



NEED FOR FOOD SYSTEM CHANGE TO MODIFY CONSUMPTION

Both global and local food systems, and the wider food environment, are key determinants of our diet and health. They not only determine our day-to-day food preferences but also shape our food preferences and habitual eating behaviour throughout our life. This makes behaviour change, be it for health or for sustainability, challenging. This is particularly true when the food, the physical, the social and the economic environment all reinforce unhealthy and unsustainable choices. In this issue, Christian Reynolds highlights the dynamic nature of food systems demonstrating how consumer's beliefs and behaviours had changed radically in the last 100 years, but also the potential to change them equally dramatically to address the individual and global health. Emma Boyland discusses how ubiquitous and pervasive marketing targets young consumers promotion the consumption of foods and beverages high fats, sugars and/or salts. Most alarming is the recruitment of social media 'influencers' who directly engage with children through vloggers (YouTube) and Instagram, by brands promoting the intake of unhealthy snacks and other energy dense products. Finally, Frans Folkvord examines how marketing techniques can be used to promote health foods in children providing a theoretical model, which details how we might change attitudes and behaviour.

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"CHANGING CONSUMPTION DUE TO FOOD SYSTEM
CHANGE: THE ROLE OF MARKETING, BEHAVIOURAL
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Unhealthy food marketing techniques and food consumption impact

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Overweight and obesity, particularly in childhood, are a global public health concern. Because levels have risen in multiple countries simultaneously, it has been suggested that changes to the global food system are largely to blame¹. One of these changes is the increased production and persuasive marketing of processed foods and beverages that are high in fats, sugars and/or salt (so called 'HFSS' items). The ubiquitous availability and accessibility of these items, along with the engaging and progressively more sophisticated methods through which they are marketed, is purported to be making a substantial contribution to the increasing passive overconsumption of energy across populations.

Children – key target of food marketing

Children, as a demographic group, are preferentially targeted by food marketers. This is because they affect product sales in three interlinked ways: 1) they have independent spending money ("pocket money") which they often use to purchase snacks and confectionery, 2) they have influence over family spending through product requests and pester power and 3) they are future adult consumers who, in the longer term, will make purchase decisions for themselves and their family. Therefore, brands seek to engage children with their marketing activity from even the pre-school period in order that they might foster brand awareness, brand preference and brand loyalty – all drivers of purchase and consumption behaviours. This process (Figure 1) conceptualises the pathway through which exposure to marketing (on the left) could plausibly influence weight gain and diet-related disease (to the right) via effects on predictors of behaviour (e.g. norms, desires, awareness) and actual behaviours (e.g. product purchase, consumption).

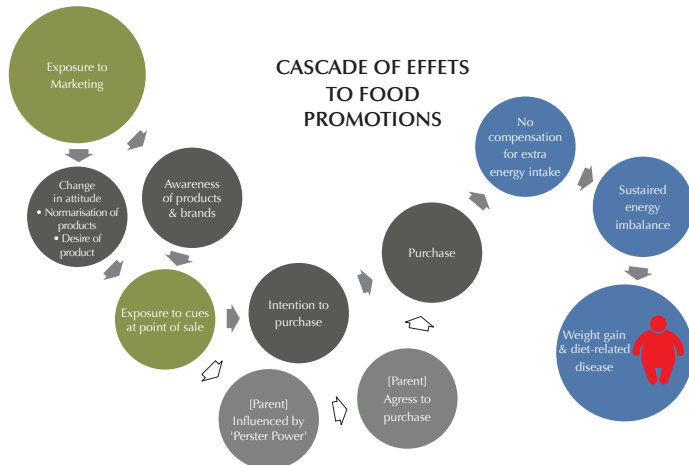


Figure 1: Cascade of effects to food promotions²

The impact of food marketing on body weight

Although demonstrating direct effects of food marketing exposure on body weight is extremely challenging due to the many confounders, the lack of a control study group who are not exposed to high volumes of marketing, and the incremental nature of weight gain; there is research evidence to support this model, demonstrating the detrimental effects of food marketing exposure on many of the steps in this pathway. A meta-analysis that measured the impact of experimental exposure to unhealthy food advertising on TV or via internet "advergames" (online games in which brand imagery is present throughout) found convincing evidence that children's immediate food intake is significantly increased after such exposure³. Recent experimental data also shows that children do not compensate for this additional intake by consuming less at the next meal⁴ so that food advertising is implicated in a sustained energy imbalance that would, over time, lead to weight gain.

The need to restrict children's exposure to unhealthy food marketing

The World Health Organization has repeatedly called for Member States to take robust regulatory action to restrict children's exposure to unhealthy food marketing⁵, including addressing the challenges of doing so in the digital sphere. Digital marketing is tailored to the user, with both contextual (content viewed) and behavioural (characteristics and preferences) data collection underpinning the ad ecosystem⁶. Research on the extent, nature and impact of digital marketing to youth is in its infancy, but evidence is starting to emerge that food and beverage marketing online is characterised by the presence of the same international brands that advertise on TV, mostly unhealthy foods, and the use of numerous marketing strategies (including endorsements, competitions, emotional appeals)^{7,8}. Within this, social media is now a major food marketing platform, via which brands (either directly or through so-called "influencers") can engage directly with young people. A new study shows that when children are exposed to influencers marketing unhealthy foods via Instagram, their immediate intake increases, just as with TV advertising⁹. This is supported by a large nationally representative cross-sectional survey recently published in the UK, which demonstrated that children (aged 7-11 years) who use the internet for more than 3 hours per day are almost three times more likely to pester their parents for junk food, are almost four times more likely to buy junk food, and will eat around three times less fruit and vegetables compared with children who spend less than 3 hours online¹⁰.

It is clear that if we are to support healthier consumption, we must first tackle the negative influence of unhealthy food marketing that currently undermines public health efforts to raise children to eat healthy, sustainable diets.



Review Emma Boyland's presentation: Unhealthy food marketing techniques and food consumption impact

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The complexities of food system change - the long view on vegetable consumption

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The food system is in a constant state of evolution. Every harvest brings new challenges, prices and opportunities for farmers. Likewise, consumer's taste habits, practices, and preferences all shift over time. Indeed, though the public perception is that diets and food production is constant, they are ever changing. For example, the amount of time (when, and how) that is spent shopping, cooking, and eating has all drastically changed over the last one hundred years^{1,2}. Food fads and trends emerge yearly; some of these become main stream food culture, though most fade away becoming nostalgia. Likewise, farming, and food processing methods have advanced rapidly. Thanks to the green revolution, and advances in logistics and manufacturing the globalised food system now provides safe, nutritious food to the majority of the global population.

Food system change – in numbers

Professor Derek Oddy's *From Plain Fare to Fusion Food: British Diet from 1890s to the 1990s* (2003) describes the rapid development, challenges, and changes of the food system over the last 100 years³. Through this long view, the dramatic changes in what, where, and how much vegetable was produced, and the typical quantities of vegetables eaten can be seen. In the 17th centuries vegetables were eaten in small quantity in a UK peasant's seasonal diet, with 56g a day of "Pease" being the most common vegetable. Variety was low and hunger a seasonal possibility. Quantity and quality of vegetables consumed began rise from the 1890s to between 45g to 142g a day by 1930, with varietal choice also improving. Post war, vegetable consumption settled at typically between 157g to 185g per day (1950s-2000s), with a greater variety of types of vegetable – available in now 'convenient' frozen and tinned forms– available to the consumer. However, in recent years (2000+) vegetable consumption has slightly declined, it is still higher than previous intakes – over a 330% increase in 300 years.

Change towards sustainable and healthy diets

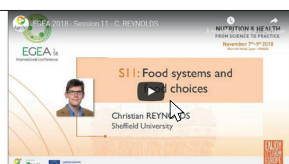
Looking to the future, changes in food system will not only have to address the rise in Obesity – for the health of citizens; but also address the challenge of shifting in the global population towards

a sustainable diet – for the health of the planet. Part of this solution includes an increase the consumption of vegetables, the recent EAT-Lancet report *Food in the Anthropocene* proposing 300g of vegetables a day⁴. How to achieve this consumption change remains to be seen. One possibility is continued generational dietary change; another is income and inequality improvement. Reynolds and Bridle (2018) examined how diets change over the life course, and how different generations have had different dietary greenhouse gas emissions due to their dietary composition⁵. Reynolds and Bridle calculated GHGE related to household consumption of selected foods by age of main diary keeper split in to 10 year 'generations' 1910-2000 with diets reported at 5 year intervals. They found that differences in generational eating habits (such as meat, dairy and vegetable consumption) do produce diets with different GHGE footprints. The fruit and vegetable share of the diet (normalised for calories intake) is increasing with each generation.

Specific attention must also be given to the fragmented and contrasted dietary patterns of the most rich and poor income groups. As shown in Reynolds et al (2019) healthy and lower-GHGE diets could be created in for all income groups, but tailoring changes to income groups may make dietary changes more achievable⁶. Broadly, the changes needed were similar across all groups; reducing animal-based products and increasing plant-based foods but varied by specific foods per income group and dietary pattern. Improving income and reducing dietary inequality will thus assist in leading to a healthy sustainable future.



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Review Christian Reynolds's presentation: Food systems and food choices

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Healthy food promotion: a theoretical framework

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Current dietary intake of children and adolescents is poor and does not meet (inter)national nutritional standards^{1,2}. As a consequence of this unhealthy eating pattern, we are currently facing a current global epidemic of childhood obesity and, in line with this trend, non-communicable diseases that are highly related to dietary intake and which are relatively easy to prevent. Considering that unhealthy eating patterns develop during childhood and continue into adolescence and adulthood, this trend is very likely to accelerate in decades to come³. Therefore, the World Health Organization (WHO) has stated that prevention and treatment of childhood obesity is one of the highest priorities⁴.

Food promotion of healthy foods - a highly promising avenue to increase F&V intake

One important factor that explains the unhealthy eating patterns of people, and children in particular is food marketing. The accumulation of advertising promotes and stimulates to consume energy-dense foods over healthier foods - contrasting with the repeated recommendations by health practitioners⁵. Given the effectiveness and success of food promotion of unhealthy foods, it might be a highly promising avenue to investigate whether, how, when, and for whom, food promotion techniques of healthy foods increase the reinforcing value of foods such as fruit and vegetables. As a consequence of increased reinforcing value, such exposure might subsequently also increase the intake of these foods among children^{6,7}. To arrive at an overarching theoretical model that explains and predicts how food promotion of healthier foods might be effective, an extensive synthesis of existing theoretical models from different disciplines and a review of recent empirical evidence was conducted and is shortly reported here.

The Promotion of Fruit and Vegetable Model

The proposed theoretical model contains an eclectic combination of theories from different research fields that have studied eating behavior from different angles for decades (i.e., consumer psychology, developmental psychology, biology, neuroscience, sociology, nutritional science, behavioral economics, and communication science). Integrating findings from such differing research fields leads to important insights on how to stimulate children's fruit and vegetable intake, which can be used for research and practice in a variety of disciplines.

The five foundational assumptions of the designed model (see Figure 1) are that:

1. by increasing attention toward, and the reinforcing value (e.g., liking and wanting) of fruit and vegetables through food promotion,
2. a reciprocal relation with eating behavior occurs, which in time,
3. leads to a normalization of intake of fruit and vegetables (habit formation) and, ultimately,
4. to improved health states as indicated by physiological (e.g., inflammation levels, blood lipids, blood pressure, insulin sensitivity, neurological activity, weight) and psychological (e.g., craving, hunger, general well-being) improvements. Furthermore,
5. individual and societal factors (e.g., impulsivity, BMI, gender, socioeconomic status, food fussiness, parental feeding style) determine susceptibility to food promotion. The promotion of healthier foods model explains some recent empirical findings and aims to stimulate new scientific research in order to improve dietary intake among children.

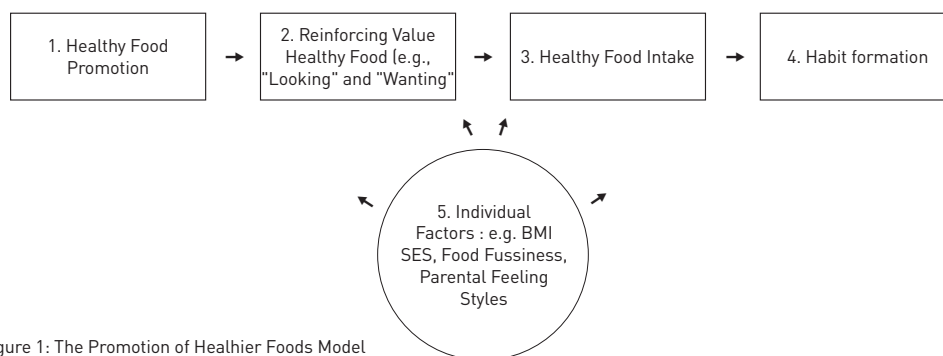


Figure 1: The Promotion of Healthier Foods Model



Review Frans Folkvord's presentation: Healthy promotion through digital techniques

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