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Mystification and Obfuscation in portion sizes in UK food products

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Abstract

There has been concern expressed as to how obesity is framed as an individual responsibility easily solved with common sense. Such research has questioned the appropriateness of a size-based emphasis to public health. Moving away from the emphasis on the individual this paper critically reviews consumer marketing techniques in the presentation of portion sizes, given what is known about human cognitive and physical limitations around food choice. Through a micro study of portion size in three products, cereals, cereal bars and yoghurts, claims are made regarding marketing techniques of obfuscation in portion size presentation that at a macro level link to earlier critiques of marketing mystification. Findings suggest a number of specific obfuscators that could lead to passive overconsumption. The paper concludes that regulators should shift their emphasis away from the individual to examining marketing mystification and techniques of obfuscation. Where information is presented it should be more appropriate and consistent across brands within a product category.

Keywords

Portion size, calorie obfuscation, marketing mystification, individual responsibility, passive overconsumption

Calorie Obfuscation in portion sizes in UK food products

Introduction

In 2013 Critical Public Health published a special edition entitled 'Obesity discourse and fat politics: research, critique and interventions'. The editorial and many of the papers in the special edition challenge the dominant discourse of an obesity epidemic and in particular moralizing judgements about fatness as individual failure. The editors note that while opportunities for intervention abound, interventions which suggest changing behaviors of others inevitably bring tensions for the researcher (Monaghan, Colls and Evans, 2013). A common research and policy emphasis is that body size is a proxy for health and that poor diet and lack of physical activity are key explainers for obesity. The focus on individual responsibility may lead to ethical concerns of negative consequences including, stigmatization and eating disorders (Monaghan et al., 2013); responsibility can become inseparable from 'neoliberal norms of self-governance' (Guthman, 2013, 264).

Some researchers challenge how people are socially constructed as 'weight deviants' (Monaghan, Hollands and Pritchard, 2010, 65), others suggest that size is made real by repeated claims creating an obesity epidemic which is primarily a social and cultural phenomenon (Guthman, 2013). The idea of an obesity epidemic can too easily conflate size with illness to become a health problem (Jasanoff, 2004). This is exacerbated by other social and cultural entities such as the media, where obesity is often framed as 'a problem of culture and environment, couched in the language of traditional biomedical epidemics and yet also a problem that can be solved by simply relying on common sense' (Boero, 2013, 372).

Doubtless social context does shape science and while some will argue that science is ideology free, others regard science as power-loaded, the conclusions of which should not be taken at face value (Reardon, 2005). The production of science can result in the production of social order; in for example what society classes as overweight and obese. Media constructions of health issues too, lead to societies' construction of what should be of most concern and in turn to favored policy initiatives (Boero, 2013). While some therefore find the obesity epidemic a scientific fact, others do not agree leading to unlikely groupings of fat activists, feminists and food industry-funded organizations querying the hype around obesity (Gard, 2010). In response, Guthman (2013, 265) calls for a third way of critical research which examines 'how and for whom scientific knowledge is produced as a way to promote reflexivity about the scientific process'.

While these authors question the appropriateness of a size-based emphasis to public health, another approach can be to move away from the individual to a critical review of consumer marketing techniques (Alvesson, 1994); in this case the presentation of portion sizes. In so doing a more reflective view with regard to the consequences of marketing may be garnered while engaging with scientific phenomena of human responses. This requires recognition of the social consequences of such activity and researchers' limitations in terms of constructing and adding to the existing obesity debate. Nevertheless one technique that marketing does practice is obfuscation, in such areas as pricing for example (Mohammed, 2011), which adds to earlier metaphors for marketing theory suggested by Alvesson (1994) of marketing as mystification and cultural doping whereby marketing selectively constructs and confuses needs and understandings.

Boero (2007, 51) argues that obesity has become so framed as a 'problem of individual gluttony and sloth' that regardless of content, obesity science inevitably confirms this because ' [a] black box of fatness underlies all of these seemingly divergent perspectives'. In

this paper the concern is not to identify correlation but to recognize causal pathways to understanding how marketing contributes to what may or may not be considered a problem. In so doing the paper necessarily engages with science including science that considers human limitations. The aim, however, is to explore how this might be used to better understand mystification and obfuscation approaches used in the marketing of food portions.

A Critical View of Marketing

Peattie (2007, 201) describes consumer sovereignty and choice as 'a sacred article of faith within marketing' despite the costs that this may lead to for others, and consumers themselves, who may not in economic terms have perfect information in the choices they make. While critical theory assumes the possibility of autonomy for individuals to challenge the domination of corporations developing preferences (Alvesson, 1994), the scientific route examines the limitations that may exist in humans' abilities to resist this domination, including that increased consumption may not lead to increased satisfaction (Pickett and Wilkinson 2009). Therefore the paper engages with scientific discussions of human cognitive limitation and preferences to put another light onto the apparently rational information processing individual that consumer sovereignty represents and which marketing targets. Critical marketers suggest the need to study phenomenon at multiple levels and that the zooming in and out process reveals aspects that may be obscured if only studied from one level (Dholakia, 2012). The present study moves between a micro study of portion size and a macro level critique of marketing mystification.

The paper considers portion size as a marketing phenomenon with social and cultural consequences. In so doing the paper engages with the concern regarding the increase in people's size while attempting to refrain from bifurcating issues of individual responsibility. Rather the paper considers, through a study of UK retailers, how portion sizes could reveal

problematic representations of needs through forms of mystification (Alvesson, 1994, 304) that reinforce difficulties that people have ‘in clarifying and evaluating their needs and wants’. The marketing as mystification metaphor creates smoke-screens which have the ability to lead to greater consumption. Through considering how portion sizes of three products, cereals, yogurts and cereal bars are communicated to consumers, the paper aims to show how products can be constructed as symbols which obfuscate and confuse. The paper begins by reviewing research in two areas important to portion size. Firstly, the paper considers human capabilities in relation to what and how much people eat. This includes physical and cognitive limitations and human bias. Secondly, the paper examines the context in which people engage with food in the twenty first century, where and how food is sold, marketed and consumed. This section also considers business and technological developments which have impacted on the context of food consumption in relation to portion size. The paper then outlines the methods and results of an analysis of three processed foods in terms of their presentation of portion size. The recommendations to remove marketing mystification and specifically obfuscation are limited to improving marketing practice in terms of contribution to social good, nevertheless given that the causal pathways of obfuscation may lead to particular consequences, messages for policy are also possible. The empirical research does not engage directly with consumer behavior but embeds the findings in the context of a large range of existing research on consumers’ responses to the food environment.

Physical and cognitive limitations in managing portion size consumption

Despite continuing discussion of the role and place of self-control in the rise of obesity (Askegaard, Ordabayeva, Chandon, Cheung, Chytkova, Cornil, Corus, Edell, Mathras, Franziska Junghans, Brogaard Kristensen, Mikkonene, Miller, Sayarh, and Werle, 2014), research shows that the continuing attempts to educate people with regard to the relation between portion size and calorie intake are likely to fail (Nestle and Nesheim, 2012). Self-control, following education may be impeded by the physical inability to implement such discipline. This is because human beings are limited in their abilities to resist food. Cohen (2008) gives a comprehensive analysis of the range of such human limitations and how business has exploited them. She examines ten cognitive and physical limitations of humans which lead to increased calorie consumption in the presence of calorie dense food. These ten factors include physical responses such as: the secretion of dopamine (which motivates desire) when food is perceived; innate preferences for sweet tastes, for example a new-born will drink more sweetened solutions than plain water (Desor, Maller and Andrews, 1975; Keskitalo, Knaapila, Kallela, Palotie, Wessman Sammalisto, Peltonen, Tuorila and Perola 2007) and the activation of the brain's reward system and reduction of satiety when consuming fats (Erlanson-Albertsson, 2005). Other physical factors include hardwired survival responses to consume more in times of abundance, and mirroring, whereby people mimic the eating habits of those in their surroundings (Dijksterhuis, Smith, van Baaren and Wigboldus, 2005). Cognitive limitations include the inability to judge calorie content and cognitive overload when too much information makes understanding difficult, which may lead to suboptimal choices.

Researchers have examined the nature of information processing during supermarket shopping and found that up to two thirds of purchase decisions occur in store in a time of around one hour; effectively people are regularly evaluating thousands of products on a range

of criteria in a very short time (Caswell and Padberg, 1992; Schwarz, 2004). People do not always prefer more choice (Iyengar and Lepper, 1999, 2000) and decision-making under time pressure deteriorates (Park, Iyer and Smith, 1989), implying that those in store decisions may often be suboptimal, in some cases leading to what has been referred to as passive overconsumption (Blundell and King 1996).

Portion Size and Calorie Consumption

Of the many factors that contribute to high calorie consumption, portion size is critical for two reasons. Firstly, the absolute size of the food portion consumed will contribute to weight gain or loss and portion sizes have increased over time (Chandon, 2012; Young and Nestle, 2003). For example the number of larger sized portions in supermarkets has increased 10 fold between 1970 and 2000 (Wansink and van Ittersum, 2007). Secondly, perceptions of appropriate portion size appear to work in tandem with other factors such as nutrition claims with the usual effect of increasing consumption (Wansink and Chandon, 2006). What Nestle and Nesheim (2012) refer to as 'calorie distractors' – claims of low fat or sugar, added vitamins, organic or antioxidant ingredients - convey to people that what you eat is more important to body weight than how much you are eating, which is not the case.

How food is presented can also impact how much is eaten. A larger pack size will almost always have a price cheaper than smaller alternatives, appearing as better value for the consumer. But the pursuance of value can also be a problem as people's perceptions of an appropriate serving size can vary by around 20% (Wansink, 2004). Larger packs, however, produce greater margins for companies as the marginal cost of the extra food is little in comparison to the perception of increased value for the consumer (Chandon, 2012).

Some products are effectively in portions, such as a bar of chocolate or a standard 330 ml canned soft drink. Estimating what is the appropriate portion size when serving from a box of cereal or a family size bag of M&M's is more difficult. In such situations unless you weigh a portion and calibrate this using the information on the package, you can only infer the appropriate serving size from other cues. Clues can include bowls and plates and the imagery appearing on the pack, seeing what others do either in family and social situations or as depicted in advertising and previous experience. Researchers have found that people tend to underestimate the portion they serve themselves (Wansink and Cheney, 2005), resulting in passive overconsumption.

The marketing environment as mystification

Swinburn, Egger and Raza (1999, 564) identified the term obesogenic environment as 'the sum of influences that the surroundings, opportunities, or conditions of life have on promoting obesity in individuals or populations'. The term is an issue for some for suggesting an environment that makes fat bodies problematic (Colls and Evans, 2014). Rather than engage specifically with the concept of the obesogenic environment this section considers how marketing has developed in terms of the extent and presentation of food. Concomitant with technological advances are opportunities for mystification.

Food today has much more variety in product formulation than previous generations would have experienced; these include differences in flavors, ingredients, such as low fat, low sugar, and differences in sources such as Fair Trade and organic. Through technological change including improved distribution systems, preservation techniques and packaging, foods are cheaper and more readily available. The nature of the food available in supermarkets has changed both in content and size. As Kessler (2009), notes the food

available to us is regularly processed and often with the addition of calories through coatings, batters and frying. Firms engineer such hyperpalatable foods with the addition of fat, sugar, and flavorings to appeal to the known innate desire for such ingredients leading some to consider such food types as having the potential to be as addictive as drugs (Gearhardt, Grilo, DiLeone, Brownell, and Potenza, 2011).

Portion sizes have increased substantially over the years (Wansink, van Ittersum and Painter, 2006). Young and Nestle's study (2003) measures single food portion sizes in convenience stores and fast food restaurants, finding that portion sizes of many of the foods studied had increased since the mid-1980s. Smiciklas-Wright, Mitchell, Mickle, Goldman and Cook (2003) undertook a systematic study of food intake across 11,000 people and found consumption increases in over one third of the food types they studied in a 5 year period. Plate, bowl and glass sizes too have increased and this will inevitably affect the amount put into receptacles – the larger the plate the more food a person consumes (Wansink and van Ittersum, 2007). Such increase in portion size led the US Food and Drug Administration (FDA) to increase their suggested portion sizes in 2014. The UK does not have a definitive portion size similar to the FDA although some websites including BUPA and the NHS (http://www.nhs.uk/change4life/Documents/PDF/Schools%20cooking%20resources/SchoolFoodStandardsGuidance.PDF) suggest typical portion sizes. In 2006 The European Consumers Organization (BEUC, 2006) identified evidence that consumers preferred nutrition information to be presented by serving or portion rather than per 100 grams. They agreed, however, that nutrition information by portion would only be relevant if the portions are clear and realistic and they had concerns as to how people might compare information provided by different manufacturers' portion sizes. The change in portion sizes is even noted in cookery books with Wansink and Payne (2009) reporting that recipes in the Joy of Cooking had increased the average calories per serving by 63%.

Another important aspect of food business is that the ratio of calorie content to portion size is growing. This is particularly the case with processed foods. Erlichman (2013) identified one supermarket pizza which advertised that a portion would provide 446 calories while in small print a note stated that one portion was just a quarter of the pizza; if you consumed the whole pizza the calorie intake would reach 1,784. So in this case the suggested portion size is probably unrealistic – few people could be expected to buy a pizza and eat only one quarter unless bought intentionally for sharing.

The pizza described above cost less than £2. This highlights another issue with regard to portion size; that marketing has trained consumers to look for value for money. Such activity is described by Alvesson and Willmott (1994) as cultural doping whereby marketing acts as a socialization agency. Value for money is a socialization norm developed by marketing such that looking for special offers becomes a norm of food shopping and the pricing of food items is made of greater importance than content. One obvious way that value is manifested is by getting more for less money with businesses offering larger portions or packs. The increase in size of packs is doubtless a sensible marketing strategy, allowing companies to avoid price wars by focusing on size and adding value. The marginal cost to produce such increases is low, resulting in large boxes of cereals and other jumbo sized items often presented as family packs. Companies are also quick to respond creatively to declines in consumption. Nestle reports that in following a 10% decline in the consumption of French fry portions in children aged 2 to 5, companies introduced new versions to appeal to children including blue and chocolate or cinnamon and sugar coated French fries.

Human limitations suggest that policies which rely on education and individual responsibility in the face of how food is marketed are difficult to implement successfully. The choices made by consumers must be viewed in the context of a complex food environment

that includes market actions that mystify and even culturally dope consumers (Alvesson, 1994).

UK Policy, food marketing and portion size

Many countries have introduced legislation and policies to counter potentially negative effects of retailer marketing including restrictions on marketing to children (Hawkes, Lobsten and Polmark Consortium, 2011). The reasoning for such approaches is questioned by some who argue the unlikeliness of similar methods to be aimed at adults who are viewed as culpable both for their weight and their children's weight (Boero, 2013). The EU now has compulsory labelling of macronutrient content (Watson, 2011). Front of pack (FoP) nutrition labels such as the traffic light based system which grades fat sugar and salt content on the basis of green for low, amber medium and red high, may support consumer choice of healthier foods (White and Signal, 2012), although the quality of studies in this area have been questioned (Vyth, Steenhuis and Brandt, Roodenburg, Brug and Seidell, 2012).

While many major food retailers signed up to the UK government's public health responsibility deal (Department of Health, 2011a) which includes pledges on salt and calorie reduction, most health organizations have left, citing the increasing power of companies to set the agenda on their terms (Better Health, 2013). The UK consumer organization, 'Which?' voiced concerns as to how effective the responsibility deal would be as many companies had not signed up (Which?, 2012a). Companies have pledged to reduce calories within products (Department of Health 2013). Tesco, for example pledged to use lower calorie ingredients and manage portion size. Sainsbury pledged to make a third of their product promotions on healthier choices such as their 'Be good to yourself' products which

should contain 30% less calories compared to the standard label. Nevertheless this leaves standard products available in the choice mix often with higher caloric content.

The next part of the paper examines the presentation of portion sizes of three processed food products commonly linked to healthy eating by the companies that produce them. Cereals are a breakfast staple with whole grain versions low in sugar and salt recommended by the UK government (Department of Health, 2011b). Many cereals have health and nutrition claims, although some people question how healthy they are (NHS Choices, 2012). A product extension, the cereal bar can be a breakfast substitute or snack and has shared similar criticism (Which? 2012b). Many people also view yogurts as healthy but they often have high fat, sugar and/or salt content (Trichterborn, Harzer and Kunz, 2011).

Method

The UK's top three leading retailers, Tesco, Sainsbury's and Asda account for over 61% of the market (Kantar World Panel, 2015). Data was collected online and in store and then collated and analyzed using Microsoft Excel. The researchers viewed retailer websites between February and July 2013 to gather information on products available. Data was collected on the product name, weight (total and per portion), price, promotional price (if relevant) and nutritional information (per portion and per 100g). Nutritional information was limited to the macro-nutritional content including calories and weight of sugar, fat, saturated fat, fiber, sodium and salt. Where nutritional information was not available from retailer websites, information from manufacturer websites was used. As the list of products can change day-to-day, the products, price and promotional prices for a food group from a single store was gathered on one day. The product images displayed on-line were also gathered for messaging analysis. Information from one superstore in central England for each retailer was

taken on two days in June 2013. Each store granted permission for data collection. Data gathering involved two phases. The first phase was an audit of products in-store. The general location of these food groups was noted including specific aisles for cereal bars as these appeared in multiple locations. A total of 615 cereals, 306 bars and 606 yogurts were included in the first phase. The second phase of in-store research involved gathering additional information on 30 (10 from each product) selected brands representative of each product category. This was done by categorizing all brands into four types:

1. Children's; a sizeable number of products were children oriented and this has been a focus of concern in terms of calorie intake (Hawkes et al. 2011).
2. 'Good for you' brands, implying some kind of nutritional or other benefit.
3. Indulgence or sweet products, usually containing sweet ingredients such as honey or chocolate.
4. Standard, that is with no special ingredients, or message appeal.

This categorization excluded 'free-from' (such as gluten) products. Brands and own brands were split giving a final grouping of 8 categories and random number sampling was used to choose the final 30 brands.

Figure 1 shows the products selected for detailed analysis with a summary of weight, portion size and nutritional profile and store where stocked.

(Insert Figure 1 PDF here 'Products selected for detailed analysis including a summary of weight, portion size, nutritional profile and stores in which they were stocked'.)

Stores requested photos were not taken so information gathering was in the form of site notes. For each, brand information noted included the price and placement in store. Each selected product was purchased and further nutritional and portion size information taken as

well as images and messaging. A narrative and visual synthesis of all information gathered for each product was performed to compare marketing to nutritional profile. From this six types of messaging were categorized into six groups: nutrition, health, ‘good for you’, sensory, quality, functional, price and other. Nutrition messaging included any reference to fat, sugar, fiber and other relevant nutritional qualities that may be viewed as promoting products, for example ‘wholegrain’. Natural and organic messages could be thought of in multiple categories but were included in nutrition on the basis that this implied a lack of added chemicals (Eden, 2011). Health messaging included all specific references to health and functional properties such as cholesterol lowering or inner defense (Mariotti, Kalonji, Huneau and Margaritis, 2010). Terms implying health such as ‘vitality’ were also included in this category. ‘Good for you’ messaging could link to nutrition but implied a non-specific benefit and included phrases such as ‘goodness’ and ‘go ahead’. Sensory messages included any specific taste or textural language using nonspecific wording such as delicious, juicy, chewy or more specific denotation of content such as nutty or fruity. Quality messaging included terms such as ‘luxury’, ‘improved recipe’ and ‘chosen by you’ and terms implying the quality of manufacture such as ‘family millers’ traditionally made’.

Findings

In the first phase no nutritional data was available for 4 cereals, one bar and 42 yogurts which appeared online. Partial nutritional data was available for 14 cereals, six bars and 60 yogurts with 12 cereals and 20 yogurts missing nutritional values for one or more macronutrients that appear in the traffic light rating. Portion sizes varied. 34% of cereals had 30 gram portion sizes with most of the rest higher (40g, 45g or 50g). Bars had a more even spread of portion sizes ranging from 12.5g to 50g with a median of 30g and most frequent bar size at 35g (12%). Yogurt portion size ranged from 40 g to 200g with half of products at

100g, 125g and 150g. Portion size is only a recommendation from the manufacturer. See figure 2 for a summary of portion sizes and frequency by supermarket studied, based on the online data.

(Insert Figure 2 PDF here ‘Portion size in grams for products on retailer websites’)

Promotion: Front of pack messaging

Over 95% of all products had messaging on the front of the packet with around 40% of products with three or more messages. Nutrition messages were the most frequent major message. See figure 3.

(Insert Figure 3 PDF here ‘Summary of number and calorific density of message on front of packages of products on retailer websites’)

Products with health messages generally had the lowest median calorific density with sensory messages around 10% higher for cereals and bars and over double for yogurts. Bars with functional or other messages and yogurts with quality messages also had a similar higher median calorific density. Extensive messaging appeared on cereal packets but less on bars and yogurts which have less surface area. Surprisingly in many cases nutrition and health messages and images were not on products that had a better nutrition profile. Both branded and own branded cereals bars and yogurts had images often with the healthy ingredients such as fruit or oats. This included products with the worst nutrition profile such as, figs on breakfast biscuits with no green FoP ratings and strawberries on children’s yogurts with only one green rating. Cartoons appeared on all children’s products. Backs of products also had images that would appeal to children. Many brands had nutritional or health messages including those with poorer nutritional profiles, for example Nestlé Lion had a particularly

poor nutrition profile yet had the health message ‘Helps build strong bones’ on the front of the packet. A yogurt had the message ‘Healthier lunchbox’’ on the front despite having fat, saturated fat and sugar rated amber.

Nutritional information and portion size

Nutrition information was not consistent across products. Three branded cereals had no FoP label. All nutrition labels showed 100g and per serving information, however many, including sweet cereals did not include milk. For the remaining cereals FoP label nutrition levels were without milk (only a Sainsbury’s own brand had both). One bar had no FoP nutrition label and contained nearly 200Kcal per portion and two yogurts with high calorific density had no FoP label.

Portion sizes varied across all product categories. Some had a higher calorific density by between 40 and 60 kcal but had lower kcal per portion purely because the portion size was smaller. Figure 4 shows how cereals are typically displayed with full bowls of cereals despite the recommended portion size being usually 30g. The researchers tested the recommended portion size against a range of currently available cereal bowls and found that to fill the bowls in the manner displayed, the portion size would have to double alongside the addition of milk increasing the calories to more than twice.

(Figure 4 PDF here ‘Front of pack images of selected cereals’)

Some bars had portion size information based on one slice despite three slices making up one of the individually wrapped packets. One own-brand equivalent, however, had a more realistic portion size of three slices. The prices of products with worse nutritional profiles or higher calorie were not cheaper or, in the time studied, put on special promotion.

Discussion

A number of issues arise from the study of importance to a critical view of marketing mystification; in this case how companies present their products' nutrients and calorie content in terms of suggested portions. Given what is known about human cognitive limitations, time typically spent shopping and problems in situations of hyper-choice (Schwarz, 2004), the sheer range of products coupled with the variety of recommended portion sizes suggest that confusion and/or oversight of recommended portion size is likely to occur. Where FoP labelling is not apparent, consumers have to spend time and cognitive effort identifying and comparing the calorie content. Nutrition information on products was not consistent and could misrepresent the product contents, such as cereals with no milk included in the calories per portion.

Promotional nutritional messaging was found on about three quarters of products but this included around 150 products with messages which had a poor traffic light rating (all amber or one red and two amber or worse). In addition 59 of these products had no FoP nutrition label. Cereals and bars with positive (low) fat messages and yogurts with similar sugar messages had comparable calorific density to products without such messages. Products with messages such as 'no added sugar' or 'no added hydrogenated fat', while technically correct often still had high levels of naturally occurring sugar or fat. This type of messaging may create a health halo effect resulting in consumption of larger portions and calories as consumers feel they are eating something healthy (Wansink and Chandon, 2006). A number of products with health messaging also had poor nutritional profiles particularly bars where 41 (nearly 90%) were red for sugar and 11 red for saturated fat. In such cases these messages could be referred to as calorie obfuscators, rather than just calorie distractors (Nestle and Nesheim, 2012).

For yogurts and bars, portion size is generally determined by the manufacturer (by pot size or individually wrapped portion). Both food groups included products of high calorific density and large portion sizes and larger portion size has been shown to result in greater consumption without self-regulation for calorie intake (Rolls, Morris and Roe, 2002).

Consumers determine portion size of most cereals and have been shown to underestimate portion size when taking cereals from packs (Roberto, Shivaram and Martinez, Boles, Harris, and Bronwell, 2012). A large proportion of cereals had a portion of 30 g which as indicated is a very small size. Of the ten cereals within the detailed analysis, five had pictures of bowls full of cereal and milk which did not align to the actual portion size when put in a standard bowl. Such images also obfuscate the calorie reality.

Out of the 10 bars selected for detailed analysis three had a portion size based on one biscuit rather than three that were in the packet. Increasing portion size can lead to increases in consumption of about 35% on average although not surprisingly the effects are curvilinear; there is a limit to how much one person can eat (Zlatevska, Dubelaar, and Holden, 2014). Others have found that so-called sharing bars are often consumed by the same person within the same day (Vermeer, Bruins and Steenhuis, 2010). Such packaging may increase the likelihood of passive overconsumption questioning the wisdom of bars being sold in anything more than one portion size.

A positive finding for marketing was that prices for cereals and yogurts with better nutritional profiles, both in terms of content and calorific density, were often marketed at a slightly lower unit price, with a lower unit price considered more likely to encourage purchase (Andreyeva, Long and Brownell, 2010).

Conclusions

Dholakia (2012) argues that in critical marketing studies, contradiction should be encouraged as part of a theoretical structure that embraces the possibilities of change. Burton (2001, 726) suggests that a task for critical theory must be to both critique contemporary society and envision different possibilities such that critical theory is 'about values and what ought to be'. The present study has examined portion sizes at what might be considered a micro level of detail but without that detail, juxtaposing the problem of the so-called obesity epidemic against the continuing activity of marketing as a socialization agency, which develops and extends norms of consumption, would not be possible. From this micro study, macro conclusions may be made. Alvesson (1994, 304) says that the mystification metaphor represents how marketing creates smoke-screens and 'exploits ambiguity in the way customers relate to their worlds'. The argument outlined above is that marketing uses such a smoke-screen in the way that portions are presented introducing ambiguity and difficulty in choosing and using goods.

The intention of the paper was to examine the problems of portion size as part of the mystification of marketing which includes what Alvesson's (1994, 304) refers to as the 'problematic claims of the representation of needs'. In so doing the paper has aimed to avoid a representation of fat as being an issue of individual responsibility, although the paper does not dismiss a medical view of the health risks that may result in weight gain. Nevertheless and as reflexive researchers, the authors recognize the unlikeliness of this paper containing no value judgements. While this may be so, the aim is only to present such value judgements where they reflect marketing's role in mystifying the marketplace and obfuscating issues of portion size in light of evidence of human limitation in a number of areas pertaining to food choice.

The paper has shown how calorie intake and portion size may be affected by factors apparent in the products studied in this research. A radical view might be to say that health bodies and regulators are responsible to understand how these elements work together with different marketing techniques including the presentation and communication of portion sizes. Governments, in looking at new regulation around food, should consider first how such obfuscators operate given the existing knowledge of cognitive limitations, and prioritize understanding techniques of mystification over stressing the responsibility of individuals to control their weight.

While others have made suggestions for how marketing could be improved to limit calorie intake (Chandon and Wansink, 2011), the study of marketing messages related to portion sizes and nutrition intake of brands in specific product classes is underrepresented. The number and range of products available in typical supermarkets in the UK with a variety of messaging and differences in suggested portion sizes support Swinburn et al.'s (2011, 806) statement suggesting that the current food environment is 'a sign of commercial success but a market failure'. The market has an incentive to obfuscate when consumers have a limited perception of complex objects and inbuilt cognitive and physical limitations that lead them, as part of normal human behavior, to use simple heuristics in their decision making.

Just the number and variety of brands available in the product categories studied make mystification possible. While not suggesting that any food is inherently bad, other research has shown that just the presence of healthy options can mean people make alternative more indulgent food choices. Therefore such 'Good For You' options among a range of products may themselves act as obfuscators. Manufacturers will argue that consumer sovereignty requires choice and some people may think removing options a perverse action, nevertheless the evidence shows choice can be problematic.

The presentation of portion sizes is often unrealistic as in the case of cereals or may suggest a form of consumption (sharing of bars), that will not take place. In both cases such products are likely to be consumed in larger portion sizes through passive overconsumption. Manufacturers could present cereals alongside a typical serving of milk, full fat, semi or skimmed. While more information may not be better, fuller or more appropriate information should help consumers. The Royal Society for Public Health recently suggested activity equivalent calorie labelling to show how much energy one would need to expend to burn off the food purchased (Royal Society for Public Health, 2016); such initiatives might (or might not) help in understanding the implications of food consumption in easier to understand terms. Regulators should look more closely at just how realistic portion sizes are with the view to having consistency across product types. As a result, advertising that is presented in terms of how few calories are present in a portion, such as the Sainsbury's Balance brand in figure 4, would at least be comparable. While accepting that recommending a reduction in calorie intake has normative connotations that many of the researchers referred to in this paper would not support, nevertheless a recommendation is that marketing needs to forgo mystification and not engage in techniques that, because of known natural human limitations, can lead consumers to be effectively doped. Marketing has a vested interest in supporting the so-called education of people such that food choice becomes the individual's responsibility. Rather the onus of responsibility needs to be placed in the hands of the manufacturers to reduce calorie density and clearly show realistic portion sizes and the calorie content of these portions on the front of pack. This is only likely to come through regulation to ensure that promotional messaging reflects the calorie and nutrition content of processed foods such as those examined in this study but in a manner appropriate to cognitive framing. If consumers are to be held responsible for their consumption, ensuring a level playing field before purchase is the least that firms should do.

In line with suggestions for what critical theory should do (Calhoun, 1996), the paper makes a critical engagement with the contemporary social world, recognizing that the current state is not exhaustive and offers suggestions for social action. The research, while at a micro level of portion size obfuscation, illuminates macro issues of marketing mystification that need to be given more consideration than the continued empahsis on personal responsibility in food choice behavior.

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