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Sugar Reduction: The evidence for action

Annexe 3: A mixed method review of behaviour changes resulting from marketing strategies targeted at high sugar food and non-alcoholic drink

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A mixed method review of behaviour changes resulting from marketing strategies targeted at high sugar food and non-alcoholic drink

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1. GLOSSARY AND ABBREVIATIONS AND ACRONYMS:

1.1 Glossary

Advergaming:	The integration of advertisements into computer games.
Digital marketing:	The use of digital platforms such as websites, Apps, text messages and social media for marketing purposes.
Food psychology:	The complex bundle of psychological factors that influence an individual's decisions and practices relating to food, such as knowledge, values, attitudes, hedonic responses
Guerrilla marketing:	An advertising strategy using innovative, unconventional marketing tactics to maximise impact.
Ofcom:	Independent regulator and competition authority for the UK communications industries.
Premiumisation:	A marketing strategy that involves the establishment of a higher quality or 'specialness' which enables an increased/premium charge for the product.
Proportional pricing:	The removal of beneficial prices for large sizes.
Spokes character:	A popular familiar or bespoke unfamiliar character used to endorse a brand or product. Also known as character branding.

1.2 Abbreviations and acronyms

BMI	Body mass index
BCAP	Broadcasting Committee of Advertising Practice
CAP	Committees of Advertising Practice
COREQ	Consolidated criteria for reporting qualitative research
CVD	Cardiovascular disease
FSA	Food Standards Agency
HFSS	High fat, sugar, salt
JBI	Joanna Briggs Institute
NGO	Non-governmental organisation
OECD	Organisation for Economic Co-operation and Development
PHE	Public Health England
PRISMA	Preferred reporting items for systematic reviews and meta-analyses
RCT	Randomised controlled trial
SACN	Scientific Advisory Committee on Nutrition
SES	Socioeconomic status
SSDs	Sugar-sweetened drinks
WHO	World Health Organization

2. EXECUTIVE SUMMARY:

2.1 Background

In June 2014, alongside the publication of the Scientific Advisory Committee on Nutrition (SACN) draft report 'Carbohydrates and health', Public Health England (PHE) published 'Sugar reduction: Responding to the challenge'. It described PHE's future plans relating to sugar reduction, including plans to carry out evidence reviews and further analysis to allow consideration of initiatives that have been previously identified as areas for future discussion. This review was conducted alongside a complementary review examining the impact of fiscal measures targeted at high sugar food and non-alcoholic drinks.

2.2 Aim

The aim of this review was to examine the most recent (2010 onwards) research evidence on the health and behavioural impacts of marketing strategies, examined under the four P's (Product, Price, Promotion, Place) framework, that target high sugar food and non-alcoholic drink, in both adult and child populations to provide evidence to support possible policy development in relation to marketing practices.

2.3 Methods

This is a mixed methods review that combined, by triangulation, the findings from the peer reviewed and grey literature (published in English language in Organisation for Economic Co-operation and Development (OECD) countries from 2010 onwards), with findings from a series of key stakeholder interviews.

2.4 Key Findings

A total of 45 primary research publications were identified and included in the literature review. The majority of the evidence focused on children (29 studies), presenting evidence from the US (n=16); Netherlands (n=8); England (n=5); Australia (n=4); Belgium (n=4); Mexico (n=2); Portugal (n=2); across several European countries (n=1), Austria (n=1); South Korea (n=1) and Canada (n=1). The majority of studies were short term, small scale studies of generally low to moderate quality, presenting a mix of 31 experimental/controlled and 14 descriptive observational studies with a focus on the impact measured by preference, purchase and consumption outcomes. Findings from the literature review were triangulated with emerging themes from 20 stakeholder interviews (one interviewee provided a written response).

2.4.1 Summary of primary research evidence

Research evidence published from 2010 onwards is summarised by category, using the four P's marketing framework

PROMOTION:

- the evidence base on the impact of screen advertising is highly heterogeneous in study design, with a reliance on relatively small, variable quality experimental or observational studies. However, the findings from five studies suggest that screen advertising has the potential to influence intake of high sugar products, or unhealthy foods to varying degrees in adults, with some evidence to suggest this impact may vary by population subgroup (eg individual psychology, gender and body mass index (BMI))
- findings from the studies examining the impact of screen advertising in children were mixed, with two studies in parents and children demonstrating an association between advertising and self-reported consumption of high sugar foods, and two studies (one from the UK) demonstrating an association between high sugar product consumption and TV advertising, while the remaining four studies were inconclusive
- all eight studies examining the role of advergames, demonstrated an impact of increasing consumption of, or preference for unhealthy or high sugar foods, under experimental conditions
- one observational and one experimental study provided evidence to illustrate the role of traditional print marketing approaches in promoting high sugar product choices in children. The observational study demonstrated that alongside print/transport/school marketing, exposure to TV and digital marketing also influenced self-reported food choices
- sponsorship was identified as an emerging marketing strategy however, only one small, relatively low quality Portuguese study examined the influence of event sponsorship on children's purchase intention for a high sugar drink

PRICE:

- two high-quality observational studies (one from England) demonstrated that price discounting can have a significant impact on increasing sales of less healthy, high sugar products

PRODUCT:

- evidence from five experimental studies demonstrated that use of character branding/spokes characters may increase preference for, or intake of high sugar foods in young children aged 2 to 7 years
- five studies examined the impact of branding, suggesting an influence on high sugar food/drink preference. Although the evidence was difficult to summarise collectively due to the vast diversity in study designs, there was some evidence (although inconsistent) to suggest that branding may be more influential in children with a higher body weight
- evidence from the six heterogeneous studies examining the impact of product size, aligns with findings from a recent Cochrane review examining the impact of food size (portion, packet or individual unit size), suggesting that reducing the size of high sugar food and drink products may help to reduce sugar consumption in both adults and children

PLACE:

- one high quality observational study in England provided good evidence to suggest that end of aisle displays can significantly increase purchases of carbonated soft drinks

2.4.2 Summary of stakeholder interviews

While saturation of themes was not reached given the breath of the topic area and small number of interviews conducted, a number of key themes emerged. However, the interviews did not reveal any emerging new marketing strategies or unpublished intelligence.

2.4.3 Summary of triangulated findings

When triangulated, evidence from the literature and stakeholder interviews provided convergent themes to suggest:

- marketing strategies (price, product, place, promotion) are likely to impact on purchases and consumption, with the evidence predominantly focused on children
- promotion activities such as advergaming and sponsorship can influence purchase and intake of high sugar products
- pricing strategies such as discounting can increase purchases of high sugar food
- food packaging, such as the use of character branding/spokes characters, can influence children's food choices
- product placements such as end of aisle displays can promote high sugar purchases

2.4 Conclusion

Findings from this review, support evidence from previous systematic reviews to suggest that marketing is effective in influencing the purchase and consumption of high sugar foods. Unsurprisingly much of the research evidence focuses on children, given they lack an adult's understanding of advertising intent, and are therefore considered more vulnerable to the impact of marketing. While current evidence suggests that advertising, advergames, discounting, use of character branding, product size and supermarket product placement can influence high sugar product selection or consumption, much of the research evidence is reliant on small scale, low to moderate quality experimental/controlled studies from outside of the UK. Although TV remains a dominant marketing channel, there are also several emerging and new marketing strategies such as sponsorship, integrated, digital and online marketing that require further research.

KEY CONSIDERATIONS:

- promotion can impact on high sugar food preference, purchase and consumption although the current evidence base is strongly focused on children
- TV advertising remains a popular food marketing channel and evidence suggests it has potential to influence preference for, or intake of high sugar products, however independent research suggests that current UK broadcast regulations are not strong enough to reduce children's exposure to unhealthy food advertising
- digital marketing strategies are rapidly growing and are a potentially influential area, given the highly immersive and interactive nature of these approaches. However, this remains an under-researched field, with current research evidence focusing on the advergaming, which was found to significantly influence intake of, or preference for high sugar foods in school age children
- understanding the behavioural and health impacts of new digital marketing strategies is essential, given they differ in approach to most traditional marketing strategies, therefore introducing a number of new concerns which may require additional regulatory consideration
- sponsorship is recognised as an emerging marketing strategy, yet despite many high profile sponsorship deals in the UK, there remains a lack of evidence as to diet and health related impacts of this approach
- price discounting can promote the sales of less healthy food, however more research is required to understand the broader implications of discounting on overall dietary intake and impact across different demographic groups
- character branding can be an effective strategy to market high sugar foods to young children, and while current regulations prevent the use of the approach to young school-age children, they may still be susceptible to products branded for wider appeal
- altering portion size can influence sugar intake, however it is important to consider the impact of possible counter marketing or compensatory behaviours to any size regulation
- supermarket placement may influence high sugar purchases, however, evidence is limited (one study identified in this review) and lacks further detail on consequential health and behavioural impacts

3. BACKGROUND:

3.1 Public health and policy context

In Europe, poor diet is responsible for up to 40% of the non-communicable disease burden [1, 2]. In the UK, the contribution of diet-related risk factors to the burden of illness and disease, including high BMI, is second only to tobacco use [3]. Currently in England, 25% of adults aged 16 and above are obese and around two thirds are either overweight or obese [4].

With the increasing prevalence of obesity, in developing as well as developed countries, there has been increased focus on tackling the 'obesogenic' environment through population level, coordinated action by local, regional and national policy makers. Within Europe and globally, a number of different types of public health nutrition policies have been implemented to improve the nutrition of the population [2, 5].

The UK population consumes more sugar than is currently recommended [6] and sugar consumption increases the risk of consuming too many calories, which contributes to weight gain and obesity [7]. In June 2014, alongside the publication of the SACN draft report 'Carbohydrates and health', PHE published 'Sugar reduction: Responding to the challenge'. It described PHE's future plans relating to sugar reduction, including plans to carry out evidence reviews and further analysis to allow consideration of initiatives that have been previously identified as areas for future discussion. This review was conducted alongside a complementary review examining the impact of fiscal measures targeted at high sugar food and non-alcoholic drinks.

3.2 What is marketing and why is it important?

Marketing is referred to as: *"Various practices which constitute a commercial communication or message that is designed to, or has the effect of, increasing the recognition, appeal and/or consumption of particular products and services. It comprises anything that acts to advertise or otherwise promote a product or service." [8]*

Food and drink marketing is a vast global industry. Evidence also suggests disproportionate marketing of high fat, sugar, salt (HFSS) products (eg [9] [10] [11]), and in 2014, the UK food industry spent £256 million promoting unhealthy foods[1] sold in retail alone [12]. Marketing strategies can potentially influence the consumption of high sugar products (as illustrated in the logic model in Figure 1), through a number of different factors which are commonly classified under the four P's framework: Price

[1] 'Unhealthy food' includes high sugar and/or fat foods sold in UK retail including: non-alcoholic drinks, chocolate, confectionery, snacks, desserts, ice cream, cakes, biscuits, sweet and savoury pastries, processed meat products, condiments.

(discounts); Place (availability and accessibility of products such as end of aisle displays); Product (the size and formulation of a food or drink item); and Promotion (advertising). In the past, advertising traditionally used media such as TV, radio and print, and while TV advertising remains a dominant form of marketing, advertising strategies are rapidly evolving to use new digital channels such as websites, gaming, social media, mobile and tablet applications, and developing alternative approaches such as product placement, sponsorship, integrated and guerrilla marketing [13]. Marketing tactics are becoming increasingly sophisticated, combining approaches and developing innovative new strategies to maximise impact, thereby immersing many aspects of daily life.

Marketing is therefore thought to play an important contributory role in influencing the obesogenic environment [14].[2]

While the multimillion pound investments in food and drink industry marketing is testament in itself to the impact of these approaches in terms of product sales, the behavioural and health impacts of these approaches, particularly in children, has generated interest for several decades [15]. In 2003 the Food Standards Agency (FSA) commissioned one of the first systematic reviews examining the effects of food promotion to children [9], demonstrating both the prevalence of unhealthy food promotion, and the impact it can have on children's food preference, purchasing and consumption. Following this report, in 2007 Ofcom (the independent regulator and competition authority for the UK communications industries) introduced tighter regulation of children's food promotion, by restricting advertisements of HFSS food and drink during children's programming [16] (a summary of current UK marketing regulations relevant to this review are shown in Table 1, see relevant Broadcasting Committee of Advertising (BCAP) code). Further action was later endorsed by the World Health Organization (WHO) in 2010, through the publication of its recommendations on marketing of food and non-alcoholic drinks to children, which includes a policy recommendation to reduce the exposure, power and marketing of HFSS foods to children [8]. A later report (2014) commissioned by the Committees of Advertising Practice (CAP) examined the current evidence base on the exposure and impact of online marketing of food and soft drinks targeted at children and young people [17]. In response to this review CAP will be providing new guidance, advice, training and monitoring to ensure current online regulations are adhered to, and that children understand the commercial intent of any online marketing [18].

[2] 'the sum of influences that the surroundings, opportunities, or conditions of life have on promoting obesity in individuals or populations'. Swinburn B, Egger G. Preventive strategies against weight gain and obesity. Obesity Reviews 2002;3(4):289–301

Figure 1: Logic model for the hypothesised impact of high sugar food and non-alcoholic drink marketing

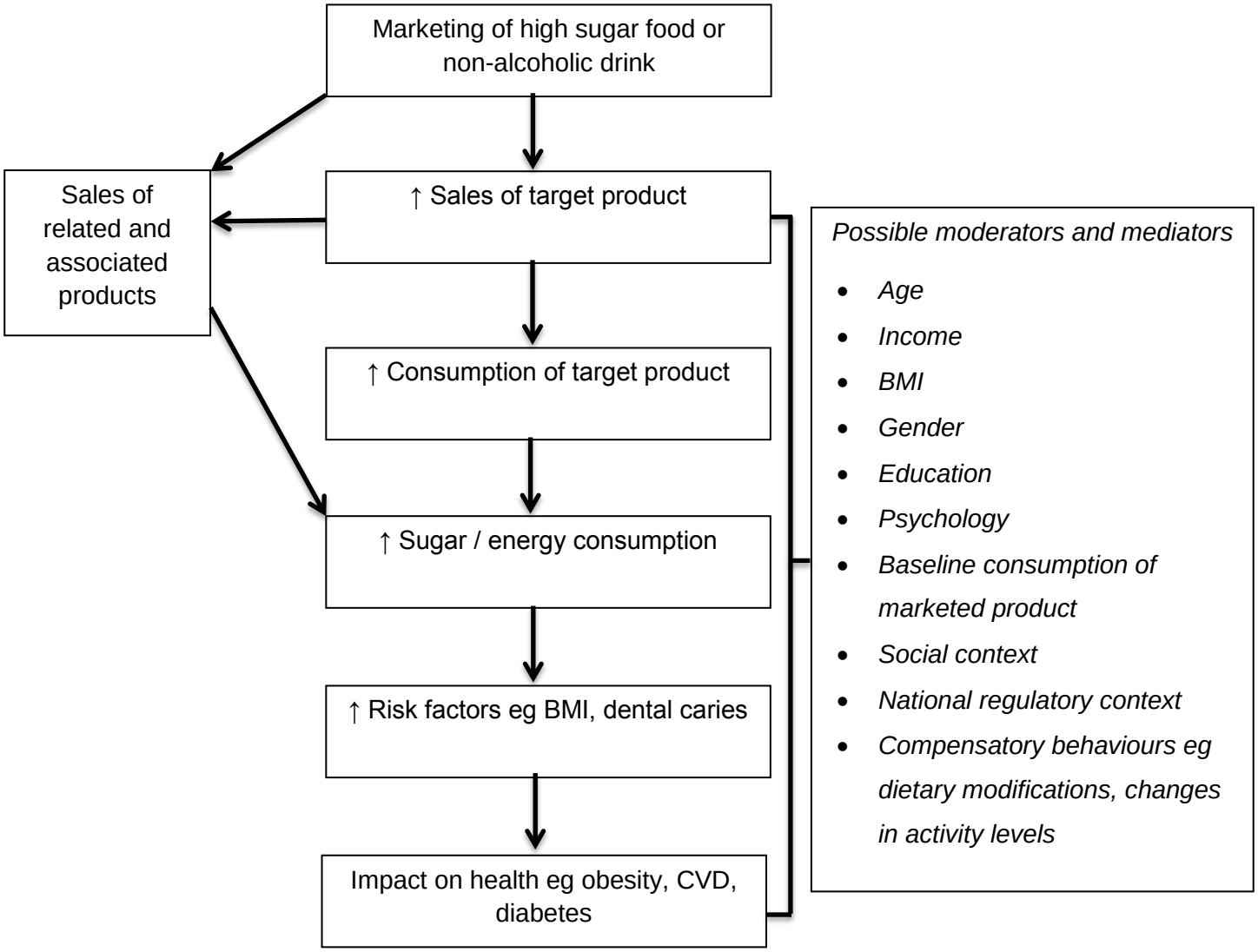


Table 1: Overarching current UK marketing regulations relevant to high sugar foods, extracted from CAP and BCAP code (full codes available at: http://www.cap.org.uk/Advertising-Codes.aspx – accessed April 2015) *NB Unless otherwise stated, a "child" is defined as someone under 16 years old*

CAP regulations for non-broadcast marketing communications (child specific regulations are highlighted in bold)
Marketing communications must not condone or encourage excessive consumption of a food.
Marketing communications must not condone or encourage damaging oral healthcare practices, especially in children.
Marketing communications must not condone or encourage poor nutritional habits or an unhealthy lifestyle in children.
Marketing communications must not disparage good dietary practice or the selection of options, such as fresh fruit and fresh vegetables, that accepted dietary opinion recommends should form part of the average diet.
Marketing communications featuring a promotional offer must be prepared with a due sense of responsibility.
Except those for fresh fruit and fresh vegetables, food product advertisements that are targeted through their content directly at pre-school or primary school children must not include a promotional offer
Licensed characters and celebrities popular with children must be used with a due sense of responsibility. Except those for fresh fruit or fresh vegetables, food advertisements that are targeted directly at pre-school or primary school children through their content must not include licensed characters or celebrities popular with children. The prohibition does not apply to advertiser-created equity brand characters (puppets, persons or characters), which may be used by advertisers to sell the products they were designed to sell.
Although children might be expected to exercise some preference over the food they eat or drink, marketing communications must be prepared with a due sense of responsibility and must not directly advise or ask children to buy or to ask their parents or other adults to make enquiries or purchases for them

BCAP regulations for broadcast marketing communications (child specific regulations are highlighted in bold)
Advertisements must avoid anything likely to condone or encourage poor nutritional habits or an unhealthy lifestyle, especially in children.
Advertisements must not condone or encourage damaging oral healthcare practices, especially in children.
Advertisements must not condone or encourage excessive consumption of any food.
Comparisons between foods must not discourage the selection of options such as fresh fruit and fresh vegetables, which generally accepted dietary opinion recommends should form a greater part of the average diet. Advertisements must not disparage good dietary practice. No advertisement should suggest that a balanced and varied diet cannot provide adequate nutrients in general
Television only – Promotional offers must be used with a due sense of responsibility. They may not be used in HFSS product advertisements targeted directly at pre-school or primary school children. That prohibition does not apply to advertiser-created equity brand characters (puppets, persons or characters), which may be used by advertisers to sell the products they were designed to sell.
Television only – No nutrition or health claim may be used in HFSS product advertisements targeted directly at pre-school or primary school children. For the avoidance of doubt, claims referring to children's development or health are acceptable in non-HFSS product advertisements, if those claims are authorised by the European Commission
Television only – Although children might be expected to exercise some preference over the food they eat or drink, advertisements must be prepared with a due sense of responsibility and must not directly advise or ask children to buy or to ask their parents or other adults to make enquiries or purchases for them
Radio only – Promotional offers to children must be used with a due sense of responsibility. They may not be used in food or soft drink product advertisements targeted directly at pre-school or primary school children; that prohibition does not apply to advertisements for fresh fruit or fresh vegetables. Advertisements that contain a promotional offer linked to a food or drink product of interest to children must neither seem to encourage children to eat or drink a product only to take advantage of a promotional offer nor create a sense of urgency. If a promotional item can also be bought, that must be made clear. Closing dates for collection-based promotions must enable the whole set to be collected without having to buy excessive or irresponsible quantities of the product in a short time.
Radio only – Licensed characters and celebrities popular with children must be used with a due sense of responsibility. They may not be used in food or soft drink product advertisements targeted directly at pre-school or primary school children. That prohibition does not apply to advertisements for fresh fruit or fresh vegetables or to advertiser created equity brand characters (puppets, persons or characters), which may be used by advertisers to sell the products they were designed to sell. Licensed characters, equity brand characters or celebrities well-known to children may present factual and relevant generic statements about nutrition, safety, education and the like.
Radio only – Claims referring to children's development or health are acceptable in radio food or soft drink product advertisements if those claims are authorised by the European Commission.

4. RESEARCH BRIEF

PHE carried out this review in collaboration with Teesside University to bring together the most recent robust evidence in this area to allow in-depth consideration of a possible policy initiative to reduce sugar consumption. It is intended to contribute to the package of evidence to inform the government's thinking on sugar in the diet as requested by the Department of Health [19]. Evidence on this subject was last considered by the FSA [9], resulting in advice to the Department of Health and Ofcom, and the development of the current BCAP restrictions in advertising high fat, salt or sugar foods or drinks to children.

The review had to identify and examine the effect of a range of interventions on a range of outcomes in both child and adult population groups against contrasting regulatory backgrounds as well as accommodate time and resource limitations. A broader and rather more flexible approach was therefore needed that still adhered to a systematic methodology, but did not strictly follow the conventional Joanna Briggs Institute (JBI) or Cochrane approaches to systematic reviews.

Pragmatic decisions were made regarding the methodology and inclusion criteria by a project steering group (for membership details see Appendix 12.1). These decisions included: developing evolving inclusion criteria, which were broader than would be expected of an academic publication to ensure that the outcomes supported policy thinking; literature searches were limited to 2010 onwards to ensure studies were most relevant to the present day environment; interviews with key informants were included to support the literature review, as it was thought much evidence in this area may not be in the public domain.

The review primarily focused on high sugar foods and drinks, but a decision was made to include short listed studies where these foods were consumed as part of a product (ie a food that is both high in sugar and fat) or meal. The review excluded marketing interventions with a primary outcome of health promotion, as the purpose of the review was to focus on the marketing of high sugar food or drinks; interventions examining the impact of labelling, were outside the scope of the review as labelling is governed by EU regulations. Qualitative studies were also excluded to ensure only the most robust quantitative studies are included.

5. AIM, OBJECTIVES AND RESEARCH QUESTIONS:

5.1 Aim

The aim of this review was to examine the most recent (2010 onwards) research evidence on the health and behavioural impacts of marketing strategies, examined under the 4 P's framework (Product, Place, Promotion, Price), that target high sugar food and non-alcoholic drink, in both adult and child populations.

5.2 Objectives

- to undertake a pragmatic review of the existing literature, to draw together evidence from recent (2010 onwards) primary research and grey literature on marketing strategies targeting high sugar[3] food and non-alcoholic drink, and the resultant impact on attitudes, purchases, consumption and health
- to collect qualitative data from stakeholders/informants, to gather key intelligence on the impact of current marketing strategies, emerging and iconic marketing

5.3 Research questions

- what marketing strategies (as detailed in 'aims' above) targeted at high sugar food and non-alcoholic drink have been implemented?
- what product(s) do they target, at which populations and how are they evaluated?
- what has been the impact of these marketing strategies on subsequent changes in attitudes, consumption, purchasing behaviour and health?

[3] For the purposes of this review 'high sugar' was defined as >5g sugar per 100g or >2.5g sugar per 100ml and refers to total sugar, however as few papers provide a nutritional analysis of the products under investigation, the research team used their judgement to determine which were high sugar.

6. METHODOLOGY

Given the requirement to identify and examine a range of interventions and outcomes, in both adult and child populations, against potentially contrasting regulatory backgrounds (see research brief for further details), a broader more flexible approach was required to construct a review that remained fit for purpose while utilising a systematic methodology. The resulting research protocol was developed and agreed with the project steering group. The methods are presented separately for the literature review, and stakeholder interviews, and are reported, where possible, following the Preferred Reporting Items for Systematic Reviews guidelines (PRISMA) [20].[4]

6.1 Literature review methodology

6.1.1 Inclusion criteria

Searches were conducted from 2010 onwards,[5] to identify published and unpublished experimental, quasi-experimental and observational studies that met the following criteria:

- Population: Studies involving populations of any age (children were defined as <18 years of age; adults 18 years and over), from OECD countries (to enhance the applicability of findings to the UK)
- Outcomes: consumption patterns, purchasing patterns, dietary intake, excess weight, weight gain, dental health, diabetes, cardiovascular disease (CVD) risk, attitudes, energy
- Intervention: Any marketing strategy that demonstrated a health or behavioural impact on high sugar food and / or non-alcoholic drink

Commentaries, systematic reviews, non-systematic reviews, qualitative studies or discussion pieces, research that focused on nutrition labelling, health promotion or the promotion of healthy food/drink, non-English language papers, studies published outside of stipulated publication dates, from non OECD countries, with no relevant impact data or focused on alcohol were all excluded.

[4] As the literature was reviewed using a systematic approach, the PRISMA statement was followed where possible, however the following criteria were not met: item 2 – structured summary was written as an executive summary for the policy audience; item 5 - the publication of the review protocol, which was not possible due to the policy and time constraints imposed upon the project; item 13 - principal measure was not identified due to the vast heterogeneity between studies; items 14 15, 20,21,23 - n/a as meta-analysis was not possible due to heterogeneity.

[5] Studies from 2010 were selected to provide an overview of the most current research evidence in order to fit the resource and policy requirements outlined in the research brief.

6.1.2 Search strategy

A list of key search terms was developed by the project team in consultation with the steering group (shown in Appendix 12.2). Each electronic database was systematically searched using a combination of these terms, tailored to optimise sensitivity, specificity, and the syntax and functionality of each database. The final search strings were therefore created and run (on the 30th of October 2014) by an information scientist. An example search string is shown in Appendix 12.3. The databases searched were: CINAHL, Cochrane library, Embase, Health Business Elite, HMIC, LILACS, Medline, and PsycInfo.

The database search results were also supplemented by hand searches, and resources provided by the steering group, stakeholder interviewees and ongoing study author contacts.

In addition to the peer reviewed literature, a number of grey literature searches were undertaken using the broad search terms: 'sugar and food and drink', these searches included key government and organisation websites as well as general searches in Google, Bing and the social media sites Facebook and Twitter. A full list of the grey literature searches is shown in Appendix 12.4.

6.1.3 Screening and data extraction

All titles and abstracts were screened by one reviewer. The resulting shortlist was reviewed by the research team, to finalise the list of references that potentially met the inclusion criteria. Full text versions of these papers were extracted and assessed by one reviewer, and a second reviewer was consulted where any question or ambiguity existed. Any conference proceeding or study protocol was categorised as an ongoing study, and where contact details were available, authors were contacted for further information (see Appendix 12.5 for further details).

A standardised data extraction template was developed and agreed by the steering group to record study characteristics and authors key findings. Quality appraisals were carried out for each included study, using the Joanna Briggs Institute appraisal tools [21]. All data were extracted and quality assured by two reviewers. Throughout the review process a third reviewer was consulted if any queries arose during the data extraction and quality assurance process. Due to the vast heterogeneity of the included studies, meta-analyses were not possible, therefore a narrative synthesis is provided. Evidence was appraised by examining the number of studies identified within each marketing category (or subcategory), within the context of the study quality and consistency of findings. Key findings were contextualised within the study design, quality assessment, objectivity of the outcome measure and funding source.

6.2 Stakeholder interview methodology

A purposive sample of key stakeholders was identified through a 'snowballing' approach which included discussions with the steering group members, exploring key contacts through the literature searches, interview process and PHE. Ethical clearance for the interviews was granted by Teesside University Research Governance and Ethics Committee on 03/12/2014. All interviews were conducted over the phone using a semi structured interview (shown in Appendix 12.6) and audio recorded following the acquisition of informed consent. Narrative data from these interviews was thematically analysed in NVivo (version 10) following Creswell's methodology [22]. Emerging themes were identified by one researcher and checked for accuracy by a second researcher. The consolidated criteria for reporting qualitative research (COREQ) 32-item checklist was completed (see Appendix 12.7) for quality assurance [23]. The emerging themes are presented below and triangulated with the review data following O'Cathain et al's methodology [24].

7. RESULTS

7.1 Literature review findings

7.1.1 Search results summary

The database searches identified 19,624 studies (after deduplication), with seven additional records identified through the grey literature, and 12 papers identified through hand searches and author contacts. Preliminary screening led to the exclusion of 19,080 studies and a shortlist of 544 studies which were scrutinised by the study team, to refine the list to 124 studies, which were subjected to full text review. When combined with the hand searched and author derived papers, 45 primary research studies met our inclusion criteria and were included in this narrative synthesis (see figure 2).

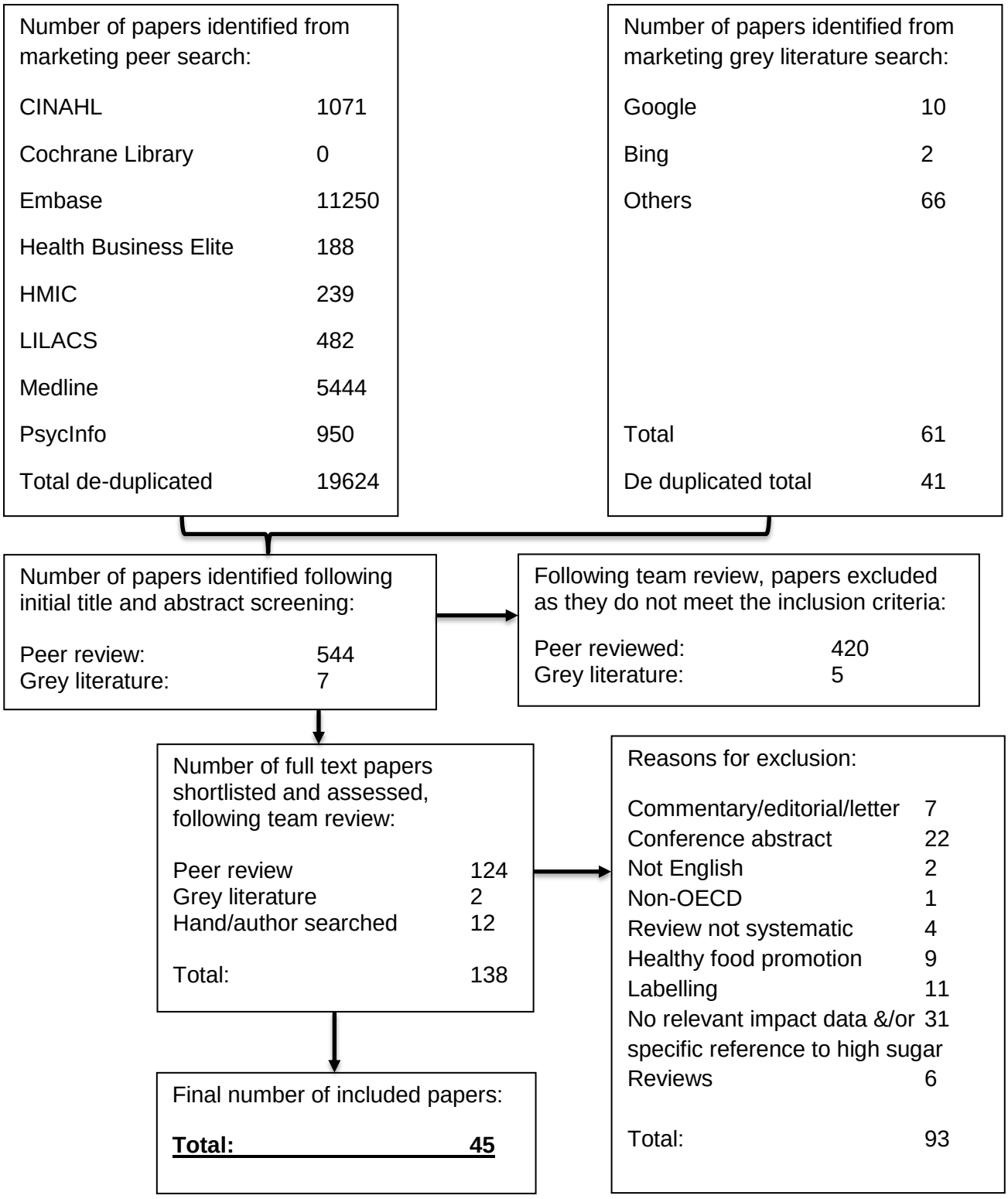
7.1.2 Characteristics of included studies

The 45 primary research publications included in this review provide evidence on the impact of marketing in children (29 publications), adults (14 publications), and adults and children (2 publications). The studies were conducted across 10 different countries (US: 16; Netherlands: 8; England: 5; Australia: 4; Belgium: 4; Mexico: 2; Portugal: 2, Across Europe: 1; Austria: 1; South Korea: 1; Canada: 1) and present a mix of 31 experimental/controlled and 14 descriptive observational studies. The majority of studies were short term and small scale, with 27 out of 45 with an n<200. Study quality was generally low to moderate, with many of the experimental studies lacking clear details on blinding, allocation concealment, randomisation and withdrawals, to gain higher scores in the quality assessment model used (see Appendix 12.8 for the quality assessment summary). Declarations of funding source for each study is presented in

Appendix 12.9, and show that where declared (in 29/45 studies), funding derived from either foundation trusts, government, research councils or universities. No explicit commercial funding was declared.

The studies represent data from an array of different study designs, examining a range of different marketing approaches on a number of target products (which include various sweets/candies, chocolate, sugar sweetened drinks, biscuits/cookies and sugared cereal), using a variety of subjective and objective outcome measures. The vast majority of included studies reported outcomes related to preference, purchase or consumption. These behaviours therefore provide the focus of the narrative comparisons presented in this review, as it was not possible to conduct any meta-analyses given the vast heterogeneity between studies.

Figure 2: Marketing literature flow diagram



7.1.4 Findings from included publications

The main characteristics and results from each included study are shown in the data tables presented in Appendix 12.10, but have been summarised here by publication type and marketing category.

7.1.4.1 Primary research evidence: Place

One high quality observational study in England [25] demonstrates, using objective sales data, that end of aisle displays (after controlling for the effect price, price promotion and number of display location) can have a highly significant (P<0.001) impact by increasing sales volumes for carbonated drinks by just over 50%.

7.1.4.2 Primary research evidence: Product

A total of 17 studies were identified that examined the impact of 'product'. These have been sub-categorised to size, packaging and branding.

7.1.4.2.1 Product size

Six very heterogeneous, small (n=17 to 165) studies examined the impact of product size. Four moderate quality experimental studies (two in children from the US [26] and Belgium [27], and two in adults from Belgium [28, 29] and the Netherlands [30]), showed that reducing product size can significantly reduce objectively measured consumption of high sugar snack foods (chocolate pudding, cookies/biscuits, sweets/candies and chocolate respectively). A further small, moderate quality experimental Belgian study examined the impact of container and portion size [31], providing evidence to suggest that larger containers can stimulate food intake over and above their impact on portion size. The final lower quality observational study [32], found that self-reported sugar sweetened drink (SSD)/soda consumption decreased when larger size options were restricted, however consumption and sales increased when the smaller sizes were offered in bundles.

7.1.4.2.2 Packaging

Six relatively small (n=40 to 343), heterogeneous, low to moderate quality studies, all in children (four from the US [33-36], one study from the Netherlands [37] and Belgium [38]), examined the effect of character branding/spokes characters (popular familiar or bespoke unfamiliar cartoon characters) on product packaging. All five experimental studies were conducted in young children aged 2 to 7 years, and demonstrated, using a range of objective and subjective measures, that character branding/spokes characters can influence children's food choices. Four of these studies found that character branding/spokes characters increased intake of, or preference for high sugar foods [33, 35, 36, 38], while the Dutch study did not report a significant impact on the high sugar

sweets/candy when compared to the healthy fruit snack [37]. The Wansink study [34] was the only observational study, conducted in an older age group (aged 8 to 11 years). This relatively low quality study found that a popular character branding/spokes character did not significantly influence biscuit/cookie consumption.

7.1.4.2 Branding

Five extremely diverse, small scale studies (n=27 to 126), of low to moderate quality, examined the impact of branding. Findings from a relatively low quality observational study carried out in England [39], found that brand category dominance determined self-reported purchasing preference of high sugar products, in the 126 adults surveyed. The remaining two experimental and two observational studies examined the impact of branding in children, using a range of objective measures. A very small laboratory study in US adolescents [40], found that the Coke product advertisements activated gustatory and visual brain regions, and Coke logo advertisements heightened posterior cingulate responsivity in habitual Coke consumers. Another recent US observational study [41] identified a significant relationship between young (aged 3 to 6 years) children's awareness of branded foods high in fat, sugar and salt, and their BMI, with children's knowledge of HFSS shown be a significant predictor of BMI. This finding complemented another US study in 4 to 6 year olds which identified a relationship between branded food intake and BMI, with overweight children consuming more calories (from a food selection which included a high sugar option) in the branded condition. However the second study in this paper in slightly older children was unable to demonstrate the same relationship to weight status) [42]. The remaining Canadian study [43] in a similar age group, examined children's taste preference for food with different branding, however the results were not significant for the high sugar food examined.

7.1.4.3 Primary research evidence: Price

A total of three adult studies examined the impact of price from the US, Netherlands and England. Two high quality observational studies (one small study from the US in low income African American women [44] and one very large nationally representative study from England [45]) objectively measured the impact of discounting on food purchases. The US study demonstrated that discounting had a significant impact on sales of high sugar products. This finding was reflected in the UK study which reported a significantly higher sales uplift for discounted less healthy food (which included high sugar foods such as chocolate and sugar confectionery, but was by no means exclusively high sugar foods). One moderate quality field experiment from the Netherlands [46], examined the impact of removing price incentives for large portion food and soft drink items within a fast food scenario. While the proportional pricing had no significant impact on self-reported soft drink selection within the general population, it was effective in reducing the size of soft drink selection in the overweight participants.

7.1.4.2 Primary research evidence: Promotion

By far the most evidence was collated under the 'promotion' marketing approach, which included 24 studies from the US, Netherlands, Australia, Austria, England, Mexico, Portugal and Europe. These have been examined by the following subcategories: screen advertising, advergames, print advertising and sponsorship.

- Screen advertising

Thirteen studies examined the impact of screen advertising. Five relatively small (n=51 to 351), moderate quality experimental studies from the US [47, 48], Netherlands [49, 50] and Australia [51], examined the impact of screen advertising in adults. Although there is considerable variability in the study design, all the studies demonstrated, to varying degrees, that TV advertising can influence high sugar or unhealthy foods (which contained a high sugar component) consumption. Additionally, several of the studies indicate that impact may differ by population subgroup, for example Zimmerman [48] observed that advertising effect was more pronounced in the lower SES group and was only significant in the high cognitive load task arm (in this arm participants were given a cognitively demanding task). Anschutz [49] also observed a significant sex effect, where women consumed more when exposed to the food vs. the neutral commercials (whereas the opposite was shown in men). A transportability effect was observed by Wonderlich-Tierney [47], whereby consumption in response to food adverts was higher in the participants with high transportability *('the tendency to become engrossed in what one is viewing')*. Kemps also observed an increased self-reported desire to eat in response to food adverts but only for overweight and obese individuals.

Two studies (one moderate quality large Australian web based study [52] in parents and children aged 8 to 14 years) and one low quality small Mexican observational study in parents and children 8 months to 5 years [53]) examined the impact of screen advertising. Both studies demonstrated a relationship between advertising and self-reported consumption of high sugar foods or a range of food items which contained a high sugar option, such as confectionery and biscuits.

Six studies examined the impact of screen advertising in children only. Three moderate quality observational studies from South Korea [54], Europe [55] and the US [56] (in children aged 6-15 years), with vast differences in sample size, report inconclusive findings. However, one very large relatively good quality observational study from the US, by Andreyeva [57] did report a relationship whereby, an exposure to 100 incremental TV ads for sugar sweetened carbonated drinks during 2002 to 2004 was associated with a 9.4% increase in 3rd and 5th grade children's soft drink consumption in 2004. The remaining two moderate quality experimental studies were both conducted in English children. Dovey [58] reported a significant relationship between objectively measured calorie intake (which came predominantly from high sugar foods) in response to unhealthy food TV advertising with children aged 6 years. Boyland [59] demonstrated an increase in the selection of branded and non-branded fat and carbohydrate rich

foods following exposure to food advertising compared to toy advertising. However the type of advertising exposure did not have a significant impact on relative sweet preference in the participating children aged 6 to 13 years. Although most of these studies also examined the effect of BMI, no significant interaction was reported.

- *Advergames*

Seven relatively small (n=92 to 276), moderate quality experimental studies in predominantly pre-teen children (aged 5 to 12 years), and one pre-experimental study by Hernandez [60] which included teenagers, examined the impact of advergames (the integration of advertisements into computer games) in the Netherlands [61-63], US [64, 65], Austria [66], Mexico [60] and Portugal [67]. Five of these studies examined the impact of advergames on intake of high sugar foods such as candy/chocolate [61-63] and cereal [65, 66], while three [60, 64, 67] examined the impact on 'unhealthy food' selection which included a high sugar component. Although there was considerable variation in the studies in terms of study design, and target product, all studies demonstrated (using mostly objective measures of intake or selection), that playing advergames with an unhealthy food cue significantly increased consumption of, or preference for high sugar products, or a selection of unhealthy foods which contained a high sugar option.

- *Print advertising*

Two Australian studies (large observational study [68] and one feasibility randomised controlled trial (RCT) [69]) have examined the impact of print advertising in children. The high quality, large web survey by Scully [68], examined exposure to food and drink marketing in print/transport/school, alongside digital and TV adverts in adolescents (12-17 years), and found that self-reported consumption of sweet snacks was associated with exposure to print, transport and school food marketing. The authors of this study also reported an increase in self-reported consumption of high sugar snacks and drinks in participants who watched excess commercial TV (> 2h/day), and an increase in sugary drink consumption in participants exposed to high volumes (based on monthly exposure to email or text message promotion: coded 0 to 2, 0 being low and 2 high) of digital marketing. This study, therefore, provides further evidence on the impact of TV advertising in adolescents, and the only included study to provide data on the possible impact of email and text message exposure, however it should be noted that the measured advertising exposure (irrespective of delivery media) was to 'a food or drink product', not specifically a high sugar food or drink. The small moderate quality feasibility RCT by Jones [69], also found an association between exposure to print marketing and objectively measured unhealthy snack choice, which included a range of high sugar foods, in children aged 5 to 12 years, with children in the experimental condition more likely to select the advertised foods.

- *Sponsorship*

One relatively small, low-moderate quality Portuguese study, by Simões [70], examined the impact of event sponsorship on children's (aged 7 to 11 years) purchase intentions

for soft drinks. The findings from this study demonstrate that brand sponsorship could be an effective mechanism for increasing purchase intentions for high sugar products in young children. In this experiment two drinks were assessed: a familiar and less familiar high sugar drink brand, and while purchase intention increased for both drinks following the sponsorship intervention, the finding was only significant for the less familiar brand.

KEY FINDINGS

PLACE:

- one high quality observational study in England provided good evidence to suggest that end of aisle displays can significantly increase purchases of carbonated soft drinks

PRODUCT:

- evidence from five experimental studies demonstrated that use of character branding/spokes characters may increase preference for, or intake of high sugar foods in young children aged 2 to 7 years
- five generally small studies examined the impact of branding, suggesting an influence on high sugar food/drink preference. Although the evidence was difficult to summarise collectively due to the vast diversity in study designs, there was some evidence (although inconsistent) to suggest that branding may be more influential in children with a higher body weight
- evidence from the six heterogeneous studies examining the impact of size, aligns with findings from a recent Cochrane review examining the impact of food size (portion, packet or individual unit size), suggesting that reducing the size of high sugar food and drink products may help to reduce sugar consumption in both adults and children

PRICE:

- two high quality observational studies (one from the UK) demonstrated that price discounting can have a significant impact on increasing sales of less healthy, high sugar products

PROMOTION:

- the evidence base on the impact of screen advertising is highly heterogeneous in study design, with a reliance on relatively small, variable quality experimental or observational studies. However, the findings suggest that screen advertising has the potential to influence intake of high sugar products, or unhealthy foods to varying degrees in adults, with some evidence to suggest this impact may vary by population subgroup (eg individual psychology, gender and BMI)

- findings from the studies examining the impact of screen advertising in children were mixed, with two studies in parents and children demonstrating an association between advertising and self-reported consumption of high sugar foods, and two studies (one from the UK) demonstrating an association between high sugar product consumption and TV advertising, while the remaining four studies were inconclusive
- all eight studies examining the role of advergames, demonstrated an impact in increasing consumption of, or preference for unhealthy or high sugar foods, under experimental conditions
- one observational and one experimental study provided evidence to illustrate the role of traditional print marketing approaches in promoting high sugar product choices in children. The observational study also demonstrated that alongside print/transport/school marketing, exposure to TV and digital marketing of food and drink also influenced self-reported food choices
- sponsorship was identified as an emerging marketing strategy however, only one small, relatively low quality Portuguese study examined the influence of event sponsorship on children's purchase intention for a high sugar drink

7.2 Stakeholder interview results

A total of 37 key stakeholders with knowledge of marketing strategies were invited to participate, five declined, four were unable to arrange a date before the deadline (13/2/15), nine did not respond, one provided a written response to the questions, and 20 completed interviews. Of these participants, interviews were conducted with six academics, seven non-governmental organisations (NGOs), five private sector/industry (one of which provided a written response) and two international experts.

7.2.1 Themes identified from the interviews

The stakeholder interviews revealed a variety of themes relating to the impact of various marketing strategies on behaviour or health. Academics and international stakeholders generally believed that marketing influences consumer choices and can increase consumption, however, they argued it was difficult to systematically measure impact due to the wide range and reach of marketing strategies. NGOs also believed marketing strategies impact on consumption and influence choice, however, they tended to talk in terms of advocacy, in helping reduce children's exposure to unhealthy food advertising for example, as opposed to focusing too heavily on developing an evidence base. Industry stakeholders argued that marketing was primarily aimed at sales growth or growing market share, and that particular strategies will certainly increase purchases as well as potentially increasing consumption.

While saturation (the point at which no new data emerges) of themes was not reached given the breath of the topic area and small number of interviews conducted, the key emerging themes have been extracted and described (see Appendix 12.11). These

themes focused on marketing impact, marketing and advertising spend, the 4Ps: Promotions, Price, Product, Place, emerging or overlooked strategies online, sponsorship, the effectiveness of advertising restrictions and problems measuring impact. The stakeholder interviews did not reveal any significant new or emerging marketing strategies, or provide any new unpublished data or intelligence relating to marketing impact.

7.3 Triangulation results

The key findings from the literature review and stakeholder interviews have been triangulated to assess convergence. The results are presented in Table 2 and highlight convergence on a number of themes which suggest: 1) Marketing is likely to impact on purchases and consumption, with a predominant focus on children; 2) Promotion activities such as advergaming and sponsorship can influence purchase and intake of high sugar products; 3) Price promotions such as discounting can increase purchases of high sugar food; 4) Food packaging, such as the use of character branding/spokes characters, can influence children's food choices; 5) Product placements such as end of aisle displays can promote high sugar purchases.

Inter-method discrepancies were found when themes from the interviews covered areas which were either not identified in the literature review or fell outside of the scope of the review. These themes, that were only identified in the stakeholder interviews, addressed the difficulties in scientifically assessing the impact of a single marketing strategy in isolation, given the proliferation and breath of the marketing environment; the impact of regulation in terms of reducing marketing exposure; the 'premiumisation' of unhealthy products and the impact of reformulation.

Table 2: Triangulation results: convergence coding matrix for themes emerging from qualitative interviews and literature review

Emerging themes from interviews and review	Findings from qualitative study	Findings from literature review	Convergence assessment
Impact	Stakeholders believed marketing does have an impact on purchases and consumption. Discussions mainly focused on the effect of marketing to children.	Evidence is predominately focused on children, but suggests marketing can impact food preference and consumption.	**Convergence**
Promotions	Promotion activities such as online social media, advergames, sponsorship were described as influential on purchase and consumption	Promotion activities, such as advergames, and sponsorship, were described as influential on intake of high sugar foods.	**Convergence**

Price	Price promotion strategies, such as buy one get one free or discounts, were described as an effective strategy at increasing purchases with potential increases in consumption.	Evidence suggests discounting of high sugar and less healthy foods can increase purchases.	**Convergence**
Product: Packaging	Stakeholders argued packaging influenced children's food choices.	Evidence of character branding could be successful in promoting unhealthy foods.	**Convergence**
Reformulation	Products should be reformulated to contain less sugar.	Literature review did not identify any studies on reformulation that met the inclusion criteria.	**Inter-method discrepancy**
'Premiumisation'	Manufacturers may 'premiumise' products if they are deemed unhealthy.	Literature review did not identify any studies that described the impact of 'premiumisation'.	**Inter-method discrepancy**
Place	Checkouts and end of aisles in stores were described as influencing purchases and these areas sometimes contained confectionery items.	One high quality study provided evidence to suggest end of aisle displays can promote purchases of sugar products.	**Convergence**
Advertising restrictions	Mixed views, some stakeholders believed these current regulation is effective but this conflicted with previous themes. Mainly discussed in terms of changes in exposure to advertising.	Literature review did not include studies which assessed exposure to advertising.	**Inter-method discrepancy**
Problems measuring impact	Prolific and wide ranging marketing strategies make it difficult to scientifically assess the impact of one strategy in isolation.	Literature review did not include studies which provided commentary on methodological problems assessing marketing strategies, although this theme was discussed within the included systematic reviews.	**Inter-method discrepancy**

8. DISCUSSION

The aim of this review was to examine the most recent evidence gathered from 2010, on the health and behavioural impacts of marketing strategies targeted at high sugar food and non-alcoholic drink, through a pragmatic mixed method approach.

However, despite searching for studies with health and attitudinal outcomes, the majority of studies focused on impact in terms of preference, purchase or consumption, this is likely to be accountable to: 1) the short term nature of the majority of the studies in this field, which make the examination of longer terms health related outcomes impractical; 2) the exclusion of qualitative study designs which are more likely to have provided attitudinal data.

Nevertheless, the resulting evidence demonstrates that overall marketing is likely to impact on purchasing and consumption of high sugar products, although the evidence is predominantly focused on children. This result is perhaps unsurprising in that: a) the multimillion pound investment in unhealthy food and drink marketing in the UK alone [12, 71] provides evidence in itself that marketing can influence sales; and b) given adults are generally responsible for their own decisions providing they are adequately informed, it would seem sensible to focus research on children given they lack an adult's understanding of the persuasive intent of marketing approaches [72].

However, as marketing is thought to play an important role in the development of unhealthy weight status [14], improving the current evidence base examining the effectiveness of marketing in adults would be extremely useful.

8.1 What food and drink did the review evaluate?

Evidence presented in this review had a broad product focus and while the literature was originally screened to extract those studies which specifically examined high sugar food, a steering group decision was made to also include, where identified in the shortlist, those studies that reported on an unhealthy food or range of foods providing they included or referred to a high sugar component. This decision was to reflect sugar consumption within a free living environment where it is often consumed as one component of a food product or meal selection. The range of products targeted in the primary research studies was diverse but focused on sugar sweetened soft drinks, confectionery (chocolates and sweets), biscuits and sugary cereals. Very few studies provided a nutritional analysis of the target products assessed.

8.2 What strategies were evaluated and what impact did they have?

The marketing strategies evaluated in this report were categorised using the 4P's marketing framework, (examining price, promotion, product and place); and while it is acknowledged that some strategies may overlap categorises, it was felt this

classification system provided the most useful method of aggregating and contextualising such a large evidence base. The literature review identified a wide range of marketing approaches, however unfortunately the stakeholder interviews failed to achieve the aim of identifying significant new emerging marketing strategies or unpublished data, otherwise inaccessible to the reviewers, on the impact of existing approaches as anticipated. This perhaps reflects the commercial and academic sensitivities of sharing emerging, unpublished, or pay to view intelligence. Given overall, the stakeholder interviews provided a compilation of personal opinion and reference to the existing evidence base, it is not surprising that there were a number of convergent emerging themes when triangulated with the literature review.

8.2.1 Promotion

By far the most evidence was collated under the category ‘promotion’, providing evidence to suggest that promotion can impact on high sugar food preferences, purchases and consumption, with a predominant focus on children. These findings provide continued support for the outcome of the earlier 2003 FSA review [9] and later update [73] which also report that promotion can affect children’s preference for, and consumption of, unhealthy food. The majority of the promotional evidence identified in this review examined TV advertising and advergaming. Only two studies (both from Australia) examined the impact of print advertising, and both reported an influence on high sugar snack selection. The observational study assessed print marketing alongside transport and school marketing and compared it to the impact of exposure to excess commercial TV and digital marketing of food and drink products. This provided further evidence to demonstrate a link between sugar consumption and TV advertising, and the only data in this review to demonstrate a link between food and drink advertising exposure through email and texts and self-reported sugary drink consumption. The small number of studies focusing on print advertising perhaps reflects the reducing market share in this sector [7], and therefore the number of more recent studies that would have met the limitations applied within this review.

8.2.1.1 TV advertising

In this review screen advertising was the largest promotion subcategory, providing a range of experimental and observational evidence in adults and children, to demonstrate the potential to influence high sugar or unhealthy food or drink preference or intake. However the impact of screen advertising in adults varied across studies, with some evidence to suggest disparity by population subgroup. These findings align with a recent systematic review [74], which was unable to conclusively demonstrate whether or not food advertising (which was predominantly screen advertising) affected food related behaviour in adults, but did report inconsistent effects in subgroups. Although the findings in children were also variable, they do align with the 2003 FSA review [5] and later update [73], which identified TV as the predominant and potentially influential marketing channel for children.

The impact of screen advertising could be explained by earlier experimental work that demonstrated the power of TV food advertising in priming eating behaviours in both adults and children [75], and are an important consideration given: 1) the continued (although reducing) market dominance of TV advertising [13]; and 2) the ecological evidence demonstrating a link between children's TV advertising and risk of overweight [76]. In 2007 Ofcom introduced tighter regulation of television advertising to children (see Table 1), with the aim of reducing children's exposure to HFSS products [16]. However an independent evaluation of these new regulations [77] demonstrated that although the restrictions were well adhered to, they failed to change the relative exposure of children to high fat sugar salt food. This is likely to result from children viewing programmes such as soaps and entertainment shows which are not classified as children's programmes, and therefore fall outside of the tightest regulatory controls. Thus suggesting that stronger regulations are required to reduce children's exposure to unhealthy, high sugar food advertising.

8.2.1.2 Digital marketing

While TV promotion remains an important advertising medium, it's popularity is reducing, with the rapid growth in the field of digital marketing [13], [78]. However, this evidence review was only able to identify one observational study examining the impact of email and text exposure (described above), with the remaining studies examining the impact of advergaming, an approach which was shown to significantly influence preference for, or intake of, high sugar products in school age children. This finding complements a previous report examining the advergaming evidence base [79], which documents the wide use of this approach for HFSS products and highlights the subconscious, persuasive nature of advergames, stating that children as old as 15 years do not recognise the advertising intent of advergames. The studies identified in this review consisted of eight small scale, moderate quality, short-term experimental studies from outside of the UK. Given the highly immersive and engaging nature of these games, longer term studies within free living environments are required to understand the extent to which this approach contributes to longer term health consequences.

The lack of research evidence in the digital marketing field was also reported by Clarke [17]. This report highlights the need to understand the behavioural and health impacts of these new marketing strategies, given they pose a number of new concerns, which include: 1) the highly immersive, interactive nature of many of these new approaches may well enhance resulting impact; 2) online marketing materials may be embedded or inextricable from other content, making it difficult to recognise commercial intent; 3) viral or social marketing strategies may be misleading if the original source is not clear; 4) issues of privacy and data gathering, and how aware users are, in particular children, of these strategies that allow marketers to optimise approaches using this unique insight into individual consumer habits and preferences. These new marketing strategies may therefore be misleading in a completely different way to more traditional approaches, a

consideration which is particularly important in terms of regulation. In the UK guidance is provided by BCAP (for Broadcast) and CAP (for non-broadcast media) (see Table 1), however it is possible that some of these newer strategies may exploit existing loopholes in this guidance. Further research in this area is urgently required.

8.2.1.3 Sponsorship

Food and drink sponsorship has received much media attention and was identified as an emerging marketing technique (particularly in children) [13]. While evidence on character branding, which can be considered a form of sponsorship, has been relatively well researched, only one small relatively low quality Portuguese study examined the impact of event sponsorship on self-reported high sugar drink consumption. Despite several high profile sugar related sponsorship deals within the UK (eg Cadbury's, McDonald's and Coca Cola sponsorship of the 2012 Olympic games [80], Coca Cola's sponsorship of the London Eye [81], and Mars chocolate sponsorship of the Football Association [82]), there remains a lack of UK based evidence on the health and behavioural impact of these approaches.

KEY CONSIDERATIONS:

- promotion can impact on high sugar food preference, purchase and consumption, although the current evidence base is strongly focused on children
- TV advertising remains a popular food marketing channel and evidence suggests it has potential to influence preference for, or intake of high sugar products, however independent research suggests that current UK broadcast regulations are not strong enough to reduce children's exposure to unhealthy food advertising
- digital marketing is a rapidly growing and potentially influential area given the highly immersive and interactive nature of these approaches. However this remains an under researched field, with current research evidence focusing on the advergaming, which was found to significantly influence intake of, or preference for high sugar foods in school age children
- understanding the behavioural and health impacts of new digital marketing strategies is essential, given they differ in approach to most traditional marketing strategies, therefore introducing a number of new concerns which may require additional regulatory consideration
- sponsorship is recognised as an emerging marketing strategy, yet despite many high profile sponsorship deals in the UK, there remains a lack of evidence as to diet and the health related impacts of this approach

8.2.2 Price

Two high quality observational studies (including one large English study) found that price discounting can promote the sales of less healthy, high sugar food. These findings are supported by the wider marketing literature [83], however more research is required to understand the broader implications of discounting, to assess the full impact on dietary intake. For example are discounted purchases simply stock piled or does consumption also increase; does the purchasing of discounted less healthy products impact on the purchase of healthier products; and are these responses to discounting equivalent across demographically different populations? Some of these questions have been addressed in an analysis of the Kantar Worldpanel British purchasing data (see Annexe 4).

KEY CONSIDERATION:

- price discounting can promote the sales of less healthy high sugar food, however more research is required to understand the broader implications of discounting on overall dietary intake and differences in demographically distinct population subgroups

8.2.3 Product

8.2.3.1 Branding

Branding is a broad subcategory that has been placed under product but also spans promotion, with popular character or celebrity branding often classified as a form of sponsorship. Given that product branding uses a number of different approaches to build strong emotional consumer attachments to a product or logo, it is perhaps unsurprising that five extremely diverse studies were identified in this review. The findings however, do complement previous research, suggesting that branding can influence food choices and may be more influential in children with a higher BMI [84]. Although the findings underpinning the relationship with weight status were inconsistent in this evidence review, this area certainly warrants further research, particularly as product branding enters more targeted digital markets, and given the high prevalence of obesity in England.

8.2.3.2 Packaging: using character branding

The impact of using character branding to promote high sugar products to children was assessed in six predominantly short term, small international studies. While the evidence base would benefit from longer term, higher quality studies, it does provide evidence to suggest that the use of character branding or spokes characters can increase preference for, and consumption of, high sugar foods in younger pre-teenage

children, a finding that also complements the outcomes of two recent systematic reviews [85, 86]. It is therefore perhaps not surprising that WHO [8] recommend that licensed characters, brand mascots and celebrities are not used to market food and drink to children. Additionally in the UK, BCAP [87] and CAP [88] stipulate that both broadcast and non-broadcast marketing communications use licenced characters and celebrities with due sense of responsibility, and they may not be used to advertise to preschool or primary school children. However, the BCAP regulation only applies to HFSS products and neither BCAP or CAP regulations apply to equity brand characters (ie characters that have been created by the product advertiser and have no separate identity outside of the brand). It is also important to note that the regulations only apply to products that directly target pre-teenage children, therefore allowing the advertisement of HFSS products with wider appeal. The impact of this was illustrated in a recent study by Boyland [89], who demonstrated that celebrity endorsement of a popular crisps brand had a significant impact on consumption in 181, 8-11 year old UK children.

8.2.3.3 Product size

A sample of small heterogeneous, mostly experimental studies from outside the UK demonstrated that reducing product size can reduce consumption of high sugar snacks. These findings align with evidence from a Cochrane review (protocol [90], results unpublished), which identified moderate quality evidence to suggest that exposure to larger sizes increased food consumption (SMD: 0.38, 95% CI: 0.29 to 0.46), which if sustained, would be equivalent to an average daily energy increase of between 144 and 228kcal. However, one observational study, did provide evidence to suggest that while size reduction may reduce soft drink consumption, the benefits of size reduction strategies may be counteracted by multi buy bundles. While this study was not of high quality and was reliant upon self-reported consumption, it does raise an important consideration for future size reduction studies to carefully observe the impact of possible counter marketing strategies or consumer compensatory behaviours.

KEY CONSIDERATIONS:

- character branding can be an effective strategy to market high sugar foods to young children, and while current regulations prevent the use of the approach to young school children, they may still be susceptible to products branded for wider appeal
- evidence from this review, supported by findings from a recent Cochrane review suggest that reducing product size can reduce consumption, however it is important to consider the impact of counter marketing strategies or compensatory behaviours in relation to any size reduction strategy

8.2.4 Place

One high quality English observational study, demonstrated that end of aisle displays can promote carbonated soft drink purchases. The stakeholder interviews also discussed other placements such as check out displays, illustrating the broader scope of this marketing strategy which also includes a host of category and aisle management techniques. However, despite growing grocery industry interest in this area of marketing, very little research evidence exists, with respect to resulting health and behavioural impacts [91].

KEY CONSIDERATION:

- supermarket placement can influence the sales of high sugar drinks. However, evidence on consequential health and behavioural impacts of this strategy are limited

8.3 Limitations of this review

The majority of the included evidence derives from a heterogeneous mix of small scale, short term international experimental studies of generally moderate quality. This raises several possible considerations. Firstly, most experimental studies lacked adequate information on randomisation, blinding, withdrawals (particularly whether the study population was actually the population originally randomised) and power, thus raising some concern as to the methodological rigor and robustness of the findings.

As most evidence came from outside of the UK (only five studies were based in England), it raises question as to how transferable the findings are to a UK setting. While some of the inconclusive findings from the observational studies may highlight the difficulties of examining the impact of a single marketing exposure within a complex obesogenic environment, the short term experimental nature of much of the evidence may not provide findings that are representative of exposure within free living environments. As such the level of impact within free living environments may be different to the experimental setting. Indeed it is possible that this wider marketing environment may also impact on the effect sizes observed, even in an experimental setting, given most adults and children will be influenced to some degree by the accumulated effect of embedded marketing exposures acquired during daily living. In addition to consideration of varying environmental mediators, the impact of individual demographic and biological characteristics are also an important consideration.

However, while some included studies in identified biological or demographic differences, findings were mixed and not all studies examined these differences. It is nevertheless an important consideration for any further marketing research, as it remains an important question when addressing potential health inequalities. Given the

broad scope and resulting search strategy used in this review, it is perhaps unsurprising that the resulting evidence base is quite heterogeneous. However, given the relative consistency in findings in that majority of marketing approaches appear to be having the expected effects on preference and/or consumption of high sugar products, the heterogeneity may be interpreted as a strength, ie the direction of effect is generally the same irrespective of approach or study design. This is particularly important given the small sample sizes, as evidence from different approaches are showing similar relationships therefore suggesting that the evidence is real and less likely to be an artefact of unreliable statistics resulting from small samples.

The vast majority of the included studies measured impact in relation to preference, purchase and consumption outcomes, rather than health or attitudes. This limitation may occur as a result of the short term nature of the studies in this field which preclude the measurement of longer term health impacts, in addition to the exclusion of qualitative studies from this review which are likely to provide the richest source of attitudinal data. In terms of the range of marketing strategies evaluated, the most obvious gap is the lack of available evidence on new and emerging digital and social marketing strategies. This area is particularly important given that recent reports from Europe [13] and the US [78], document the rapid growth in this market. The Bollars report [13] highlights a number of emerging marketing strategies used to target food and drink to children, which were not identified in this review, these include: Online placement: eg advertising through social media, search engines, news, music, video and blog sites; Product placement: eg product placement in popular TV shows, PC games, and Apps; Viral marketing: eg word of mouth, often stimulated through payment or reward and seen increasingly through social media; Direct marketing: eg promotional emails, text and phone call, promotion and sampling in schools; Product promotion: eg packaging vouchers with discounts of popular entertainment, packing codes for online entertainment; Integrated marketing: eg linking film, toy and food products to new media; and Interactive and user-generated marketing: eg two way marketing and market shaping activities such as customer voting for favourite flavours, you tube video competitions.

There is also a need to examine the wider impact of marketing strategies on purchasing and compensatory behaviours, for example, it is important to understand how different marketing strategies influence brand switching, overall consumption of the target food (both target and non-target brands), and whether compensatory behaviours such as increased physical activity or reduced intake of other food/drink takes place.
It is important to consider the findings presented in this review within the following methodological limitations:

1) This review specifically focused on evidence from high sugar foods, however much of the research evidence is focused on broader food groups such as unhealthy foods, energy dense or HFSS products, and these studies will not have been identified for inclusion unless they provided a specific reference to a high sugar

component in the title and abstract. This may have limited the size and range of the evidence base assessed

2) Given the requirement to identify and examine a range of interventions and outcomes, in both adult and child populations, against potentially contrasting regulatory backgrounds a broader more flexible approach had to be applied to the review methodology (see research brief)
3) Due to time and resource restraints only one reviewer conducted the initial reference screening. Gold standard systematic review protocols such as Cochrane, recommend second reviewer screening to help reduce the likelihood of missing a relevant study and introducing selection bias
4) Time and resource constraints limited the number of stakeholder opinions that could be recorded, therefore saturation of themes was not reached
5) Restricting studies by English language and date (2010 onwards) will have limited the size of the evidence base reviewed. The language restriction could have limited possible learning from non-English speaking countries and the date restriction is likely to have had greatest impact on the inclusion of evidence from more traditional, longer standing marketing approaches such as print adverting

8.4 Research recommendations

The evidence presented in this report highlights a number of areas for future research consideration, (Box 1).

Box 1: Research recommendations

More high quality research carried out in the UK in both adult and child populations would be helpful in the following areas:

- the impact of new and emerging marketing approaches (social, digital, viral and integrated marketing, product placement, branding, and corporate sponsorship) targeting high sugar foods
- the impact on population sub groups and resulting impact on inequalities
- the long-term health impacts, and the effect of repeated exposures, compensatory and associated behaviours, within free living (non-experimental) environments

9. CONCLUSION

Findings from this review support findings from previous systematic reviews, to suggest that marketing is effective in influencing the purchase and consumption of high sugar foods.

Unsurprisingly much of the research evidence focuses on children, given they lack an adult's understanding of advertising intent, and are therefore considered more

vulnerable to the impact of marketing. While current evidence suggests that advertising, advergames, discounting, use of character branding, product size, and supermarket product placement can influence high sugar product selection or consumption, much of the research evidence is reliant on small scale, moderate quality experimental studies from outside of the UK.

Although TV remains a dominant marketing channel, there are also several emerging and new marketing strategies such as sponsorship integrated, digital and online marketing that require further research.

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Conflicts of interest: Kath Roberts is employed by PHE, Louisa Ells is employed by Teesside University but has an academic secondment to work for PHE two days/week, Victoria McGowan and Theodora Machaira are both employed by Teesside University and have been contracted to work on this project for PHE. None of the authors have any conflicts of interest to declare.

11. REFERENCES

1. Murray, C.J., et al., *Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010.* Lancet, 2012. **380**(9859): p. 2197-223.
2. Lloyd-Williams, F., et al. *Assessing public health nutrition policies using a novel framework across 30 european countries: Lessons for the USA?* 2014; Circulation. 129: **AP409**.
3. Jessop, E., *Health in the UK:could do even better?* The Lancet, 2013. **381**(9871): p. 970-972.
4. Health and Social Care Information Centre. *Health Survey for England 2013- Trend Tables*. 2014 21st March 2015]; Available from: http://www.hscic.gov.uk/catalogue/PUB16077.
5. Zhang, Q., et al. *Food Policy Approaches to Obesity Prevention: An International Perspective*. 2014; 2:[171-182].
6. Public Health England, *National Diet and Nutrition Survey: Results of Years 1-4 of the Rolling Programme (2008/09-2011/12) Executive Summary*. 2014: London.
7. Public Health England, *Sugar Reduction - Responding to the Challenge*. 2014: London. Online. Available from: https://www.gov.uk/government/publications/sugar-reduction-responding-to-the-challenge
8. World Health Organization, *WHO framework for implmenting the set of recommendations on the marketing of foods and non-alcoholic beverages to children*. 2010, World Health Organisation.
9. Hastings, G., et al., R*eview of research on the effects of food promotion to children*. 2003, University of Stirling. Online. Available at: http://tna.europarchive.org/20110116113217/http:/www.food.gov.uk/news/pressreleases/2003/sep/foodtochildren
10. Galbraith-Emami, S. and T. Lobstein. *The impact of initiatives to limit the advertising of food and beverage products to children: A systematic review*. 2013 Obesity Reviews; 12:[960-974].
11. Adams, J., et al. *Socioeconomic differences in exposure to television food advertisements in the UK: a cross-sectional study of advertisements broadcast in one television region*. 2012 Public Health Nutrition; 3:[487-494].
12. Nielsen Media Research, *Estimated Marketing Spend data extracted from Ad Dynamix*. 2014 (Jan-Oct), Nielsen Media Research.
13. Bollars, C., et al., *marketing of food high in fat, salt and sugar to children: update 2012-2013*. 2013, World Health Organization: Geneva.
14. Butland, B., et al., *Tackling obesities: future choices - project report*. 2007, Foresight: Government Office for Science. Online. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/287937/07-1184x-tackling-obesities-future-choices-report.pdf
15. Institute of Medicine, *Food marketing to children and youth: threat or opportunity?* 2005.
16. Ofcom, *Television advertising of food and drink products to children - final statement*, Ofcom, Editor. 2007: London.
17. Clarke, B. and S. S, *Literature review of research on online food and beverage marketing to children. Produced for the committee of dvertising practice (CAP)*. 2014.
18. Committee of Advertising Practice (CAP), *Online food and drink marketing to children: CAP's response to the 2014 literature review by Family Kids & Youth*. 2015, CAP: London.
19. Ellison, J., *Public Health England Remit Letter.* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/319708/PHE_remit_letter_pdf.pdf, 2014.
20. Moher, D., et al., *Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement.* PloS medicine, 2009. **6**(6): p. e1000097.
21. The Joanna Briggs Institute, *Joanna Briggs Institute Reviewers' Manual: 2011 edition*. 2011.
22. Creswell, J.W., *Qualitative Inquiry & Research Design: Choosing among five approches.* 2007: Sage Publications.
23. Tong, A., P. Sainsbury, and J. Craig, *Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups.* International Journal for Quality in Health Care , 2007: p. 349-357.
24. O'Cathain, A., E. Murphy, and J. Nicholl, *Three techniques for integrating data in mixed methods studies.* British Medical Journal (Clinical Research Ed.), 2010. **341**: p. C4587.
25. Nakamura, R., et al. *Sales impact of displaying alcoholic and non-alcoholic beverages in end-of-aisle locations: An observational study*. 2014. Social Science and Medicine. **108**; 68-73].
26. Looney, S.M. and H.A. Raynor. *Impact of Portion Size and Energy Density on Snack Intake in Preschool-Aged Children*. 2011. **111**;3:[414-418].

27. Marchiori, D., L. Waroquier, and O. Klein, *"Split them!" smaller item sizes of cookies lead to a decrease in energy intake in children.* Journal of nutrition education and behavior, 2012. **44**(3): p. 251-5.
28. Marchiori, D. *Smaller food item sizes of snack foods influence reduced portions and calorific intake in young adults*. 2011 Journal of the American Dietetic Association. **111**;5: 727-31.
29. Marchiori, D., L. Waroquier, and O. Klein, *Smaller food item sizes of snack foods influence reduced portions and caloric intake in young adults.* Journal of the American Dietetic Association, 2011. **111**(5): p. 727-31.
30. van Kleef, E., C. Kavvouris, and H.C.M. van Trijp. *The unit size effect of indulgent food: How eating smaller sized items signals impulsivity and makes consumers eat less*. 2014; Psychology & Health 29:9:[1081-1103]..
31. Marchiori, D., O. Corneille, and O. Klein. *Container size influences snack food intake independently of portion size*. 2012 Appetite 58; 3:[814-817].
32. Wilson, B.M., S. Stolarz-Fantino, and E. Fantino. *Regulating the Way to Obesity: Unintended Consequences of Limiting Sugary Drink Sizes*. 2013; PLoS One 4: e61081
33. Kotler, J.A., J.M. Schiffman, and K.G. Hanson. *The influence of media characters on children's food choices*. 2012 Journal of Health Communication 17.8:[886-898].
34. Wansink, B., D.R. Just, and C.R. Payne. *Can branding improve school lunches?* 2012. Arch Pediatr Adolesc Med. 166.10:[967-968].
35. Lapierre, M.A., S.E. Vaala, and D.L. Linebarger. *Influence of licensed spokescharacters and health cues on children's ratings of cereal taste*. 2011; Arch Pediatr Adolesc Med. 165;3:[229-234].
36. Roberto, C.A., et al., *Influence of licensed characters on children's taste and snack preferences.* Pediatrics, 2010. **126**(1): p. 88-93.
37. de Droog, S.M., P.M. Valkenburg, and M. Buijzen. *Using brand characters to promote young children's liking of and purchase requests for fruit*. 2011. J Health Commun 16:1:[79-89].
38. Smits, T. and H. Vandebosch, *Endorsing children's appetite for healthy foods: Celebrity versus non-celebrity spokes characters.* Communications, 2012. **37**(4): p. 371-397.
39. Laforet, S. *Brand names on packaging and their impact on purchase preference*. 2011 Journal of Consumer Behaviour 10;1:[18-30].
40. Burger, K.S. and E. Stice. *Neural responsivity during soft drink intake, anticipation, and advertisement exposure in habitually consuming youth*. 2014; Obesity (Silver Spring)22:2:[441-450].
41. Cornwell, T.B., A.R. McAlister, and N. Polmear-Swendris, *Children's knowledge of packaged and fast food brands and their BMI. Why the relationship matters for policy makers.* Appetite, 2014. **81**: p. 277-83.
42. Keller, K.L., et al. *The impact of food branding on children's eating behavior and obesity*. 2012 Physiol Behav 106.3:[379-386].
43. Elliott, C.D., R. Carruthers Den Hoed, and M.J. Conlon, *Food branding and young children's taste preferences: a reassessment.* Canadian Journal of Public Health. Revue Canadienne de Sante Publique, 2013. **104**(5): p. e364-8.
44. Phipps, E.J., et al., *Buying food on sale: a mixed methods study with shoppers at an urban supermarket, Philadelphia, Pennsylvania, 2010-2012.* Preventing Chronic Disease, 2014. **11**: p. E151.
45. Nakamura, R., et al., *Price promotions on healther compared with less healthy foods: a hierarchical regression analysis of the impact on sales and social patterning of responses to promotions in Great Britain.* American Journal of Clinical Nutrition, 2015 (In press). **In press**.
46. Vermeer, W.M., et al., *Value for money or making the healthy choice: the impact of proportional pricing on consumers' portion size choices.* European Journal of Public Health, 2010. **20**(1): p. 65-69.
47. Wonderlich-Tierney, A.L., et al., *Food-related advertisements and food intake among adult men and women.* Appetite, 2013. **71**: p. 57-62.
48. Zimmerman, F.J. *The effects of food advertising and cognitive load on food choices*. 2014 2014//.
49. Anschutz, D.J., et al. *Sex differences in young adults' snack food intake after food commercial exposure*. 2011 Appetite 56; 2:[255-260].
50. Koordeman, R., et al., *Exposure to soda commercials affects sugar-sweetened soda consumption in young women. An obeservational experimental study.* Appetite, 2010. **54**(619-622).
51. Kemps, E., M. Tiggemann, and S. Hollitt, *Exposure to television food advertising primes food-related cognitions and triggers motivation to eat.* Psychology & Health, 2014. **29**(10): p. 1192-205.
52. Pettigrew, S., et al., *The effects of television and Internet food advertising on parents and children.* Public Health Nutrition, 2013. **16**(12): p. 2205-12.
53. Diaz-Ramirez, G., et al. *Effect of the exposure to TV food advertisements on the consumption of foods by mothers and children*. 2013 J Pediatric Gastroenterol Nutr 56 1:[86-88]..

54. Lee, B., et al. *Effects of exposure to television advertising for energy-dense/nutrient-poor food on children's food intake and obesity in South Korea*. 2014 Appetite 81[305-311].
55. Reisch, L.A., et al. *Experimental evidence on the impact of food advertising on children's knowledge about and preferences for healthful food*. 2013
56. Velazquez, C.E. and K.E. Pasch. *Attention to food and beverage advertisements as measured by eye-tracking technology and the food preferences and choices of youth*. 2014.J Acad Nutr Diet. 114. 4:[578-582].
57. Andreyeva, T., I.R. Kelly, and J.L. Harris. *Exposure to food advertising on television: Associations with children's fast food and soft drink consumption and obesity*. 2011 National Bureau of Ecoomic Research. http://www.nber.org/papers/w16858
58. Dovey, T.M., et al. *Responsiveness to healthy television (TV) food advertisements/commercials is only evident in children under the age of seven with low food neophobia*. 2011 Appetite 56.2:[440-446].
59. Boyland, E.J., et al. *Food commercials increase preference for energy-dense foods, particularly in children who watch more television*. 2011 Pediatrics 128. 1:[e93-e100].
60. Hernandez, M.D. and S. Chapa. *Adolescents, advergames and snack foods: Effects of positive affect and experience on memory and choice*. 2010 Journal of Marketing Communications 16(1):1-2.
61. Folkvord, F., et al., *The effect of playing advergames that promote energy-dense snacks or fruit on actual food intake among children.* American Journal of Clinical Nutrition, 2013. **97**(2): p. 239-245.
62. Folkvord, F., et al. *Impulsivity, "advergames," and food intake*. 2014 Pediatrics 133(6):1007-12.
63. Folkvord, F., et al., *The role of attentional bias in the effect of food advertising on actual food intake amoung children.* Appetite, 2015. **84**: p. 251-258.
64. Harris, J.L., et al. *Us food company branded advergames on the internet: Children's exposure and effects on snack consumption*.2012 Journal of CHildren and Media 6(1):51-68.
65. Rifon, N.J., et al. *Age dependent effects of food advergame brand integration and interactivity*. International Journal of Advertising: The review of marketing communications 33(3):475-508.
66. Waiguny, M.K.L., M.R. Nelson, and R. Terlutter, *The relationship of persuasion knowledge, identification of commercial intent and persuasion outcomes in advergames - the role of media context and presence.* Journal of Consumer Policy, 2014. **37**: p. 257-277.
67. Dias, M. and L. Agante. *Can advergames boost children's healthier eating habits? A comparison between healthy and non-healthy food*. Journal of Consumer Behaviour 10(3):152-160.
68. Scully, M., et al., *Association between food marketing exposure and adolescents' food choices and eating behaviors.* Appetite, 2012. **58**(1): p. 1-5.
69. Jones, S.C. and L. Kervin. *An experimental study on the effects of exposure to magazine advertising on children's food choices*. 2011 Public Health Nutrition 14(8):1337-44.
70. Simoes, I. and L. Kervin, *The impact of event sponsorship on Portuguese children's brand image and purchase intentions.* International Journal of Advertising: The Review of Marketing Communications, 2014. **33**(3): p. 533-556.
71. Panjawani, C. and C. Haigh, *Soft drinks, hard sell: How soft drink companies target children and their parents*. 2011, Sustain: London, UK.
72. Rozendaal, E., M. Buijzen, and P. Valkenburg, *Comparing Children's and Adults' Cognitive Advertising Competences in the Netherlands.* Journal of Children and Media, 2010. **4**(1): p. 77-89.
73. Cairns, G., et al. *Systematic reviews of the evidence on the nature, extent and effects of food marketing to children. A retrospective summary*. 2013 Appetite 62:209-15.
74. Mills, S.D., L.M. Tanner, and J. Adams, *Systematic literature review of the effects of food and drink advertising on food and drink-related behaviour, attitudes and beliefs in adult populations.* Obesity Reviews, 2013. **14**(4): p. 303-14.
75. Harris, J.L., J.A. Bargh, and K.D. Brownell, *Priming effects of television food advertising on eating behavior.* Health Psychology, 2009. **28**(4): p. 404-413.
76. Lobstein, T. and S. Dibb, *Evidence of a possible link between obesogenic food advertising and child overweight.* Obesity Reviews, 2005. **6**(3): p. 203-208.
77. Adams, J. *Effect of restrictions on television food advertising to children on exposure to advertisements for 'less healthy' foods: Repeat cross-sectional study*. 2012 PLOSone DOI: 10.1371/journal.pone.003157878.
78. Powell, L.M., J.L. Harris, and T. Fox, *Food marketing expenditures aimed at youth: putting the numbers in context.* Am J Prev Med, 2013. **45**(4): p. 453-61.
79. Nairn, A. and H. Hang, *Advergames: "it's not an advert - it says play"*. 2012, Family and Parenting Institute: Bath, UK.
80. Clark, M. and R. Brownell, *The obesity games: Junk food sponsorship of the Olympic Games*. 2012, Sustain: London, UK.

81. Vaz, K., *COCA COLA SPONSORSHIP OF THE LONDON EYE*, in *Early Day Motion 723*. 2015: London, UK.
82. Football Association. *The FA and Mars renew partnership through to 2018*. 2015 15/4/15]; Available from: http://www.thefa.com/news/2013/dec/the-fa-and-mars-renew-just-play-partnership.
83. Neslin, S.A. and H.J. Van Heerde, *Promotion dynamics. Foundations and Trends in Marketing*. 4 ed. Vol. 3. 2008: Now publisher Inc, USA.
84. Forman, J., et al., *Food branding influences ad libitum intake differently in children depending on weight status. Results of a pilot study.* Appetite, 2009. **53**: p. 76-83.
85. Smit, T., et al., *The persuasiveness of child targeted endorsement strategies: A systematic review* in *Pre print publication provided by author*. in press.
86. Kraak, V. and M. Story, *Influence of food compaines brand mascots and entertainment compaines cartoon media characters on children's dit and health: a systematic review and research needs.* obesity reviews : an official journal of the International Association for the Study of Obesity, 2014.
87. BCAP, F*ood, food supplements and associated health or nutritional claims*. 2014, CAP: London, UK. p. Section 13.
88. CAP, F*ood, food supplements and associated health or nutritional claims*. 2014, CAP: London, UK. p. Section 15.
89. Boyland, E.J., et al. *Food choice and overconsumption: Effect of a premium sports celebrity endorser*. 2013 J Pediatr 163(2):339-43.
90. Hollands, G.J., et al., *Portion, package or tableware size for changing selection and consumption of food, alcohol and tobacco (Protocol).* Cochrane Database of Systematic Reviews 2014. **2014**(4): p. Art. No.: CD011045. DOI: 10.1002/14651858.CD011045. .
91. Glanz, K., M.D.M. Bader, and S. Iyer. *Retail grocery store marketing strategies and obesity: An integrative review*. 2012 Am J Prev Med 42(5):503-12.
92. van Kleef, E., C. Kavvouris, and H.C. van Trijp, *The unit size effect of indulgent food: how eating smaller sized items signals impulsivity and makes consumers eat less.* Psychology & Health, 2014. **29**(9): p. 1081-103.

12. APPENDICES

A12.1: PROJECT STEERING GROUP

Table 3: Steering group membership

Secretariat	Jayne Owens
Chief Knowledge Officer directorate, PHE	Kath Roberts (Chair) Dr Louisa Ells – joint role with Teesside University Dr Victoria McGowan – project research associate – Teesside University Clare Perkins (Deputy Chair) Tim Chadborn/Sarah Payne PHE (Behaviour Change Unit)
Health and Wellbeing directorate, PHE	Dr Alison Tedstone Dr Rachel Allen Victoria Targett
University of Cambridge	Professor Theresa Marteau
University of Stirling	Professor Gerard Hastings
University of Nottingham	Amanda Avery
World Obesity Federation	Professor Tim Lobstein
UK Health Forum	Modi Mwatsama
Representative from marketing industry	Andrew Knowles
Observers	
Department of Health	Jo Newstead Kevin Naylor Peter Dick
HM Treasury	Paul Randle/Sarah Maxwell

A12.2: KEY SEARCH TERMS: Used to inform the search string development

Table 4: search string development terms

Marketing terms		**High sugar food and non-alcoholic drinks terms**	**Consumer behaviour outcomes/ Health related outcomes**
Marketing Guerilla market* Advertising Advert* Promotion*# Point of sale* Aisle Product placement Spokes character* Animated character* Brand* Reward Discount* Bargain* Food packaging Food labelling Prize* Voucher* BOGOF Buy one get one free Motivation	Incentive* Corporate identity Corporate reputation Lobbying Digital market* In-game advert* Advergaming Mobile mark* Smart phone mark* Laptop mark* Viral mark* Social market* Social media Stakeholder market* Social responsibility Corporate affair* Cause marketing Sponsorship Nudge Offer*	Sugar* Sugar sweetened Added sugar Sugar containing food drink* or beverage* Soft drink* Fizzy Cake* Pastr* Biscuit* Pudding*Preserve* Jam* Marmalade* Confectionery Chocolate* Sweet* Energy drink* Sports drink* Yogurt/yoghurt Breakfast cereal* Juice* Squash* cordial* Snack* Candy Dessert* Soda Bake*	Obes* Over weight Weight gain Adipos* Tooth decay Dental caries or cary or carie Oral health Nutrition* Food preference Energy intake Calorific Calorie caloric Diet* Impact *Purchas** *Consumer behaviour** *Consumption* *Expenditure* *Buy** *Attitud** *Acceptab**

Terms in italics were removed by the information scientist to improve the specificity of the search

proximity searches were conducted to pair with other marketing terms in order to avoid too many health promotion papers

A12.3: EXAMPLE SEARCH STRING

NB: This string was run for Medline using OVID. Numbers include duplicates which were removed prior to entry into figure 1. String included specificity checks for gold standard reference papers.

30/10/2014 Ovid: Search Form

Wolters Kluwer Health | OvidSP

Logged in as KLS PHE at Public Health England

My Account | My PayPerView | Support & Training | Help | Logoff

Search Journals Multimedia My Workspace

Search History (120 searches) (close) View Saved

	# ▲	Searches	Results	Search Type	Actions
	1	sugar$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	102873	Advanced	Display Delete More
	2	(sugar adj sweetened).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	1054	Advanced	Display Delete More
	3	(added adj sugar$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	709	Advanced	Display Delete More
	4	(sugar adj3 contain$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	1594	Advanced	Display Delete More
	5	exp "food and beverages"/	1123389	Advanced	Display More
	6	drink.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	14412	Advanced	Display Delete More
	7	drinks.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	10535	Advanced	Display Delete More
	8	(soft adj drink$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	2508	Advanced	Display Delete More
	9	fizzy.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	167	Advanced	Display Delete More
	10	cake$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	3097	Advanced	Display Delete More
	11	pastr$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	468	Advanced	Display Delete More
	12	biscuit$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	871	Advanced	Display Delete More
	13	pudding$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	358	Advanced	Display Delete More
	14	dessert$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	901	Advanced	Display Delete More
	15	preserve$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	111639	Advanced	Display Delete More
	16	jam$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	22684	Advanced	Display Delete More
	17	marmalade$.mp. [mp=title, abstract, original title, name of	58	Advanced	

30/10/2014 Ovid: Search Form

		substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]			Display Delete More
	18	confection/ry.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	558	Advanced	Display Delete More
	19	chocolate$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	3506	Advanced	Display Delete More
	20	sweet$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	21768	Advanced	Display Delete More
	21	exp Energy Drinks/	205	Advanced	Display More
	22	(sport$ adj drink$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	398	Advanced	Display Delete More
	23	yog?urt$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	2784	Advanced	Display Delete More
	24	(breakfast adj cereal$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	681	Advanced	Display Delete More
	25	juice$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	40170	Advanced	Display Delete More
	26	cordial$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	218	Advanced	Display Delete More
	27	squash$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	1911	Advanced	Display Delete More
	28	snack$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	4727	Advanced	Display Delete More
	29	candy.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	1868	Advanced	Display Delete More
	30	soda.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	2969	Advanced	Display Delete More
	31	bake$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	8838	Advanced	Display Delete More
	32	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31	1393763	Advanced	Display More
	33	exp Marketing/	31193	Advanced	Display More
	34	market$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	89272	Advanced	Display Delete More
	35	(guer?illa adj market*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	11	Advanced	Display Delete More
	36	exp Advertising as Topic/	13405	Advanced	Display

					More ≫
☐	37	advert$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	20941	Advanced	Display Delete More ≫
☐	38	promotion$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	104291	Advanced	Display Delete More ≫
☐	39	(point adj3 sale$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	263	Advanced	Display Delete More ≫
☐	40	aisle$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	117	Advanced	Display Delete More ≫
☐	41	(product adj3 placement$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	71	Advanced	Display Delete More ≫
☐	42	spokes|character$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	4	Advanced	Display Delete More ≫
☐	43	(animated adj3 character$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	45	Advanced	Display Delete More ≫
☐	44	brand$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	13998	Advanced	Display Delete More ≫
☐	45	exp Reward/	25393	Advanced	Display More ≫
☐	46	discount$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	8339	Advanced	Display Delete More ≫
☐	47	bargain$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	3867	Advanced	Display Delete More ≫
☐	48	exp Food Packaging/	5175	Advanced	Display More ≫
☐	49	exp Food Labeling/	2470	Advanced	Display More ≫
☐	50	prize$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	20287	Advanced	Display Delete More ≫
☐	51	voucher$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	1134	Advanced	Display Delete More ≫
☐	52	(Buy adj one adj get adj one adj free).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	7	Advanced	Display Delete More ≫
☐	53	BOGOF.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	0	Advanced	Delete Save More ≫
☐	54	exp Motivation/	137069	Advanced	Display More ≫
☐	55	incentive$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	24635	Advanced	Display Delete More ≫
☐	56	(corporate adj identity).mp. [mp=title, abstract, original title,	29	Advanced	Display

		name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]			Delete More
	57	(corporate adj reputation).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	4	Advanced	Display Delete More
	58	exp Lobbying/	4126	Advanced	Display More
	59	(digital adj market$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	9	Advanced	Display Delete More
	60	(in?game adj advert$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	0	Advanced	Delete Save More
	61	advergaming.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	4	Advanced	Display Delete More
	62	(mobile adj mark$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	7	Advanced	Display Delete More
	63	(smart?phone adj mark$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	5	Advanced	Display Delete More
	64	(laptop adj mark$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	0	Advanced	Delete Save More
	65	(viral adj mark$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	810	Advanced	Display Delete More
	66	exp Social Marketing/	2180	Advanced	Display More
	67	exp Social Media/	1428	Advanced	Display More
	68	(stakeholder adj market$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	1	Advanced	Display Delete More
	69	exp Social Responsibility/	21701	Advanced	Display More
	70	(corporate adj affair$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	4	Advanced	Display Delete More
	71	(cause adj market$).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	5	Advanced	Display Delete More
	72	sponsorship$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	2105	Advanced	Display Delete More
	73	nudge$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	310	Advanced	Display Delete More
	74	offer$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	330902	Advanced	Display Delete More
	75	33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65 or 66 or 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74	756917	Advanced	Display Delete More

76	(A systematic review of the effectiveness of food taxes and subsidies).m_titl.	1	Advanced	Display	More
77	"Why fat taxes won't make us thin.".m_titl.	0	Advanced	Delete	More
78	The taxing of fizzy drinks.m_titl.	1	Advanced	Display	More
79	Yes, the government should tax soft drinks: findings from a citizens' jury in Australia.m_titl.	1	Advanced	Display	More
80	(Twenty percent tax on fizzy drinks could save lives and generate millions in revenue for health programmes in New Zealand).m_titl.	1	Advanced	Display	More
81	(Taxing soft drinks could reduce obesity and diabetes in India).m_titl.	1	Advanced	Display	More
82	"Lowering the price of good foods would be better than taxing bad foods in reducing obesity".m_titl.	1	Advanced	Display	More
83	(Mexico attempts to tackle obesity: the process, results, push backs and future challenges).m_titl.	1	Advanced	Display	More
84	(Trade policy and obesity prevention).m_titl.	1	Advanced	Display	More
85	When do fat taxes increase consumer welfare?.m_titl.	3	Advanced	Display	More
86	A typology of beverage taxation: multiple approaches for obesity prevention.m_titl.	1	Advanced	Display	More
87	Public health doctors call for a levy on sugar sweetened drinks.m_titl.	1	Advanced	Display	More
88	Building a strategy for obesity prevention one piece at a time.m_titl.	1	Advanced	Display	More
89	(Fast food prices, obesity, and the minimum wage).m_titl.	1	Advanced	Display	More
90	"Royal Colleges call for duty on sugary drinks in action plan against".m_titl.	1	Advanced	Display	More
91	"Implications of a sugar-sweetened beverage (SSB) tax when substitutions".m_titl.	1	Advanced	Display	More
92	When do fat taxes increase consumer welfare.m_titl.	3	Advanced	Display	More
93	Will soda restrictions help New York win the war on obesity.m_titl.	1	Advanced	Display	More
94	(Lack of correlation between antiobesity policy and obesity growth rates).m_titl.	1	Advanced	Display	More
95	(The impact of initiatives to limit the advertising of food and beverage).m_titl.	1	Advanced	Display	More
96	Priming effects of television food advertising on eating behavior.m_titl.	1	Advanced	Display	More
97	(Availability and marketing of food and beverages to children through sports).m_titl.	1	Advanced	Display	More
98	(Systematic literature review of the effects of food and drink advertising).m_titl.	1	Advanced	Display	More
99	76 or 77 or 78 or 79 or 80 or 81 or 82 or 83 or 84 or 85 or 86 or 87 or 88 or 89 or 90 or 91 or 92 or 93 or 94 or 95 or 96 or 97 or 98	23	Advanced	Display	
100	32 and 75	51109	Advanced	Display	
101	32 and 75 and 99	11	Advanced	Display	More
102	obes$.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	236878	Advanced	Display Delete	More
103	over?weight.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease	45108	Advanced	Display Delete	

		supplementary concept word, unique identifier]			More
	104	(weight adj3 gain).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	57967	Advanced	Display Delete More
	105	adipos*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	112002	Advanced	Display Delete More
	106	(tooth adj decay*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	805	Advanced	Display Delete More
	107	(dental adj (caries or cary or carie)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	41544	Advanced	Display Delete More
	108	exp Oral Health/	10710	Advanced	Display More
	109	nutrition.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	168851	Advanced	Display Delete More
	110	exp Food Preferences/	10687	Advanced	Display More
	111	exp Diet/	204697	Advanced	Display More
	112	exp Energy Intake/	37117	Advanced	Display More
	113	caloric.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	20500	Advanced	Display Delete More
	114	calorific.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	467	Advanced	Display Delete More
	115	calorie.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	11945	Advanced	Display Delete More
	116	impact.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	545444	Advanced	Display Delete More
	117	102 or 103 or 104 or 105 or 106 or 107 or 108 or 109 or 110 or 111 or 112 or 113 or 114 or 115 or 116	1232158	Advanced	Display More
	118	32 and 75 and 117	14900	Advanced	Display More
	119	limit 118 to (english language and yr="2009 -Current")	6365	Advanced	Display More
	120	**99 and 119**	**10**	**Advanced**	Display More

Remove Selected | Save Selected | Combine selections with: And Or | RSS

Save Search History

A12.4: GREY LITERATURE SEARCHES

The following resources will be searched for relevant reports, papers and policy documents:

- government websites for Hungary, New York, Island of St Helena, France, Brazil, Mexico, Norway, Denmark
- Regulatory and industry body websites: Ofcom, CAP, BACP, ASA, Action on Sugar, Sugar Nutrition UK, Food and Drink Federation, Advertising Standards Authority (ASA)
- Advertising Educational Foundation, Rudd Centre for Food Research and Obesity at Yale
- All party parliamentary Group on Food and Drink manufacturing group
- Food and drink companies identified from: http://www.britishcompanies.co.uk/food.htm
- The British Retail Consortium
- Market intelligence and marketing research companies: Kantar, Nielson Europe Insights, Mintel
- Bank of America, Credite Suisse and Merill Lynch
- World advertising research centre database
- http://mednar.com/mednar/
- www.scirus.com
- www.metacrawler.com
- www.disref.com.au/
- www.hon.ch/Medhunt/Medhunt.html
- www.medworld_stanford.edu/medbot/
- http://sumsearch.uthscsa.edu/cgi-bin/SUMSearch.exe/
- www.intute.ac.uk/healthandlifesciences/omnilost.html
- www.mdchoice.com/index.asp
- www.science.gov/
- http://www.eHealthcareBot.com/
- http://medworld.stanford.edu/medbot/
- http://omnimedicalsearch.com/
- http://www.ingentaconnect.com/
- http://www.medical-zone.com/
- World Health Organization, http://www.who.int/library/
- National Institute on Alcohol Abuse and Alcoholism, http://www.niaaa.nih.gov/
- Canadian Health Network, http://www.canadian-health-network.ca/customtools/homee.html
- Health Insite, http://www.healthinsite.gov.au/
- MedlinePlus, http://www.nlm.nih.gov/medlineplus
- McKinsey and Company, www.mckinsey.com
- National Guidelines Clearinghouse, http://www.guideline.gov/index.asp
- National Electronic Library for Health (UK), http://www.nelh.nhs.uk/

- Partners in Information Access for the Public Health Workforce, http://phpartners.org/guide.html
- http://worldwidescience.org/index.html
- British Sugar – education resources http://www.britishsugar.co.uk/Education-Resources.aspx
- Sugar Nutrition UK http://www.sugarnutrition.org.uk/science-and-research.aspx
- Sugar reduction: Responding to the challenge. 2014. https://www.gov.uk/government/publications/sugar-reduction-responding-to-the-challenge
- Action on Sugar http://www.actiononsugar.org/

A12.5: ONGOING STUDIES TABLE

Table 5: Ongoing studies

Title and author(s)	Journal	Year	Email sent?	Response?
Food marketing to children: Mapping the policy arena LOBSTEIN, T. & AIKENHEAD, A 'tlobstein@worldobesity.org'	International Association for the Study of Obesity	2010	Yes	Yes – provided two papers Hawkes and Lobstein (2010) Regulating the commercial promotion of food to children: A survey of actions worldwide Galbraith-Emami and Lobstein (2013) The impact of initiatives to limit the advertising of food and beverage products to children: a systematic review Both excluded from main review as no impact data. But, discussed in review background.
The ability of Danish children (11-12 year) to interpret marketing of unhealthy food on the internet: A pilot study SORENSEN, N. N., JESSEN-KLIXBU LL, E. A. D., TOTTENBORG, S. & ROBERTSON, A	International Association for the Study of Obesity	2010	Can't locate email 12/02	
Association of food-related TV advertisements with the consumption of high energy food by Mexican women. DIAZ-RAMIREZ, G., BACARDI-GASCON, M., SOUTO-GALLARDO, M. C. & JIMENEZ-CRUZ, A	Obesity Reviews	2011	Can't locate email 12/02	
Marketing gadgets and food: No evidence of association with caloric intake in an experimental ad libitum snacking occasion study. GREGORI, D., FRANCHIN, L. & DIBILDOX, J. 'dario.gregori@unipd.it'	The Journal of the Federation of American Societies for Experimental Biology	2011	yes	No response as of 03/03

Lower consumption of soft drinks among children with parents who limit TV-commercials. OLAFSDOTTIR, S., EIBEN, G., PRELL, H., HENSE, S., LISSNER, L., MARILD, S., REISCH, L. & BERG, C.	Annals of Nutrition and Metabolism	2011	Can't locate email 12/02	
What is the appetite for policy actions to address obesity? kim.raine@ualberta.ca 'candace.nykiforuk@ualberta.ca'. RAINE, K. D., NYKIFORUK, C. I., WILD, T. C., FLAMAN, L., VANSPRONSEN, E. & TRITHART, S.	Canadian Journal of Diabetes	2011	Yes	Paper provided - Understanding Key Influencers' Attitudes and Beliefs about Healthy Public Policy Change for Obesity Prevention – Excluded not sugar, no impact of fiscal strategy
Food requests in children. The role of habitual commercial television exposure, weight status and meal patterns. BOYLAND, E. J., HARROLD, J. A., KIRKHAM, T. C. & HALFORD, J. C. G.	http://www.liv.ac.uk/media/livacuk/food-security-network/documents/Food,requests,poster.pdf	2011	yes	Yes – no paper just poster.
SORENSEN N.N. A review of the evidence of marketing to children through new media channels		2010	Can't locate email	
The impact of food and beverage advertising to children: Evidence from a series of UK studies and implications for policy. BOYLAND, E. J. & HALFORD, J. C. G.	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed12&NEWS=N&AN=71619509	2014	yes	Oral presentation covering various published materials
GREGORI, D., VECCHIO, M. G., NIKOLAKIS, A. & GALASSO, F. 2014. Even a very intense advertising promoting fruit consumption is not enough to have children eating more fruit: Results from an experimental study in Italy	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed11&NEWS=N&AN=71498441	2014	yes	

ORTON, L., LLOYD-WILLIAMS, F., BROMLEY, H., HAWKES, C., TAYLOR-ROBINSON, D.,O'FLAHERTY, M., MOONAN, M., RAYNER, M. & CAPEWELL, S. 2013. Using the "4Ps" marketing approach to evaluate healthy food policies: A rapid scoping review		2013	n/a	Paper extracted under FISCAL – Used the 4Ps to evaluated food taxes
ORTON, L., MCGILL, R., ANWAR, E., TAYLOR-ROBINSON, D., BROMLEY, H., LLOYD-WILLIAMS, F., O'FLAHERTY, M., PETTICREW, M., WHITEHEAD, M. & CAPEWELL, S. 2013. Assessing the potential effect of healthy eating policy interventions on socioeconomic inequalities: Systematic review	http://ovidsp.tx.ovid.com/sp-3.14.0b/ovidweb.cgi?&S=NNHBFPKOHFDDIBEFNCLKGCJCOIGIAA00&Complete+Reference=S.sh.51%7c10%7c1	2013	yes	Out of office until 23/2
SWANSON, M., SZYBIAK, M. & MORLEY, B. 2013. LiveLighter Campaign: Development of the social marketing campaign and results	http://ovidsp.tx.ovid.com/sp-3.14.0b/ovidweb.cgi?&S=NNHBFPKOHFDDIBEFNCLKGCJCOIGIAA00&Complete+Reference=S.sh.54%7c3%7c1	2013	Yes	Paper under review
ALEXIOU, E. 2013. Food advertising and media: How do they influence dietary behavior?		2013	Can't locate email	
BAGATINI SAUD FERRO, E. L., FERNANDES BORASCHI, D., LUCA CORAL, M. & ELIAS GOULART DE ANDRADE MIRANDA, D. 2013. Media influence of television in nutritional status of Preschool		2013	Can't locate email	

DIXON, H., SCULLY, M., KELLY, B., CHAPMAN, K., DONOVAN, R. & WAKEFIELD, M. 2013. Fighting back: Can counter-advertising minimise the effects of unhealthy food marketing on pre-adolescent children?		2013	yes	Papers received 24/02 Can counter-advertising reduce pre-adolescent children's susceptibility to front-of-package promotions on unhealthy foods?: Experimental research Included Counter-Advertising May Reduce Parent's Susceptibility to Front-of-Package Promotions on Unhealthy Foods OUT – no relevant impact data.
FUENTES-GARCIA, A. & URIBE, R. 2013. Evaluating the behavioral effect of junk food advertising and brand placement on children		2013	yes	Paper in review – kindly provided a working draft but is unfortunately out as there is no direct reference to high sugar food.
GONZALEZ, C. 2013. Quality of carbohydrates of foods being advertised to children on chilean tv		2013	Can't locate email	
LEE, S. K., NAM, S. Y., YOON, B. J. & CHUNG, S. J. 2013. Impact of national policy banning TV advertisement on High-energy/Low-nutrient foods		2013	Yes	Paper in preparation
HERNANDEZ-TORRES, J. J., LOPEZ-ROBLES, J. C., MACIAS, V., IRIBAR, C., MIRANDA, M. T. & CAMPOY, C. 2013. A qualitative interview study on ethical aspects of marketing and food advertising for children. Evaluation of perceptions, attitudes and beliefs of parents		2013	Can't locate email	
KELLY, B., KING, L., BAUR, L., RAYNER, M., LOBSTEIN, T., MONTEIRO, C., MACMULLAN, J. & MOHAN, S. 2013. The informas framework for monitoring food marketing to children		2013	Yes	Paper received 23/02 Monitoring food and non-alcoholic beverage promotions to children OUT – no relevant impact data

A12.6: MARKETING INTERVIEWS: semi structured interview schedule

1. What is your knowledge and experience of food and non-alcoholic drink related marketing strategies?

2. What products have you been involved with, what marketing strategies have they used and what is their target audience?

3. [PROMPT: to tease out differences between the various different marketing approaches: 4Ps v Brand strategy; digital media; corporate affairs and identify the impact these have]

4. What impact do you think these strategies have had or may have in the future?

5. [PROMPT: for example impact on consumption, attitudes or health outcomes – both positive and negative?]

6. Do you know if these impacts have been evaluated and if so how is this impact evaluated?

7. In your opinion, what is the best marketing strategy to date? Why do you think it's successful?

8. In your opinion, what do you think has been the biggest marketing failure? Why do you think it failed so badly?

9. Do you know of any emerging examples of new marketing practices/trends in food and non-alcoholic drink promotion? If yes, what are they and why do you think they will be good and what impact do you think they're likely to have?

10. Do you know of any published or unpublished literature on marketing of foods and resultant behaviour and health outcomes?

A12.7: QUALITY ASSURANCE FOR INTERVIEWS

Table 6: Consolidated criteria for reporting qualitative research (COREQ)[6]

No	Item	Guide questions/description
Domain 1: Research team and reflexivity		
Personal Characteristics		
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group? **Victoria McGowan**
2.	Credentials	What were the researcher's credentials? *Eg PhD, MD* **Victoria McGowan PhD, MA, BSc**
3.	Occupation	What was their occupation at the time of the study? **Research Associate**
4.	Gender	Was the researcher male or female? **Female**
5.	Experience and training	What experience or training did the researcher have? **PhD with qualitative interviews** **MA Research Methods - qualitative**
Relationship with participants		
6.	Relationship established	Was a relationship established prior to study commencement? **None – aside from email correspondence to arrange interview date**
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? eg *personal goals, reasons for doing the research* **Research associate conducting interviews for project funded by Public Health England to assess the impact of fiscal and marketing strategies aimed at reducing sugar consumption**
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? eg *Bias, assumptions,*

[6] Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007;19(6):349-357.

No	Item	Guide questions/description
		reasons and interests in the research topic **None – no bias or conflicts of interests identified**
Domain 2: study design		
Theoretical framework		
9.	Methodological orientation and Theory	What methodological orientation was stated to underpin the study? *eg grounded theory, discourse analysis, ethnography, phenomenology, content analysis* **Narrative research – exploring individual's experience and knowledge of the impact of fiscal and/or marketing strategies on sugar consumption**
Participant selection		
10.	Sampling	How were participants selected? *eg purposive, convenience, consecutive, snowball* **Purposive – key stakeholders identified by experience/knowledge in fiscal and marketing strategies**
11.	Method of approach	How were participants approached? eg *face-to-face, telephone, mail, email* **Email**
12.	Sample size	How many participants were in the study? **Fiscal – 15 (plus 2 provided written evidence)** **Marketing – 20 (1 provided written evidence)**
13.	Non-participation	How many people refused to participate or dropped out? Reasons? **Fiscal – 5 declined due to lack of expertise; 3 were unable to arrange a suitable date.** **Marketing – 5 declined due to lack of expertise; 4 were unable to arrange a suitable date.**
Setting		
14.	Setting of data collection	Where was the data collected? eg *home, clinic, workplace* **Home or workplace via telephone.**
15.	Presence of non-participants	Was anyone else present besides the participants and researchers? **Researchers – no, interviews took place over the phone in an empty office.** **Participants – did not divulge whether they were alone during the telephone interview.**
16.	Description of sample	What are the important characteristics of the

No	Item	Guide questions/description
		sample? *eg demographic data, date* **The sample consisted of individuals with knowledge of fiscal or marketing strategies and included academics, industry, non-government organisations, international public health experts.**
Data collection		
17.	Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested? **Yes, a semi-structured interview was conducted with a list of questions relating to either fiscal or marketing strategies. Due to time constraints this was not pilot tested.**
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many? **Only 1 interview per participant was conducted.**
19.	Audio/visual recording	Did the research use audio or visual recording to collect the data? **Yes, audio recording equipment was used to collect the data.**
20.	Field notes	Were field notes made during and/or after the interview or focus group? **Yes, field notes were made during the interview where participants referred to points which were thought to be important and required follow up prior to transcription of the audio recordings ie Recommended literature or suggested other individuals with expertise in this area.**
21.	Duration	What was the duration of the interviews or focus group? **Between 15 minutes and 1 hour.**
22.	Data saturation	Was data saturation discussed? **Yes. The fiscal interviews almost reached saturation point as individuals tended to discuss similar points. Marketing was broader and therefore saturation was not reached.**
23.	Transcripts returned	Were transcripts returned to participants for comment and/or correction? **No, due to time constraints and data anonymity.**

No	Item	Guide questions/description
Domain 3: analysis and findingsz		
Data analysis		
24.	Number of data coders	How many data coders coded the data? **One researcher coded the data which was checked and independently reviewed by a second researcher.**
25.	Description of the coding tree	Did authors provide a description of the coding tree? **No, non-hierarchical coding was adopted.**
26.	Derivation of themes	Were themes identified in advance or derived from the data? **Themes became apparent during the interviews which were then identified in the data.**
27.	Software	What software, if applicable, was used to manage the data? **NVivo v10.**
28.	Participant checking	Did participants provide feedback on the findings? **No, due to time constraints and data anonymity.**
Reporting		
29.	Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? eg *participant number* **Yes, quotations were presented. No quotes were identified to protect anonymity.**
30.	Data and findings consistent	Was there consistency between the data presented and the findings? **Yes, presented data was reviewed and checked by a second researcher.**
31.	Clarity of major themes	Were major themes clearly presented in the findings? **Yes, major themes relating to the research questions were presented.**
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes? **No, themes which were not related to the research questions were not presented. The commissioners only requested data which were pertinent to the research brief.**

A12.8 QUALITY ASSURANCE SUMMARY TABLE

Table 7: quality assurance assessment summary tables

Green: yes, Red: no, Yellow: unclear; Clear (no fill) N/A

RCTs and pseudo-randomised trials assessments									
Study	Was the assignment to the treatment group truly random?	Were participants blinded to treatment allocation?	Was allocation to treatment groups concealed from the allocator?	Were the outcomes of people who withdrew described and inluded in the analysis?	Were those assessing outcomes blind to the treatment allocation?	Were the control and treatment groups comparable at entry?	Were groups treated identically other than for the named interventions?	Were outcomes measured in a reliable way?	Was appropriate statistical analysis used?
Van Kleef [30]									
Marchiori [29]									
Marchiori [31]									
Marchiori [27]									
Kotler [33]									
Smits [38]									
De Droog [37]									
La Pierre [35]									
Looney [26]									
Roberto [36]									
Keller [42]									
Elliot [43]									
Zimmerman [48]									
Kemps [51]									
Wonderlich-Tierney [47]									
Anschutz [49]									

Koordeman [50]									
Boyland [59]									
Dovey [58]									
Folkvord [63]									
Folkvord [62]									
Folkvord [61]									
Harris [64]									
Dias [67]									
Rifon [65]									
Jones [69]									
Vermeer [46]									

Comparable cohort studies:									
Study	Is sample representative of participants in the population as a whole?	Are the participants at a similar point in the course of their condition?	Has bias been minimised in relation to selection of cases and of controls?	Are confounding factors identified and strategies to deal with them stated?	Are outcomes assessed using objective criteria?	Was follow up carried out over a sufficient time period?	Were the outomes of people who withdrew described and inluded in the analysis?	Were outcomes measured in a reliable way?	Was appropriate statistical analysis used?
Burger [40]									
Pettigrew [52]									
Waiguny [66]									
Simões [70]									

Descriptive studies:									
Study	Was study based on a random or pseudo-ramdom sample?	Were the criteria for inclusion in the sample clearly defined?	Were confounding factors identified and strategies to deal with them stated?	Were outcomes assessed using objective criteria?	If comparisons are being made, was there sufficient descriptons of the groups?	Was follow up carried out over a sufficient time period?	Were the outcomes of people who withdreew described and included in the analysis?	Were outcomes measured in a reliable way?	Was appropriate statistical analysis used?
Nakamura [25]									
Wilson [32]									
Wansink [34]									
Laforet [39]									
Cornwell [41]									
Phipps [44]									
Nakamura [45]									
Velazquez [56]									
Lee [54]									
Reisch [55]									
Andreyeva [57]									
Diaz-Ramierz [53]									
Hernandez [60]									
Scully [68]									

A12.9: FUNDING DECLARATION TABLE

Table 8: Funding declaration table

Author (study ref)	Funding declaration
Andreyeva	This research was supported by grants from the Robert Wood Johnson Foundation and the Rudd Foundation.
Anschutz	This study was supported by a grant of the Behavioural Science Institute of the Radboud University Nijmegen.
Boyland	The authors have indicated they have no financial relationships relevant to this article to disclose.
Burger	Oregon Research Institute.
Cornwell	Financial support from the University of Michigan (OVPR grant) to the first author is gratefully acknowledged.
De droog	*Not provided*
Dias	*Not provided*
Diaz-Ramirez	*Not provided*
Dovey	*Not provided*
Elliot	This study was supported by the BMO Financial Endowment in Healthy Living, Alberta Children's Hospital Research Institute for Child and Maternal Health (ACHRI).
Folkvord (2014)	The Behavioural Science Institute, Radboud University Nijmegen funded this research.
Folkvord (2013)	This research was granted by the Behavioural Science Institute, Radboud University Nijmegen.
Folkvord (2015)	*Not provided but no conflicts declared*
Harris	This work was supported by grants from the Robert Wood Johnson Foundation and the Rudd Foundation.
Hernandez	*Not provided*
Jones	The present study was part of an ongoing research project funded by the Australian Research Council.
Keller	Funding for this study came from NIH grant K01DK068008 and a St. Luke's Roosevelt Hospital Pilot Award. Additional support came from the Obesity Research Center Grant (NIH grant 5P30DK026687-27).
Kemps	This research was supported under the Australian Research Council's Discovery Project funding scheme [project number DP0985729].
Koordeman	*Not provided*
Kotler	These studies were funded by a grant to the Sesame Workshop from the Dr. Robert C. Atkins Foundation.
Laforet	*Not provided*
Lapierre	No financial disclosures declared
Lee	*Not provided*
Looney	No financial disclosure declared

Marchiori (2012adult study)	This research was funded by the National Research Fund (Luxembourg)
Marchiori (2012 child study)	This article was supported by a grant (2007–2011) to the first author (DM) from the National Research Fund, Luxembourg.
Marchiori (2011)	This article was supported by a grant (AFR 07/052) from the “Ministère luxembourgeois de la Culture, de l’Enseignement Supérieur et de la Recherche’’ to the first author (D. Marchiori).
Nakamura (2014)	The study was funded by the Department of Health Policy Research Programme (Policy Research Unit in Behaviour and Health [PR-UN-0409-10109]).
Nakamura (2015)	Department of Health
Pettigrew	This research was supported under the Australian Research Council’s Linkage Projects funding scheme (project number LP0991615). Funding was also provided by Cancer Council New South Wales and Cancer Council South Australia.
Phipps	This research was supported by grants (nos. 70014 and 70889) from the Robert Wood Johnson Foundation to the African American Collaborative Obesity Research Network (AACORN).
Reisch	*Not provided*
Rifon	The project described was supported by Award Number R21HD061761 from the Eunice Kennedy Shriver National Institute Of Child Health & Human Development.
Roberto	The authors have indicated they have no financial relationships relevant to this article to disclose.
Scully	The National Secondary Students’ Diet and Activity Survey was jointly funded by state Cancer Councils through Cancer Council Australia, and by the National Heart Foundation of Australia.
Simões	*Not provided*
Smit	*Not provided*
Van kleef	*Not provided*
Velasquez	Funding for this study was provided by a Faculty Research Grant to K. E. Pasch through the University of Texas at Austin and eye-tracking equipment was provided by the Department of Kinesiology and Health Education at the University of Texas at Austin.
Vermeer	This work was supported by the Netherlands Organization for Health Research and Development (ZonMW) [6130-0033].
Waiguny	*Not provided*
Wansink	Financial disclosures: none reported
Wilson	The authors have no support or funding to report
Wonderlich-Tierney	*Not provided*
Zimmerman	*Not provided but no conflicts of interest declared.*

A12.10: MARKETING DATA SUMMARY TABLES

PRIMARY RESEARCH DATA (ordered by marketing approach)

Table 9: Data summary tables

Key:

COLOUR CODES: blue shading: adult studies; pink shading: child studies; purple shading: adult and child studies.

IMPACT CODES: +: intervention had a positive impact on reducing sugar; - intervention had a negative impact on reducing sugar; 0 intervention had no impact on reducing sugar.

NB Authors key findings provide extracts from the text, combined with reviewers summaries where required.

* This refers to the number of QA criteria met using the JBI criteria (each score is out of 9 but if a criteria is marked as not applicable it is deducted from the total).

** population details are provided only when available.

F=female; m=male; SES=socioeconomic-status

Italics: denote studies that report a high sugar food as part of the meal or range of products assessed but do not present separate outcomes for the high sugar foods ie the results reflect a meal or product range that may include, but is not exclusively high sugar (for example a study may assess impact on energy dense food intake by monitoring consumption of crisps and chocolate candy in an experimental condition, however they do not report separate results for the candy and crisps, instead they provide total energy intake from the test food, therefore while it is impossible to attribute the findings directly to the high sugar product as it may be that participants energy intake came solely from the crisps). These studies have been included to demonstrate the impact of sugar as part of a diet, as in free living conditions high sugar foods maybe consumed as part of a meal rather than in isolation. The authors acknowledge that these studies were identified from those papers that were screened for a high sugar impact, but where it was only apparent on full review that the impact of the high sugar food is not reported in isolation. It is therefore possible that other studies may include impact data on high fat, sugar, salt foods, but were not included following screening as the title and abstract did not suggest or refer to the high sugar component specifically.

PLACE

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact: +/-/0]
Nakamura (2014) England [25]	Observational (observation of sales data - no individual demographics)	Purchasing patterns (supermarket sales data). [O]	Examine the impact of displaying carbonated beverages in end of aisle locations.	Controlling for price, price promotion and number of display location, end of aisle display had a large impact on sales - increasing sales volumes for carbonated drinks by 51.7% ($p<0.001$), which is equivalent to an increase from 85.5-129.8L per week. Therefore restricting end of aisle displays for SSB could help encourage healthier in store purchases, without affecting availability or cost of products.	6/6 [-]

PRODUCT

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact: +/-/0]
SIZE / QUANTITY					
Van Kleef (2014), Netherlands [30, 92]	3x experimental between subject (laboratory) studies (study 1 n=118 f only, study 2 n=124, study 3 f,m n=165 f,m), adult students	Perceived impulsiveness, self-reported impulsiveness, portion size appropriateness, excess consumption and expected satiation [S&O]	Examine the impact of small vs one large unit size of chocolate (Mars bar)	Studies 1 and 2 demonstrate that when consuming similar amounts of chocolate, consumption of five small units is considered to be significantly more impulsive, excessive and less appropriate than consuming on large unit. The third study demonstrated that around 23% (~52kcal [$p<0.01$]) less chocolate is eaten when presented in small unit size vs a large unit size, an effect that is mediated by impulsivity.	4/8 [+]

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact: +/-/0]
Wilson (2013) US [32]	Observational behavioural simulation (paper based) (n=100), f,m adult students	Self-reported soda purchasing patterns [S]	Examine whether a sugary drink limit will be effective if larger-sized drinks were converted into bundles of smaller-sized drinks	Participants bought significantly (p<0.001) more ounces of soda from a bundle menu which offered 16oz, 2x16oz or 2x12oz than an unregulated menu offering 16, 24 and 32oz drinks. However significantly (p<0.001) less soft drinks were purchased from the regulated no bundle menu which just offered a 16oz soda. Total business revenue was also significantly (p=0.001) higher when bundles rather than only small-sized drinks were sold.	2/8 [-&+]
Marchiori (2011) Belgium [29]	Experimental between subject (laboratory) study (n=33) mainly f, healthy weight young adults	Food intake [O]	Examine the effect of altering the size of candies, of equal-size food portions, on short-term energy intake while snacking	Decreasing the item size of candies led to decreased gram weight intake (30.7+/-18.2 vs 16.3+/-20.3 p=0.04), resulting in an energy intake decrease of 60 kcal (109.04+/-64.5 vs 49.22+/-57.2 in the large vs small candy item size respectively). Thus suggesting that decreasing snack food item size without altering portion size, may help reduce kcal intake.	4/9 [+]
Marchiori (2012a) Belgium [31]	Experimental between subject (laboratory) study (n=88), f, m young adults	Food intake [O]	Examine the impact of container size on snack food (candy chocolate – M&M) consumption	Participants in the medium portion, small container condition consumed significantly less (30.4g) than those in the medium portion, large container condition (69.5g) p<0.005 and large portion size, large container condition (59.8g) p<0.02 (there was no significant difference between the latter two conditions). The larger container increased intake by 129% (199 kcal) despite holding portion size constant, while controlling for different confounding variables. This research suggests that larger containers stimulate food intake over and above their impact on portion size.	4/8 [-]
Marchiori	Experimental	Consumption	Examine the	Halving the item size of cookies significantly (p<0.05)	4/9

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact: +/-/0]
(2012b) Belgium [27]	between subject (school based) (n=77) aged 9.2yrs +/-2.5yrs, f, m	patterns and energy intake [O]	influence of altering the size of cookies (small vs large) on energy intake	decreased gram weight intake by 25%, corresponding to a reduction of 68kcal, an effect that was not moderated by appetite rating, subject and food characteristics.	[+]
Looney (2011) US [26]	Experimental cross over design (n=17) f,m, mixed ethnicity aged 3-4 years	Food intake [O]	Examine the impact of portion size on intake of a lower energy-dense and higher energy-dense Snacks (apple sauce vs chocolate pudding)	There was no significant main effect of energy density on snack intake, but the main effect of portion size on snack intake (small portion size 84.2+/-30.8 kcal, large portion size 99.0+/-52.5 kcal) was significant ($p<0.05$). Results indicate increased energy intake when snacks are offered in larger portion size, regardless of energy density.	4/9 [-]

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact: +/-/0]
PACKAGING					
Kotler (2012) US [33]	2x Experimental (laboratory) (n=343; 207*) 2-6 years mixed ethnicity from low-middle income *subset of previous cohort excluding under 3's and allergy	Healthy vs unhealthy food preference (experiment 1) [S] and choice (experiment 2) [O] (high sugar options: donut vs Cheerios & chocolate vs	Examine the role of media characters in influencing children's food choices	Children were more likely to indicate a preference for one food over another when one was associated with characters that they liked and with whom they were familiar. This effect was particularly strong when a sugary or salty snack branded by a favoured character was competing with a healthier option branded by an unknown character or no character. Alternatively, when children were asked to choose between a healthy food and a sugary or salty snack, branding of the healthy food with a favoured character did not significantly change	4/9 [-]

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact: +/-/0]
PACKAGING					
	sufferers	broccoli		appeal of that healthy snack. However, when foods within the same category (ie, 2 vegetables, 2 fruits, or 2 grains) were asked to compete against each other, character branding strongly influenced children's food choice.	
Wansink (2012) US [34]	Observational study (n=208), m, f, 8-11 years, ethnically and economically diverse	Product choice [O]	Examine the impact of stickers with a known an unknown character on consumption of healthy (apple) and unhealthy (cookie) foods	Children were more likely to choose an apple when the Elmo icon was on it than when there was no icon (pretest control) (t78=−1.65; P=.05). On the other hand, there was no effect of the Elmo icon on the cookie (t82=−1.18; P=.24). In addition, there was no effect of the unknown character icon on the apple choice compared with the pretest control (t98=−0.41; P=.68). This study suggests that the use of branding or appealing branded characters may benefit healthier foods more than indulgent, more highly processed foods.	3/9 [0]
Smits (2012) Belgium [38]	Experimental between subject school based study (n=57) 6-7years, f,m	Appetite, wished-for frequency of consumption and expected number of purchase requests for that product.[S]	Examine the effectiveness of spokes-characters, both 'celebrity' and 'non-celebrity', in promoting healthy (apples & grapes) versus non-healthy (cookies & chocolate) foods.	The results indicate that adding a spokes character increases the appetite, intended frequency of consumption and parent requests to both healthy and unhealthy food. However the effect of the celebrity spokes-character exceeds that of a similar (but unknown) gnome and unhealthy foods showed larger endorsement effects (M=.93, SD=.72) than healthy foods (M=.68, SD=.69), though both were significantly positive (p<0.0001).	3/9 [-]
De Droog	Experimental	Preference and	Examine the extent	Only when children were confronted with the healthy fruit	3/9

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact: +/-/0]
PACKAGING					
(2011) Netherlands [37]	between subject (n=216) f,m, aged 4-6 various socioeconomic and cultural background	purchase request intent [S]	to which familiar and unfamiliar characters are successful in creating product liking and purchase request intent or banana candy vs chopped fresh banana	snack without a character on the package did they give fruit a considerably lower liking score than candy (M=2.63, sd1.22 healthy vs M=3.44 sd1.01 unhealthy p<0.01) and a lower purchase request intent than the candy (M=1.29, sd0.45 healthy vs M=1.71, sd0.44 unhealthy p<0.05). When the healthy fruit snack had a character on the package (either familiar or unfamiliar – there was no significant difference between to the two) fruit was liked just as much as candy (familiar character: liking for healthy M=3.19, sd 1.04 vs unhealthy M=3.33, sd0.92; purchase request for healthy M=1.45, sd0.48 vs unhealthy M=1.56, sd0.47) and purchase request intent for fruit was similar to that of candy.	[0]
Lapierre (2011) US [35]	Between subject experimental (shopping centre setting) (n=80) 4-6 years, f,m	Taste & liking [S]	Examine whether licensed media spokes characters on food packing (sugary vs healthy cereal) and nutrition cues affect taste	Children who saw a popular media character on the box reported liking the cereal more (mean [SD], 4.70 [0.86]) than those who viewed a box with no character on it (4.16 [1.24]). Those who were told the cereal was named Healthy Bits liked the taste more (mean [SD], 4.65 [0.84]) than children who were told it was named Sugar Bits (4.22 [1.27]). Character presence was particularly influential on taste assessments for participants who were told the cereal was named Sugar Bits.	3/9 [-]
Roberto (2010) US [36]	Experimental (laboratory (n=40), 4-6 years old, f,m , mixed ethnicity	Taste preferences [S] and snack choice [O]	Examine how popular licensed cartoon characters appearing on food packaging affect young children's	Children significantly preferred the taste of foods that had popular cartoon characters on the packaging, compared with the same foods without characters. The majority of children selected the food sample with a licensed character on it for their snack, but the effects were	4/8 [-]

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact: +/-/0]
PACKAGING					
			taste and snack preferences (Graham crackers, gummy fruit snacks, and carrots)	weaker for carrots than for gummy fruit snacks and graham crackers. Graham cracker: taste preference w/o vs with character: 7.5%, vs 55% p<0.001, choice w/o vs with character: 12.5%, vs 87.5% p<0.001); Gummy candy: taste w/o vs with character: 10% vs 52.5% p<.001, choice w/o vs with character: 15% vs 85% p<0.001.	

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* /[impact: +/-/0]
BRANDING					
Laforet (2011) England [39]	Observational (high street survey) (n=126) adults	Self-reported Purchase preference [S]	Examine whether appearance of corporate, product and dual brand names (or a combination of brand names used together) on packaging (chocolates and cereals) influence consumer purchase preference.	Consumers consider well-known brand names over price and supermarket own labels, associated with low price in both chocolate and cereal products. However, brand type is not as important as brand category dominance in determining customer choice. This study's main aim is to examine the impact of the corporate, individual product brand, and dual brand names on customer purchase preference. The findings indicate that none of these approaches influences purchase behaviour per se, in fact, brand category dominance determines choice. A brand is best known in a product category will be selected over those that are not. Different brands or products seem to be preferred by British consumers under different categories.	3/7 [0]
Burger,	Controlled	Neural	Examine the neural	Advertisements highlighting the Coke product vs.	5/6

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* /[impact: +/-/0]
BRANDING					
(2014), US [40]	laboratory study (n=27) f,m, adolescents, mix of habitual and non habitual coke drinkers	response to carbonated soft drink (coke) intake, anticipated intake and advertisement exposure [O]	response to coke intake, anticipated intake and advertisement exposure as well as milkshake intake adolescents using a functional MRI	nonfood control advertisements, but not the Coke logo, activated gustatory and visual brain regions. Habitual Coke consumers vs. nonconsumers showed greater posterior cingulate responsivity to Coke logo ads, suggesting that the logo is a conditioned cue. Results indicate that soft drinks activate reward and gustatory regions, but are less potent in activating these regions than high-fat/sugar beverages, and imply that habitual soft drink intake promotes hyper-responsivity of regions encoding salience/attention toward brand specific cues and hyporesponsivity of inhibitory regions while anticipating intake.	[-]
Cornwell (2014), US [41]	*2x observational (laboratory) studies (n=69, 75), f, m, 3-6 years old, mixed ethnicity*	*Brand knowledge and its relation to BMI.[O]*	*Examine the impact of commercial tv exposure on brand awareness (McDonalds, Burger King, Coke & Pepsi, lucky charms and trix cereals) and BMI*	*Across the two studies, child knowledge of brands offering products high in sugar, salt and fat was shown to be a significant predictor of child BMI, even after controlling for their age and gender and when also considering the extent of their TV viewing.*	*4/6 [-]*
Keller (2012) US [42]	*2xExperimental studies study 1: (n=43) aged 4-6, study 2: (n=41) aged 7-9 both studies had f, m mixed ethnicity, ~ half were overweight*	*Food intake [O]*	*Study 1: to determine the presence of 6 familiar food brands (which oreo cookies as on option) compared to unbranded control Study 2: to*	*Findings for study 1: No difference in intake of branded and unbranded condition for all children, although the difference was significant (p≤0.05) when assessed by weight status, with overweight children consuming ~41 more kcal in the branded condition. Findings from study 2: there was a trend for all children, regardless of weight status, to eat more at the branded compared to the unbranded meal, with mean±standard deviation intakes of 793.0±302.9 kcals and 730.0±326.4*	*4/9 [-]*

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* /[impact: +/-/0]
BRANDING					
			determine the impact of placing this brand on a multi-item test-meal that included: turkey & cheese, ham & cheese, peanut butter & jelly sandwiches, pretzels, graham crackers, apple slices, carrot sticks, pudding, plain & chocolate milks.	*kcals, respectively. When test-meal foods were analysed individually, there were no significant differences in intake between conditions depending on whether the food was healthy (eg carrots, apples) or unhealthy (eg ham and cheese sandwich, and chocolate milk). There was a trend for OW children to eat more than non-OW children regardless of brand condition, with mean (SD) intakes of 843.7±314.1 kcals and 691.7±265.3 kcals, respectively (p=0.10). However, child weight status did not interact with brand condition (p=0.80).*	
Elliot (2013) Canada [43]	Experimental study (n=65) 3-5 years old, f,m, mixed ethnicity	Consumption patterns of fast food, cupcakes, milk and carrot sticks [O]	Examine the impact of food branding (plain, coloured, McDonalds, Starbucks) on children's taste preferences of fast food (which included cupcake & carrots)	Children significantly preferred the McDonalds wrapped fries and carrots versus the plain packed versions. Children also significantly preferred the taste of the carrots in the coloured non branded wrapping. The other results were not significant. No demographics or tv habits affected the results, only frequency of mcDonalds visits influenced the taste preference in the McDonalds vs plain package group. Preschoolers taste is therefore influenced by colourful package design, although no significant results were found for the high sugar food.	5/9 [0]

PRICE

Author (date), country	**Study type (size) & population****	**Outcomes measured: [O: objective; S: subjective]**	**Intervention and target product**	**Key finding**	**QA score* [impact: +/-/0]**
DISCOUNTING					
Phipps (2014) US [44]	Observational: longitudinal (n= 82) mainly low income African American women.	Food purchasing patterns via supermarket transactions [O]	To observe the impact of price discounting on food purchasing patterns	The transaction data indicated that shoppers in the sample sought out and took advantage of discounts. In analyses of 6,493 food purchase transactions over 65 weeks, the odds of buying foods on sale versus at full price were higher for grain-based snacks, sweet snacks, and sugar-sweetened beverages (odds ratios: 6.6, 5.9, and 2.6 respectively; all p<0.001) but not for savoury snacks.	*7/7 [-]*
Nakamura (2015) England [45]	*Observational: Secondary analysis of cross sectional survey (n=26,986 households) mixed SES & BMI, f, m*	*Purchasing patterns – tracked using barcode scanners and till receipts [O]*	*To examine the purchasing patterns of healthy and less healthy (which includes high sugar foods – defined using the FSA nutrient profiles) promotions.*	*There was no significant gap in the frequency of promotion by the healthiness of products neither within nor between categories. However, after we controlled for the reference price, price discount rate, and brand-specific effects, the sales uplift arising from price promotions was larger in less-healthy than healthier categories; a 1- SD point increase in the category mean NP score, implying the category becomes less healthy, was associated with an additional 7.7–percentage point increase in sales (from 27.3% to 35.0%; P < 0.01). The magnitude of the sales uplift from promotions was larger for higher–socioeconomic status (SES) groups than lower ones (34.6% for the high-SES group, 28.1% for the middle-SES group, and 23.1% for the low-SES group). Finally, there was no significant SES gap in the absolute volume of purchases of less healthy foods made on promotion.*	*7/7 [-]*

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact: +/-/0]
PROPORTIONAL PRICING					
Vermeer (2010) Netherlands [46]	Experimental (fast food restaurant survey, under different test conditions) (n=137), adults, mainly female, low income, mix BMI	Self-reported Fast food choice [S]	Examine the impact of proportional pricing (ie removing beneficial prices for large sizes) on people's portion size choices of high caloric food and drink items (soft drink and chicken size choices).	Overall 28.2% chose the reference size of soft drink. Neither main effects nor interaction effects for pricing were found on the likelihood to choose the reference size. With respect to the likelihood to choose the largest size a significant interaction effect of overweight status and pricing was found (p=0.06). Among normal weight participants pricing strategies had no effect on the likelihood to choose the largest size. However among overweight or obese participants proportional pricing reduced the likelihood to choose the largest size (OR=0.07, p=0.04 CI 0.01-0.83)	3/9 [0&+]

PROMOTION

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact : +/-/0]
SCREEN (TV/INTERNET) ADVERTISING					
Zimmerman (2014), US [48]	*2x2 experimental (laboratory) study (n=351), adults, f,m, mixed SES & ethnicity*	*Number of snack items chosen and total resulting calories [O]*	*Examine the impact of unhealthy food advertising (combined with a low or high cognitive task) on snack item selection (which included candy,*	*In all comparisons, more food was taken in the food-advertising arm than in the non-food advertising arm. For calories, most of the increase was among the unhealthy foods, with the largest percentage increases for soda and chips. For number of items, there were large increases in the unhealthy foods, again with proportionately large increases for soda and chips. Effects were more pronounced for the lower SES groups, and the effect of food advertising was only significant for the arm*	*5/8 [-]*

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact : +/-/0]
SCREEN (TV/INTERNET) ADVERTISING					
			coke, chocolate and crisps as unhealthy options)	*undertaking the high cognitive load task, not in those undertaking the low cognitive task.*	
Kemps (2014) Australia [51]	*2x experimental (laboratory studies) (n=160, f, mostly healthy weight; n=124, f, overweight) adults*	*Desire to eat [S]*	*Examine the impact of exposure to television food advertising (16 food ads which included chips, chocolate and yogurt) on access-ibility of food-related cognitions and motivation to eat.*	*Exposure to televised food advertisements led to the completion of word stems with more food- and eating-related words in both experiments. It also increased self-reported desire to eat, but only for overweight and obese individuals (Experiment 2). In both samples, there was a positive association between accessibility of food-related cognitions and reported desire to eat, following priming with television food advertisements.*	*3/9 [-]*
Wonderlich -Tierney (2013) US [47]	Experimental (laboratory) study (n=87), adults, f,m, mainly white, mixed BMI students	Consumption patterns [O]	Examine the impact of TV advertisements (for fast food, candy and soda) on food intake (cookies) according to sex and transportability (tendency to become engrossed in what one is viewing).	A significant interaction was found between ad condition and transportability ($F(2,69)=3.12, p=0.051, R^2=0.08$) such that those high in transportability ate more in the food than other advertisement conditions. A second interaction was found between sex and transportability ($F(2,69)=4.26, p=0.043, R^2=0.04$), with women high in transportability eating more food than women low in transportability irrespective of advertisement condition. No significant main effects of advertisement condition, sex, or transportability were found. Results suggest the importance of studying the impact of individual difference variables on the relationship between food-related advertising and food intake.	4/8 [-]

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact : +/-/0]
SCREEN (TV/INTERNET) ADVERTISING					
Anschutz (2011) Netherlands [49]	*Experimental (RCT) study (n=82), adults, f,m, healthy weight*	*Food intake, [O] satiation [S]*	*Examine the direct effects of exposure to food commercials on concurrent non-advertised snack food intake (M&Ms and crisps)*	*No significant differences were found between baseline conditions. Satiation explained a significant proportion of the variance in food intake and had a negative relation. Sex had a significant main effect on food intake in general men ate more than women. Furthermore the interaction between commercial condition and sex was significant. Women ate more when exposed to the food commercials than when exposed to the neutral commercials. Men, in contrast, ate more when exposed to the neutral commercials. BMI had no significant main effect on food intake.*	*5/9 [-]*
Koordeman (2010) Netherlands [50]	Experimental (between subject laboratory) (n=51) adults, female only, range of BMI	Soft drink consumption [O]	Examines the direct effects of TV commercials advertising soda on actual sugar sweetened soda consumption among young women.	There was a significant main effect of condition on the amount of soda consumed F(1,50)=5.20, p=0.027. The Cohens d effect size was medium: 0.31. The total model explained 37% of the variance in total soda intake. In the commercial condition participants consumed 1.29oz more soda than participants in the water commercial condition. Thus women consumed more sugar sweetened soda when exposed to a soda commercial when compared to a water commercial.	4/9 [-]
Velazquez (2014), US [56]	*Observational study (n=102) 8-15years old, f,m, mixed: SES,ethnicity & BMI*	*Eye-tracking records, Food and beverage preferences & choices [0]*	*Examine the impact of computer advertisement for 'unhealthy' foods (snack foods and SSBs).*	*The length of time and number of times participants looked at unhealthy food and beverage items within advertisements were each significantly associated with unhealthy food/ beverage preferences of youth ($p<0.05$). However associations were no longer significant after controlling for demographic characteristics.*	*5/8 [0]*
Lee (2014) South Korea [54]	Observational study (n=2419) aged 11-13 from 118 elementary	Self-reported height, weight, amount and time of tv	Determine the association between exposure of energy dense,	Increases in television exposure to advertising for, chocolates*, sweets*, cakes/doughnuts*, fruit flavoured juices, soft drinks, non alcoholic beverages, were associated with significant ($p<0.05$) increases in children's	5/8 [0]

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact : +/-/0]
SCREEN (TV/INTERNET) ADVERTISING					
	schools f,m, mixed BMI	watched, food preferences and food consumption frequency. [S]	nutrient poor food advertising in children and food intake, preference and obesity.	preferences (*and intake) for respective food categories, although this disappears after adjustment for amount of tv watched.	
Reisch (2013) European: Belgium, 60 (26.2%), Estonia, 25 (10.9%), Germany, 48 (21.0%), Italy, 47 (20.5%), and Spain [55]	*Observational study – cohort secondary data analysis (n=229) aged 6-9, f,m*	*Children's knowledge and preference of food, diet [S] and weight status [O]*	*Examine the impact of TV advertising on food preference (which included sugared cereals, coke, chocolate, cakes, ice lollies)*	*The results indicate that advertising has divergent effects on children's food knowledge and preferences and that food knowledge is unrelated to food preferences.*	*6/7 [0]*
Andreyeva (2011) US [57]	Observational (cohort) study (n= 9760) mixed SES & ethnicity, fifth grade	BMI and consumption patterns [O]	Estimate the relation between exposure to food advertising on television and children's food consumption and body weight	Higher consumption of soft drinks and fast food in children with increased exposure to TV advertising for carbonated soft drinks (CSD) and fast food was observed. An increase in TV exposure to sugar-sweetened CSD advertising by 10, 000 GRPs over the 3 year period (2002-2004) was associated with a 9.4% increase in children's consumption of soft drinks, significant at the 1% level. The elasticity of the mean value of regular CSD advertising (0.696) implies that a 100% increase in sugar-sweetened CSD advertising was	6/7 [-]

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact : +/-/0]
SCREEN (TV/INTERNET) ADVERTISING					
				associated with a 6.5% increase in children's consumption of soft drinks. The same increase in exposure to fast food advertising was associated with a smaller soft drink consumption rise of 1.6% significant at the 5% level. This positive effect reveals the complementary nature of soft drinks and fast food. When all 3 measures (CSDs, fast food and cereal) were included they were jointly significant. Fast food ads were significantly associated with BMI for overweight and obese children.	
Boyland (2011) England [59]	Experimental within subject (laboratory) (n= 281) aged 6 to 13	Food preference [S]	Determine whether levels of television viewing (as a proxy measure for habitual commercial exposure) affect children's food (which included high sugar food) preference responses to tv food adverts	After viewing food ads all children selected more branded and non branded fat and carbohydrate rich items from food preferences lists. However there was no main effect of commercial condition on relative sweet preference ($p=0.432$) nor any interaction with weight status ($p=0.504$) or television viewing level ($p=0.343$). However all children selected more sweet than savoury items after both the food and toy commercials ($p<0.001$). The food preferences of children with higher habitual levels of tv viewing were more affected by food commercials exposure than those of low tv viewers.	3/9 [0]
Dovey (2011) England [58]	Experimental (within participant) (n=66 children), f, m 6 years olds	TV advert recognition, BMI, Food neophobia, Food and food intake [O]	Examine the effects of advert type and food neophobia status on caloric intake by food item and total intake (test foods: low-fat savoury snack, low fat jelly sweet, high	For all children, total kcal intake was higher following the unhealthy food adverts (461.2 +/- 52.8) compared to both the healthy food adverts (410.8 +/-8.0 $p=0.005$) and toy adverts (400.3 +/-50.2 $p<0.001$). There was no significant difference found between the healthy food adverts and the toy adverts in terms of total kcals consumed ($p=0.21$). Weight status was found to have a non significant effect ($p=0.86$). Participants with high neophobia scores ate significantly more following the unhealthy food adverts	5/8 [-]

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact : +/-/0]
SCREEN (TV/INTERNET) ADVERTISING					
			fat sweet: chocolate, high fat savoury: crisps, fruit & and vegetables.	compared to following the toy adverts only, in contrast participants with low neophobia ate significantly more following the unhealthy food adverts compared to both the healthy food adverts and the toy adverts. There was significant main effect of food type observed when measured by kcal. Children overwhelmingly consumed more energy through chocolate (599.3) over all other food items offered (although jelly sweets were favoured second). Children with high neophobia scores ate more chocolate in both unhealthy (p=0.045) and healthy (p=0.036) advert conditions in comparison to toy adverts. In contrast, children with lower food neophobia scores ate more chocolate following the adverts for unhealthy foods compared to healthy foods only (p=0.003).	
Diaz-Ramirez (2013) Mexico [53]	Observational, interviews (N,=365) Mexican mothers and children (age 8mths to 5 yrs)	Self-reported food consumption [S]	Examine the association between products advertised and those consumed by mothers and children Unhealthy or healthy according to the UK traffic light and Mexican health bureau.	The foods advertised that were consumed more frequently by the mothers were seasonings (85%), carbonated drinks (79%), liquid milk (78%), sandwich bread (73%), and cookies (73%).The type of foods advertised on TV that were purchased the most by mothers and consumed by their children were sweetened fresh cheese (45%), juices (40%), cookies (30%), purees (27%), yogurt (27%), and sweetened cereals (22%). The foods that children consumed more frequently were cookies (89%), sweetened fresh cheese (84%), potato chips (79%), sweetened and carbonated drinks (70%), and flavouring powders for water (66%). There was a significant correlation between frequency of food ads and child (r=0.66,p0.0001) and mothers (r=0.73, p0.0001) consumption.	1/7 [-]

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact : +/-/0]
SCREEN (TV/INTERNET) ADVERTISING					
Pettigrew (2013) Australia [52]	*Controlled web based study Parents (n =1302) & children 8 to 14 years (n=1302), f,m, mix of age, SES, family structure*	*Parental and child desire for and perceived acceptable consumption frequency for advertised products.[S]*	*Examine the impact of television and Internet food advertising on four commonly advertised energy dense foods: fried chicken, popcorn, snack bar and confectionery*	*After a single exposure to each advertisement, parent respondents in the two exposure conditions had a significantly greater desire to consume the products and thought the product could be consumed more frequently than those in the control condition. Similar trends were observed among children, although the differences were statistically significant only for the frequency of food consumption in the Internet advertisement condition. Females and those from 2 parent families were more likely to have higher levels of desire for advertised foods. Levels of desire in parents were also generally stronger as BMI increased.*	*4/7 [-]*

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact : +/-/0]
ADVERGAMES					
Folkvord (2015), Netherlands [63]	Experimental study (factorial between subject design) (n=92) f,m 7-9 years	Calorie intake [O]	Examine the potential moderating role of attentional bias (ie gaze duration) in the effect of advergames promoting energy dense snacks (gummy, jelly sweets) on	Children playing the energy dense food advergame ate significantly more (m=178.0kcal sd99.5) than those in the non food game (m=132.9kcal, sd87.0). However this was only significant for the chocolate consumption ($p<0.05$), not the jelly candy. Children with a higher gaze duration for the food cues ate more of the advertised snack. Children with faster latency of initial fixation to the food cue ate more in total and ate more of the advertise snacks. The number of fixations on the food cues did not increase actual snack intake. This demonstrates that the extent to which a child's attention is directed to a food	4/9 [-]

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact : +/-/0]
ADVERGAMES					
			children's snack intake (gummy, jelly sweets & chocolate).	cue, increases the effect of the advertisement.	
Folkvord (2014), Netherlands [62]	Experimental study (laboratory) (n=261), 7-10 years old, mix of BMI	Calorie intake[O]	Examine the role of impulsivity in the effect of advergames that promote energy-dense snacks on children's snack intake (Cola bottles and chocolate candy)	Overall, playing an advergame containing food cues increased general caloric intake p<0.01. Furthermore, rewarding children to refrain from eating significantly decreased their caloric intake p<0.01. Finally, rewarding impulsive children to refrain from eating had no influence when they were playing an advergame promoting energy-dense snacks, whereas it did lead to reduced intake among low impulsive children and children who played non food advergames.	4/9 [-]
Folkvord (2013) Netherlands [61]	Experimental (laboratory) study (n=270) 8-9 years old, mostly healthy weight	Snack (energy dense: cola bottle, chocolate and fruit: apple & banana) consumption [O]	To examine the effect of advergames that promote energy-dense snacks or fruit on children's snack & fruit consumption.	The main finding was that playing an advergame containing food cues significantly increased general energy intake p<0.01, regardless of the advertised brand or product type (energy-dense snacks or fruit), and this activity particularly increased the intake of energy-dense snack foods: kcal intake from energy dense food in advergame for: energy dense snack: 170+/-107; fruit: 150+/-116; non food: 106+/-83; vs no advergame: 80+/-71	4/9 [-]
Harris (2012) US [64]	*Experimental (laboratory) study (n=149) 7-12 years old, m,f mainly white*	*Healthy (carrot, grape), moderately healthy (fruit snack, gold fish crackers) and*	*Examine the impact of exposure to advergames (fruit vs, oreo, poptart vs, non food) on snack food consumption*	*Playing the PopTarts and Oreos advergames increased children's consumption of unhealthy snack foods by 56% compared to playing the fruit games, and 16% more than playing the control games; totalling an additional 77 kcal and 25 kcal, respectively. In addition, children who played unhealthy advergames consumed one-third fewer*	*4/9 [-]*

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact : +/-/0]
ADVERGAMES					
		unhealthy (chips and cookies) snack food consumption [O]	*(healthy: fruit; moderately healthy: fruit snacks, goldfish crackers; unhealthy: crisps and cookies).*	*fruits and vegetables than children who played the control and healthy games.*	
Dias (2011) Portugal [67]	*Experimental (RCT) (n=231) 7-8 years old f,m, middle-class*	*Snack selection [O], Food liking, Nutritional knowledge [S]*	*Compare advergames food content effects on children's food choices, product liking and nutritional knowledge (test foods: healthy snacks (3 more wholesome and generally higher in nutrient value) and 3 unhealthy snacks (less wholesome and higher in glucose).*	*Advergames influenced snack selection - significant association between healthy game and healthy snack choice and unhealthy game and unhealthy snack choice ($p<0.000$). Advergames also influenced liking - mean preference for healthy products is higher (although non significant) for those children who played the healthy version of the game, whereas mean preference for less healthy products is significantly higher for those who played the less healthy version of the game. When examining liking of specific foods results confirmed no sig difference for healthy foods. However, there were significant differences between the children who played the different games in their liking of savoury non healthy foods however this was non-sig in the sweet unhealthy foods (cookies, lollipops and chocolate mousse). Children's nutritional knowledge was not influenced by the game they played.*	*4/9 [-]*
Hernandez (2010) Mexico [60]	*Descriptive pre post experiment (n=128) aged 10-15years, f,m.*	*Snack choice [O]*	*Examine factors affecting Mexican adolescents' brand recognition and choice of snack products (fruit*	*Among the participants, more than 65% selected snacks promoted on advergames over other snacks. The difference was statistically significant. A positive relationship between liking, enhanced memory and snack choice was found. The findings suggest that promotion of snack brands in*	*4/9 [-]*

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact : +/-/0]
ADVERGAMES					
			snacks, cheese crackers, and peanut butter cookies) contained in advergames.	*advergames has the potential to influence not only adolescents' memory but also choice.*	
Rifon (2014) US [65]	Experimental 3x2 post test between subject (n=276) aged 5-10yrs, f,m. mixed SES and ethnicity, representative of area	Purchase request [S]	Examined how food advergames exert their influence on children's attitudes and purchase requests for sugary cereals.	The findings of the experiment demonstrate the effects of brand integration and interactivity (playing versus watching) on childrens brand recall, attitudes, taste expectations, purchase requests and health perceptions for brands placed in a game. A significant interaction between brand integration and play/watch appeared for the cereal purchase request ($F(2,259) = 3.33 p=0.037$) but when game attitude was entered as a covariate the interaction disappeared and a main effect of play/watch remained $p=0.057$. The results offer evidence that younger children are responsive to advergames and warrant additional study in this domain.	3/9 [-]
Waiguny (2014) Austria [66]	Controlled trial 2 week follow up (n=149: 101 advergame: 48 control) aged 7-10 yrs, f,m	Pester intention/behaviour and preference for high sugar cereal [S]	Examine the impact of the nesquik advergame on the brands preference and pester behaviours	Children who played the advergame showed significantly higher degrees of preference, and pester intentions and reported pester behaviour compared with those children who did not play the game ($p<0.003$).	3/8 [-]

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact : +/-/0]
PRINT ADVERTISING					
Scully (2012) Australia [68]	Observational (cross sectional web survey) study (n=12,188) 12-17 year olds, f,m, mix BMI and SES.	Self-reported consumption of fast food, sugary drinks and sweet and salty snacks. [S]	Examine associations between food marketing exposure and adolescents' food choices and reported consumption of energy-dense and nutrient-poor (EDNP) foods	Results indicated greater exposure to commercial television, print/transport/school food marketing and digital food marketing were all independently associated with students' food choices. High commercial television viewers (>2 h/day) were more likely to report higher consumption of high sugars foods (adjORs ranged from 1.73 for sugary drinks to 1.91 for sweet snacks p<0.001). Exposure to two digital marketing sources resulted in reports of higher sugary drink consumption (adjOR 1.34, p<0.01). Exposure to 2 (adjOR 1.33 p<0.01) or 3 (adj OR 1.54, p<0.001)print/transport or school marketing sources resulted in an increase in reported sweet snacks choices.	5/7 [-]
Jones (2011) Australia [69]	*Experimental (feasibility RCT) (n=47) aged 5-12,f,m*	*Snack choice [O]*	*Examine the effects of exposure to magazine advertising on childrens' food choices (test foods: advertised lollipop, non advertised lollipop & healthy foods (sultanas, fruit and rice wheels).*	*Children in the experimental condition were more likely to choose advertised foods than those in the control group. Interestingly, the majority reported taste and healthiness as the most important factors in snack food choices; however, when faced with the actual food choice, they predominantly chose unhealthy foods (eighty-two unhealthy and only twelve healthy items were chosen).*	*4/9 [-]*

Author (date), country	Study type (size) & population**	Outcomes measured: [O: objective; S: subjective]	Intervention and target product	Key finding	QA score* [impact : +/-/0]
SPONSORSHIP					
Simoes (2014) Portugal [70]	controlled trial (n=334) aged 7-11 f,m	Purchase intention [S]	Examine the effects of sponsors brand image on purchase intentions	Findings suggest that sponsorship can influence children's image of the advertised brand and their purchasing intentions, especially in the case of non-familiar brands. Additionally, the research suggests that sponsorship can affect the purchasing intention for low-involvement [Fizzy drink] products, while brand image is more affected in the case of high-involvement products [sports shoes], contrary to our expectations. Purchase intention averages for Fanta experiment group 3.97, Fanta control 3.82 (not significant); Sunkist experiment 3.76, Sunkist control 3.25 (p=0.016).	2/7 [-]

A12.11: MARKETING INTERVIEWS: Detailed findings

A12.10.1.Marketing Impact

In general all stakeholders agreed that marketing has an impact, however, their views differed slightly on the resulting outcome. Here one stakeholder described how all marketing strategies are aimed at growth which may consequently drive sugar purchase or consumption.

> *"marketing strategies are ultimately about growth, either trying to stem declines or actually organic growth and therefore any marketing strategy that pertains to, aiming to drive sugar purchase or sugar consumption, so anyone, cereal, anyone in confectionery, anyone in biscuits, cakes, the list is endless and so on, I mean hundreds and thousands of marketing strategies will do that"*

Another argued that while consumption may be one outcome, advertising has a wide variety of roles.

> *"it can help new markets increase in size, can encourage consumers to switch within categories or between categories and by building brand fame and consideration it can create loyalty or sustain a premium price... among other things"*

However, few stakeholders described other outcomes beyond consumption, purchasing, and sales growth. Here one describes how research has shown that despite industry arguments, which describe marketing as competitive and influencing, switching between brands, the overall impact is an increase in consumption.

> *"the original* [name removed] *study... got beyond saying it's just about competition and trading one brand for another and it did come to the conclusion that there was a real increase as a result. The marketing did cause an increased consumption... it isn't that I doubt there is a marketing effect on consumption, we do know there are studies by* [name removed] *they were small group trials of the consumption where ads shown to kids have increased their consumption of, you know, whatever it is that's being advertised compared with stuff that isn't advertised... so there is an effect in laboratory studies on immediate consumption which I think is helpful to show"*

This argument is furthered by another stakeholder who discusses marketing specifically in relation to sugary foods.

> *"I've never looked at the literature and broken it down according to sugar or non-sugar but obviously there's work out there on snack foods and soft drinks, which obviously contain sugar... the evidence base has grown in the last 2 years in terms of looking at things like end of aisle displays or health claims on sugary foods and there's quite, it's not huge literature but... so yes, would say without question that marketing can have an influence on the intake of sugary foods"*

An interesting point was raise by this stakeholder who argued that there is the potential for specific products to drive consumption of others and the impact of switching from one co-consumption product to another may theoretically have greater nutritional benefits.

> *"sometimes I think we assess the impact of products in isolation, we don't eat individual products we eat collections of products we make meals to make a snack and certain products drive, because of their co-consumption drive consumption of others, a stupid example to drive the point, tea drives consumption of milk... carbonated soft drinks drive consumption of crisps and chocolate, water drives consumption of fruit, so there are products which have a positive association or nutritionally negative halo effect and that's true at a consumption point of view... 2% of water is consumed with fruit, 4% of cola is consumed with chocolate for example so get me to switch from cola to water and you get double positive benefit my fruit consumption with the drink doubles, my chocolate consumptions halves and my salty snack consumption nearly halves"*

There was also discussion on combining mechanisms to have a greater impact on reducing consumption of unhealthy foods.

> *"if you did the same on price and promotion and say that, you know, you should not be discounting unhealthy brands and you should not be promoting unhealthy brands there then you would have an effect as well, there are mechanisms for including tax for doing that... if you did all of those at the same time you could shift consumer behaviour, if you do any one thing then you're likely to have very little impact because, you know, one could argue these individual things have no one impact"*

A12.10.2 Marketing and advertising spend

In relation to the theme on impact, some stakeholders described how companies spend large sums of money on marketing and that they would not allocate these resources if the strategies did not increase sales.

> *"the industry in the UK spends over 1 billion pounds per year on advertising junk food and sugary drinks so if we go back to basics and reflect that every one of these companies has one statutory obligation and that's to maximise profit for their shareholders, then they are not going to spend a single cent unless they get a return so for me that is a very, very powerful bit of evidence... the bottom line is that they would not spend any money on marketing junk food if there wasn't a return, or sugary drinks"*

> *"I forget what the phrase is but in terms of marketing agencies and the companies spend millions and millions of pounds on marketing, they wouldn't be spending that if it didn't have an effect"*

One stakeholder even described how this level of spending is specifically aimed at influencing adults as well as children as future consumers.

> *"it is the fact that actually there is millions and millions of pounds are advertising for certain foods and certain drinks and you're looking to change that because if it wasn't working companies wouldn't be spending that amount of money, not it might not be, it's not just children, the advertising does influence adults or potentially influencing children for later life purchases"*

A12.10.3 Promotion

Online marketing, advergames, social media, and sponsorship were discussed by stakeholders as promotion strategies that may influence purchases and consumption. They described as these as strategies which were outside television advertising regulations and potentially parental controls.

> *"we know that online is the big growth area for marketing to children because it is below the radar of parental controls and the integration of marketing messages and brands and indeed the products themselves within games and apps and toys"*

> *"the internet is a biggy, a real biggy, the fact that the current restrictions that we see on television do not translate to the media that is most appealing to and the habitat of young people and that will require going beyond self-regulation to something much more robust"*

Advergaming was described as an emerging strategy which can achieve a greater level of immersion into a brand due to the continuous exposure and psychological reward mechanisms of playing the game.

> *"well advergaming is interesting because you don't actually show the food products, you just immerse them in the brand and the brand image goes everywhere... whereas an advert a child can watch it or not watch it but it's only 30 seconds long, this is continuous exposure and because it's rewarding, because of a sense of achievement, a sense of competition with others because of high scores, you can spread it, this whole online content, particularly the content that is user driven, falls outside the regulations"*

> *"and when you get things like advergames which are in essence an advert but they're much more than that, what they do is immerse the child in a brand rewarding them though interaction and enjoyment and through competition and social media the child is engaged but then they're also promoting it to their peers"*

> *"I think online is a problem that has not been even conceptualised well enough to be address so I think researchers and kind of policy active people that I've talked to just find it a bit scary, so kind of embedded adverts on sites... and then there's lots of very attractive marketing use on products on sites... you go to the website for a sugar-sweetened beverage and there's really kind of immersive engaging games"*

> *"I think the gaming, the online gaming industry should possibly be looked at, it's quite shocking what is allowed, what is still permissible in terms of kind of marketing of online gaming characters that are definitely associated unhealthy food brands and it clearly works, kids definitely get hooked on those types of things, that definitely requires a bit more scrutiny, I mean, it's essentially subliminal advertising, outlawed"*

> *"advergames I think that's a big area and very difficult to monitor particularly because you have to be really immersed in them to see the kinds of adverts and even then it becomes difficult to determine what is an advert that's a bit of a red herring because even if children know it's an advert it still influences their choices regardless"*

Although most stakeholders believed online marketing was problematic, one discussed how companies are moving away from the digital space as there is little

evidence the strategies have resulted in financial returns. Therefore, they argued there has been shift to more integrated marketing to capture a wider audience.

> *"social media certainly has been very attractive to companies, they thought it was a substitute for broadcast media... what they're generally finding is that it doesn't appear to be very effective, people can spend vast sums in social media marketing for little evidence of any return at all... most of the organisations in the categories you're interested in are pulling away from social media marketing... they're not being much more sophisticated in that they're doing integrated stuff... they'll go to Glastonbury and they will do most to disseminate that information not just to the people that go to Glastonbury... but the many millions more who watch the stuff on YouTube or wherever"*

Stakeholders described the potential impact of food and drink sponsorship through reinforcing the brand message and keeping it in view of consumers. Moreover, stakeholders felt connecting unhealthy food and drink with healthy sporting activities sends out the wrong message to consumers.

> *"we know that sponsorship by particular food brands of things that are popular with children be it their own sports teams, so* [Fast Food Restaurant] *sponsoring children's football leagues is a way of keeping the brand in view and also to create positive associations between the brand and the good things in life"*

> *"sports sponsorship that's one thing we're quite interested in, but how the association between people who are known for sport, promoting foods that aren't healthy and how that muddies the water certainly, something I think doesn't help from a consumer clarity perspective to have sports people promoting things that shouldn't really be part of a healthy diet for any person let alone a sports person"*

> *"sponsorship is an area that has never properly been tackled and where there's an unwillingness to even talk about that and yet you know you only have to see at one end of the spectrum things like the World Cup and the Commonwealth Games and just the incredible level of promotion of soft drinks in complete contrast of the SACN advice"*

Sponsorship in the form of celebrity endorsement was also discussed by two stakeholders as potentially having an impact by reinforcing the brand message.

> *"most messages are reinforced through other marketing activities... so that could be sponsorship... you know celebrity characters, licence*

> *brand equity, celebrities, licence characters... they're not just components of the advert but they operate beyond the advert to reinforce the brand message"*

> *"the idea that the celebrity endorsement effect and found that when children are exposed to* [Sports Celebrity] *even outside of a promotional context so with him presenting* [Sports TV Show] *football highlights that promoted the intake of* [brand removed] *crisps relative to what they thought was a supermarket brand in the same way that an advert did... it was actually sort of driving over consumption relative to the control as well"*

A12.10.4 Price

Pricing strategies were described as being able to influence consumer choices. One stakeholder combined price and promotional strategies to illustrate that even when unhealthy options are on promotion these should not be cheaper than healthy options.

> *"think you do have to take all of them, I think the basic thing, price it's about the rebalancing of promotions and promotional activity so that, I mean, I know some people at any point of the sugar, the less sugary, the healthier alternative should be no more expensive and preferably cheaper than the less healthy alternative, even if the less healthy alternative is on promotion"*

Some stakeholders felt price was the most significant strategy for changing consumer behaviour.

> *"So you know there are different strategies for different organisations and the answer to your questions, going back to it, is it possible to change behaviour? Yes, low price usually changes behaviour"*

> *"they need to be told is that prices are a fundamental thing, it's known to every food marketing company in the world, it's one of their usual marketing tactics, they manipulate the price of commodities, deliberately as one of their major sale things... and it's all down to price"*

Moreover, one stakeholder described that in one supermarket they had noted that a large proportion of their £1 items were for products that could be deemed unhealthy. As a result of this survey, this stakeholder argued, the supermarket altered their price promotions to include more fruit and vegetables.

> *"when I did a survey on their website on September 2013 of 217 in think items listed on their £1 deal, 180 or so of them were food or drink and of those almost all of them were what would be categorised as impulse purchases ie biscuits, confectionery and only one was for something that contained a portion of fruit... that has changed, it's still nowhere near where we would like it to be but they have actually instituted more price promotions on fruit and veg"*

Where stakeholders discussed price promotions this was generally followed with a discussion on how they believed this was a very successful strategy for increasing sales, which then potentially leads to an increase in consumption.

> *"the marketing strategy that's most highly correlated with immediate volume uplift are promotions of any manufacturer and crudely about 40% of grocery purchases are on some form of promotion so a significant proportion of our grocery purchases and sugar, salt, and saturates are all if you like are over promoted so relative to the mean of products sales weighted salt sugar fat is over promoted... but anyone that engages in promotions while volume or price promotions knows that it's going to lead to very, very substantial brand uplift"*

> *"there are some types of products which are more, you know, people will, it does expand the usage... if you've got 2 packs of biscuits for the price of one people will take those and they will tend, you know, that expands the market for those biscuits, ie people eat more of them... I think the evidence, I haven't seen, so you know anecdotally I've been told that people tend to, it does tend to increase consumption... if it's doughnuts or something, if you've got 4 doughnuts for the price of 2, or the special offer where you've got more or bigger, they will eat, you know, more of them so if you can buy an extra-large* [name removed] *bar for the price of a normal* [name removed] *bar then you might well eat the whole bar"*

However, this stakeholder went on to discuss the problem with associating promotional volume uplift with increased consumption.

> *"I can't prove that they're not stockpiled and then thrown away but a rational person would say that if you look at purchasing over the year and promotions, and the fact that you return to your normal frequency purchasing cycle for the rest of the time that you've consumed twice as much during that period"*

Stakeholders also discussed how high sugar products are promoted as these items are expandable and add basket value.

> *"And one of the reasons why snack products and high fat salt and sugar products are promoted is because they're expandable and therefore they add basket value and incremental purchase whereas if I promote chicken I won't buy as much beef or other proteins if I promote confectionery it, crudely it's just additives to my basket, I'll buy everything else I was going to buy and add the confectionery as well... and that's really, that truth is really the case for snack products"*

This stakeholder felt that promotional strategies such as larger product sizes, free items, or multi-buys encouraged consumption.

> *"I do think that sweet and salty snacks, I suspect that there is certainly larger sizes, free, or multi-buys, you know, probably do encourage additional consumption"*

A12.10.5 Product

In terms of product there were several subcategories that stakeholders described as influencing consumers. One stakeholder argued some confectionery products have been designed to mimic healthy products in order to by-pass parental controls.

> *"so what we have observed particularly in confectionery they have used shape and colour, they have mimicked the appearance and flavour of things that are good for you like fruits to sort of get them past the parental controls"*

A12.10.6 Packaging

Stakeholders mainly discussed packaging in terms of influencing children and here one described how research has shown that using characters from TV or films influences children's taste preference.

> *"basically that was showing if you put a licensed character so from a film or a TV programme onto food... kids were more likely to say that food tasted better than the non-character equivalent but also more likely to choose... and we've done the same study, it's not out yet, with brand equity characters so these are ones made by a particular brand... and we've found basically the same thing, kids think that the food tastes nicer when they have a character on"*

Another stakeholder described the use of characters influencing children's choices and the potential for this to be adopted to promote healthy food items.

> *"there's also the basic stuff like packaging... still you just, stuff like having cartoon characters on breakfast cereals and from all of our research children obviously cite the cartoon characters they ask for the cartoon characters and despite we always said why can't you use the characters on healthy items and use it in a positive way to encourage those choices and you might have had a few lower sugar items but nothing significant has come onto the market"*

A12.10.7 Reformulation

Stakeholders discussed the potential for products to be reformulated so they contain less sugar or calories.

> *"I think that marketing strategies are more important and there are studies that show that marketing can push for reformulation... if we manage to persuade the industry to reformulate the products and reduce calorie intake then I think that we will achieve great results without taxing anyone"*

This stakeholder described how some companies have already committed to reformulating and removing high sugar drinks from sale.

> *"I would highlight* [name removed] *who has made a commitment to, not just in terms of reformulation but to say we're actually going to stop producing our top most sugary drinks... was primarily aimed at children, they have phased out the high sugar versions"*

However, there were also discussions about potential effects of product reformulation where companies do not remove their high sugar products. Stakeholders gave examples indicating consumers may move from diet/low to higher sugar products.

> *"I think there's also stuff in the marketing literature that kind of having these new products within a brand also draws attention to the core products which is red Coke so a lot of advertising for green Coke will also drive sales for full sugar coke"*

> *"I think it was to try and sort of be by* [soft drink brand name] *was to try and reduce people's sugar consumption by introducing the sort of* [soft drink brand name] *like red* [soft drink brand name]*... with stevia instead*

of sugar... anyway it seems to be the case that people are switching to green [soft drink brand name] *not from fat* [soft drink brand name] *but from diet* [soft drink brand name]*... which is probably counterproductive so instead of people switching from the red* [soft drink brand name] *to green, instead of going down they're actually going up because... they stopped buying diet* [soft drink brand name]*... but at the end of the day are they going to end up with more calories?"*

A12.10.8 Premiumisation

One stakeholder claimed that manufacturers may adopt premiumisation as a marketing strategy if their product is classed as a public health issue. They described how alcohol manufacturers focus on premiumising a product rather than focusing on volume growth.

"very few try and decrease purchasing, there are some strategies in markets where either because of, on a relatively limited number of occasions like the alcohol industry then because of public health issues... there is not a focus on volume growth there is a focus on brand switching and a focus on premiumisation so value growth rather than volume growth... if they're operating in a market that's in terminal decline they may well be trying to premiumise and drive value and the way they do that is through marketing tools that are available to them from above the line advertising to promotions... through to innovations through to pack sizing"

A12.10.9 Place

Stakeholders also discussed how the location within the retail space can encourage purchasing. The ends of aisles and checkouts were described as areas where confectionery items tend to be placed to increase impulse purchases.

"so there is this stuff about checkout, displays at checkout as well as displays on the end of aisles, whether it's on the top shelf or eye level or shoulder level... and also the volumes, I'm sure you know the bigger the expanse of a particular product the higher among actually purchased"

"the food companies pay for the shelf space that they have, how close it is to eye level, it goes on the end of the road or just in the middle"

However, some also discussed how pressure from consumers is affecting change within some stores and retailers are using these impulse spaces for alternative products.

> *"product placement we know that the sales uplift at checkout points compared to other places in the stores are really what's driving the placement of sweets at the checkout although it's quite interesting now that a number of retailers have pledged to remove sweets largely because their own customers are saying that they find it unhelpful and they're finding other things to put there I've noticed that wet wipes, batteries are finding their way onto, what used to be called the guilt lanes, we also know that placement in store the lower level child height, buggy level, is very popular for the little packet sweets"*

> *"things that have worked or trials of things that are popular and suggest are working are removing sweets and chocolates from checkouts and queuing areas... and replaced them with healthier items... but certainly in terms of the anecdotal data and in terms of customer perception and survey data that seems to suggest that that is a positive strategy"*

There were also discussions around online grocery shopping indicating consumers are not exposed to the wide variety of marketing strategies adopted in stores potentially resulting in healthier purchases and reducing impulse buys.

> *"If all our grocery shopping was done online then our baskets would be healthier... people who shop online... you're less controlled, you're subject point of sale and impulsive behaviour whereas if you're at home you don't buy that multi-pack of crisps and confectionery, you stick to more meal based products so actually and internet grocery purchasing is at 5-6% of total grocery purchasing it's growing by about 20% per annum, if that continues then it's one of the positive things for public health... it can help drive healthier nutritional choices"*

A12.10.10 Advertising restrictions

There were differing opinions about the current UK advertising regulations. Some stakeholders argued these were effective in preventing companies from advertising to children and adopting strategies which may influence unhealthy consumption patterns. However, these statements appear inconsistent with some of the themes presented above.

> *"All advertisements for food and soft drinks must not: condone or encourage poor nutritional habits or an unhealthy lifestyle in children;*

> *encourage excessive consumption, use promotional offers in an irresponsible way or use "high pressure" or "hard sell" techniques; use licenced characters or celebrities popular with children, promotional offers or nutritional and health claims when directly targeting pre or primary school children; give a misleading impression of the nutritional benefits of products"*

> *"studies have shown that marketing restrictions which won't allow companies to advertise to children are very effective"*

Moreover, some stakeholders argued that self-regulatory codes, like these described in Mexico, were very ineffective and companies continued to use strategies which have been described above as influencing children's food choices.

> *"in 2008 or 2009* [in Mexico] *there was industry after a lot of pressure in the press and so on, they came up with a self-regulatory code which was really very ineffective... is proposing on the marketing, regulating marketing to children, this was really a very, very soft regulation... it didn't have nutrition criteria... which products should be promoted, which shouldn't, they continued to use characters... was not well designed"*

One stakeholder discussed the possibility of using warnings on adverts targeted towards children and whether the evidence supported their efficacy.

> *"looking at whether they could warn children about adverts and sort of like increase their critical viewing skills by saying firstly that adverts are there to persuade you to buy things so it's sort of mentioning the persuasive nature of advertising with one warning and another one mentioning that adverts tend to be for high fat, sugar, salt foods that aren't conducive to a healthy diets and sort of a health warning and we've done a study looking at whether that impacts on what children eat... we think it doesn't even when they've seen the warning on the screen, they've heard it they know, they remember hearing it and seeing it but they don't, they don't adjust their behaviour, I know that's a strategy being used by the French in their regulations they have to display a warning and there's not a lot of evidence to suggest it works and certainly from our data we would say that it sounds good but it doesn't seem to stop children responding to the adverts"*

A12.10.11 Problems measuring impact

Although most stakeholders held the view that advertising and marketing does influence food choices and increase consumption they argued it was difficult to scientifically demonstrate this.

> *"it's much more difficult to systematically find and evaluate the exposure of children to these things... we've got OFCOM viewing data for channels... for new media it's even more difficult you don't know who's watching it... using it, and trying to gauge exposure... very, very difficult*"

> *"where we've seen changes in consumption levels? I mean, it's always very tricky because there are usually more than one reason why consumption levels might have changed or resisted change I can't think of anything off the top of my head where there's been a clear demonstration of reduced purchases as a result of a change on a marketing level, so you know, tricky one that"*

> *"it's very difficult to subject this to any kind of scientific measure, what we know is we can observe what the food companies are doing and we have to, we take it as read that the things they continue to do are the ones that are paying off and the ones that they stop doing are less profitable"*

Additionally, they argued that it is difficult to assess the impact of one strategy in isolation as individuals are exposed to a whole variety of marketing strategies across various different mediums.

> *"it's hard to say what has the most impact I think the collective impact of the different marketing techniques and increasingly I think it's difficult to keep track of it"*

> *"most data is available on TV advertising of course because it's been around for longer and it's more easy to manipulate and measure, the difficulty is we have no, is that it's so integrated and so it's not really possible to isolate the impact of just TV food advertising from children's overall brand and marketing exposure which happens over all the different avenues at once and indeed that's the general strategy of the food companies now"*