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Department of **Media** and **Communications**

**ADVERTISING FOODS TO CHILDREN:
Understanding Promotion In The Context Of Children's Daily Lives**

A review of the literature prepared for the Research Department of
the Office of Communications (OFCOM)

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Sonia Livingstone and Ellen Helsper

Department of Media and Communications
London School of Economics and Political Science
Houghton Street, London WC2A 2AE
Tel. 0207 955 7710
Email s.livingstone@lse.ac.uk
www.lse.ac.uk/collections/media@lse/whoswho/sonialivingstone.htm

EXECUTIVE SUMMARY

Focus of the review. Following longstanding public concern over the potentially harmful effects of food promotion on children, this literature review examines the effect of food advertising on children's food choice and, ultimately, children's obesity. It notes first that the evidence suggests that television advertising has a *modest, direct* effect on children's food choices. This evidence is then re-examined for the effect of age and for the relation between media literacy and media effects. Second, the review focuses on the possibility, widely argued but little examined, that advertising has *further, indirect* effects on children's food choices. This claim is critically examined by setting advertising in a wider context so as to understand how generic processes of persuasion contribute to a multi-factor explanation of children's food choices. Third, the review puts the UK situation in the context of cross-national research.

(1) ADVERTISING TO CHILDREN OF DIFFERENT AGES

Children are affected by advertising at all ages. Surprisingly little is known of how media affect children differently at different ages, though it is commonly assumed that younger children are more influenced. Empirical studies of the effects of television advertising on children's food choice were re-examined according to the age of the sample. Contrary to widespread belief, this did not show that young children, being more vulnerable, are more readily affected than more media-literate teenagers. Instead, findings of effects are rather mixed for younger children and more clear-cut for older children and teenagers. It is argued that all age groups are affected by advertising, both because different persuasion processes operate at different ages and because, presumably as a consequence, each age group is targeted by age-specific forms of advertising.

Media literacy is associated with age. Media literacy, "the ability to access, analyse, evaluate and create messages across a variety of contexts", has been widely investigated among children. Experts concur that before four or five years old, children regard advertising as simply informative (and not easily distinguished from programmes); that between four and seven, they begin to be able to distinguish advertising from programmes, most generally having grasped the intention to persuade by the age of eight; and that after eleven or twelve they can articulate a critical understanding of advertising and of the intentions of its producers. While children younger than twelve can learn to understand the differences between information and persuasion, they do not necessarily apply these skills spontaneously.

Literacy mediates the effects of advertising in two ways. Since it is argued both that advertising affects children across the whole age range and that advertising literacy varies significantly by age, it is concluded that no single process of persuasion can account for these findings. Consequently, we must rethink the assumption that, since children gain in advertising literacy as they become developmentally more sophisticated, this results in a greater ability to resist or defend against the messages of advertising. It is suggested that less literate viewers (generally younger children) are more influenced by superficial or peripheral features of advertising (e.g. celebrity sources, colourful and entertaining images), provided these are sufficiently attractive. On the other hand, more literate viewers (generally older children and adults) are more influenced by the quality of

the arguments and claims of advertising, provided these are sufficiently strong, and provided the audience is motivated to engage with the message. Research suggests that this latter form of persuasion lasts longer.

One key hypothesis we may draw from this review is that media literacy education, if focused on recognition of advertising production purposes and techniques, would have benefits for younger children in reducing the effects of advertising. However, as this age group becomes more literate, one would also expect advertisers to respond in targeting their messages. For teens, a different strategy is indicated, one less focused on media literacy and more focused on countering the arguments of advertising (e.g. through consumer awareness, provision of alternative food messages and health information).

(2) DIRECT AND INDIRECT INFLUENCES ON CHILDREN'S OBESITY

Obesity is caused by multiple factors. Food promotion must be understood within the larger web of causality underlying children's food choice, health and obesity. For example, research suggests that exercise levels (of both parents and children), meal habits (of both parents and children) and exposure to advertising each make an independent contribution to accounting for variation in children's food choice, health and obesity, and further that they interact with each other, indirectly affecting children's health. Food knowledge also matters, though it does not translate straightforwardly into food behaviour. Declining levels of exercise are also part of the explanation for rising obesity levels.

Multiple factors work at several levels. The review identifies multiple factors which affect children's food choice, including food promotion, which operate at four distinct levels. (1) Individual (intrapersonal) - psychosocial, biological and behavioural factors. (2) Social environmental (interpersonal) - family, friends and peer networks. (3) Physical environment (community) – accessibility, school food policy and local facilities. (4) Macrosystem (societal) - mass media and advertising, social and cultural norms, production and distribution systems and pricing policies.

These factors vary not only in the probably extent of their influence but also in their susceptibility to intervention and change. Expert commentators are agreed that a multi-stranded intervention, in which the media form one strand, is more likely to succeed than interventions based on any single factor.

Television viewing is correlated with obesity. Among the many influences on obesity, television viewing is consistently reported as a key factor. Surveys confirm that hours spent in television viewing correlate with measures of poor diet, poor health and obesity among both children and adults. This finding is open to three explanations. (1) Television viewing is a sedentary activity that reduces metabolic rates and displaces physical exercise. (2) Television viewing is associated with frequent snacking, pre-prepared meals and/or fast food consumption. (3) Television viewing includes exposure to advertisements for HFSS¹ food products. There is support for each of these explanations although little empirical research attempts to disentangle them.

¹ Throughout this document the term HFSS foods is used to refer to foods high in fat, sugar and salt. These foods are considered to be unhealthy as part of an unhealthy diet or lifestyle.

Multiple factors work indirectly as well as directly. It is too simple to posit that the multiple factors each play a separate role in accounting for variation in food choice. Rather, these factors interact with each other, *indirectly* affecting children's food choice. Hence, advertising – and television viewing more generally – has an effect *indirectly*, working alongside and through other variables, as well as directly. The size of this effect cannot be determined on the basis of existing research. The review outlines the range of indirect processes that mediate between advertising and children's food choice, including gender, cost, birth order, cultural meanings of food, obesity levels, family eating habits, parental regulation of media, parental mediation of advertising, peer mediation of advertising, pro-health messages and pester power.

(3) SETTING THE UK IN A CROSS-NATIONAL CONTEXT

UK-based research is sparse. The review mainly draws on US research, for research on food advertising and/or children's food choice in the UK is far from abundant. Most UK studies are reviews of empirical research conducted in other countries, with little primary empirical research being conducted in the UK. Further, very few studies have addressed forms of promotion other than television advertising.

Similarities and differences between UK and other countries. There is little reason to suppose that research conducted in other countries, as most research has been, cannot be applied to the UK context. However, some cultural, social and contextual studies indicate cross-national variations that could affect the interpretation of findings across countries. UK children are less likely to eat regular meals with their parents, more likely to be dissatisfied with outdoor leisure facilities and more likely to have their own television set than in many European countries, for example. This suggests that UK children may have a relatively more sedentary lifestyle, less parental monitoring or influence on both media use and food choice, and possibly a greater frequency of eating while watching television.

The consequences of restrictions on advertising. Surprisingly little research has evaluated the effectiveness of advertising regulation and there is next to none on the effectiveness of banning food advertising from children's television since few if any countries have implemented an effective ban on food advertising. Although most countries in the EU regulate advertising to children, few of these policies have been tested for their effectiveness in changing children's buying behaviour or food preferences. Evaluations exist for alcohol and tobacco advertising bans, and these tend to find that effects are at best weak and temporary, with little consequent reduction in consumption.

ADVERTISING FOODS TO CHILDREN: Understanding Promotion In The Context Of Children's Daily Lives

Introduction: reviewing the field of children and food promotion

There has been longstanding public concern over the potentially harmful effects of food promotion on children. In the UK, high levels of concern currently centre on the evidence of rising obesity among children, in common with many other countries in the developed world (WHO 2000). Previous food-related concerns have included nutrition, dental health, dieting and anorexia, and so forth. The Royal College of Physicians reports that obesity has doubled among 2-4 year olds between 1989 and 1998, and trebled among 6-15 year olds between 1990 and 2002 (Kopelman 2004 in Ambler 2004; see also Kaiser Foundation 2004 for American statistics).

All agree that the food industry is one of the major players in the field of advertising (Hastings et al 2003, Young, Paliwoda and Crawford 2003). Total UK advertising spending per annum in the categories of food, soft drinks and chain restaurants is £743 million, with £522 million spent on television advertising and £32 million spent in children's airtime (source: OFCOM, February 2004). Food advertising on television is dominated by breakfast cereals, confectionary, savoury snacks and soft drinks, with fast-food restaurants taking up an increasing proportion of HFSS advertising on television.

What effect, if any, does food advertising have on children's food choice and, ultimately, children's health? This question is the main focus of the present report. But we address the question by setting advertising in a wider context, reviewing the published literature in order to understand the range of factors influencing children's food choice.

A major review of the field, recently conducted by Hastings et al (2003) for the Food Standards Agency, has focused academic, policy and public attention on the role that food promotion, particularly television advertising, plays in influencing children's food choices, defined in terms of food knowledge, preferences and behaviour. This is a complex field and the answers are rarely simple. Both research methods and findings addressed in this and other reviews are much contested (see Paliwoda and Crawford 2004; Young 2003; Ambler 2004; and Livingstone 2004). Some reviews cover a wide terrain, examining the range of factors which may influence children's diet. Others draw their boundaries more narrowly, focusing on the direct effects of advertising on food choice.

Unfortunately, much of the literature on diet and obesity pays little attention to media-related factors such as exposure to television in general or advertising in particular. Also unfortunately, much of the literature on the effects of advertising pays little attention to the contextual factors which may mediate or provide alternative explanations for the observed relationship between media use and children's diet and/or weight. Reviewing the field is complex in part because the research available spans a range of academic disciplines, countries and contexts and also because empirical studies use different measures, control for different factors or omit valuable information.

In reviewing the published literature, it is worth identifying not only what can be concluded but also what remains unclear as well as questions for future investigation. Importantly, the balance of evidence (experimental, correlational and observational) in the published literature shows that television advertising has a *modest, direct* effect on

children's food choices. Although there remains much scope for debate, this conclusion is widely accepted across diverse positions and stakeholders (Livingstone 2004).

Concluding that modest, direct effects occur does not tell the whole story. It is widely argued in the fields of social, health and developmental psychology and in consumer and marketing research that the media (television, advertising, promotions, etc) also have *further, indirect* effects on children's food choices. Less is understood or known of these indirect effects, how they work, or how substantial they are. Hence, this is the focus of the present report.

The starting point – 'A Commentary on the Research Evidence Regarding the Effects of Food Promotion on Children' (Livingstone 2004) concluded:

There is sufficient empirical evidence to conclude that television advertising has a modest direct effect on children's food choices.

Although much of this evidence has been produced over several decades, mainly in America, the process of media influence is assumed to operate in a similar manner in the UK, notwithstanding the possibility of minor differences in the effectiveness of food promotion between the two countries.

There is insufficient evidence to show that television advertising, indeed food promotion more generally, has a larger, indirect effect on children's food choices. However, it is widely argued in the fields of social and developmental psychology and in consumer and marketing research, that substantial indirect effects occur.

There is insufficient evidence to determine the relative size of the effect of television advertising on children's food choice, by comparison with other relevant factors; nor does a clear consensus exist yet regarding the nature of these other factors.

For a range of mainly methodological reasons, it is unlikely that research will ever produce the ideal, uncontroversial demonstration of a causal effect of food promotion on children's food choices. Nor is it likely ever to produce a complete and comprehensive picture of all the factors that, in combination, influence children's food choices. Consequently, it would be advantageous both to continue to commission and fund UK research in this and related areas and to consider possible policy options now on the basis of the existing research base.

Moving forward

Although the possible harms (or benefits) of food promotion is an important research issue, ultimately public concern is centred not on advertising *per se* but on children's diet and health. If research asks, '*does food promotion affect children's food choices?*', the debate will continue to be polarised into yes/no camps, with continued methodological dispute and calls for more research. But if one asks, '*what affects children's food choices?*', the debate can be opened up into a broader examination of the range of factors contributing to children's diet and health, including the relations among these

factors and their relative importance (Livingstone 2004). The contribution of television advertising can then be placed in context.

The present review of the academic literature was commissioned by the Research Department of the Office of Communications (Ofcom) in February 2004. The brief was to contextualise food promotion to children within a broader analysis of the range of factors that influence children's food choice and so to understand and weigh the importance of promotion, particularly television advertising, within that wider framework. The present focus is less on the content of food promotion, since it is generally accepted that the range of food products advertised on television and portrayed in the media conflict with what is officially considered a healthy and balanced diet (Hastings, Stead, McDermott, Alasdair, MacKintosh, Rayner, Godfrey, Caraher, and Angus 2003, Paliwoda and Crawford 2003 Lewis and Hill 1998, Furnham, Abramsky, and Gunter 1997, Kunkel and Gantz 1992).

Rather, the main emphasis is on the question of effects, seeking to locate television advertising in relation to the broader context of everyday influences on children's food choice. To pursue this question of effects, the review asks a series of specific questions insufficiently addressed by previous reviews (Livingstone 2004). It concentrates particularly on recent literature, on UK-based studies, and on research available in the public domain concerning the advertising on television of food products to children aged 2-15 years. Although little empirical research exists on forms of promotion other than television advertising, it will be suggested that the underlying socio-cognitive processes of persuasion are likely to be similar across diverse promotional channels. Moreover, it will be argued that advertising, indeed media influences more generally, cannot be seen in isolation from other factors that might contribute to or mediate persuasive effects.

This review takes as its starting point the existing reviews of the field, aiming especially to complement the systematic review process undertaken by Hastings et al (2003). A systematic review includes the work that has been done, it describes it in detail, and it summarises the overall balance of findings. However, a systematic review does not necessarily interpret the findings by putting them in the context of children's development and family life, or of theories of persuasion, media literacy or, indeed, obesity. Particularly, we need to understand the process of advertising and persuasion, not simply the inputs (adverts) and outputs (food choice). A theoretically-informed, process-oriented interpretation of the field can, we believe, add to the understanding of the problem of children's food choice among policy makers and the public.

Given the public policy discussion following the publication of Hastings et al's review, a series of key questions were identified, these providing the basis for the present report. In addition to searching the published literature across a range of fields (see Bibliography), the authors also consulted a range of experts in the fields of child development, advertising, nutrition, media effects and obesity (see Annex 1).

Key questions addressed by the review

In the four main sections that follow, a series of key questions are addressed.

1. Expert opinion. What are the conclusions reached by experts in the field in relation to the nature and effect of food promotion on children and to the range of other influences on children's food choices?
2. UK-based research. Are there key studies conducted recently in the UK that have not yet been included in previous literature reviews?
3. Media literacy. In what ways are young audiences active, selective or critical in relation to food promotion messages and, if so, does this mediate the effects of advertising on children?
4. Children's age. Is there any evidence for a link between children's age (and, by implication, their level of media literacy) and the effects of advertising?
5. Range of relevant factors. What is the range of factors which influences children's food choices, where does food promotion fit within this, and what gaps exist in the evidence base?
6. Direct and indirect effects. How does this range of factors interrelate, resulting in indirect as well as direct effects on children's food choice?
7. The consequences of restrictions. Does restricting or banning the promotion of certain categories of product work, resulting in changes in children's preferences or reducing children's consumption?
8. Cross-national comparisons. Can lessons learned from other countries be straightforwardly be applied in the UK?

A. Reviewing the reviews

Expert opinion. What are the conclusions reached by experts in the field in relation to the nature and effect of food promotion on children and to the range of other influences on children's food choices?

In addition to reviewing the findings in the literature, as is often undertaken, it is worth reviewing the range of expert opinion in the literature. Since Hastings et al (2003) did not include the views of experienced researchers in the field unless they reported original empirical material, one gains no overall picture from their review of the judgements of key researchers or their views of research strengths or gaps. These views should surely be brought into the public policy debate. The views of experts consulted in preparing the present review (see Annex 1), together with those in published sources, are represented below.

It is widely argued that television advertising has a direct but relatively modest influence on children's food preferences and choices:

‘A large and growing body of evidence ... has established significant associations between media exposure and a variety of health risk behaviours in children and adolescents’ (Rich and Bar-on 2001:156).

'Clearly advertising tends to affect knowledge, preferences and behaviour of its target market since that is the reason for doing it' (Ambler 2004: 5)

'Food promotion is having an effect, particularly on children's preferences, purchase behaviour and consumption. This effect is independent of other factors and operates at both a brand and category level' (Hastings et al 2003: 3).

It is also widely argued that there is likely to be a rather stronger but indirect effect of the media both through their negative influence on physical exercise as well as their role within a complex environment, labelled by some as 'obesogenic' (multiple cultural, economic, social and material factors combining to produce an overweight population). For example:

'TV viewing by children may not just be a sedentary behaviour in its adiposity promoting effect. Exposure to advertisements for food on TV can have an effect also on eating behaviour, stimulating energy intake from a range of foods and exaggerating unhealthy choices among foods' (Halford et al 2003: 4).

'Because of the wide range of commercial messages meticulously targeted to specific segments of the child audience, children seem to have become less dependent on their parents in learning about consumer values. It is possible that entertainment and advertising aimed at young children shortens the period during which parents are the primary socializing force in the lives of their children. Although today's children and adolescents have the spending power to utilize their consumer skills, they still often lack the maturity to think carefully about buying decisions. Media literacy research is needed to understand how children and adolescents can be taught to make thoughtful consumer decisions, as well as how to protect them from commercial pressures to buy quickly and impulsively' (Valkenburg and Cantor 2001: 69-70).

As Valkenburg and Cantor suggest, many believe also that media literacy is one of the factors that mitigates the harmful effects of advertising and television viewing on the child's preferences and eating patterns. Wartella (1980, p.25) hopes that 'appropriate learning materials will be developed to teach children about the medium of television, both its programming and advertising content. Such materials should help children overcome their misunderstandings of television messages. By improving the skills children bring to the viewing situation we may be able to moderate the impact television has on the child'.

Although these direct and indirect effects are assumed to vary depending on different markets, target groups, products and promotional channels, it is also often assumed that a generic, underlying process of persuasion operates both across and within product categories, markets and channels, although here the evidence is less clear: Duffy (1999: 1) reviews econometric evidence which finds 'no evidence of advertising affecting the demand for food as a whole at the expense of non-food demand... [in other words] advertising can be an effective tool of competition between brands, but in mature food markets it seems to have no effect on total market size' (see also Eagle and Ambler 2002). However, the advertising industry itself claims success in using advertising to increase consumption by product categories rather than merely brands (e.g. Marr and Brownless 2002, Aarons and Clerke 2000).

Nonetheless, the academic literature on media influences is interested in generic processes of persuasion, regarding the exploration of variation in effects depending on products and markets as a useful way of testing hypotheses about or mapping the scope of this process. Thus it tends to be sceptical of the advertising and marketing industry for its adoption of different arguments to suit their interests at different times. Instead, it attempts to sidestep commercial concerns in pursuit of a consistent and coherent position understanding of persuasion (or media effects). By contrast, the academic literature on nutrition, health and obesity pays far less attention to persuasion in general, whether conceived in brand-specific or generic terms. In this fields, media or advertising effects figure merely as one among many sources of influence on the target outcomes, albeit often a source that is interesting because it is seen as amenable to practical strategies of intervention.

Notably, there are few significant areas of controversy or disagreement discernable among expert views. Indeed, despite considerable diversity in their disciplines, academic and policy concerns or methodological preferences, there is widespread agreement that children's food choice, and their consequent health or obesity, represents a complex issue to be explained only by reference to multiple, interacting factors. Understanding this 'web of causality', as one expert put it, requires a careful disentangling of multiple causal trajectories, not all of which trace a direct path from the media to children's diet. In policy terms, specific interventions to improve children's health are, similarly, widely assumed to require a multi-stranded approach, even if any one intervention programme focuses on influencing just one of the operative factors. As Gortmaker, Dietz and Cheung (1990: 1247) conclude, 'multiple intervention approaches involving diet, exercise, and restriction of television viewing and other sedentary activities all appear necessary to halt the fattening of America'.

Within this framework, there are relatively few calls for bans on food advertising to children, perhaps because there are few examples of this proving effective (see later section), while there are many more calls for better food information and labelling and more pro-nutrition health messages. In other words, more stress is placed on using persuasion as a positive force in children's lives than on attempting to restrict children's exposure to persuasive messages per se (e.g. Ambler 2004). However, it is also widely argued that both advertising bans and pro-health messages are unlikely to be very effective unless implemented as part of a co-ordinated and multi-stranded approach. Within this, many argue that this multi-stranded approach should include financial levies, content regulation, compensatory 'healthy' messages, or other forms of control placed on the advertising and marketing of HFSS foods to children, especially for the youngest age groups. As one expert commented, 'Given the number of factors involved, the independent contribution of food advertising and more specifically advertising on television must be small. Banning such ads alone as a single strategy to combat excess weight gain in children seems highly unlikely to succeed. However, as part of a broader obesity strategy – or indeed - broader strategy to improve children's diets, it is impossible to argue against.'

The views of experts are further developed in the following sections of this report, pursuing the crucial issues of the nature of the persuasion process, the relation between children's development and media effects, the importance of media literacy, the range of factors which, together with advertising, impact on children's food choices, the complex relations among these various factors, and the implications of these arguments and findings for policy interventions.

Before examining the main issues of this review, this report first seeks to update the picture so as to ensure that recent studies are included, particularly those conducted within the UK, since the purpose is to inform UK communications policy.

UK-based research. Are there key studies conducted recently in the UK that have not yet been included in previous literature reviews?

What research has been conducted in the UK since 1990? It will quickly become apparent in the work reviewed below that research on food advertising and/or children's food choice in the UK is far from abundant. Moreover, the studies are hard to compare because of their different foci, methods and approaches, and the results are at times contradictory. Most significant is the observation that articles published in the UK are generally reviews of studies conducted in other countries, or commentaries on those studies, or they come from private institutions whose publications are not subject to peer review. Hence, in the UK, more basic or primary empirical research is needed. Particularly, more empirical research is needed that incorporates a multilevel, multifactor approach to the effects of advertising on children's food choice.

- Ambler (1996, 2004): Makes the case that banning advertising in the UK will not reduce consumption of the goods advertised. He backs this up by showing how in other countries some advertising bans related to alcohol have actually been followed by an increase in alcohol consumption. In a review of the literature he remarks that food promotion on television does not lead to obesity.
- Donkin, Neale and Tilston (1993): In a survey, it was found that cereals, biscuits, fruit, sweets, drinks, and meat products are children's favourite food purchase requests. According to this study, television watching is associated with higher sugar consumption.
- Duffy (1999): This study of the influence of advertising on the demand for food products in the UK showed that advertising has little effect on total food demand nor does it effect the part of the household budget designated to food products.
- EUFIC² (1999): The studies done by this organisation show that in the UK, by contrast with other countries, children are less likely to have daytime and evening meals with their families or other adult supervision. This might have significant effect on the actual content of their meals.
- Halford et al (2003): According to this study, food advertising exacerbates already existing differences in food advertising recognition and related food consumption. Obese children are already more aware of food ads than those children of normal weight and the exposure to food cues in advertising induces a higher intake of food by these groups.
- Hastings et al (2003): Systematic review of research evidence on the content and effects of food promotion, mainly television advertising, to children. Argues that the advertised diet differs significantly from the recommended diet, and that television advertising directly affects children's food knowledge, preferences and behaviour.
- Hitchings and Moynihan (1998): These authors conducted a survey in private and state schools. They found that children recall cereals, confectionary, and soft

² The European Food Information Council. Eufic.org/gb/home/html.

- drink ads more than any other type of ad. The strongest relationships between recall and consumption are for soft drinks, crisps, cakes and sweets. They also found that higher levels of television viewing are positively associated with the number of purchase requests made to parents.
- Lewis and Hill (1998) conducted a content analysis showing that food is the most advertised product category on children's television, and that confectionary, cereals and savoury snacks are the most advertised. Hence, 60% of food adverts to children are for convenience foods, 6% for fast food outlets, and the remainder for cereals and confectionery (c.f. Young, 2003).
 - Lewis and Hill (1998): This study found that overweight children are less satisfied with their appearance and have a greater preference for thinness; feeling fat was directly related to weight. In general, children feel better, less worried and more liked after seeing adverts. They also found an interaction effect: after seeing a food advertisement, overweight children feel healthier and show a decreased desire to eat sweets, while normal weight children feel less healthy and more like eating sweets than before seeing the ad. The opposite pattern was observed after viewing non-food ads.
 - Dibb and Castell's (1995) study found that 50-70% of UK television advertising to children was food-related and that, as also summarised in Hastings et al (2003, p.A74), 'the foods we should eat least are the most advertised, while the foods we should eat most are the least advertised'.
 - A recent survey of UK parents conducted for the National Family and Parenting Institute (2004) shows that parents feel their children are 'bombarded' by advertising – to ever younger children and across an ever-greater range of media platforms. They claim to be anxious, irritated and pressurised, not least because of the considerable domestic conflicts they claim that consumer demands from children result in within the family.
 - Young (2003): This review of the literature concluded that children understand advertising from 8-9 years old and that they play an active role in families' food buying. Dietary preferences of children are said to be established by about five years old, before advertising is understood. The author further argues that a multiplicity of factors, of which advertising/television viewing is only one, influence eating patterns.
 - Stratton & Bromley (1999) determined through a series of interviews that the dominant preoccupation of parents is to get their children to eat enough. Parents try to adjust the food to the preferences of family members so that children will eat. There was a notable lack of reference to nutrition and health when talking about food choices for children in the British families interviewed.

Very few studies have addressed forms of promotion other than television advertising. The majority of studies that address non-television promotion focus on schools and are in some way specific to the North American system of education. For example, French et al (2001, see also French, Lin and Guthrie 2003) pointed towards vending machines at schools as another important area of promotion to children. They showed that lowering the prices of low fat snacks and fruits in these vending machines had significant positive effects on the sales of these healthy foods, making these important to consider when studying how children form dietary habits. Few if any similar studies have been conducted in the UK.

In planning further research, it would be advantageous not only to broaden the range of promotional forms investigated, but also to adopt comparable measures (for example, of

television exposure, attitudes, preferences, diet, etc) across multiple methods (experiment, survey, observation) within the same research programme in order to improve comparability of findings and to reduce methodological artefacts or confounds.

B. Children: a special audience?

Children's age. Is there any evidence for a link between children's age (and, by implication, their level of media literacy) and the effects of advertising?

While the conditions of childhood vary across cultures, making the UK in some ways a specific environment, in other respects, many argue that children develop in highly similar ways. Indeed, some argue that children are, wherever they live, appropriately considered as a 'special audience' (Dorr, 1986).

There have been many empirical investigations of the effects of television advertising on children's food choice. A typical, and much-cited example, is that of Borzekowski and Robinson (2001), who showed that 2 to 6 year old children who watched videotapes with an advertisement embedded in it were more likely to prefer the advertised items than children who saw the same videotape without advertisements. But, are findings such as this specific to pre-school children or does it apply across the age range? Curiously, findings regarding the effectiveness of advertising are rarely examined in relation to the factor which most obviously differentiates among children, namely their age.

Indeed, we know surprisingly little of how media affect children differently at different ages. Instead, researchers appear to decide, on theoretical or policy grounds, which age group is of most interest, and then test the effects of television exposure or advertising for that age group only. Indeed, when a wide age range is studied, it is commonplace to 'control for age' (or extract the effects of age) in examining the relation between media exposure and food choice, rather than examining the possibility that results might vary systematically by age or be greater for some age groups than others.³

Consequently, even though theories of both child development and media literacy stress the importance of age – as do most policy frameworks – it remains unclear whether media effects occur evenly across all age groups or whether, by contrast, they are greater at some ages than others. In short, can it be said that certain age groups (most obviously, younger children) are more vulnerable to media influences than others? Surely conclusions – and policy recommendations - regarding advertising to children should be age-specific, but if so, what is the empirical justification for age distinctions?

In order to pursue this question, published research investigating the effects of television advertising on children's food choice were categorised according to the nature of the finding (evidence for effects or otherwise) and the age of the children in the sample (according to three standard age bands) (see Table 1).⁴ This shows clearly that the age group that has been most systematically researched is between 6 and 12 years of age;

³ In other words, statistical techniques are used to examine partial out the variation associated with age that is evident in the effect of interest (e.g. effect of media on behaviour). Ambler (2004) makes the same point about socioeconomic status – again, rather than controlling for this, research should seek to understand the clear variations in food choice/health by SES.

⁴ As Hastings et al (2003) point out, some of these studies are better conducted than others.

for both younger children and adolescents, research is unfortunately much less prevalent.

Intriguingly, Table 1 shows a counterintuitive pattern of findings. The theoretical prediction would be that younger children are more vulnerable to persuasion, and hence effects would be more evident among this age group, while teenagers – who are the most media-literate – would be the least vulnerable, and hence evidence for effects would be less convincing, even absent. However, the table suggests the opposite, for it shows that mixed findings are more common among the youngest age group, while among 6-12 year olds and, even more so, among teenagers, research is more likely to show clear evidence of media effects. Logically, one might conclude, therefore, that children younger than six are least vulnerable while those over twelve are most vulnerable. Alternatively, one might seek an artefactual explanation, for example that measures of both exposure and food choice are most difficult or flawed for the youngest group and hence the findings are most confusing and inconsistent (see also Donahue, Henke and Donahue 1980).

Table 1

Findings of the effects, or otherwise, of food advertising/ television exposure, by age of children sampled in study (in parentheses)

	Food advertising (or TV exposure) has effects	Absent/weak effects of advertising/TV exposure
Samples 6 years or under	<ul style="list-style-type: none"> ▪ Bolton 1983 (2-11) ▪ Borzekowski and Robinson 2001 (2-6) ▪ Brody et al 1981 (3-5) ▪ Galst 1980 (3-7) ▪ Goldberg et al 1978a/b (5-6) ▪ Fischer et al 1991 (3 to 6) ▪ Ritchey and Olson 1983 (4.5) ▪ Stoneman and Brody 1982 (3-5) ▪ Taras et al 1989 (3-8) ▪ Wong et al 1992 (2-20) 	<ul style="list-style-type: none"> ▪ Clarke 1984 (av. 4.5) ▪ Dawson et al 1988 (av. 6) ▪ Galst 1980 (3-7) ▪ Jeffrey et al 1982 (4-5) ▪ Robinson et al 1993 (av. 12)
Samples 6-12 years	<ul style="list-style-type: none"> ▪ Atkin 1975 (9-12) ▪ Bolton 1983 (2-11) ▪ Buijzen and Valkenburg 2003b (8-12) ▪ Brucks et al 1988 (9-10) ▪ Coon et al 2001 (av. 10) ▪ Dietz and Gortmaker 1985 (6-11) ▪ Giamattei et al 2003 (11-13) ▪ Goldberg 1990 (9-12) ▪ Gorn and Goldberg 1980b (5-8) ▪ Gorn and Goldberg 1982 (5-8) ▪ Gorn and Florsheim 1985 (9-10) ▪ Gortmaker and Must 1996 (10-15) ▪ Halford et al 2003 (9-11) ▪ Hitchings and Moynihan 1998 (9-10) ▪ Kaufman and Sandman 1983 (5-10) ▪ Klesges et al 1993 (8-12) ▪ Lewis and Hill 1998 (9-10) ▪ Norton et al 2000 (9-18) ▪ Peterson et al 1984 (av 6.2)* ▪ Robinson 1999 (av 8.9) ▪ Ross et al 1981, 1981 (5-11) ▪ Stoneman and Brody 1981 (9-10) ▪ Taras et al 1989 (3-8) ▪ Wong et al 1992 (2-20) 	<ul style="list-style-type: none"> ▪ Brucks et al 1988 (9-10) ▪ Gorn and Florsheim 1985 (9-10) ▪ Gorn and Goldberg 1980a (8-10) ▪ Peterson et al 1984 (av 6.2) ▪ Wiman and Newman 1989 (8-12)
Samples 12 years or over	<ul style="list-style-type: none"> ▪ Brand and Greenberg 1994 (av. 15) ▪ Del Toro and Greenberg 1989 (13-17) ▪ Dietz and Gortmaker 1985 (12-17) ▪ Giamattei et al 2003 (11-13) ▪ Gortmaker and Must 1996 (10-15) ▪ Norton et al 2000 (9-18) ▪ Wong et al 1992 (2-20) 	<ul style="list-style-type: none"> ▪ Gracey et al 1996 (av. 16)

Note: Findings are reported for selected studies employing either experimental or correlational designs. Classifications are based on published abstracts or summaries in Hastings et al (2003). Studies appear in more than one cell where appropriate.

** Study involving pro-nutritional advertising.*

But if we take this pattern of findings seriously, one might also postulate that different processes are occurring at different ages. Perhaps the youngest group pays least attention to the media and so is less consistently affected (hence the findings both of effects and no effects), while teenagers pay more (if often selective) attention, for a variety of reasons and so, when they do attend, they are more consistently affected. Or one might read Table 1 as showing that all age groups are affected by advertising because each age group is successfully targeted by advertising, but in different ways.

Advertisements differ in their address to target groups: advertisements for younger children appeal through bright colours, lively music and simple messages, advertisements for teenagers appeal through witty or stylish imagery and subtle messages. Generally, though not in all cases, experimental research presents children with examples of advertising appropriate to their age group. In correlational or observational research, however, the independent measure of exposure is simply 'advertising' or 'television viewing', thus including content addressed to all age groups; thus inconsistencies in findings by age could be the result of a methodological artefact (in terms of independent variables rather than, as above, in terms of dependent variables).

Whatever the conclusion regarding the interpretation of apparent age differences in openness to persuasion, Table 1 clearly refutes the widespread assumption that young children are more readily affected, while the greater media literacy of teenagers provides them with a defence against media effects. It may yet be acceptable to draw such a conclusion in policy terms, but this would require a different justification. This might be mounted in terms of a developing moral responsibility for oneself and one's actions, achieved by 12 but perhaps not earlier, or in terms of the unfairness of advertising to children who do not yet understand the purpose of advertisements. The point here is that the research evidence for media effects does not simply provide such a justification; rather, the evidence suggests that children and young people across the age range are influenced and so could be said to be in need of protection or defence. Bandyopadhyay, Kindra and Sharp (2001) provide a comprehensive summary of the research and policy arguments on either side of the debate over children as a media-savvy market versus children as vulnerable and in need of protection (see also Kaiser Foundation 2004).

Lastly and most obviously, Table 1 makes it clear that most published studies find evidence of media effects, rather than otherwise. And that most researchers are interested in the period of middle childhood rather than in younger children or, especially, adolescents. As we have seen in the above discussion of media literacy, it is somewhere between the ages of six and twelve that children understand more fully the nature of and intentions behind advertising, making this a pivotal group for examining responses to advertising. It is also the age group that attracts considerable attention as they become identified as consumers – the new 'tweenage' market, between maturity and immaturity, although increasing market interest and public concern is now focusing on younger, pre-school children.

Media literacy. In what ways are young audiences active, selective or critical in relation to food promotion messages?

Most if not all reviews (e.g. Bandyopadhyay, Kindra and Sharp 2001, van Evra 1998, Hastings et al 2003, Valkenburg and Cantor 2001, Young et al 1996, Young 2003) concur that before four or five years old, children regard advertising as simply

entertainment, that between four and seven, they begin to be able to distinguish advertising from programmes, most generally having grasped the intention to persuade by the age of eight, and that after eleven or twelve they can articulate a critical understanding of advertising and of the intentions of their producers. These two factors – being able to distinguish advertisements from programmes and, separately, being able to recognise the persuasive intent underlying advertising – are seen as crucial in all approaches (Kunkel and Wilcox 2001). The latter factor, however, represents a more complex skill, and one which develops later. Roedder (1981) designed and tested a developmental model proposing three stages of advertising literacy:

1. Limited: children have no knowledge or sophistication in judging the intentions of advertisers. This applies to children roughly under 6 to 8 years of age.
2. Cued: children have the knowledge to counter argue advertising claims, but do not use this knowledge spontaneously. This stage is commonly found in children between 8 and 12 years old.
3. Strategic: children have both the knowledge and the ability to use this knowledge without being cued. Most children over 12 years old are able to use this strategic advertising literacy.

Whether one frames the developmental trajectory in terms of unfolding social or cognitive stages or of developing media/advertising literacy, it seems clear that between seven or eight and eleven or twelve lies an uncertain area in which children vary in the sophistication of their understanding of advertising: they experience difficulties distinguishing advertising from other types of programming, they tend to accept the claims that advertisers make at face value and they may not understand the underlying motives of advertisers (Buijzen and Valkenburg 2003a, 2003b, Blosser and Roberts 1985, Young 2003). Many have therefore supposed that children may be particularly vulnerable to the effects of advertising before eight years old and, for some, up until twelve years old. However, if we conclude, with the evidence summarised in Table 1 above, that advertising is effective across all age groups, one may still argue that it works in different ways at different developmental stages.

What kind of evidence lies behind these claims? Wartella (1980) showed that very young children of three or four years old react to the change from programming to advertising when watching television, but that this is based on the audio-visual characteristics of programmes and advertisements, not on an understanding of the differing intent of the producers or the conceptual differences between the genres. Moreover, young children of 2-72 months old obey the principle of ‘centration’ - they react to a single prominent attribute of a product (e.g. colour or sound) to determine whether they like it or not, (Carruth, Skinner, Moran and Coletta 2000, Valkenburg and Cantor 2001).

This may account for the finding of Fischer, Schwartz, Richards, Goldstein and Rojas (1991) that recognition of logos is already occurring by the age of three and that, although this recognition is highest for children’s brands, the recognition of logos for adult products such as cigarettes and cars is considerable. In these studies there is, however, no link made between recognition and effect; nor is it easy to identify the original source for logo recognition (e.g. advertising or direct experience with the product). However, it does appear that “environmental promotion” - advertising not on traditional media but present as logos or in the form of products at public events that

children attend - has an impact in the absence of television advertising (as is the case for tobacco products).

By the age of eight, Dorr (1986) found that most children are capable of differentiating commercials from regular programming on more than visual and auditory qualities. Before then, they also find it more difficult than adults to distinguish reality from fiction: for example, when actors or humans are used it is assumed to be real, while fiction is limited to cartoons, puppets or other fictitious characters; the notion of an actor paid to pretend to be someone else can be difficult for them to grasp (Reeves and Nass 1996, Dorr 1983, Kennedy, Sztremeko, Danford and Kools 2002). Brucks, Armstrong and Goldberg (1988) support Roedder's model in showing that children aged nine to ten do have advertising knowledge but need to be cued to use it. This cueing can be as simple as asking a direct question about what the advertisement intends to do (and thus the use of direct questions in analysing advertisements in media literacy programmes is an effective way of stimulating advertisement knowledge as long as the students are frequently and consistently cued).

In general, advertising is seen by many children as informative rather than persuasive, as providing a helpful indication of what is available in the shops (Childwise Monitor 2003, Young 2003). Voluntary expression of and reflection on the underlying persuasive motives of advertising begins to appear around the age of 12 (Powell 2001). In short, while children younger than twelve can learn to understand the differences between information and persuasion (Peterson and Lewis 1988), this does however not necessarily lead to the spontaneous application of these skills. The same holds for nutritional advertisements or pro-social advertising: young children learn the lesson but it does not seem to influence their preferences and behaviour.

By the time they are teenagers, children are often highly sceptical of advertising, more selective in their attention to advertising, and more distrustful of the claims made in advertisements (Boush 2001, Childwise Monitor 2003, van Evra 1998). It seems that those who have just acquired the skill to identify the persuasive intent of commercials tend to overreact and think that everything in advertising is unreal and created with malicious intent (Dorr 1986).

Advertising literacy and processes of persuasion: does literacy mediate the effects of advertising on children?

What is the link between age, literacy, and advertising effects? Curiously, although many reviews consider both the question of developing literacy and the question of effects on children, none put these two together so as to ask whether advertising or consumer literacy makes a difference to, or mediates, the effects of advertising. Young's (2003) review is typical of others when it draws conclusions separately about each of these issues but does not seek to relate them.

How shall we relate the two arguments put forward above, namely that advertising affects children across the whole age range, but that advertising literacy varies significantly by age? No single process of persuasion can account for this combination of findings. Consequently, we must rethink the commonly assumed view that, since children gain in advertising literacy as they become developmentally more sophisticated, this results in a greater ability to resist or defend against the messages of advertising. Rather, it has been suggested that both the form of advertising messages and the level

of children's media literacy vary by age. It may also be that socio-cognitive processes of influence and persuasion vary by age, providing a further piece of the puzzle.

Importantly, the findings reviewed are consistent with the Elaboration Likelihood Model of Persuasion (Petty and Cacioppo 1986, Eagly and Chaiken 1993), a widely-adopted socio-cognitive model which proposes two 'routes' to persuasion. Each is governed by different principles and affected by different factors. According to the model, under certain conditions, people pay attention to the content of the message, and so are persuaded by the message precisely because they attend to and engage with the arguments put forward for a position or product (this is termed the 'central route' to persuasion). Under other conditions, people remain relatively unengaged by the message content but may still be persuaded by such characteristics of a message as the status of its celebrity source or the intensity of the message (colour, sound, emotion) that do not directly relate to the arguments given (this is termed the 'peripheral route' to persuasion).

Since the central route to persuasion increases the likelihood that the person will engage cognitively with the message, checking, interpreting, amplifying – indeed, elaborating – the message, this process has been found to have longer lasting effects than the peripheral route, where the likelihood of elaborating the message is much lower. In other words, with both routes to persuasion, the person pays attention, but the quality of the attention is different, and hence so are the consequences.

What conditions make the difference? Research suggests that if people are motivated to attend to the message, which depends in turn on whether they consider it likely to be personally relevant to them, and if people have the ability to engage with the message, which in this context we might reframe in terms of media literacy, then the central route becomes more likely. Persuasion then depends on the nature of the message – the strength of the arguments, the quality of the content. If the person lacks either motivation or ability/literacy, the quality of the arguments matters little, but a different kind of attention – more superficial – may still occur, resulting in less lasting but still significant effects.

The important point to take from this model is that, contrary to popular views of advertising, it does not assume that if a person is knowledgeable about or critical of an advertisement, they will not be persuaded.⁵ Rather, it suggests they may be even more persuaded if they are motivated and interested in the message content. Similarly, it does not suggest that if a person pays little attention, they will not be persuaded. Rather, it suggests that under these conditions, more superficial factors – like a celebrity endorsement or an intensely appealing or attractive image – may catch their eye, resulting in a less enduring but still significant form of persuasion.

⁵ Some research does support this view, however. For example, Kim and Rubin (1997) report a path-analysis study which noted the advantages of 'media-scepticism' as well as the disadvantages of its absence (which we might term 'media-naivety'), concluding that 'the facilitative activity of selectivity, attention, and involvement served as a catalyst to media effects, whereas the inhibitory activity of avoidance and scepticism served as a deterrent'. At a certain point, one must inquire more closely into how 'effects' and 'media literacy' are defined in these kinds of studies, in order thoroughly to compare the findings of different studies conducted using different theories.

Putting this together with our findings on age, literacy and media effects, we suggest that younger children are more likely to be persuaded primarily by the peripheral route, while teenagers are more likely to be persuaded by the central route. Despite the popular image of the distracted and inattentive teenager, this makes sense: in surveys, teens report on their self-selected viewing (and so may be supposed to be interested in it, ignoring that which merely attracts their scepticism), while in experiments, teens are likely to treat the experimental viewing as a school lesson (and so pay dutiful attention to the content of the arguments). Gunter and McAleer (1997) review research suggesting that teens are indeed influenced by advertising when they are highly motivated to attend to it.⁶

This also makes sense of advertising to adults: if we follow the logic that developing media literacy undermines the effects of advertising, one would wonder why advertisers advertise to adults. But if one argues instead that different processes are involved, depending on motivation and relevance, ability and literacy, then it makes sense not only that advertisers address audiences of all ages but also that they do so using different strategies to appeal to, argue to, persuade those different audiences.

The possibility, then, is that less literate viewers (generally younger children) are more influenced by superficial or peripheral features of advertising, provided these are sufficiently attractive. On the other hand, more literate viewers (generally older children and adults) are more influenced by the quality of the arguments and claims of advertising, provided these are sufficiently strong. Hence, examining these possibilities further and systematically – both theoretically and empirically – would merit further attention.

The importance of ‘source credibility’ – being persuaded not by the qualities of the product but by the qualities of the source recommending the product – is a key indicator of peripheral route persuasion. Recent public attention has focussed on the possibility that for children (and adults), celebrities are influential sources, though little empirical research has examined this. Ross, Campbell, Wright, Huston, Rice & Turk (1984), in a much-cited study, found that children older than eleven were less influenced by celebrity endorsement than those aged eight to ten. This supports the argument above, the peripheral route processing – and hence the effectiveness of celebrity endorsement – is typical of younger rather than older children.

Studies regarding the effect of celebrity endorsement on children are few and far between. For younger children, celebrities are seen as experts on the topic, they increase the popularity of the product and, interestingly, they need not be a real celebrity, merely to be perceived as such by the children (van Evra 1998; Ross et al 1984). Even cartoons or live action figures in advertising can be seen as a form of celebrity endorsement since these characters are often the heroes of younger children. Among older children, the effects that do occur may be less tied to the advertised product. For example, Maltby, Giles, Barber and McCutcheon (in press) found that intense worship of celebrities can lead to negative body images in teenage girls. Giles and Maltby (2004) found that interest in celebrities is related to decreasing attachment to parents, suggesting that media figures might take over from parents as teen role models.

⁶ Arguably, then, the UK population’s pride in the wit and quality of its advertising points precisely at the source of its power.

Although the number of studies is rather sparse, many experts appear to be of the view that celebrities, cartoon favourites and other familiar characters from programmes should not be used in promoting HFSS food products to children (and conversely, may be effectively used in promoting pro-health messages). Such thinking has clearly informed phrasing of the Swedish restrictions on advertising to children.⁷

Linking media literacy, persuasion and advertising effects

Media literacy is “the ability to access, analyse, evaluate and create messages across a variety of contexts” (Aufderheide 1993). Or, as Hobbs and Frost (2003: 334) put it, media literacy is “the skills of analyzing, evaluating, and creating media and technology messages that make use of language, moving images, music, sound effects, and other techniques”. Note that by creating messages, the intention is not to transform audiences into broadcasters but rather to argue that if people are skilled in message creation as well as reception, they are more thoroughly ‘empowered’ to use the medium, as well as more able to analyse and so criticise its messages (Livingstone 2003). “Advertising literacy”, by extension, can be understood as the skills of analysing, evaluating and creating persuasive messages across a variety of contexts and media.

So, how does media literacy enter into the relationship between advertising and dietary patterns? By comparison with many other countries, the UK has a relatively long and strong tradition in media literacy research and educational programmes. Most research is based on assumption that the media’s negative effects might be mitigated if children had a more sophisticated awareness of what is real and what is fictional, or of media production techniques (Gunter and McAleer 1997, Buckingham 1993). Advertising literacy fits well here, since it has been argued that (food) advertising has negative effects on children’s health and that children have difficulties distinguishing advertising from other programming, therefore accepting its claims at face value.

‘Because cognitive abilities work in different ways for viewers’ processing of television, the application of more or less effort to them may have different outcomes. Some cognitive effort while viewing may increase learning, comprehension, or the isomorphism between television content or viewer beliefs and behaviours. In other cases, cognitive effort may decrease learning from television or increase the likelihood of beliefs opposed to those presented on television (Hawkins and Pingree 1987: 462).

Consistent with the Elaboration Likelihood Model, Hawkins and Pingree (1987) do not advocate that increased cognitive effort (or media literacy) will undermine media effects. Rather they suggest that under different conditions, cognitive effect will increase or reduce media effects.

Based on information processing approaches that study the ways in which persuasive messages influence behaviour, it is argued that there are several elements of a message that can have an effect (Eagly and Chaiken 1993). Advertising that uses visual imagery (cf. the ‘intensity’ criterion of the Elaboration Likelihood Model) is in general better remembered not only by adults but also by children (Edens and McCormick 2000).

⁷ Available at <http://www.konsumentenverket.se/mallar/en/startsidan.asp?IngCategoryId=662andIngArticleId=889>.

Also, advertisements that relate directly to the world of the child and are relevant to the child will invite more elaborate and critical processing by this child. If the child is not interested in what is advertised or presented, then he or she is likely to pay more attention to non-argument (peripheral) features such as jingles, colours and characters. Note, however, that in studying the cognitive abilities of children to understand advertising or media in general, it is important to consider their ability to voice their thoughts. An inability to do so does not necessarily mean a lack of understanding (Donohue, Henke and Donohue 1980). It is also important to note that negative attitudes towards advertising do not necessarily predict behaviour after being exposed advertising (van Evra 1998).

Media literacy is often discussed in situations where advertising bans are not seen as an appropriate way forward (Roedder 1981). Yet there is surprisingly little empirical support for the assumption that media literacy (or active and critical viewing) weakens or undermines the effects of advertising on behaviour. Hobbs and Frost (2003) review evidence which suggests that media literacy training can be effective and stimulate critical thinking about the messages presented to young people. After media literacy training, students were able to identify information that was implicit or omitted in advertising. However, in this study, such critical thinking was not actually used unless activated by media literacy training or when explicitly invited of the young people, and still the evidence that this undermines observable effects could be stronger.

C. Food choice and obesity: complex issues with multiple causes

Effect size. To what extent, in terms of explained variance, does food promotion to children affect their food choices?

How does food promotion fit within the larger web of causality in explaining children's food choice and rising obesity? Focusing here just on the question of the size of any direct, rather than indirect, effect, one should note first that the vast bulk of the literature addresses television advertising rather than food promotion in general. It appears to do so not for theoretical reasons – for the underlying interest is indeed on food promotion across multiple channels in a complex and mediated environment.

Rather, the reasons may be assumed to be methodological. Studies of nutrition, diet and obesity tend to be large-scale, often government-funded surveys, and in these it is very difficult to ask in a reliable manner about exposure to diverse promotion channels. It is also difficult to ask in a survey about exposure to television advertising specifically. Consequently, the variable most commonly used as a proxy is hours of television viewed per day or week. Unfortunately, reliability of measurement⁸ (which is fairly high for such a measure, though still flawed especially for younger children) is routinely traded off against the validity of the measure⁹ - for as many critics have observed, television exposure is imperfectly associated with advertising or promotion exposure; nor have attempts been made to assess the degree of validity of this very widely-used measure.

⁸ The reliability of a measure refers to whether, when the measure is repeated under similar circumstances, the same results are obtained for the same individual.

⁹ The validity of a measure refers to whether you are actually measuring what you want to measure in a study. In this case, the question is whether the number of hours of television viewed is a good measure for the quantity of advertisements that a child is exposed to.

Hours spent in television viewing is also the most widely used measure of food promotion exposure because it has been found in many studies to correlate with measures of poor diet, poor health and obesity, among both children and adults (Gortmaker, Must, Sobol, Peterson, Colditz and Dietz 1996; Kaiser Foundation 2004, Klesges, Shelton and Klesges 1993, Wong, Hei, Qaqundah, Davidson, Bassin and Gold 1992, Bar-on 2000). Hence, this measure does appear to be telling us something important. It is here that the main – and for our present purposes, key – contentious issue arises among the experts in the field. For some, the strong and consistent correlation between hours spent viewing television and nature or level of HFSS food choices and obesity is crucial. For others, it represents one among many factors, and may be among the least important. For some too, television viewing is one of the more easily altered variables contributing to obesity, and so a useful focus for interventions (Kaiser Foundation 2004). For others, there are several higher priorities for intervention. Within the literature, and among expert commentators, there remain, then, some unresolved issues.

First, what is the relative influence of television exposure on children's food choice by comparison with other factors? This is generally discussed in statistical terms, asking about the proportion of observed variance in children's food choice that can be explained by television exposure, when all other relevant factors (especially those known to correlate with both television exposure and food choice, such as socioeconomic status) have been statistically controlled for. Frustratingly, and as noted by several reviews (e.g. Hastings et al 2003; Young 2003), few studies examine the variance explained, or effect size, of television exposure by comparison with that of other variables.

There is also a methodological bias such that experimental studies, which directly measure advertising exposure, include too few other variables to compare the effect size of advertising with other influences on food choice, while correlation-based survey studies, which do measure a wide range of variables, generally use television exposure as an approximation of advertising exposure. Lastly, the most practical difficulty here, few published studies report sufficient statistical details (subgroup sizes, degrees of freedom, means and standard deviations, test values, etc) to permit secondary re-analysis or meta-analysis of the effect sizes¹⁰.

Unfortunately, therefore, this issue remains unresolved, although one much-cited study in America found that food advertising, among in the broad array of factors that influence eating habits, independently contributes 2% to the variance explained (Bolton 1983). While this may seem low, especially by comparison with findings of greater influence of parental diet, product price, family meal habits or exercise (Ashton 2004, Bolton 1983, French 2003, Hastings et al 2003), it is consistent with findings in other domains of media effect (for example, in the case of television violence, meta-analysis shows that both correlational and experimental studies tend to reveal fairly consistent but fairly modest effects, accounting for some 5% of the variance in the dependent variable (Hearold 1986).

¹⁰ 'Meta-analysis seeks to combine the analyses from all relevant individual studies into a single statistical analysis with an overall estimate and confidence interval for effect size' (Givens, Smith and Tweedie 1997: 221).

Second, what is the significance of television exposure? In other words, why is there a correlation between amount of viewing and food choice? Interestingly, few argue that the causal inference should be that those with HFSS food preferences are more likely to watch more television. Similarly, although many studies are careful to identify third causes (such as socioeconomic status), it is generally considered that in addition to the effects of the third cause (in which, for example, lower SES families both have less healthy diets and, independently, watch more television), it is also the case that television exposure affects food choice/health. In the literature, three possible explanations are offered:

- (1) television viewing is a sedentary activity that reduces metabolic rates and displaces physical exercise;
- (2) television viewing is associated with frequent snacking, pre-prepared meals and/or fast food consumption;
- (3) television viewing includes exposure to advertisements for HFSS food products.

While the relative weight accorded to these explanations varies, and while too little empirical research has successfully disentangled these explanations, most expert commentators appear to assume that all three have some purchase (Robinson 2001, Proctor, Moore, Gao, Cupples, Bradlee, Hood and Ellison 2003, Dietz and Gortmaker 1985, Klesges, Shelton and Klesges 1993). Nonetheless, it should be noted that 'while logic suggests that extensive television viewing is part of a more sedentary lifestyle, the evidence for this relationship has been surprisingly weak to date' (Kaiser Foundation 2004: 4).

Most researchers believe that exercise levels, meal habits and exposure to advertising each make an independent contribution to accounting for variation in food choice, health and obesity, and they may interact with each other, thereby also indirectly affecting these outcome measures among children, possibly to a much larger extent than for any direct effect. It is to these two questions – the range of factors affecting health, and the relations among these factors, that we now turn.

Range of relevant factors. What is the range of factors which influences children's food choices, where does food promotion fit within this, and what gaps exist in the evidence base?

The complexity of the obesity epidemic, as it has been called, is such that one cannot blame any one single factor. Advertising and television viewing thus contribute to the broad array of factors that influence eating patterns. Young et al (1996: 19-22) offer a broad review of the influences on children's food selection and preference. This suggests the importance of a number of social factors (caregivers choices, pairing with reward or punishment, cultural norms, etc) determining food selection (and, in consequence, food preference). Parental habits and control of eating are also an important determinant of children's diets, while schools and peers are also influential in determining preferences and habits. However, the evidence base is rather small, particularly for UK-based research, providing comparatively little insight into the influence of peers, parents, cultural norms or other media or non-media influences on

children's food choices, and leaving open entirely the possibility of interactions or indirect effects among these various social influences (whether mediated or unmediated).

Nonetheless, some valuable and interesting empirical studies have been conducted, as reviewed below. Often researchers are concerned not only to identify problematic influences on children's health but also to identify effective strategies for positive interventions.

Children's food knowledge and food choice

As in other domains of pro-social intervention (e.g. public information campaigns, health education, civic education), in this field a significant challenge is the widespread observation that food knowledge does not translate straightforwardly into food behaviour. Children may know what constitutes a good diet yet continue to make HFSS food choices; and the same, of course, applies to many parents and other adults. Hence eating habits, much more than food beliefs or eating intentions, predict food choice (Lvovich 2002).

A study in New Zealand (Hill, Casswell, Maskill, Jones and Wyllie 1998) showed that although teenagers had good knowledge of what was healthy and what not, what they ate was determined by how desirable foods were. Desirability is in turn determined by taste and by looking and feeling good after eating the product (Gracey, Stanley, Burke, Corti and Beilin 1996). Important barriers to eating healthy are the unavailability of healthy foods at home or school, not knowing about contents of foods and the effort involved in dieting. According to Gracey et al (1996) one of the most important elements of improving eating behaviours is increasing youngsters' self-efficacy in controlling their diet; this needs to be accompanied by provision of nutrition education, and parents and schools need to be involved in making healthy foods more available.

It is very important to establish healthy eating habits early on in life, these patterns will be continued in adult life and hard to change at a later stage (Hill, Casswell, Maskill, Jones and Wyllie 1998; Kelder, Perry and Klepp 1994; Sweeting et al 1994). Although UK children are aware of the recommendations for health diets, the messages are nonetheless often confusing or unclear. In general, more recognise fruit than vegetables to be as part of a healthy diet (Edwards and Hartwell 2002). It has proved easier to promote fruits than vegetables to children, and when promotions for healthy eating are more effective if the focus is on taste rather than health (Sutcliff, Thomas, Harden, Oakley, Rees, Brunton, and Kavanagh 2003).

An intriguing finding in a study by French, Story, Neumark-Sztainer, Fulkerson and Hannan (2001) shows that among adolescents, frequent visits to fast food restaurants are not related to obesity, although it is related to higher intake of energy and fat, and that among males they are in fact negatively related. These habits formed at a time when the young body needs more energy intake, can have negative effects when these children get older and their body needs less energy. These same authors found that greater fast food restaurant use was related to television viewing, but also to less concern about healthy eating, more perceived barriers to eating healthy foods (e.g. taste), and lower parental concern over eating.

Weight concerns are more strongly related to Body Mass index (BMI) and less prevalent in boys than in girls (Field, Camargo, Taylor, Berkey, Roberts and Colditz 2001). It is

less common for boys to worry about being overweight. On the other hand, girls may be more amenable to intervention: differences have been found between boys and girls in the effects of interventions (Gortmaker, Peterson, Wiecha, Sobol, Dixit, Fox, and Laird 1999). Interventions such as diminishing the hours of television viewed and increasing physical activity do seem to have an effect on girls but not on boys, although girls who lose weight are more likely to put it on again.

Parental food knowledge and behaviour

As with smoking behaviour, parental habits are an important factor in determining children's eating patterns before the age of five (Skinner, Carruth, Moran, Houck, Schmidhammer, Reed, Coletta, Cotter, and Ott 1998, Field, Camargo, Taylor, Berkey, Roberts and Colditz (2001). A study by Ritchey and Olson (1983) showed that the parent's frequency of eating foods, parent's attitudes towards giving sweets and the amount of television viewed all influence how much sweets their children eat, but that all these relationships were stronger for the oldest child than for subsequent children. There is also a stronger relationship for younger (preschool) children than for older children. Parents' frequency of consumption is a better predictor of children's eating habits than parents' preferences for certain foods. Skinner et al (1998) conclude that the most restricting factor in the food preferences of children is the not offering of food by parents.

Greater parental knowledge about nutrition, and the parental belief that eating patterns can influence a child's health, diminishes the probability of their children being overweight. It is not only parental knowledge or behaviour that influences the child's eating patterns but also the mother's eating preferences. Children's preferences correspond with their mothers at an early age and by the age of 2 or 3 years old food preferences are formed (Skinner, Carruth, Bounds and Zeigler 2002). Girls who see their mother dieting frequently become more worried about their own weight. The perception of importance of thinness of the child by a father, according to this survey, was more important than the perception of thinness by the mother. In this study, as unfortunately in many others, media exposure was not measured and so one cannot determine the relative importance of mothers' dieting habits in comparison with media influences. Other studies show that when parents underestimate their own weight, the chances of their children being overweight are larger than for those that accurately estimate their weight (Variyam 2001).

Several studies point to the fact that those who eat with the family have healthier dietary habits. Family meals become less frequent as children get older and the frequency of those meals differ for different ethnic groups and socio-economical status (Neumark-Sztainer, Hannan, Story, Croll and Perry 2003). The influence of family eating patterns on dietary intake stays strong even after controlling for other variables such as television viewing and physical activity. Eating away from home also increases the consumption of soft drinks which is related to problems with weight (French, Lin et al 2003).

The socioeconomic status of parents and their educational background is associated with whether a child has the opportunity to select products while shopping with parents (Carruth, Skinner, Moran and Coletta 2000). Stratton and Bromley (2003) report that family and friends' pressure to eat certain things is perceived by parents as having a greater influence in what they eat than television advertising. The older the child becomes the harder it is for parents to control what their kids are eating. Peer pressure to eat 'cool stuff' seems to be important especially for adolescents (Hill et al 1998).

Diet or exercise?

There is some debate over whether children's calorific intake has declined in recent decades (Ambler 2004); suggesting that there has been an even greater decline in exercise if growing obesity is to be explained (see also Clarke and Preston 2003). Less controversially, Lvovich (2002) reviews evidence that levels of physical activity among children in the UK are 50% lower than the recommended level. Research also shows that parental inactivity is a major predictor of child inactivity, just as parent obesity is a strong predictor of child obesity (Lvovich 2002).

As previously discussed, most research linking media with obesity or being overweight and media has been conducted in relation to television viewing. Sedentary behaviour like television viewing is associated with the consumption of more food. Unhealthier eating and snacking are associated with watching television and using the computer, while reading and doing homework are related to more healthy diet patterns (Utter, Neumark-Sztainer, Jeffrey and Story 2003). It is important to note the difference between boys and girls: sedentary activities in girls are more related to homework and reading while for boys they relate to watching television and playing computer games.

In a much referred-to family-based intervention study, Epstein, Paluch, Gordy and Dorn (2000) showed that actively reducing sedentary behaviour is more effective in treating preventing and treating weight problems and obesity than interventions directed at dietary changes or increased physical exercise. For this strategy to work it is important that other attractive activities are available to the child. Physical activity changes are also better maintained than dietary changes. Gortmaker, Dietz and Cheung (1990) point to the same solution when suggesting that dieting is primary in preventing obesity, but that limiting sedentary activities in children is just as important, more so than promoting strenuous physical activity. These and other authors come to the conclusion that reducing television viewing is vital in the treatment of obesity. As Robinson (2001: 1023) argues, 'television viewing is a cause of increased body fatness and ... reducing television viewing is a promising strategy for preventing childhood obesity'.

Physical activity declines when children grow older, especially in adolescence, and the difference between boys and girls increases to the disadvantage of girls (Neumark-Sztainer, Story, Hannan, Tharp and Rex 2003). BMI and eating at fast food restaurants are not related to physical activity, but are associated with television viewing for adults and children (Neumark-Sztainer, Story, Hannan, Tharp and Rex 2003, French, Harnack and Jeffrey 2000). This is further confirmed by the fact that television watching is not associated with physical exercise. However, time constraints, support of parents and peers for physical activities and self-image are also significant in determining obesity in adolescents. Physical activity and knowledge about healthy foods also seem to be associated with each other (Hill et al 1998).

Other key demographic variables also make a difference. In American research, factors such as ethnicity, environment, socio-economic status and education are related to amount of television viewing, to the influence of advertising and to eating patterns (Brand and Greenberg 1994, Linhares, Jones, Round and Edwards 1984, Story, Neumark-Sztainer and French 2002, French, Story et al 2001, Proctor, Moore, Gao, Cupples, Bradlee, Hood and Ellison 2003, Tirodkar and Jain 2003; Andersen, Crespo, Bartlett, Cheskin and Pratt 1998). In general, ethnicity, lower socio-economic status and

lower educational levels are found to be related to higher television viewing and less healthy eating patterns. There is little clarity as to how these demographic features interact to support certain patterns of attitudes or behaviour, and parallel studies in the UK are lacking.

School and external factors

School involvement in issues related to healthy living can be divided into three areas: classroom based programs, changing school meals, and plans to increase physical activity within the school day (Eufic 1999). In general, the influence of these programmes in reducing obesity has been small and further research is necessary to see how these programmes might be developed to become more effective (Fulkerson, French, Story, Snyder and Paddock 2002, French, Story and Fulkerson 2002, Norton, Falciiglia and Wagner 1997). In a recent review of intervention studies, Sutcliff, Thomas, Harden, Oakley, Rees, Brunton, and Kavanagh (2003) found that school interventions can have a small but significant positive effect on healthy eating, knowledge, self-efficacy, physical activity and BMI.

Another role that schools could play is that of educator in cooking and in regulating what is sold in the school through vending machines and in the canteen by packaging healthy foods in a snacking format that attracts children (Hill et al 1998). French (2003) showed that reducing the price of vegetables and fresh fruit in schools can mean a significant increase in healthy eating patterns. Another American study showed that financial and other matters contribute to schools' resistance to offering only healthy foods to the students (French, Story, Fulkerson and Gerlach 2003; Harnack, Snyder, Story, Holliday, Lytle and Neumark-Sztainer 2000). The more powerful interventions are those targeted at 'high-risk' parents, and interventions are more effective if concentrated on a single message promoted across a variety of media and institutions (Hill et al 1998).

A multi-level approach to explaining food choice

Story, Neumark-Sztainer and French (2002) have usefully distinguished four levels of factors that influence eating behaviour, thus developing an appropriately complex, multi-factor account of food choice:

- Individual (intrapersonal): psychosocial, biological, and behavioural factors.
- Social environmental (interpersonal): family, friends, and peer networks.
- Physical environment (community): accessibility and lack of foods.
- Macrosystem (societal): mass media and advertising, social and cultural norms, production and distribution systems, policies, and pricing systems.

This same article reviews a wide range of findings, mostly American, in each of these categories, as summarised and extended in Table 2 (see also Hastings et al 2003, Livingstone 2004, Young et al 1996). Although this article focuses on adolescents, many of the same factors apply also to younger children (and indeed, to adults). It remains for future research to 'evaluate the relative contribution of each domain [social, physiological, etc] to the development of food choice patterns, food preferences, and eating style' (Young et al 1996: 2).

Table 2

A multi-level model of factors that directly influence children's food choice

Level	Factor	Argument/ finding
INDIVIDUAL (INTRAPERSONAL)		
(a) Psychosocial		
	Food preferences	Food preferences established in early childhood are a strong predictor of later food choices
	Taste/ sensory/food perceptions	Those who place most emphasis on taste (rather than hunger or price) are less likely to select healthy foods
	Health and nutrition	Health and nutrition are not a major influence on food choice among adolescents
	Meanings of food	Junk food is associated with friendship and fun; healthy food is associated with family
	Self-efficacy	High self-efficacy is associated with healthy food choices, and vice versa
	Food knowledge	Knowledge of nutrition is important, yet poorly related empirically to healthy dietary behaviour
(b) Biological		
	Heredity	Research suggests a fair proportion of variation in obesity is attributable to heredity
	Hunger	A significant driver of food choice in adolescents who grow fast in this period
	Gender	Boys eat more than girls, with adolescent girls not always meeting their nutritional needs
(c) Lifestyle		
	Time and convenience	Actual or perceived constraints on time/effort strongly influence adolescent food choices
	Cost	Like adults, teens are price-sensitive, and healthy eating is increased by price reductions
	Meal patterns	Skipping meals (especially breakfast) is associated with less healthy diets
	Dieting	Common among girls, frequent dieting is associated with inadequate nutrition
SOCIAL ENVIRONMENT (INTERPERSONAL)		
(a) Family		
	Poverty	Evidence linking household income and dietary intake is mixed; some findings that diets are less healthy in poorer families
	Working mothers	Research does not find that increasing maternal employment over recent decades is associated with less healthy diets
	Family meals	Eating dinner with the family declines in frequency with age, and eating with the family is associated with a healthier diet
	Food availability	Having healthy foods to hand in the home is associated with healthier food consumption
	Parental	Parents' weight, nutritional knowledge and

	weight, diet and knowledge	food intake are all key determinants of children's nutrition and health
(b) Peers		
	Influence of friends	Weak link between teens' diet and friends' diet (stronger link between teens' and parental diet)
	Conformity/norms	Teens claim independence from peer pressure, yet may still occur
PHYSICAL ENVIRONMENT (COMMUNITY)		
(a) Schools		
	Type of school	Food provided by primary schools is healthier than secondary schools
	School finance	Schools sell HFSS snacks to raise money, and school lunch services must compete with commercial sources of food supply
	Commercial contracts	Schools increasingly contract with commercial suppliers for vending machines, soft drinks etc
	Advertising/sponsorship	Schools increasingly accept sponsorship in exchange for school advertising opportunities
(b) Commercial sites		
	Fast-food restaurants	Cheap, fun and available, this increasing part of teens' daily life provides an unhealthy diet
	Vending machines	Increasing snacking from such machines is associated with an unhealthy diet
	Convenience stores	Often located near schools and recreation centres, teens buy HFSS products
	Worksites	Many teens have part-time jobs, often in fast food restaurants and convenience stores where they receive discounted food
MACROSYSTEM (SOCIETAL)		
(a) Consumerism		
	Youth market	Teens' discretionary spending power, earned or from parents, is significant in the present and provides access to the future adult market
	'Pester power'	Children's influence their parents' spending directly and, through parental attempts to please them, indirectly
(b) Media		
	Media-rich environment	Multiple media, the media-rich home and personalised media combine to create an advertising-rich, media culture
	Food advertising	With significant budgets devoted to food promotion, especially television advertising, studies find that these messages directly encourage HFSS food choices
	Television exposure	The consistent correlation between television viewing and HFSS food choices/childhood obesity is due to displacement of physical exercise and increased snacking

	Effects on food requests	The more television is viewed, the more children request, purchase and consume advertised foods
	Influences on body image	Especially for teenage girls, the media encourage unrealistic expectations of ideal body size, resulting in discontent with body image and attempts to diet

Direct and indirect effects of advertising. How does the range of factors interact, resulting in indirect as well as direct effects of promotion on children’s food choices?

As we have seen, reviews of the field concur that, ‘adolescent eating behaviour is viewed as being a function of multiple levels of influence.’ (Story, Neumark-Sztainer and French 2002: S41). Story et al go on to argue for the importance of ‘interaction and integration of factors within and across levels of influence’. Indeed, the research literature contains many attempts to model the process of food choice. While a comprehensive review of these is beyond the scope of this report, most reviews also concur that these multiple factors operate at multiple levels. Hence, it is too simple to posit that the multiple factors each, separately, play a role in accounting for variation in food choice. Rather, we need to consider the possibility that these factors *interact* with each other, thereby *indirectly* affecting children’s food choice (Boush 2001). As Yanovitsky and Bennett (1999) observe:

‘For several decades, researchers’ theoretical and empirical efforts to uncover substantial media effects on human behaviour have predominantly focused on the effects of direct individual exposure to media content. In general, this line of research provided evidence of minimal media effects, at best...future research efforts to uncover media effects on human behaviour may also benefit from considering the impact of mass media on the social and cultural environment that surrounds people and influences their behaviour.’¹¹

So, having identified a wide range of factors affect children’s food choice, health and obesity, of which advertising is undoubtedly one, we now consider the argument that advertising – or television viewing more generally – has its effect *indirectly*, mediated alongside and through other variables, as well as directly. In other words, if television/advertising → xxxx → children’s food choice, health and obesity, then what is xxxx ? Different forms of indirect effect can be proposed here. For example, in some cases, advertising has an amplified or reduced effect if the mediating factor is present. In other cases, there is an interaction between advertising and another factor. Indeed, statisticians distinguish different forms of indirect or mediating process here, including

¹¹ Yanovitsky and Bennett (1999) continue, summarising the views of many researchers in the field: ‘Theoretically, it may be useful to consider media effects at the higher-than-individual level (i.e., societal level or group level). It is also important to address the question of cumulative effect of exposure to enduring media content. In so doing, it is also important to recognise that human behaviour change is likely to be slow and gradual rather than rapid and substantial. The methodological implications of these theoretical guidelines is that uncovering substantial media effects on behaviour requires the incorporation of the time dimension into the analysis and a multilevel analysis of the relationship between mass media content and human behavior’.

factors that amplify/dilute an effect, factors that switch an effect on or off, factors that interact with another to generate an outcome greater than that of either of the separate factors combined, factors that are effective as part of a larger system of factors, each of which alters the operation of the others, and so forth.

Table 3 outlines the range of indirect or mediating processes that affect children's food choice that have been proposed in the literature, categorising the mediating variables in terms of the same four levels of analysis as were identified in Table 2. Not enough is known as yet to confirm precisely how these various indirect processes have their effect, though each process identified below is readily interpretable.

Table 3
Indirect or mediating processes that affect children's food choice

Xxxx	Mediation by intrapersonal-level variables
Gender	<i>Advertising → gender → unhealthier food choice in boys more than girls</i> Several studies (Edens and McCormick 2000, Robinson, Hammer, Killen, Kraemer, Wilson, Hayward and Taylor 1993) find that adolescent girls are less affected by advertising than boys, partly because their media literacy is greater.
Cost	<i>Advertising → pocket money/own budget → HFSS food choice</i> The variety of ways in which children can obtain food mediates the effect of food advertising on children's eating habits and health, particularly since most children have their own budget and can buy food in different places on their way to school or in school.
Birth order	<i>Advertising → birth order → unhealthier food choice in first born</i> Ritchley and Olson's (1983) survey found a correlation between food promotion and diet mainly for older/oldest children, suggesting that the family culture, or style of parenting, varies for first born and later children.
Meanings of food	<i>Television → normalises image of 'unhealthy diet' → HFSS choices</i> Reductions in television viewing are associated with healthier perceptions of nutrition (Signorielli and Staples 1997) and with higher fruit and vegetable consumption (Gortmaker, Peterson, Wiecha, Sobol, Dixit, Fox and Laird 1999 ¹² , Boynton-Jarett, Thomas, Peterson, Wiecha, Sobol and Gortmaker 2003, Coon et al 2001).
Obesity	<i>Advertising → obesity → greater effect</i> There is a relation between obesity and the recognition of food adverts versus non-food adverts, with overweight children showing a greater ability to recognise food adverts, resulting in higher food consumption (Halford, Gillespie, Brown, Pontin and Dovey 2003).
	Mediation by interpersonal-level variables
Family meals	<i>Television viewing → meal habits → greater effect</i> An association between viewing television while eating and the choice of easy to prepare meals shows that households that eat during viewing make less effort in feeding children and so, in turn, they eat fewer

¹² Both this study and the Boynton-Jarett et al study (2003) were intervention studies for which reducing television was part of a broader intervention in grades 6 and 7 aiming to improve healthy living in children. Television viewing turned out to be an important factor in both eating more healthily and in losing weight.

	vegetables (Coon, Goldberg, Rogers and Tucker 2001); parents' nutritional knowledge was less important than ease of preparation.
Parental regulation	<i>Advertising → parents' regulation of media by age → media effects</i> In studies related to media in general, it seems that parents also tend to reduce their attempts to control their children's media use as they grow older (Atkin, Greenberg and Baldwin 1991).
Parental mediation	<i>Advertising → mediated by parental comments → less effect of ads</i> The experiment by Galst (1980) also shows the helpful mediating role of adult comments during viewing television advertisements. The positive effect of adult comments when viewing raises questions of literacy (helping children understand the intentions behind advertising) and/or of social norms (permitting children to distance themselves from the normative claims of advertising (see also Boush 2001).
Peer mediation	<i>Advertising → mediated by peer comments → less effect of ads</i> Stoneman and Brody (1981), in one of the few experiments that investigate the <i>mediating impact of peers</i> on the effects of advertising, obtain clear findings that both advertising and peers have an effect on the selection of the advertised salty snack (with peers able both to increase and decrease the effectiveness of an advertisement). This is, after all, the focus of viral marketing (e.g. Puri and Bullivant 2002).
	Mediation by community-level variables
???	We have not found research studies which suggest that community-level variables (e.g. school or public sites) mediate the effects of advertising or other media in affecting children's food choices.
	Mediation by societal-level variables
Pro-health messages	<i>Advertising → countered by pro-health messages → healthier choice</i> Goldberg et al (1978; study 2) shows, through an experiment, that viewing a prosocial television programme (with a positive message about healthy eating) has a greater effect on children's food selections than either advertising (for sugared foods) or a public service announcement (for healthy foods).
Pester power	<i>Advertising → pester power → unhealthy diet</i> Buijzen and Valkenburg (2003; see also Bandyopadhyay, Kindra and Sharp 2001 and Brody, Stoneman, lane & Sanders 1981) showed that the culture of advertising in general affects children's materialism, and their purchase requests to parents and so affects the food choices parents make for their children. This effect is seen to be stronger for younger children. However, Carruth et al (2000) show that, when the child is a preschooler, parents resist and almost always say no to the child's request, explaining why they refuse to buy.

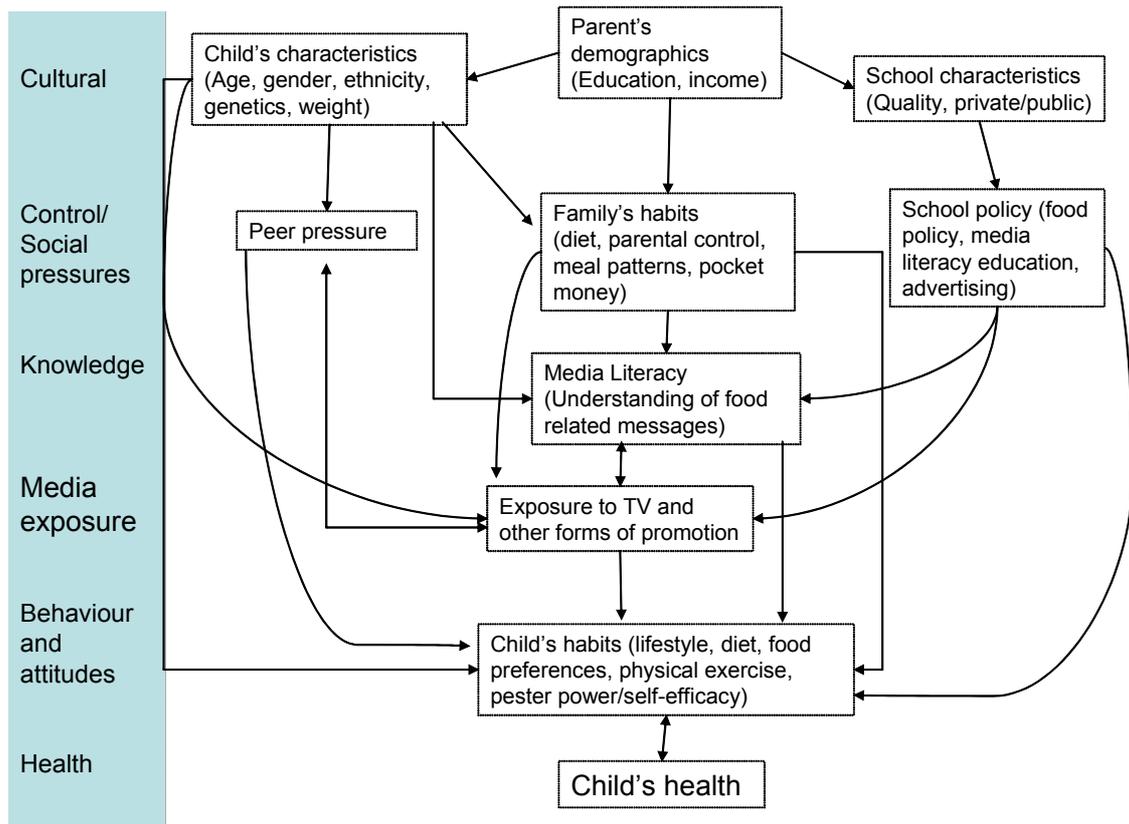
Towards a more complete picture of children's health

Figure 1, which is by no means comprehensive, begins to map the relations among these variables, showing both the direct (Table 2) and indirect influences (Table 3) and, hence, the complexity of this issue. Different levels of influences are indicated on the left hand side of the model.

In this figure both the indirect and direct effects of advertising, mediated by media literacy, are shown. The figure also shows the importance of the child's characteristics

as an influence on exposure to television, knowledge about media messages, and other habits. Further it shows the importance of parental habits as a direct influence on the development of (un)healthy habits and as a mediator of advertising influences. School characteristics are depicted as another mediating element through their influence on media literacy, which in turn mediates the influence of television exposure and other types of promotion.

Figure 1 Model of factors that influence children's food choice, habits and health



D. Questions of culture: UK-based research to inform UK policy?

The consequences of restrictions on advertising. Does restricting or banning the promotion of certain categories of product work, resulting in changes in children's preferences or reducing children's consumption?

The debate over the effect of food promotion on children's health and, in particular, the relationship between television advertising and growing levels of obesity has become of increasing importance in the UK and in many other European countries. Rather than avoiding the question of cross-national variation, an appropriate research strategy would be to interpret such differing findings as exist cross-nationally precisely in relation to national differences in communication and consumption contexts. While more primary research would be helpful here, in pursuing the rationale for and, especially, the

consequences of decisions to restrict or ban advertising to children in other countries, this section reviews the available findings so as to identify the outcomes of policy interventions to alter the conditions of food promotion or of children's diet. Can lessons from elsewhere be applied in the UK context?

The National Family and Parenting Institute (2003) is one of a number of organisations calling for a ban on food advertising to children in the UK, arguing that before a certain age children lack the knowledge to understand advertising's commercial purposes and so are more vulnerable to its influence. Other organisations take a more positive approach to advertising, arguing that keeping children from contact with advertising will leave them unprepared for the adult world and seeing it as parents' responsibility to regulate their child's consumption patterns (Bandyopadhyay, Kindra and Sharp 2001, Peace Pledge Union 2003). The World Health Organisation's (2003: 11) report on prevention of non-communicable diseases states that:

"Food advertising affects food choices and influences dietary habits. Food and beverage advertisements should not exploit children's inexperience or credulity. Messages that encourage unhealthy dietary practices or physical inactivity should be discouraged, and positive healthy messages encouraged. Governments should work with consumer groups and with the industry (including the advertising sector) to develop appropriate approaches to deal with the marketing of food to children."

Regulation regarding advertising in relation to children is now in place in many European countries (see Annex 2). Advertising restrictions or bans have been implemented for a range of product categories, raising the question of how far parallels can be drawn from, typically, the regulation of advertising for tobacco and alcohol to the case of food. It seems that most (HFSS) food advertising regulation started with a concern for dental health and so has focussed on sugary food products, although these regulations are now being reconsidered for their applicability towards other non-healthy foods, such as fast foods and soft drinks. More significantly, in most cases the effects of regulation have been little evaluated. Indeed, the instigation and implementation of regulation draws more on moral anxieties than on evidence-based policy making.

Effect of advertising bans

Surprisingly little research has sought to evaluate the effectiveness of advertising regulation and there is next to none on the effectiveness of banning food advertising from children's television since very few countries have a ban on food advertising (Hastings et al 2003). Many researchers therefore look to the effects of tobacco and alcohol advertising bans to predict if a ban of HFSS food advertising could make a difference.

There are indications of an association between exposure to advertising by young people and their awareness of tobacco and alcoholic products, as well as their smoking behaviour (Wilcox, Tharpe and Yang 1994), although the sales of alcoholic beverages in general do not seem to be influenced by advertising (Hastings et al 2003). It is also often the case that in countries which ban alcohol advertising, there are lower levels of alcohol abuse and related negative effects of alcohol use (Young 1993).

However, the causal factor in this relationship does not seem to be advertising restrictions *per se* but the fact that countries that already have lower levels of alcohol abuse are also more likely to impose bans on alcohol advertising. When Young (1993) controlled for such cultural factors, the relationship between bans and alcohol consumption disappeared (see also Fisher 1993). A similar pattern emerges when data are analysed on an aggregate level for bans on tobacco advertising. An international comparison across countries that have advertising bans on smoking found neither that these have lower levels of smokers nor that smoking was reduced following imposition of a ban (Boddewyn 1994), although health warnings on cigarette packages do seem to have an effect (Stewart 1993).

A number of meta-analysis studies have been conducted, and in general they show that tobacco advertising bans have at most weak and temporary effects (Duffy 1996, Lancaster and Lancaster 2003). Ambler (1996) studied the effect of advertising bans on the consumption of tobacco and found no support for either the weak theory (that there is an indirect effect of advertising) or for the strong theory (direct effect advertising bans); indeed, he found that advertising does not affect total market size. Since in general, then, advertising bans have been found to be ineffective in diminishing overall demand for and consumption of cigarettes, Duffy (1996) recommends that research should now examine the possibility of different effects for different groups (teenagers, adults etc) instead of just measuring effects for the population in aggregate. An additional argument concerning the apparent ineffectiveness of advertising bans is that generally they are partial in their focus on television advertising. To become effective, bans should probably encompass all forms of promotion instead of being implemented in relation to just one medium.

Goldberg (1990) and Caron (1994) have argued that the banning of food advertising on Canadian television did have an effect, as evidenced by the lower rates of obesity among French-speaking children (who were subject to the ban) than English-speaking children (who could still watch American commercial television from across the border). However, since no baseline measures were taken before the ban was implemented, the possibility remains that the French/English difference is long-standing and cultural rather than a result of the ban. Indeed, a recent study on the effect of advertising bans on childhood obesity shows that obesity does not diminish in countries (Sweden and Quebec) where advertising to children has been banned (Ashton 2004). This report also claimed that the evidence would lead us to blame not calorie intake but lack of exercise (itself related to television viewing) for the growing problem of obesity. On the other hand, within the advertising industry it is argued that ceasing to advertise results in reduced consumption of the product – hence the use of ‘defensive advertising’ (Johnson and Daniels 2000).

Cross-national comparisons. Can lessons learned from other countries be straightforwardly be applied in the UK?

Although most countries in the EU now have regulations in place regarding advertising to children, few of these policies have been tested for their effectiveness on reducing children’s buying behaviour or preferences. Statistical meta-analyses conducted following alcohol and tobacco advertising bans tend to find, in terms of their effectiveness at aggregate levels, that bans on advertising do not reduce consumption of these products.

Conclusions on tobacco and alcohol advertising may or may not be applicable to HFSS food advertising. One important argument is that the former are in part physically addictive and can cause dependency relationships while for food this is not necessarily the case. Another argument is that food is a necessity to survive, even though HFSS food is not, and that therefore different rules might apply for food advertising than for alcohol and tobacco advertising which are for a great part purely detrimental to health. However, it would seem that where there has been research on the effectiveness of bans on food advertising in relation to obesity, the conclusions are, at best, both unclear and contested.

However, obesity is a growing problem across Europe and America, including in the UK. Interestingly, there is rather little discussion within the academic literature on whether and how conditions in the UK differ from those in the USA or other countries. Notably, none of the research conducted in the UK contradicts findings obtained from other countries, suggesting a common approach to the problem may be valid despite the absence of clear-cut lessons developed elsewhere that can be applied in the UK.

There are some cultural, social and contextual studies which indicate cross-national variations that could affect the interpretation of findings across countries. For example, in studies of eating patterns across Europe (EUFIC 1999, 2002), the UK differs in one important aspect from other European countries: UK children apparently eat without their parents present more often than in other EU countries. While children in Italy, Germany and France eat at least half of their daytime meals (breakfast and lunch) with their parents, in the UK only one third do so. The implications for diet and healthy eating are yet to be demonstrated, but clearly this suggests both less parental monitoring or influence on what children eat and, probably, a greater frequency in the UK of eating while watching television, itself associated with unhealthy eating patterns.

In studies of children's leisure across Europe (Livingstone and Bovill, 2001), the UK again stands out, this time for a higher frequency of children having a television and other media goods in their bedrooms, and a higher dissatisfaction among UK children when evaluating the leisure opportunities available outside the home. Taken together, this suggests that UK children may have a more sedentary lifestyle and, while again the implications for diet and healthy eating are yet to be demonstrated, they may well take less exercise and have more individualised, home-based habits.

It is beyond the scope of this paper further to compare the conditions of childhood across developed countries more broadly, but undoubtedly a range of cross-national differences can be identified (Amit-Talai and Wulff 1995, Boh et al 1989, Burgelman 1997, Chisholm et al 1995, Gibbons et al 1997, Hofstede 1998, Johnsson-Smaragdi et al 1998, Livingstone et al 2001, Peschar 1984, Qvortrup 1989, Silverstone 1997). Further pan-European and UK-specific studies are highly recommended.

Policy alternatives

Since the apparently simple solution of banning advertisements receives little empirical support, and since this report has argued for diet and obesity as multiple-caused, complex problems, we end by mapping the range of possible policy alternatives as regards the link between media and children's health. The list that follows (Table 4) has

been taken from Kaiser Foundation (2004; see also Livingstone 2004), albeit adapted for the UK context.

Table 4
Policy options for altering the relationship between media use and children’s food choice

A ban on any advertising to young children
A ban on the advertising of HFSS or ‘junk’ foods to very young children
An official investigation into the marketing of HFSS food to children
A prohibition on food product placement in children’s programming
The provision of ‘equal time’ for messages on nutrition or fitness to counteract food ads
Parental ‘warnings’ about the nutritional value of advertised foods
A repeal of the tax deduction for company expenses associated with advertising HFSS foods to children
A prohibition on food advertising or promotion in schools
Explicit announcement of food-related product placement deals in popular programmes seen by children
Eliminating or limiting cross-promotions between popular children’s media characters or celebrities and HFSS food products
Increasing the use of popular media characters and celebrities to promote healthy food alternatives
Improving the labelling of or information about both healthy and HFSS food options

One key hypothesis we may draw from this review is that media literacy education, if focused on recognition of advertising production purposes and techniques, would have benefits for younger children in reducing the effects of advertising. However, as this age group becomes more literate, one would also expect advertisers to respond in targeting their messages. For teens, a different strategy is indicated, one less focused on media literacy and more focused on countering the arguments of advertising (e.g. through consumer awareness, provision of alternative food messages and health information).

Further, the review has identified a wide range of factors which affect children’s health and obesity. These factors vary not only in the probably extent of their influence but also in their susceptibility to intervention and change. Hence, expert commentators are agreed that a multi-stranded intervention, in which the media form one strand, is more likely to succeed than interventions based on any single factor.

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Annex 1: Experts (who responded to the invitation to advise this report)

Professor André Caron
Department of Communication
Faculty of Arts and Sciences
University of Montreal

Professor Charles Crook
Department of Human Sciences,
Loughborough University

Professor Julie Dockrell,
Department of Psychology and Human Development,
Institute of Education
University of London

Dr Cecilia von Feilitzen
Department of Journalism, Media and Communication
University of Stockholm

Professor Simone French
Division of Epidemiology
School of Public Health
University of Minnesota

Dr. Susan Jebb
Head of Nutrition and Health Research
MRC Human Nutrition Research

Professor Ulla Johnsson-Smaragdi
School of Social Sciences
Växjö university

Professor Stephen Kline
School of Communication
Simon Fraser University

Dr Flora Kokkinaki
Department of Primary Education
University of Patras

Dr. John Maltby
Department of Psychology
University of Leicester

Dr. Dianne Neumark-Sztainer,
Division of Epidemiology
University of Minnesota

Professor Stylianos Papathanasopoulos

Faculty of Communication and Mass Media Studies
Department of Psychology of Communication Practices and Planning
National and Kapodistrian University of Athens

Sheila Turner
Chairman of the Food First Planning Group
British Dietetic Association

Professor Dr. Patti Valkenburg
Faculty of Social and Behavioral Sciences
Amsterdam School of Communications Research ASCoR

Dr Brian Young
School of Psychology
University of Exeter

Annex 2: The regulation of advertising to children in selected European countries

In the following section an overview is given of regulation of advertising to children in selected other European countries, in order to compare these situations with that of the UK so as to help determine whether banning food advertising for children would be effective.

United Kingdom

In the UK there is no official ban on food advertising to children, although several bodies are involved in regulating advertising to children (Clarke and Preston 2003).

The Office of Communications (OFCOM) places general restrictions on advertising to children. Specifically, advertising must not directly advise or ask children to buy or to ask their parents or others to make purchases. It may not imply that children are inferior to others or disloyal or will have let someone down if they do not use product. For food advertising in general, nutritional claims must be supported by sound scientific evidence and may not be misleading. Food advertising must not encourage or condone excessive consumption of food or show the eating of sweet products close to bedtime in situations where the brushing of teeth is unlikely. Food advertising must also not discourage other healthy food options such as eating fresh fruit and vegetables.

The Advertising Standards Association (ASA) uses the principle that “advertisements should contain nothing which is likely to result in physical, mental or moral harm to children or to exploit their credulity, lack of experience or sense of loyalty”, where children are defined as those under 16 years old. Further ASA guidelines are similar to OFCOM regulations:

- Toys must not be displayed larger than they are
- Advertisers should clearly state prices
- Advertisements should not encourage citizens to make a nuisance of themselves or make them feel unpopular for not buying a product
- No encouragement of eating or drinking near bedtime or to eat frequently throughout the day
- Should make clear that children need permission from their parents to buy expensive or complex products
- Advertisements must not lead a child into a potentially dangerous situation

The Netherlands

Dutch advertising regulation is largely self-controlled and a myriad of organisations are responsible for different aspects of advertising regulation implementation and complaints. There are varying definitions of a child in Dutch advertising regulation: in general, a child is defined as a person up until 12 years old; for magazines, there is a special definition which is that it is a children’s magazine if over 25% of the audience made up of children under 11 years old; for the advertising of sweets, children are defined as those younger than 14 years old.

General advertising directed at children cannot contain, in word, sound or image, information that is misleading as to the characteristics and possibilities of the advertised product. It should not cause moral or physical harm to children:

- Children should not be incited to buy a product by counting on their lack of experience or their innocence
- Children should not be stimulated to convince their parents or others to buy the products advertised
- Advertising must not profit from the special trust that children have in parents, teachers or others
- Advertising must not show dangerous situations without proper justifications for doing so

Specific requirements for the advertising of sweets, for both adults and children, state that advertising must not stimulate or justify excessive use of sweet products; it should not suggest that sweets can replace common meals; it must not portray in a negative way those who do not wish to consume sweets; it should not associate sweets with health or say that low sugared sweets cause fewer cavities; and no situations can be shown in which sweets are consumed just before going to bed or just after brushing teeth. An icon of a toothbrush must be shown on all advertisements for sweets and for children under 14 years old this toothbrush has to have a minimum size of 1.5x1.0 cm. In magazines, there must be a disclaimer (“advertising”) for all types of advertising in children’s magazines.

A recurring problem with all television and broadcasting regulations in the Netherlands is that broadcasters based in other countries are not obliged to comply with these rules and thus – being a small continental country bordering countries with fewer or different regulations - the regulations are not as effective as they were intended to be.

Sweden

The definition used by the Swedish regulators for children is all those persons under 12 years of age. Sweden probably has the strictest advertising ban in Europe in relation to advertising and children. There is a ban on all advertising directed at children and advertisers are not allowed to use children’s voices or show children buying products or asking their parents to buy products on any other type of advertising even when directed at adults. After 21:00 the rules are assumed to be relaxed, but if there is a special event that children might be likely to watch then the same strictness applies.

In relation to food advertising the regulation is similar to that in the Netherlands. Also similar is the situation by which television broadcasters not based in Sweden do not have to abide by Swedish regulations. Notably, two television channels broadcast to Swedish children from the UK, carrying considerable advertising – although this may soon cease. Through these channels, Swedish children are thus still exposed to food and other advertising, making the evaluation of the Swedish ban difficult.

Greece

While there are not specific regulations for food advertising in Greece, a ban is in force for all television advertisement for toys between 7am and 10pm and for all advertising of war toys. The definition of children in this regulatory framework is those under 12 years old, and the Minister of Press and Media has the authority to impose specific obligations

on certain television channels in relation to advertising to children. Regulations apply only to broadcast media, there being no regulations for print advertising.

There is no specific ban or regulation for food advertising to children but there is a general regulation regarding food advertising stating that one cannot attribute properties to the product that it does not have or say that they have a certain nutritional value that is higher than that of other products. It is also forbidden to refer to slimming qualities of the product without specifying the diet type for which it is recommendable. Infomercials selling children's products are explicitly forbidden, and there are some specific regulations on the advertising of food for infants.

End.