Behavioural Science

1 Purpose of the paper

1.1 This paper is for information

1.2 This paper presents a summary of behavioural science evidence relevant to attempts to change consumer's food choices and dietary behaviours. The evidence presented demonstrates that most food choices are made with little conscious awareness or deliberation, and are heavily influenced by habits and food cues/ opportunities in the surrounding environment. This suggests that while educational and motivational strategies may play a valuable role in informing consumers about the risks and benefits of different food choices, they are unlikely to lead to sustainable shifts in population level behaviour. More successful strategies may be those which require little effort or input from consumers. I recommend that the following four points be considered;

- Humans are hard wired to enjoy high fat/high sugar foods but there may be possibilities for 'damage limitation' in food provision, where reduced portions of unhealthy but frequently consumed foods are made routinely available, easier to obtain and 'normal'.
- Food choices are largely driven by what is available / appealing at the moment of choice. Making healthy (or less unhealthy) options, more common, more visible and more convenient may increase the chances that they are selected.
- Food choice requires comparisons between products. When large numbers of products are available (as is often the norm), product summaries which allow information to be absorbed 'at a glance' may help consumers to identify products that meet all of their requirements (i.e. taste, health, price etc).
- Many of the strategies which could change consumer behaviour require co-operation from food retailers and manufacturers. Identifying those which would be mutually beneficial may increase the chances that interventions are adopted and implemented.

Concrete examples of strategies to achieve these recommendations are outlined in section 3.2 / 3.3 below.

1.3 The Board is asked to:

- **Note the information provided**

2 Background

2.1 **The negative impact of an unhealthy diet**
In Scotland in 2015, 65% of adults and around 30% of children were overweight, and 29% of adults and 15% of children were obese [(1)]. At an individual level, obesity has well documented consequences[(2, 3)] including increased risk of chronic disease (e.g. hypertension, type 2 diabetes, heart disease, cancer, stroke), impaired mental health (e.g. depression, anxiety) and reduced quality of life. High levels of obesity also result in substantial healthcare and economic costs for society [(2,4,5)]. The financial cost of diet-related disease and ill health to the NHS in Scotland is estimated to be between £360 and £600 million per year [(6)].

How can dietary behaviour be changed?
Although it is intuitively appealing to try to encourage healthy food choices through information provision and education, knowledge alone is typically insufficient to change behaviour. While the vast majority of people know what they "should" and "should not" eat [(7)], around 50% of people with good intentions fail to act on them at all [(8)] and fewer than a quarter of people who embark on a healthy eating plan are still sticking to it (to any extent) 12 months later [(9)]. Similarly, while 'shock' tactics' (e.g.

graphic warnings about health risks) are often used to try and prompt behaviour change, the best available summaries of the current evidence suggest that the effects of such strategies are small, and that they are less effective in changing ongoing, repeated behaviours like dieting and are better suited to discrete, one-time-only behaviours (such as attending a screening test) [10].

To understand why such strategies have limited success in changing food choice and dietary behaviour, and to identify potentially more useful strategies, three key factors have to be considered;

1. Humans have an innate preference for energy dense, high fat/high sugar foods
2. Most food 'decisions' are made in the moment with little conscious awareness
3. Food choices are powerfully influenced by social and environmental cues

Some determinants of food choice are hard-wired

Humans have strong and inbuilt taste preferences for energy dense, high fat/high sugar foods [11,12] and taste is consistently the strongest predictor of food choice [13]. Any attempt to change dietary behaviour must take into account the preferences that people have for unhealthy foods. Similarly, neuroscientific studies have shown that people have predictable biases in attention and memory that help them to seek out high calorie foods. For example, people display reliably better memory for the location of high than low calorie foods in their environments [14]. These biases are likely to reflect evolutionary adaptations to promote survival in ancestral environments where quality foods were sparse and widely distributed. However, as high calorie foods are readily available in the modern food environment, these adaptations are no longer beneficial. People today who have superior memory for the location of high calorie foods and whose attention is drawn to high calorie foods in their environment are significantly more likely to be overweight than others [15,16].

Most food 'choice' is not consciously controlled

Most food 'decisions' are made in the moment with little conscious awareness or deliberation [17,18,19]. This substantially limits the potential for rational strategies such as provision of risk information to change behaviour.

Human behaviour is controlled by two systems in the brain known as the 'reflective' and 'impulsive' systems [20]. The reflective system is a conscious system that slowly and effortfully takes in information, deliberates it, and comes to a rational decision based on current goals, desires, knowledge, beliefs and attitudes. This system is primarily used to make decisions when a novel situation is encountered or when novel information must be processed. However, as humans live in a busy, information filled world, it is not possible (or desirable) to pay conscious attention to every action taken. Everyday, familiar actions are largely carried out under the control of the impulsive system, a highly efficient system which elicits behaviours automatically with little or no conscious awareness in response to cues in the environment. This impulsive system operates when behaviours are familiar or frequent (e.g. habitually having a biscuit with a cup of tea), when there are too many options to consider properly (e.g. quickly choosing a recognisable option from a large array of products) or when tempting cues are present in the environment (e.g. food adverts, smells, etc) which suggest that doing X will result in positive outcomes (e.g. pleasure, enjoyment). 'Decisions' made by this impulsive system occur automatically with no real conscious awareness, and studies suggest that the vast majority of food related thoughts and choices occur in this way [19]. As the automatic system 'learns' only from the frequency with which behaviours occur (e.g. breakfast occurs every day in the morning) and the immediate consequences of different behaviours (e.g. eating cake = feeling of enjoyment), information about the future health consequences of a particular behaviour will not change its operation. The most viable way to change the operation of the impulsive system is to 'retrain' it by changing the environmental cues that it encounters. For example, if this system repeatedly encounters small servings of cake (frequency) and these are still associated with pleasure and enjoyment (positive outcomes), it will learn that this smaller serving is the 'appropriate' amount to consume. Ultimately, automatically controlled behaviours are largely elicited by what people encounter in their surrounding environments and so changing foods in the environment may be the best way to change behaviour.

Our environment triggers unhealthy consumption

With a tendency to eat without conscious awareness and an inbuilt preference for energy dense foods, people are highly likely to eat unhealthily if such foods are available to them. Unfortunately,

high fat/ high sugar foods are readily accessible and available in the modern 'obesogenic' food environment [21,22]. Empirical studies demonstrate clearly that food choice and eating behaviour are powerfully influenced by the social and environmental context in which they occur. For example, people eat more when foods are visible and easily accessible [23]; when portion sizes or serving dishes are larger [24]; when in social situations [25]; and when confronted with food cues to consumption [26]. Even when actively trying to make a considered, rational choice, consumers often struggle to identify foods that meet all of their needs (e.g. tasty, affordable AND healthy), because there are large numbers of products to compare and humans can only hold limited amounts of information in mind at any one time [27].

3 Discussion

3.1 What does this mean for behaviour change interventions?

As outlined above;

- People have an inbuilt preference for high fat / high sugar foods,
- Many (if not most) food choices happen with little conscious awareness
- The food environment makes it easy to overeat

Consequently, there is a need to;

- Be pragmatic about consumers – accept that many people want to eat high calorie foods and work to make smaller, healthier versions of these foods available, easier to obtain and 'the norm'.
- Acknowledge that strategies which target the brain's reflective system (like education and motivation) will inevitably have a limited effect on food choice because many food 'choices' occur automatically. Focus instead on retraining the impulsive system (by making healthier options easier, more enjoyable and more common).
- Change the food environment to make it easier to eat healthily (or less unhealthily) and more difficult to overeat.

3.2 / 3.3 Strategies that can usefully be employed

The Foresight Report "Tackling Obesity" [2], emphasises the importance of creating "*….an environment that supports and facilitates healthy choices".* Intervention strategies which focus on changing choice by changing the placement or properties of objects/stimuli in the environment are known as 'choice architecture' interventions or 'nudges' [28]. Examples of such interventions are moving healthy options closer to customers in shops, increasing the relative availability of healthy options, making healthy foods easier to identify within a product array, altering plates and packaging, reducing portion sizes, etc. All such interventions are designed to make healthy behaviours easier for people to perform at moments when they are paying little conscious attention.

4 illustrative examples of choice architecture interventions are outlined below;

<u>Case 1: Point of purchase prompts</u> (*Allan, Johnston & Campbell, 2015; [29]).*
Aim: People report difficulty in interpreting the nutritional information on packs and struggle in particular to compare multiple products with different characteristics [30]. The present intervention aimed to make it easier for people to quickly compare all available products in order to identify an option that meets all of their needs simultaneously (preference, healthiness, size, etc).

Intervention: Signs (pictured) were displayed at the point of purchase in a public café showing all available snacks arranged from lowest to highest calorie. This format allows consumers to compare all of the available products 'at a glance'. **Results:** In over 20,000 purchases, the proportion of high calorie snacks sold reduced significantly from 45% to 41% (c300 fewer high calorie snack sales per week). On average, customers purchased items with 66kcal less than normal after seeing the signs, a difference which if enacted daily would be sufficient to prevent normal weight individuals from gaining 2kg a year.

Case 2: Downsizing *(Schwartz, Riis, Elbel & Ariely, 2012; [31])*.

Aim: To reduce the number of calories ordered and consumed by customers in a Chinese restaurant. **Intervention**: At the point of order, customers were told that they could downsize side dishes to a reduced portion if they wanted. **Results**: 14-33% of customers accepted the offer to downsize (regardless of whether they were given a financial discount) and did not compensate by ordering more of other items. Diners who downsized were served on average 200kcals less than those who didn't.

Case 3: Reducing portion sizes *(Wansink, van Ittersum & Painter, 2006; [32])*

Aim: To test whether bowl size affects amount of food consumed. **Intervention**: Large (34oz) bowls and large (3oz) ice cream scoops were switched for small (17oz) bowls and small (2oz) ice cream scoops at an event for graduate students and nutrition scientists. **Results**: Although participants in this study were relatively affluent, well educated, and knowledgeable about nutrition, those using small scoops and small bowls still served themselves 53% less ice cream than those given large bowls and scoops. This finding is echoed in a recent large scale systematic review [(33)] which demonstrates that people consistently consume more food and drink when offered larger-sized portions, packages or tableware than when offered smaller-sized versions.

Case 4: Visually reminding people about consumption *(Geier, Wansink & Rozin, 2012; [34])*

Aim: To reduce the number of crisps consumed from tubes. **Intervention**: Coloured crisps were inserted at regular intervals into tubes of standard crisps to provide a visual reminder of portion size. **Results**: Students eating the crisps while watching a film ate 50% fewer crisps when coloured crisps were present, suggesting that the visual cue may have interrupted automatic mindless eating and helped participants to monitor the quantity consumed.

Advantages of choice architecture interventions

Interventions of this type have three clear advantages over educational and motivational interventions. Firstly, they work primarily via automatic or non-conscious processes so do not require individuals to 'buy in' to the intervention or exert effort. Secondly, if effective, they are likely to be cost-effective as they typically involve small scale and straightforward changes to the environment. Finally, people from both ends of the socioeconomic spectrum can be exposed to them in contrast to more traditional educational interventions in which, low SES individuals are often under represented. Although the effects of such interventions often appear relatively modest, reducing energy intake by as little as 100kcals a day is sufficient to prevent weight gain in normal weight individuals [(35,36,37)]. Such small changes are a viable and worthwhile approach to population level behaviour change as smaller, less dramatic changes in behaviour are likely to be more acceptable to, and manageable for individuals interested in weight loss [(37)] and have the potential to accrue significant benefit over time.

Industry considerations
Changing behaviour in the ways outlined above inevitably requires the involvement of food manufacturers and retailers. While this presents challenges, there are many possible 'win wins'. For example, the intervention presented in Case 1 was designed to shift sales from one product to another rather than to reduce purchases per se (thus maintaining retail profits). Similarly, many customers in the study presented in Case 2 voluntarily reduced their portion size when offered the opportunity to do so, while retaining a willingness to pay the full price for their meal. Finally, as 40% of food purchasing in Scotland is of items on price promotion [(38)], and 66% of UK adults think that price promotions on junk food should be reduced [(39)], there is scope and public backing to shift price incentives away from junk foods and towards healthy alternatives.

4 Conclusion

4.1 In conclusion, the behavioural science evidence presented in this paper suggests that those aiming to change the food choices and dietary behaviour of consumers should;

- Be pragmatic. Consumers prefer high fat / high sugar foods. Look at the possibilities for 'damage limitation' and trying to make smaller amounts of these foods routinely available, easier to obtain and 'normal'.
- Make healthy choices easier, more common and more convenient so that when people pay little attention, the chances that they will automatically select a healthier option are increased.
- Simplify nutritional information so it can be absorbed 'at a glance', helping consumers to quickly identify products that meet all of their requirements (i.e. taste, health, price etc). Choice requires comparison between different options and this may require more than pack information.
- Focus on strategies that are likely to be acceptable to the food manufacturers and retailers. Identifying mutually beneficial strategies will maximise the chances that interventions are adopted and implemented.

4.2 The Board is asked to:

- **Note the information provided**

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ANNEX A

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