

Search string	Results
(children AND (advertising OR food OR marketing)) OR (food AND advertising)	106

WHOLIS (World Health Organization Library and Information Networks for Knowledge Database) (23.03.09)

<http://dosei.who.int/uhtbin/cgiisirs/4MJBx1LO6k/21350188/38/1/X/BLASTOFF>

Limits: publication year 2006-2008

Search string	Results
(children AND (advertising OR food OR marketing)) OR (food AND advertising)	7

LexisNexis Business and News (23.03.09)

Source: All English Language News

Limits: publication year 2006-2008

Search string	Results
(ATL3(children) AND ATL3(food) AND ATL3(advertising OR marketing OR promotion)) AND Subject Type "Reports, Reviews & Sections"	69
(ATL3(children) AND ATL3(food) AND ATL3(advertising OR marketing OR promotion)) AND Subject Type "Research Reports"	65
(ATL2(children) AND ATL2(food) AND ATL2(advertising OR marketing OR promotion)) AND Geography "Africa"	12
ATL2(children) AND ATL2(food) AND ATL2(advertising OR marketing OR promotion)) AND Geography "Asia"	36
ATL2(children) AND ATL2(food) AND ATL2(advertising OR marketing OR promotion)) AND Geography "Middle East"	4

ATL3 – At least 3 mentions; ATL2 – At least 2 mentions

**Food and Agriculture Organization of the United Nations
FAO Corporate Document Repository (23.03.09)**

<http://www.fao.org/documents/>

Browsed by "topic" and sorted by year of publication:

- Nutrition and consumer protection
- Trade and marketing

New Internationalist (23.03.09)

<http://www.newint.org/issues/>

Browsed the 2006-2008 issues

ANNEX 2

Data Extraction Table: The Extent and Nature of Food Promotion to Children

Shading indicates a new study published between 1st March 2006 and 15th November 2008

STUDY	COUNTRY	STUDY DESIGN	SAMPLE	KEY RESULTS
Aktaş 2006	Arnas, Turkey	Content analysis	5 weeks of TV programmes and adverts broadcast 07:00 to 11:30 hours on Saturdays and Sundays were watched. Every week only one channel was watched and the data recorded on a semi-structured observation form.	The time devoted to children's programs was approximately 121 min and the adverts during this period were approximately 35 min. A total of 344 of the 775 television adverts shown were related to food. Most of the food adverts were about candy/chocolate, chips, milk and milk products such as cheese, yoghurt, and breakfast cereals.
Alexander et al., 1998	USA	Content analysis	75 advertisements yielded from 24 archived shows from the 1950s	<p>Time trends analyses for the 1950s, 1970s, and 1990s are undertaken by citing Barcus & Wolkin (1977) and Kunkel & Gantz (1992). The current analysis finds that adverts are longer; > 1 min compared with around 30 s in earlier decades.</p> <p>Advertised product categories in children's programs are reported as: toys 8.3%, cereals 23.3%, candy/snacks 21.7%, fast-food 0% and other products 46.7%. Categories in all programs: toys 6.7%, cereals 20.0%, candy/snacks 17.3%, fast-food 0% and other products 56.0%.</p> <p>The study also attempts to look at promotional techniques and reports that across children's television from three decades, live action in advertising has fallen (the article states that the 1950s were indisputably the decade of the adult white male spokesperson) from 70.0% to 58.0% to 55.9%. Meanwhile animation in advertising has increased only from 1.7% to 16.0% and 17.0%. The analysis also notes a rise in the use of disclaimers from 8.3% to 41.0% and to 51.1% in the 1990s.</p>

				<p>The study concludes that by 1959, dominance of the “Big Four” product types in children’s advertising had not occurred. The 1950s are described as an important period for the introduction of brand building as this period marked the origin of Kellogg’s Tony the Tiger character and the ‘Snap! Crackle! and Pop!’ slogan.</p>
Alvy & Calvert, 2008	USA	Cross-sectional content analysis	10 popular children’s websites from KidSay’s market research with 8-11 year olds in Feb 2005	<p>Seven of the 10 websites contained food marketing. Instances of food marketing and their characteristics from the sites underwent χ^2 analysis. Of 15 possible food categories, the only marketing observed was for candy (248 instances), sweetened breakfast cereals (42), quick-serve restaurants (9), chips (3), dairy products (3), other (2) and sweet snacks (1). All advergames and integrated marketing pages contained bold/colourful text and dynamic images. 98.3% of adverts used bold/colourful text and 90.2% of adverts used dynamic images. Animation was used heavily in all marketing in all but product placements.</p> <p>One in 7 of the marketing instances used a branded character.</p> <p>Repetition was prevalent: 112 of 308 food marketing instances were unique. Only 32 products and 18 brands were marketed overall.</p> <p>One website was a food product site and thus contained a significantly greater amount of food marketing than the other children’s sites.</p>
Atkin, 1975a; Atkin & Heald, 1977	USA	Longitudinal content analysis	470 adverts taken from 4 hours of children’s Saturday morning television	<p>The content analysis provides a breakdown of advertising by product for both 1972 and 1973:</p> <ul style="list-style-type: none"> • 1972 – toys comprised 50% of advertising, “especially sugared” cereals comprised 27%, and candies/drinks/sweets/snacks/deserts/fast-food comprised 21% of advertising (total for food advertising, 48%). • 1973 – toys comprised 66% of advertising, “especially sugared” cereals comprised 17% of advertising, and candies/drinks/sweets/snacks/deserts/fast-food comprised 15% of advertising (total for food advertising, 32%). <p>The study shows that the reduction in adverts during the heavy toy selling season was accounted for by reducing food advertising. Nevertheless, after toys, food was the top product advertised. Cereals (especially sugared cereals) were the most advertised food product, followed by candies, drinks, snacks sweets, deserts and fast-foods.</p> <p>Creative strategies were also analysed by comparing the role models in each type of advert. It was noted that mothers tended to appear in food adverts, and that adults were only portrayed as heroes and villains in food adverts (toy adverts tended to feature children alone). Theme appeals were also assessed showing that 98% of toy adverts took a serious appeal, and 92% of food adverts took a humorous appeal. Much of these data are not adequately broken down by</p>

				<p>food or food product, and reporting is somewhat subjective, e.g. “food adverts almost exclusively based on the fun claim, while toy adverts frequently emphasized feelings of power and being grown up”.</p> <p>Only food adverts made use of animation and these were more likely to adopt a humorous (fun as opposed to serious) tone. Of food adverts, 62% included at least some animation, compared with only 1% of toy adverts. Of food adverts, 94% adopted a fun tone, compared with 43% of toy adverts.</p> <p>The study also examines nutritional appeals and mentions sweetness (21%) and nutritional claim (47%). Only 2% of adverts used “tell mom to get this cereal”, i.e. explicit ‘pester-power’ strategies in 1972. Both food and toy commercials are said to rely on celebrity endorsement/testimonials or on more general customer satisfaction to a “limited extent”. In contrast, 24% of food adverts used premiums.</p>
Bang & Reece, 2003	USA	Content analysis	813 adverts in children’s television programming	<p>Caucasians continue to be the predominant models in terms of the types of roles that they play in food advertising and how much they feature. The representation of minority groups has improved, though they are still more likely to play minor roles in advertising.</p> <p>Of all adverts featuring black models, 61.1% showed them in food adverts (compared with 46% for Caucasian models).</p>
Barcus, 1971a; 1971b	USA	Content analysis	311 adverts from 4 channels of Saturday morning television	<p>The content analysis provides a breakdown by product category - toys (22%), candies/sweets (20%), cereals (24%) and other food snacks (22%). In terms of creative strategies, all toy adverts were non-animated, although 66% of food adverts were animated or mixed. Of toy adverts, 92% showed the product in use, while only 72% of food adverts showed the product in use. Food adverts usually followed a dramatic skit (59%) while toy adverts used off-stage voice (73%).</p> <p>Cereal adverts were more likely to make nutritional claims, and 19 out of 36 adverts mentioned sweetness appeal. Only four in 21 adverts for sweets/candies/soft drinks (and five in 32 adverts for other foods & snacks) made nutritional claims, with a baseball player making an energy claim endorsement for a product. Of 21 adverts for sweets/candies/soft drinks, 17 showed the child consuming the product.</p> <p>Disclaimers were rarer with foods adverts (verbal, n = 8, 6 for cereals, compared with 10 for toys and visual, n = 3, for all cereal adverts, compared with 5 for toys). Also mentions some inappropriate marketing, though this is not food focused.</p>

<p>Barcus, 1975a; USA 1975b, Barcus & Wolkin, 1977</p>	<p>Partly longitudinal content analysis</p>	<p>The sample of adverts for the content analysis of commercial television at weekends was taken from television during April 1975, which yielded 403 adverts (137 versions of 119 items for 65 sellers (98% of all adverts of 30 s length))</p>	<p><u>Children's commercial television on the weekends:</u> Content analysis of top advertised products showed that cereals and candies/sweets both comprised 24.8% of advertising, then toys at 18.1%. Other food groups advertised being eating places/meals (10.4%), snacks (4.0%) and other food (4.0%). Total of food advertising = 68.0%. The study states a ratio of 3:1 for advertised cereals of the sugared variety (n = 76:23) and identifies few adverts for milk/dairy products (1.5%), bread (0.5%) or fruit/juices (1.2%). No adverts were for fresh meat or vegetables.</p> <p>A breakdown of animation strategies, mixed animations strategies and non-animation strategies by product category is provided (in percentages). Respectively, these are: cereals, 18, 62, 20; candies/sweets, 22, 29, 49; eating places/meals, 0, 0, 100; snacks, 25, 6, 69; other foods, 25, 6, 69. The analysis showed that, with the notable exception of restaurants, food adverts often included at least some animation whereas toy adverts did not. Toy adverts also tended to have an off-screen announcer format.</p> <p>A breakdown of off-screen, on-screen, musical and drama formats by product category is provided (in percentages). Respectively, these are: cereals, 3, 17, 29, 51; candies/sweets, 21, 10, 32, 37; eating places/meals, 10, 29, 52, 9; snacks, 0, 38, 0, 62; other foods, 31, 12, 19, 38. The analysis found that a dramatic skit was the most common method used in food adverts, with the exception again being restaurants where music (e.g. McDonalds jingle) was more common. A breakdown of the status of 'product display' in advertising in terms of "shown", "in use" and "name only" (remainder = unclassifiable others) was also provided by product category (in percentages). Respectively, these are as follows: cereals, 46, 50, 0; candies/sweets, 18, 76, 6; eating places/meals, 5, 50, 24; snacks, 6, 94, 0; other foods, 44, 56, 0. The analysis found that fast-food restaurant advertising was less reliant on showing the product, (i.e. they tended to rely more on branding) and that cereal advertising tended to feature the box rather than the product in use.</p> <p>The study also examines 'who speaks' for the product. Of toy adverts, 100% were reported as featuring adults (with 75% of these being male). A breakdown of the percentages of adults and children featuring in advertising by product category is also provided. Respectively, these are as follows: cereals, 55, 19; candies/sweets, 66, 6; eating places/meals, 98, 2; snacks, 6, 0; other foods, 44, 50. No product advertising was majority female. The eating place category again seems to be the exception in its use of adults (like toys). The study observed a small use of celebrity endorsement (7% of all adverts), the only food adverts using personalities reported as being cereals (17%) and candies (7%).</p> <p>A breakdown of the percentages of audio, visual and both audio and visual</p>
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The sample of adverts for the content analysis of commercial television after school was taken from television during May 1975, which yielded 487 adverts (1262 versions of 218 items, 80% of all adverts were of 30 s in length)

disclaimers featuring in advertising by product category is also provided. Respectively, these are as follows: cereals, 24, 15, 13; candies/sweets, 12, 10, 10; eating places/meals, 5, 10, 5; snacks, 16, 0, 0; other foods, 16, 0, 0. In comparison, toys were: 55, 14 and 0 respectively.

A breakdown of the percentages of premiums and contests featuring in advertising by product category is also provided. Respectively, these are as follows: cereals, 47, 0; candies/sweets, 10, 6; eating places/meals, 21, 5; snacks, 16, 0; other foods, 16, 0. In comparison toys were 0 and 0 respectively. A breakdown of theme appeals in terms of appearance, amount, convenience, taste, texture, fun, health, status/superiority, action/adventure, comparative, uniqueness/newness and quality is provided by product category (in percentages). Respectively, these are as follows: cereals, 3, 3, 0, 36, 12, 2, 34, 2, 7, 1, 0, 0; candies/sweets, 3, 6, 5, 30, 19, 15, 4, 3, 0, 0, 15, 0; eating places/meals, 2, 0, 0, 26, 22, 5, 0, 38, 0, 5, 2, 0; snacks, 0, 0, 17, 46, 17, 0, 0, 0, 20, 0, 0, 0; other foods, 0, 3, 12, 37, 18, 0, 21, 0, 0, 9, 0 and 0. In comparison toys were 19, 5, 9, 4, 0, 9, 0, 1, 44, 0, 1, 3 and 15 respectively. In this instance, food advertising tended to focus on taste (except for cereals advertising where nutrition was top). Those foods, e.g. candy, which lacked this claim opted for fun or texture as secondary selling points. However, peer status, popularity or general superiority were important with fast-food outlets

A range of examples of misleading adverts is given, but the study states that more research is required. The study provides a breakdown of nutritional adverts. The top advertised product is given as sugared cereals (27.8%), followed by candy bars (17.2%), eating places (14.6%), non-sugared cereals (8.8%), cakes & cookies (8.0%) and fruit drinks (7.3%). The study refers to public service announcements as non-commercial announcements (n = 92) of which nine (9.8%) were for nutritional messages.

Children's commercial television after school:

The content analysis provides a breakdown of advertising by product category: the top advertised products were toys (18.5%), then cereals (17.4%) and candies/sweets (14.9%); other food groups being eating places/meals (11.3%), snacks (0.4%) and other food (1.8%). Total of food advertising = 46.0%. The ratio of sugared cereals to unsugared cereals is again reported as 3:1 (n = 65:20). In terms of creative strategies the study looks again at 'who speaks' for the product; 100% of toy adverts featured adults (92% male). The percentages of adults and children featuring in food adverts for different products are also provided. Respectively, these are reported as: cereals, 37, 14; candies/sweets, 66, 14; eating places/meals, 95, 0; snacks/other foods, 91 and 9. Again no product was majority female (although cereals featured the most females at only 17%).

The sample of adverts used to assess seasonal variations in television advertising to children was taken from television during November 1975. The study compares the 1200 min recorded in April with 960 min recorded in November, seen as run-up to Christmas

This part of the study looks at who appears in the advert and reports a different pattern in which toy adverts featured the most children. The percentages of adults to children featuring in toy adverts for different products are also provided. Respectively, these are: cereals, 13, 55; candies/sweets, 32, 24; eating places/meals, 38, 50; snacks, 60, 0; other foods, 44 and 56. In comparison, toys were 12 and 88, respectively. Again no product was majority female (other foods most at 44%). The analysis suggests that for fast-food advertising, adults announce, but children appear.

The study also breaks down products by estimated audience of children viewing programmes, into 0–29, 30–49, 50–69 and $\geq 70\%$. Respectfully, these figures for food products are: cereals, 5, 14, 38, 43; candies/sweets, 9, 26, 40, 25; eating places/meals, 11, 14, 29, 46; snacks/other foods, 18, 46, 9 and 27. Toys were 3, 4, 37 and 56 respectively. This shows that foods were targeted at children's programmes, beaten only by toys. In comparison the percentages of household products (33, 39, 11, 17) and personal care products (26, 42, 21, 11) were more evenly spread and slanted in the opposite direction.

Again only a small use of celebrity endorsement is observed (5% of all adverts), foods using personalities being cereals 4%, candies 0%, eating places 4% and snacks/other foods 27% (again only cereal using endorsement 1%). No food adverts were reported as using tie-ins.

A breakdown of the use of audio, visual and both audio and visual disclaimers for different products is also provided (in percentages). Respectively, these are: cereals, 0, 16, 16; candies/sweets, 1, 0, 0; eating places/meals, 22, 11, 6; snacks/other foods, 0, 0 and 0. In comparison toys were 51, 1 and 1, respectively. A breakdown of the use of premiums in food advertising across different food product categories is also provided: cereals, 33%; candies/sweets, 1%; eating places/meals, 31%; snacks/other foods, 9%. No food contests. In comparison toys 0% premiums, but 1% contests.

In terms of price information, only advertising for eating places used this 18.2% (toys were 22%). Advertising for eating places were the least likely to provide product information (especially when compared to advertising for household products and personal care products).

The study also looks at misleading advertising and provides percentages broken down by nutrition, "sweetness", product is a snack, product is a meal, taste (other than "sweetness"), and product is natural/artificial. The respective percentages for the advertising of different food products are as follows: cereals, 41, 22, 0, 94, 74, 4; candies/sweets, 11, 0, 14, 8, 49, 3; snacks/other foods, 18,

0, 9, 9, 36, 9.

The study also provides a more detailed breakdown of nutritional adverts. The top advertised products are given as; sugared cereals (29.0%), candy bars (22.8%), eating places (11.2%), non-sugared cereals (8.9%), cakes & cookies (7.2%) carbonated beverages (5.4%) and fruit drinks (4.0%). The report states that 61% of all advertised foods are sugared.

A breakdown of theme appeals in food advertising in terms of appearance, amount, convenience, taste, texture, fun, health, status/superiority, action/adventure, comparative, uniqueness/newness and quality is also provided by product category. The respective percentages are: cereals, 7, 3, 0, 36, 10, 1, 34, 1, 8, 0, 0, 0; candies/sweets, 7, 16, 2, 35, 11, 10, 7, 3, 0, 1, 6, 0; eating places/meals, 0, 11, 20, 14, 9, 3, 0, 9, 0, 0, 4, 2; snacks, 0, 0, 50, 50, 0, 0, 0, 0, 0, 0, 0; other foods, 8, 0, 8, 25, 0, 8, 17, 0, 0, 0, 8, 12. In comparison toys were 17, 13, 6, 2, 2, 16, 0, 15, 23, 0, 5 and 1 respectively. Again advertising of cereals was the biggest user of nutrition appeals. Only 52 public service announcements (non-commercial advertisements) were identified, and only one of these was for a nutritional cause.

Comparisons between food advertising to children at weekends and food advertising after school showed that the advertising was similar (although more non-child adverts were shown after school). Of nutritional adverts 4% were shown at weekends, and 2% after school.

Seasonal variations in television advertising to children:

Advertising time was found to rise from 12.8–15.0%, and public service announcements fell from 3.1–0.9%. The content analysis shows a rise in toy advertising from 17.3–47.5%. Advertising of food products is shown to fall: cereals, 23.5–19.7%; candies/sweets, 27.2–19.7%; snacks, 5.2– 0.3%; eating places, 6.2–5.3%; other foods 3.6–1.8%. The examination of food advertising alone revealed little change, with 142 of 200 adverts in April and 100 of 133 at Christmas-time being for highly sugared products.

Specifically, variations in top advertised products between April and November were sugared cereals, 29.5–33.1%; candy bars, 22.5–22.6%; eating places, 8.5–11.3%; cakes/cookies, 8.0–12.0%; fruit drinks, 7.0–1.5%; and unsugared cereals, 6.0–9.0%. A breakdown of changes in the use of audio, visual and both audio and visual disclaimers in food advertising across different product categories is also provided. The respective figures show a rise in their use in cereal advertising: 26–50%, 18–45% and 18–34% (in line with toys, 49–53%, 0–18% and 0–13%).

Barcus, 1981	USA	Review article	'New' data consists of 33 hours of children's television	<p>The review states that the average child is exposed to 15 adverts, five promos and two public service announcements per hour. The content analysis found more food advertised as a percentage of total advertising on NAB-compliant channels compared with independents. The reported breakdown by product are as follows:</p> <ul style="list-style-type: none"> • NAB: cereals, 34%; candies/sweets, 29%; eating places, 15%; toys, 12%; other food, 1% (food total = 82%). • Independents: toys, 49%; cereals, 13%; candies/snacks, 13%; eating places, 9%; other food < 0.5% (food total = 35%). • Overall (133 adverts analysed): cereals, 24%; candies, 21%; and 12% for fast-food such as McDonald's and Burger King (food total still top at 60%, n = 133). <p>The review states that 70% of foodstuff adverts are for highly-sugared products, and that less than 1% are for healthy products such as "meats, bread, dairy products, fruits or vegetables".</p> <p>Creative strategies are also examined and three types reported:</p> <ol style="list-style-type: none"> "Product presentation" – Animation/live mix reported on 80% of cereal adverts (e.g. Kellogg's Tony the Tiger) compared with an off-stage announcer in toy advertising (usually adult white male). Only 4% of food adverts used live announcers and only 5% used testimonials. No explicit evidence of overtly urging "pester power". Premium offers were reported in 25% of cereal adverts. "Attention-getting devices" – More than half of all food adverts and 90% of cereal adverts employed fantasy techniques (e.g. magical kingdoms inside the box). "Qualifiers, disclaimers and disclosures" – Since 1971, many more qualifiers were used. However, these can be misleading – inappropriate marketing – e.g. cereals with added vitamins "part of a balanced breakfast" could be construed as a "necessary part" of a balanced breakfast. <p>The review reports little use of hard product information (e.g. price, quality or ingredients): tend to be advertised more on taste or texture (added vitamins aside). In "many cases" content could only be discerned from product name (e.g. Corn Flakes). However, sweet sugary nature often mentioned.</p> <p>Four types of verbal appeals are also listed:</p> <ol style="list-style-type: none"> "Assertions" – e.g. "will save money" is "fun" or "convenient"; only about 30% (of all children's adverts) used this. Fun usually used and sometimes convenience. "Attributed Qualities" – e.g. "tastes great" or "country fresh". "Almost nine
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- out of ten" food adverts used qualities which the observer may not agree with (e.g. taste in 80% and novelty in 10%).
- iii) "Product Properties" – e.g. size, shape, colour or texture; 70% of food adverts had some of this. The major property in food adverts was texture (e.g. crunchy/chewy) which rose to 60% with cereal adverts.
 - iv) "Product Composition" – e.g. ingredients (what the product was made of); this was found in 90% of cereal adverts. About 40% of adverts had this in their product name alone, with others including vitamins, honey, sugars, flavours and chocolate.

The author claims that visual appeals were of hedonism (e.g. adventure and fun) rather than education, work or relationships (only two of 133 food adverts took place in a work setting).

Barnabè et al., Italy 2008	Review	Existing data and expertise, particularly relating to Europe.	<p>EXTENT Children watch TV for an average of 3 hours/day. Children in low or middle income working families and where both parents are out of the home most of the day watch the highest exposure of 6 hours/day.</p> <p>Food is the main sector in Europe in terms of advertising expenditure. Available data for France, the United Kingdom, Italy, Germany and Spain show that, in children airtime (1400-1800 hours), one food commercial is broadcast every 10 min (every 5 in Italy). This translates to 33,000 commercials per year.</p> <p>About 60% of food advertising is programmed to air between 1600 and 2100 hours and about 40% of TV adverts for big-6 category products (soft drinks, confectionary, snacks, fast food, convenience food, cereals) is in children's airtime. Thus children watch an average of 29 commercials per day and in children's airtime (1400-1800 hours), 60% are for Big-6 food category products. Between 1400 and 2100 hours, 40% of adverts are for big-6 products.</p> <p>The authors could not identify any equivalent market research about children's exposure to other advertising media (outdoor, print, cinema, radio and internet) although in Europe the media mix for the whole food sector is 85% TV, 10% press and the rest outdoor and radio, with a growing internet budget.</p> <p>The prevailing food and beverage marketing messages to children and youth have focused on products that are high in total calories, sugar, salt, and fat and low in nutrients. The advertised diet contrasts sharply with the one recommended by public health organizations; and there is little promotional support for healthy dietary behaviour.</p> <p>NATURE</p>
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Batada & Wootan, 2007	USA	Cross-sectional content analysis	Nickelodeon (the most-watched children's television station) media: NICKI television channel (28 hours – 23-24 September 2005), <i>Nickelodeon Magazine</i> (4 monthly issues September to December 2005), all products with Nickelodeon characters on the pack in large grocery store in Washington DC (3-day period in September 2005).	<p>Nutritional quality was assessed using set of standards created by a panel of nutritionists and health experts based on fat, sugar, salt, nutrient content, and meal portion sizes.</p> <p>Of 168 television food ads, 148 (88%) were for foods of poor nutritional quality.</p> <p>Of 21 magazine food ads, 16 (76%) were for foods of poor nutritional quality.</p> <p>Fifteen grocery store products were identified with Nickelodeon characters on the packaging; nine (60%) were foods of poor nutritional quality.</p> <p>Of the 48 possible children's meal combinations at restaurants with promotional offers tied to Nickelodeon programs, 45 (94%) were of poor nutritional quality.</p>
Batada et al., 2008	USA	Cross-sectional content analysis	27.5 hours Saturday morning children's television programming from the major broadcast and cable networks on the same day in May 2005	<p>4.08 hours of advertising were broadcast including 1.99 hours of food adverts. Of 572 adverts, 281 (49%) were for food. The most heavily marketed foods and beverages, by category, were ready-to-eat breakfast cereal and cereal bars (27% of food adverts), restaurants (19%), snack foods (18%), and candy (14%).</p> <p>Of the 281 food adverts, 91% of the foods were high in fat, added sugars, or sodium, or low in nutrients.</p> <p>The most commonly used marketing techniques were movie, cartoon, animated, or costumed characters (used in 74% of food adverts), giveaways (26%), use of websites/e-mail (15%), and animation (15%).</p> <p>86% of adverts had an emotional appeal, such as fun or being hip or cool.</p>

Berry & Canada McMullen, 2008	Cross-sectional content analysis	Sample of 15 supermarket cereal aisles in Toronto – images taken 48 inches from the ground and 24 inches back from the shelves.	Breakfast cereal products with higher-than-average levels of sugar, refined grains and trans-fats were more likely to feature child-oriented marketing in the form of spokes-characters, themed cereal shapes/colours and child incentives on cereal boxes. Cereals shelved within reach of children aged 4-8 years had less sugar per serving and were less likely to contain trans-fats than less reachable products.
Buijzen & USA Valkenburg, 2002	Content analysis	601 adverts from 216 hours of recorded television from children's programming	The content analysis found that the top five products in children's adverts were toys & games adverts (58.3%), followed by candies and snacks (12.2%), music & video (12.2%), non-alcoholic drinks (5.8%) and foods (5.0%). In comparison, soft drinks were in the top five teenage products advertised (11.9%) and foods in the top five general audience products advertised (6.5%). The creative strategies of the advertisements were assessed using an appeal coding system. Appeals featured to the following extent in advertising to children: play (57.6%), action-adventure (38.8%), fun (30.2%), courage (7.2%), affection for animals (12.2%), collecting (6.5%), nurturing (8.6%), creativity (6.5%), affection for children (9.4%), competition (8.6%), family ties (5.0%) and capability (2.2%). Appeals featured to the following extent in advertising to teenagers: being modern (18.3%), being 'cool' (18.3%), fun (20.6%), seizing opportunities (20.6%), sexuality (13.5%), individuality (9.5%), personal freedom (11.1%), having the best (23.0%), belonging to a group (9.5%), energy (5.6%) and enjoyment (6.3%). Appeals featured to the following extent in advertising to the general audience: convenience (17.9%), financial security (11.0%), health (11.6%), sexuality (10.7%), love (6.5%), individual (5.7%), physical attractiveness (14.6%), personal freedom (7.4%), affection for children (7.7%), family ties (7.7%), having natural organic food & clothing (3.9%), self-esteem (3.3%), enjoyment (8.0%) and career (2.4%). The top five appeals used in the advertising of candy & snacks were pleasant taste (88.6%), humour (85.7%), newness (31.4%), fun (17.1%) and action-adventure (14.3%). The top five appeals for the advertising of non-alcoholic drinks were humour (83.7%), pleasant taste (34.9%), energy (34.9%), newness (20.9%) and fun/quality (18.9%). The top five appeals for adverts for foods were humour (82.5%), taste (82.5%), quality (27.5%), newness (22.5%) and health (22.5%). The study concludes it is through adverts for toys or candy that children are "confronted with specific child-related appeals, such as play, fun, action-adventure and humour".

Byrd-Bredbenner & Grasso, 1999a; 1999b; 2000a; 2000b; 2000c	USA	Content analysis	700 adverts taken from 17.5 hours of prime-time television	<p><u>Recommended Diet</u> The USDA Food Pyramid is <u>not</u> fats, oils & sweets 41%, milk, cheese and yoghurt 8%, meat, poultry, fish, dry beans & eggs group 0%, vegetable group 6%, fruit group 6% and bread, cereal, rice & pasta group 41%.</p> <p>The study simply states that “fruits, vegetables (except French fries) and dairy products were rarely advertised” and “protein rich foods and grain products were well represented in prime-time advertising mainly because of frequent advertisements for fast-food sandwiches”. A brief mention is made of foods in the fats and sweets group in the USDA food guide pyramid being advertised frequently. References (n = 755) to ‘low nutrient density foods’ coupled with foods in the ‘foods high in the fats, sweets and alcohol’ exceeded the references (n = 667) to high and moderate nutrient density foods combined. The study concludes that the prime-time diet “can be described as calorie-laden, fatty, salty, sweet and low in fibre”.</p> <p><u>Public service announcements</u> The analysis of public service announcements was found to replicate previous and other research as none were observed for diet. The study observes a mixed message in that 89% of actors consuming foods in food adverts were slim and healthy yet 54% of food consumed was rated low nutrient density. Only one PSA with NRI was recorded; in this a child gives an anti-drug message whilst eating French fries.</p> <p>In comparing time trends with 1992, the study observes a rise in the amount of advertising from 19–24% of television time. It also reports a rise in adverts with health information from 246 to 298 (or 14 to 17/hour) (N.B. no mention of significance). Content analysis of both 1992 and 1998, reported respectively 105 adverts (28%) and 108 adverts (23%) for food, of which 100% had health information. This is the largest category in each. In both years only five health-orientated PSAs were recorded. In 1992 all five were about drugs and AIDS, and in 1998 one was about domestic violence, the rest about drugs. The study also monitored non-adverts, non-PSAs, and non-programme promotions, and states that 30% of non-programme time is for these, with over 25% of these promotions containing health information.</p> <p>The proportion of advert time is reported as similar between 1992 and the current study, at 79% (156 minutes) and 77% (199 minutes) respectively. This was made up of 337 adverts and 467 adverts of which 204 (54%) and 231 (49%) had health information. The study also claims that the amount of misleading information in food advertising declined from 75% to just over 50%.</p> <p>In comparing data from 1971, 1977 and 1990 with the current study, it is</p>
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reported that the percentage of food adverts is decreasing (from 31 to 35, to 20 to 15% respectively), but set against rise in total adverts (11 to 40 per hour), the amount of exposure remains the same. Changes over time in products advertised are significant ($P < 0.001$); dominated by food categories “restaurants”, “low-nutrient beverages”, “protein rich foods” and “cereals”. The study observes the main trend towards restaurants (fast-food, hamburgers, fried-chicken and pizza) from “virtually non-existent” to being the largest category.

The study also looks at creative strategies and states that almost half of food and drink adverts made misleading or inaccurate claims. A total of 42 of the 108 food adverts made at least one nutritional claim, compared with 85 with taste claims (and 97 with any consumer-related claim) In 40 adverts (2%) only a restaurant name was given, not food product, providing evidence of brand building. The study concludes that the prime-time diet is similar to the unhealthy diet in the American population, i.e. high in sugar, sodium and fat but low in fruits, vegetables and whole grains.

Byrd-Bredbenner, 2002	USA	Review article	Adverts sampled from recordings in both 1993 and 1999 which yielded 11.5 and 9.5 hours respectively of Saturday morning television	<p>This article is the most up-to-date in a series of content analyses from the author. The total of food adverts (as a % of all adverts) was 70% in 1971, 69% in 1993 and 78% in 1999. Product trends are also provided across the four data points (1971, 1975, 1993 and 1999) (N.B. figures are in %):</p> <ul style="list-style-type: none"> • Fast-food restaurants’ advertising has increased from 8, 11, 23 to 28%. • Fats and sweets advertising has fluctuated from 49, 41, 36 to 53%. • Advertising for breads and cereals has fluctuated from 37, 45, 40 to 16%. The data for sweetened cereal advertising is different (27, 33, 24, 14%): in other words advertising for cereals is <u>decreasing</u>, but sweetened cereals much less so. • Advertising for dairy products has fluctuated from 3, 2, 1 to 3%. • Advertising for frozen dinners has decreased to zero (2, 0, 0 to 0%), as has advertising for vegetables (1, 0, 0 to 0%). • Advertising for fruit has remained at 0% throughout as has advertising for high protein foods. <p>In terms of creative strategies, the review addresses inappropriate marketing – and also looks at the characters who eat in adverts. In 1993, the proportion of thin/average-sized characters was 81%; in 1999 this had risen to 96%.</p> <p>Premiums and prizes were found to be (35% in 1993, 29% in 1999) similar to 1970s levels, however these had switched from breakfast cereals to fast-food advertising (61% and 79%). The review also states that in 1993 only 48% of advertising focused on the prize, whereas in 1999 this had risen to 87%.</p>
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Carter, 2006	Australia	Systematic literature review	Research, reviews and commentaries identified through Boolean searches of PubMed, ScienceDirect and Google; searches of bibliographies of relevant papers – with preference given to Australian data.	Australia children are exposed to more television food advertising than the US, UK, New Zealand, or 11 other western European countries. The average estimate suggests 9-12 food adverts per hour on Australian children's TV, with 74-99% of these being for energy-dense foods (e.g. fast foods, soft drinks, lollies, ice cream, chocolates, and snack foods). Equates to the average Australian child viewing 6,074 energy-dense food adverts per year, or 17 per day.
Chapman, Nicholas & Supramaniam, 2006	Australia	Cross-sectional content analysis	672 hours of TV programmes and adverts taped from all 3 commercial stations available on free-to-air Australian television between 0700 and 2100 hours on 2 weekdays (Tue 7-Wed 8 June) and 2 weekend days (Sat 4-Sun 5 June) in 2005 in Sydney, Brisbane, Tamworth (NSW) and Ballarat (V).	<p>645 hours were available for analysis. A total of 10,593 adverts were analyzed, of which 3,287 (31%) were food adverts. 81% of the food adverts were for unhealthy/non-core foods, which equated to 25% of all adverts screened between 0700 and 2100 hours.</p> <p>A similar number of health/core food adverts were screened in the metropolitan and regional areas. A significantly higher proportion ($\chi^2= 29.7$, $P<0.0001$ with 1 degree of freedom) of total and unhealthy/non-core food adverts were screened in the metropolitan areas. An average of 4.13 unhealthy/non-core food adverts/hour, more than four times the number of healthy/core food adverts (0.96 adverts/hour)</p> <p>Weekdays between 1800 and 2100 hours and Saturday between 0900 and 1100 hours were the most concentrated periods for advertising unhealthy/non-core food (at over 5 adverts/hour and over 6 adverts/hour respectively). The early time slot on Saturday was the most concentrated period for advertising unhealthy/non-core food and significantly different from the weekdays and Sunday levels at the same time ($\chi^2=6.89$, $P=0.03$ 2 df). Overall, the level of food advertising shown on weekdays compared with weekends was identical.</p>
Chapman et al., 2006	Australia	Cross-sectional content analysis	Food products from 7 food categories using promotional tactics (giveaway/competition, cartoon character, sports/movie celebrity, character promotion) or not, from 9 supermarkets (3 of each chain) around Sydney in socio-economically similar, family-oriented shopping areas. Data collected 11-18 August 2005.	<p>All the surveyed supermarkets carried food products promoted using the techniques surveyed. Confectionary had the greatest variety of products with 145-190 available. Confectionary had the highest proportion of promoted products (35% average), then dairy snacks (31%), snack foods (30%). Promotional methods were used less for breakfast cereals, ice creams (both 15%) and chips/savoury snacks (9%). These differences in proportions were statistically significantly different ($\chi^2=29.8$, $P<.001$ 6 df).</p> <p>100% of promotional activity within the confectionery, sweet biscuit, chips/savoury, dairy snacks and ice cream categories directed at children. The total number of promotions amounted to 231, of which 82% (n=189) were used to market unhealthy foods and 18% (n=42) to promote healthy foods. Snack food had the highest level of multiple food promotion usage on a single product. Breakfast cereals, although they seldom used food promotions, used multiple</p>

			<p>ones when they did. Most promotions were run singularly on confectionary products. 48% promoted foods used cartoon characters unique to the food pack (i.e. not from TV or movies) however this was not uniform across food types ($\chi^2=30.5$, $P<.0001$ 6 df). 75% confectionary products used cartoon characters and cereal companies tended to use well-known characters. 27% promoted foods used TV or movie characters – predominantly cartoon-based with the exceptions of <i>The Wiggles</i> and <i>Star Wars</i>. 100% promoted products in dairy snacks, ice cream, sweet biscuits and chips/savoury snacks used cartoon or TV/movie characters. 13% of promoted foods used giveaways. Snack foods used this method the most when promoting a product (35%). 12% of promoted foods used competitions. 50% of promoted cereals and 35% of promoted ice creams used competitions. 5% of promoted cereals (one product) used sports stars.</p>
<p>Chester & Montgomery, 2007; 2008</p>	<p>USA</p> <p>Exploratory review</p>	<p>Examines US food and beverage companies' public documents and press statements, supplemented by analyses of websites and other online content, to identify the major contemporary strategies used by food marketers to promote brands to children and adolescents.</p>	<p>The new marketing practices by food and beverage companies include:</p> <p>Mobile (cell) phones enable companies to directly target users based on previous buying history, location, and other profiling data.</p> <p>Database marketing has become a core strategy, on the Internet, cell phones, video games, and other new platforms. Profile compiled from demographic data, purchasing behaviour, responses to advertising messages, and the extent and nature of social networks.</p> <p>Peer-to-peer/buzz/viral/word-of-mouth marketing used to target key influential young people, 'brand sirens'/'brand advocates', to promote products to peers through instant messaging, social networking sites, and blogs. One campaign across different media. Often use viral videos, with the sponsoring company disguised.</p> <p>The three major instant messaging formats (AOL, Yahoo! and MSN) offer a variety of strategies, including 'roadblocks' and 'takeover ads' that flood a site's homepage with interactive commercials, as well as branded 'bots' and buddy icons.</p> <p>Commercializing online communities/social networking sites.</p> <p>Food and beverage companies have created their own online branded entertainment sites, designed to encourage young consumers to engage playfully with products over long periods of time, many offer 'free' content, games, merchandise, and endless replays of television commercials.</p> <p>In-game advertising, or 'game-vertising', combines product placement, behavioural targeting, and viral marketing to forge ongoing relationships between brands and individual gamers.</p> <p>Online immersive 3D environments or virtual worlds are complex, multilayered enterprises that combine instant messaging, interactive gaming, and social networking into increasingly elaborate settings, in which individuals create their own online identities through avatars. Food companies brand and marketing messages can be spread by avatars and displayed in the virtual world.</p>

Chestnutt & Ashraf, 2002	United Kingdom	Content analysis	237 hours of children's television and 42 hours of prime-time television yielded 2345 and 891 adverts respectively	<p>The content analysis found significantly more food advertising during children programmes (62.5%) than on prime-time television (18.4%). Moreover, of advertising time devoted to food adverts during children's programming, 73.4% were for products deemed detrimental to oral health, compared with only 18.6% similarly categorized during prime-time. The content analysis also provides a breakdown in terms of products detrimental to oral health that are reported and notes that the top foodstuffs include; confectionary (46.6%), sugared cereals (24.1%), sugared-dairy products (16.0%), sugared soft-drinks (10.9%), diet (1.3%) and low-sugar (1.2%).</p> <p>The study also points out that the two Saturday and Sunday morning children's television shows broadcast in the United Kingdom are sponsored by a confectionary and a sugared dairy product (tie-ins).</p>
Childs & Maher, 2003	USA	Content analysis	215 advertisements	<p>Nearly half (46%) of the advertising tapes was for food or candy.</p> <p>A sample of food advertising to children exhibits greater gender preference in presentation than a comparison sample of non-food adverts. Food adverts contain a greater distortion in gender distributions for voice-overs, dominant product users, and main character roles. Boys are presented as dominant figures and role models.</p>
Choate, 1972	USA	Content analysis	Adverts taken from 28 hours of children's Saturday morning television	<p>The content analysis reports that more than half of recorded adverts are for food products (and 30% for toys). It also notes that 10% of adverts for vitamins maintain that they are "sold to children in case you don't eat right".</p> <p>A breakdown of advertising by food product category provided the following: breakfast cereals (n = 92), candy, cookie and soft drinks (n = 51), snacks (n = 22), 'drive-in' (i.e. fast-food) restaurants (n = 20), main meals (n = 9), pastries/puddings (n = 8), continental baking (n = 6) and soup (n = 2).</p>
Condry, Bence & Scheibe, 1988	USA	Longitudinal content analysis	Adverts taken from 86.5 hours of children's television	<p>Three content analyses produced longitudinal trends (N.B. this is better than 'before' or 'after', but random selection may negate this). Food products were always the top advertised product during every year studied (65.4% for 1983, 48.4% for 1985 and 51.3% for 1987), though advertising is reported to have declined due to increase of toy and other adverts. A breakdown of advertising for different food product categories is provided for the years 1983, 1985, and 1987 respectively (in %): cereals, 31.8, 20.5 and 22.8; candy/snacks/sodas, 19.6, 14.5 and 17.2; restaurants 12.5, 8.8 and 7.9; other food/beverage, 1.5, 4.6 and 3.4.</p> <p>Decline is most evident when compared with data from Barcus (1971a; 1971b): total food advertising 82% (cereals 34%, candy/snacks 32%, restaurants 15%</p>

and other food/beverages 1%). Seasonal variation finds that toys are the most advertised product in December (46.6%) (approximately twice as much as the other months: 23.2–26.4%), with corresponding fall in food adverts (cereals, 16.2% compared with 20.7% and 27.9% and candy/snacks, 7.7% compared with 20.5% and 24.2%). PSAs also declined (though many due to a decline in general audience). PSAs for children and teens actually increased, but mainly due to anti-drugs adverts (majority of 25 PSAs in 1987, by which time nutritional PSAs had disappeared).

Connor, 2006	USA	Cross-sectional content analysis	48 hours made up of four 4-hour blocks (0900 to 1300 hours) of television programming from 3 stations aimed at toddlers and preschool children (PBS Kids from a broadcast network, and Playhouse Disney and Nick Jr from basic cable channels) was randomly selected and recorded on weekdays in May 2005.	In 96 half-hour blocks of preschool programming, the 3 stations had a total of 130 food-related adverts (1.354 food adverts per half-hour). More than one half of all food adverts (76 of 130 adverts) were aimed specifically at children, and the majority of those were for fast food chains (50 adverts) or sweetened cereals (18 adverts). The primary advertising appeals used in food adverts aimed at preschool children associated products with fun and happiness (82%) and/or with excitement and energy (57%). Fast food adverts in particular seemed to focus on building brand recognition and positive associations, through the use of licensed characters, logos, and slogans. χ^2 test analyses indicated that adverts for fast food were more likely than adverts for other food products to use animation ($P=.004$) and to incorporate licensed characters ($P=.001$) but were significantly less likely to show food ($P<.001$).
Consumers International, 1996	International (inc United Kingdom)	Content analysis	Monitors television advertising across 13 countries (11 European countries, the USA and Australia) during “children’s programming”. Each country aimed to provide 20 hours of programming for analysis although this varied across the sample	<p>The content analysis of television advertising by product category found that, in all bar two channels surveyed (on Australian channel and one, of two, Swedish channels) food was the most advertised product.</p> <p>Of 13 countries, the United Kingdom had the most adverts in Europe during “children’s programming (17 hours from 20 hours 10 minutes recording)”, but this was behind the USA (24 hours) and Australia (29 hours). In the United Kingdom this translated to 10 food adverts per hour (59% of all adverts); the USA had 11 adverts per hour (45% of all adverts) and Australia had 13 adverts per hour (39% of all adverts). The United Kingdom came second to the USA among six countries in terms of number of adverts per 20 hours in 1996 (330 and 484 adverts respectively). The figure for France was similar (330 adverts), the others being Germany (279 adverts), Netherlands (91 adverts) and Sweden (37 adverts). In terms of proportion of food adverts, the United Kingdom was second to the Netherlands (59% and 84% respectively) ahead of France (49%), the USA (45%), Germany (41%) and Sweden (30%). That so many adverts are for other products is said to indicate that adult viewers may be the target audience during these advertisement breaks.</p> <p>The United Kingdom and USA (1996) had highest numbers of food adverts broadcast during children’s programming (n = 195 and n = 215 respectively)</p>

compared with France (n = 166), Germany (n = 115), Netherlands (n = 77), and Sweden (n = 11). The most advertised food category on United Kingdom children's television was confectionary (n = 55), which was also the most commonly advertised category in the Netherlands and France. Next came breakfast cereals (n = 32), which were the most commonly advertised in Germany and the USA. Other categories of food product advertised on United Kingdom television were ready-prepared foods (n = 30), restaurants (n = 23), sauces & savoury products (n = 18), meat & meat products (n = 14), hot beverages (n = 8) and all others (n = 15). The most advertised food products in the United Kingdom were confectionary (55%), breakfast cereal (31%), restaurants (18%), dairy products (17%), savoury snacks (15%), ready prepared foods (8%), fish & fish products (7%), hot beverages (7%), soft drinks (6%), cakes and biscuits (6%) and others (11%).

Across all countries confectionary, breakfast cereals and restaurants (virtually all fast-food) accounted for more than half of all adverts. Confectionary alone accounted for one fifth. This varied by country, with confectionary being advertised in the United Kingdom approximately four times as much as in Germany and 35 times as much as in Sweden. Confectionary also had the greatest variety of manufacturers, though Nestlé, Cadburys and Mars were frequent. Most (81%) of breakfast cereal adverts were for products high in sugar or sodium (67%). The majority of cereals were manufactured by either Nestlé or Kellogg's. The third most advertised product was restaurants, such as McDonald's. These adverts tended to promote the 'experience' or multi-item meals (burgers and fries) rather than specific products and used brand building. Again, these are products high in salt, fat and sugar, but low in fibre.

In contrast there were few adverts for fruit and vegetables. In the United Kingdom the only advert recorded in this category was for frozen peas. Adverts for fish & fish products tended to be for battered fish fingers or battered foods.

In this study only the United Kingdom carried out nutritional analysis (Sweden attempted this, but had too few food adverts, Greece could find too little information on food packets). This analysis involved examining high fat content (> 30% energy) high sugar content (> 20% energy) and high sodium content (> 2.36 g/10MJ = > 6g salt). The analysis found that 62% of adverts were for products high in fat, 50% for products high in sugar and 61% for products high in sodium. In total, 95% of adverts were for products high in fat and/or sugar and/or sodium.

The study also describes some creative strategies and reports on some sponsorship (tie-ins) in the United Kingdom (other countries do not have sponsorship or are not allowed; others have more sponsorship, especially

				Australia). The tie-ins were for Potomus Park (Hipo Yogofrais, yoghurt) and for the chart show (Twix, confectionary).
Consumers International, 1999	International	Content analysis	Content analysis of 80 hours of television in Hungary, Poland, Slovakia, and Slovenia	<p>The content analysis found that food was the most commonly advertised product (except during the run-up to Christmas and on the Cartoon Network where toy adverts were more common. As with other research this Central European study found that confectionary the most common product, together with sweetened breakfast cereals, savoury snacks and soft-drinks, comprising over three-quarters of all food adverts.</p> <p>In terms of creative strategies, the study finds some evidence of sponsoring, including chocolate (Poland, Slovakia, and Slovenia) and savoury snacks (Poland). Some misleading adverts are noted, including 'extra milk' in chocolate (Poland, Slovakia, and Slovenia) and chocolate giving energy (Slovenia). Sugar-free gum is also noted as being portrayed as an encouragement to eat sweetened foods.</p> <p>Inappropriate marketing is also discussed: adverts observed included chocolate being kept in a medicine cabinet (Slovenia); a reference to being addicted to savoury snacks (Slovenia); peer group exclusion (all countries). This last advert involved three boys and a girl eating ice-cream, a fourth boy approaches and gives her sugar-free gum to overcome the 'wicked acids', leaving the other boys feeling excluded. Other inappropriate marketing observed included a cartoon character used to promote yoghurt (Slovenia) and widespread use of free gifts (eg. Kinder and McDonald's), competitions or children's clubs (e.g. Lego). An example of product placement is also provided in terms of a chocolate brand seen on a television programme where St Nicolas gives out presents from a basket on St Nicolas Day (Slovenia).</p> <p>Though not part of the report, in-school marketing, direct mail, magazine and internet advertising were also noted. For example, confectionary company representatives handing out free samples and free gifts, with the company's logo and a competition where children had to collect chocolate wrappers (Slovakia).</p>
Consumers Union, 1995	USA	Exploratory study of in-school marketing techniques.	The study includes the analysis of posters, teaching packs video, software, and CD-ROMS. Of 111 teaching guides examined, 77 were learning kits, 29 sponsored contests, and five reading incentive programmes	<p>All but one of 21 nutritional materials were reported as being sponsored by food companies (e.g. Kellogg's 'Build on Good Nutrition' – 'Get going with breakfast'; Mars' '100% Smart Energy').</p> <p>McDonald's programme avoids mentioning (its) fast-food: even in its 'what's on your plate', 'balancing your act' and 'healthy growing up', nutrition aids (video, posters, teaching guide, booklets, student certificate, stationary, etc.) although the logo is used or McDonald's is mentioned in the credits. The study reports that this allows biased promotions which reflect inappropriate marketing on a</p>

				large scale.
Cotugna, 1988	USA	Content analysis	225 adverts taken from 12 hours of Saturday morning television	<p>The content analysis revealed that 71% of the 225 recorded adverts were for food, and 80% of these were judged as having low nutritional value. The study provides a breakdown of food advertising by product category: breakfasts cereals (31%), cookies/candy/gum/pop-corn/snacks (34%), beverages (7%), waffles/pastries (4%), canned pasta (5%), canned deserts/frozen dinners/drive-ins/peanut butter/oranges (13%), others including prepared meat and fish products/diary product/oils/catsup (ketchup) (6%).</p> <p>The study compares these data from 1987 with data from Brown (1976) (not elsewhere included in this review) and Gussow (1972). The analysis finds little change in nutritional content (previously, 76 and 84% respectively). Cereal advertising was down at 31% (previously 38.5% and 41% respectively), but offset by an increase in the ratio of sugared to non-sugared cereals (from 5:1 in 1976 to 12.5:1 in 1987).</p>
Cowburn & Boxer, 2007	United Kingdom	Cross-sectional content analysis	15 magazines: 5 popular titles (measured by the Youth Target Group Index which combines readership and interviews data) for each of the following age groups: <5, 6-10 and 11-19 years. Includes all issues published in November 2004 to January 2005 and June to August 2005. Internet food marketing sites readers were directed to in the magazines.	<p>Food advertising appeared as (i) 'cover mount' free gifts and as (ii) part of the main bound issue. The presence of free gifts varied with titles, and younger children were offered free gifts more frequently than older children. All issues of Pre-school magazines and two issues of Pre-teen/Teenage magazines contained a free gift but none were food-related. 10% of issues of Early school magazines had food based free gifts and all were confectionary. Pre-school magazines contained no food advertising. Early school magazines contained food 57 instances of food advertising: 48% for sugar-coated breakfast cereals or sugary breakfast snacks, 24% for confectionary, 15% for sugared soft drinks and 3% for fruit and vegetables. Pre-teen/Teenage magazines contained 112 instances of food advertising: 27% for foods high in fat and sugar (mostly confectionary and ice-cream adverts), 17% for pre-prepared dishes and cooking ingredients, 12% for rice or cereal-based foods (most for healthier foods) and 11% for each of dairy and meat products.</p> <p>54% food adverts in Early schools magazines referred readers to internet sites. These were mostly from 2 titles but there was no consistency between the quantity of adverts, referral to a website and the food product's nutrient profile. 37% food adverts in Pre-teen/Teenage magazines referred readers to internet sites. Most were from 1 title where 67% were for 'less healthy' foods. Food adverts directed readers to 30 different websites, 83% of which were still active at the time of analysis (6 months after last issue of sample magazine published). 44% websites were aimed at children, a further 16% contained sections for children. 91% and 18% websites from Early school and Pre-teen/Teenage magazines respectively were aimed at children. 64% websites contained games, quizzes or tests and were more common websites from Early school (95%) than</p>

				Pre-teen/Teenage (36%) magazine referrals. 32% websites had a 'spokescharacter' with whom visitors could interact, most commonly from Early school magazine referrals. 32% websites requested children seek parental consent prior to use.
CWS Ltd, 2000 Dibb & Gordon, 2001	United Kingdom	Content analysis	272 food and soft drinks adverts were recorded from broadcasting over a period of 37 hours 35 minutes in March 2000 in the United Kingdom.	<p>The content analysis reported more food advertising on television during children's viewing time when compared with adult programming. It was found that children are exposed to more food adverts than adults, with only 21% of post-watershed adverts being for food products compared to 48% of adverts on Saturday morning television and 58% of adverts during the children's hour.</p> <p>Of the adverts featured during children's viewing times, 95–99% were for products high in either fat (30–40%), sugar (63–74%) or salt (27–49%). Corresponding figures for broadcasts after 21.00 h were 88%, 25%, 25% and 49% respectively.</p> <p>The National Food Guide recommended diet defines five products and how much should be consumed of each. These are bread, other cereals & potatoes (34%), fruit & vegetables (33%), milk & dairy products (15%), meat, fish & alternatives (12%) and fatty & sugary foods (7%). Taking the three samples of children's viewing times, exposures to adverts for these categories of food were bread, other cereals & potatoes (16%), fruit & vegetables (0%), milk & dairy (10%), meat, fish & alternatives (4%) and fatty & sugary foods (70%).</p> <p>An expert commentary on the creative strategies employed in food advertising identified four emotional needs of children exploited by advertisers:</p> <ul style="list-style-type: none"> • the need for nurture and protection • the need for stimulation • the need for role models • the need for peer group acceptance. <p>The consumer study reported that 73% of children ask their parents to buy after seeing sweets and crisps advertised, and that 71% have bought something for a free gift or token. If children are told 'no', a variety of 'pester-power' strategies are used with only 19% of children reporting giving up and doing nothing.</p> <p>Of adults participating in the study 77% wanted to see a ban on the advertising of high sugar or fat products to children. On a four point rating scale, 68% felt a free toy or gift was 'very persuasive', as did 65% with association with a character. In comparison only 12% felt that claims about how healthy the product is was 'very persuasive' with 40% rating this as 'not at all persuasive'. Combining scores of 'very' and 'quite persuasive' produced majority responses for associations with cool, fashionable people (62%) and in-store display (68%).</p>

Dibb & Castell, 1995	United Kingdom	Content analysis	Two content analyses were undertaken in the United Kingdom during the weeks 11–17 June 1994 and 1–6 May 1995. Both weeks involved 35 hours 20 minutes of viewing. Observations were made during ITV's children's hour (8 hours 20 minutes), Saturday morning television (7 hours), the Big Breakfast (10 hours) and late evening (post-21.30-watershed) aimed at adults (10 hours)	<p>Food adverts constituted 7 out of 10 adverts on Children's ITV (children's hour), 5 out of 10 for both Saturday morning television and the Big Breakfast (weekday mornings), and only 2 out of 10 after the watershed. This is the inverse of the proportion of adults who watch at each time.</p> <p>In terms of nutritional assessment, adverts for food products high in fat, sugar or salt reached 100% broadcast during children's viewing times in 1994 and 98% in 1995. Advertising for such products during adult viewing time was 96 and 86% respectively.</p> <p>The national food guide recommended diet defines five products and how much should be consumed of each. These are bread, other cereals & potatoes (34%), fruit & vegetables (33%), milk & dairy products (15%), meat, fish & alternatives (12%), and fatty & sugary foods (7%). The advertisements for bread, other cereals & potatoes ranged between 16 and 40% across the different viewing times. However, two-thirds of these were for breakfast cereals (mainly pre-sweetened) and only 8% were for bread. Only 2 adverts of 549 were for fruit. Between 0 and 5% of adverts were in the category of milk and dairy products although none were for low-fat versions. Between 0 and 20% of adverts fell into the meat, fish and alternatives categories. However, none were for fish or low-fat products.</p> <p>Advertising for fat and sugary products predominated, varying between 44 and 76% of all adverts observed (i.e. 6–10 times more than recommended consumption of such products).</p> <p>The study concluded that the foods we should eat least are the most advertised, while the foods we should eat most are the least advertised.</p>
Dibb, 1993	United Kingdom	Review article	'New' data is provided from recordings of two samples of one week of children's hour television advertising	<p>In terms of advertising spend, the review reports that in 1992 food and soft drinks were advertised on television more than any other product sector (£523 million). Figures for only above-the-line advertising spend by food product category are also provided: cereals (£83.9 million) chocolate confectionary, excluding sugar confectionary (£72.7 million), soft drinks (£55.7 million) coffee (£32.0 million), tea (£31.6 million), potato crisps and snacks (£22.6 million), ice-cream and lollies (£19.4 million), margarine & low fat spread (£18.8 million), cheese (£16.9 million), fresh & frozen meat & poultry (£16.9 million), frozen ready meals (£16.0 million), yoghurt (£15.4 million), milk & milk products (£14.7 million), stocks & stock cubes (£13.8 million), cooking sauces (£13.2 million), frozen vegetables (£10.7 million) and butter (£8.5 million).</p> <p>Excluding tea and coffee, the products with the highest spend are reported to include brands heavily advertised to children. In contrast, advertising spend for</p>

fresh fruit & vegetables was reported as only £4.5 million in 1991.

The review also mentions “below-the-line” marketing and gives examples of other promotional channels including; comics (little used except for one-off promotions), in-school promotion, computer games, sponsorship, packaging and free gifts (toys and collectables).

The review also includes case study analyses of complaints about inappropriate marketing:

- Milky Way – “you can eat between meals without ruining your appetite”
- Mars - “A Mars a day helps you work rest and play”
- Kellogg’s – reports on a misleading claim that a bowl of corn flakes with semi-skimmed milk had less fat than a slice of brown toast with low-fat spread.
- Farley’s bed timers – suggestion that a sugared drink had put a baby to sleep.
- Lucozade – celebrity endorsement by Daley Thompson

The review also cites data from other content analyses of food promotion, e.g. The Food Commission (1990) ‘Sweet Persuasion – A diet of junk food adverts’ which found that 53% of 92 adverts (from 4 hours of Saturday morning television) were for food or soft drinks; eight times higher than any other category or an average of 10 per hour. The review states that 78% were for pre-sweetened cereals, sweets, crisps, fast-foods, soft drinks and other products high in sugars, fats or both. In contrast, only 10% could be described as encouraging a healthy diet. A follow-up study by the Food Commission (1992) of the content of 190 adverts recorded from children’s television during one week in May 1992 found that 47% of adverts were for food or soft drinks. The following breakdown is provided by food product category: sweetened cereals (32%), confectionary (16%), fast-food (10%), bagged snacks (6%), soft drinks (6%), butter (6%), milk (6%), ice cream (4%) and others (14%).

The review also cites a content analysis from Young (1987) of 1750 adverts shown after-school during 1983/84 which reported that 33% of adverts were for food, and that 34% of these were for sugared products. Dibb concludes that the frequency of adverts for such products is increasing in comparison to the findings of Young.

Findings from Castell (1988) are also reported. This content analysis found that 62% of all food and drink adverts on TV-AM were for sugar-containing foods and that 48% were highly sugared. Of these adverts, 80% were for soft drinks, sweetened cereals, confectionary and ice cream.

				<p>Findings from Donkin (1992) are also reported. This study compares all adverts on United Kingdom commercial television broadcast in the first six months of 1991 with child audience ratings. The study reports that such adverts are “slanted towards snack/convenience foods” that are often high in added sugar (50–55%), high fat products (45–50%) or both (25–30%). Adverts for fresh fruit and vegetables were almost “non-existent” (apart from an advert for grapefruit).</p> <p>Donkin’s (unpublished) compares audience figures obtained from the British Audience Research Bureau (BARB) for 1 January to 1 July 1991 for the percentage of total food advertising time and the percentage of total child audience. For the Top 10 food product categories advertised during this time the respective percentages are: chocolate (15.11%, 12.94%); breakfast cereals (13.6%, 16.07%); frozen food (9%, 8.01%); prepared food (7.15%, 8.34%); carbonated drinks (6%, 6.24%); crisps & savoury snacks (4.66%, 4.39%); margarine & low fat spread (4.2%, 3.14%); biscuits & crisp-breads (3.92%, 3.97%), and restaurants & fast-food chains (3.41%, 5%).</p>
Dickinson, 1997; 2000	United Kingdom	Content analysis of television advertising and programming	Two weeks United Kingdom television, 527 hours of output, 872 programmes	<p>Dickinson (1997) reports on a content analysis of 1186 food adverts by the National Food Guide’s five categories: Bread/cereal/potatoes (26.9%), fruit/vegetables (1.6%), dairy (9.4%), meat/fish/alternatives (15.4%) and fatty/sugary foods (46.8%).</p> <p>The study also reports on a content analysis of programmes (excludes 12.3% unclassifiable): bread/cereal/potatoes (18.2%); fruit/vegetables (32.8%); dairy (9.6%); meat/fish/alternatives (16.0%); fatty/sugary foods (24.3%).</p> <p>The study found that the high-fat sugared diet commonly found in other studies was present in the advertised diet, but not in the television programmes. The programme diet mirrored the recommended diet (by National Food Guide) regardless of whether these were fiction or non-fiction non-adverts.</p> <p>Dickinson (2000) states that young people were particularly adept at recalling the voice-overs in food adverts “almost verbatim.”</p>
Dixon, Skully & Parkinson, 2006	Australia	Observational survey	257 individual checkouts in 24 randomly selected supermarkets situated within a 20-kilometre radius of Melbourne’s General Post Office	All supermarkets surveyed displayed food products at their checkouts, with most checkouts displaying chocolate (87%), gum (81%) and sweets (80%). Only 7% of checkouts had their display of foods or drinks out of the reach of children.
Doolittle & Pepper, 1975	USA	Content analysis	A recording of Saturday morning television on a single day yielded 162 adverts	The content analysis of food adverts reported the following proportions: cereals (40%); sweets & gum (18%); snacks & soft-drinks (12%); meal food (7%); other food (7%). The remaining adverts were for toys (7%) and other non-food

products (8%).

An analysis of the created strategies utilized in the advertising found that free gifts (toys) were promoted in 20% of adverts (all for cereals). Ambiance in the advertising, categorized as 'light', predominates with only adverts for snacks and toys below 90%.

In terms of the format of advertising, 71% of cereal adverts, 12% of sweet adverts, 39% of adverts for snacks, 0% of adverts for meals, 0% of other food adverts, and 0% of other product advertising had a mixed animation format.

An animation only format was found in 7% of cereal adverts, 44% of sweet adverts, 50% of snack adverts, 50% of adverts for meals, 60% of adverts for other foods, 0% of toy adverts, and)% of other product adverts. Characters featured in the adverts were male dominated (84–94%) and 75% of adverts used an announcer (this was not broken down by food product).

Eagle & Brennan, 2007	England	Cross-sectional content analysis	30 leaflets, flyers, pamphlets or menu-cards distributed in one area of NW London over 4 months (1 st December 2006 and 31 st March 2007).	27 items (90%) related to foods whose advertising would potentially be restricted if it were placed on TV (re. the early 2007 TV regulations). 74% for pizza, 10% for Chinese food, and 3% each for Indian food and MacDonald's. 3 leaflets (10%) contained potentially healthy options and none offered healthy options as part of their special promotions. None of the leaflets contained nutritional information.
Egberts & Riley, 2004	Australia	Content analysis	75 hours of food advertising on Australian television directed at children and adults	Adult's advertising contained more "core" food products (e.g. breads and cereals, fruit and vegetables, and dairy). Children's television advertising of food used more cartoon (25.1%) and animated characters (13.7%), a faster pace (3-fold) and the themes of magic, adventure and violence (50%) than found in adult's television advertising.
Elliott, 2008a; 2008b	Canada	Cross-sectional content analysis	367 'regular' foods (dry goods, dairy, produce and frozen – excluding 'junk' foods) repacked to appeal to children purchased from a top (highest revenue and greatest number of stores) Canadian supermarket chain, Loblaws in December 2005.	367 food products met at least 2 of the following criteria: direct claims to fun/play on the pack; cartoons 'pointedly' aimed to children (i.e. not Jolly Green Giant, the Pillsbury Dough Boy); tie-ins with children's TV, merchandise or films; foregrounding of unusual shapes, colours or tastes; puzzles or games targeted at children. Of 367 products, 3 failed to provide information relating to the quantity of sugar, 3 to the salt and 2 to the fat contained in the product. 89% (326 products) of those with nutritional data could be classed as PNQ (poor nutritional quality) due to high sodium, fat or sugar, 61% 'fun foods' (222 products) were in dry goods category, 17% (63) in frozen foods, 14% (53) in dairy and 1% fruit and vegetables. Only small apples and baby carrots were specifically targeted at children. 63% of 'fun foods' analysed made one or more nutrition claims on the

				<p>front of the box. Of the 326 'fun foods' noted as PNQ, 202 (62.0%) had nutrition claims on the front of the package. [NB: pre-packaged food in Canada requires mandatory nutrition labelling.] 84% 'fun foods' used a cartoonish script or crayoned font. 75% had a cartoon image on the front: an anthropomorphised animal (48%) or a cartoon child (25%). 19% pictured the cartoon image engaged in some type of physical activity.</p> <p>Packages may appeal to fun by a direct reference to 'fun' on the box (7%), have unusual product names or flavours (38%) or verbally emphasize the food's intractability (18%), collect points/enter a contest/free download (10%), display an on-pack activity/game, interact with a website (11%), or provide a game played with the food itself (3%).</p>
Folta et al 2006	USA	Cross-sectional content analysis	<p>31 hours taped in 3 time slots (0700-1000 and 1500-1800 hours on Tuesday, Wednesday, Thursday and 0700-1300 hours on Saturday) of popular children's television programming (WB from a broadcast network, and Nickelodeon and The Cartoon Network cable stations) was randomly selected and recorded during one week in late September 2005.</p>	<p>There were a total of 987 advertisements and promotions in the 31 hours of children's programming, approx. 32 per hour.</p> <p>Excluding promotions, there were 711 adverts, 35% of which were for food/restaurants. 27% unique foods ads were for breakfast cereals, 19% were for restaurant meals, 13% for sweet snacks and desserts, 11% for both other breakfast foods and juice drinks, 8% for dairy products and 3% for savoury snacks. There were no ads for fruit, vegetables or carbonated beverages. Food and beverage ads depicted children engaged in physical activity and associated the advertised product with athletic ability significantly more than toy and game ads.</p> <p>In terms of persuasive techniques, foods being advertised were most often associated with fun and good times (75%), pleasant taste (54.1%), being hip or cool (43.2%), and feelings of happiness (43.2%). They were also associated with toys giveaways, athletic ability, innovation or newness, friendship or social success, magical or superhuman abilities, and deceiving or tricking adults.</p>
Federal Trade Commission, 2008	USA	Exploratory review	<p>An analysis of 2006 marketing expenditures (using FTC compulsory process orders) and activities by 44 US food and drinks companies (primary marketers to youth (2-17 years) in a range of food categories). Analysed media include: television, radio, print, Internet activities and other new electronic media, packaging, in-store</p>	<p>Companies included: beverage manufacturers and bottlers; companies producing packaged food (e.g. snacks, baked goods, cereals, and ready meals); makers of candy and chilled desserts; dairy marketers; fruit and vegetable growers; and quick-service restaurants (QSRs).</p> <p>The companies spent approx. \$1,618.6 million to promote food and beverages to children (2-11 years) and adolescents (12-17 years) in the US in 2006. Carbonated drinks, QSR food and breakfast cereals accounted for 63% of this. 46% of the expenditure was on television advertising and 53% was by television, radio and print combined. New media promotion accounted for only 5% of the expenditure. Premiums (item free with food product or at discount price with proof of purchase) and prizes totalled 4% expenditure – excluding toys</p>

		<p>advertising, event sponsorship, and promotions that take place in schools.</p>	<p>distributed with QSR meals. (When QSR toys included, it ranks second only to TV advertising and is more than twice amount spent on marketing in any other food category). Packaging and in-store display materials accounted for 12% expenditure. Marketing in schools' share was 11%, 90% of which was for drinks. The final 15% expenditure covered: event and athletic sponsorships; celebrity endorsement fees; cinema, video and videogame ads; product placements in films, TV and videogames; cross-promotion licensing fees; and promotional activities conducted in connection with philanthropic endeavours. 13% of all reported youth marketing expenditure was for cross-promotions. For restaurant food and fruits and vegetables, cross-promotions were nearly 50% of reported child-directed (2-11years) expenditures.</p> <p><u>Nature of promotions:</u> Integrated promotional campaigns with themes carried over the various media used; cross promotions for films included TV, cinema and internet ads, packaging and in-store displays, advergaming, contests and sweepstakes and premium items. Animated 'spokescharacters' appear across the different media and make 'live' appearances.</p> <p>Two-thirds of the 44 companies reported online youth-directive activities e.g. space on website devoted to youth, independent websites for products that appeal to children, advergaming. Websites feature sports, music, free downloads (screensavers, wallpaper, ringtones, MySpace layouts, activity sheets, podcasts). Viral marketing such as e-cards/emails with links back to the site. Peer-to-peer (not necessarily electronic) communications with young people recruited to hand out promotional materials or samples.</p> <p>Packing and point-of-sale materials used TV/film cross-promotions, spokescharacters, premiums/prizes and staging of mini-events. Some companies offered point systems via proof-of-purchase; redeeming merchandise through the company's website for example. Celebrity endorsers – actors, athletes, singers, and musical groups – were featured in TV and print ads, on the Internet and in store displays, primarily in ads directed to 8-14 years. Sponsored events, performances and teams. Product placement occurred in a few TV programmes popular with youth and some PG, PG-13 films. Occasionally products integrated into videogame content. Marketing in schools included point-of-sale displays at vending machines/cafeterias, sponsorship, product samples, branded merchandise, nutritional/fitness materials.</p>	
Galcheva, Iotova & Stratev, 2008	Bulgaria	Cross-sectional content analysis	41.5 hours of children's television programming aired between 0600 and 1830 hours on three national	Food/beverage advertisements accounted for 124 (33.4%) of all commercials, with 96.8% being for unhealthy foods. 57% of them were aimed specifically at children as the most advertised products were salty/sweetened snacks and cereals, sweets, soft drinks/carbohydrate juices and salty foods, with no fruit or

			networks (1 public Canal 1, 2 private NTV, BTC), were videotaped on two weekdays, Saturdays and Sundays between 17 February and 2 March 2007.	vegetable commercials. Food advertisements used more themes of adventure, animation, music and gifts to attract children's attention, and gave information based on the product's taste, physical qualities, novelty, presence of premiums/prizes. Of all food/beverage advertisements, 27.4% contained health-related information about the products; three-quarters of the advertisements were shot with young normal-weight actors with a good/healthy appearance.
Gamble & Cotugna, 1999	USA	Content analysis	16 hours of Saturday morning television yielded 353 adverts	<p>The content analysis of food advertising showed that of the PSAs, 8 were nutrition-related. Of the food adverts, 56.3% were for products in the 'bread, cereal, rice and pasta group' (and, of this, most were in the least healthy sugared cereals product category), 27% were for fast-food restaurants, 11% were for fats, oils and sugars according to recommended diet food pyramid definitions.</p> <p>The study provides a detailed list of products. The top advertised food product was high-sugar cereal (34.5%). Of food adverts 23.8% were for kids meals (e.g. McDonald's), and the typical advertised kids meal consisted "cheeseburger, French fries, soda and toy".</p> <p>The study also compared the food advertising trends from this 1996 sample with four other data sweeps: Gussow (1972), Brown (1976), Cotugna (1988) and Kotz & Story (1994). The comparison finds little nutritional change in adverts. There were no adverts for fruit and vegetables.</p> <p>The study finds a ratio of 19.5:1 sugared to non-sugared breakfast cereals (those reported in other comparison studies range from 5:1 to 12.5:1).</p>
Gantz et al., 2007	USA	Cross-sectional content analysis	1,638 hours (126 hours per network) of programming from 13 networks: 6 commercial broadcast (ABC, CBS, Fox, NBX, WB and UPN), 6 commercial cable (ABC Family, BET, The Cartoon Network, Disney, MTV and Nickelodeon) and one non-commercial broadcast network (PBS). Recordings were made from 0600 to 0000 hours between May and September 2005. Networks chosen were the most popular among 2-7, 8-12 and 13-17	<p>This study covered advertising in all genres of programming viewed by children, rather than just children's shows. A total of 40,152 ads and 996 public service announcements (PSAs) were identified and coded by type of product, service, or issue. A total of 8,854 of these were for food or beverages.</p> <p>Children aged 2-7 years see an average of 12 food ads per day on TV; 8-12 years see an average of 21 food ads per day on TV; and 13-17 years see 17 food ads per day on TV. 50% of all ad time on children's shows was for food and food is the largest products category among all the ads all ages saw.</p> <p>34% TV ads targeting children and teens are candy and snacks, 28% for cereal, 10% for food, 4% for dairy products, 1% for fruit juices and none for fruit or vegetables. 34% TV food ads targeting children and teens use taste appeals, 18% fun appeals, 16% appeal with the use of premiums/contests and 10% appeal that the product is unique or new. 2% used nutrition or health claims as a primary or secondary appeal in the ad and 5% used pep. 22% of the TV food</p>

			year olds from Nielsen data.	<p>ads included a disclaimer (e.g., “part of a balanced diet”); 20% promoted a website; 19% offered a premium; 15% portrayed an active lifestyle; 13% included at least one specific health claim; 11% used a children’s TV or movie character; and 7% featured a contest or sweepstakes.</p> <p>Children aged 2–7 and 8-12 years saw an average of one PSA on fitness or nutrition every 2-3 days and 13-17 year old saw less than one per week.</p>
Guittard, 2008	France	Review	European published data	<p>The research evidence regarding the effects of food promotion to children extends over forty years. It is commonly known that the majority of foods advertised to children are ‘highly processed’, i.e. high in fat and sugar and low in nutrients. It is difficult to provide a global picture of the situation in the EU because national self regulatory rules which govern TV advertising to children may differ greatly. Data and figures are mostly available at national level. Therefore one must be careful in trying to compare data between countries. In the UK television advertising of HFSS products has experienced a significant decline of almost 18% since 2003. This means that food and drink manufacturers have voluntarily reduced their advertising expenditure on these products by £42 million in the last three years, from £231 million down to just under £190 million.</p>
Gussow, 1972; 1973	USA	Content analysis	29 hours of Saturday and Sunday morning television yielded 388 adverts.	<p>Of the 319 food adverts: 38.5% were for breakfast cereals (particularly Kellogg’s), 17% were for “cookies, candy, gum, popcorn and other snacks”, 15% were for vitamins, 8% were for beverages & beverage mixes, 7.5% were for frozen waffles & pop-tarts, 5% were for canned pasta, with the remaining 9% comprising adverts for canned desserts, frozen dinners, drive-ins, peanut butter and oranges (Sunkist, termed as the “one positive note”).</p> <p>In terms of inappropriate marketing, the study comments on adverts for vitamins that are advertised with the slogan, “to keep you growing right even if you don’t eat right” – calling these “offensive” (especially the advert for chocolate-covered vitamins).</p> <p>The study also states that television programmes are themselves counter-nutritional. For example, Sesame Street’s cookie monster is described as a programme celebrity. The analysis observed no adverts for milk products (except hot cocoa mix), and no adverts for eggs, meat, cheese, vegetables and fruit. The study comments that a company (Libby) which sells fruit, meat and vegetables, had advertising for a set of three “fun” frozen meals containing a strangely imbalanced mix of high-carbohydrate foods that in the words on the box “youngsters prefer”. The dinner comes complete with a packet of “chocolaty super stuff” to add to your milk, the whole “seasoned and proportioned for the younger tummy” whatever that means – and another example (Kraft) who sell</p>

				<p>milk, cheese, yoghurt and ice-cream, yet whose only advertised product is candy.</p>
Hammond, Wyllie & Casswell, 1997a	New Zealand	Content analysis	88 food adverts from the children's hours and prime-time television.	<p>A content analysis of the food advertising provided the following breakdown by food product category: snacks (n = 36), fast-food (15), cereals (11), dairy (8), pasta/rice (4), fruit/vegetables (6), drinks (3) others (5). The study also analysed theme appeals in food advertising and provide the following breakdown: acceptance (5%), achievement (2%), cool (3%), convenient (2%), desire (4%), energy (4%), family (6%), fresh/quality (4%), fun (12%), health (6%), nationalism (2%), natural (2%), power (3%), sex (4%), television (3%), solution (5%), sophistication (4%), special offers (3%), sport (2%), taste (17%), value (4%) and others (4%).</p> <p>The study also provided a breakdown of theme appeals by product category: snacks (taste, 18%; fun, 18%); fast-food (taste, 19%); cereals (health, 24%); dairy (taste, 25%); pasta/rice (convenient, 21%); fruit/veg (taste, 14%; natural, 14%); drinks (energy/sport, 22%); Note: some of these numbers were very small (e.g. nationalism or sport, 2% is five adverts).</p> <p>The study suggests that the themes appealing to young people are those that feature in advertising for low nutritional food products. The study concludes that food advertising is not consistent with nutritional guidelines recommendations.</p>
Hammond, Wyllie & Casswell, 1997b; 1999	New Zealand	Content analysis	15 hours of recorded children's hour and prime time television during weekdays yielded 276 adverts	<p>The content analysis provided a breakdown by food categories: confectionary/snacks, 30%; fast-food, 17%; soft-drinks, 17%; breakfast cereals, 17%; dairy, 8%; pasta/bread, 4%; fruit/vegetables, 3%; retail food services, 3%; others, 1%. Advertising for sweet snacks, fast-food services & restaurants, drinks and breakfast cereals comprised 84% of all food adverts.</p> <p>People-metre study: The people-metre data show how many of the 100 households with 17–19-year-olds are reached by food adverts and how often they are viewed. These were multiplied together to provide an annual exposure rate. When metering is accounted for cereals become less salient. At the top is confectionary (68 adverts per 20 hours), followed by restaurants (52), drinks (27), breakfast cereals (24), and dairy products (12). (No adverts were for cakes & biscuits or fruit & vegetables).</p> <p>When exposure rates were calculated from the above, sweet snacks were at the top with 1121 advertising exposures plus 133 hours of promotions, from a total of 1254 exposures; the highest product was chocolate (n = 512). Equivalent for other categories were drinks (18.5% of the calculated exposure rate), fast-food & restaurants (15%), breakfast cereals (14%), dairy products (4%) and nuts/pulses/beans (4%). Taken together with all other categories (15.5%), the</p>

				total was 4298 exposures (3803 adverts and 495 promotions).
				Comparisons were made with a 13-country study by Consumers International (1996), and also Morton (1990) whose food categories were used in this study. In these comparisons the United Kingdom had 54 adverts per 20 hours for confectionary (second to Greece among the 13 countries), 32 adverts for breakfast cereals (equal third) and 23 for restaurants (fourth). No United Kingdom adverts per 20 hours were for cakes & biscuits, fruit & vegetables and dairy products. New Zealand was third for food, top for confectionary, and second for fast-food.
Harrison & Marske, 2005	USA		Content analysis	426 food advertisements aimed at general and child audiences
				Convenience/fast-foods and sweets comprised 83% of advertised foods. Snacktime eating was depicted more often than breakfast, lunch, and dinner combined. Apparent character body size was unreleased to eating behaviour. A 2000 calorie diet of foods in the general audience advertisements would exceed recommended daily values of total fat, saturated fat and sodium. A similar diet of foods in the child-audience adverts would exceed the sodium RDV and provide 171g (nearly 1 cup) of added sugar.
Harrison, 2006	USA		Cross-sectional content analysis	40 hours of television programming, rated as most popular nationwide with 6-11 year olds, taped between 0700 and 2200 hours in north-central Illinois over 5 weeks in Spring 2003.
				Analyses revealed notable differences between ads depicting Black characters and ads without Black characters. Compared with ads without Black characters, ads with Black characters were more likely to sell convenience foods, especially fast foods, yet less likely to feature overweight characters. Ads without Black characters, in contrast, were more likely to sell foods high in sugar. Overall there were few differences in the nutritional breakdown of foods advertised in ads with and without Black characters, mainly because both types of ads tended to sell nutritionally unbalanced foods. A 2,000-calorie diet of foods advertised in both types of ads would exceed recommended daily values of total fat, saturated fat, and sodium, yet fail to provide recommended daily values of fibre and certain vitamins and minerals.
Hawkes, 2002	USA & various developing countries		Exploratory review	Examines the literature centering on four products – Coke, Pepsi, McDonalds and Yum! (KFC and Pizza Hut)
				In terms of extent, the review reports that the main food brands are all in top 100 global advertising spenders and this advertising spend is increasing especially, outside the USA. Promotional spend in the USA remained relatively stable between 1994 and 2000 (US\$ 2353 million to US\$ 2347 million), but has greatly increased elsewhere (US\$ 1172 million to US\$ 2211 million). The review also examines the promotional channels being used to promote foods and this includes television (“magic moment experience” rather than food appeal), adverts in press or on signage, television programming and movie tie-ins, the Internet, point-of-sale, in-service marketing (including schools) and

sports (from Olympic to local) sponsorship. The creative strategies described include 'glocal', novelty driven, premiums (free collectible-toys), children's meals (happy meals), children's mascots, birthday parties, kids web sites (free Internet access at point-of-sale), kids clubs with rewards for loyalty (i.e. brand building).

The review make reference to a McDonalds Snoopy promotion in South-East Asia, where a toy doll dressed in a different cultural costume every day for 28 days was given away with the purchase of an Extra Value Meal. This caused controversy when a paediatrician stated that if a child ate an extra value meal for 28 days it would gain a kilogram in weight. The promotion was also run in China, where six meals had to be purchased before a toy was given away.

Television adverts are based on the following themes: family values, friendship, local tradition, rebel/romance for teens, and fun and excitement for children (e.g. cartoons).

Hill & Radimer, 1997	Australia	Content analysis	27 hours of television were recorded yielding 239 separate adverts for 275 food products	<p>The study also looked at PSAs, but of 29 PSAs, none were food-related.</p> <p>The study examined a total of 239 adverts. To investigate the extent of food advertising, a breakdown of advertising time was provided by food group: foods high in fat and/or sugar, 48.0% (chocolate the most advertised within this category at 24.9%); fast-foods, 28.5%; cereal/bread/rice/pasta, 9.1% (excludes 9.3% high in sugar, includes 4.8% low sugar breakfast cereals); fruit (including canned), 5.9%; dairy products, 2.8%; vegetables, 0.8%; meat/fish/alternatives, 0%; others, 4.8%. To examine the nature of food advertising, an analysis of disclaimers looked at messages consistent with dietary recommendations and found that: 11.7% (of the total sample of adverts) contained messages to eat more bread and cereals, 11.7% contained messages to eat foods containing iron, 2.9% contained messages to eat a variety of nutritious foods, 1.7% contained messages to decrease total fat intake, 1.7% contained messages to decrease total sugar intake,, 0.8% contained messages to increase food and vegetable intake, 0.8% to increase fibre intake, and 0.8% to limit salt intake. None of the adverts contained messages about maintaining a healthy body weight and eating foods containing calcium.</p> <p>An analysis of theme appeals revealed the following percentages of food advertisements with explicit and implicit consumer-related/promotional messages (implicit messages in brackets): gifts, 20.1% (0); taste, 15.5% (33.9%); fun, 14.2% (36.0%); cool, 13.4% (9.2%); popularity, 0 (4.6%); competition, 2.9% (0). An analysis of nutritional appeals revealed the following percentages of food advertisements with explicit nutritional messages: vitamins, 13.8%; minerals, 11.7%; natural/pure/fresh, 11.3%; wholesome/goodness, 7.1%; healthy/nutritious, 4.2% (with 16.7% implied); and breakfast is important, 2.9%</p>
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(0). The study also looked at additional foods within the item being promoted. The top two were fruit, 9.6% (mainly in cereal advertising); and vegetables, 5.8% (advertised in pizza or a sandwich).

The study was critical of the use of terms such as “natural” and “wholesome goodness”, which tended to apply to chocolate products (27 of 38 and 14 of 17 respectively). The study concludes that only cereals are a healthily promoted food meeting recommended nutritional guidelines and targets.

Ho & Len, 2008	Malaysia	Cross-sectional content analysis	<p>The marketing for 6 cereal brands judged to be targeted at children from the dominant food companies in Malaysia was studied over April-May 2008, including packaging, TV commercials, websites and in-school promotions.</p> <p>TV spots were recorded for 3 days (April 29, May 2-3 2008) from 0600 to 2100 hours on four free-to-air TV channels (3 private, 1 government owned) where children’s TV programmes are more prevalent.</p>	<p>Three Kellogg’s and 3 Nestlé cereals chosen for analysis. Nature of the marketing techniques in Malaysia included: On-pack promotions e.g. free gifts and toys, movie tie-ins, puzzles and games; cartoon and animated characters; health claims to reassure/make products attractive to parents and carers; interactive websites; school programs; sponsorships of children’s sports activities; and television advertising.</p> <p>Extent of television advertising: Of the 6 products, only Nestlé aired TV advertisements for its children’s breakfast cereals. One product had two adverts, one featured frequently during cartoon shows while another was normally aired during drama slots or late evening programmes. The child-targeted advert featured an animated character and taste appeals. The adult-targeted advert featured a mother and child, nutrition appeals and school/sporting success of the child.</p>
Holt et al., 2007	USA	Longitudinal content analysis	<p>All television national and local-spot adverts (including paid commercial ads, public service announcements, and promotions for a network’s own or affiliated programming) aired during the four weeks beginning Nov 2nd 2003, Feb 8th 2004, May 2nd 2004 and Jul 4th 2004 on all ad-supported networks in the USA. Combined with Nielsen audience estimates data of exposure to 2-11 year olds in 2004. Dates chosen to match similar research</p>	<p><u>Children’s Overall Ad Exposure: 1977 and 2004</u> Using Adler et al’s (1977) National Science Foundation study data as a baseline, 2-11 year old children’s exposure to paid advertising fell by about 7% by 2004 and exposure to all advertising rose by about 17%. Children in 2004 spent less time watching ad-supported television compared to 1977 and in 2004 ads were shorter on average.</p> <p><u>Exposure to Food Advertising: 1977 and 2004</u> Using Abel’s (1978) and Beales’s (1978) FTC studies as a baseline, children’s food advertising exposure on TV in the USA has not risen and is likely to have fallen modestly: 9% fewer food ads in 2004 than in 1977.</p> <p><u>Changes in Exposure by Product Category</u> The mix of food ads (restaurants and fast foods, cereals, desserts and sweets, snacks, sweetened drinks, dairy products, prepared entrees and other food) seen by children in 2004 is more evenly spread across food categories than in 1977 (cereals and desserts and sweets dominated, with restaurant and fast food and sweetened drinks also among the top categories).</p>

			published in 1978.		<p><u>Sources of Children's Ad Exposure in 1977 and 2004</u></p> <p>Children got approximately half of their food ad exposure from children's programming (programs in which children are at least 50% of the audience) in 2004, compared to about one quarter in 1977. Saturday morning is a popular viewing time for children, but children get almost as much advertising exposure from one weekday's primetime viewing (4.2% of the total) or from their Sunday primetime viewing (4.1%) as from Saturday morning (4.3%).</p> <p>The authors note that since the late 1970s, other marketing has likely changed and new forms of marketing have emerged, including Internet-based advertising techniques; these marketing activities are not covered this report.</p>
Horgen, Choate & Brownell, 2001	USA/ International	Review article	Review based on international literature	the	<p>The review includes television advertising spend data and states that 24 of the top 100 campaigns of the twentieth century were for food products. In 1997, US\$ 1.4 billion was spent on the promotion of food and food products in USA, with a further US\$ 1.2 billion on restaurants and drive-ins on network television, and US\$ 369 million on independent television.</p> <p>The category of soft-drinks/snacks/confectionary was reported to have the fourth biggest advertising spend at US\$ 144 million. Restaurants and drive-ins were the top advertised category on local television, with a reported US\$ 1.3 billion spent in 1997 (this is more than twice the next biggest category: auto dealers with US\$ 455 million). McDonald's moved from the fifth to the second biggest USA advertiser between 1900 and 1992, and by 1997 was believed to be the most prolific advertiser in Europe. The company is claimed to have stated that 40% of its adverts directly target children, and that the average child sees a McDonald's advert almost every second day.</p> <p>The review includes an analysis of in-school marketing, and states that eight million children see USA in-school television Channel 1. This is a 10-minute news programme with 2 minutes of adverts which provides schools with televisions, video recorders and satellite dishes. The review cites figures that state that 69% (31/45) of adverts featured on Channel 1 in a 4-week period were for food, including gum, soft-drinks, fast-food, candy and snacks.</p> <p>The review highlights the paucity of research in this area (e.g. analyses of cafeterias with fast-food outlets or vending machines).</p>
Howard, 2003	USA	Content analysis	100 randomly selected children's food adverts between 1987 and 1998		<p>Results show a shift away from pro-social and healthful themes in the late 1980s to anti-social and self-harming themes in the late 1990s. In 1998 food adverts were dominated by social alienation, violence, crime and addiction.</p>

Ji & McNeal, 2001	USA/China	Content analysis	431 adverts recorded taken from both Saturday morning television and the children's hour	<p>The content analysis found that 81.8% of Chinese adverts were for food, compared with only 30.8% in USA where toys (55.5%) were the top advertised product. The study reports that this is because of famine versus fun.</p> <p>In the USA, the adverts were more fun-focused, in China more health-focused. In the USA commercials were typically longer (25.5 versus 20.7 seconds). There were also statistically more adult voiceovers (announcers) in the USA (75.5 versus 62.9%) and also more speaking characters (37.1 versus 18.9%). Some food-specific differences are reported as Chinese adverts were more likely to show the product in use (71.8% versus 57.4% compared with 74.2 and 78.3% for all products). USA advertising featured fewer health appeals (7.0 versus 38.6%) and convenience appeals (2.0 and 6.1%), but more fun (43.5 versus 14.4%) and adventure (14.7 versus 3.0%) appeals than Chinese advertising. Chinese adverts had a greater popularity appeal (4.0 versus 12.1% - Confucian). However, Chinese products also more likely to give information on quality (2.7 and 25.8%) and texture (1.0 and 14.4%). USA foods also more likely to sell on uniqueness (18.2 versus 34.0%, compared with 12.4 and 14.1% for all products).</p> <p>In 10/132 Chinese commercials the brands featured were all non-Chinese, with KFC, McDonald's and Oreo cookies common to both China and USA.</p>
Jones & Fabrianesi, 2006; 2008	Australia	Cross-sectional intercept survey	100 adults aged 18-74 years (M=37.6 years, sd 12.9), 62% female, 64% with ≥1 child recruited at a large regional shopping centre in New South Wales.	<p>For three of products, 42–54% parents would buy the product after seeing the child version magazine advert compared with 82–84% parents after seeing the adult version magazine advert.</p> <p>And for three of the products, 74–92% parents perceived that the adult version of the magazine advertisement suggested the food was nutritionally beneficial compared with 2–14% parents perceiving this for the child version.</p> <p>The study results suggest that: (1) adults' perceptions of advertised food products appearing in both adults and children's magazines and, most importantly, purchase intentions for those products differ according to the version of the advertisement seen and (2) adults clearly perceive distinctly different messages in advertisements for the same products which are targeting parents vs. those targeting children</p>
Karupaiah et al., 2008	Malaysia	Cross-sectional content analysis	6 months of televised food advertising from 6 out of 7 of the Nation's commercial television networks.	<p>Based on reported timings of children's programmes, prime time significantly differed ($p < 0.05$) between weekdays (mean = 1.89 +/- 0.18 hr) and weekends (mean = 4.61 +/- 0.33 hr). The increased trend during weekends, school vacation and Ramadhan was evident.</p> <p>Over the six-month period, the mean number of food advertisements appearing</p>

				<p>per month varied greatly between television stations (C = 1104; D = 643; F = 407; B = 327; A = 59; E = 47). Food advertising also increased the most in September (n = 3158), followed by July (n = 2770), August (n = 2431), October (n = 2291), November (n = 2245) and June (n = 2211). Content analysis of advertisements indicated snacks were the highest (34.5%), followed by dairy products (20.3%), sugars and candies (13.4%), biscuits (11.2%), fast food (6.7%), breakfast cereal (6.4%), beverages (4.1%), supplements (0.9%), rice (0.6%), noodles (0.5%), bread (0.3%), miscellaneous and processed foods (0.2%).</p> <p>The frequency of snack food advertised during children's prime time was 5 times more than fast foods. The sodium content (mean = 620 mg per 100g) of these snack foods was found to be highest.</p>
Kelly & Chapman, 2007	Australia	Cross-sectional content analysis	Sixteen popular (by readership and circulation data) Australian children's magazines were selected and back copies of each magazine were purchased for publications released between January and December 2006 (n = 76).	There were a high number of overall food references within the children's magazines, with the majority of these being for unhealthy food products (63.7% unhealthy versus 36.3% healthy foods, p < 0.001). The food groups with the highest proportion of branded food references, and therefore paid marketing, were ice cream and iced confection (85.6% branded references), fast food restaurant meals (83.4%), high-sugar drinks (78.9%) and snack foods (73.4%). Of all magazines, those targeting males and children aged 7-12 years had the highest proportion of unhealthy food references (78.1 and 69.8% unhealthy food references, respectively). Food references within children's magazines are common and skewed towards unhealthy foods.
Kelly et al., 2007	Australia	Cross-sectional content analysis	TV adverts from 357 hours of television taped from all 3 commercial stations available on free-to-air Australian television in Sydney between 0600 and 2300 hours from Sunday 14 th to Saturday 20 th May 2006.	Food advertisements occurred in similar proportions during children's viewing hours and adult's viewing hours (25.5 vs. 26.9% of all advertisements, respectively), although there was a higher rate of high-fat/high-sugar food advertisements during children's viewing hours (49 vs. 39% of all food advertisements, P < 0.001). There were even more advertisements for high-fat/high-sugar foods during popular children's programmes, contributing to 65.9% of all food advertisements. Estimates of exposure indicate that children aged 5-12 years were exposed to 96 food advertisements, including 63 high-fat/high-sugar advertisements per week. Since 2002, there has been a reduction in overall food and high-fat/high-sugar food advertisements.
Kelly et al., 2008a	Australia	Cross-sectional content analysis	119 food product websites and 196 popular children's websites (selected on website traffic data for 2-16 year old Australian children and previous research on frequently marketed brands).	Websites contained a range of marketing features. On food product websites these marketing features included branded education (79.0% of websites), competitions (33.6%), promotional characters (35.3%), downloadable items (35.3%), branded games (28.6%) and designated children's sections (21.8%). Food references on popular children's websites were strongly skewed towards unhealthy foods (60.8% v. 39.2% healthy food references; P<0.001), with three times more branded food references for unhealthy foods. Branded food

				<p>references displayed similar marketing features to those identified on food product websites e.g. graphics (78.0%), brand logos (75.0%) and corporate logos (52.4%), links to the food product website (42.1) and inclusion of a product package (35.4%).</p>
Kelly et al., 2008b; 2008c	Australia	Cross-sectional content analysis	<p>Advertisements broadcast on all three commercial Australian television channels were recorded for an equivalent 1 week period in May 2006 and May 2007 (714 h) in Sydney.</p>	<p>A total of 20,201 advertisements were recorded over the 14 days, 25.5% of which were for food. Significantly more food advertisements broadcast during children's peak viewing times (assessed from purchased commercial data), compared to non-peak times, contained persuasive marketing methods of promotional characters (e.g. celebrities or cartoon characters) ($P < 0.05$) and premium offers (e.g. competitions, toys, rebates, vouchers) ($P < 0.001$).</p> <p>During children's peak viewing times, 61% of food advertisements were for high fat/high sugar foods. During programs most popular with children, there were 3.3 non-core food advertisements per hour containing premium offers, compared to 0.2 per hour during programs most popular with adults. The majority of advertisements containing persuasive marketing during all viewing periods were for non-core foods. There were 18 times more food advertisements using premium offers during programs popular with 5-12 year olds than during adults' popular programs ($\chi^2=19.76$, $P<0.0001$). Persuasive marketing techniques are frequently used to advertise non-core foods to children, to promote children's brand recognition and preference for advertised products.</p>
Klebba, Stern & Tseng, 1994	USA	Content analysis	<p>135 adverts from 50 hours of children's programming</p>	<p>A content analysis of television advertising was undertaken by product category: cereals (31.1%); toys (48.4%); restaurants (6.6%); candy (0.8%); other foods (12.3%); other products (0.8%).</p> <p>A content analysis of disclaimers in advertising by product category was also undertaken: cereals (32.2%); toys (52.2%); restaurants (3.4%); candy (1.1%); other foods (10.0%); other products (1.1%). These figures were examined using Chi-square analysis, which demonstrated that, with the exception of breakfast cereals, food advertisements were significantly less likely to have disclaimers than non-food advertisements (i.e. toys) aimed at children. Cereals were also significantly more likely ($\chi^2 = 10.63$, $P < 0.03$) to use both audio and visual disclaimers (31%) than toys (14%) or others combined (9%).</p> <p>Time trend analyses were also performed with data from Stern & Haron (1984) which revealed that use of disclaimers in children's advertising has risen – cereals from 88.5% to 97.7%; toys from 58.1% to 87.0%; restaurants from 10.7% to 75.0%; candy from 0 to 9.1%; other foods from 0 to 30.1%; other products from 0 to 16.7%.</p>

Kotz & Story, USA 1994	Content analysis	52.5 hours of Saturday morning television yielding a total of 997 adverts	<p>The content analysis of 564 food adverts classified 46.3% as 'fats, oils & sweet food' group in the USA-recommended diet food pyramid. The product groups 'bread, cereal, rice & pasta' were represented in 37.5% of adverts, fast-food restaurants in 10.8% of adverts (McDonalds, Burger King and Pizza Hut), 'milk cheese & yogurt' in 4.5% of adverts, and 'meat, poultry, fish, dry beans, eggs & nuts' represented in 1.8% of adverts. There were no adverts for fruit or vegetables.</p> <p>By individual products, sugared cereals were the most advertised product (23.0%), followed by candy (15.0%), cereal with sugar as the main ingredient (10.3% – recorded in 'fats oils and sugar food group', rather than the 'bread, cereal, rice and pasta' group), low sugared cereals (6.0% – less than 20% sugar by weight) and soft-drinks (5.6%).</p> <p>When examining creative strategies, authors rated whether each advert contained explicit or implicit messages (N.B. levels of viewer reliability on each measure are reported). This process rated 2.4% of food adverts as containing an explicit "healthful & nutritious" message. This is behind "taste" (36.2%), "free toy" (16.9%), "fun" (16.7%) and "cool or hip" (7.3%). However, the authors rate 49.1% of adverts as containing implicit "healthful & nutritious" messages, the top implicit message. Most commonly resulting from "a complete/balanced/nutritious breakfast claim". Other implicit message ratings being "taste" (35.9%), "fun" (29.1%), "cool or hip" (10.3%) and "convenient" (7.3%). The study concludes the diet of the Saturday morning pyramid is the "antithesis" of the recommended diet.</p>
Kunkel & Gantz, USA 1992	Content analysis	604 hours children's television were recorded from Saturday morning television, the children's hour, and weekday morning television yielding 10 325 adverts	<p>The content analysis finds significant differences across television networks, by the number of adverts: more feature on network broadcast television and fewest observed on cable channels). Differences are also observed in terms of the diversity of products. The authors state that this may be due to lower costs or lack of regulation. The study cites an (unethical) phone-line advert.</p> <p>The content analysis provides a breakdown by product category by all three media: For major television channels: toys (17.2%); cereals (31.2%); snacks and drinks (32.4%); fast-food (8.7%); healthy food (4.6%); other (5.8%). For local television channels: toys (42.1%); cereals (22.7%); snacks and drinks (15.6%); fast food (5.6%); healthy food (1.7%); other (12.4%). For cable television channels: toys (24.7%); cereals (15.9%); snacks and drinks (15.8%); fast food (3.8%); healthy food (4.3%) other (35.5%). Toys comprised 33.8% of adverts across all media, cereals and breakfast 22.4%; snacks and drinks, 18.4%; fast food, 5.7%; healthy food, 2.8%; and other, 16.9%.</p> <p>Same food products dominate, but especially in broadcast networks, toys more</p>

				<p>on independents, other products remarkably more on cable.</p> <p>The study also reports on an analysis of theme appeals in advertising in terms of fun, flavour, performance, social context, power, appearance, personal gain, texture and other. These are broken down respectively into percentages by product category: toys, 25.3, 1.6, 37.6, 3.6, 19.7, 4.9, 0.2, 0.1, 7.1; cereals, 15.4, 46.6, 2.6, 6.9, 0.6, 7.0, 1.8, 7.3, 11.9; snacks & breakfast, 26.1, 36.8, 4.4, 15.7, 0.5, 4.0, 1.7, 2.0, 9.0; fast-food, 71.9, 3.8, 2.3, 13.2, 0, 0, 1.9, 0.2, 9.0; healthy food, 46.7, 15.7, 4.1, 6.1, 0.5, 4.6, 3.0, 0, 19.2; other, 27.5, 1.2, 23.7, 6.7, 3.7, 2.3, 17.9, 0.1, 16.9; total, 26.6, 18.8, 18.3, 7.7, 7.6, 4.6, 4.0, 2.1 and 10.4%.</p> <p>The study also reports on the use of disclaimers in advertng. More than half of all advertisements featured disclaimers (n = 6195). Percentage breakdowns in terms of the proportion of audio, video and both audio and visual disclaimers respectively are provided by product category: toys, 33.4, 47.3, 19.6; cereals, 87.3, 4.6, 8.1; snacks & drinks, 17.7, 68.9, 13.4; fast-foods, 14.1, 58.7, 27.2; healthy food, 42.9, 57.1, 0; other, 16.2, 31.6, 52.2; total, 49.6, 32.1 and 18.3%.</p>
Kuribayashi, Roberts & Johnson, 2001	USA	Content analysis	Recordings of Saturday morning television and prime-time television (20.00–21.00 h) in mid-September 1997 yielded 145 and 136 adverts respectively	<p>27.0% of adverts during Saturday morning television, and 16.8% of adverts during prime-time television were for food products. Non-significant differences were reported in the number of adverts featured during children’s programming and prime-time television. Adverts were more likely to feature food products on during Saturday morning television (27% compared with 16.8% of prime-time advertising).</p> <p>In terms of nutritional assessment: products high in fat featured in 50.0% of Saturday morning television and 65.2% of prime-time television; products high in sodium featured in 50.0% of Saturday morning television advertising and, 69.2% of prime-time television advertising; products high in cholesterol featured in 25% of Saturday morning television advertising and 17.4% of prime-time television advertising; products high in sugar featured in 50.0% of Saturday morning television advertising and 13.0% of prime-time television advertising. The total of adverts classified as featuring unhealthy products were 97.5% and 78.3% respectively. A t-test analysis found that products advertised during morning television were significantly more likely to be classified as unhealthy (overall) and high in cholesterol or sugar.</p>
Larson, 2003	USA	Content analysis	595 adverts featuring child characters	Results show that over one-third of the adverts that featured children contained aggression. More than half of the aggression incidents occurred in adverts that featured only white children.
Lemos, 2004	Portugal	Content analysis	Adverts from 84 hours of programming	In the 504 advertisements: 26% were for breads and cereals (sugared cereals); 35% for sweets (chocolates and cookies); 12% for soft drinks; 21% for dairy products; and 6% miscellaneous. This pattern distorts the Portuguese food

					guide recommendations as it has much more fats and sugars and less fruits and vegetables.
Lewis & Hill, 1998	United Kingdom	Content analysis of children's television advertising	91.33 hours of children's broadcasting yielded 828 adverts for analysis		<p>The content analysis provides a breakdown of advertising by food product: cereal, 30.1%; confectionary/savoury snacks, 29.8%; other food, 34.3%; and fast-food, 5.8%. Comparisons are made with Dibb & Castell (1995), finding a reduction in food advertising from 62.8% to 49.4%, but still remaining the top advertised product category. Top foodstuffs (60%) being confectionary, cereals and savoury snacks. Some evidence of a trend from fast-food to convenience foods (sauces, ready-meals etc.) which tended to be broadcast at tea-time (maybe seasonal, more toys in this study).</p> <p>The study also compares satellite and terrestrial television, finding more breakfast cereals on satellite television. It is difficult to partial out effects of time, season and channel. In terms of creative strategies, food adverts were reported as being significantly more likely to be cartoons, to use humour, to feature a story and to be mood-altering/fun in nature, but less likely to make claims of value for money. Food adverts more than toys, had magical/fantasy theme, as did child-oriented adverts, which differed greatly across all products in comparison to food adverts only. Authors suggest this difference was less with food adverts so as child and parent watching together would influence decision to purchase.</p>
Lobstein et al., 2008	32 countries ⁶	Cross-sectional content analysis	<p>13 breakfast cereal products marketed as being suitable for children on sale in many (between 7 and 25) of the 32 countries during April 2008.</p> <p>Recordings of children's prime-time television programmes from nearly all the 32 countries during a week in April 2008.</p>		<p>The nutritional quality of breakfast cereals marketed to children: Of the 13 products examined, only one had 'medium' levels, while all remaining products had more than 25% sugar many had sugar levels above 40%, and in one sample the sugar level was 55%. Salt was added to nearly all products, typically at around 1% of the product's total weight but ranging up to 2.5%. Nearly half the products could be classed as 'low fat' and all the remaining ones as 'medium fat'. The nutritional quality of products with the same name and similar appearance varied considerably between different countries.</p> <p>On pack marketing tactics: Examples of methods used to make products attractive to children: characters from TV and website tie-ins, puzzles, gifts, appealing/fantasy shapes, coloured ingredients, added flavour agents, movie tie-ins, sports equipment vouchers, clubs/societies. Examples of methods used to make products attractive to parents: Whole grain, high fibre, low fat; helps</p>

⁶ **Europe:** Belgium; Czech Republic; Denmark; France; Germany; Ireland; Italy; Netherlands; Norway; Poland; Portugal; Slovenia; Spain; Sweden; Switzerland; the United Kingdom.

Asia and Pacific: Australia; Fiji Islands; China, Hong Kong Special Administrative Region (SAR); India; Indonesia; Malaysia; New Zealand; Russia; Republic of Korea; Thailand. **Americas:** the USA; Argentina; Brazil; Chile; Peru. **Africa:** Kenya.

				<p>education attainment; front-of-pack nutrition claims; vitamin claims; fat free, low fat; energy; lowers cholesterol; natural ingredients; no added colours/flavours/preservatives; good for child growth/teeth/bones; happy families; approved by parents.</p> <p>Television advertising: Examples include cartoon characters, fantasy adventure, prizes, free gifts, sports celebrities, mother-and-child interactions.</p> <p>Websites: Packs led purchasers to seek more nutritional information by visiting websites, voucher and coupon give-aways on packs (such as swimming pool entry vouchers) were further explained on websites, and most significantly, children were encouraged to visit company websites for entertainment, including games, puzzles, cartoons, ringtones, and other rewards. Company websites did not restrict access/require parental approval to prevent young children gaining entry.</p> <p>TV adverts have been used for many years, and in some countries the use of TV advertising is beginning to decline in favour of other approaches, including Internet sites and direct marketing. Note that sweetened breakfast cereals are being promoted to children through other activities, such as school classrooms and teaching activities, and sports sponsorships for children's junior championships.</p>
Longman, 2000	United Kingdom/ international	Review article	The review uses a convenience sample, an industry Opinion Survey by Datamonitor and reports figures from Consumers International (1996)	<p>The Industry Survey by Datamonitor identifies future trends in marketing to children (as more they experience more economic independence due to more money and family structure change). Targeting tools that are described as likely to decrease in use in the future are licensed characters and in/on pack promotions. Those reported as likely to increase in the future are healthy products and fun food. In terms of fun tools, the use of characters, in/on pack promotions and collectible toys are likely to decline in use in the future, and .use of interaction, play with food, and competitions is likely to increase or remain the same.</p> <p>The following creative strategies are identified for use with the different groups:</p> <ul style="list-style-type: none"> • children – shapes, cartoons (novelty and pleasure), no health • adolescents – cool style, some health • adults – convenience, much health • family (biscuits) – combining. <p>Bipartite relationships – child as independent buyer, able to exert influence over other buyers for products for themselves or influence other buyers for products for the buyer; and as a future buyer.</p>

				<p>Case studies (in terms of appeals in promotions) are also described:</p> <ul style="list-style-type: none"> • Kraft Lunchables – convenient for mum • Quaker Dinosaur Eggs – fun for kids, health for mum • Yoplait Frubes – fun for kids, convenient and healthy <p>Each of above undergoes a SWOT analysis, focusing on the interactions between health/convenience/pleasure. Statistics on product launches are also provided by Datamonitor: Confectionary, 38.2%; bakery/cereals, 22.1%; dairy, 10.6%; soft-drinks, 9.1%; desserts, 5.8%; meats 3.5%, snacks, 3.5%; ready meals, 3.2%; canned food, 2.1%; others, 2.0%.</p>
Longman, 2002	United Kingdom / International	Exploratory review	Convenience sample and Industry Opinion Survey by Datamonitor	<p>The report highlights the potential growth in online marketing, by examining various examples of children's food and drink products' web sites.</p> <p>Reports that the United Kingdom youth (after USA youth) spend more time online than youths in Germany, Sweden, Netherlands, France, Italy and Spain). The report also describes some of the creative strategies being used by the food industry to market its products to young people over the Internet. Apart from direct selling, strategies included the use of cartoon styles, music, quizzes, competitions, games, animations, educational content and links to other sites. These activities can be complemented by offline advertising and promotion, to help to build a strong consumer-brand relationship, and the incorporation of parent/teacher-friendly material to ensure the child is not discouraged from accessing the web site and links from other sites. In short, the site itself needs to be advertised and must also provide inducements so that it will be accessed in the first place.</p> <p>As well as helping to build a strong consumer relationship with young people, Internet advertising allows many more specific advantages of to the sellers. These include the addictive component of web-surfing, particularly games or other features which may foster repeat visits to the site. Sites having an educational content can exploit the use of the Internet in schools (in-school marketing), and sites which encourage registration or participation in competitions can help firms collect consumer/market data to facilitate direct marketing (e.g. a customer account).</p> <p>The report presents some case studies of food and drinks promotions over the Internet. Examples are shown of promotional web sites for companies selling:</p> <ul style="list-style-type: none"> • United Biscuits BN – use of animation and brand imagery • Eden Vale Munch Bunch – educational emphasis • Nestlé Nesquik – use of games to encourage return visits • Petits-Filous Frubes – use of animation, brand imagery and games

				<ul style="list-style-type: none"> • Ferrero Kinder Surprise – parent-friendly design • Tango soft-drink – use of games, registration and soliciting for other products.
Macklin & Kolbe, 1984	USA	Content analysis	A total of 144 adverts were obtained for analysis via three consecutive Saturday mornings on three major television networks. Repetitions were excluded, yielding 64 unique commercials	Of the 64 adverts, more than two-thirds (69%) were for food. The sample differs from others which have only looked at toys however the study still concludes that there are stereotyped sex roles in children's adverts.
Maher et al., 2006	USA	Longitudinal content analysis	Television advertising from Nickelodeon and WB which air the top children's programmes (Nielsen data) taped in the morning and after school for five days, Saturday morning, and Sunday morning during 1 week in March 2000 and the same week in 2005.	In 2000, 45 executions consisted of adverts for food, beverage, candy or restaurants (excluding duplicates PSAs, adult commercials and network promotions). In 2005, 80 food adverts were recorded (same exclusions). Results indicate that food processors and restaurants have not changed their advertising messages to children in response to the multitude of pressures the industry is facing. Specifically, this pre-post longitudinal comparison shows no significant change regarding types of food products advertised and type of appeals used in the ads directed to children.
Maryam et al., 2005	Islamic Republic of Iran	Content analysis	14 hours of children's programming yielded 155 commercials	"Ashimashi's" puffed cereals were the largest category of advertised foods (36%). The message most frequently used to promote the sale of a product was "taste" (56%). The most frequent appeal of food adverts was "attributed quality" (67%). Half of the nutritional messages were scientifically untrue or misleading.
Matthews, 2008	Austria; Belgium; Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Iceland; Ireland; Italy; the Netherlands; Norway;	Review: questionnaire and data-collection protocol	Data from post-1990 reports, studies, surveys and projects on-going at the end of 2004 were gathered from academic journals, government departments, commercial, public interest and market research organizations were collected May 2004 – February 2005.	<p>The data showed that food advertisements during children's TV overwhelmingly promoted 'unhealthy' foods, with very little promotion of fruit and vegetables and other 'healthy' foods. The extent of unhealthy food marketing to children varied between countries with estimates ranging from 49% in Italy to nearly 100% in Denmark and the UK.</p> <p>In the UK, children viewed an average of 5 TV adverts per day for Core Category products (food, soft drinks and chain restaurants), the vast majority of which were for food items considered to be unhealthy in having a nutritional content high in fat, salt or sugar.</p> <p>Across countries, commonly used creative strategies used when targeting children included: referencing movies and their characters, using child-related appeals to play, fun, action-adventure, humour, magic or fantasy; using cartoon or celebrity characters.</p>

	Portugal; Slovenia; Spain; Sweden & the United Kingdom			Recent UK statistics suggest that though spending on advertising in the food sector may be increasing, the proportion spent on TV adverts may be declining. Nonetheless, across countries where data was reported, the vast majority of food promotion was through TV, with food promotion through radio, magazines and cinemas taking a low and possibly declining proportion of advertising spending. Schools, on the other hand, represented a growing marketing channel and the Internet was also a new and growing medium, where creative strategies included cartoon-style games, competitions, educational materials and links to food company websites.
Mazur et al., 2008	Poland	Cross-sectional survey	All 44 primary (N=8971 pupils) and secondary schools (N=5225 pupils) in Rzeszow, Poland. Shop owners proximal to the schools description of food purchases by students one week before school visit. School's head-teacher or teacher's description of school policy on food ads and sponsorship.	Recommended foods like milk, yoghurts and fruit were offered by only 40-9% of shops. There was a correlation between foods offered in the shop and foods purchased by students. In schools, 40-9% (95% CI 25-8, 56-0%) of shop windows displayed or advertised 'healthy' foods while 9-1% (95% CI 0-0, 17-9%) of shops displayed advertisements of food companies. The difference between display of 'healthy' food in shop windows and display of food on company advertisements was significant (likelihood ratio χ^2 test, $P < 0-04$). Type of school (primary v. secondary) was not significant factor in advertising or purchasing pattern.
Messner et al., 1999	USA	Content analysis	Advertising featured during sports programming during one week yielded 722 adverts for analysis	A content analysis of 722 adverts finds 11% are for snacks/fast-food (highest category was automobile adverts, 20.5%). The highest level of snacks/fast-foods advertising was found during wrestling (21% – just behind automobiles) which was not regarded as a real sport by the authors, and this was the highest product category (14%) with extreme sports. An analysis of creative strategies revealed that some sponsorship (e.g. "scores brought to you by...") and adverts or corporate banners were visible from the field of play or logos on equipment or opening shots [N.B this is not broken down by food category]. Some celebrity endorsement and tie-ins with branding (e.g. baseball superstar hits into big Mac land – McDonald's) are also reported.
Molnar et al., 2008	USA	Cross-sectional study by telephone	313 primary (elementary and middle) school officials from a stratified random sample of US public schools reporting	According to school officials, 37.7% of primary schools nationwide participated in fundraising, 31.6% participated in incentive programs, and 16.3% participated in exclusive agreements with a corporation that sells FHFS or FMNV.

			<p>their school's participation in marketing activities with corporations that sell foods high in fat and sugar (FHFS) and foods of minimal nutritional value (FMNV)</p>	<p>87.5% of school officials reported that their schools would not be forced to reduce programs if marketing was prohibited, and 53.7% supported the increased regulation of FHFS and FMNV marketing.</p>
Moore, 2006; Moore & Rideout, 2007; Moore, 2008	USA	Cross-sectional content analysis	<p>Websites of 77 major food advertisers, who advertise heavily to children (chosen by studying TV listings and competitive media reports), during the summer and fall of 2005.</p>	<p>85% leading food brands that target children on TV in the US are also either directly targeting children on the internet or provide online content likely to be of interest to children.</p> <p>68% sites directly centred on young children (2-11 years); 12% emphasized information for adults or parents, but child-oriented content was also embedded (often in a separate section); 9% seemed to target teens directly, but there were activities of interest to a younger audience as well; 11% contained content for each age group. 50% included products had an on-pack website address.</p> <p>73% of websites studied included advergames[†]; 79% of websites included a 'brand benefit' claim on their site; 64% used viral marketing and this was more common on sites for children and teens than those including adult content; 53% websites had TV commercials to view; 25% offered users membership, 13% required parental permission for this; 13% websites included polls/quizzes which could be used for market research; 47% websites had a film or TV tie-in; 38% used incentives for product purchases; 73% websites allowed customisation, enhancing the user's involvement; 76% websites provided brand-related content the child could use when they left the site e.g. wallpaper or screensavers; 72% websites studied contained nutritional information and 27% had information about a healthy diet; 35% websites had educational content; 97% of sites included information specifically labelled for parents.</p> <p>The researchers highlighted 11 issues with public policy implications:</p> <p>1. Common Online Marketing Practices: Unhealthful brand nutritional profiles; Persuasion potential of "advergames"; Ethics of viral marketing; No limits on advertising exposure; Limited use of "ad breaks"; Opportunities for corporate research abound; Information for parents is available.</p> <p>2. Varied Online Practices: Children's online privacy protections; Direct inducements to purchase; A new venue for licensing and host selling; Learning potentials and pitfalls.</p> <p>[†] An internet-based or downloadable videogame advertising a brand-name product by featuring it as part of the game.</p>

Morgan et al., 2008	United Kingdom	Cross-sectional content analysis	503 hours of television video-recorded from the 4 most popular British children's commercial television channels (free-to-air ITV England/ Wales and CITV and subscription satellite Nick Junior and Nickelodeon) at the most popular viewing times for children over 5 one-week periods from October 2006 to January 2007.	Analysis of the recordings revealed that 16.4% of advertising time was devoted to food products; 6.3% of all advertising time was devoted to high-sugar and potentially cariogenic products (those which readily give rise to tooth decay). Sugared cereals were the most commonly advertised high-sugar product, followed by sweetened dairy products and confectionery ($\chi^2=6524.8$, $df=4$, $P<0.001$). The advertising of confectionery and high-sugar foods appeared to be influenced by school Christmas holidays ($\chi^2=69.7$, $df=8$, $P<0.001$).
Morton & Moore, 2004	Australia	Content analysis	75 hours of television programmes broadcast between 16.00 and 21.00 on three South Australian commercial TV stations in June 2003	Over half of the adverts were for convenience foods. Many explicitly devalued home cooking. The adverts verbally and visually denigrate home cooking and show its rejection; it is portrayed as an unrewarding use of women's time. Convenience foods are presented as compatible with "good mothering".
Morton, 1984	Australia	Content analysis	120 food advertisements recorded between the hours of 16.00–18.00 everyday (16.00–17.00 being the children's hour and 17.00–18.00 being prime-time television) for five days (weekdays only) during one week in June 1984	30 hours of television yielded only 120 food advertisements (which averages 4 per hour and 2.5 per children's hour). One channel (ADS-7) had no food advertisements during the children's hour, another (SAS-10) had six food advertisements and the third (NSW-9) had 32. Less difference between the frequencies of food advertisements was observed in the following hour (25, 26 and 31 food adverts respectively). Food advertisements were also analysed by food category. In total, only eight adverts were for breakfast cereals (all were for unsweetened cereals and none featured during the children's hour) compared with 44 adverts for confectionary, 18 adverts for pies/pasties, 10 adverts for fast food and 10 adverts for snacks, and only two adverts for soft drinks. Two adverts were for fresh fruit (apples), but these were then seen being baked into high-energy foods. The study concludes that although there is less food advertising to children in South Australia than elsewhere, it is still unhealthy.
Morton, 1990	Australia	Content analysis	In total, 45 hours of television were recorded over 5 days (weekdays only) from 3 hours per day (16.00–18.00 and 19.00–20.00) during 1 week in April 1989, yielding 851	A content analysis of television advertising revealed that food was the top advertised product category with 412 advertisements (48%). The same four food product types were found to predominate as elsewhere: 19.9% for "chocolate & confectionary"; 17.4% for "food services & restaurants"; 17.2% for "breakfast cereals"; and 17.0% for drinks & drink mixes" throughout all three television time slots. Although this was true of all time slots, products with less appeal to

			advertisements lasting 417 minutes	<p>children (e.g. rice or margarine – especially low-fat, rather than butter) featured less during the children’s hour (i.e. between 16.00 and 17.00).</p> <p>The content analysis also recorded fewer advertisements more generally during the children’s hour (87.3 minutes) compared with the hour immediately following the children’s hour (168.15 minutes) and the first hour of “peak-time” viewing (161.15 minutes). However, the number of food advertisements recorded within each time slot was similar (130, 156, and 126 respectively). Therefore the percentage of food advertisements in the children’s hour was more than that of the hour immediately following the children’s hour (46%) and the first hour of “peak time viewing” (37%). Only 50 advertisements were for low-processed foods, and very few advertisements for such products were recorded during the children’s hour.</p> <p>However, the study notes that on one channel in the children’s hour 93% of adverts were for food and that one programme that featured during the hour was sponsored by Kellogg’s and McDonald’s. Also observed, are differences in the promotion of food products across the different time slots. For example, the study reports that 32 cereal adverts that only featured during the children’s hour used creative strategies such as “animation and special effects as well as ‘bottom’ humour designed to appeal to young children”, whereas cereal products which made nutritional claims dominated in prime time. The study further states that some cereals made misleading claims concerning ‘fibre’, or claims of ‘energy’, ‘natural cane sugar’ and ‘wholesome goodness’. The research also noted only eight diet-related PSAs (fewer than 0.2 per hour).</p> <p>A time-trend analysis was also undertaken by comparing data from similar studies from 1984 and 1986 (see Morton 1984). Although these trends reflect a drop in advertising in the children’s hour (79.4 to 39.15 to 87.3), the number of food adverts is increasing (from 38 to 44 to 130) which actually means that the rate of food adverts per hour is also increasing (from 2.5 to 2.9 to 8.6).</p>
Muehling & Kolbe, 1998	USA	Content analysis	582 prime-time adverts and 552 children’s adverts	<p>The content analysis of television advertising found that disclaimers in children’s advertisements featured most often in toy adverts (38%), breakfasts (22%) and fast-food restaurants (17%), compared with top prime-time disclaimers for food & snacks (22%), medicines (16%), and automobiles (15%). The study also reported that informational disclaimers (that explain what the product does do) were more likely to feature in adverts for toys (65 from 130), breakfasts (49 from 76), candy & gum (13 from 18), but that restrictive disclosures (that explain what the product does not do) were more likely to feature in adverts for fast-foods (61/59) (by these four categories – informational 65/130, 49/76, 13/18 and 30/59 – restrictive 39/130, 11/76, 0/18 and 61/59). No statistics provided as percentages as adverts may contain more than one type of disclaimer.</p>

				From the data reported in this study, it is possible to extract content analysis data of children's advertising by product category: toys, 130; breakfasts, 76; fast-food restaurants, 59; snack food, 24; candy & gum, 18; and others, 38. Comparisons can be drawn with content analysis data of prime-time advertising by product category: food & snacks, 88; medicines, 66; automobiles, 62; restaurants/retailers, 50; personal & beauty, 43; and others, 93.
Neville, Thomas & Bauman, 2005	Australia	Content analysis	390 hours of television broadcast during children's viewing times and 346 hours of confectionary and fast-food advertising during adult programming.	Half of all food adverts were for products high in fat and/or sugar. Confectionary and fast-food were the most advertised food categories during children's television hours. Confectionary adverts were three times more likely and fast-food adverts twice likely to be broadcast during children's compared with adult's programming.
Ogletree et al., 1990	USA	Content analysis	675 adverts yielded from nine Saturday mornings of children's television	The content analysis of advertisements by product category found that 60.6% of advertisements were for food products. In terms of the gender characteristics of these food advertisements, most of the adverts had male narrators, consumers or characters. Although only 22 advertisements were rated as "enhancing the appearance of a person, doll or animal", more female than male main and supporting characters were found in these advertisements.
Outley & Taddese, 2006	USA	Cross-sectional content analysis	Three sets of television adverts from 3 stations showing children's television programming (Black Entertainment Television, The WB [Warner Bros], and Disney Channel) during a 1-week period, 11-15 July 2005, from 1500 to 2100 hours.	256 of 1098 recorded advertisements were food and beverage commercials. Results indicate that 36.3% of all commercials were based on fast food restaurants, 31.3% were for drinks, 16.8% were for candy, 13.7% were for cereals, and 2.0% were for snacks (percentages do not total 100 because of rounding). Compared with The WB and Disney Channel, Black Entertainment Television had significantly ($P=.001$) more food and beverage advertisements. Few health-related content (HRC) or physical activity-related content (PARC) adverts were shown. Of 256 food and beverage commercials, only 8.2% contained HRC and 9.4% had PARC. The HRC and PARC scenes contained messages that were implied vs explicitly talking about the health or physical benefits of the product.
Page & Brewster, 2007a	USA	Cross-sectional content analysis	147 distinct food commercials from 59 hours of recorded children's television broadcasting on US terrestrial broadcast networks recorded on 15 separate Saturday mornings made up of 3 blocks	Findings show that the most frequently used promotional strategies were the use of jingles/slogans (64%), showing children with the food (54%), and the use of product identification characters (44%). The use of animation (63%), "real children" (66%) and animated main characters (57%) were the most used attention elements in the commercials.

			from each of 5 networks between 18 September 2004 and 19 February 2005. (Same sample as Page & Brewster 2007b.)	
Page & Brewster, 2007b	USA	Cross-sectional content analysis	147 distinct food commercials from 59 hours of recorded children's television broadcasting on US terrestrial broadcast networks recorded on 15 separate Saturday mornings made up of 3 blocks from each of 5 networks between 18 September 2004 and 19 February 2005. (Same sample as Page & Brewster 2007a.)	The most prominent emotional appeals were fun/happiness (85%) and play (59%) followed by fantasy/imagination (50%), social enhancement/peer acceptance (34%), and coolness/hipness (27%). Many of the products used the term 'super-charged' (24%) or a similar adjective to describe the powerful taste or other physical properties of the product. More than one-third of all the commercials used a fruit appeal or association (35%). Statements or depictions that a product was healthy or nutritious were quite rare among the commercials.
Powell, Szczypka & Chaloupka, 2007a	USA	Cross-sectional weighted content analysis	224,083 national ads from 170 top-rated TV shows viewed by children aged 2 through 11 years from 1 st September 2003 to 31 st May 2004.	In 2003-04, 27.2% and 36.4% of children's exposure to total nonprogram content time and product advertising, respectively, was for food-related products (cereal, snacks, sweets, beverages, fast food restaurants, non-fast food restaurants, and other food products). Similar distributions were found by race. Cereal was the most frequently seen food product, making up 27.6% of all food ads. Comparisons with previous studies suggest that, over time, food ads account for a smaller share of the product ads seen by US children.
Powell et al., 2007	USA	Cross-sectional content analysis	Recorded sample of top-rated television shows (using ratings data) to examine the nutritional content for fat, saturated fat, sugar, sodium, and fiber of food-product advertisements seen on television by both children and adolescents.	For 2-11-year-olds and 12-17-year-olds, respectively, a sample of 50351 and 47955 30-second-equivalent food-product advertisements and their related nutritional content were weighted by television ratings data to provide actual exposure measures of the nutritional content of food advertising seen by children and adolescents. 97.8% and 89.4% of food-product advertisements viewed by children 2 to 11 years old and adolescents 12 to 17 years old, respectively, were high in fat, sugar, or sodium. On average, 46.1% and 49.1% of total calories among the products advertised came from sugar in the advertisements seen by these respective age groups. A total of 97.6% of cereal advertisements seen by children 2 to 11 years old were for high-sugar cereals. No substantial differences were found in the nutritional content of advertisements seen by black and white children 2 to 11 years old. However, a slightly higher proportion of food advertisements in general and across all food-product

				categories seen by black versus white adolescents were for high-sugar products.
Powell, Szczyпка & Chaloupka, 2007b	USA	Cross-sectional content analysis	Television ratings were used to examine the distribution of food advertising exposure among adolescents aged 12-17 years based on 170 top-rated shows across network, cable and syndicated TV stations over the 9-month period from September 2003 to May 2004.	<p>A total of 238,353 30-second equivalent advertisements on the top-rated shows were assessed.</p> <p>The results showed that among total nonprogram content time, food-related products accounted for roughly one fifth (19.6%) of advertising exposure. Excluding TV promotions and public service announcements, as a proportion of all product advertising, total food-related advertising made up 26% of advertised products viewed by adolescents. By race, the proportion of advertising exposure to food products was 14% greater for African-American versus white adolescents and total exposure to food advertising would be even larger for African-American teens given that, on average, they watched more TV. Fast food was the most frequently viewed food product category comprising 23% of all food-related advertisements among adolescents.</p>
Rajecki, McTavish & Jessup, 1994	USA	Content analysis	114 adverts from 45 hours of major television networks, 30 hours of cable and 25 hours of local	<p>The adverts were categorized by meal-type: Dry cereals (n = 88); toasted products (n = 7); canned pasta (n = 6); additives (n = 5); hot cereals (n = 5); frozen dinners (n = 2); and one soup advert. Of these 96.5% made reference to breakfast or another meal-time. Twenty-two adverts did not contain stories, leaving a final sample of 92 adverts for story-line analysis.</p> <p>When examining creative strategies, the study identified seven story themes:</p> <ul style="list-style-type: none"> • achievement • conflict • dependence – significantly more live action characters • enablement • mood alteration • trickery • violence – significantly more animated characters. <p>These seven varied by creative strategy and produced six clusters of themes, with 64% of adverts clustered on some combination of violence, conflict and trickery. The study also found four subtext themes:</p> <ul style="list-style-type: none"> • traditional • practical • emotional • analytical. <p>All six story clusters were found to have a strong emphasis on emotional subtext, less on traditional and practical and lacked analytical themes.</p>

				<p>The study provides an example of a high emotional/low analytical advert for Kellogg's where a boy subverts his parents by playing a violent video game as they comment on his sensible eating. One new story-line in an advert is generated for each hour of children's viewing. Concludes that the negative themes of social strife, dishonesty and substance use are used in advertising of this kind.</p>
Reece, Rifon & Rodriguez, 1999	USA	Content analysis	<p>The study used audience figures to determine when children watch the most television and listings to identify children's programmes: essentially Saturday morning television and cable channels. Recordings were made during February and March 1997 (different channels were recorded each week in order to get more adverts and PSAs). This yielded 908 adverts, of which 416 were for food.</p>	<p>The content analysis provided a breakdown by food product category: cereal, 39.2%; fast-food restaurants, 21.6%; candy/snacks, 21.4%; beverages, 4.8%; other breakfast, 4.6%; other, 4.3%; pasta, 2.4%; and PSAs, 1.9%.</p> <p>An analysis of the nature of food advertising found few celebrities featured in advertising, but instead there were many cartoon characters. Cartoon images (or partial animation) were a feature of nearly half of the advertisements. Taste (n = 40) and fun (n = 37) were the main theme appeals used in food advertising.</p> <p>Time trend comparisons are made with Gussow (1972), Brown (1977), Cotugna (1988) and Kotz & Story (1994). The study reports rising trends in the promotion of foods, however this is difficult to assess because of network changes. Of all adverts 45.8% were for food products; significantly lower than previous studies. The study also reports a rise in advertising for fast food.</p> <p>A medium scoring study of both the extent and nature of food promotion to children.</p>
Roberts & Pettigrew, 2007	Australia	Cross-sectional content analysis using quantitative and qualitative methods	<p>28.5 hours of children's morning television programming over 3 weeks in Perth. 950 advertisements were aired, 212 of which were for food products.</p>	<p>Food advertising comprised 22.3% of ads sampled and 30 food campaigns were identified. The most frequently advertised foods were those cautioned in the Australian healthy eating guidelines (NHMRC 2003), with advertising messages communicating numerous themes disregarding healthy eating practices.</p> <p>The qualitative themes evident in the ads were the prevalence of grazing, the denigration of core foods, exaggerated health claims, and the implied ability of certain foods to enhance popularity, performance and mood.</p>
Robinson, 2008	Asia Pacific (Fiji; China, Hong Kong SAR; India; Indonesia; Malaysia; Nepal; Philippines; and Thailand)	Cross-sectional content analysis	<p>Examination of marketing of unhealthy food products (by TV advertising, packaging, innovative marketing techniques) by 6 multinational food and drink companies (choice based on market share) between April and June 2008. Report compiled</p>	<p>Multinationals were chosen based on their market share and foods/drinks classified as unhealthy using UK Foods Standards Agency Criteria traffic labelling scheme (high score in at least one of sugar, fat or salt content).</p> <p>The techniques that these six multinational companies (Coca-Cola, Kellogg's, KFC, McDonald's, Nestlé and PepsiCo) used to market their unhealthy products to children in Asia Pacific countries included the following: sponsorship of children's sporting activities in schools, television advertising, interactive websites, sports-themed contests and competitions, discounts and</p>

				from Consumers International partner countries' data (methodology based on Which? 2008)	money-off vouchers for other products, use of cartoon characters, on-pack games and promotions, movie tie-ins, children's clubs, free toys, children's meals, celebrity endorsements, children's parties, posters, language teaching, sponsorship of children's TV programmes.
Rodd & Patel, 2005	United Kingdom	Content analysis	Television adverts		On average, 24 adverts were shown per broadcast hour (accounting for 15.8% of the total schedule time). Nearly 40% (34.8%) of adverts related to food and drinks products and 95.3% of these were for products that were deemed to be potentially "erosive". The most frequently promoted food and drink products were breakfast cereals with added sugar (26.3%), confectionary (23.7%), and non-carbonated soft drinks (18.1%).
Schwartz et al., 2008	USA	Cross-sectional study	All ready-to-eat (RTE) breakfast cereals (N=161) available from 4 leading cereal manufacturers between January and February 2006 – using local grocery stores and the companies' websites to identify all products.		<p>Of the 161 cereals identified, 46% were classified as being marketed to children (eg, packaging contained a licensed character or contained an activity directed at children).</p> <p>Multivariate analyses of variance were used to compare children's cereals and nonchildren's cereals with respect to their nutritional content, focusing on nutrients required to be reported on the Nutrition Facts panel (including energy). Compared to nonchildren's cereals, children's cereals were denser in energy, sugar, and sodium, but were less dense in fibre and protein. The proportion of children's and nonchildren's cereals that did and did not meet national nutritional guidelines for foods served in schools were compared using χ^2 analysis. The majority of children's cereals (66%) failed to meet national nutrition standards, particularly with respect to sugar content.</p> <p>t tests were used to compare the nutritional quality of children's cereals with nutrient-content claims and health claims to those without such claims. Although the specific claims were generally justified by the nutritional content of the product, there were few differences with respect to the overall nutrition profile. Overall, there were important differences in nutritional quality between children's cereals and nonchildren's cereals.</p>
Sjölin, 2008	Sweden	Review	European data		<p>Studies have documented that a high percentage of adverts targeting children feature sweets, fast foods, and snacks and that exposure to such advertising increases consumption of these products. The problem is that the great majority of foods that are advertised are high in fat, salt and/or sugar (CFC, 2007).</p> <p>A survey, made by Consumers International 1996, measured the amount of ads directed to children in Australia, US and eleven European countries. The countries that had the most TV adverts were Australia, US and UK. Sweden and Norway had the lowest amount (Ekström & Sandberg, 2007). The OECD countries that had the most TV ads 1996 were in descending order: Australia,</p>

		<p>United States, United Kingdom, France, Greece, Finland, Germany, Denmark, Netherlands, Belgium, Norway (TV 3*), Austria, Sweden (TV 4*). The average number of food adverts per hour ranged from 1 to 12 (CFAC, 2007) (* No adverts in other channels).</p> <p>80% of all food adverts, when children watch terrestrial channels, are for HFSS12. A Swedish study has shown that 80% of the food adverts are shown between 1800 and 2100 hours during documental soap operas (28%), TV-series (26%) and children's programs (24%). The results from the study on TV ads were similar to the internet study showing that no ads were found for fruits and vegetables, meat, fish poultry egg and sausages. There were no soft drink adverts and no adverts for ice cream and sweet desserts, cookies and bakery goods, which might be a result of self-regulation. Of the food TV ads 13% were for sweets, chocolate and crisps and 11% for fast food chains (Ekström & Sandberg, 2007).</p> <p>During children's television hours, confectionary and fast foods adverts are most frequent during all timeslots and especially children's weekend viewing morning.</p>		
Solomon et al., 1982	USA	Content analysis	<p>Study 1: 37 adverts were recorded from three 1-hour segments of children's television on three consecutive Saturday mornings in November 1978</p> <p>Study 2: 130 adverts were recorded from six 1-hour segments of weekday children's programming during September 1978 and November 1979</p>	<p>Study 1: Of a total of 37 adverts, 63% were for toys, and 35% for food.</p> <p>Study 2: Of a total of 130 adverts in 1978, 86% were toys and 6% were for food; in 1979, 71% of advertisements were for toys and 21% for food.</p> <p>The findings from these studies demonstrate that food is advertised less (and toys advertised more) outside the main television networks.</p>
Stern & Harmon, 1984	USA	Content analysis	<p>Children's programming recorded over 6 weeks yielded 976 advertisements</p>	<p>The study provides a breakdown of commercial advertisements by product category (the figures in brackets represent the percentage of advertisements featuring a disclaimer):</p> <p>Breakfast cereals, n = 339 (88.5%); confectionary, n = 114 (0%); toys, n = 105 (58.1%); restaurants, n = 50 (10.7%); health care, n = 48 (0%); clothing, n = 9 (0%); soft drinks, n = 3 (0%); other foods, n = 34 (0%); and other products, n = 106 (0%). The study finds that breakfast cereal advertisements are most likely to have disclaimers of the "part of a nutritious breakfast" kind. Apart from restaurants, disclaimers were absent from advertising for all other foods.</p>

Taras & Gage, USA 1995; Taras et al., 2000	Content analysis	95 hours of children's programming yielded 845 advertisements	<p>Study 1 (Taras & Gage, 1995): A content analysis of advertisements from the 60 hours of weekday programming and 35 hours Saturday morning television by product category is reported (note: 6 hours of this programming was excluded from analysis as it was not considered child-oriented e.g. news and sports). During these times there were 21.3 advertisements per hour (mean 28.6 seconds). Of these 47.8% were for food products, with 91% for foods high in fat sugar or salt. Only 2.5 minutes (approximately 0.2% of all non-programming time) contain PSAs with a nutritional message.</p> <p>The data were compared with earlier studies (Barcus & Wolkin, 1977; and the 1980s data sweep study of Condry, Bence & Schiebe, 1988) that were conducted prior to imposed regulations that limited advertising time to children. The time trend analysis found that the percentage of adverts for cereals and sweet snacks has decreased (the latter marginally), but that advertising for dairy products had increased. Therefore, the amount of advertisements for products high in fat, sugar and salt remained unchanged (e.g. comparing data from the present study with the 1978 data, the percentage of adverts featuring products high in sugar was 69.9% and 68.0% respectively, those featuring products high in fat was 39.7% and 35.0% respectively, those featuring products high in salt was 20.4% and 17.0% respectively, and finally those featuring products low in salt was 8.9% and 11.0% respectively). The study concludes that during 1993 children watched more commercials of shorter duration, but that the message content of the advertising was largely unchanged.</p> <p>Study 2 (Taras et al., 2000): This study provides a more detailed breakdown of advertising by food product category (17 food groups): high sugar cereals (n = 222); restaurants (n = 153); chocolate (n = 85); low-sugared cereal (n = 71); fruit juice (n = 68); candy (n = 40); dairy (n = 36); sugared milk (n = 34); cookies (n = 33); jelly (n = 24); soda (n = 23); cakes (n = 13); gum (n = 13); cheese (n = 6); other beverages (n = 6); and soup (n = 1).</p> <p>The study also compares this breakdown with parental beliefs about the effects that such advertising has on children's requests for food products (and parent's compliance with such requests). The study reports strong correlations between the extent of food advertising and parental beliefs, concluding that certain classes of food are requested by children and purchased by parents in the same relative frequency as they are advertised.</p>
Temple, Steyn & Nadomane, 2008	Cross-sectional content analysis	Children's programs were recorded on two TV channels: 1. SABC2 was recorded from 0900 to 1100 h on six occasions. The languages	<p>There were 408 advertisements, of which 69 (16.9%) were for food. Two categories:</p> <p>A: Thirty-eight advertisements (55%) were for foods of generally poor nutritional value: fast-food restaurants (n= 18; 12 advertisements were for McDonald's and</p>

			<p>used are mainly English and Afrikaans plus a small amount of Xhosa.</p> <p>2. YoTV on SABC1 (1500 to 1630 h) is mainly in English plus a small amount in Zulu. Recorded during weekdays between June and October 2006.</p>	<p>5 for KFC), highly refined breakfast cereals ($n=9$), sweets (candies, $n=6$), potato chips ($n=2$), and sugar-rich cold drinks ($n=2$).</p> <p>B: Twenty-nine advertisements (42%) were for foods of generally good nutritional value, namely yogurt ($n=24$) and peanut butter ($n=5$), i.e., these foods are nutritionally superior to foods in group A but, depending on the formulation, are still likely to be inferior to comparable whole foods such as milk and nuts</p> <p>Findings reveal that many advertisements were for foods of generally good nutritional value, namely yogurt (24 advertisements) and peanut butter (5 advertisements); these two foods comprised 42% of all advertisements for food. Nevertheless, 55% of food advertisements were for foods of poor nutritional value. There were no advertisements for fruit, vegetables, or whole grains.</p> <p>Our findings must be viewed with caution. We recorded children's programs on two TV channels, but only one of them had food advertisements. Our data are based on 69 food advertisements, all from one TV program shown on weekdays over a 5-mo period.</p>
Thompson et al., 2008	USA	Cross-sectional content analysis	Food and drink advertisements aired during after-school hours (1500-2100 hours) on 2 US Spanish-language television stations were sampled over a 1-week period in the spring of 2006.	Reviewed 60 hours of programming. Of the non-program content, 47% was for product advertisements, 15% ($n=153$) of which was for food/drink. A mean of 2.5 food/drink commercials aired per hour (range 0-8), and the median duration was 30 seconds; 31% of food/drink commercials advertised fast food, and 27% advertised drinks, most (54%) of which were sugared. About one third (31%) of the food/drink commercials targeted children, 12% featured Latino celebrities, and 19% made reference to Latino culture Only 16% of the food/drink commercials had health-related content.
Warren et al., 2007	USA	Longitudinal content analysis	Programming from November 2004 to February 2005 from 1400 to 2200 hours was recorded and pooled with a second sample of programming from January to May 2006. 1,880 30s food/beverage adverts in first sample and 2,898 in the second.	<p>In both Year 1 and Year 2, the most frequently advertised products are the same: pizza/fast food (Yr1 34%, Yr2 27%); sweets (Yr1 12%; Yr2 15%); family restaurants (Yr1 11%, Yr2 10%); breakfast foods (Yr1 10%; Yr2 10%); and convenience meals/entrees (Yr1 6%; Yr2 8%). The results suggest few changes in food advertising seen by children.</p> <p>When limited to child-targeted adverts, most of the same persuasive appeals are most frequently used: taste/flavour (Yr1 26%; Yr2 31%) and mood alteration (Yr1 18%; Yr2 15%). New appeals that appeared in the first year (Yr1 8%) were replaced by nutritional (Yr2 7%) and adventure (Yr2 7%) appeals in the second year ($\chi^2=115.82$, $DF=18$, $p<.001$).</p>
Warren et al., 2008	USA	Cross-sectional content analysis	Programming from 6 broadcast and 5 cable networks recorded from 1400	Sample yielded 4,324 commercials: 51% child-targeted and 49% targeted to general audience.

			<p>to 2200 hours over 77 random days from January to May 2006.</p> <p>(same 2006 sample as Warren et al 2007)</p>	<p>Unlike previous content analyses, the results show that nutrition appeals are among the most frequently used. However, as in past research, unhealthy foods are most frequently advertised. 74% of all food/beverage products marketed are among the 5 most unhealthy food categories: pizza/fast food (24%), sweets (16%), breakfast-foods (13%), family restaurants (12%) and convenience meals (9%) ($\chi^2=358.09$, $DF=12$, $p<.001$).</p> <p>Further, child-targeted commercials employ production techniques and persuasive appeals that children have found difficult to evaluate critically.</p>
Weber, Story & Harnack, 2006	USA	Cross-sectional content analysis	<p>The top five brands in eight food and beverage categories, 40 brands in total, were selected based on annual sales data from <i>Brandweek</i> magazine's annual "Superbrands" report.</p>	<p>The results show a wide variety of Internet marketing techniques and advertising strategies targeting children and adolescents. "Advergaming" (games in which the advertised product is part of the game) was present on 63% of the Web sites. Half or more of the Web sites used cartoon characters (50%) or spokescharacters (55%), or had a specially designated children's area (58%) with a direct link from the homepage.</p>
Which?, 2008	United Kingdom	Exploratory review	<p>Examination of leading food and drink companies' marketing foods high in fat, sugar and/or salt targeted at children (under 16 years) via websites, packaging, advertising and other promotions from January to June 2008. BARB data for children aged four to 15 and Nielsen data were analysed for the period: 31 March–13 April 2008.</p>	<p>Since the last analysis (Which? 2006), many companies were still reliant on traditional marketing techniques such as competitions and cartoon characters on packaging. Others have shifted their focus to the teen market, using new media such as websites (e.g. social networking) and mobiles, in a way that parents are unlikely to be aware of. Other techniques include: online offers, viral marketing, mobile marketing (e.g. ringtones), licensed characters on packaging and websites, film tie-ins, sports schemes and sponsorship and misleading labelling and disclaimers.</p> <p>Since 2006: there has been a reduction in the use of licensed characters by the leading companies in the UK.</p> <p><u>TV advertising:</u> Since 2006, stricter TV advertising regulations came into force in the UK (manufacturers of foods high in fat, sugar and/or salt can no longer be advertised during children's programmes) but these are failing to stop children being exposed to less healthy food advertising as family programmes are not affected by the new TV advertising restrictions: during the 2 week period, 16 of the top 20 programmes showing adverts that were watched by the highest numbers of children were not affected by the restrictions.</p>

Wilson, Quigley & Mansoor, 1999	New Zealand	Content analysis	42 hours of children's programmes (Saturday morning television: 08.00–11.00 and the children's hour (15.30–18.30) yielded 269 food adverts (29% of total adverts)	<p>42 hours of children's programmes, yielded 269 food adverts (29% of total adverts) of which 63% were for products high in fat and/or sugar. The next most frequently advertised products were fast-food items at 14%. A total of 76% of food adverts were for food not eaten as part of a meal. There were no adverts for low-cost healthy foods or traditional healthy Maori foods.</p> <p>The study concludes that, even allowing for other food intake, a child who consumed the advertised diet would have too much (based on recommend daily intakes, RDI) fat and other energy foods (sucrose, fructose, and glucose) and too little of a range of minerals and vitamins. The study also raises the implications for the food security of poor people and ethnic groups.</p>
Wilson et al., 2006a; 2006b	New Zealand	Content analysis	858 adverts taken from 155 hours of children's programming	<p>Compared to Australian channels, both New Zealand channels had significantly higher proportions of food adverts that were classified as being high in fat and or sugar (54% compared with 80% and 69% respectively). Of the food adverts on New Zealand television 70.3% were for foods "counter to improved nutrition" (95% CI, 67.1%, 73.3%) compared with those favouring improved nutrition at 5.1% (95% CI, 3.8%, 6.9%). The number of food adverts per hour was higher in 2005 than 1997 for the channel for which there was time trend data.</p>
Winick et al., 1973	USA	Content analysis	236 children's adverts	<p>A content analysis of the adverts obtained provides the following breakdown by product category: cereals, 19.9%; candy, 15.7%; drinks, 15.7%; food for meals, 8.5%; restaurants, 6.8%; cookies, 6.4%; cakes, 5.9%; puddings, 5.5%; vitamins, 4.7%; snacks, 4.7%; non-edibles, 6.4%. A content analysis undertaken by observing 92 of the 236 adverts identified on weekday television (between 07.00 and 14.00 h) across four weekends between September/October 1971 provides the following breakdown of advertising by product category: cereals, 26.1%; candy, 18.5%; drinks, 13.0%; food for meals, 9.8%; restaurants, 8.7%; cookies, 8.7%; cakes, 2.2%; puddings, 3.3%; vitamins, 5.4%; snacks, 3.3%; non-edibles, 1.1%. These observations weighted by exposure: cereals, 26.6%; candy, 12.7%; drinks, 17.1%; food for meals, 7.0%; restaurants, 2.9%; cookies, 7.2%; cakes, 4.4%; puddings, 5.5%; vitamins, 13.2%; snacks, 2.8%; others 0.7%.</p> <p>In terms of creative strategies, the study addressed 143 dimensions collapsed into seven indices:</p> <ol style="list-style-type: none"> 1. Product information – i.e. disclosure/disclaimer. This scored second highest overall, most often for candy and the main candy appeal. 2. Fantasy – animation, puppets, etc. This scored third highest overall, most often for restaurant – fast-food

					<p>experience.</p> <p>3. Personalities – use of real celebrities or cartoon characters. Scored lowest overall, again most often in restaurants – no need to mention ingredients.</p> <p>4. Sales techniques – e.g. fun jingles, testimonials, "pester-power". This was in the middle overall, yet again highest for restaurants.</p> <p>5. Self social status – enablement, popularity. Scored third lowest overall, highest for vitamins (snacks amongst foods).</p> <p>6. Nutrition/health – good eating claims. Scored second lowest, again highest for vitamins (though cereals by far the most of food). Note: was zero for candy, cookies (taste) and restaurants (eating experience).</p> <p>7. Realistic social perspective – e.g. family settings. Scored highest overall and in all categories except candy.</p> <p>The factors analysis identified 36 factors; the first was animated/cartoon/fantasy, and the second health/nutrition.</p>
Young et al., 1996	United Kingdom	Review article	International literature	academic	<p>This is the best review identified in the current systematic review (refers to Hastings et al 2003). The included studies are examined in detail, which included making assessments of their methodologies (such as sample sizes, and representativeness) and the findings. The review highlights the absence of standardized procedures, such as data collection, coding, rating and analysis, which make comparisons and trends difficult to assess.</p> <p>It also looks for gaps in the research, such as the excess of studies conducted in the 1970s focussing on sugar rather than other food constituents.</p>
Young, 1990	United Kingdom	Content analysis	Saturday morning television and the children's hour were recorded over 47 days in 1983 and 1984 yielding 1750 adverts		<p>The content analysis yielded 1750 adverts of which 573 (33%) were for food. Of these, the study notes that 'only' 33% were sugared (N.B. products were defined as sugared if over 10%). The author notes that this is much less than figures from the USA at this time which range from 59–76% sugared foods. The pre-Christmas effect is also acknowledged, with toys featuring in over 10% of adverts. Fifty-eight sugared product commercials aimed at children were analysed (108 discarded if 'obviously adult' – no reference to children or no child-centred techniques used). In this study, in cases where categorization of adverts was difficult, resolution was only sought through discussion with another colleague.</p> <p>The following percentages describe the relative extent of different creative strategies in the adverts examined: animation, 64%; consumption, 53%; family, 29%; puppets, 9%; day-life setting, 40% (fantasy 41%); normal action, 62% (31% magic); humour, 57%; sugar, 9%. The following percentages describe the</p>

relative extent of different creative appeals in the adverts examined: hyperbole, 26%; adventure [not stated]; fast-pace, 12%; romantic-domestic, 9%; romantic-past, 16%; rhyme, 41%; metaphor, 29%; pun, 24%; and 21% use of a well-known character.

A factor analysis was also conducted, although statistics are not reported, and the analysis was undertaken on only 58 adverts, producing three vague factors:

1. Fast-paced child centred with extrinsic disclosures/disclaimers.
2. Extrinsic disclosures/disclaimers and rhyme.
3. Humour.

Zuppa, Morton & Mehta, 2003	Australia	Content analysis	544 adverts from 63 hours of programming classified as specifically produced for children 6–13 years of age or suitable for children to view without adult supervision	Of the adverts, 31% were for core foods and 79% were for non-core foods. Fast-foods, chocolate, and confectionary made up almost 50% of the food adverts shown on television.
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ANNEX 3

Data Extraction Table: The Effects of Food Promotion to Children

Shading indicates a new study published between 1st March 2006 and 15th November 2008

STUDY	COUNTRY	STUDY DESIGN	SAMPLE	KEY RESULTS	CAPABLE OF EST. CAUSALITY?
Aktaş 2006	Arnas, Turkey	Survey	347 mothers with children aged 3-8 years	<p>89.6% of the children either drank or ate something while watching television and the food they consumed most while watching television were fruits (60.8%), soft drinks (44.1%), popcorn/nuts (36.6%), cake/pasta (33.7%), chips (33.4%) and candy/chocolate (28.8%).</p> <p>Younger (preschool age) children paid more attention to advertisements than the older children (i.e. 32% at age 5 and 1% at age 8). 32.85% of children asked the parents to buy the products presented in the advertisements while watching them, particularly 4-5 year olds (28% and 58% respectively and leavening off to 9% at age 6).</p> <p>When out shopping, 40.3% of the children asked their parents to purchase the goods that they saw on the television adverts and that 8.9% of them argued with their parents and/or cried in order for their parents to buy that particular product. 3-6 year olds were more insistent on crying for advertised products while out shopping however there was no correlation with the time spent watching TV. Children tended to request more sweetened products such as candy, ice-cream, biscuit, cake or soft drinks.</p>	No
Arluk et al., 2003	USA	Cross-sectional survey	7-12-year-olds	Using BMI, 39.8% of children were obese. A significant relationship was found between childhood obesity and computer usage, television watching, total hours in sedentary behaviour and maternal BMI.	No

Atkin, 1978	1975b; USA	Observational study	516 family 'dyads' (mother plus child or father plus child)	In 66% of situations, the child initiated the interaction by demanding (46%) or requesting (20%) a cereal. Of the children 9% explicitly identified the free gift as the main reason for wanting a cereal, and observers indicated that up to a quarter of children appeared to make their decision at least partly on the basis of the free gift. Children mentioned nutritional considerations as the main reason in only 1% of interactions.	No
Atkin, 1975c	USA	Cross-sectional survey.	775 4 th -7 th grade students	<p>Two indices, cereal advertising exposure index and candy exposure index, were created by multiplying Saturday morning television viewing by self-reported frequency of viewing specific adverts for the two types of products. Cereal advertising exposure correlated with reported consumption of eight heavily advertised cereal brands ($r = + .41$). The correlation remained strong when grade, sex, socioeconomic status and school performance were controlled for ($r = + .37$). There was also a correlation, albeit weaker, between cereal advertising exposure and consumption of five lightly advertised brands ($r = + .27$), and a strong correlation between consumption of heavily and lightly advertised brands ($r = + .58$). In families with no reported rules restricting snacking, the partial correlation between consumption of cereals and cereal advertising exposure was $+ .49$. There was a moderate correlation between exposure to cereal commercials and child anger after a cereal request denial ($r = + .20$).</p> <p>Cereal advertising exposure was moderately correlated with frequency of requesting cereal purchases ($r = + .32$). Twelve percent of respondents with 'light' cereal advertising exposure asked their mothers to buy cereals a lot compared with 27% of respondents with 'heavy' cereal advertising exposure (no significance values are quoted). There was no correlation between cereal advertising exposure and beliefs about the nutritional value of sugar, and only a very slight correlation between cereal advertising exposure and number of tooth cavities ($r = + .09$).</p> <p>Multivariate analysis, using path analysis procedures, of the relationships between key variables and requesting that parents buy cereals found a relationship between cereal advertising exposure and more frequent asking for cereals ($r = + .27$). Cereal advertising exposure was linked to cereal consumption both directly ($r = + .30$) and indirectly, through requests ($r = + .27$) which were then correlated with consumption ($r = + .26$). The two exogenous demographic variables in the model, grade, and socioeconomic status, were not significantly related to cereal eating.</p>	Yes

Confectionery advertising exposure was correlated with consumption of three heavily advertised confectionery products ($r = + .29$); this dropped slightly to $r = + .25$ when controlling for school grade, school performance, sex, and socioeconomic status. Correlations between confectionery advertising exposure and consumption of lightly advertised confectionery products were equally strong, suggesting that respondents who viewed more confectionery adverts on Saturday morning television tended to eat all kinds of confectionery more frequently than lighter viewers. A modest correlation ($r = + .10$) was found between exposure and quantity of confectionery eaten per week. No relationship was found between confectionery advertising exposure and beliefs about the nutritional value of sugar or with number of dental cavities in the past year.

A total advertising exposure index was created from measures of prime-time, teen-oriented and Saturday morning viewing (this measure did not include reported amount of attention paid to advertising). This was correlated with more general measures of food consumption, including asking parents to visit fast-food restaurants. A correlation of $r = + .30$ (dropping to $r = + .28$ when controlling for grade, sex, socioeconomic status and school performance) was found between the total advertising exposure index and consumption of five frequently advertised foods (crisps, soda, hamburgers, chocolate drinks and cookies). Identical correlations were found for consumption of less advertised foods (pretzels, hot dogs, ice cream, and cake). The relationship between advertising exposure and consumption was stronger for girls than boys ($r = + .33$ vs. $+ .20$) and for children with parental snacking restrictions than for those without ($r = + .31$ vs. $+ .24$). Exposure was modestly correlated with frequency of asking to visit fast-food restaurants ($r = + .17$).

Overall, the study indicated that children who reported watching more Saturday morning television more often asked for cereals, expressed anger when requests were denied, and ate cereals. More than twice as many 'heavy viewers' of Saturday morning television as 'light viewers' reported making cereal purchase requests 'a lot' of the time. Exposure has a direct effect on amount of consumption as well as an indirect effect mediated by requesting cereal products. The strength of the direct effect may explain why purchase requests to parents were not found to be a stronger mediating variable.

Authors' conclusions: Children most exposed to television tend to

				<p>consume more foods, both advertised and non-advertised, than children less exposed to television. "Since it is unlikely that heavy eaters of purely advertised foods are motivated to watch more television than other people, it seems justified to conclude that this minor relationship is evidence of a flow of causality from viewing to eating rather than the reverse sequence". But "a conservative reading of the data suggests that the effect is not strong".</p>	
Barnabè et al., 2008	Italy	Review	Existing data and expertise, particularly relating to Europe.	<p>A significant positive correlation was found between overweight prevalence and the promotion of energy-dense foods, but there is no evidence that it may be due only to this factor. On the contrary, the negative, but weaker, correlation with the promotion of healthier foods may suggest a potential benefit for healthy food marketing actions which may actually counter obesity.</p> <p>Children's nutritional knowledge, food preferences, purchasing and purchase related behaviour, consumption, and diet and health status are influenced by advertising. Several studies indicate that there is a favourable attitude towards advertised products.</p> <p>Even exposure to advertisements as brief as 30 seconds long can significantly influence the food preferences made by children as young as two years old. The influence of food promotion on children's behaviour is independent of other factors and causes both brand switching and category effects. Even though a link was found, there is no evidence, indeed, to prove that advertising has a direct effect on children's diet, and on obesity. Focusing on the effects of television advertising, a relation between adiposity and television advertising was confirmed but the evidence is not sufficient to support a causal relationship. The results indicate that there is evidence of a relationship between children food marketing and children behaviour, but it is not sufficiently clear whether there is a relation between overweight or obesity in childhood and children food marketing.</p>	No
Barry & Hansen, 1973	USA	Non-randomized non-controlled experiment	60 2 nd grade pupils from two Dallas schools. Pupils were from two classes of 30 pupils each. One class was all white and one was all black	<p>There were no significant recall differences between racial groups on six of the eight items. On the other two items, which assessed brand recall, black children had significantly poorer recall than white children.</p> <p>The three preference items displayed significant racial differences. For all three items, black children expressed a strong preference for one advert, cereal or character over another, whereas white children did not have decided preferences ($P < 0.01$).</p>	No

Batada & Borzekowski, 2008	USA	Clustered design with children and schools randomly selected. In-depth interviews including open ended questions	58 children (grades 3-5) and their parents, randomly selected from public schools in Baltimore City (urban low income area).	<p>Half of the participating children (N=29, 50%) could describe unprompted and from memory 5 or more of the 10 commercials associated with the presented cereal characters/logos. Logo and character recognition was negatively associated with a child's weight; overweight children were less likely than their average weight and at-risk for overweight counterparts to recognise more characters. Having more than 3 working televisions in the home was associated with higher recognition of cereal characters /logos.</p> <p>Fewer than half of the elementary school children were able to accurately describe the persuasive intent of television commercials. Children who were overweight were more likely than average weight children and children who were at-risk for overweight to understand the persuasive intent of television commercials ($\chi^2 = 10.9, p < 0.05$).</p>	No
Bolton, 1983	USA	Cross-sectional survey	<p>Data were obtained for 262 children aged 2–11 years from two-parent families with a television set. The families were predominantly white and of higher socioeconomic status, and children were distributed evenly across age and sex categories.</p> <p>The children were part of a large household survey conducted in Ohio in 1977. No information is provided on how the household survey was generated other than that households were "contacted through community organizations in Ohio".</p>	<p>The structural coefficient estimates indicated that the most important direct influence on children's behaviour was parental behaviour. Child descriptors (age, missed meals, snacking, food commercial exposure) were consistently of secondary importance. The direct effects of parental supervision were mixed, and smaller in magnitude than the effects of child descriptors.</p> <p>The study uses structural equation modelling to predict the relationship between food commercial exposure and children's behaviour. (For details of the equations, see original paper).</p> <p>In equation 1, children's food commercial exposure increased significantly with parental food commercial exposure and decreased with parental supervision of television viewing. However, parental supervision explained only 3% of variance in children's food commercial exposure, while parental exposure explained 22% of variance. In equation 2, parental snacking frequency explained 29% of variance in children's snacking frequency. However, parental diet supervision did not have the significant negative effect on snacking which was hypothesized. Age had only a small impact on snacking, explaining only 4% of variance in snacking (with older age being associated with less snacking). Missed meals were not significantly related to snacking frequency. <u>Children's food commercial exposure</u> had a significant effect on snacking frequency, although small (explaining only 2% of the variance). The impact of parents' snacking frequency was 15 times larger than the impact of advertising.</p>	Yes
In equations three and four, an increase in parental caloric intake					

significantly increased children's calorific intake (explaining 9% of variance), and an increase in parents' nutrient efficiency significantly increased children's nutrient efficiency (explaining 8% of variance). The direct effects of parental behaviour were smaller in these two equations than in equations one and two because of the indirect effects of parental behaviour through children's food commercial exposure and snacking frequency. Parents' diet supervision did not significantly affect children's calorific intake or nutrient efficiency. Snacking significantly increased children's calorific intake, explaining 5% of its variance, and significantly decreased their nutrient efficiency (explaining 6% of variance). Missed meals caused a decrease in calorific intake, although snacking had a more detrimental effect than missed meals. In these two equations, snacking and missed meals together had as great an effect as parental example, suggesting the importance of dietary habits in determining children's nutritional well-being.

Age-related effect were generally greater than parental behaviour, children's snacking or children's missed meals, explaining 12% of the variance in children's calorific intake and 8% of the variance in children's nutrient efficiency. Older children consumed proportionally less calories than nutrients, causing nutrient efficiency to rise.

Children's food commercial exposure did not have a significant direct effect on children's calorific intake, but did significantly decrease children's nutrient efficiency, although explaining only 2% of the variance. Food commercial exposure also had significant indirect effects on children's calorific intake and nutrient efficiency, increasing the former and decreasing the latter. This indirect effect worked through the effects of food commercial exposure on children's snacking frequency, which in turn increases their calorific intake and decreases their nutrient efficiency. Again, these effect sizes are small (around 1% of the variance). The combined direct and indirect effect of food commercial exposure on children's calorific intake and nutrient efficiency was at most half the size of the direct impact of other predictor variables.

In equation 5, parental nutrient balance explained approximately 9% of the variance in children's nutrient balance, whereas parental diet supervision did not have a significant effect. In this equation, neither children's food commercial exposure nor children's snacking had any significant effects.

Overall, the analyses suggested that children's exposure to television food advertising influenced their diet in three separate ways. Firstly, it

				<p>significantly increased the number of snacks consumed. According to the structural equation model, an increase in food advertising exposure by an additional 25 minutes per week (12 hours total viewing per week) would have caused a child to consume one additional snack per week. Secondly, this additional snack would have increased the child's calorific intake by approximately 1.4 % and decreased the child's nutrient efficiency by a similar amount, assuming that children typically snack on low nutrient, high calorie foods. Thirdly, children's exposure to television food advertising significantly decreased their nutrient efficiency directly, in addition to the indirect effect through increased snacking frequency. According to the model, an increase in food advertising exposure by an additional 25 minutes per week would have decreased the child's nutrient efficiency by about 6%. Because in this equation calorific intake was not affected, this implies that the child consumes low nutrient, high calorie foods in place of foods with equivalent calories but higher levels of nutrients. This was consistent with the notion that children's snack preferences are influenced by the low nutrient, high calorie foods advertised on television. The influence of parental behaviour was greater than that of television advertising exposure. However, parental behaviour was also, according to this model, an important influence on children's television food advertising exposure.</p>	
Borzekowski & Robinson, 2001	USA	Randomized controlled experiment	46 children aged 2-6 years from Head Start programme in California	<p>There were no significant differences between children in the two experimental conditions in demographic or media use characteristics.</p> <p>Children who viewed the commercials tape were more likely to select the advertised food in seven of the nine pairs of items. The remaining two items were the breakfast cereal, where children in both groups were equally likely to choose the advertised product, and the remote control toy, where children in the treatment group were not more likely to select the advertised product. The largest odds ratios were for the two food items advertised twice on the tape [biggest difference between experimental and control groups e.g. three times more likely]. There were no significant differences between boys and girls in the rate at which they selected advertised vs non-advertised food items. There were also no significant differences in the proportion of responses for advertised items in relation to amount of media technology in the home (based on 'low' vs 'high' numbers of televisions, VCRs and videogame players in the home).</p>	Yes
Boynton-Jarrett et al., 2003	USA	Randomized controlled trial	548 ethnically diverse students from public	For each additional hour of television viewed per day, fruit and vegetable servings per day decreased (-0.16) after adjustment for other	Yes

			schools	variables. Baseline hours of television viewed per day was also independently associated with change in fruit and vegetable servings.	
Bridges & Briesch, 2006	USA	Longitudinal survey	Households in a multi-store panel in Colorado covering a 118 week period starting in the mid-1990s.	<p>Finds evidence that advertising targeted at children (but not other promotional methods tested, which included price, POS) results in changes to food purchase behaviour at both brand and product category level.</p> <p>There is moderate evidence of effect of advertising on children-influenced food category and brand purchases (mediated through nag factor and demand elasticity of household).</p>	Yes
Buijzen, Schuurman & Bomhof, 2008	The Netherlands	Cross-sectional multi-method (diary/survey) study	234 urban and suburban households near Amsterdam with children aged 4-12 years in 8 elementary schools in Spring 2006	Children's exposure to food advertising was significantly related to their consumption of advertised brands ($\beta=.21$) and energy-dense product categories ($\beta=.19$). The relationship between advertising exposure and overall food consumption was considerably stronger overall in lower-income families, but nonsignificant ($\beta=-.08$). The impact of television food advertising generalised to other brands within the same product category as the advertised brand Family communication about consumer matters moderated the advertising and consumption variables which were reduced by high levels of consumption-related communication within a family.	Yes
Cantor, 1981	USA	Randomized controlled experiment using a 2 x 2 independent-measure factorial design	37 children aged 3-9 years (25 boys and 12 girls).	<p>Mean scores for proportion of sweet dessert choices differed between the conditions during the pre-experiment period. Analysis of variance was therefore conducted, and indicated that none of the pre-experiment differences between conditions were significant. Analysis of variance on the data for the week of exposure yielded an interaction effect approaching significance ($F(1,22) = 3.45, P < 0.07$). None of the associated means differed significantly from one another in subsequent tests (Newman-Keuls method). In order to correct for individual differences prior to exposure to the manipulation, an analysis of covariance was performed, using the pre-exposure proportions as the covariate and the proportions after exposure as the criterion. This yielded no significant main effects, but an interaction effect of borderline significance ($F(1,32) = 3.68, P < 0.06$).</p> <p>Multiple <i>t</i>-tests (Tukey's) indicated that children exposed to the serious PSA plus the toy advert (i.e. not exposed to the sweet dessert advert) made significantly fewer sweet dessert choices after the experiment compared with children exposed to the serious PSA plus the sweet dessert advert and children exposed to the humorous PSA and the toy advert ($P < 0.05$). Data for proportion of fruit choices followed a similar pattern. Children exposed to the serious PSA plus the toy advert made</p>	Yes

				<p>significantly more fruit choices after the experiment compared with children exposed to the serious PSA plus the sweet dessert advert and children exposed to the humorous PSA and the toy advert.</p> <p>The serious PSA appeared to have more impact on children's fruit choices than the humorous version when it was not followed by a sweet dessert advert, although the lack of a main effect suggested that the presence of the sweet advert did not in itself have an effect. However, the group exposed to the combination of serious PSA and toy advert made significantly fewer sweet dessert choices and significantly more fruit choices, post-experiment, than the group exposed to the serious PSA and confectionery advert.</p>	
Carruth et al., 2000	USA	Longitudinal study	34 children 5-year-old children (14 males, 20 females)	The most commonly given reasons for product preferences were, in descending order: liking/favourite, flavour/taste, characters or action figures, product type, colour, the foods depicted on the package, prior consumption, appearance, free gift, because parents buy it, and health reasons. Some reasons increased over time and some decreased, but no statistical analyses are reported. Responses to mothers' questionnaire are not relevant to the review.	No
Carruth, Goldberg & Skinner, 1991	USA	Self-completion survey	887 10 th -12 th grade students in four high schools	<p>Overall, about 9% of respondents reported 'very often' or 'often' talking about food adverts with their parents, and about 6% with their friends, whereas 72% reported 'never' or 'rarely' discussing adverts with their parents and 75% with their friends.</p> <p>Eight percent reported that seeing a food advert made them want to get something to eat 'every day', 14% 'several times a week', 27% 'once or twice a week', 25% 'less than once a week', and 27% 'never'. Responses to an open-ended question about snacks were consumed in front of the television indicated that crisps (55%), fizzy drinks (21%), popcorn (21%), cookies (19%), sandwiches (18%), fruit (15%) and sweets (14%) were most frequently reported.</p> <p>The study reports that snacking in front of the television in this study was not related to seeing a commercial, but no data are provided.</p>	No
Carter, 2006	Australia	Systematic literature review	Research, reviews and commentaries identified through Boolean searches of PubMed, ScienceDirect and Google; searches	<p>Controlled studies have consistently shown that children exposed to advertising choose advertised products at significantly higher rates than those unexposed, and the effect does not diminish with age.</p> <p>Two separate literature reviews have concluded that there is sufficient evidence to suggest food advertising has an independent effect on the</p>	No

			of bibliographies of relevant papers – with preference given to Australian data.	<p>preferences, purchasing behaviour and consumption of food by children at both brand and category level.</p> <p>Multiple cross-sectional studies have demonstrated that children's television viewing is positively associated with higher intakes of dietary energy through fat, sweet and salty snacks, and carbonated beverages and thus are related, however studies fail to establish direction of causation and co-variables, such as poor parental supervision, cannot be ruled out as a causal mechanism.</p> <p>From the Australian evidence, the review finds the link between television and childhood obesity is weak, with a ~1% independent effect size.</p>	
Chamberlain, Wang & Robinson, 2006	USA	Prospective cohort study	827 third grade children from 12 elementary school in northern California (Sep-Oct 1999); a ethnically and socio-demographically diverse prospective sample of 386 pupils in 6 schools were followed up 3 times for 20 months (Apr-May 2000, Sep-Oct 2000 and Apr-May 2001).	<p>Results relevant to the review (excluding the 6 schools in the smoking prevention trial):</p> <p>Children reported watching +10 hours TV and +22 hours total screen time (TV, movies, videos or videogames) per week; and making nearly 1 request/week for toys seen on TV and more than 1 request/2 weeks for food/drinks they had seen on TV. At baseline, children's screen exposure was significantly associated with requests for foods/drinks ($P < .001$). In prospective analysis, children's screen exposure at baseline was significantly associated with their mean number of foods/drinks requests 7, 12 and 20 months later ($P < .01$).</p> <p>Overall, after adjusting for baseline requests and socio-demographic variables, the relationship between screen media exposure and future requests for advertised foods/drinks remained significant for total TV viewing and total screen media exposure.</p>	No
Chan & McNeal, 2003	China	Three cross-sectional surveys	1665 parents of elementary school children aged 6–14 years in Beijing, Nanjing and Chengdu	<p>Results indicate that Chinese parents hold negative attitudes towards television advertising in general and children's advertising specifically. The negative attitudes result mainly from the perception that advertising is deceptive and annoying. Parents feel strongly that advertising should be banned on children's programming. Ninety-eight per cent of parents exercise some control over the contents and times of television viewing. Parents perceived that they have a great influence on their children's attitudes towards advertising.</p>	No
Chan, 2000	China	Semi-structured interviews	448 Chinese children aged 5–12 years in China, Hong Kong	<p>Results relevant to the review:</p> <p><i>Favourite advert:</i> 222 adverts were identified as favourites (not all respondents could identify a favourite advert). The most frequently cited</p>	No

			SAR (equally distributed between the sexes)	<p>adverts were for food and drink (57%) followed by toys (12%), mobile phones (8%), restaurants/fast-food (6%), and supermarkets (4%). All other categories received 3% or fewer citations. The main reasons given for liking adverts were categories as 'entertainment' (57%), liking the product (23%), and choice of character/celebrity (18%).</p> <p><i>Least favourite advert:</i> 116 ads were identified as least favourites. The top categories of least favourite adverts were mobile phones (18%), food and drink (17%), PSAs and supermarkets (10% each), toys (7%) and property (5%). All other categories received 4% or fewer citations.</p> <p><i>Brand recognition</i> was stronger for liked adverts than for disliked adverts: 85% of respondents could spontaneously recall the brand featured in their favourite advert, compared with 60% for their least favourite advert.</p> <p><i>Brand recall:</i> when presented with three slogans (for Kinder chocolate, Nestle milk powder, Maltesers), between 18 and 32% could recall the brand. Older children had better brand recall than younger children.</p> <p><i>Comprehension</i> of the four adverts presented in storyboard form: 63% of children identified the correct messages in both the Kinder chocolate advert and the equal rights PSA. Less than half could identify the key messages in the tea advert (40%) and taxi advert (27%). Understanding of key messages was significantly related to school year, with increasing understanding as children got older.</p>	
Chernin, 2008	USA	Single factor experimental study	Convenience sample of 133 5-11 year olds (60.2% female; M=8.18 years, SD=1.45) from two elementary schools in suburban Philadelphia.	<p>Exposure to commercials (or a sweetened breakfast cereal and an orange-flavoured drink mix) was positively and significantly associated with preference for the advertised product ($\beta=.33$, robust SE=.11, $p\leq.01$) when shown coloured pictures of the product and three others within the same product category.</p> <p>Age was not statistically significant ($\beta=.07$, robust SE=.07, $p=.36$); younger and older children exhibited similar preferences for the product. Boys were more influenced by the commercials than girls ($\beta=.48$, robust SE=.22, $p=.03$). The gender difference may have been exacerbated by the commercials' main character being a boy.</p> <p>The two commercials were equally persuasive as the interaction between ad exposure and ad variable was not significant.</p>	Yes
Clarke, 1984	USA	Randomized controlled experiment	80 preschool children of both sexes with a mean age of 53 months.	There were no significant differences found in any of the fruit drink measures between groups depending on programme type, advertising exposure, or whether or not food was offered during the viewing situation. Significant effects were found in relation to the toy truck	Yes

questions, but these are not relevant to the review.

Coon et al., 2001	USA	Cross-sectional survey	91 parent-child pairs from Maryland, USA. All children were in 4 th -6 th grade (average age 10 years)	<p>Televisions were more likely to be on during meals in households with lower incomes ($P \leq 0.01$), single parents ($P \leq 0.05$) or less educated mothers ($P \leq 0.05$). Television presence during meals was inversely related to parents' nutritional knowledge, attitudes and norms ($P \leq 0.05$) and positively related to parents' attachment to meat ($P \leq 0.01$), and frequency of parents preparing quick suppers ($P \leq 0.01$). There was a relationship between the television being on during two or more meals per day and lower consumption by children of foods in the fruit and vegetable group (fruit, vegetables, juice and juice drinks) ($P \leq 0.01$). Consumption of foods in the meat group (red meat, processed meat, chicken, egg and fish) and foods in the pizza/salty snacks/soda group was significantly higher among children exposed to television during two or more meals per day ($P \leq 0.05$ and $P \leq 0.01$ respectively). Children in this group derived 6% more (compared with children exposed to less or no television during meals) of their daily total energy from all three meat groups combined ($P \leq 0.01$), 5% more from pizza, salty snacks and sodas ($P \leq 0.01$), and nearly 5% less from fruits, vegetables and juices combined ($P \leq 0.001$). They also consumed more caffeine than children with low television exposure ($P \leq 0.01$).</p> <p>Multiple linear regression examined the relationship between each of five dependent variables (children's consumption of five food groups: fruit; vegetables; red meat; pizza and snacks; soda) and the independent variable presence of television during meals, controlling for socioeconomic factors, parents' nutritional knowledge, attitudes and norms and parents' use of quick foods. There was a significant relationship between more exposure to television and higher consumption of red meat ($P \leq 0.01$), pizza and snacks ($P \leq 0.05$) and soda ($P \leq 0.05$), and lower consumption of vegetables ($P < 0.01$). Of the socioeconomic and demographic variables, only two were significant: family income was significantly inversely related only to fruit consumption ($P \leq 0.05$), and being black was negatively associated with soda consumption ($P \leq 0.05$). Multiple regression analysis also showed television during meals to be independently and significantly associated with percentage total daily energy from the three combined food groups. Compared to children with lower exposure to television during meals, higher exposure children derived a lower percentage of total daily energy from fruit, vegetables and juice ($P \leq 0.001$) and a higher percentage from meat ($P \leq 0.05$) and from pizza, snacks and soda ($P \leq 0.001$). Of the socioeconomic and demographic variables, being black</p>	Yes
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was significantly associated with higher percentage of total daily energy from fruit, vegetables and juice ($P \leq 0.01$) and from meat ($P \leq 0.01$), and lower percentage from pizza, snacks and soda ($P < 0.05$). The study did not report the proportion of variance in consumption explained by the regression equations and it was unclear whether the reported regression coefficients were standardized or unstandardized. This makes it potentially difficult to assess the strength of influence of television during meals relative to other influences. However, the regression analyses showed that, when the socioeconomic and demographic factors were controlled for, television during meals had an independent and significant influence on frequency of consuming four foods (vegetables, red meat, pizza and snacks, and soda). Furthermore, with the exception of soda, none of the socioeconomic or demographic variables had a significant influence. This shows that, for those particular foods, television during meals had a stronger influence on consumption than the socioeconomic and demographic variables. Similarly, with the exception of race, television during meals had a stronger influence than the other socioeconomic and demographic variables on the percentage of total daily energy derived from the three combined food groups.

Dawson et al., 1988	USA	Randomized controlled experiment	80 white, middle-class, public school, kindergarten (mean age 6.2 years) students residing in the north-western USA	<p>“All children (100%) engaged in some consummatory behaviours. Half (50%) engaged in behaviours such as touching the food, picking up the food, pretending to eat, or eating” (p.1356) [no further breakdown is provided]. Children in the ‘low nutrition’ food stimulus condition displayed more consummatory behaviours than children in the ‘pro-nutrition’ food stimulus condition (mean score 15.35 vs mean score 10.50, $P < 0.01$), regardless of the commercial shown. There was no significant difference in consummatory behaviours by children exposed to the different commercial types. Children exposed to the ‘low nutrition’ food commercial displayed 13.10 consummatory behaviours compared with children exposed to the ‘pro-nutrition’ commercial who displayed 13.45 consummatory behaviours.</p> <p>Self-reported temptation to transgress displayed a trend, with greatest temptation being reported after viewing the ‘low nutrition’ commercial followed by the ‘pro-nutrition’ commercial, the toy commercial and the no commercial control. However, this was only significant at the 10% level ($P < 0.09$). Girls reported significantly more temptation to transgress than boys (mean score 3.41 vs mean score 2.08, $P < 0.05$).</p>	Yes
Del Toro & Greenberg, 1989	Puerto Rico	Cross-sectional survey	225 9 th –12 th grade high school students from two schools (one public	Girls were significantly more positive and less negative about food adverts than boys, and reported greater desire for foods seen in adverts ($P < 0.05$ for all three factors). Girls and boys were equally likely to ask	No

			<p>and one private) in a metropolitan area in Puerto Rico. One class from each grade level in each school was surveyed. The sample contained twice as many females as males so data were weighted to balance sex across the grade levels. The sample was described as 89% Puerto Rican, and similar to the national profile in terms of number of people living in each household</p>	<p>their parents to buy foods they had seen advertised (between 35% and 48%), and to buy advertised foods themselves. Younger respondents (9th–10th grade) were more likely to ask their parents to buy foods they had seen advertised than older children ($P < 0.05$). When reported television behaviours were correlated with reported nutrition behaviours, there was a consistent significant correlation between amount of snacking and amount of television watched at different times (during the week $r = 0.21$, at weekends $r = 0.17$, and during meals $r = 0.19$, $P < 0.05$).</p> <p>Television viewing was consistently significantly related to holding the opinion that eating is good for you.</p> <p>There was a significant correlation between using one's own allowance to buy foods and television viewing on weekdays ($r = 0.14$), Sundays ($r = 0.22$), and during the week ($r = 0.25$). There was a relationship between watching television on Saturday morning and using one's own money to buy 'bad' foods such as chocolate confectionery, soft drinks and potato crisps ($r = 0.25$, $P < 0.05$). Television exposure was <u>not</u> related to the number of meals eaten or skipped, frequency of eating out, intake from different food groups, opinions about what constitutes a healthy diet or making purchase requests from parents.</p>	
Dickinson, 1997	United Kingdom	Semi-structured interviews	12 United Kingdom households containing at least one child aged 11–18 years and two adults.	Limited findings reported on how households engage with food advertising. Young people were described as "particularly adept at recalling the voice-overs in food adverts almost verbatim".	No
Dietz & Gortmaker, 1985	USA	Two cross-sectional surveys and one longitudinal survey	<p>Three samples were included in the study:</p> <p>6965 children aged 6–11 years studied in cycle two of the USA National Health Examination Survey between 1963 and 1965</p> <p>6671 children aged 12–17 years studied in cycle three of the USA</p>	<p>Cross-sectional analysis of the cycle two sample (children aged 6–11 years) indicated a significant relationship between television watching and obesity; children who watched more television experienced significantly more obesity ($P < 0.01$) and super-obesity ($P < 0.02$) than children who watched less television. There were no significant relationships between obesity and children's reported number of friends, ability to get on with friends, time spent with friends, time spent alone, listening to the radio, reading, or other leisure activities. Cross-sectional analysis of the cycle three sample (children aged 12–17 years) also indicated a significant relationship between television watching and obesity; children who watched more television were significantly more obese ($P < 0.0001$) or super-obese ($P < 0.0001$) than children who watched less television.</p>	Yes

			<p>National Health Examination Survey between 1966 and 1970</p> <p>2153 children studied in cycle three who had also previously been studied in cycle two.</p>	<p>There was a dose-response relationship between obesity, super-obesity and time spent watching television. Estimated regression coefficients indicated that the prevalence of obesity increased by 1.2 to 2.9% for each additional hour of television watched per day. Similarly, the prevalence of super-obesity increased by 1.4 to 1.6% for each additional hour of television watched per day. When a range of control variables were entered into the analysis to control for their potential influence on obesity, super-obesity and television viewing – including past history of obesity at cycle two and socioeconomic characteristics of the family, the magnitude of the television–obesity relationship was not altered in the cross-sectional analyses. Controlling for past obesity and socioeconomic characteristics did reduce the influence of television viewing on obesity in the longitudinal analysis, but the relationship between television viewing and obesity and super-obesity was still significant ($P < 0.001$ and $P < 0.05$ respectively).</p> <p>A more stringent test of the relationship between television viewing and obesity was obtained by examining the association between television viewing in cycle two and obesity in cycle three (i.e. 3–4 years later), in the longitudinal sample. When cycle two obesity and family socioeconomic characteristics were controlled for, coefficient estimates for cycle two television viewing and obesity and super-obesity in cycle three were 0.008 ($P < 0.07$) and 0.006 ($P < 0.03$), i.e. marginally significant.</p>	
Dixon et al., 2007	Australia	Cross-sectional survey and experiment	919 Grade 5 (mean age 10.3 years, sd 0.52 years) and Grade 6 (mean age 11.3 years, sd 0.5 years) students recruited large primary schools within metropolitan Melbourne	<p>The index of weekly hours of TV viewing indicated children watched an average of 17 h of TV per week ($M=16.83$, $sd=8.93$; range 0-31.5). Controlling for gender, grade and SES, the survey showed that hours of weekly TV viewing was significantly positively associated with more positive attitudes toward fizzy drinks, chocolate and fast food, stronger liking of junk food, perceiving that other children ate junk food more often, perceiving junk food to be healthier, and higher reported frequency of consumption of junk food.</p> <p>The experiment found exposure to the junk food ads did not enhance children's attitudes or intentions towards unhealthy foods. Exposure to ads for nutritious foods promoted selected positive attitudes and beliefs concerning these foods. This generally happened irrespective of whether healthy food ads were aired alongside junk food ads or not.</p>	No
Donkin et al., 1992; Neale & Tilston,	United Kingdom	Cross-sectional survey	507 parents or guardians of children aged 7–11 years in the	Children's food purchase requests reported by parents were for a range of foods, the largest category being cereals (18%), followed by biscuits and cakes (11%), fruit and vegetables (11%), sweets and chocolates	No

1993			Central television district of England	(10%), drinks (10%), and meat and meat products (9%). Eleven percent of requests were specifically for Kellogg's cereals. Forty-five percent of the requested products had added sugar. A relationship between television watching and sugar consumption by children is described in the text, but it is not clear how this relationship was measured and analysed.	
Donohue, 1975	USA	Semi-structured interviews	162 black elementary-school children in 1 st -3 rd grade	<p>Favourite adverts were listed by product category. Food adverts were the most popular, comprising 18% of favourite adverts for the sample as a whole. Food adverts were listed as favourites by 9% of first grade pupils, 32% of second grade pupils, and 15% of third grade pupils. They were followed closely by programme trailers, toys and games adverts, and adverts for medicines/vitamins. A fifth could not recall a favourite advert, and 13% had no favourite. When asked what they specifically liked about adverts, humour was the most important feature (27%), followed by entertainment (18%), with smaller numbers giving 'cartoons', 'information' and 'action' as important features.</p> <p>The majority of children (90%) reported that they helped their parents to pick out items when shopping. When asked how they knew what to buy, interpersonal influence ('someone told me about it') was the most commonly given reason (34%), followed by having seen the product on television (29%), having seen it in the store (13%), needing it (3%), and other reasons (22%).</p> <p>When asked whether the cereal itself or the free gift was more important in selecting a cereal, both were equally important for boys, but for girls, the free gift was the main consideration (56% free gift, 44% cereal). First grade children appeared to put more emphasis on the free gift than on the cereal. However, none of the differences were significant.</p>	No
Escalante de Cruz et al., 2004	India; Indonesia; Malaysia; Pakistan; Philippines; Republic of Korea	Cross-sectional surveys	Parents and children	<p>Children are exposed to an overwhelming amount of advertising as there is little regulation; 30% of Malaysian children watch over 8 h of television per day during holidays and are exposed to over 2.5 h of advertisements per day; 73% of Pakistani and 68% of Filipino children claim to love advertisements.</p> <p>More than 50% of parents in all countries surveyed said that their children are an important influencing factor in their purchase decisions. Of Pakistani children 73% perceive soft drinks to be healthy for frequent consumption. In the Philippines, 80% of children and 71% of parents drink soft drinks at least once per week, as do 71% of those in the Republic of Korea. In the Philippines 40% of parents and 63% of</p>	No

children believe fast food to be fit for frequent consumption.

Folta, Bourbeau & Goldberg, 2008	USA	Qualitative study: focus groups	A random sample of (N=52) children from a typical urban, multicultural community in Massachusetts. 2-4 children per group and equal numbers of boys and girls. The average age was 9.3 years.	<p>Overall, many children understood the purpose of commercials and were sceptical about claims that were made. All children could distinguish what is real in a commercial, either in their first reaction or upon further reflection, and were aware of the persuasive intent.</p> <p>The children judged advertised foods based on a number of factors, not all nutrition-related. They identified positive and negative nutritional attributes of foods, but many were equally influenced by messages about taste and by incentives to buy the product.</p> <p>Children evaluated both the yogurt snack and high-sugar cereal as “good and bad” after viewing the advertisements. Sugar or artificial sugar was the “bad part.” Milk and the free DVD were the “good part” of yogurt. They were particularly interested in the free DVDs that came with products.</p>	No
French et al., 2001	USA	Randomized controlled experiment	Users of 55 vending machines at 24 sites (12 secondary schools and 12 workplaces)	<p>Both the pricing strategies and the promotion strategies influenced sales of low fat snacks. Price reductions were significantly associated with percentage of low fat snack sales ($F(3,66) = 156.89, P < 0.001$). With no price reduction, 10.9% of total sales were for low-fat snacks. This increased by 9%, 39% and 93% with price reductions of 10%, 25% and 50% respectively ($P < 0.05$). The number of low fat snacks sold (as opposed to the percentage) did not differ significantly between the control and the 10% price reduction condition. There were significant increases in the absolute number of low fat snack sales in the 25% and 50% price reduction conditions, compared with the other two conditions ($P < 0.05$). In other words, the 10% price reduction increased the percentage of snack sales which were for low fat products without increasing the absolute number of low fat snacks sold or the total sales volume, suggesting that customers may have been substituting a low fat snack for a regular snack. However, with a 25% and 50% reduction, the absolute number of low fat snacks sold increased, as did the total sales volume (in the 50% reduction condition). This suggests that customers increased the number of snacks they bought from the machine, and may have actually increased their overall calorific intake.</p> <p>Promotion (labelling and signage) was significantly and independently associated with increased low fat snack sales ($F(2,44) = 3.48, P < 0.04$). The percentages of low-fat snacks sold in the no signage, labelling, and labelling plus signage conditions were 14.3%, 14.5% and 15.4% respectively. Only the labelling plus signage condition differed</p>	Yes

			<p>significantly from the no signage condition in post hoc means comparisons ($P < 0.05$). The total number of low fat snacks sold did not differ significantly by promotion condition, suggesting that the promotions did not increase the total number of low fat snack sales, only the percentage of snacks sold which were low fat.</p> <p>There were no significant main effects for price or promotion, and no significant 2-way interactions, on machine profits, indicating that profits were not significantly affected by any of the experimental conditions. Overall sales volume was unrelated to promotion, but was related to price reduction, with a significant increase in sales volume in the 50% price reduction condition compared with the other three price conditions, which did not differ significantly from each other. There were no differences between adolescents and adults in price sensitivity.</p> <p>Sales of low fat snacks increased significantly and proportionately with increasing price reduction, and promotional labels and signage also had a small, independent effect on low fat snack sales. These effects occurred in both adult (workplace) and adolescent (school) populations.</p>	
Galst & White, USA 1976	Non-randomized experiment plus observational study	41 children of both sexes aged 3–11 years (mean age range 4–7) and their mothers	<p>Children made an average of 15 PIAs during the supermarket trip, equivalent to one for every two minutes in the store. Nearly two-thirds (64%) of the PIAs were independent (i.e. not made in response to a question from the mother) verbal requests made in front of the item display on the shelf. The most heavily requested items were cereals and sugars and confectionery (8% of all requests each), followed by vegetables (6%), fruit (6%) and articles and plastic goods (6%). Forty-five per cent of PIAs were successful.</p> <p>Spearman rank correlation coefficients found a significant positive relationship between overall television reinforcement value and number of PIAs made ($r = 0.64, P < 0.01$), and between the commercial reinforcement ratio and number of PIAs made ($r = 0.52, P < 0.01$). In other words, the more effort a child exerted to keep the overall videotape playing, and the more effort they exerted to watch the commercials compared to the programme, the more PIAs they made per minute in the supermarket. Age was correlated positively with the commercial reinforcement ratio ($r = 0.28, P < 0.05$) and the overall television reinforcement value ($r = 0.45, P < 0.01$), although this may have been a study artefact, in that older children may have been more adept at pressing the response button than younger children. Age was also correlated positively with total number of PIAs ($r = 0.44, P < 0.01$) and number of independent PIAs ($r = 0.37, P < 0.01$), with older children</p>	Yes

				<p>making more attempts than younger children. The number of PIAs made correlated positively and significantly with total number of hours of commercial television watched per week ($r = 0.31$, $P < 0.05$), but not with total number of hours of non-commercial television watched. There was no significant correlation with age, suggesting that the relationship between commercial television exposure and PIAs was not a function of age.</p> <p>Overall, the study suggested that the more effort a child put into watching television commercials, as compared with programmes, the greater the number of attempts to influence mothers' shopping purchases he or she made at the supermarket. The fact that only hours of commercial television watched per week (as opposed to hours of non-commercial television watched per week) also correlated significantly with number of purchase attempts lent further support to the relationship between commercials and purchase influence behaviour.</p>	
Galst, 1980	USA	Randomized controlled experiment	65 children aged 3.5–6.75 years	<p>One-way analysis of variance on baseline snack choice proportions indicated that the groups differed in their choices prior to the intervention. Therefore analysis of co-variance for each of the four intervention weeks was performed using baseline proportions as the covariate variable. The average proportion of snacks with added sugar content selected during weeks 3–6 was calculated for each condition, and Scheffé multiple-contrast tests were performed to locate the sources of the differences demonstrated by the significant main effect.</p> <p>Children in the control condition (no adverts) requested significantly more sugared snacks than children in three of the experimental conditions: adverts for added sugar foods viewed without adult comments; adverts for added sugar foods viewed with adult comments; and adverts for no added sugar foods plus dietary PSAs, viewed with adult comments. Children who were exposed to the adverts for no added sugar foods plus dietary PSAs viewed with adult comments, requested significantly fewer sugared snacks than children in three of the conditions: adverts for added sugar foods viewed without adult comments; adverts for added sugar foods viewed with adult comments; and adverts for no added sugar foods plus dietary PSAs, viewed without adult comments.</p> <p>Children exposed to the sugar adverts with comments scored higher (i.e. were more accurate in their perceptions of which snacks were 'healthy' and which contained 'too much sugar') than children exposed to the sugar adverts without comments ($F(1,23) = 12.16$, $P < 0.01$),</p>	Yes

				children exposed to the non-sugar adverts with comments ($F(1,22) = 3.50, P < 0.07$), children exposed to the non-sugar adverts without comments ($F(1,23) = 9.20, P = 0.01$) and control children ($F(1,22) = 19.41, P < 0.001$). Pearson correlation coefficients indicated that there was no relationship between knowledge scores and proportion of sugar snacks selected. Note that children selected their snacks in groups, so there may have been pressure to conform to the group norm.	
Ghani & Zain, 2004	Malaysia	Cross-sectional survey	252 Malaysian children aged 10–12 years from two Grade A Malaysian primary schools	Children's awareness of television advertising and their influence over parental purchases were significant predictors of their attitudes towards television advertising.	No
Goldberg, 1990	Canada	Naturalistic quasi-experiment	144 English-speaking children and 331 French-speaking children aged 9–12 years.	<p>English-speaking children reported a significantly greater number of children's cereals in the home than did French-speaking children ($F = 5.51, P < 0.02$, English mean = 2.42, French mean = 2.03). A significant effect for income was found, with low income children purchasing a greater number of children's cereals than upper-middle income children ($F = 23.92, P < 0.0001$, low income mean = 2.56, upper middle income mean = 1.38). "Both of these main effects must be interpreted in light of a significant language by income interaction ($F = 3.68, P = 0.05$)". Newman-Keuls analyses indicated that there was a significant difference between the two low income groups in number of children's cereals purchased, with the English-speaking group purchasing significantly more (mean = 3.59 vs 1.44, Newman-Keuls $P < 0.05$), but that there was no difference between the two upper-middle income groups (mean = 1.44 vs 1.30, ns).</p> <p>Correlation between level of American television viewing and children's cereals purchased was 0.35 for the English-speaking sample ($P < 0.0001$) and 0.19 for the French-speaking sample ($P < 0.01$). This suggested that within each language group, purchase of cereals increased with greater exposure to American television.</p> <p>American television viewing scores for both English- and French-speaking children were divided into three levels, with a third of each group in each level (low, medium and high). This independent variable was used in one-way ANOVAs, with number of children's cereals purchases as the dependent measure.</p> <p>One-way ANOVA for English-speaking children revealed significant effects (children's cereals purchased $F = 6.90, P < 0.01$). Newman-Keuls test revealed that children with the highest level of American television viewing had significantly more children's cereals in their</p>	Yes

homes (mean = 3.81) than did children with medium and low levels of American television viewing (2.23 and 1.23 respectively). Similarly, one-way ANOVA for French-speaking children revealed significant effects for level of American television viewing on children's cereals purchased ($F = 5.24, P < 0.01$). Newman-Keuls test indicated that cereal purchase scores for children with highest levels of American television viewing were significantly higher (mean = 2.66) than cereal purchase scores for children with medium and low levels of American television viewing (mean = 1.89 and 1.49 respectively). The relationships within each group supported the explanation that the differential level of American television exposure, rather than cultural or income characteristics, was responsible for at least part of the difference between the two language groups in purchase of children's cereals.

It was hypothesized that if English-speaking and French-speaking children who watched the same amount of American television had similar scores for cereal purchase, other factors could be ruled out as independent influences, whereas if they had differing cereal purchase scores, other independent influences may have been operating on cereal purchase. The entire sample of children was therefore divided into low, medium and high levels of viewing of American television. At each level, a comparison for English- and French-speaking children was made for the cereal purchase variable. *t*-tests indicated that none of the comparisons were significant; this supported the hypothesis that French- and English-speaking children viewing the same amount of American children's television respond similarly to products advertised during those programmes. The investigators argued that the lack of differences lessened the likelihood that other language or cultural factors might explain the differences in cereal purchase.

To minimize the problem that television viewing was measured more sensitively (as a continuous variable) whereas language was a dichotomous variable, level of American television viewing was dichotomized at the midpoint. A dummy variable regression was performed, with American television viewing, language and income as independent variables and cereals purchased as the dependent variable. This indicated a significant main effect for level of American television viewed ($F = 14.30, P < 0.001$), with children in the high level having purchased more children's cereals (mean = 2.67) than children in the low level (mean = 1.62). There was also a significant main effect for income ($F = 19.78, P < 0.0001$), with low income children having purchased more children's cereals (mean = 2.42) than upper-middle income children (mean = 2.03). There was no significant effect for

				language, and no significant interactions, although the interaction of level of American television viewed by income approached significance ($P < 0.07$). The difference in children's cereals purchased as a function of level of American television viewing was larger for the low income groups than for the high income groups.	
Goldberg, Gorn & Gibson, 1978a; Goldberg, Gorn & Gibson 1978b; Study 1	USA	Randomized controlled experiment	80 1 st grade (5–6-year-old) children in three 'upper middle class' schools in Northern California Bay Area	<p>Children exposed to sugared food adverts selected a significantly greater number of sugared foods than children exposed to PSAs (12.58 vs 8.70, P value not given). Similarly, children exposed to sugared food adverts selected a greater number of sugared foods than children in the control group (12.58 vs 10.20, $P < 0.05$). Children exposed to the PSAs selected fewer sugared foods than children in the control group, although this difference was not significant. There was a significant main effect on number of sugared foods selected for message type (i.e. sugared food adverts vs PSAs) ($F = 7.47$, d.f. = 1.57, $P < 0.01$). The same pattern of results was obtained when snack foods and breakfast foods were analysed separately. There were no significant effects on number of sugared foods selected for level of exposure (4.5 minutes vs 9 minutes) and no significant interaction.</p> <p>To test the hypothesis that repeated exposure might increase the likelihood of preferences generalizing from the advertised foods to unadvertised foods in the same category (e.g. from one brand of sweets to another), the mean number of non-advertised sugared foods was compared with the number of advertised sugared foods in three different levels of exposure (9 minutes, 4.5 minutes, control). Children exposed to the 9 minutes of adverts selected more non-advertised sugared foods than children exposed to the 4.5 minutes of adverts ($P < 0.10$) and than children in the control group ($P < 0.05$). There were no differences between any of the groups in the numbers of foods they identified as healthy and unhealthy.</p>	Yes
Goldberg, Gorn & Gibson, 1978a; Goldberg, Gorn & Gibson, 1978b; Study 2	USA	Randomized controlled experiment	122 1 st grade (5–6-year-old) children	<p>Children exposed to the Fat Albert programme in all three experimental conditions selected significantly fewer sugared snacks than children in the control group ($P < 0.05$). Children in Condition three (programme plus sugared food adverts) selected a greater number of sugared foods than children watching Fat Albert on its own or with nutritional PSAs, but the difference was not significant.</p> <p>Children exposed to the Fat Albert programme on its own selected significantly fewer sugared foods than children exposed in Study 1 to 4.5 minutes of nutritional PSAs ($t = 2.91$, d.f. = 28, $P < 0.01$) and to 9 minutes of nutritional PSAs ($t = 6.89$, d.f. = 28, $P < 0.001$). There were</p>	Yes

				no differences between any of the groups in the numbers of foods they identified as healthy and unhealthy.	
Gorn & Florsheim, 1985	USA	Randomized controlled experiment	70 girls aged 9–10 years	<p>As hypothesized, stronger effects were found for the lipstick condition, in which exposure to the advertising affected brand and product preferences, and perceptions of age-appropriate behaviour. Exposure to the diet drink advertising was associated with increased brand awareness of diet drinks ($P < 0.01$), and with increased ability to complete the jingles in the two diet drink adverts ($P < 0.01$). Exposure to the diet drink advertising had no effect on respondents' personal product preferences or their preferences if selecting for a teacher, or on their brand preferences in either of these situations, or on perceptions of age-appropriate behaviour.</p> <p>Overall, the study suggested that even where children are exposed to advertising for a product which may not be salient to them (as diet drinks were judged to be at the time the study was conducted), the advertising can increase their brand and advertising awareness and their perceptions of the link between the product and looking grown-up</p>	Yes
Gorn & Goldberg, 1980b; 1982	Canada	Randomized controlled experiment	288 children aged 5–8 years	<p>There was a significant treatment effect on children's drinks choices ($F(3,280) = 4.18, P < 0.01$). Children exposed to the fruit adverts selected the most orange juice and children exposed to the sweets adverts selected the least orange juice (45% vs 25%, $P = 0.05$). Children exposed to PSAs and to no messages or adverts fell between the two other groups (40% and 35% orange juice respectively) and were not significantly different from the children in the sweets adverts condition.</p> <p>There was also a significant treatment effect on children's food choices ($F(3,280) = 5.32, P < 0.001$). Children exposed to the sweets adverts picked significantly less fruit (25%) than children in the other three groups, which were not significantly different from one another (fruit adverts 36%, PSAs 35%, control 33%).</p> <p>There were no significant differences between groups of children in their expectations of the researchers' and doctor's preferences, with expectations of the researcher's preferences tending to 'mostly fruit' and of the doctor's preferences tending to 'all fruit'. There were no significant differences between groups of older children in their views on what food and drinks the camp should provide for the new children. The overall tendency was in the direction of more sweets than candy, but this did not differ for the different conditions.</p>	Yes

Gorn & Goldberg, 1980a	Canada	Randomized controlled experiment	131 boys aged 8–10 years in Quebec	<p>Children in each condition were reasonably accurate in recalling the number of adverts they had seen. Correct recognition of the name of the ice cream increased in children who saw three repetitions of the advert compared with one advert only (76% vs 48%, $X^2 = 3.40$, d.f. + 1, $P < 0.10$) and in children who saw three different adverts compared with one advert only (95% vs 48%, $X^2 = 8.94$, d.f. +1, $P < 0.10$). Increasing the number of exposures to five did not improve children's recall further. Correct recognition of the number of flavours mentioned in the advert was relatively high. Of children exposed to only one advert, 62% gave the correct answer, and there were no significant differences between the treatment groups.</p> <p>Analysis of variance indicated that all experimental conditions had an effect on children's brand preference for the advertised brand over other brands ($F = 2.59$, d.f. = 5, 105, $P < 0.05$). Newman-Keuls post hoc analysis indicated that those who viewed three different adverts had significantly greater preference for the advertised brand than did those who viewed only one advert ($P < 0.01$). The preference scores for all other experimental groups fell within this range and were not significantly different from one another.</p> <p>There were no significant differences between any of the groups with regard to first choice for a food snack (generic preference). However, children exposed to five different adverts were significantly more likely to select ice cream as their second choice (45% made this selection), compared with 10–15% in the other conditions ($P < 0.05$).</p> <p>Increased exposure to the adverts did not increase consumption of the ice cream, and there was a tendency for those seeing increased numbers of repetitions to eat fewer ounces of ice cream. This was not the case for those who viewed increased numbers of different commercials, where there was no discernible relationship between quantity of ice cream consumed and number of different adverts. Removing the influence of the child's weight and treating it as a covariate did not alter the results.</p>	Yes
Gracey et al., 1996	Australia	Cross-sectional survey	391 year-11 students (mean age 15.8 years) of both sexes from two public schools and one private school in Perth, Australia	<p>The results relevant to the review concern the relationship between television watching and food knowledge, attitudes and behaviour.</p> <p>There were significantly lower levels of television watching during the week among private school students compared with public school students. Television watching during the week correlated negatively with nutrition knowledge scores ($r = -0.1170$, $P = 0.028$). There were no</p>	Yes

significant correlations between television watching and body mass index, fat score or food variety score.

Weekend television viewing was significantly correlated with Kinlay's fat score, although no details are reported. Linear regression analyses were conducted with Kinlay's fat score and the food variety score as dependent variables. In each model, independent variables comprised variables that showed significant univariate relationships with these variables. Weekend television viewing was one of the independent variables in the Kinlay's fat score model, but appears not to have been included in the model of food variety score. This suggests that weekend television viewing had a significant univariate relationship with Kinlay's fat score but not with the food variety score. However, no details are given of the strength or significance of the univariate relationships. The regression models controlled for sex, age and school and all independent variables appear to have been entered in one step. The linear regression with Kinlay's fat score as the dependent variable showed that, controlling for age, fat score was positively associated with being male ($P < 0.001$), drinking alcohol ($P < 0.05$) and weekend television viewing ($P = 0.0513$) and was negatively associated with age ($P < 0.05$), self-efficacy ($P < 0.001$) and influence over food bought at home ($P < 0.05$). Thus, a higher level of weekend television viewing was associated with a higher fat score, although this just approached significance. The regression model explained 22% of variation in the fat scores.

Guittard, 2008	France	Review	European data and reviews the UK's Ofcom (2004, 2006) and Hastings (2003) reports and the USA's Institute of Medicine (2005) report.	<p>There have literally been hundreds of articles published in this area over the last 3-4 decades, most of which come from the USA. Among food marketing practices, television advertising was and still is the subject of most research. This led to a number of global reviews, which have been used as a basis for policy decision-making since the early 2000s.</p> <p>In marketing and social sciences, it is very unlikely that one side is wholly right or wholly wrong. The purpose of this review was not to weigh one paper against another but to select well-supported arguments as a foundation for action.</p> <p>The balance of evidence does support the conclusion that television advertising has a modest direct effect on children's food preferences and choices.</p> <p>There are promotional effects at brand level, distinct from product category level but the evidence for promotional effects at the level of</p>	No
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				<p>overall diet is thin at best.</p> <p>The balance of evidence does not support that television advertising (or food promotion more generally) has larger, indirect effects than other factors affecting children's lives. More importantly, there is no evidence weighing these factors against each other so as to determine their relative influence.</p> <p>Advertising is undoubtedly only one in a wide range of factors affecting children's food choice, health and obesity. From that, it can be easily understood that advertising – or television viewing more generally – has its effect <i>indirectly</i>, mediated alongside and through other variables, as well as <i>directly</i>.</p> <p>The evidence that reducing exposure to advertising has beneficial consequences is also mixed. Research on television advertising also does not offer straightforward guidance regarding the degree of restriction, partly because there is no easy translation from amount of advertising viewed to dietary consequences, and partly because little research has evaluated the relative importance of food advertising by comparison with other influences on diet.</p> <p>Research also provides little guidance regarding the influence of forms of promotion other than television advertising because this has rarely been examined, notwithstanding the fast changing array of promotional strategies, particularly for the internet, games, mobile phone and so on.</p>	
Halford et al., 2007	England	<p>Within-subjects, counterbalanced design (food adverts versus toy adverts). Two testing occasions separated by two weeks.</p> <p>(Same adverts as Halford et al. 2004⁷)</p>	<p>93 children (39 males) aged 5-7 years from a UK school. Using BMI scores, 65 were lean (NW) and 28 overweight or obese (OWOB).</p>	<p>Exposure to the food advertisements produced significant and substantial increases in food consumption in the group as a whole. The increase in caloric intake was roughly the same magnitude in the two weight status groups, 17% (112 kcal) in the NW children and 14% (97 kcal) in the OWOB children, and proves significant in both.</p> <p>The level of intake of each food was significantly associated with the type of food ($F(4,88) \frac{1}{4} 126.467$; $p < 0.001$), and the effect of advert condition on the types of foods chosen by the children was near significant ($F(4,88) \frac{1}{4} 2.265$; $p \frac{1}{4} 0.069$). Beyond their effects on brand choice, exposure to food advertisements promoted over-consumption in 5-7 year old children.</p>	Yes

⁷ Effects study which passed the inclusion criteria and demonstrated causality in Hastings G et al. (2006). *The Extent, Nature and Effects of Food Promotion to Children: A Review of the Evidence. Technical Paper prepared for the World Health Organization.* Geneva, World Health Organization.

Halford et al., 2008a	England	Within-subjects, counterbalanced design (toy advert control condition versus food advert experimental condition). Two testing sessions held at same time (2 hours after lunch) on test days two weeks apart. (Same adverts as Halford et al 2008b)	37 children aged 11-13 years from a school in Liverpool, UK. 24 were normal-weight (NW), 10 were overweight (OW) and 3 obese (OB).	Exposure to food advertisements significantly increased the preference for branded food items ($t(23)=2.795$, $p=0.01$) and non-branded food items ($t(23)=2.426$, $p=0.024$) compared with the control condition in NW children. No significant differences were found for the OWOB group between the two conditions, however OWOB children showed a greater preference for branded foods than NW children per se. In the OWOB group only, there was a significant positive correlation between food advertisement recall and the total number of food items chosen in the experimental (food advertisement) condition ($r=0.497$, $N=13$, $p=0.042$, one-tailed). OWOB children did not recall more food advertisements than NW children.	Yes
Halford et al., 2008b	England	Within-subjects, counterbalanced design (food advert versus toy advert). The children were tested on two occasions separated by two weeks. (Same adverts as Halford et al 2008a)	59 children (32 male) aged 9-11 years recruited from a UK school. 33 were normal-weight (NW), 15 overweight (OW) and 11 obese (OB).	Exposure to food adverts produced substantial and significant increases in energy intake in all children ($P < 0.001$). The increase in intake was largest in the OB children ($P = 0.04$). All children increased their consumption of high-fat and/or sweet energy-dense snacks in response to the adverts ($P < 0.001$). In the food advert condition, total intake and the intake of these specific snack items correlated with the children's modified age- and gender-specific body mass index score. There was a significant three-way interaction of food consumption between food type, advert condition and weight status ($F(8,108) = 3.429$; $P=0.001$). Using planned post hoc one-way ANOVAs, it was shown that this significant interaction was due to differences in food intake between the weight status groups. The OB group ate significantly more chocolate buttons and Snack-a-Jacks following the food adverts than both the OW and NW children, and more crisps than the NW children (all tests $p<0.05$). In response to the food adverts, the OB children increased their intake by 1.97MJ (471 kcal) from the control (toy advert) condition compared with 1.28MJ (306 kcal) in the OW and 1.05 MJ (250 kcal) in the NW children.	Yes
Halford et al., 2004	United Kingdom	Repeated measures design	42 lean, overweight and obese school children in Liverpool	No significant difference in the number of non-food adverts recognized by the lean and obese children was observed, but the obese children did recognize significantly more food adverts. Ability to recognize the food adverts significantly correlated with the amount of food eaten after	Yes

					<p>exposure to them. Overall snack food intake of the obese and overweight was significantly higher than the lean children in the control (non-food advert) condition. The consumption of all the food offered increased post food advert with the exception of the low fat savoury snack. These data demonstrate obese children have heightened alertness to food related cues. Exposure to food adverts promotes consumption.</p>	
Harrison & Marske, 2005	USA	Survey at two time points		132 children in school grades 1–3	Television viewing predicted subsequent reductions in nutritional knowledge and reasoning but these findings were significant only for foods that tend to be heavily promoted as “weight loss aids”. Concludes that television’s framing of diet foods may confuse children by equating weight-loss benefits with nutritional benefits.	Yes
Heslop & Ryans, 1980	Canada	Randomized controlled experiment		280 children aged 4–8 years in London, Ontario, and their mothers	<p>Exposure to the experimental adverts had a significant impact on only one of the measures; the child’s stated cereal. Preference ($P = 0.06$) when the F ratio for the control group versus all other groups was examined. There was no significant difference between the control and experimental respondents on the other two measures of preference and behaviour. The degree of emphasis placed on the free gift in the advert (i.e. whether all or only part of the advert featured the free gift) had no significant impact on any of the three measures.</p> <p>The proportion of respondents selecting the advertised cereal over another cereal was always higher for the group exposed to three repetitions of the advert compared with those exposed to only one, but the difference was not significant. When compared by age, older children were significantly more likely to take home the advertised cereal than younger children.</p> <p>Overall, the study suggested that effects of the advertising and free gifts on behaviour were minimal, although there was an effect on child’s preference.</p>	Yes
Hitchings & Moynihan, 1998	United Kingdom	Interviews children’s completion intake diary	plus self-food	44 children aged 9–10 years (mean age 10.2) of both sexes	The mean number of adverts recalled in each category ranged from 0.36 for cakes and biscuits to 3.25 for breakfast cereals. Children also recalled an average of 2.14 confectionery adverts and 1.59 soft drink adverts. Spearman’s rank correlation analysis indicated that the strongest relationships between adverts remembered and foods consumed were for soft drinks ($r = 0.68, P < 0.001$), crisps and savoury snacks ($r = 0.61, P < 0.001$), cakes ($r = 0.57, P < 0.001$) and sweets ($r = 0.56, P < 0.001$). All other relationships were also significant apart from the relationship for chips.	No

				Comparing the 10 most frequently recalled food adverts by children and the 10 most frequently requested foods as reported by parents, four items appeared on both lists: Walkers crisps, Kellogg's Coco Pops, Micro chips, and Kellogg's Frosties. Parents reported granting 96% of children's food requests.	
Jeffrey, McLellarn & Fox, 1982 Study 1	USA	Exploratory randomized controlled experiment	47 children aged 4–5 years	<p>The analysis of variance with repeated measures (3 x 2 factorial ANOVA) found significant increases between baseline and post-test in total calories consumed from foods, ($F(2,44) = 9.75, P < 0.01$), total calories consumed from beverages, ($F(2,44) = 8.12, P < 0.01$) and total calories consumed from food and beverages ($F(2,44) = 14.99, P < 0.01$). However, as no significant difference between groups and interaction effects were found the study did not provide evidence of low nutrition adverts exerting an influence on the children's food consumption.</p> <p>Pre–post changes in the three calorific consumption scores were analysed separately for each of the treatment groups. Comparing baseline and post-test scores for each group separately, the group exposed to 'low nutrition' adverts increased their total calorific consumption for foods ($t(1,15) = 2.41, P < 0.05$), drinks ($t(1,15) = 2.67, P < 0.05$) and foods and drinks combined ($t(1,15) = 3.38, P < 0.01$). The group exposed to 'pro-nutrition' adverts increased their total calorific consumption only for drinks ($t(1,14) = 2.36, P < 0.05$). The control group displayed no significant changes between baseline and post-test.</p> <p>Calorific consumption scores for the specifically advertised foods were also analysed separately. Subjects exposed to the 'low nutrition' adverts increased their consumption of two of the three advertised 'low nutrition' foods between baseline and post-test (Hersheys Chocolate, $t(1,15) = 2.63, P < 0.05$; Fritos, $t(1,15) = 2.16, P < 0.05$). Subjects exposed to the 'pro-nutrition' and control adverts did not increase their consumption of these specific foods.</p> <p>These separate analyses of pre–post change within each treatment group were suggestive of a possible influence of 'low nutrition' adverts on the children's food consumption. However, in the absence of between groups and interaction effects from the ANOVA, no effect could be concluded.</p>	Yes
Jeffrey, McLellarn & Fox, 1982 Study 2;	USA	Randomized controlled pre- and post-test	Groups of 48 4–5-year-olds and 48 9–10-year-olds, with an equal	There was a significant change x group x sex interaction on the total calories foods and beverages variable, $F(2,84) = 3.60, P = 0.032$. Newman-Keuls test on the adjusted means indicated that boys exposed	Yes

Fox, 1981	experiment	number of boys and girls in each age group.	<p>to the low nutrition adverts were the only group to display a significant increase in consumption ($P < 0.05$). Males in the low nutrition adverts groups did not differ from males in the other two groups at baseline, but consumed significantly more food on the post-test than males in the other two groups ($P < 0.05$). The change x group x sex interaction on the low nutrition foods and beverages variable was not significant at the traditional 0.05 level ($F(2,84) = 2.75, P = 0.07$). Post hoc comparisons performed on the adjusted means revealed the same pattern of results as found on the total calories food and beverage variable, with the low nutrition advert group for males eating more after exposure to the television adverts than any other group. In comparison with the other groups, males exposed to the low nutrition adverts consumed significantly more calories from all foods at post-test. They also consumed more calories from low nutrition foods than did other groups, but this did not reach statistical significance at the traditional $P < 0.05$ level.</p> <p>Change x group x sex x age interactions were not significant, suggesting that the two different age groups were not affected differentially by the adverts. On the cognitive measures, 9-year-olds scored more highly than 4-year-olds on definitions of a balanced diet and ability to identify healthy and unhealthy food, and on recall of the advertised products. They were also better able to define the difference between programmes and adverts, and were less likely than 4-year-olds to believe that programmes and adverts always tell the truth.</p>		
Jones et al., 2007, Study 2	Australia	Qualitative study: focus groups	<p>In May 2007, 24 5-9 year olds (12 males) recruited in friendship pairs took part 4 single-sex focus groups. Thirty 12-14 year olds (15 males) took part in 4 single-sex focus groups. Respondents recruited from blue-collar (e.g. Parramatta and Blacktown) and middle class (e.g. Bauklham Hills and Castle Hill) areas in Sydney by a commercial recruitment company.</p>	<p><u>Media exposure:</u> Media use for 5-9 year olds involved TV and movies; only half were permitted to use internet at home (boys more than girls, mostly to access games), boys media use was predominantly screen-based, and some children identified reading children's magazines from the supermarket but could not name titles. A range of media were used by 12-14 year olds: TV, movies, radio, using the computer for social networking and downloading music. Boys indicated playing videogames and only girls indicated reading magazines.</p> <p>The discussions illustrated how the marketing strategies used by food companies influence children's knowledge, attitudes and behaviours in relation to the advertised foods. Both the 5-9s and the 12-14s showed that their food beliefs and food preferences were being influenced by food companies' marketing strategies in Australia. In relation to food beliefs, of particular significance is the predominance of non-core food groups as favourite foods (the ads for Coco Pops/Coco Rocks, and Cadbury chocolate were the most commonly recalled and liked) and the association between the playing of sport and the need to consume high</p>	No

			<p>sugar foods for energy. There was reasonable knowledge of healthy eating practices, particularly in the 12-14s. However, in all groups, knowledge of healthy eating appeared to have only a small influence on food preferences. Instead, preferences appeared to be particularly influenced by the power of the brand, particularly branding with celebrities (sport and other), cartoon or movie characters. Competitions, toys and prizes were significant motivators of food purchase. McDonald's was overwhelmingly identified as a favourite restaurant, with toy offers appearing to be integral to this preference. Some teenagers were critical of marketing strategies utilised by food companies, however, it is unclear whether this critical perspective altered food preference or consumption.</p>	
<p>Kaufman & Sandman, 1983 USA</p>	<p>Randomized controlled pre- and post-test experiment</p>	<p>1108 children aged 5–10 years from public schools in three cities in the USA. Each class was randomly assigned to one of four treatments. A total of 1179 children completed all parts of the study, but 71 were excluded from the analysis because of “invalid answer sheets”, leaving a sample of 1108. The sample was evenly distributed by sex and age</p>	<p>‘Healthy Choice Scores’ at post-test were subject to analysis of covariance by experimental condition, controlling for both city and pre-test scores. This measured the effect of the different experimental adverts on children’s preferences when the confounding effects of city and pre-test preferences were statistically eliminated. Both city and pre-test scores significantly affected post-test ‘healthy choice scores’ (city $F = 16.6$, pre-test ‘healthy choice score’ $F = 808.7$; $P < 0.01$). There was also a significant main effect on post-test ‘healthy choice scores’ ($F = 24.0$, $P < 0.01$) when these influences were statistically controlled for. The explained variance for the analysis was significant at $P < 0.01$, suggesting that the relationship between treatment and post-test ‘healthy choice score’ was unlikely to be due to other variables.</p> <p>Adjusting for pre-test preferences and differences between cities, children exposed to the sugared food adverts only made fewer ‘healthy food choices’ at post-test than respondents in other conditions (adjusted mean 49.76), and children exposed to the counter-adverts (whether accompanied by sugared food adverts or not) made the most ‘healthy food choices’ (counter-adverts alone 61.40, counter-adverts plus sugared food adverts 60.93); children exposed to the sugared food adverts with disclaimers fell between these groups (56.69). No control was made for possible age variation.</p> <p>The investigators suggest that post-test scores may have been influenced in either of two directions by the research design. Children may have perceived the post-test task as altering their preferences in the direction of the adverts they had just seen, and the post-test scores may therefore have represented a willingness to alter their responses to match the adverts: i.e. the differences between the groups may have been enlarged by a willingness to comply with the perceived purpose of</p>	<p>Yes</p>

				the test. Alternatively, the task of completing the pre-test may have "initiated a strain toward consistency for some children", deterring them from changing their responses after seeing the adverts in order to maintain consistency. This may have diminished differences between groups.	
Lam, 1978	USA	Cross-sectional survey	44 children aged between 4 and 7 years, and their mothers	<p>Twenty-five per cent of children said that they 'always', and 59% that they sometimes, demanded cereal products that they saw advertised on television. Mothers' reports of children's demands fell within a similar range (18% always and 75% sometimes). Mothers described yielding to children's demands most of the time (9%), sometimes (55%), very seldom (25%) and never (11%).</p> <p>Boys reported that their favourite adverts were for toys (62%), food (13%) and cars (13%), while for girls the favourites were toys (39%), cereals (14%), food (12%) and dolls (12%). Food and cereal adverts did not feature in the list of least favourite adverts.</p>	No
Lewis & Hill, 1998	United Kingdom	Non-randomized experiment	103 children (51 girls, 52 boys) aged 9–10 in Year 5 from two state schools in the north of England. The sample represented 90% of the school registers for the year group; the remainder were absent on one or more of the research days. The sample is described as majority white (82%) and from a low to middle class social background. No information is provided on how the two schools were selected.	<p>The group of overweight children had a significantly greater preference to be thinner than the 'normal weight' children ($P < 0.001$) and were significantly less satisfied with their physical appearance ($P < 0.01$).</p> <p>Of the 'current state' ratings, only one, 'feeling fat', was significantly related to children's weight, with overweight children feeling significantly more fat than normal weight children ($P < 0.001$). Viewing the adverts had significant effects on mood, with children reporting feeling significantly less worried and less sad, and more liked by their friends, after exposure to the adverts ($P < 0.05$ for all three measures). There were no significant main effects by advert type, although there were significant interactions on two rating scales 'feeling healthy' and 'feeling like eating sweets'.</p> <p>There were three-way interactions between advert type, time and weight. Thus, overweight and normal weight children responded differently to the two advert types on their ratings of 'feeling healthy' (three-way interaction: $F(1,33) = 11.26, P < 0.01$) and desire to eat sweets (three-way interaction: $F(1,33) = 5.80, P < 0.05$). After viewing the food adverts, overweight children felt healthier and felt less like eating sweets while comparison children felt less healthy and more like eating sweets. The opposite occurred after viewing the non-food adverts, with overweight children reporting that they felt less healthy and more like eating sweets, while normal weight children reported feeling more healthy and had less desire to eat sweets.</p>	Yes

Lobstein & Dobb, 2005	USA, Australia & 8 European countries	Surveys in 13 countries	Various	A significant association was found between the proportion of children overweight and the numbers of advertisements per hour on children's television, especially those adverts that encourage the consumption of energy-dense, micro-nutrient-poor foods, ($r = 0.81, P < 0.005$). A weaker negative association was found between the proportion of children overweight and the number of adverts encouraging healthy diets ($r = -0.56, P < 0.10$). The quantity of advertising on children's television appears to be related to the prevalence of excess body weight among children.	No
Marshall, O'Donohoe & Kline, 2007	New Zealand - data Scotland & Canada - analysis	Secondary analysis of survey and qualitative data	8-11 year old children from New Zealand	HFSS food ads were well-represented in their repertoire of favourite ads, and they reported being influenced by these. However, their accounts of snacking highlighted the extent to which their actual consumption was shaped by parental agendas and concerns. Although they gravitated towards less healthy snack foods, fruit, and vegetables were included in their categorization and repertoire of snacks, perhaps reflecting the level of monitoring and gatekeeping exerted by their parents, who established ground rules for snacking and in many cases directly controlled their access to snack foods, although the limits imposed varied according to context. The children were generally accepting of this, although they drew on a range of strategies and tactics to access their preferred snacks. In the survey 67% reported that food ads 'often' or 'sometimes' made them feel hungry, 78% that seeing an advertisement on television made them want to buy the product 'sometimes' or 'often'.	No
Maryam et al., 2005	Islamic Republic of Iran	Cross-sectional survey	398 junior high school students from six state and six private schools in a middle class district of Tehran	"Ashimashi's" puffed cereals was the most recalled advert. Food adverts are not based on sound nutritional principles and are therefore misleading. These cereals were shown in the content analysis part of the study to be the largest category of advertised foods (36%).	No
Maskill et al., 1996	New Zealand	Qualitative interviews with adolescents carers; survey of adolescents	20 Pakeha (European) families with 13-16-year-olds	Not many of the young people perceived television advertising to have a significant effect on their purchasing or consumption behaviour, however, it was perceived to have an effect on some teenagers' decisions to buy certain product categories (sweets, takeaways and crisps). Television advertising appeared to influence young people by raising their awareness of a particular food (often new foods or those on special offer). Several respondents also reported that television advertising had some influence on them wanting to eat more takeaways, sweets, breakfast cereals, bread, fruit and crisps.	No

					Common reasons for liking food advertising included that they were 'cool, humorous, far-fetched, had catchy tunes, made you aware of the food and made you feel hungry.'	
Matheson et al., 2004	USA		Three consecutive 24h dietary recalls collected from each child	Ethnically diverse third-grade children and predominantly Latino fifth-grade children	On weekdays and weekends, 17–18% and approximately 26% of total daily energy were consumed during television viewing in the two samples, although the fat content of foods consumed during television viewing did not differ significantly from that of the foods consumed with the television off; less soda, fast-food, and fruit and vegetables were consumed with the television on. The amount of food consumed during television viewing was not associated with children's BMI, but in the 3 rd grade sample the fat content of foods consumed during television viewing was associated with BMI.	Yes
Moya De Sifontes & Dehollain, 1986	Venezuela		Cross-sectional survey	263 housewives (or the person who fulfilled the role of housewife); 8% were upper class, 31% were middle class, and 61% were lower class	<p>A preliminary content analysis of all adverts for food products featured in the mass media (television, radio and the press) during one week. The exercise provided researchers with some background data on the types of food advertising going on, and informed the development of the questionnaire.</p> <p><i>Use of social mass media:</i> Nearly all homes (98%) had a television (the 2% that did not were all lower income homes). Three-quarters of mothers said that they watched television with their children, usually for 2–4 hours per day. Nearly all children watch television (99%). Children's viewing habits (in terms of frequency of viewing and preferences for different television channels) were consistent with the viewing habits and preferences of their mothers, and were also consistent across different social class groups.</p> <p>Nearly half of mothers (44%) listened to the radio for < 2 hours per day. Over a quarter (27%) listened for an average of 2–4 hours, 16% listened for more than 4 hours, and 13% did not listen to the radio. There was a slightly positive relationship (gamma coefficient of 0.20, $P < 0.05$) between the amount of time spent listening to the radio and social class: upper class mothers tended to listen to the radio for longer periods than lower class mothers (2–4 hours on average per day vs 2 hours respectively).</p> <p>Nearly all mothers (97%) read the press; 68% read print media on a daily basis (this was consistent across social class groups). The authors also note that the preliminary content analysis of newspapers indicated that three newspapers ('El Nacional', 'El Universal' and 'Ultimas Noticias') contained more adverts for commercial food products, and</p>	No

that these newspapers were indeed read by mothers included in the study.

Recall of food advertising: Nearly all mothers (97%) said that they could remember some form of food advertising featured in the mass media. No statistically significant differences were observed across social class groups in this respect, although, in purely descriptive terms, mothers in middle class and lower class groups were better able to remember food advertising than upper class mothers (99% vs 97% vs 90% respectively).

There were differences in the types of food adverts recalled by mothers in different social class groups. High protein food adverts were well remembered among upper class mothers and cereal advertising was better remembered among mothers from low and middle social class groups.

Liking for and attitudes towards food advertising: Over half of the sample (52%) indicated a preference among children for food adverts. Differences by social class were non-significant ($\chi^2 = 3.14$, $P = 0.05$).

Over 70% (73%) of mothers considered television as the primary media influence on their children's preferences for advertised foods, just 1% felt that either the radio or the press was the most significant influence, and a quarter of respondents said that they 'did not know.'

There was a significant relationship ($P = 0.01$) between social class, and mothers' beliefs about the importance of highly advertised commercial foods in their children's diets. Lower class mothers attributed greater importance to the commercial foods advertised in their children's diets (gamma coefficient = 0.30). Cereals and jams were considered by mothers as among the top three most important foods in children's diets, followed by jelly and ice cream. Little importance was attributed to fizzy drinks, despite the fact that fizzy juice is frequently consumed by children.

Mothers were questioned directly about the extent to which they believed food advertising messages. Again, a significant relationship was observed between mothers' beliefs and social class. As social class decreases, the proportion of mothers influenced by advertising increases (gamma coefficient = 0.32).

Preferences for different foods: Most children (consistent across social

class groups) demonstrated preferences for chocolate drinks, cereals, jelly, pork, sausages and ice cream (in that order of importance). There was a significant relationship ($P = 0.05$) and a positive correlation (gamma coefficient 0.28) between time children spend watching television and their 'preference for commercial foods broadcast by the social mass media'.

Purchase-related behaviour: A significant relationship was also observed between mothers' responsiveness to children's requests for advertised food products and social class; lower social class mothers demonstrated a greater tendency to respond to children's requests ($P < 0.05$).

Food purchase behaviour: Nearly half of all mothers (44%) purchased foods from supermarkets. The relationship between social class and choice of purchasing outlet was statistically significant ($P < 0.05$). Seventy-seven per cent of upper class mothers and 79% of middle class mothers bought foods from supermarkets (compared with only two-thirds of lower class mothers).

Just over half (52%) of mothers shopped for food alone, and 30% went shopping with their husband. Children were not significantly involved in food shopping: 9% of mothers went shopping with older children, and 6% typically went shopping with their younger children. No significant social class differences were observed.

By way of establishing whether mothers consciously bought advertised foods, they were asked to provide reasons for their food purchase choices. Less than half of mothers confirmed that they had purchased products they had seen or heard advertised on television, radio or in the press. No social class differences were observed.

Mothers were also questioned more specifically about purchases made for food products that had been advertised during the course of the research. In this respect, lower class mothers demonstrated a greater tendency to purchase advertised foods: 46% vs 37% of middle class mothers and 33% of upper class mothers. Upper class mothers demonstrated a tendency to purchase high protein foods, compared with lower class mothers who demonstrated a tendency to purchase carbohydrates. Cereals and chocolate drinks were the most frequently purchased products. This effect was consistent across all social class groups.

			<p><i>Food consumption behaviour:</i> Jams and fizzy drinks were frequently consumed among lower social class children, and jams and cereals were most consumed by middle class children. Preferences among upper class children were for fizzy drinks and yoghurts. The authors note that all these products are sweetened foods.</p> <p>Overall differences by mothers' occupation and level of education were not significant. However significant differences in age were observed; older mothers (> 39 years) showed less of a tendency to believe in the 'food advertising process'.</p>	
Musaiger et al., 1986	Bahrain	Cross-sectional survey	<p>Mothers from 1260 households in Manama City (capital of Bahrain)</p> <p><i>Hours children spend watching television:</i> Over 60% of all children watch more than 3 hours of television per day. The association between television viewing and social class was statistically significant, as socioeconomic status increased, children spent less time watching television ($X^2 = 134.59, P < 0.001$).</p> <p><i>Children's favourite food adverts:</i> Over half of all children (52.8%) favoured advertising for 'candies and chocolate'. This finding was consistent across low, (52.7%) middle (51.3%) and high (56.7%) social class groups. This was followed by advertising for 'milk and milk products' (28.7%) of all children, baby foods (7.1%), frozen foods (1.6%), coffee and tea (0.8%), and others (9.0%).</p> <p><i>Children's requests for advertised foods:</i> Nearly 60% (59%) of all children 'always' request foods advertised on television, 29.8% 'sometimes' and 11.2% 'rarely'. The relationship between social class and requests for advertised foods was statistically significant ($X^2 = 50.29, P < 0.001$), as lower and middle social class children were more likely to request advertised foods than upper social class children. Two-thirds (66.2%) of lower social class children 'always' request foods advertised on television, 52.7% of middle class children 'always' request, compared with 46.6% of upper class children. [$X^2 = 50.29 (P < 0.001)$].</p> <p>Children aged between 6 and 12 years demonstrated a greater tendency to request advertised foods (53.2% of entire sample) than children under 6 (31.1%) or over 12 years (15.7%). This trend was particularly evident among lower social class children (58.1%, compared with 47.9% and 43.3% of middle and upper class children respectively) [$X^2 = 91.35, (P < 0.001)$].</p> <p><i>Mothers' responses to children's requests for advertised foods:</i> Over</p>	No

					60% of all mothers (61.1%) were 'always' responsive to children's requests for advertised food, 34.4% were 'sometimes' responsive and only 4.1% 'do not respond'. Again, the relationship between mothers' responsiveness to requests and social class was statistically significant [$X^2 = 41.91 (P < 0.001)$]. Again, lower income groups were more responsive: 67.3% of lower class mothers were 'always' responsive to children's requests, compared with 58.2% of middle class mothers and 41.6% of upper class mothers.	
Neeley & Schumann, 2004	USA	Post-test subjects designs	between factorial	2-5-year-olds	Although character action and voice may influence attention to the advert, character and product recognition, and a positive attitude towards the product, the relationship between preference, intention and product choice remained unclear.	Yes
Norton, Falciglia & Ricketts, 2000	USA	Survey		35 adolescents aged 9-18 years (19 males, 16 females). All subjects were white and middle class. All respondents were one member of a pair of twins	<p>Overall, the foods perceived by the researchers as more frequently eaten by young people were also the most preferred foods, with spaghetti, cola, sugared cereal, apples, snack cake, French fries, orange juice, chicken and hamburger all receiving ratings of 6.74 and above.</p> <p>Overall, taste was significantly correlated with preference for the highest number of foods (15 of the 17 foods). 'Healthfulness' was significantly related with preference for four of the foods, as was accessibility (although not with the same four foods). 'Peers eat it' was significantly correlated with preference for three of the foods. 'Parents serve it' was significantly correlated with preference for one of the foods (broccoli), as was advertising (chicken). Price was not significantly correlated with preference of any food.</p> <p>Stepwise regression of the seven motivational factors indicated that taste had the greatest impact on food preference, followed by advertising, peers eating, parents serving, accessibility and healthfulness. Price did not influence preference for any item. Taste was a significant influence on 16 food items, while advertising was a significant influence on three (apples, beans, low fat milk). 'Healthfulness' was an influence only on unsweetened cereals. Parents serving was an influence on cheese and whole fat milk, and peers eating was an influence on apples and chicken. Accessibility was an influence on unsweetened cereal and whole fat milk.</p> <p>No standardized regression coefficients were reported so it is not possible to assess, from this multivariate analysis, the strength of the independent influence of television advertising relative to other</p>	Yes

			<p>significant variables. However, the analysis does show that television advertising ($P < 0.05$), taste ($P < 0.01$) and 'peers eat it' ($P < 0.05$) all significantly and independently influenced preferences for apples while the remaining motivational factors were controlled for. Similarly, television advertising ($P < 0.05$) and taste ($P < 0.01$) significantly and independently influenced preference for beans, and television advertising ($P < 0.01$) and taste ($P < 0.01$) significantly and independently influenced preference for low fat milk. These latter two regressions also controlled for the remaining motivational variables that were not found to be significant. While the regression coefficients are not available, to judge the relative influence of television adverts compared with other motivational factors, the strength of the Pearson correlation coefficients and the finding that taste influenced so many preferences together suggest that taste had a stronger influence than television advertising.</p>	
Olivares et al., Chile 1999	Cross-sectional survey	<p>786 school-aged children aged 6–11 years (44% boys, 56% girls). Three socio-economic levels were represented:</p> <p>Low and low or average level (43% of schools)</p> <p>Mean level (38.3%)</p> <p>High and high mean level (18.7%)</p>	<p><i>Television viewing behaviour (as a proxy measure of food advertising exposure):</i> Nearly all children (99%) said that they watched television at home (independent of age, sex, or socioeconomic status). Over 20% of children watch more than 3 hours of television on weekdays and over 40% watch 1–3 hours of television. Significantly more 6–8-year-olds than 9–11-year-olds watch more than 3 hours of television per day (23.1% vs 13.9%). No significant differences according to sex or socioeconomic status were observed.</p> <p><i>Liking for food advertising:</i> 80% of all children could recall food or drinks adverts that they liked. This effect was greater among older children (9–11 years). The three most popular food and drink adverts were for snacks (32.6%), drinks (32.5%), and yoghurt and milk (11.7%). Preferences for milk/yoghurt adverts were greater among children from low or average social class groups. Advertising for other product categories mentioned includes: sauces, mayonnaises, ready meals and other non-nourishing' products.</p> <p><i>Preferences for different foods:</i> 'In accordance with their favourite adverts', the children were also questioned about their favourite foods. The most popular food type was snacks, listed by over half of all children (56.0%), and followed by ready meals (22.1%) and home-made meals (21.9%). Fizzy juice was the favourite type of drink (74.2%).</p> <p><i>Influence of advertising on food-related behaviour:</i> 70% of students expressed an interest in trying new food or drinks advertised on</p>	No

television. When asked if they had consumed food or drinks that had appeared in adverts of the previous day, half (50.6%) of 6–8-year-olds and 66.5% of 9–11-year-olds said that they had consumed at least one product.

Over 80% (83.8%) of all children said that they had money to buy food and drinks (there were no significant differences across socioeconomic groups). Children were asked about the foods that they bought: two-thirds (66.6%) of all children bought snack products, 14.5% bought fizzy drinks or juice, and 6.9% bought yoghurt or milk. The authors comment that the children's purchase choices are consistent with their advertising preferences (snack products always the first choice). Gender analysis revealed significant differences between boys and girls: more girls than boys bought snacks, and more boys than girls bought drinks. Three-quarters (74.8%) of all children said that they bought food or drinks advertised on television with offers of prizes or gifts: this effect was significantly greater among children in low (75.2%) and average (78.3%) socioeconomic groups (vs 66.4% of children from high socioeconomic groups). This effect was also greater among children aged 6–8 years (77.3%) than 9–11 years (70.0%). Furthermore, 64.9% of children said that they continue to buy such products even when the offer of a prize or gift has ended.

Consumption (eating and snacking) behaviour: Children were also asked about their general eating habits. Eighty per cent of all children took a snack to school. A greater proportion of students of high socioeconomic status brought snacks to school. Lower social class children also reportedly took more fruit to school (36.6%) than average (27.9%) and high (14.9%) social class children. Overall, 96.9% of children ate homemade food in school and at lunch time, only 3.1% ate fast-food or another commercial product (although 8.4% of high social class children ate fast-foods). Over 70% (71.6 %) of all children said they ate foods outside 'habitual eating hours'. Snacks were the most popular choice of foods among children at these times (54.3%), followed by drinks and juice (20.1%); 14.7% ate yoghurt or milk products and 10.9% plain bread or with an accompaniment. No significant differences in terms of sex, age or socioeconomic status were observed.

Olivares, Yáñez & Díaz, 2003	Chile	Cross-sectional survey	274 primary-school children (aged 10–13 years) from Copiapo, north Chile (31.8% of children), Melipilla,	<i>Television viewing behaviour (as a proxy measure of food advertising exposure):</i> 91.9% of all children watched television every day (differences by city or gender were not significant). A quarter of all children (24.7%) watch more than 5 hours of television on weekdays and nearly one third (31.8%) watch 3–4 hours. Children reportedly	No
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central Chile (37.9%), and Delcahue, south Chile (30.3%)

watch more television on Saturdays: 27.5% watch more than 5 hours and 30.9% watch 3–4 hours (again, differences by city were not significant).

Preferences for food advertising: Nearly 70% of children said that they liked to watch television adverts and nearly 90% (88.7%) remembered food adverts that they liked (differences by city or gender were not significant).

Almost 40% (38.5%) of all children said that they preferred adverts for sweet and salty products (including French fries, salty snacks, chocolate, cakes and other products saturated in fat, sugar and salt, and low in fibre. (As much as 46.8% of children in Copiapo preferred advertising for sweet and salty products). Of all children, 28.4% preferred adverts for drinks/refreshments, 19.5% preferred yoghurt adverts and 13.6% preferred fast-food advertising.

Influence of television food advertising on food consumption and purchase behaviour: 40% of all children said that they had consumed some food or drink that had featured in advertising of the previous day. Over 70% of children showed an interest to try new foods promoted through television advertising.

Children were also asked about their own food purchasing behaviour. Over a third of all children (34.3%) said that they 'always' had money to buy the foods and drinks they wished, and over 60% (64.2%) said that they 'sometimes' had the money to buy what they wanted. (Nearly half of children in Melipilla 'always' had money to spend as they wished). Children's first priority of purchase was sweet and salty food products (68.1%); 17.2% bought drinks; only 6.3% bought yoghurt/ milk; and only 4.7% bought other products. Children in Delcahue demonstrated a greater tendency to buy sweet/salty products than children in the other two cities.

Children were also asked about the foods they brought to school. Nearly 40% (38.7%) of all children brought a lunch from home, of which nearly half (47.4%) consisted of sweet and salty products (this figure was as high as 60.4% in Delcahue). Only 19.5% of children brought fruit and 18.1% yoghurt. Differences by city were not significant.

Pavlu, 2001	Czech Republic	Cross-sectional survey	121 mothers of schoolchildren aged 8–11 years	Over 80% (81%) of mothers felt that advertising had some influence on their child; 82% said that their children, under the influence of television adverts, request them to buy certain products. Most often, these	No
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				requests are for drinks, candies, toys and dairy products.	
Peterson et al., USA 1984	Randomized controlled pre- and post-test experiment	106 'kindergarten' grade children of both sexes aged 5–6 years, with a mean age of 6.2 years.		On the first set of nutritional knowledge questions, both the experimental and control groups scored higher at post-test. There was a significant main effect for trials, $F(1,4) = 10.13$, $P < 0.05$, but no significant treatment by trials interaction was obtained. On the second set of nutritional knowledge questions, designed to test learning of the specific nutritional concepts presented in the tapes, a significant main effect for trials was obtained, $F(1,4) = 55.00$, $P < 0.001$. A significant treatment by trials interaction was also obtained, $F(1,4) = 24.48$, $P < 0.01$. Repeated measures ANOVA performed on the food preferences scores revealed significant main effects for trials on both composite preferences for 'pro-nutrition' foods ($F(1,4) = 14.73$, $P < 0.01$) and composite preferences for 'low nutrition' foods ($F(1,4) = 10.06$, $P < 0.05$). Both experimental and control groups expressed stronger preferences for 'pro-nutrition' foods at post-test. Repeated measures ANOVA and analyses of covariance were performed on the consumption score for each individual food. No significant treatment-by-trials interactions were obtained on any of the analyses. There was a tendency for experimental group children to consume more of the 'pro-nutrition' foods at post-test than children in the control group, but the differences were not significant. Overall the pro-nutrition tape increased knowledge but did not change preferences or consumption.	Yes
Radkar & Mundlay, 2001	India Cross-sectional survey	759 children and 788 adults from the state of Maharashtra, India, from both urban and rural areas. 60% of the children were aged between 10 and 14 years		When asked to list, unprompted, three recalled adverts, the adverts most frequently recalled by children were for noodles, biscuits, soft drinks and chocolates. Children showed higher levels of advertising recall than adults for all the four products except noodles. Parents reported 'child's demand' for the product was a substantial influence on buying decisions for several categories of food product.	No
Reeves & Atkin, 1979	Usa Observational study	100 mother-child pairs were observed and interviewed. Children ranged in age from 3 to 13 years (mean 7.53 years), and were of both sexes (46% male, 54% female). The socioeconomic status of the families was		Children initiated 58% of the cereal and confectionery purchase interactions. In 32% of the interactions the child demanded a particular product (as opposed to requesting it). Just under two-fifths of interactions were initiated by the mother, either inviting the child to select a brand (18%), directing the child to select the brand chosen by the mother (16%), or choosing the brand without discussion with the child (4%). Mothers agreed to 55% of children's requests and demands for cereal or confectionery products, refused 21% of requests and demands, diverted	Yes

slightly above average

11% with suggestions for an alternative product, and ignored the remainder. Where mothers invited children to select a brand, 70% of children did so, and the remainder did not make a selection. Where mothers directed that a brand was chosen, children nearly always agreed, with only two refusing the selection or trying to divert the mother to an alternative brand. Conflict over the choice of product occurred in 14% of interactions, with the approximate mean length of argument being 16 seconds. Ten percent of interactions involved raised voices and 7% involved 'verbal aggression'.

Children requested a mean number of 1.6 products, while the actual number of products purchased was a mean of 1.5, indicating that the same number of products were purchased as were requested. Thirty-eight percent of children gave reasons for selecting a particular product. The most common reason was that the product 'tasted good' or 'I like it' (40% of expressed reasons). Other reasons, receiving only a small number of responses, included a sweet taste, nutritional value, television adverts, or free gifts.

Thirty-eight percent of children had watched Saturday morning television before coming to the store. There was no relationship between whether children reported watching of television and probability of making a request or demand for a product. However, there was a significant relationship between amount of Saturday morning viewing and frequency of requests and demands, with children who had watched more Saturday morning television before the trip making more demands or requests for products than children who had watched less Saturday morning television ($t = 1.69$, d.f. = 36, $P < 0.05$). Other television exposure measures showed no significant relationship with frequency of requests or demands while shopping, although there was a tendency for children with higher television exposure to initiate requests and demands more frequently.

Mothers perceived that cereal and confectionery adverts had a strong (50%) or moderate (46%) impact on their children. Sixty-four percent of mothers said that their children paid close attention to Saturday morning advertising and 30% that their children paid some attention. The majority (61%) of mothers described themselves as yielding to some of children's requests for cereals and confectionery, while 27% said they did not yield very often; 12% said they yielded 'most of the time'. Frequency of reported yielding to children's requests was significantly related to higher levels of children's Saturday morning television viewing as reported by mothers ($r = 0.27$, $P < 0.05$). Yielding to requests was

				significantly related to having more lenient rules about eating sweets. Mothers who perceived that advertising had a strong influence on their children were also significantly more likely to say that their children paid close attention to advertising ($r = 0.45, P < 0.05$).	
Riecken & Yavas, 1990	USA	Cross-sectional survey	152 children aged 8–12 years attending a 'university-operated school in a [USA] mid-western city	<p>Children's attitudes towards advertising in general and towards advertising in the three product categories differed, with children having more favourable attitudes towards toy adverts than to adverts in the other product categories or adverts in general.</p> <p>The relationship between attitudes towards advertising in the three product categories and evaluations of the eight brands was examined to assess whether children's evaluations of brands are influenced by their pre-existing attitudes towards adverts. An association was found for only one of the three cereal brands and one of the toy brands, suggesting little clear relationship between attitudes to advertising and brand evaluations.</p>	No
Ritchey & Olson, 1983	USA	Cross-sectional survey designed to measure family factors which might moderate preferences for sweets in children	122 pre-school children of both sexes, ranging in age from 36 to 64 months (mean age 52.2 months), and their parents	<p><i>t</i>-tests and analysis of variance revealed few consistent relationships between family characteristics and parental and child attitudes and behaviours. Amount of television watched was related to the greatest number of other variables (the data are not presented in the article), and was therefore entered into multiple regression analyses.</p> <p>When the dependent variable was children's self-reported preference for sweet foods, none of the independent variables had a significant relationship with preferences. When children's frequency of consumption of sweet foods as reported by parents was the dependent variable, three independent variables had a significant relationship with consumption: parents' own frequency of consumption, amount of television watching, and parents' attitudes towards sweet foods. Together these variables accounted for 35% of the variance in children's frequency of consumption. Television watching made a significant contribution at the $P < 0.01$ level independently of other variables in the model. The analyses also examined whether the strength of the relationships between the variables changed depending on whether the preschool child was the oldest in the family or not. Associations were found to be stronger when the preschool child was the oldest in the family: parents' own frequency of consumption, amount of television watching, and parents' attitudes towards sweet foods together accounted for 54% of the variance in children's frequency of consumption when this child was the oldest, compared with only 12% when there were other older children in the family. Television watching</p>	Yes

made a significant contribution at the $P < 0.01$ level, only for those children who were the oldest in the family, independently of other variables in the model.

Robinson et al., 2007	USA	Experimental study	63 3-5 year old children (mean±SD age, 4.6±0.5 years; range, 3.5-5.4 years) from preschools for low-income children in from 6 centers in San Mateo County, California.	<p>By the early age of 3 to 5 years, low-income preschool children preferred the tastes of foods and drinks if they thought they were from McDonald's, (the mean±SD total taste preference score across all food comparisons was 0.37±0.45 (median, 0.20; interquartile range, 0.00-0.80) and significantly greater than zero ($P_{.001}$)), demonstrating that brand identity can influence young children's taste perceptions. This was true even for carrots, a food that was not marketed by or available from McDonald's. These taste preferences emerged despite the fact that 3 of the foods were from McDonald's and only the branding was changed, indicating that the effects were not due to familiarity with the taste or smell of McDonald's food. Even the children with the lowest frequency of eating food from McDonald's had average positive total preference scores, indicating they preferred more of the branded foods.</p> <p>Moderator analysis found significantly greater effects of branding among children with more television sets in their homes and children who ate food from McDonald's more often.</p>	Yes
Ross et al. 1980; 1981	USA	Randomized controlled experiment	100 children (52 boys, 48 girls) from USA school grades kindergarten to six	<p>At baseline, all respondents were less accurate in their rating of artificial fruit products than in their ratings of fruit and non-fruit products. Significant main effects were found for age ($F(1,88) = 13.22, P < 0.001$) and for fruit content ($F(2,176) = 91.09, P < 0.001$). Older children's ratings of artificial fruit products were more accurate than younger children's ratings, but less accurate than their own ratings for fruit and non-fruit products.</p> <p>It was hypothesized that exposure to the experimental adverts would lower children's accuracy ratings for the artificial fruit products but would improve or not affect their accuracy ratings for fruit and non-fruit products, i.e. there would be a three-way interaction of treatment x session x fruit content, and that age would enter the interaction if the adverts had differential effects on younger and older children. No significant effects on children's accuracy ratings were found following naturalistic exposure to the adverts (i.e. adverts embedded in a television programme). However, planned comparisons computing interactions of treatment and session indicated that following intensive exposure to the adverts, accuracy ratings for artificial fruit products decreased in children exposed to the adverts compared with control group children ($F(1,87) = 5.97, P < 0.05$). Accuracy ratings were</p>	Yes

significantly different between experimental and control group children following intensive exposure, indicating that experimental group children became less accurate and control group children more accurate ($F(1,87) = 6.64, P < 0.05$).

It was also hypothesized that accuracy ratings by experimental group of children for artificial fruit products would decrease more for those products which had appeared in the six adverts than for the six products which were not advertised (while accuracy ratings for fruit and non-fruit products which were advertised were expected to increase or remain the same in comparison with non-advertised products). A three-way interaction was predicted between session x fruit content x advertisement. No significant effects on accuracy ratings for artificial or non-fruit products comparing advertised and non-advertised products were found after naturalistic exposure to the adverts (i.e. with television programmes). Planned comparisons computing interactions of treatment and session indicated that for real fruit products, children became slightly more accurate after seeing the adverts for the six advertised products, and slightly less accurate for the non-advertised products ($F(1,47) = 6.26, P < 0.05$). This suggested a positive effect of advertising on accuracy ratings about real fruit products, but the results were complicated by baseline scores for non-advertised real fruit products being higher than baseline scores for advertised fruit products. Following intensive exposure to the adverts, there was a significant interaction as predicted between session, fruit content and advertisement. There was a significant difference between accuracy ratings for advertised artificial fruit products following intensive exposure and accuracy ratings for non-advertised artificial fruit products ($F(1,47) = 9.26, P < 0.01$).

Effects of repeated testing were also examined for different age groups. Older respondents became more 'sceptical' with repeat testing (i.e. more likely to say that products did not contain fruit), while respondents in the middle age group became more likely to say that any product did contain fruit. There was no consistent pattern in response for the youngest respondents.

The investigators concluded that the data indicate a consistent misjudgement by children of whether artificial fruit products contain fruit. This misjudgement occurred for all respondents, at all sessions (including baseline), and in relation to both advertised and non-advertised products. Viewing of adverts in an intensive situation (i.e. with no accompanying television programmes) increased rather than

decreased this tendency to misjudge. This tendency occurred when comparing: (a) the experimental group's ratings with their baseline ratings; (b) the experimental group's ratings for the advertised products with their ratings for the non-advertised products; or (c) the experimental group's ratings with the control group's ratings for the same products. This indicates a robust effect attributable to the adverts. Viewing the adverts in a naturalistic situation neither improved nor worsened children's tendency to misjudge the fruit content of artificial fruit products.

Sjölin, 2008	Sweden	Review	Literature and reports with European data	<p>In 2003, the report by Technical Experts (TRS 916) showed probable evidence between heavy marketing of energy-dense foods and fast food outlets and an increased risk for weight gain and obesity. Five major reviews of the evidence on the impact of food marketing to children (published 1987-2006) showed that marketing inter alia has an impact on attitudes, purchase requests and consumption. Nevertheless the International Chamber of Commerce maintains that there is no scientific evidence that restrictions on advertising would have an impact on the incidence of obesity and that advertising bans would be disproportionate and ineffective.</p> <p>Studies have documented that a high percentage of advertisements targeting children feature sweets, fast foods, and snacks and that exposure to such advertising increases consumption of these products. The problem is that the great majority of foods that are advertised are high in fat, salt and/or sugar (CFC, 2007).</p> <p>Concludes that marketing of unhealthy foods is thus a contributing factor to overweight and obesity.</p>	No
Stoneman & Brody, 1981	USA	Randomized controlled experiment	80 4 th grade children attending a rural elementary school	<p>Factorial analysis of variance (4 x 2) indicated that there was a significant main effect for experimental condition on number of salty snacks selected. Newman-Keuls post hoc comparisons were utilized to define these significant effects further. Children in Condition 1 (adverts only) selected salty snacks more frequently than children in the control condition (mean scores 5.35 vs 3.75, $P < 0.01$). Children in Condition 2 (adverts plus peer modelling similar food choices) selected salty snacks more frequently than children in Condition 1 (mean scores 6.8 vs 5.35, $P < 0.01$). Children in Condition 3 (advert plus peer modelling dissimilar food choices) selected salty snacks less frequently than children in Condition 1 (mean scores 3.8 vs 5.35, $P < 0.01$).</p> <p>Analysis of variance also revealed a significant interaction between</p>	Yes

				<p>experimental condition and race of child. White children in Condition 3 (advert plus peer modelling dissimilar food choices) selected salty snacks more frequently than white children in the control condition (4.8 vs 3.1, $P < 0.05$), whereas black children in Condition 3 selected salty snacks less frequently than black children in the control condition (2.7 vs 4.4, $P < 0.05$). Retention scores, both of advertised foods and of peer model's choices, were extremely high for all subjects.</p> <p>Overall the study showed that the adverts alone influenced snack selection by increasing the frequency with which salty snacks were chosen. It also showed that the peer modelling influenced snack selection over and above the adverts, but the direction of this influence depended on whether or not the peer models made similar or dissimilar food choices. Furthermore, there was a significant interaction between experimental condition and race of child that showed white and black children reacting differently to peers modelling dissimilar food choices. Black children exposed to the adverts and peer dissimilar modelling chose salty snacks less frequently than black children in the control, while white children exposed to the adverts and peer dissimilar modelling chose salty snacks more frequently than white children in the control.</p>	
Stoneman & Brody, 1982	USA	Randomized controlled experiment	36 mothers and their preschool children (aged 3–5 years) recruited from a child and family centre in Georgia, USA	<p>Children exposed to the experimental tape engaged in more PIAs in general than children exposed to the control tape ($X = 43.20$ vs $X = 28.36$, $P < 0.01$), and engaged in more PIAs for the specific products advertised on the experimental tape ($X = 4.4$ vs $X = 1.9$, $P < 0.025$). The frequencies of parental “no’s”, verbal put backs and physical put backs were summed to create a measure of parental power assertion. Mothers of children exposed to the experimental tape used power assertion responses more frequently than mothers of children exposed to the control tape ($X = 4.7$ vs $X = 2.7$, $P < 0.05$). They also made more alternative offers in response to children’s purchase requests ($X = 2.1$ vs $X = 2.1$ [sic], $P < 0.025$). No significant difference was found between experimental group and control group children in number of hours of television reportedly viewed per week, and the two groups of children did not differ in the amount of attention they paid to the experimental tape, which increases the likelihood of the observed differences in behaviour being attributable to the experimental tape.</p>	Yes
Tantivejakul, 2001	Thailand	Focus group interviews	20 focus groups were undertaken with 120 teenagers (plus 4 initial pre-test groups)	<p>Television adverts generated cultivation effects and these were different among heavy and light television viewers.</p> <p>Heavy TV users were found to rely more upon television adverts as a</p>	No

			<p>product information source, demonstrated by their heavy referral to advertising during discussions. Heavy users also admitted that when watching the appeal stuck in their mind and they promised themselves to buy the product. However this effect was only shown for product categories specifically targeted at teenagers (such as shampoo and conditioners and skin care products) and among those with their own purchasing power.</p> <p>Heavy TV users were also found to consistently use language very similar to the form used in advertising. Some heavy TV viewers expressed similar thinking to themes/portrayals used in advertising.</p> <p>Overall conclusions: heavy TV viewers tended to use advertising as their main source for product information, and advertising appeals were also shown to attract the attention of heavy TV viewers and persuade them to buy. This effect was not shown for the only food and drinks product category (milk and dairy products).</p> <p>(N.B. results do not really separate out the effects for the different product categories).</p>	
Taras et al., USA 1989	Cross-sectional survey	66 mothers of children aged 3–8 years in public 'preschools' and elementary schools	<p>The most frequently requested food items influenced by television were sugared cereals (65 requests), sugared fruit (15), fast foods (16), soft drinks (9) and non-sugared cereals (8). Of the sports items requested, bicycles were the most popular (12 requests), followed by skateboard (10), pogo balls (7) and balls (6). High sugar foods made up 66% of foods requested, followed by high fat items 36%, high salt items 19%, and low sugar/fat/salt items 7%. High fat items made up 58% of the items which mothers reported buying in response to requests, followed by high sugar items 34%, high salt items 22%, and low sugar/fat/salt items 11%. The authors describe a "strong agreement" between the relative proportion of foods requested and purchased in the different nutritional categories (high sugar, high fat, high salt, and low) and the foods advertised on television, but no statistical significance is reported. There was a correlation between purchase of requested food items and purchase of requested sports items ($r = 0.44$, $P < 0.001$). There was no correlation between purchase of sports or food items with child's participation in a sport or other physical activity after a television-influenced request.</p> <p>Significant positive correlations were found between hours of television viewing and number of food items requested as influenced by television ($r = 0.31$, $P = 0.006$), number of food items subsequently purchased ($r =$</p>	Yes

				<p>0.44, $P = 0.001$) and caloric intake as measured by the food frequency questionnaire ($r = 0.34$, $P = 0.001$). Snacking while watching television was also significantly positively correlated with number of food items requested and purchased and with caloric intake. Watching television during a meal was significantly negatively correlated with caloric intake.</p> <p>Correlations were also examined between food requests and purchases influenced by television and nutrient intake as assessed by the food frequency questionnaire. Total food requests and purchases were significantly correlated with saturated fat and sugar consumption ($P = 0.012$ and $P = 0.001$ respectively), but not with salt intake. Requests for and purchase of high fat foods were significantly correlated with saturated fat intake ($P = 0.012$), sugar intake ($P = 0.001$) and salt intake ($P = 0.004$). Requests for and purchases of high sugar foods were significantly correlated only with sugar intake ($P = 0.03$), while requests for and purchases of high salt foods were not correlated with salt intake.</p> <p>Relationships between hours watching television and requests and purchases of sports items and physical activities influenced by television were generally weaker. There was a significant negative association between hours watching television and sport items purchased ($P = 0.009$).</p>	
Taras et al., 2000	USA	Cross-sectional survey	237 American families	<p>The correlation coefficients between (i) the scores of advertised product categories and scores of products requested, and (ii) the scores of advertised product categories and products purchased were significant at 0.91 ($P < 0.0001$; $t = 21.08$) and 0.94 ($P < 0.0001$; $t = 16.92$) respectively.</p> <p>To account for the predominance of two highly correlated categories (restaurants and sugared meals), an additional analysis was undertaken using only the other 15 product categories. The correlation coefficients were still significant at 0.61 ($P < 0.015$) and 0.66 ($P < 0.008$), respectively.</p>	No
Unnikrishnan & Bajpal, 1996	India	Cross-sectional survey and qualitative interviews with focus groups	730 children aged 5–15 years in Delhi	<p>Pepsi adverts were the favourite cold drink adverts among the sample as a whole, and among upper class and middle class children. Pepsi adverts were second favourite among lower class children, who tended to prefer adverts for cheaper Indian brands. Pepsi was also the most frequently consumed cold drink. Children's preferred cold drinks and consumption habits were also reported, and the authors claimed that preferences and consumption habits reflected advertising patterns,</p>	No

although no statistical analyses were conducted to investigate the relationships.

Utter, Scragg & Schaaf, 2006	New Zealand	Secondary data analysis of a nationally representative, cross-sectional survey	3275 children aged 5 to 14 years surveyed in homes or schools of New Zealand	The odds of being overweight or obese increased with duration of TV viewing for children and adolescents when controlling for age, sex, ethnicity, socio-economic status and physical activity. Time spent watching TV was an independent correlate of obesity, when controlling for age, sex, ethnicity, SES and physical activity, among children (odds ratio 2.1; 95% confidence interval (CI) 1.1-4.0) and adolescents (OR 2.9; 95% CI 1.5-5.7). Children and adolescents who watched the most TV were significantly more likely to be higher consumers of foods most commonly advertised on TV: soft drinks and fruit drinks, some sweets and snacks, and some fast foods. Both children and adolescents watching two or more hours of TV a day were more than twice as likely to drink soft drinks five times a week or more (P = 0.03 and P = 0.04, respectively), eat hamburgers at least once a week (both P = 0.02), and eat French fries at least once a week (both P < 0.01). TV use was positively associated with the consumption of soft drinks, fruit drinks, potato chips, chocolate sweets, biscuits, hamburgers and French fries (not fried chicken), and negatively associated with the consumption of fruits and vegetables.	No
Vajpeyi, 2001	India	Cross-sectional survey	159 parents and 244 children 'in and around Delhi'	Findings relevant to the review: <i>Exposure to food advertising:</i> Low income consumers in developing countries are described as being less exposed to television advertising for fast-foods (e.g. because they have no television) and cannot really afford it and are therefore 'largely protected from the fast-food menace by their so-called poverty.' <i>Children's awareness and liking of food advertising:</i> Most children like adverts for either of the big two Coke brands (Coca-Cola and Pepsi) and are aware of the 'war' in advertising between the two (and the use of celebrities to endorse and promote products). <i>Food preferences:</i> Products like chocolate, 'candies' and gum are reported as the most popular among children and teenagers. The author comments that Indian children 'buy into imported foods in a big way'. <i>Parent's views on food advertising to children:</i> Almost all parents felt that there was a 'huge and growing' influence of food advertising on children. 'Most' parents felt there was a need to restrict fast-food marketing activity. Parents also said that they felt 'compelled' to respond	No

to children's demands for food products at times.

Food consumption behaviour: The author comments that 'fast-food chains have made their presence felt in Delhi.' Fast-food was found to be very popular among children although consumption was usually restricted to a few days per month. Most children were aware of the lack of nutritive value in fast-foods and parents revealed their concerns about the increase in consumption of fast-food and confectionary products among children. As an aside, it is noted that fast-food products are often consumed by higher social class Indians, and that 'low income children and parents....do not consume fast foods at all.'

Ward, Reale & Levinson, 1972	USA	Structured interviews	67 children aged 5–12 years	Favourite advert: The largest category of favourite adverts was food adverts (33%), followed by toys (10%), programme announcements (9%), soft drinks (6%), cars (5%), and PSAs (3%). Seventeen percent of favourite adverts were for other products. One-fifth of children did not have a favourite or could not remember it. Food adverts were also the most disliked adverts: 15% of least favourite adverts were for food products. In over a third of cases, children could not remember their least favourite advert or did not have one.	No
Other results do not relate to food advertising.					
Wiecha et al., 2006	USA	Prospective observational study	Five public schools in 4 communities near Boston. The sample included 548 students (mean age at baseline, 11.70 years; 48.4% female; and 63.5% white). baseline (fall 1995) and follow-up (spring 1997) measures of youth diet, physical activity, and television viewing	Main outcome measures were change in total energy intake and intake of foods commonly advertised on television from baseline to follow-up. After adjusting for baseline covariates, each hour increase in television viewing was associated with an additional 167 kcal/d (95% confidence interval, 136-198 kcal/d; P<.001) and with increases in the consumption of foods commonly advertised on television. Including changes in intakes of these foods in regression models provided evidence of their mediating role, diminishing or rendering nonsignificant the associations between change in television viewing and change in total energy intake. Among youth increases television viewing predict increases in total energy intake and that consumption of foods commonly advertised on television mediates this relationship.	No
Williams, 1974	USA	Cross-sectional survey	54 9–13-year-olds	All children reported spending "almost half" of their allowance each week on snacks, and 44% reported that they purchased snacks that they saw advertised on television.	No
Wiman & Newman, 1989	USA	Cross-sectional survey	327 children in USA elementary school grades 3–6 (ages 8–12)	One-way analysis of variance was conducted to investigate whether television viewing varied significantly by age. This revealed that there was no variation by age in afternoon viewing, but that younger age was	Yes

		years)	<p>significantly related to greater viewing of Saturday morning television ($P < 0.000$), while older age was significantly related to greater viewing of weekday evening television. Age correlated significantly with nutritional knowledge and understanding of nutritional phraseology, with older children having higher scores on both measures.</p> <p>Partial correlation coefficients were calculated for the relationship between television viewing and the two nutritional measures controlling for age. The amount of television viewed on Saturday mornings correlated negatively with nutritional knowledge ($r = -0.116$, $P < 0.05$) and understanding of nutritional phraseology ($r = -0.113$, $P < 0.05$) i.e. greater exposure to child-oriented television was associated with less nutritional knowledge and understanding. There was no significant relationship between television viewing on weekday afternoons and either of the nutritional measures. Weekday evening (i.e. non-child-oriented) viewing was positively correlated with nutritional knowledge ($r = 0.114$, $P < 0.05$), i.e. the more television viewing the greater knowledge. There was no significant relationship between academic achievement (as measured by academic grade level) and amount of television viewing at any of the time periods examined. There was however a positive relationship between academic grade and nutritional knowledge ($r = 0.304$, $P < 0.001$) and understanding of nutritional phraseology ($r = 0.297$, $P < 0.001$).</p> <p>Overall, when controlling for age, poorer nutritional knowledge and understanding were associated with greater viewing of television at times when advertising is more child-oriented. The possibility that poorer nutritional knowledge/understanding and greater television viewing could both have been associated with, or caused by, some other factor is not ruled out, as the results showed that there was a stronger relationship between academic grade and nutritional knowledge scores than between Saturday television viewing and nutritional knowledge. However, Saturday morning television viewing did not vary significantly by academic grade, suggesting that television viewing or some other variable accounted for some of the relationship with nutrition knowledge.</p>	
Wong et al., USA 1992	Cross-sectional survey	1081 children aged 2–20 years (mean age 7.4 ± 3.6 SD) in California	Children with higher cholesterol levels were more likely to have a parent or grandparent with high cholesterol ($P = 0.02$), to consume lean meat ($P = 0.01$), to have fat trimmed from meat ($P = 0.02$), to have food cooked in vegetable oil ($P = 0.04$), and to watch two or more hours of television/video per day ($P = 0.001$). The use of television watching as a predictor variable together with family history predictors identified 85% of the children with higher cholesterol levels. Only 66% of this group	Yes

				<p>would have been identified without the use of television watching as a predictor.</p> <p>Children who reported watching more than four hours of television daily were less likely to consume lean meat ($P = 0.006$) or engage in physical activity ($P = 0.02$).</p> <p>Multiple logistic regression analyses with high cholesterol in children as the dependent variable found that family history of high cholesterol, higher levels of television viewing, and lean meat consumption were each independently associated with increased risk of high cholesterol. Children watching 2–4 hours of television daily were approximately twice as likely (relative risk 2.2, $P < 0.01$), and those watching ≥ 4 hours four times as likely (relative risk 4.8, $P < 0.01$), to have a high cholesterol level than children watching < 2 hours daily. The relative risk for family history of high cholesterol was 1.6 ($P < 0.05$), and that for lean meat consumption 2.5 ($P < 0.01$).</p>	
Yavas & Abdul-Gader, 1993	Saudi Arabia	Cross-sectional survey	217 students in Saudi school grades 5–8; 56% of the sample were male and 44% female	<p>Two-fifths of respondents reported watching three or more commercial breaks per day (the highest response on the scale). There were no significant gender differences. The most frequently recalled adverts were for foods (ranked first), followed by soft drinks, toys and cars. Spearman's rank order correlation indicated moderate agreement in the rankings by males and females, with the order for males being food, soft drinks, cars and clothes; for females, food, soft drinks, toys and baby care products. The most preferred type of advertising was humorous adverts, liked by 72.3%, followed by cartoons (61.7%) and educational adverts (39.6%). The most popular types of advert by product category were food adverts (52.5%), followed by cars (47.9%), soft drinks (40%) and detergents (39.6%). There were significant gender differences, with 75% of females liking food adverts compared with 34.7% of males ($P < 0.05$); females also liked soft drinks adverts more than males (50% vs 32.2%, $P < 0.05$).</p> <p>Around a third of respondents said that they 'always' and 46% 'sometimes' asked parents to buy items they had seen advertised, and that parents agreed 'always' (43.9%) and 'sometimes' (45.3%). A majority (69.3%) said that they could always identify advertised brands in the shops.</p>	No

ISBN 978 92 4 159883 5



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