

Consumers' snack choices: current factors contributing to obesity

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Abstract

Purpose – The purpose of this paper is to indicate the need for and create an insightful understanding of the current factors contributing to consumer's obesity levels due to their snack choices.

Design/methodology/approach – This paper reports on previous literature using publications from the Emerald Insight Journals, Google Scholar, ScienceDirect and Web of Science electronic database from 1999 to 2018 that validate and support existing literature. The retrieved literature is organised and classified into specific constructs.

Findings – Research into consumers' choice of snacks from an environmental, cultural and health perspective is still underrepresented in the international scientific literature. More research is required on the specific effects of specific levels of the stated factors contributing to obesity. Health and cross-cultural studies are needed for a more comprehensive understanding of the relation between snack choices and factors contributing to obesity that will help to implement more efficient health measures.

Originality/value – This paper is of value to academics studying consumers' snacking behaviour and public health practitioners evaluating qualitative and quantitative methods to address the obesity epidemic.

Keywords Culture, Health, Obesity

Paper type Literature review

1. Introduction

In 2016, 39 per cent of the world's population were overweight and 13 per cent were obese (WHO, 2017). Obesity rates are highest in the USA, Mexico, New Zealand and Hungary, while they are lowest in Japan and Korea (OECD, 2017). Over the past decade, snacking behaviours have increased in parallel with the obesity prevalence. The snacking of energy-dense foods has increased in parallel with weight gain and may cause non-communicable diseases, such as diabetes and obesity (Eksteen and Mungal-Singh, 2015). The prevalence of obesity is due to the increased supply and faster distribution of cheap, snack-based foods; which makes food more accessible (Hill *et al.*, 2016).

"Snacks" are defined as small servings of simple, convenient, easy to prepare food that can be consumed (Warde and Yates, 2017) between regular meals (Thornton *et al.*, 2013) and "snacking" is described as the act of eating a snack, regardless of whether healthful choices or "snack foods" are consumed (Thornton *et al.*, 2013). Snacks are often sold in pre-determined portion sizes, which unconsciously suggests a norm for how much should be consumed (Hill *et al.*, 2016). This leads to consumers often making poor choices in terms of nutrition (Bucher *et al.*, 2016), preventing themselves from overeating and maintaining a healthy bodyweight (Swinburn *et al.*, 2011).

Food choice is the process of decision making involving the sensory (e.g. taste) and non-sensory characteristics of the food itself, characteristics of the environment (e.g. culture) and consumer's eating behaviour (e.g. attitudes) in which the choice is made (Sobal *et al.*, 2006).



Environmental exposure, motivation and ability to evaluate have been suggested as key determinants of healthy vs unhealthy food choices (Brug, 2008).

Food choices are also influenced by factors, such as health, weight (Hearty *et al.*, 2007), nutritional beliefs, socio-demographic features, lifestyle and intercultural differences (Padulo *et al.*, 2017). As countries differ in their eating environments, marked differences are visible in what people eat and in their food–health associations. These differences in eating environments between countries raise the question of whether there are also differences in the consistency of eating motives across countries (Sproesser *et al.*, 2018). Studies including data from multiple countries, consistently report large differences in food consumption across countries (Hess *et al.*, 2016). Culture-specific differences in food choice motives can be used to change food-related behaviours in different populations towards healthy eating (Markovina *et al.*, 2015).

Furthermore, it is critical to understand the factors that play a role in individual food choices as typical consumer dietary surveys gather information on what is eaten without understanding why those foods are eaten or consist of motivation surveys that determine dietary choices based on overarching general patterns of food choice, often without consideration of individual foods (Phan and Chambers, 2016). To promote healthy snack choices, it is important to understand how consumers perceive these individual food groups and to determine which criteria shape their perceptions when deciding whether a snack is healthy. Food choices are central behaviours affecting consumer's health and wellness, yet the understanding of the key factors that drives obesity and influence consumer's choices on snacking are incomplete (Friedl *et al.*, 2014).

The aim of this review is to gain further insights of the current factors that contribute to consumer's obesity levels due to their snacking choices. The paper stresses the importance of studying these factors to develop better public health-promotion activities.

Papers were identified by searching behavioural and social science, health science, nutrition and food science databases: Emerald Insight Journals, Google Scholar, ScienceDirect and Web of Science. Search terms were also used in a Google search to identify grey literature. Reference lists of the retrieved articles were scanned for relevant papers. Search terms included: (snacks) or (snacking) or (snack foods) and (food choice) or (consumption) or (eating) and (health) and (culture) and (behaviour). Where the initial search yielded large volumes of material with varying or general relevance, additional search terms were included to narrow the search to describe the different factors influencing consumers' snack choices, for example (satiety) or (physical activity). Articles were included if they met the following criteria: peer-reviewed, written in English, published between 1999 and 2018, and validate and support existing literature. The retrieved literature was scanned for relevance, organised and then classified into the following constructs: global snack consumption, the factors contributing to obesity (i.e. level of satiety, physical inactivity, sleep deprivation, unemployment and use of technology) and the behavioural outcomes of snacking, followed by the recommendations for future research.

2. Global snack consumption

Consumers have a culture for continuous snacking and large percentages of global respondents are snack planners. They eat snacks at home (79 per cent) and with family and friends (68 per cent). Many consumers snack spontaneously, as they like to try new snacks (65 per cent), buy a variety of snacks (63 per cent) and do not plan their snack purchases (58 per cent). In addition, the large developing regions of Asia-Pacific, Middle East/Africa and Latin America exceed the global averages for such spontaneous snacking characteristics (Nielsen, 2014).

The numbers of snacks taken, and eating events *per se*, vary significantly across studies, likely due to variability in methods, definitions and cultural context (Warde and Yates, 2017).

Studies examining change using cross-sectional data have shown some increase in snacking in China (Wang *et al.*, 2012) and the USA, where the number of snacks eaten per “snacker” and the proportion of total energy intake derived from eating outside of main meals have increased (Warde and Yates, 2017). Thornton *et al.* (2013) assessed variations in the display of snack foods within a sample of supermarkets across eight countries. When assessed by individual item, the greatest aisle length devoted to chips, chocolates and confectioneries was found in UK supermarkets, while the greatest aisle length dedicated to soft drinks was in Australian supermarkets. It was concluded that exposure to snack foods is largely unavoidable within supermarkets, increasing the likelihood of purchases and particularly those made impulsively.

Small meals and snacks are common in most countries, especially among women in Australia, China, Switzerland, Sweden, the United Arab Emirates and the USA. Although the dietary guidelines of several countries mention snacks or snack foods, some of them caution against snacks but provide few, if any, suggestions for health-promoting alternatives. A few countries (Greenland, Sweden, France and Switzerland) already provide specific suggestions for snacks that include more options than dairy or nuts (Hess *et al.*, 2016). Nielsen (2014) found that consumers in Africa (75 per cent) and Europe (69 per cent) ate snacks to satisfy hunger between meals. When looking at meal replacements, people in Africa and Europe replaced their breakfast (44 per cent; 62 per cent), lunch (41 per cent; 57 per cent) and dinner (37 per cent; 56 per cent) with snacks, respectively (Nielsen, 2014).

3. Cultural influence

Snack choices are influenced by social culture, food culture and socioeconomic status (Hess *et al.*, 2016). To understand the influence of culture on consumer choices, variables such “social modelling”, i.e., the amount of food consumed by eating companions (Hess *et al.*, 2016) – meaning that if eating companions consume a large portion of food, the person eating with them also tends to eat more. The enhanced influence of eating companions during snack times may be due to the lack of an “eating routine” or “script” for snacking as an eating occasion (Van der Horst *et al.*, 2011). Snack consumption may also be initiated because of celebratory social occasions as well as the availability of or desire for tempting food. Verhoeven *et al.* (2015) developed a “reasons to consume unhealthy snacks” inventory and studied 1,544 adults. They found that the most common reasons for consuming unhealthy snacks included celebrating at a party or special occasion or craving a tasty food. In another study, Hess *et al.* (2016) reported that researchers asked 55 adults to keep a diet diary for five days and rate their reasons for snacking. In this study, the most common reason for consuming unhealthy snacks was that “they looked or smelled so tempting” (55 per cent of snacking occasions), followed by “hunger” (49 per cent) and “needing energy” (23 per cent).

Individuals who are food insecure without hunger snack more often, eat larger meals and may consume more calories from snacks than food-secure individuals. Because the major energy source for snacks among food insecure adults was “sugar, sweets and beverages”, this trend towards increased snacking indicates that snacks may serve different roles in the diet and have different health effects based on socioeconomic status (Hess *et al.*, 2016).

Unhealthy food choices become a threat to consumer’s lifestyle and strongly favour the need for an increased cross-cultural understanding of food choice. This statement emphasises the relevance of culture as a modulator of food choice. People use rules of their specific cultures and ethnic groups to frame how health influences their food choices. These and other culture-specific differences in food choice motives can be used to inform interventions to change food-related behaviours in different populations, namely towards healthy food eating and wellbeing (Cunha *et al.*, 2018; Markovina *et al.*, 2015).

4. Environmental influence

Environmental factors to consume food are increasingly seen as an important determinant of dietary behaviours (Thornton *et al.*, 2013). Food environments encompass both food prepared and consumed at home, and out-of-home sources (e.g. supermarkets). In a systematic review of 38 studies, evidence was found to support an association between neighbourhood food environments, consumption and/or health (Caspi *et al.*, 2012). The density of unhealthy food outlets in neighbourhoods was linked to higher levels of obesity (Townshend and Lake, 2017). An association between higher percentage sales of unhealthy foods at local supermarkets and the prevalence of obese individuals have also been reported (Lachat *et al.*, 2012). A UK study exploring access to takeaway foods in multiple environments found those with the greatest access were nearly twice as likely to be obese as those with the least access (Burgoine *et al.*, 2016). Therefore, the location may affect food selection for snacks, as eating at other locations is associated with more snack consumption, than eating snacks at home.

The influence of the environment (context) on consumers' perception and choice of foods has been reported by several authors (Machin *et al.*, 2014; Piqueras-Fiszman and Jaeger, 2014; Sester *et al.*, 2013). Brunner (2010) and Stöckli *et al.* (2016) confirmed that environmental cues can influence consumers' food choice. To cause a healthy behaviour, consumers' association between an environmental cue and a health concept must be strong. Applying environmental cues that influence food intake effortlessly seems to correspond with the approach of facilitating consumers to make healthier food choices (Stämpfli and Brunner, 2016). Therefore, environmental cues can be applied to influence consumer's behaviour towards a healthier diet. Future research should provide a more comprehensive understanding of the interaction of associations and the level of awareness of subtle environmental cues in the food consumption area and thus help to implement more efficient health measures (Stöckli *et al.*, 2016).

Changing the food environment (e.g. remove confectionary from supermarket checkouts) – so that individuals' can choose healthier options – will have a greater impact on population health than counselling or education (Malhotra *et al.*, 2015; Thornton *et al.*, 2013). To date, a small number of studies have been conducted that apply behavioural economics (e.g. behavioural economic-based environmental manipulations) to improve food choices, which makes it premature to draw broad conclusions (Guthrie, 2016). A recent systematic review of nudge studies found them to be effective in improving dietary choices among adults but recommended the replication of successful studies in more socioeconomically diverse settings. Nudging can be a specific form of choice architecture that uses heuristics with the aim to promote healthy behaviour, while preserving free choice and leaving economic incentives unchanged. A nudge can serve as a useful complement to health education to encourage people to eat, for example more fruit and vegetables (Broers *et al.*, 2017).

5. Level of satiety

Satiety and satiation are known determinants of consumers' dietary patterns and have been related to the obesity epidemic, initially affected by sensory (e.g. taste, texture, smell) and cognitive factors including expectations about what is to be consumed and any associations with previous experience that arise. Consumers eat in the absence of hunger for several reasons, for example the availability of palatable foods, boredom or emotional stress. However, there is a strong relationship between palatability and energy density, in that higher-energy dense foods tend to be the most palatable and vice versa (Drewnowski *et al.*, 1998). However, as Mela (2006) pointed out, although the "liking" of palatable foods may be important, the motivation to eat or the "wanting" of foods should also be considered. These two factors may occur together, but evidence suggests that they may also operate separately, as in the real world, the "wanting" of unhealthy foods may be more important

than liking them (De Castro and Plunkett, 2001). The amount of energy people consume is accounted for by voluntary behaviour (the acts of eating and drinking), influenced by physiological, psychological and cultural factors. This is in contrast to energy expenditure, of which between 20 and 40 per cent is under behavioural control via voluntary physical activity (Blundell *et al.*, 2006). Consumers eat because food is available even in the absence of biological cues, an example of unnecessary snacking and nonhabitual snackers lack a biological motivation to eat snacks and, for these “nonsnackers”, snacking without hunger leads to increased energy consumption, which can cause eventual weight gain (Chapelot, 2011; Hess *et al.*, 2016). Researching appetite, including satiation and satiety, must therefore consider both physiological and behavioural evidence to gain a full picture of how satiation and satiety affect consumers’ snack choices.

6. Physical inactivity

Inactivity is described as less than 30 min of physical activity a week (HCHC, 2015). An increase in physical inactivity and energy intake is leading to the occurrence of obesity (WHO, 2013). Measures required to promote healthier food consumption patterns and facilitate a physically active lifestyle share common grounds and are mutually interactive in determining healthier behaviours (WHO, 2017), however, a large portion of the population has insufficient physical activity levels (Sjöström *et al.*, 2006).

In the past 30 years, there has been little change in physical activity levels in the Western population (Malhotra *et al.*, 2015). Bellisle (1999) argued that few studies have listed the actual changes in food selection that accompany varying levels of exercise. Adults were surveyed for their regular physical activity and food choices. The latter two groups consumed less fat and saturated fats than their more sedentary peers. Reduced aversive affective states following physical activity might influence food choice after stress exposure, for example by reducing the intake of high energy-level foods. If there is a reduction or no compensatory increase in stress-induced food intake after physical activity, this could have a beneficial influence on overall energy balance in these stressful situations (Horsch *et al.*, 2015). Consumers’ concern for health and bodyweight is an important psychological factor to determine the relationships between exercise and food choice in consumers. Consumers with a high level of concern for health are likely to make several consistent lifestyle choices, which include regular exercise and reasonable food selection. In this context, the relationship between activity level and food choices appears to derive directly from the adoption by individuals of a healthy lifestyle (Bellisle, 1999).

7. Sleep deprivation

The amount of adequate sleep (i.e. 7 h of continuous sleep per night) obtained by adults has declined, and the incidence of physician-diagnosed sleep disorders has risen (Coborn *et al.*, 2017). Clinical studies demonstrate that sleep restriction increases weight gain and calorie intake alone or in parallel with either increased or reduced energy expenditure in adults. Recent studies report poorer sleep quality among women and a negative association between sleep duration and quality with waist circumference and body mass index in women but not men (Coborn *et al.*, 2017).

This aspect of the obesogenic environment might explain in part the effect of inadequate sleep on weight gain, as epidemiological and experimental data in humans show that decreasing either sleep time or quality increases hedonic food intake due to altered neuronal reward processing (Coborn *et al.*, 2017). A lack of sleep induces higher levels of the chemical endocannabinoid 2-AG, increasing the pleasure felt when eating sweet, salty and high-fat foods (Hanlon *et al.*, 2016). Epidemiological studies have linked a chronic lack of sleep to obesity (Magee *et al.*, 2008), and it has been suggested that restricted sleep has an impact on the appetite hormones leptin and ghrelin (Knutson *et al.*, 2007). Sleep restriction has been

found to reduce leptin and increase ghrelin levels and to increase appetite (Spiegel *et al.*, 2004). These results, however, require further study, as aspects of short sleep duration, apart from its potential effect on appetite, that could increase the risk of obesity, for example more unhealthy food choices, reductions in physical activity when tired or having more time available to eat (Knutson *et al.*, 2007). It is necessary to include these concepts into the standard definition of an obesogenic environment and develop adequate studies to understand the neuronal mechanisms that drive consumer's behaviour in this complex environment (Coborn *et al.*, 2017).

8. Unemployment

Much less common are studies examining the relationship between the unemployment rate and dietary choices, which are important determinants of consumer's health. Families faced with diminishing incomes consumed less-expensive foods to maintain energy intakes at a lower cost, and lower-quality diets were consumed by individuals with limited economic means. In a sample of low-income women, lower-cost diets were more energy dense, had the highest content of fat and sugar and contained fewer essential micronutrients than higher-cost diets (Milicic and DeCicca, 2017). Davison *et al.* (2015) explored the associations between socio-demographic and psychological factors and food choice patterns in unemployed young people who constitute a vulnerable group at risk of poor dietary health. Those who had left school before the age of 16 may be especially prone to making less healthy food choices as they were uninvolved with food which led to frequent junk food choice.

Boredom has been implicated in the current obesity epidemic and eating behaviour. Boredom can help to explain some eating behaviour; however, the literature on boredom and eating has not yet established a causal relationship between state boredom, a relatively recent psychologically examined construct, and eating. For example, the excitement or stimulation certain foods offer may help to distract people's attention from the bored self. Indeed, obesity is more prevalent among those who regularly experience boredom, compared with other negative states (Cleobury and Tapper, 2014). Boredom manipulation increased snacking on sweets and demonstrated that boredom specifically encourages the consumption of sensational unhealthy foods (Moynihan *et al.*, 2015). There is a need to investigate the impact of these psychological factors on food intake and food choice under unemployment conditions to enhance obesity prevention (Luttikhuis *et al.*, 2009).

9. Use of technology

Consumers' fascination with technology and particularly, the time spend looking at screens (e.g. smart phones), will continue in the future (Roberts *et al.*, 2014). The relationship between, for example TV viewing and weight gain is complex, as watching TV introduces more sedentary time (Crawford *et al.*, 1999) as well as the opportunity to increase their energy intake when eating, compared with eating undistracted (Cleland *et al.*, 2008; Hartmann *et al.*, 2017). Significant positive associations were found for sweets and savouries and watching TV during the main meal. Less health-conscious individuals might be more affected by the use of technology in their environment, which makes healthy food choices, more difficult. In general, watching TV during dinner is a less healthy eating behaviour, and it is likely to correspond with diets high in fat (Hartmann *et al.*, 2017).

Eating while distracted may also contribute to reduced satiety and increase consumption at the next eating occasion (Hess *et al.*, 2016). Distractions, such as listening to music or playing a computer game (Boon *et al.*, 2002), eating on the go and social interaction (Ogden *et al.*, 2018), may also increase food intake. If individuals are "multitasking" while snacking, they may eat more of a snack or consume more food at their next meal. More research is needed in this area with more diverse study populations over longer time periods to determine how distracted eating affects intake and bodyweight (Hess *et al.*, 2016).

Snack intake after the meal with the TV was higher than that without, suggesting that the disruption of the memory of the meal increased energy intake (Roberts *et al.*, 2014). Overall, there is some evidence that distractions when eating (commonly looking at screens) can make people less sensitive to internal appetite controls and lead to increased energy intake. More research is needed, however, to determine the relationship between the time looking at screens and consumers' snack choices.

10. Behavioural outcomes of snacking

Consumers are poor at estimating objective risks; they overestimate their capacity for self-control and underestimate the health risks associated with the choices they make. Conversely, they cheat in their mental book-keeping, for example "Today I ate too much, but I will just eat less tomorrow". They tend to select current enjoyment (eating cake now) over conditions they wish for later (being slim and fit), which behavioural economists explain in terms of the temporal discounting of future conditions (Leng *et al.*, 2017).

Eating and choosing food become habitual because they are everyday activities – food consumption patterns and eating contexts get repeated (Jastran *et al.*, 2009). Consequently, food habits lack cognitive awareness and require little mental effort. People have the ability for planned behaviour, but they also act habitually and impulsively on various occasions. Impulsive actions (driven, for example by a value of indulgence, such as a chocolate bar) can undermine deliberate behaviour by overruling self-control and long-term goals like healthy eating. And the more habitual a behaviour is, the less controlled it becomes and the more impulsive precursors can predict it (Hofmann *et al.*, 2009).

The impulsive system works effortlessly, as the information is processed automatically and does not depend on cognitive resources, for example impulse buying – a sudden purchase with no pre-shopping intentions that derives from a desire elicited on the spot and seeks immediate gratification (Hauser *et al.*, 2013). Most consumers are neither preparing nor following a shopping list for their grocery shopping. This may make them less likely to pay attention to the long-term consequences of their purchases (Torma *et al.*, 2018). Impulsive behaviour during the decision-making process is strengthened through habits. Habits develop through sufficient and satisfactory repetition in stable contexts. Purchasing food daily is often experienced as routine. This routine act saves time and mental effort while executing the habitual behaviour. General habits (such as always buying the cheapest available food) can derive from values that have become central and part of a person's self-concept. This is explained through the assumption that central values are enacted repeatedly in a variety of situations, which is a prerequisite of building a habit (Hauser *et al.*, 2013).

Consumers revealing unconscious habit formation are prone to be more resistant to change and mostly inaccessible to cognitive arguments. Although these consumers know their behaviour is unhealthy, they are unable to mitigate the temptations of their habitual pleasures (Köster, 2009). A more successful method for enticing consumers to change is rather to still offer at the same time healthy foods than providing information about dangers and risks. Consumers continually make trade-offs between the quality of their choice and the amount of time and effort necessary to reach a decision. In many cases, the consumer will follow decision rules that yield a satisfactory (as opposed to optimal) choice while minimising their time and effort (Tarrega *et al.*, 2017). Unhealthy snacking behaviour has been found to be largely habitual (Verhoeven *et al.*, 2012). Fortunately, findings show that habit change is not impossible and can be accomplished with for example, the use of implementation intentions (Holland *et al.*, 2006). Implementation intentions are simple if-then action plans that specify when, where (if) and how (then) to act. Verhoeven *et al.* (2013) investigated the effect of multiple implementation intentions targeting unhealthy snacking habits and found that whereas formulating a single plan successfully reduced both the number of snacking occasions and caloric intake from unhealthy snacks.

As food intake is influenced by both cognition and the food environment, aspects of cognition including distraction, memory and language exist in a dynamic and iterative relationship with the world we live in (Ogden *et al.*, 2018). A limited amount of research has been done investigating the effects of snacking on cognitive function (e.g. memory, attention). However, improvements in cognitive function have differed between studies depending on the timing of snacks, carbohydrate load, population group and the type of cognitive test employed (Miller *et al.*, 2013). Determining people's behaviour behind their choices of snacks would help to develop better public health strategies and health-promotion activities (Cannuscio *et al.*, 2014; Lyerly and Reeve, 2015). For an integrated, policy-focused understanding of food choices, researchers need to optimise information in areas such as early life experiences; environmental factors and impulsive choice behaviour; emotions and decision making and how choices change with for example, age (Leng *et al.*, 2017).

11. Conclusions and recommendations

The authors have presented a review of what they considered relevant papers on identifying the current factors that contributes to consumer's obesity levels due to their snack choices. Research into consumers' snack choices and an understanding of the current factors contributing to obesity to improve healthier snack choices from a cultural and health perspective is still underrepresented and incomplete in the international scientific literature, despite the growing economic significance of these markets. The lack of consistency and uniformity in study designs and the array of potential confounding factors (e.g. sleep deprivation) makes interpretation of findings difficult and has led to little consensus about the optimum number and composition of snacks for bodyweight control and health, hindering an adequate comparison of results between cultures. Typical consumer dietary surveys gather information on what is eaten without understanding why specific foods are eaten and provide advice based on overarching general patterns of food choice, often without consideration of individual foods. The development of methods focusing on specific snack foods and "health" factors may be more effective than the one size-fits all approach. Therefore, more research is required on the specific effects of specific levels of the stated factors contributing to obesity. Future research should: focus on the relation between unhealthy snack choices and the present factors contributing to obesity; consider physiological and behavioural evidence when investigating the effect of snack choices on consumers' health; study the influence of the environmental cues on snack choices; determine how unconscious habit formation and impulsiveness can be changed; and assess the effectiveness of interventions using methods (e.g. nudging). Providing a more comprehensive understanding of the relation between snack choices and factors contributing to obesity in the environment will help to implement more efficient health measures.

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