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**Systematic reviews of the evidence on
the nature, extent and effects of food marketing to
children:
a retrospective summary**

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Abstract

A 2009 systematic review of the international evidence on food and beverage marketing to children is the most recently published internationally comprehensive review of the evidence base. The 2009 findings are consistent with the findings of other independent, rigorous reviews conducted during the period 2003 to 2012. Food promotions have a direct effect on children's nutrition knowledge, preferences, purchase behaviour, consumption patterns and diet-related health. Current marketing practice predominantly promotes low nutrition foods and beverages.

Policy interventions introduced in the last decade in many parts of the world have targeted food and beverage marketing as a risk factor for children's health. One aim has been to modify and 'rebalance the marketing landscape'. The collective evidence on marketing practice captured by reviews conducted during the same period however indicate the marketing environment during the period 2003 to 2012 remains largely unchanged.

A globally applicable framework for co-ordinated intervention to constrain unhealthy food marketing practice and monitoring and evaluation of impact has received high level international support. The framework also provides strategic direction for future research. We recommend future food marketing policy research should build on the collective empirical evidence that marketing practice must change and aim to answer the more applied questions on how to achieve and measure this.

Key words: food marketing; children; systematic review; effects of food marketing; nature of food promotion; extent of food promotion; public health policy.

Introduction

A number of policy initiatives intended to ‘rebalance the food marketing landscape’ have been introduced during the last decade (Hawkes & Lobstein, 2011). Policies have been informed by substantial and consistent evidence that the promotion of low nutrition foods is a modifiable risk factor for non-communicable disease and is linked to the international obesity crisis (Harris, Pomeranz, Lobstein et al., 2009; Hastings, McDermott, Angus et al., 2006; Hastings, Stead, McDermott et al., 2003; McGinnis, Gootman & Kraak, 2006; WHO, 2010; WHO, 2004).

An important recent initiative to address the threat of current marketing practice to public health was the endorsement at the 63rd World Health Assembly’s of the World Health Organization (WHO) ‘Set of Recommendations on the Marketing of Foods and Non-alcoholic Beverages to Children’ (WHO, 2010). In 2011, promotion of the WHO Set of Marketing Recommendations was one of the actions cited in the Political Declaration adopted at the 66th session of United Nations General Assembly (UN, 2011). The United Nations Resolution provides clear leadership for international action to tackle the rising prevalence of non-communicable diseases (NCDs).

This high-level political commitment presents both challenges and opportunities for research aimed at informing the evidence-informed policy cycle. Policy planning can and should provide strategic direction to policy research as much as research evidence can and should inform policy design, development and evaluation. This paper therefore has two purposes. It provides a summary of the public health evidence base that has informed policy development to date, and highlights evidence gaps pertinent to next steps in developing effective marketing control policies.

Objectives

A systematic review (SR) of evidence on commercial food promotion to children was commissioned by the World Health Organization to inform the development of a set of recommendations on food marketing to children. The research objectives of the SR was to review the international evidence base on (a) the nature and extent of food promotion and non-alcoholic beverages to children; and (b) the effects of child-oriented food and non-alcoholic beverage promotion on diet, dietary determinants and health. The 2009 SR was an update of the 2006 WHO SR (Hastings, McDermott, Angus et al., 2006). The main purpose of the recommendations is to *'guide efforts by Member States in designing new and/or strengthening existing policies on food marketing communications to children in order to reduce the impact on children of marketing of foods high in saturated fats, trans-fatty acids, free sugars, or salt'* (WHO, 2010: 7).

Methods

SR methodology aims to comprehensively identify and evaluate all relevant evidence available to answer pre-specified research questions using a fully documented methodology (Littell, Corcoran, & Pillai, 2008). The methods are intended to be transparent and therefore replicable, and to minimise selection bias. Systematic review is increasingly used to inform the development of policy and identify gaps in the research literature (Bambra, 2011; Dobbins, Jack, Thomas et al., 2007).

The 2006 and 2009 SRs were developed from an SR published in 2003 (Hastings, Stead, McDermott et al., 2003) and an unpublished 2004 review of evidence on food promotion in developing countries. An outline summary of pre-specified research parameters and scope of the SRs is described below. Full details are included in the 2009 report (Cairns, Angus, & Hastings, 2009) which is available at:

http://www.who.int/dietphysicalactivity/Evidence_Update_2009.pdf.

Specific research questions were developed around the two areas of inquiry.

(a) Nature and Extent of Food Promotion to Children:

1. What promotional channels are used to market foods to children?
2. What foods are promoted?
3. What creative strategies are used?
4. What marketing strategies are being used to promote foods in low- and middle-income countries?

(b) Effects of Food Promotion to Children:

5. How do children respond to food promotion?
6. Is there a causal link between food promotion and children's food related knowledge, preferences, purchase and consumption behaviours, and diet-related health status?
7. What is the extent of any influence of food promotion relative to other factors?
8. In any studies demonstrating an effect, does this affect total category sales, brand switching or both?

Initial relevance criteria were: primary research published in peer-reviewed and grey¹ literature or review level evidence, published in any language from January 1970 to November 2008, examining all forms of commercial food promotion targeting children aged 2-15 years.

The 2009 SR searched seven academic database interfaces, covering eleven academic literature databases on 15.11.08. These were Business Source Elite, CSA Illumina, Cochrane Library, EBSCOHost, Emerald, Medline and Web of Knowledge. Searches were also conducted on 23.3.09 on the websites and databases of the Advertising Education

¹ The term 'grey literature' usually describes material that is "not published in an easily accessible form or listed in standard bibliographic databases, for example conference proceedings, internal reports, theses and some books" (CRD, 2009: 266).

Forum, the Economic and Social Research Council, the WHO's WHOLIS database, LexisNexis Business and News, the Food and Agriculture Corporate Document Repository and New Internationalist.

Update search strategies used in the 2009 SR had been developed and tested in the 2006 SR. or change around to Update search strategies developed and tested in the 2006 SR were used in the 2009 SR, such as ?????. Minor modifications developed to streamline the 2009 search were tested to ensure that they did not alter search scope or sensitivity such as?. Search terms included: children, food, diet, nutrition, marketing, advertising, promotion. A complete record of search terms applied to titles, abstracts, keywords, content lists for each database and website searched is provided in the original reports. The 2009 SR included all studies identified in the 2006 SR and the results of update searches. Can we be clear so -all studies in the 2006 SR were also identified in the 2009 SR

Data on all forms of food promotion, including but not restricted to broadcast, print and digital advertising; packaging, labelling and point of sale promotions; branding and sponsorship; merchandising and the use of licensed or brand-based characters was eligible for inclusion to answer questions (Qs) on nature and extent of food promotion (Qs 1-4) and descriptive evidence on effects (Q 5). The unit of analysis of eligible evidence was any marketing activity reporting on a range of qualitative and quantitative outcomes.

For questions on the effects of marketing (Qs 6-8), the unit of analysis for eligible evidence was children aged 2-15 years. The outcome measures for effects were nutrition knowledge, food and beverage preferences, purchase behaviours, consumption behaviours and diet-related health indicators. An additional eligibility criterion was that the research design had to be capable of demonstrating marketing as the independent variable acting on one of five pre-specified measures of effects. Study design was assessed using the Bradford Hill criteria

for determining if observed associations between variables may be inferred to be causal or simply correlational (Bradford-Hill, 1965)².

Two reviewers independently screened and filtered raw search results against initial relevance criteria outlined above. Data were sorted according to relevance to specific research questions. All data sources that met eligibility criteria for one or more research question were summarised in Data Extraction Tables, coded and thematically analysed. A flow diagram summarising the results of searching and screening is given in Figure 1.

Two reviewers applied the causality and quality rating criteria to screen and grade studies eligible for inclusion to answer Qs 6-8. Any discrepancies in assessment were resolved through discussion and/or third party expert opinion. Individual studies assessed as capable of testing for causality using the Bradford-Hill criteria were subsequently quality appraised using a five item, 25 point rating scale. Quality of exposure and effects measures, appropriateness and rigour in application of analysis, completeness of reporting items were each scored on a scale of 1-5, and then summed to give an overall score of low (5-11), medium (12-18) and high (19-25). Individual study scores, the balance of negative, positive and inconclusive effects of the pooled evidence and the size of any reported effects were then reviewed in combination to provide an overall weight of evidence assessment for the pooled evidence for each of Qs 6-8 as weak, modest or strong.

Key findings were synthesised for each question in narrative form. The heterogeneity of measures precluded meta-analysis or systematic testing for selection bias.

< Insert Figure 1 here>

Results

² Bradford-Hill outlined nine guidance criteria for assessing if causality is a likely explanation for observed association between variables. These are the strength, specificity, consistency, temporality, reversibility, and dose-responsiveness of observed relationships, as well as consideration of the coherence and plausibility of proposed causal link and any counter-factual explanations.

Overall results of search and screening

A total of ninety-nine primary studies and 16 review articles met inclusion criteria for questions on nature and extent of food promotion to children in the 2009 SR. Cross-sectional content analysis was the principal study design (over 75%) followed by reviews and other methods of content analysis. North America was the most common source of evidence (more than 50% by fieldwork and/or authorship provenance) followed by Australasia, Europe and lastly studies and reviews with international scope.

Forty data sources provided descriptive evidence for Q5, on the qualitative nature of children's response to food promotion. Forty-six studies on the effects of food promotion on children's diet, dietary determinants and health were assessed as capable of demonstrating causality and were therefore included in the evidence pool for Qs 6-8. This included eight additional studies to those identified in the 2006 SR. Design of studies assessed as capable of answering Qs 6-8 were randomised controlled trials (n=20), non-randomised controlled trials (e.g. naturalistic, quasi-experimental) and experimental (n=12), cross-sectional (n=11) and longitudinal observational surveys (n=3). North America was the main source of evidence, especially for research included in the evidence pools for Qs 6-8 (>80%). The additional eight studies introduced to the existing evidence pools for Qs 6-8 did not result in any change to assessments of the weight of evidence or overall conclusions for any of the five outcomes examined.

No changes in nutritional quality of products promoted, marketing strategies, messages or themes were apparent from comparison of the 2006 and 2009 SRs. A small proportionate shift from TV-based advertising towards electronic/digital media marketing, integrated marketing strategies and brand research is apparent from comparison of the 2006 and 2009 SRs can we say how much. The change in research focus reflects a real world shift in commercial marketing practices (Jones, 2009; FTC, 2008). And of academic work catching

up with real world developments as well as taking time to work its way through the formal processes of bidding and peer reviews-PERHAPS PUT THIS IN THE DISCUSSION

A narrative summary of main findings drawn from the pooled evidence for each research question is described below, using illustrative examples of included studies. A summary of the volume and nature of the pooled evidence for each research question is given in Table 1. Summaries of all studies included in the systematic review are provided in the Data Extraction Tables of the full reports.

<Insert Table 1 here>

The nature and extent of food promotion to children

Promotional channels used by food marketers: The evidence base reflects the fact that TV advertising is the most popular promotional channel (n=87), although its dominance is being challenged by the emergence of other media. Internet-mediated marketing (n=15) and to a lesser extent direct mail marketing, mobile phone messaging, magazines, comics and other forms of print, point of sale, free samples, gifts and tokens, packaging, loyalty schemes, tie-ins with licensed characters and programmes, sponsorship, in-school marketing, and integrated marketing packages are also deployed to promote food and beverages to children.

What food items are promoted to children? The most common categories of food products promoted to children are pre-sugared breakfast cereals, soft drinks, savoury snacks, confectionery and fast foods. Estimates of the proportion of food marketing promoting these product categories to children varied from 60-90%. A US Federal Trade Commission (FTC) survey of industry expenditure reported 63% of the marketing spend directed to children was for carbonated beverages, fast food and breakfast cereals. Furthermore, the report noted that the figures did not include the value of toys distributed as premiums with fast food children's meals, but that these clearly were an integral component of the marketing mix. The estimated value of these premiums was reported as US\$360

million, representing an additional 22% expenditure. The next most heavily promoted food categories were juice and non-carbonated beverages, snack foods and candy/frozen deserts which accounted for 25% of total expenditure (FTC, 2008). Food promotion to children is proportionately greater than that directed to adult audiences. For example, Chesnutt and Ashraf (2002) found 63% of advertising during children's programming was for food but only 18% during prime-time programming.

Creative strategies used by food marketers: Entertainment techniques such as the use of animated and other fictional characters are more likely to be used in food advertisements than in non-food advertisements aimed at children. Frequently deployed appeal themes are taste, humour, action-adventure, fantasy and fun. More serious health and nutrition appeals (with the exception of breakfast cereal promotions) and the use of disclaimers (qualifying statements on products' contribution to consumer needs) are rarely deployed. A study illustrating this (Gantz, Schwartz, Angelini, & Rideout, 2007), reported that 34% of TV food advertising targeting children used taste appeals, 18% used fun appeals and only 2% used nutrition or health appeals. There is some evidence that health and nutrition appeals are sometimes misleading, and that the boundary between television programmes and the advertising breaks is sometimes blurred. Purchase incentives such as competitions, give-aways, brand-based discounting, as well as the deployment of innovative digital technology-mediated marketing are increasingly common.

What marketing strategies are used in low- and middle-income countries? The nature of food promotion in low- and middle-income countries mirrors the strategies, techniques and channels deployed in high-income countries. It is rapidly expanding and is associated with the promotion of foods new to the indigenous food culture, such as fast food, dairy products in Asia, and carbonated soft drinks. References for all of this?

Food marketing in low-income countries aimed at children and families is using TV advertising, sports stars and celebrity endorsement, interactive digital technologies and

building of brand loyalty to promote the same types of micro-nutrient poor, energy-dense foods and beverages as in richer countries. Descriptive survey data suggests that the qualitative nature of responses of children living in low and middle income countries to food promotion is very similar to those observed in developed economies (see for example Hawkes, 2002; Hawkes, 2006).

Marketers in low- and middle-income countries are targeting children as independent consumers, as influencers of the purchase decisions of their families, and as influential intermediaries who can introduce both their own and older generations to new consumer experiences such as fast food restaurant dining. For example, Chan (2005) suggests that child-related consumption is responsible for up to one third of overall household consumption in China and McNeal and Yeh (1997) describe how McDonald's and Pizza Hut relied on children to expand their overseas markets in Pacific Asia and Europe.

Effects of food promotion to children there are no references against most to the statements on this page compared to the page across which has references

How do children respond to food promotion? Descriptive survey data provided insights into the qualitative nature of children's responses. TV advertisements, free gifts and packaging routinely attract children's attention, acceptance and stimulate demand for, and liking of, products.

Observational evidence found children self-reported regularly buying foods without parental oversight and that parents self-reported that they frequently accede to children's marketing-influenced purchase requests.

Is there a causal link between food promotion and children's food knowledge, preferences, purchasing and consumption behaviours, and diet-related

health? Some of the sub headings below the numbers quoted in the narrative do not match up with the questions in table 1.

Nutrition knowledge: Four studies rated as medium or high quality found that exposure to promotions of low nutrition foods and ‘diet’ foods correlated with poor nutrition knowledge; one study found a positive association between exposures to high nutrition foods advertising and improved knowledge. Four studies using less detailed outcome measures found no association. Overall, the weight of evidence was assessed as modest and on balance indicates that food and beverage promotion can impact children’s nutrition knowledge and perceptions of what constitutes a healthy diet.

Food preferences: Nine out of a total of 16 experimental studies and one of two cross-sectional studies reported significant changes in food preference attributable to marketing exposure; one study reported non-significant results in the direction of effect; and five studies found no evidence of effect. Two experimental studies measured preferences but did not report findings. A number studies found evidence for preference changes towards high fat, salt or sugar foods in response to food advertising (see for example, Goldberg, Gorn, & Gibson, 1978; Stoneman & Brody 1981; Halford, Boyland, Hughes et al., 2008); promoted branded foods (see for example Halford, Boyland, Cooper et al., 2008) and non-product specific brand loyalty (for example Robinson, Borzekowski, Matheson et al., 2007) Overall, the weight of evidence was assessed as modest and on balance indicates that food promotion can influence food preference.

Food purchase and purchase-related behaviour: Seven studies reported statistically significant marketing-attributable effects and one study reported no association. There was evidence that the nutritional quality of promoted foods correlated with the nutritional quality of product purchases and purchase requests. For example, French, Jeffery, Story et al. (2001) found promotional signs for low fat snacks increased vending machine sales of those

products. Overall, the weight of evidence was assessed as strong and indicates that food promotion can directly influence purchasing choice and requests.

Consumption behaviours: Fourteen of the 18 included studies demonstrated positive associations between food promotion and consumption behaviours such as increased snacking, higher energy intake and less healthful food choices. Six of the studies reported significant effects of marketing exposure. The effects included increased frequency of selecting less healthful foods in preference to healthier options (Gorn and Goldberg 1982); increased consumption of calories (Jeffrey, McLellarn, & Fox, 1982; Halford, Boyland, Hughes et al., 2007; Halford Boyland, Cooper et al., 2008; Wiecha, Peterson, Ludwig et al., 2006) and total increased food intake (Halford, Gillespie, Brown et al., 2004; Halford, Boyland, Hughes et al., 2007; Halford Boyland, Cooper et al., 2008). Eight studies reported small non-significant effect sizes and four reported inconclusive results.

The evidence on context-specificity or universality of effect is mixed. For example an experimental study found similar increases in caloric consumption for both normal weight and overweight children in response to food advertising (Halford, Boyland, Hughes et al., 2007), whilst a similar study by the same research group found significant differences in caloric intakes positively correlated with body mass index (Halford, Boyland, Hughes et al., 2008). Overall, the weight of evidence was judged as modest and that food promotion can influence food consumption behaviours.

Diet-related health status: All included studies were cross-sectional. All used TV viewing as a proxy for exposure to TV advertising, and one study reported evidence for TV viewing as a valid proxy measure for exposure to food promotion. Four reported positive correlations between food promotion and nutrition diet quality: Bolton (1983) reported a relationship between advertising and snacking frequency as well as lower nutritional diet quality. Coon, Goldberg, Roger et al. (2001); Taras, Sallis, Patterson et al. (1989); Gracey, Stanley, Burke et al. (1996) all found lower quality diet was associated with exposure to television. Two

studies reported a positive associations between TV viewing and obesity, and one with blood cholesterol levels (Matheson, Killen, Wang et al., 2004; Dietz & Gortmaker, 1985; Wong, Hei, Qaqundah et al., 1992). None of the studies reported effect size. The weight of evidence was assessed as modest but did indicate that food promotion can influence diet-related health status.

The influence of food promotion relative to other factors

Eight cross-sectional studies explored the relative magnitude of effect sizes of parents, peers, TV viewing behaviours, and food promotion on children's food and health outcomes. Studies including measures of socioeconomic status analysed this as a moderating, not independent variable and the magnitude of its influence could not be inferred from the pooled evidence. Collectively, parental dietary behaviours, food provisioning, communication styles, and TV viewing behaviour accounted for more variance in child food and health outcomes than any other independent variables explored in the included studies (Bolton 1983; Ritchey & Olson, 1983; Buijzen, Schuurman, & Bornhof, 2008; Norton, Falciglia and Ricketts 2000). Other reported influencing factors were peers and friends and children's own sedentary TV viewing behaviours (Dietz & Gortmaker, 1985; Norton, Falciglia, & Ricketts, 2000; Wong, Hei, Qaqundah et al., 1992; Coon, Goldberg, Roger et al., 2001; Gracey, Stanley, Burke et al., 1996). The weight of evidence was assessed as modest but did indicate that food promotion can act as a significant independent determinant of children's food behaviours and health status.

Food promotion effects on brand and category choice

Four studies reported evidence of brand level effects, and two reported no measurable effect. Robinson, Borzekowski, Matheson et al. (2007) in an elegant study of pre-school preferences for McDonald's branded carrots (at a time when carrots were not a McDonald's menu option) as well as burgers over non-branded but otherwise identical foods demonstrated how branding can influence food preferences in very powerful ways. Six

studies reported unequivocal evidence of category level effects (for example, food from 'more healthy' food categories versus food from 'less healthy' categories), three reported inconclusive results and two reported no effect. Overall weight of evidence was assessed as strong and indicated that food promotion does influence food choices at category and brand level.

Discussion

The first systematic review of evidence on the nature, extent and effects of marketing was published in 2003. It examined more than thirty years of evidence on marketing practice and its effects in developed economies (Hastings, Stead, McDermott et al., 2003). Subsequent SRs published in 2006 (Hastings, McDermott, Angus et al., 2006) and 2009 (Cairns, Angus, & Hastings, 2009) extended the geographic scope of the evidence base to include research conducted in low income countries. A North American systematic review of evidence published in 2006 also concluded that food and beverage promotion to children is extensive, primarily promotes low nutrition foods and influences children's food behaviours and diet-related health (McGinnis, Gootman, & Kraak, 2006).

The collective evidence of the major reviews published to early 2012 capture nearly forty years of evidence on the effects of marketing. There are methodological challenges in isolating marketing from other influences on food behaviour in the complex and inter-related pathways determining diet-related health but nevertheless there is consensus that marketing is modifiable determinant for children's health. The research, employing a mix of methods from experimental studies to naturalistic surveys, confirms food promotion can impact children's knowledge, food preferences, purchase behaviours, food consumption and diet-related health.

Recent non-systematic reviews (Kunkel, McKinley, & Wright 2009; Kraak, Story, Wartella et al., 2011; Adams, Tyrell, Adamson et al., 2012, Hawkes case study?) which examined advertising and marketing practice in developed economies collectively provide retrospective

insight on marketing trends in the wake of recent policy actions. The reviews indicate marketing practice has altered little and is, to date, remarkably resistant to the change objectives of recently introduced marketing control policies. Food marketing to children continues to primarily promote high fat, salt or sugar foods. Marketing strategies continue to employ multi-faceted and integrated techniques which are highly engaging and attractive to children. Promotions continue to target children as consumers in their own right, and as intermediaries who can influence other consumers especially their parents and peers. The marketing strategies and techniques used in developed economies are similarly deployed in lower income countries. There is little commercial promotion of foods and beverages recommended as core to a healthful diet.

The United Nations political declaration includes a commitment to *'take measures to implement the WHO set of recommendations to reduce the impact of the marketing of unhealthy foods and non-alcoholic beverages to children, while taking into account existing national legislation and policies'* (UN, 2011: 8). The WHO Set of Marketing Recommendations call for more responsible marketing, supportive and enabling policy, comprehensive monitoring and evaluation of policy actions and for a global multi-sector approach. Successful implementation of the WHO Set of Marketing Recommendations would reduce children's exposure to a significant modifiable risk factor for NCDs, overweight and obesity.

Lack of progress in rebalancing the marketing landscape to date hints at the enormity of the challenge for policy, practice and research (Hastings, McDermott, Angus et al., 2006; Cairns, Angus, & Hastings, 2009; Kunkel, McKinley, & Wright, 2009; Kraak, Story, Wartella et al., 2011; Adams, Tyrell, Adamson et al., 2012). The relationship between research and policy is likely to be most effective if policy informs evidence as well as evidence informing policy. The current evidence base provides limited insight on how policy effectiveness may be strengthened. In light of the findings of the 2009 SR, and those published before it, we recommend researchers, policymakers and marketing practitioners recognise that the

question of *if* global actions are necessary has been answered. The goal for future policy research must be to identify *how* the necessary changes in food promotion can be achieved.

Conclusions

We recommend future research strategies build on the empirical evidence that unconstrained food marketing promotes low nutrition foods and that promotions influence children's food behaviours and diet-related health. This should include research on mapping what controls and interventions work in limiting the amount of advertising and marketing to children including the impact on health outcomes. There is a need to move beyond debates over mapping the extent of the problem to exploring policy and public health solutions which are evidence based. The WHO Set of Marketing Recommendations provides comprehensive, strategic direction for future research as well as policy. A shift in emphasis to more 'normative' research aimed at supporting international policy aims and capacity can contribute to more effective and efficient policy development and children's future health.

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Figure 1: Flow Diagram of 2009 Systematic Review Update Search, Screening and Synthesis

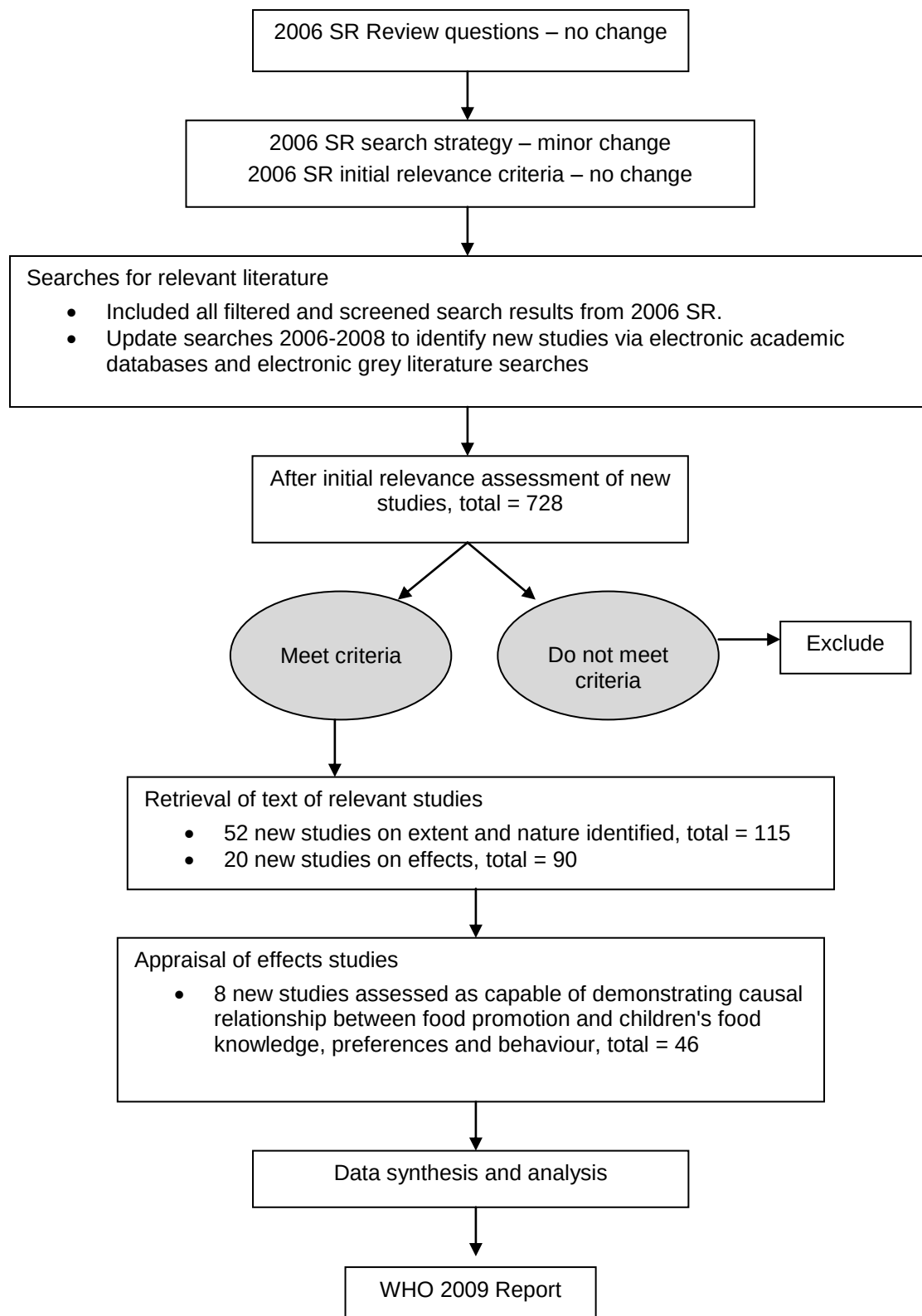


Table 1: Summary Table of the Evidence Pool for the SR Research Questions

(n=99)

Research Question	Identified studies <i>n</i>	Nature of Evidence	Weight of Evidence
1. Promotional channels	75	Content analyses and reviews	N/A
2. Foods promoted	84	Content analyses	N/A
3. Creative marketing strategies	69	Mainly content analyses and qualitative studies	N/A
4. Marketing strategies in lower income countries	32	Mainly descriptive surveys and qualitative studies	N/A
5. How children respond	40	Narrative and qualitative studies	N/A
6. Effects on food knowledge	9	2 x high quality studies 7 x medium quality studies	Modest
6. Effects on food preferences	18	5 x high quality studies 10 x medium quality studies 3 x low quality studies	Modest
6. Effects on food purchases	8	4 x high quality studies 3 x medium quality studies 1 x low quality studies	Strong
6. Effects on food consumption	18	2 x high quality studies 13 x medium quality studies 3 x low quality studies	Modest
6. Effects on diet-related health	7	1 x high quality studies 5 x medium quality studies 1 x low quality studies	Modest
7. Extent relative to other influences	8	2 x high quality studies 4 x medium quality studies 2 x low quality studies	Modest
8. Category and/or brand-level effects	15	5 x high quality studies 9 x medium quality studies 1 x low quality studies	Strong

Quality Rating Key: low score= 5-11, medium score=12-18, high score=19-25