

A content analysis of children's television advertising: focus on food and oral health

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Abstract

Objectives: To analyse the nature and content of advertising during children's popular television viewing times with the specific aims of (i) identifying the proportion of advertising time devoted to confectionery and potentially cariogenic products (those which readily give rise to dental caries, more commonly known as tooth decay); and (ii) determining whether there is a variation in the advertisement of confectionery and other high-sugar products within children's school holiday time *v.* outside holiday time.

Method: In five separate one-week periods, the output of the four most popular British children's commercial television channels was video-recorded during the most popular viewing times for children. In total, 503 h of television were recorded and analysed.

Results: Analysis of the recordings revealed that 16.4% of advertising time was devoted to food products; 6.3% of all advertising time was devoted to potentially cariogenic products. Sugared cereals were the most commonly advertised high-sugar product, followed by sweetened dairy products and confectionery ($\chi^2 = 6524.8$, $df = 4$, $P < 0.001$). The advertisement of confectionery and high-sugar foods appeared to be influenced by school holidays.

Conclusions: Health-care professionals should be aware of the shift away from the advertisement of confectionery towards the promotion of foods that might be considered healthier but contain large amounts of hidden sugar.

Keywords
Food
Advertising
Television
Children

Dental caries and obesity both constitute a significant public health problem in the UK^(1–3) and worldwide⁽⁴⁾. There is mounting evidence that obesity and dental caries are linked⁽⁵⁾ and both are related to poor food selection behaviour. Furthermore, all three of these factors are more prevalent within lower socio-economic groups^(6–8).

In 2006, 40% of British 5-year-olds had experience of dental caries and these children had an average of 1.6 affected (i.e. decayed, missing or filled) teeth. There is a considerable range of caries experience, with 21% of 5-year-olds in Mid Essex Primary Care Trust in England having at least one tooth affected by caries compared with 76% in Merthyr Tydfil Local Health Board in Wales⁽²⁾.

Obesity, especially in children, is increasing dramatically across the UK. Jebb *et al.*⁽³⁾ reported that 4.0% of British children aged 4–18 years were obese, with a further 15.4% identified as overweight. Increasing obesity levels in children are closely linked to type 2 diabetes mellitus and metabolic syndrome in adults⁽⁹⁾, which has major implications for life expectancy, quality of life and scarce health resources.

There is an irrefutable association between sugar intake and tooth decay⁽¹⁰⁾. In addition, the association between the consumption of energy-dense foods, which the UK Food Standards Agency (FSA) defines as foods high in fat, sugar and salt (HFSS)⁽¹¹⁾, and obesity has been established⁽¹²⁾.

Children are particularly vulnerable to sophisticated television advertising promoting HFSS foods including confectionery⁽¹³⁾. The food industry views children as an important market because of their tremendous spending power and influence over parents' income⁽¹⁴⁾. In the UK, a systematic review of the effects of food advertising, primarily television advertising, concluded that food promotion was having an effect particularly on children's preferences, purchase behaviour and consumption. Furthermore, the effect was independent of other factors and operated at both brand and category level^(15,16). Children who are heavy television users have been shown to be more likely to ask for advertised products⁽¹⁷⁾, which are predominantly HFSS foods⁽¹⁸⁾, and also have unhealthy conceptions about food⁽¹⁹⁾.

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In the 1950s and 1960s the total volume of children's programming broadcast on British television was less than 1000 h per annum; this soared to 113 000 h in 2006, due to the proliferation of dedicated children's channels⁽²⁰⁾.

Traditionally, British children's 'prime time' viewing has been 15.15 to 17.00 hours on weekdays, 06.00 to 13.00 hours on Saturdays and 06.00 to 11.00 hours on Sundays. However, these viewing patterns are changing, not least because almost two-thirds of British children now have a television set in their bedroom, which allows unsupervised television viewing⁽²¹⁾. Indeed, in 2003, the top twenty programmes watched by children were broadcast primarily outside children's airtime, with Eastenders and Coronation Street (soap operas), Comic Relief (charity event) and Pop Idol (entertainment programme) being the top four⁽²²⁾. British children aged between 4 and 15 years watch television for an average of 17 h/week, 12 h (70%) of which are outside traditional children's viewing hours. Of the average total viewing time, only 2.6 h (15.3%) is spent in commercial children's airtime⁽²²⁾. Furthermore, children in the lowest social class groups, who are at greater risk of developing dental caries and obesity^(6,7,23), watch more television than children in higher social classes⁽²²⁾.

In the UK, television advertising is regulated by the Office of Communications (Ofcom), the independent regulator and competition authority for the UK communications industries. In February 2007, Ofcom published its final statement on the advertising of food and drink products to children⁽²⁴⁾. Key measures included the following:

1. Scheduling restrictions applied to food and drink products assessed as HFSS as defined by the FSA's nutrient profiling model;
2. A total ban on HFSS food and drink advertisements in and around all programmes of particular appeal to children under 16 years old from 1 January 2008 (and from programmes of particular appeal to children under 10 years old from 1 April 2007);
3. A total ban on HFSS food and drink advertisements in and around all children's programming, and on dedicated children's channels as well as in youth-oriented and adult programmes which attract a significantly higher than average proportion of viewers under the age of 16.

In addition to the scheduling restrictions outlined above, content rules also apply to all food and drink advertising to children, irrespective of when it is scheduled. These rules include banning the use of celebrities and characters licensed from third parties, promotional offers and health claims in HFSS product advertisements aimed at primary-school children or younger. All restrictions on product advertising apply equally to product sponsorship and Ofcom will review the effectiveness and scope of new restrictions in autumn 2008, one year after the full implementation of the new content rules.

Conducted in the six months immediately prior to the introduction of the above measures, the present study aimed to:

1. Examine the nature and content of television advertising on commercial terrestrial and non-terrestrial channels during children's popular television viewing times, with specific reference to oral health;
2. Identify the proportion of advertising aimed at the marketing of confectionery and other cariogenic food/drink products;
3. Determine the extent to which television advertising changes during school holiday and non-holiday periods.

Method

The weekly viewing summary produced by the Broadcasters' Audience Research Board (BARB) for the week ending 24 September 2006⁽²⁵⁾ was used to select the four most popular commercial channels for children. In order to attempt to encompass the whole child viewing population, channels were selected from free-to-air terrestrial (ITV England and Wales), free-to-air digital (CITV) and subscription satellite (Nick Junior and Nickelodeon) broadcasting. These channels were recorded during the following five one-week periods:

1. Week beginning Monday 16 October 2006;
2. Week beginning Monday 23 October 2006 (half-term school holiday in England);
3. Week beginning Monday 30 October 2006 (half-term school holiday in Wales);
4. Week beginning Monday 19 December 2006;
5. Week beginning Monday 8 January 2007.

These were selected to allow examination of the influence of school holidays on television advertisements. In each week, recording was carried out on three randomly selected days of the week (two weekdays and a weekend day).

Recording took place during the most popular viewing times for children⁽²⁴⁾ or until the selected channel ceased broadcasting. Thus, the channels were recorded between 06.30 and 08.30 hours and between 15.30 and 23.00 hours on weekdays; at weekends, recording was carried out between 07.00 and 13.00 hours and 17.00 and 23.00 hours. It should be noted, however, that CITV and Nick Junior ceased broadcasting at 18.00 and 22.00 hours, respectively.

The four channels were recorded on separate DVD recording equipment and were analysed by a single investigator (A.P.) who collated information on the type, content and duration (in seconds) of each advertisement shown. The timing of the advertisements was calculated using the automated digital clock within a computerised DVD player (Version 6, Cyberlink Corporation, 1997–2004). Analysis was conducted using a proforma according to categories and criteria (explained below) agreed with the

other researchers. Cases lacking immediate clarity were resolved and ratified through discussion with other members of the research team. Of the total 503 h recorded, 5.5% (27.5 h) were reviewed by a second reviewer. There was 89.5% agreement between the primary (A.P.) and secondary reviewers (M.M.) in allocation of advertisements to product categories.

Advertisements were categorised as 'food' and 'non-food'. Since the main focus of the research was television advertising and its impact on oral health, the former category was further subdivided into 'high-sugar foods' (some of which also contain high levels of fat and/or salt) and 'other foods' (which would also include some foods which were high in salt and/or fat, but not sugar). The high-sugar foods category was based on the FSA's classification, i.e. foods containing more than 10 g sugar/100 g are considered to contain 'a lot of sugar'. The FSA low sugar category (less than 2 g sugar/100 g) and moderate sugar category (2–9 g sugar/100 g) were combined for the purpose of this analysis⁽²⁶⁾.

Foods included in the high-sugar category were:

1. Dairy sweetened, e.g. yoghurt, milk drinks;
2. Confectionery, e.g. sweets, chocolate;
3. Cereals high in sugar, e.g. Coco Rocks, Coco Pops, cereal bars;
4. Baked goods high in sugar, e.g. cakes, biscuits;
5. Drinks high in sugar, e.g. drinking chocolate, sweetened carbonated beverages.

Foods included in the other foods category were:

1. Dairy unsweetened, e.g. milk, butter, cheese;
2. Cereals low to moderate in sugar, e.g. Weetabix, Oatabix.

In the non-food category, oral health products and healthy living were recorded as distinct from other non-food advertisements using three categories:

1. Toys, games, fashion, finance, household cleaning products, toiletries, entertainment, etc.;
2. Healthy living, e.g. promoting healthy living/eating;
3. Oral health products, e.g. toothpaste, toothbrushes.

Microsoft[®] Excel 2003 software package (Microsoft Corporation, Redmond, WA, USA) was employed for data collation and presentation. The Statistical Package for the Social Sciences statistical software package version 12.0 (SPSS Inc., Chicago, IL, USA) was used for analysis. Frequency distributions of the categories of advertisements were compiled and the χ^2 test was applied to compare the proportion of viewing times (in seconds) within the high-sugar food categories. A significance level of $P < 0.05$ was accepted as statistically significant⁽²⁷⁾.

Results

A total of 503 h of television were recorded, ranging from 92 h in week 4 to 106 h each in week 1 and week 5. The

duration of recording by channel was 78 h for CITV, 134 h for Nick Junior, 141 h for ITV and 150 h for Nickelodeon. Advertising accounted for 15% (75.5 h) of this time, equating to 9 min of advertising televised per hour.

The average advertising times for the various product categories were calculated in seconds per hour to account for the differences in recording times between channels and weeks.

Table 1 shows the percentage of total advertising time devoted to each product category. The advertisement of high-sugar products occupied 6.3% of total advertising time, equating to 38.4% of the advertising time devoted to food. In contrast, foods low in sugar featured in only 2.8% of the total advertising time; this equates to 17.0% of the advertising time devoted to food. The promotion of healthy living and oral hygiene products accounted for only 1.8% and 0.3%, respectively, of the total advertising time.

Figure 1 illustrates the contribution of the various product sub-categories within the total time devoted to the promotion of high-sugar foods. Cereals high in sugar dominated the advertisements, with 40.7% of high-sugar food advertisements represented by this category ($\chi^2 = 6524.8$, $df = 4$, $P < 0.001$).

The amount of time (in seconds per hour) devoted to the advertisement of high-sugar foods by channel ranged from 10.2 for Nick Junior, to 31.8 for CITV, 41.1 for ITV and 49.6 for Nickelodeon. Figure 2 focuses on the effect of channel on the advertisement of the different high-sugar food product categories; sweetened dairy products made up 82.4% of advertisements in this category on Nick Junior, a channel aimed at pre-school children, compared with only 9.1% of advertisements on CITV.

Figures 3 and 4 illustrate the effect of the week in which recording took place. Figure 3 shows how the proportion of total advertising time devoted to the three main advertising categories (non-food, high-sugar food and other food) varied by week; the advertising of high-sugar products was greatest in week 4 of recording, i.e. the week before Christmas, and reduced in week 5, two weeks after Christmas ($\chi^2 = 69.7$, $df = 8$, $P < 0.001$, food category by week weighted by seconds). This trend is likely to be related to the fact that baked sweetened

Table 1 Percentage of total advertising time devoted to each product category: content analysis of children's television advertising with focus on food and oral health, UK, 2006–2007

Product advertised	Seconds	Seconds per hour	% of total advertising time
Non-food*	221 550	440.0	81.5
Healthy living	4940	9.8	1.8
Oral health	880	1.7	0.3
High-sugar food	17 120	34.0	6.3
Low-sugar food	7560	15.0	2.8
Other food	19 880	39.5	7.3
Total	271 930	540.1	

*Non-food category excludes Healthy living and Oral health.

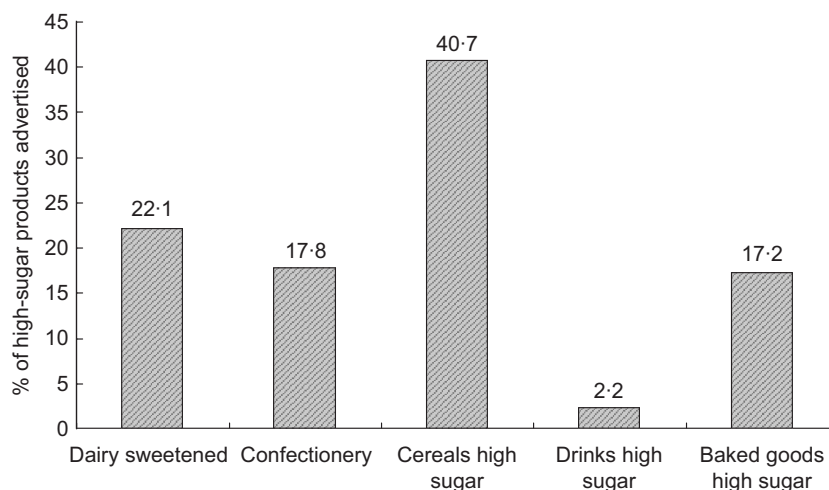


Fig. 1 Percentage of high-sugar food advertising time by product sub-category: content analysis of children's television advertising with focus on food and oral health, UK, 2006–2007. One-sample χ^2 test for the difference in proportions of advertising times for product categories, $P < 0.001$

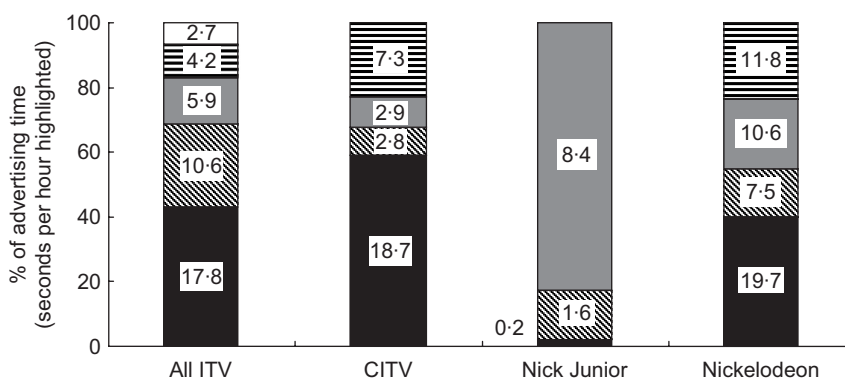


Fig. 2 Proportion of total advertising time devoted to high-sugar sub-categories (■, sugared cereals; ▨, confectionery; ▩, dairy sweetened; ▤, baked sweetened; □, sugary drinks) by channel, with seconds per hour highlighted in bars: content analysis of children's television advertising with focus on food and oral health, UK, 2006–2007

products were advertised most in week 4, accounting for over half of the high-sugar products advertised in that week (Fig. 4).

Discussion

Previous content analyses of television advertising to children using an oral health perspective^(21,28) have considered only the traditional prime viewing times and have disregarded the fact that children watch television outside these hours on an increasing number of television channels⁽²⁰⁾. In the current study selection of recording times and channels was based on information produced by Ofcom and BARB^(22,25). This showed that the peak television viewing time for children in the evening was not during children's prime time television but later. In addition, many children continued to watch long beyond this time.

The present study found that 16.4% of advertising was for food and drink and that 38.4% of this (6.3% of all advertising) was for food and drink high in sugar and, therefore, deemed to be potentially cariogenic. In comparison, Rodd and Patel⁽²¹⁾ found that 34.8% of advertisements were related to food and drink products, 95.3% of these being deemed potentially cariogenic or erosive to teeth. Likewise, Chestnutt and Ashraf⁽²⁸⁾ found that a much greater proportion of advertising time (62.5%) was devoted to food products, with 73.4% of this being devoted to products deemed potentially detrimental to oral health. The difference between the current study and those reported previously may be due to the changes in advertising policy which have taken place over recent years and differences in study design. The study of Chestnutt and Ashraf⁽²⁸⁾ in 2002 pre-dates the advertising of food to children debate, which originated in 2003 when the UK Department of Health requested that Ofcom look at the possibility of strengthening the rules on food advertising to children on

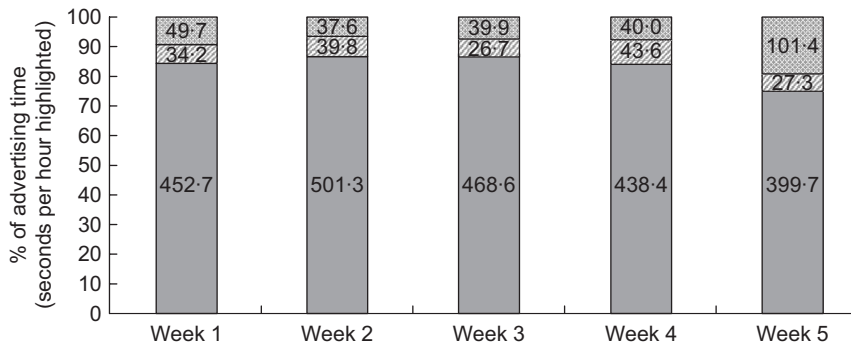


Fig. 3 Proportion of total advertising time devoted to main product categories (■, non-food; ▨, high-sugar food; ▩, other food) by week, with seconds per hour highlighted in bars: content analysis of children’s television advertising with focus on food and oral health, UK, 2006–2007. Two-sample χ^2 test for the difference in proportions of advertising times for product categories by week, $P < 0.001$

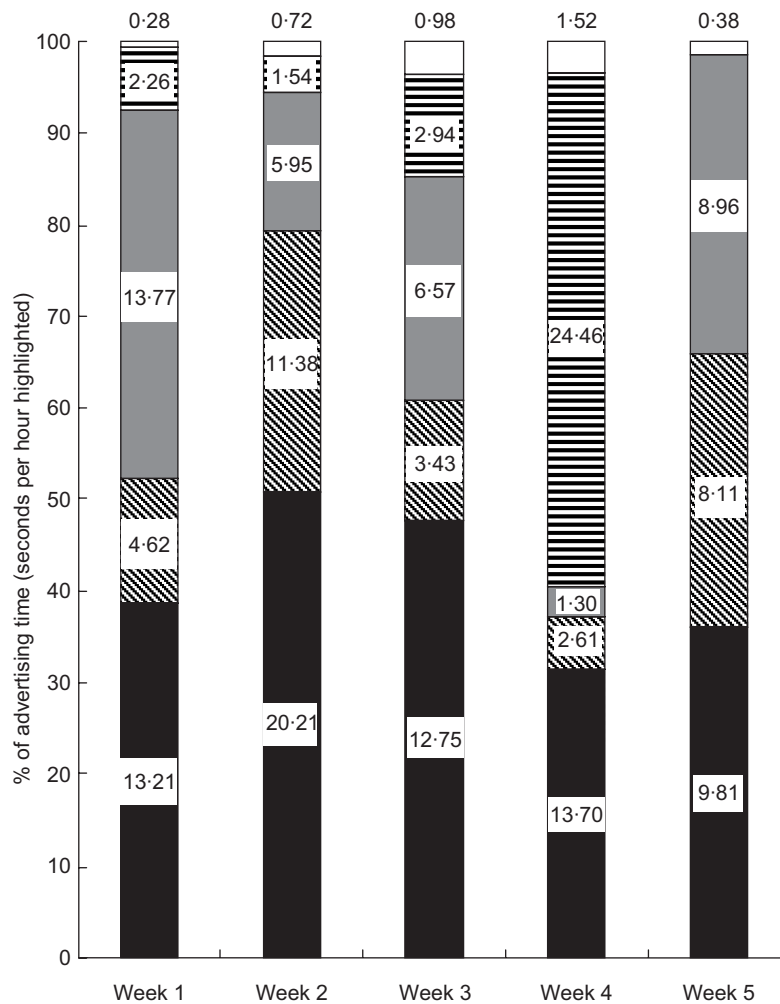


Fig. 4 Proportion of total advertising time devoted to high-sugar sub-categories (■, sugared cereals; ▨, confectionery; ▩, dairy sweetened; ▪, baked sweetened; □, sugary drinks) by week, with seconds per hour highlighted in bars: content analysis of children’s television advertising with focus on food and oral health, UK, 2006–2007

television⁽²⁹⁾. In 2005, during the lengthy Ofcom consultation process, Rodd and Patel⁽²¹⁾ published their research on the effects of food advertising on children. The present study was undertaken during the period when the Ofcom

regulations concerning both content and scheduling of advertisements were starting to be enforced⁽³⁰⁾.

In relation to differences in study design, Rodd and Patel⁽²¹⁾ and Chestnutt and Ashraf⁽²⁸⁾ each collected a

smaller amount of data from only a single television channel over a shorter period of time and during a more restricted period of the day. The reduction in high-sugar food advertising highlighted in the present study compared with previous studies should be interpreted with caution, as it may be an artefact of differences in study design. However, this should not detract from the fact that high-sugar cereals were found to dominate children's food television advertising in the present study.

Prior to commencing the current study, the authors assumed that the majority of advertising time devoted to high-sugar products would be related to confectionery. Chestnutt and Ashraf⁽²⁸⁾ for example found that 46.6% of advertisements were for confectionery, 24.1% were for sugared cereals and 16.0% for sugared dairy products. However, the study found that confectionery was only the third most commonly advertised high-sugar food (17.8%). Sugared cereal was the most commonly advertised (40.7%), followed by sweetened dairy products (22.1%; Fig. 1) which appear to be targeted at the younger audience associated with Nick Junior (Fig. 2). Interestingly, Rodd and Patel⁽²¹⁾ also found that sugared cereals were the most commonly advertised high-sugar products. However, the amount advertised equated to just over a quarter (26.3%) of all advertisements for high-sugar products.

This movement away from confectionery advertisement to high-sugar-containing cereal foods and sweetened dairy products has been noted as a possible future public health problem⁽³¹⁾. The reasons for this concern are that eating breakfast is a mainstay of public health nutrition advice, and both cereals and dairy products are promoted as constituents of a healthy diet⁽²⁶⁾. However, the majority of sweetened breakfast cereals contain over 30% sugar while sweetened dairy products contain around 15%, both in excess of the FSA high sugar category. Advertising which concentrates on these foods could lead to confusion among consumers, particularly children, and encourage consumption of foods perceived as healthy which are in fact high in sugar, with negative health consequences in terms of oral health and obesity.

Data from the present study would therefore suggest that, even before the restriction recently imposed by Ofcom, television advertising was not targeting confectionery and high-sugar products as heavily as had previously been reported⁽²⁸⁾. In addition, there appears to have been a shift in the type of high-sugar products advertised, with sugared cereals and sugared dairy products being promoted in preference to confectionery. These observations may be attributable to: (i) the impending changes in legislation affecting the television advertising of HFSS foods to children; (ii) variation in the definition of food categories (for example, biscuit could be placed in confectionery or high-sugar baked foods); or (iii) changes in advertising over the years, with the proliferation of channels providing marketing companies with more choice.

Nickelodeon (the selected subscription satellite children's channel) devoted the largest amount of broadcasting time to advertising (10 min 10 s per hour). This channel also devoted the majority of its advertising time to non-food (mainly toys and games) and high-sugar products; sugared cereals, sweetened dairy and sugary baked products received more advertising time than on any other channel. Nickelodeon tends to target an older audience than Nick Junior and CITV. It is likely that advertisers utilise Nickelodeon to reach children who receive more pocket money and have more influence on product purchase⁽³²⁾.

ITV (England and Wales) advertised the largest proportion of other food products but also devoted more advertising time to confectionery and sugary drinks than any other channel. Although Nick Junior promoted high-sugar foods least, in excess of 80% of this advertising was related to sweetened dairy products (Fig. 2). As Nick Junior is aimed at younger children the advertisers are manipulating parents by promoting dairy foods, an important food group, without referring to their high sugar content. On the positive side, a small proportion of Nickelodeon and Nick Junior's advertising time was devoted to Nicktrition, which teaches children about eating healthy foods and taking regular exercise.

Chestnutt and Ashraf⁽²⁸⁾ included a range of months in their study in order to reflect any seasonal variation in advertising but, interestingly, made no reference to there being any effect of this parameter in their publication. The present study found there to be a degree of variation in the amount of advertising devoted to confectionery and other high-sugar products when comparing school holiday and non-holiday periods. Most time devoted to high-sugar product advertising occurred in week 4, the week before Christmas. Surprisingly, confectionery was advertised the least in this week, with baked sugary products receiving the most attention. This may be due to marketing companies working on the assumption that most non-perishable food purchases, such as confectionery, would have been made early and would therefore not require further promotion. In contrast, the largest proportion of advertising time devoted to confectionery and sugared cereals occurred in week 2, English schools' half term. It should be noted, however, that ITV England was recorded in this week, when ITV Wales was used for all other weeks. Any bias thereby introduced should, however, be minimal: given that virtually all the products advertised are marketed by national and international corporations, it is likely that those broadcast in the different ITV regions are not dissimilar. This part of the study would have benefited from being further extended to include other holiday influences such as Easter (with the sale of confectionery) and the summer (with the sale of sugary soft drinks and sweetened dairy products such as frozen desserts including ice cream). A more detailed comparison of the advertising patterns of

different ITV channels could also have been made. Given the ongoing changes to children's television advertising⁽²⁴⁾, however, this is now impossible. Nevertheless, the current study is of value as a baseline comparator.

It is important to be aware that confectionery and other leading food companies are now turning to alternative forms of advertising. For example, children are keen consumer cyber-surfers with over half of 7–16-year-olds (57%) having bought on the Internet⁽³²⁾. By finding alternative marketing methods such as the Internet, companies will continue to target children directly even after the implementation of Ofcom's new legislations. Other popular marketing methods include children's films and sporting events such as the World Cup. Increasingly, advertisements are also turning to parents, making HFSS foods such as sweetened cereals and dairy products seem healthy options for their children. Marketing tricks such as film freebies, websites, text messages, day trips, sponsored hotel suites, classroom schoolbooks, viral marketing, football frenzy, competitions, joining clubs, gifts and giveaways, funky formats, healthy hints, on-pack offers, coupon collecting, cartoon characters and using health claims to promote products to parents are all tactics which have been used to promote confectionery, high-sugar foods and 'junk' food to children⁽³³⁾.

The authors wish to emphasise that, while the present study focused on oral health, the implications for health in general, particularly with the year-on-year increase in childhood obesity, are clear⁽³⁴⁾.

Conclusion

Our research indicates that there has been a shift in advertising away from confectionery and towards foods that appear healthier but actually contain large amounts of hidden sugars; for example, high-sugar breakfast cereals and sweetened dairy products. This shift occurred even before the introduction of recent legislation. These findings are of relevance to the dental profession in the prevention of dental caries and wider public health professionals in relation to both general health and obesity.

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