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Research Report

Effect of television advertisements for foods on food consumption in children

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Abstract

The impact of television (TV) advertisements (commercials) on children's eating behaviour and health is of critical interest. In a preliminary study we examined lean, over weight and obese children's ability to recognise eight food and eight non-food related adverts in a repeated measures design. Their consumption of sweet and savoury, high and low fat snack foods were measured after both sessions. Whilst there was no significant difference in the number of non-food adverts recognised between the lean and obese children, the obese children did recognise significantly more of the food adverts. The ability to recognise the food adverts significantly correlated with the amount of food eaten after exposure to them. The overall snack food intake of the obese and overweight children was significantly higher than the lean children in the control (non-food advert) condition. The consumption of all the food offered increased post food advert with the exception of the low-fat savoury snack. These data demonstrate obese children's heightened alertness to food related cues. Moreover, exposure to such cues induce increased food intake in all children. As suggested the relationship between TV viewing and childhood obesity appears not merely a matter of excessive sedentary activity. Exposure to food adverts promotes consumption.

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Introduction

A substantial body of research indicates that the prevalence of obesity in childhood is increasing. The classic externality theory of obesity postulates that the obese are more influenced by external stimuli than are the lean (Schacter, 1971). Direct exposure to certain types of food, such as processed and snack foods high in fat and sugars, generally energy dense, may contribute to the development of child obesity. A critical indirect influence on children's food choices and intake may be advertising of foods on television. Many correlational studies have demonstrated an association between the duration of TV viewing and levels of overweight and obesity in both children and adolescents (Anderson, Crespo, Bartlett, Cheskin, & Pratt, 1998). However, such cross-sectional studies fail to demonstrate a causal link from viewing TV ads to extra eating. Kaur, Choi, Mayo, and Harris (2003) conducted a prospective

study in which it was found at the three-year follow up that those who watched two or more hours of TV per day were twice as likely to become overweight during the course of the study. Two other longitudinal studies have produced similar findings (Francis, Lee, & Birch, 2003; Proctor et al., 2003). This supports the notion that excessive TV viewing does contribute to weight gain. Furthermore, in a 6-months intervention study in which children's television viewing was substantially limited, Robinson (1999) found that rises in BMI and fat deposition were significantly less than in a control group without intervention. These data also support the hypothesis that exposure to current television programming helps to cause weight gain in children.

The effect of TV viewing on weight gain seems to be, at least in part, due to a lack of physical activity rather than the act of viewing itself (Hu, Li, Colditz, Willett, & Manson, 2003). However, TV may not just promote sedentary behaviour. There is evidence that it also stimulates food intake. TV viewing is associated with overconsumption in girls, specifically of snack foods (Francis et al., 2003). Children who eat their meals in front of the TV tend to

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consume more dietary fat (Coon, Goldberg, & Rogers, 2001). Woodward et al. (1997) found that the number of hours of TV viewing by teenagers was significantly correlated with the number of unhealthy food items consumed per day.

There is another way in which TV viewing may induce food consumption. Furnham, Abramsky, and Gunter (1997) noted that, during programmes scheduled for children over two consecutive weekends, 37% of the adverts on TV channels in the USA and 49% on the UK TV channels were for food. The majority of advertised products were snack foods, followed by breakfast cereals and then fast food outlets. Also Lewis and Hill (1998) found that half of the advertisements on British television were for food items.

Previous studies have shown that exposing children to different types of food adverts may influence their subsequent food choices but there is little evidence to show a direct causal relationship. Therefore, a study was devised in order to assess if children attended to and recognised food advertisements on television more often than advertisements not for foods. In the light of Schachter's externality theory, we were interested in ascertaining if overweight or obese children are more responsive to food adverts. So we sought to determine if there was any difference between normal weight and overweight/obese children in the ability to recognise food adverts, as well as assessing the impact of recent exposure to TV food adverts on total intake of food and choice among foods. It was hypothesised that (i) obese and overweight children would recognise more food-related adverts than their normal weight counterparts, (ii) an increased ability to recognise food-related ads would be associated with the amount of food consumed after food advert exposure, and (iii) the child's weight status (weight in the healthy range, overweight or obese) would also influence the types and the total amount of food consumed during the test sessions.

Methods

Participants

A total of 42 school children (18 male, 24 female) aged 9–11 years (mean age 10.4 years) from a Liverpool primary school participated in the study. Three groups were created; lean, overweight and obese, based on body mass index (BMI) converted to a standard deviation score using the revised 1990 reference standards (Cole & Preece, 1990). A majority (28) of the children were lean ($\text{BMI} \leq 25 \text{ kg/m}^2$), nine were overweight ($25 < \text{BMI} < 30 \text{ kg/m}^2$) and five were obese ($\text{BMI} > 30 \text{ kg/m}^2$). The proportions of overweight and obese children within our sample were consistent with norms for child adiposity within the UK.

Materials

TV ads and recognition tests. Three videos were used containing a cartoon, a collection of advertisement not related to foods or a collection of food-related adverts. Advertisements were recorded from children's and family programming. Ability to recognise the adverts was assessed by identification of the product from a list of 16 products that were either shown in the advertisements or not.

Foods and intake measurement. The children were given the opportunity to select foods to eat from an assortment of types of packet food: Ryvita wholegrain crackers (low-fat savoury); Haribo jelly sweets (low-fat sweet); chocolate (high-fat sweet); and butter puffs (high-fat savoury). For each child, the set of foods to be presented and the leftovers after consumption were both weighed.

Assessment of externality

The 10-item externality scale from the Dutch Eating Behaviour Questionnaire (DEBQ) was used to assess self-reported externally induced eating (eating in response to food-related stimuli). This scale score has been shown to have high consistency and acceptable levels of validity (Van Strien, Frijters, Bergers, & Defares, 1986; Wardle & Beales, 1987) and has previously been used to assess children's eating styles (Braet & Van Strien, 1997).

Procedure

Two weeks prior to the study, the children were asked if they wished to take part and those who expressed interest had consent forms mailed to their parents. This also enabled the exclusion of children with food allergies. The study had a within-subjects design with counterbalancing of sequences of conditions, tested on two occasions separated by 2 weeks. Half the children were shown the food advertisements on the first occasion and half on the second occasion. On each occasion, the children were told that there would be some adverts at the beginning of the cartoon. After the 10 min cartoon the tape was stopped. The children were then presented with a list of 16 advertisements, of which eight had actually been shown, and asked to identify which adverts they had seen. The children were then divided into groups of four or five and each child was presented with the four foods on one plate. They were instructed that they could eat as little or as much food as they liked and there was no time constraint. After the second session, the children were asked to complete the DEBQ, and weight and height were measured.

Analysis of data

Differences in ability to recognise the presented advertisements were analysed using Kruskal-Wallis analysis of ranks, since groups varied greatly in number of children.

Very few children identified any ads that they had not been shown and so this aspect of the data was not analysed. Within-participant differences in weight of food eaten were evaluated by ANOVA irrespective of weight. Pearson's r was employed to assess if recognition correlated with food intake. Differences in food types consumed in each of the two advertisement conditions were also by ANOVA as the distributions with BMI groups combined were sufficiently near normal. Violation of homogeneity of covariance required MANOVA to be performed for interaction of food type and advertisement type. Post hoc comparisons used Bonferroni t , correcting p values for the number of comparisons. Analyses were carried out in SPSS for PC, version 11.

Results

Recognition of advertisements

As predicted, the obese and overweight children recognised significantly more food ads (means of 7.6 and 7.4, respectively, Fig. 1) than did the lean children (whose average was 6.25 out of eight), $\chi^2(2) = 19.2$, $p < 0.001$. The lean, overweight and obese groups on average each recognised similar numbers non-food ads (a grand mean of 6.0).

Food intake

The obese and overweight groups ate significantly more than the healthy-weight group (Fig. 1), both with food ads (FA), $\chi^2(2) = 24.3$, $p < 0.001$, and with non-food ads (NA), $\chi^2(2) = 22.0$, $p < 0.001$. The difference between FA and NA conditions across all children was highly reliable, $t(41) = 6.93$, $p < 0.001$. Over the whole sample of children ($n = 42$), the number of TV food advertisement recognised correlated positively with the amount of food eaten (by weight) after exposure to those ads, $r = 0.49$, $p < 0.001$.

Food choice

The weights of food eaten after viewing TV food advertisements varied significantly across the four types of food presented, merging the weight groups, $F(3, 39) = 18.4$, $p < 0.001$. This difference was attributable to selection of the high-fat foods over the low-fat alternatives ($p < 0.001$). Participants also ate more of both the sweet foods (high and low in fat) and of the high-fat savoury food after exposure to the food ads. The opposite behaviour was seen towards the low-fat savoury food, with the children eating more of this following the non-food ads than after viewing the food ads.

After the non-food advertisements, the overweight children ate more high-fat and low-fat sweet foods (27.6 and 36.2 g) and high-fat savoury food (37.9 g) than did

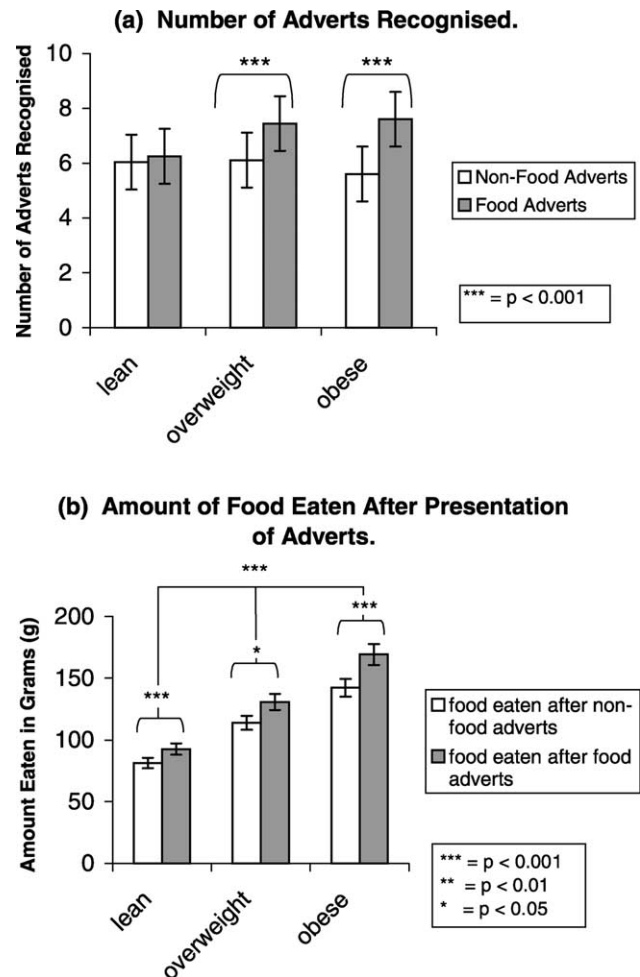


Fig. 1. The number of advertisements recognised and the weight of food eaten after viewing the advertisements by lean, overweight and obese groups in the session with non-food ads (open columns) and in the session with food ads (filled columns); mean values with SE bars; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

the healthy-weight children (18.8, 26.0 and 19.1 g, respectively) and the obese children ate more of these food items (51.2, 50 and 44 g) than did either overweight and healthy weight children (frequency contrasts always $\chi^2 > 12$, $p < 0.001$).

The consumption of each type of food with the exception of low-fat savoury was significantly greater in the food ads condition than with non-food ads in the obese, overweight and healthy-weight children taken together. This effect of relevance of the advertisements to food was significant in each group of children but more so in the overweight and the obese children: healthy weight $t = 4.62$, overweight $t = 8.06$, obese $t = 10.2$. However, in the obese group, the intake of such items was reduced (from an already low baseline observed in the NA condition).

External eating

There was no significant variation among the lean, overweight or obese groups in the DEBQ external eating

scores. Scores did not correlate with food advert recognition or intake after food advert exposure.

Discussion

Despite the small sample, the findings of our study reliably support the hypotheses. Obese children did recognise a greater number of food than non-food advertisements from TV. A similar effect was seen in the overweight children, whereas in the children with a BMI in the healthy range this difference between conditions did not appear.

This effect is not attributable to obese or overweight children recognising more ads in general or falsely identifying more ads as presented in the test, because few of the children picked out any ads to which they had not been exposed in either condition. Furthermore, a majority of the obese children (60%) were recognising nearly all of the eight food ads, whereas not one of the lean children remembered all of them. If more advertisements had been shown, it is possible that even greater differences between groups would have been observed.

Across the group as a whole, a greater ability to recognise the advertisements for food was significantly correlated with higher food intake following exposure to these food ads. However, this does not in itself establish a direct causal link between viewing TV food advertising and greater intake.

It should be noted that all three groups of children (lean, overweight and obese) ate significantly more after the food ads. However, the obese children ate the greatest amount, followed by the overweight children, in the condition in which the children were exposed to non-food advertisements. The reason why obese and overweight children selectively recognised more food adverts and also ate the most food requires further investigation.

The obese children also ate the least amount of the savoury low-fat packet food tested. This item was the least popular food with the children generally. Nevertheless, the normal weight children still consumed the savoury low-fat snack after viewing the non-food ads. Thus, exposure to the TV food advertisement exaggerated already distinctive patterns of food choice, increasing intake except of the savoury low-fat snack, with the obese children significantly reducing what was already low level of consumption after the non-food ads.

Our data are consistent with the small number of studies specifically examining the relationship between viewing food advertisements and food choices and eating behaviour in children. Brody, Stoneman, Lane, and Sanders (1981) exposed young children to food advertisements and then accompanied the child and the parent when shopping for groceries. Exposure to the food adverts increased the child's attempts to influence the parent's purchases, particularly towards choosing the food items which had been advertised. Similarly, Borzekowski and Robinson (2001) showed that

exposure to a food ad for 30 s, when embedded within a TV programme, altered food preferences in young children. Our study did not look at the effect of advertisements for specific products on food preferences, but our result do indicate that exposure to TV ads alters children's choices on the basis of pre-existing preferences.

As far as we are aware, this is the first study to show that exposure to advertisements increases food intake per se in children. It supports the view that TV viewing by children may not just be a sedentary behaviour in its adiposity promoting effect. Exposure to advertisement for foods on TV can have an effect also on eating behaviour, stimulating energy intake from a range of foods and exaggerating unhealthy choices among foods. The observed association between remembering food ads and eating more indicates that a susceptibility to food cues contributes to this overeating and promotes weight gain in children. This proposition requires testing in a prospective design.

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