Abstract

Food service provision imposes significant environmental and societal impacts. The contemporary customer is getting increasingly conscious about these impacts, which is often reflected in restaurant food choice. The catering industry should foresee this trend in consumer choice and architect it so that it becomes more responsible. This study employs a qualitative method for primary data collection and analysis to explore how various environmental (provenance and carbon footprint) and health (nutritional and calorific) characteristics of food displayed on restaurant menus affect customer choice in the UK. It finds that while presenting the carbon footprint information is generally viewed positively by consumers, managerial and policy reinforcement is necessary for it to become a determinant of consumer choice. Displaying food provenance, nutritional and calorific values is considered paramount and these food attributes should become conventional menu items.

Keywords

Food service provision, menu design, menu labelling, consumer choice, carbon footprint, UK

Highlights

- Explores the role of restaurant menu re-design in consumer choice
- Nutrition, calories and food provenance determine restaurant food choice
- Carbon values are seen positively but not fully understood
- Public knowledge on the climate significance of restaurant food choice should be reinforced

1. Introduction

The global food systems play an important societal and economic role but, concurrently, impose significant environmental impacts. These impacts originate in all operational sectors of the food systems and take various forms, but are particularly pronounced in terms of carbon footprint build-up (Coley *et al.* 2009), water use (Khan and Nanjra 2009), eutrophication (Tusseau-Vuillemin 2001) and waste generation (Lundie and Peters 2005). The environmental impacts of the food systems should be reduced to make them more sustainable.

Among the different operational sectors of global food systems, the food service provision industry (also known as catering) holds substantial environmental footprint (Baldwin *et al.* 2011), especially in terms of energy use and related greenhouse gas (GHG) emissions (Fusi *et al.* 2015). Due to the on-going regulatory changes, increased shareholder pressure and grown public demand for more environment-benign food production and consumption practices (Revell and Blackburn 2007), food service providers have started recognising the important role they play in managing the negative environmental impacts associated with their operations. However, while some progress has been made towards sustainability of food service provision (Gössling *et al.* 2011), the industry has traditionally been slow in addressing the new market challenges related to environmental management (Kirk 1998). This is reflected in the low uptake of pro-environmental management practices and their limited integration into day-to-day business operations (Chou *et al.* 2012). This calls for a change should food service provision aim to become more environmentally sustainable.

While the primary task of food service provision is to identify, accommodate and sustain customer demand, catering operators can also architect consumer choice. This can be achieved via the adoption of ‘social marketing’ tools that have been designed to affect consumer behaviour so that it becomes more beneficial from the societal, economic and

environmental perspectives (Kotler and Zaltman 1971). Likewise, pro-environmental 'nudging' can be applied to manipulate consumer demand to encourage purchase of more sustainable products (Hall 2013; Phtidis and Sabbage 2011). The penetration of 'social marketing' and pro-environmental 'nudging' into food service provision has been insufficient to-date (Truong and Hall 2013) although this may change in the future as these techniques hold potential to positively differentiate their early adopters from competition, especially in mature and saturated food markets (Dinan and Sargeant 2000; Reisch *et al.* 2013). Most importantly, the application of 'social marketing' and pro-environmental 'nudging' by catering operators can facilitate more responsible food consumption, thus minimising the environmental impacts of global food service provision (Gössling *et al.* 2011).

The growth of the 'experience economy' (Pine and Gilmore 1998) has dramatically affected consumer decision-making and behaviour, also in the context of food service provision (Quan and Wang 2004). It has accelerated customer interest in the health and well-being attributes of the food served; it has also contributed to the rise in public awareness of the environmental impacts of restaurant food choice (Quadri-Felitti and Fiore 2012). As a result, contemporary consumers have become more demanding in terms of their restaurant food choice, paying special attention to where the food comes from, what ingredients it contains and what impacts it imposes on customer health, the well-being of local communities, and the environment (Oh *et al.* 2007). It is paramount that food service providers comprehend the new consumer demands imposed by the 'experience economy' as the failure to anticipate and address the on-going market transformations may have a long-term detrimental effect on business success. Importantly, the on-going societal changes attributed to the 'experience economy' correlate well with the goals of 'social marketing' and pro-environmental 'nudging' as applied in food service provision as they all are concerned

with more responsible food choices. This suggests that food service operators should more broadly integrate the principles of consumer choice architecture into their managerial agenda.

Environmental (or eco-) labelling represents one of the key communication tools designed to promote sustainable consumption (Hall 2013) and is often considered an integral element of 'social marketing' and pro-environmental 'nudging' (Demarque *et al.* 2015; Ölander and Thøgersen 2014). Eco-labels have potential to positively affect consumer choice by emphasising the environmental benefits of certain products and services (Loureiro and Lotado 2005). Although the public recognition of environmental labelling is gradually growing (Guenther *et al.* 2014), including the wider field of food systems (Gadema and Oglethorpe 2011), there is limited evidence of its effective employment in the context of food service provision. While a dedicated research stream has looked into the application of environmental labelling in grocery retail (see, for example, Hartikainen *et al.* 2014; Nilsson *et al.* 2004; Soler *et al.* 2002; Upham *et al.* 2011), little is known about the potential of eco-labels to be adopted by catering operators (Baldwin *et al.* 2011). Furthermore, the scope of research on environmental labelling as utilised in the context of food systems has been restricted to a handful of issues. These comprise: food production methods (for instance, labels designed to distinguish between organic (bio-) and conventional produce); localism (labels to mark local versus imported produce); responsible sourcing and animal welfare (labels to indicate 'free range' and 'freedom' food); and standards of fair trade. Lastly, while the recognition of the significant carbon impacts attributed to food service provision is rising, there is little evidence of the adoption of carbon labels in catering with the goal of affecting consumer choice (Gössling and Buckley 2016; Spaargaren *et al.* 2013). The 'experience economy' constructs suggest the increased consumer awareness of the environmental (which includes climate) implications of food systems. Such related topics as 'food miles', 'slow food' and 'local food' have been trending as a result (see, for instance, Coley *et al.* 2009;

Hallsworth and Wong 2012; Kemp *et al.* 2010). This implies that carbon labelling may have a role to play in managing consumer choice in the context of food service provision. This role ought to be better understood.

This paper reports on the outcome of an 'intervention experiment' study carried out in the UK sector of food service provision. The 'intervention experiment' was designed to test the concept of utilising a restaurant menu as a 'social marketing' and pro-environmental 'nudging' communication tool in consumer choice architecture. To this end, a casual dining restaurant modified its menu card to display information on the societal (health) and environmental (provenance and carbon footprint) attributes of food choice. The reaction of restaurant visitors to the concept of this redesigned menu was captured and analysed with the help of a qualitative method. The study thus complemented the growing research stream on the determinants of restaurant food choice. Its unique contribution is seen in exploring the role of carbon label in driving consumer food choice when dining out. Managerial recommendations for food service operators on how to design more effective menus were developed. The areas for policy-making intervention required to enhance public understanding of the key issues related to sustainability of food systems were revealed.

2. In terms of its scope, the paper is concerned with the analysis of customer response to restaurant menu re-design which was implemented to facilitate more responsible consumer choice and undertaken in the form of an industry experiment. The issues related to the determinants of restaurant food choice, most notably the role of climate and health considerations in it, constitute the main subject of this article's scientific inquiry. Due to the word count constraints, the paper does not aim to examine key theories and models of consumer choice in restaurant settings as these have been extensively covered elsewhere. Instead, it strives to explore how the availability of new factual information on a menu affects restaurant food choice. **Literature review**

The determinants of restaurant food choice represent a long-established research topic with seminal contributions made by Auty (1992), Kivela *et al.* (1999a; 1999b) and Park (2004), to mention a few. Existing research has generated a number of commonalities and contradictions (Jung *et al.* 2015). This emphasises the exceptionally complex nature of restaurant food choice (Stierand and Wood 2012) and calls for its further, in-depth investigation, looking at the different levels (for example, consumer choice in the context of fast food, casual dining and fine dining catering establishments; public and private food service provision) and scales (for instance, exploring geographical, demographic and cultural differences in food selection) of analysis. Indeed, the determinants of consumer choice are manifold and tend to change in response to various external (for example, the effect of mass media and marketing campaigns) and internal (for instance, the influence of family members and health considerations) stimuli (June and Smith 1987).

The outcome of the growing number of studies suggests that contemporary catering customers select food based on its environmental credentials and 'ethic' values (see, for instance, DiPietro *et al.* 2013; Dutta *et al.* 2008; Namkung and Jang 2014). These pro-environmental changes in consumer choice are partially attributed to the effect of the 'experience economy'. The 'experience economy' makes contemporary food service customers more: 1) knowledgeable about the attributes of the food they consume; 2) conscious about the quality of the food and the dining out experience provided; and 3) concerned with the detrimental effect of the food choice decisions they make, including their effect on the environment (Fiore *et al.* 2007). The above market changes outline promising business opportunities for food service operators to intervene (Schubert *et al.* 2010) and yet they should be taken with caution. This is because previous research on pro-environmental consumer choice in food service provision has predominantly documented consumer *intentions*, rather than captured the actual consumer *behavioural* patterns (Papaoikonomou *et*

al. 2011). The 'attitude-behaviour gap' can explain the discrepancy between consumer statements and actions (Hibbert *et al.* 2013). This gap suggests that the scope of future research on pro-environmental or 'ethic' consumer choice in food service provision should be re-visited, with the research tools re-designed, in order to make it more consumer behaviour-, rather than intention- or attitude-, focused. Studies on actual customer behaviour will reveal the true determinants of restaurant food choice.

Food service operators have started recognising the improved environmental consciousness of consumers with an increasingly larger number of catering providers undertaking measures to reduce the environmental significance of their operations (see, for example, Gössling *et al.* 2011; Poulston and Yiu 2010; Wang *et al.* 2013). This notwithstanding, the sector has been slow in responding to the pro-environmental changes in demand as identified in the literature and market research. This may be attributed to such factors as: 1) limited in-house expertise and restricted resources to engage in sustainability-related projects; and 2) lack of leadership on the implementation of environmental management initiatives among hospitality operators (Bohdanowicz *et al.* 2011). It is important to demonstrate to the industry representatives through further empirical research that pro-environmental credentials of food service providers may positively affect consumer choice. It is equally essential to reveal consumer 'environmental' preferences and expectations to showcase how these can be capitalised upon by catering operators to win more custom and build loyalty.

Governmental institutions, industry associations, 'third sector' organisations and academia all have a stake in encouraging the broader adoption of sustainability initiatives in food service provision. Individual catering enterprises can also play an active role in managing demand for more responsible food choice. This can be achieved by making direct recommendations on what food to order (Edwards and Meiselman 2005) or limiting

consumer choice to a small number of more (environmentally and societally) responsible food alternatives (Grunert and Wills 2007). This can also be reached by engaging in the 'social marketing' and 'nudging' interventions that are considered effective instruments of consumer choice architecture (Hall 2013; Kallbekken and Sælen 2013; Filimonau *et al.* 2017). When applied in the context of food service provision, these interventions can take the form of, for example: changes in the size of plates used for serving buffet food with an intention to minimise food wastage (Kallbekken and Sælen 2013) or an innovative menu design which reports on the environmental and societal qualities of the food served, thus educating consumers about the implications of their restaurant food choice (Chandon 2012). The scope for implementing such 'social marketing' and 'pro-environmental nudging' interventions in food service provision has been recognised as substantial (Hall 2013). This is because food consumption represents a habitualised and largely unreflective process where external 'nudging' interventions can be particularly effective (Mont *et al.* 2014). This notwithstanding, evidence of the empirical implementation of 'nudging' interventions in catering is scant (Gössling *et al.* 2011).

Customer analysis performed by Mintel for the UK food service provision market suggests that 'menu innovation is now rife in an increasingly competitive and mature marketplace' (Hawkes 2013) and the need for future research on menu engineering has been emphasised (Wood 2007). The key conclusion is that food service operators should not only diversify their menu offer to distinguish themselves from competition, but also design menus that better appeal to customers (Filimonau and Krivcova 2017). The well-designed menus have potential to significantly affect consumer choice (Kozup *et al.* 2003). This highlights the manifold opportunities for food service operators to capitalise upon menu design as a means of applying the 'social marketing' and 'nudging' interventions and architecting consumer choice towards more societally and environmentally beneficial food options (Dayan and Bar-

Hillel 2011). This is because menus display information which customers take into account when placing food orders. Presentation of the nutritional and calorific values, information on food allergens and additives are all examples of 'social marketing' and 'nudging' as applied in the sector of food service provision to encourage healthier food choice (see, for example, Kozup *et al.* 2003). Likewise, eco-labels can be displayed on menus to signify pro-environmental methods of food production, 'freedom' food and enhanced animal welfare, thus 'nudging' more environmentally-benign consumer choice. Menu design has been utilised to provide nutritional and calorific facts to restaurant customers to facilitate healthy eating (Hwang and Lorenzen 2008) and eco-labels have been employed by grocery retailers to enable selection of foodstuffs characterised by more responsible methods of procurement, storage and preparation (Vanclay *et al.* 2011). The joint use of menu design and carbon labelling as a consumer choice architecture tool in food service provision is less established and calls for more research.

The effect of carbon label as a communication instrument of 'social marketing' and 'nudging' on consumer choice has been well documented in the grocery retail sector (see, for instance, Carbon Trust 2012; Demarque *et al.* 2015). Here, the case of Tesco and its failed attempt to display a carbon label on packaging of the retailer's own brand products has caught media attention (see, for example, Smithers 2010; Vaughan 2012). The negative example of Tesco signifies the laborious process of data collection, systematisation and interpretation necessary to develop a carbon label for foodstuffs, which may partially explain the yet limited uptake of this communication tool in catering. Estimating the carbon footprint of pre-set menus should be less cumbersome because this requires compiling less extensive lists of ingredients compared to the case of grocery products; in addition, a number of public databases exist where the necessary data can be obtained (see, for example, LCA Food Database 2007). Furthermore, given the significant societal and environmental benefits of

such projects, food service operators can collaborate with academics to reduce the costs of producing carbon inventories for food.

The literature provides limited evidence of the joint application of menu design and carbon labels as a means of encouraging more responsible consumer choice in food service provision. Furthermore, the level of success of such interventions that have been applied to-date varied. Gössling (2011) highlights the case of a fast food restaurant chain in Sweden which has chosen to label its menu items with the values of carbon footprint. The project was referred to as successful with a substantial increase in sales of the 'carbon-friendly' menu items and largely positive consumer feedback. Pulkkinen *et al.* (2016) piloted the 'Climate Choice' meal concept which was communicated to consumers in the form of a carbon label displayed on menus of 25 Finnish restaurants. The study reported the overall success of the project in terms of positive consumer attitudes and increased customer interest in carbon footprint management as applied in food service provision. Lastly, Spaargaren *et al.* (2013) narrate a similar project undertaken in the context of a work canteen in the Netherlands where menus were labelled with carbon footprint values. In contrast to the Scandinavian cases, the study found that, despite the generally positive consumer attitude towards climate change mitigation and the overall public support of the food service operator's environmental management initiatives, there was unwillingness to change restaurant food choice to make it more carbon-benign. This signifies the different levels of consumer acceptance of carbon labels as displayed on menus, but also demonstrates their promising role as a 'social marketing' and pro-environmental 'nudging' instrument in food service provision as applied in various geographical and cultural contexts. This study aims to contribute to knowledge with further empirical evidence collated in a new geography (UK) and within a specific sector of food service operations, i.e. casual dining.

3. Method

The study adopts an ‘intervention’ or ‘field experiment’ approach (Harrison and List 2004) to test the role played by carbon labelling of menu items in restaurant food choice. Field experiments should supplement theories as they enable researchers to test ideas and hypotheses in real-world settings, thus providing a more practical and business-orientated outlook on the issue under study (Harrison and List 2004). Furthermore, field experiments have potential to explore actual consumer *behaviour*, rather than consumer intentions, thus partially addressing the issue of the ‘attitude-behaviour gap’ in contemporary consumer behaviour studies.

The focus was on the sector of casual dining because it represents the most rapidly developing segment of the UK catering market (PwC 2013) while it is more reactive to implementing sustainability related initiatives compared to the upmarket catering establishments (Mintel 2014). The choice of a food service operator was opportunistic as a casual dining restaurant located in Bournemouth (Dorset, UK) had committed to help with the project and provided researchers with access to their clientele. While opportunistic research and sampling has a number of limitations, it is considered appropriate when exploring the effect of a planned intervention or carrying out a real-world experiment where finding a ‘willing-to-help’ organisation is paramount for the overall project success (Riemer 1977; Resch *et al.* 2014). The partner restaurant represents a busy enterprise of a small-to-medium size. Returning customers constitute a significant share of restaurant’s clientele.

The restaurant re-designed its regular ‘a la carte’ menu so that it contained the values of carbon footprint for all menu items. The figures of carbon footprint were calculated by adopting the life cycle thinking approach (Filimonau *et al.* 2011). The necessary data were retrieved from a range of publicly available life cycle databases (for example, LCA Food Database 2007), scientific publications (for instance, Scarborough *et al.* 2014) and specialist industry and supplier reports (for example, Kingsmill 2015). In most cases, these included all

lifecycle-related GHG emissions associated with food production and transportation; these did not however capture the carbon footprint arisen from food storage and its preparation on restaurant premises. The exclusion of these GHG emissions from analysis was partially due to data availability. It was also because this contribution is considered low compared to the carbon footprint from food production and transportation (Garnett 2011). Lastly, it was because the primary aim of this intervention project was not to estimate the carbon intensity of restaurant food to the fullest degree of accuracy, but to examine the role played by the carbon footprint values in shaping consumer choice.

It was the partner restaurant management's intention to better understand the *relative* importance played by the carbon footprint values of food in consumer choice as compared to the factual information on the heath qualities of food. To this end, the nutritional and calorific values alongside the data on the provenance of key ingredients were added to the menu. Thus, as requested by the partner restaurant, the final, re-designed menu contained the following key information blocks: 1) item price; 2) list of ingredients; 3) provenance of ingredients; 4) allergens; 5) calorific; 6) nutritional; and 7) carbon footprint values. Given the plethora of data that had to be displayed, it was paramount to re-design the menu so that it would contain all necessary information blocks while retaining its customer appeal. For better effectiveness, nutritional information was presented on the menu in the form of the 'traffic light' food labelling system which has long been adopted in UK grocery retail and gained public recognition (Campbell 2013) (Figure 1).

[Insert Figure 1 here]

The intervention project ran within four consecutive weeks in August-September 2015. Logistics of partner restaurant's operations and managerial recommendations dictated the choice of lunch as the only time period suitable for performing the intervention. This is considered a primary limitation of the project. Restaurant visitors may have different food

and time requirements when dining out at lunch compared to other meal consumption occasions, with a subsequent effect on customer food choice (Contento *et al.* 2006). Future research will aim to address this limitation by testing a re-designed menu on the evening restaurant audience.

As part of the field experiment, all restaurant guests were exposed to a new 'a la carte' menu when placing food orders while the exposure effect was observed by researchers and monitored by restaurant managers. Aside from pure observation, the outcome of intervention was recorded in the form of in-depth, semi-structured interviews with 18 volunteers from among restaurant visitors who placed food orders using the re-designed menu (Table 1). The use of a qualitative method for data collection is considered appropriate in exploratory research projects. Exploratory research aims to analyse and conceptualise public opinions on the issues that have not been examined in detail (Silverman 2000; Veal 2006) which fits the scope of this project. The number of participants in post-intervention interviews was determined by the speed of reaching data saturation; interviewing was stopped after no new themes were emerging from the on-going analysis applied to the material collected.

[Insert Table 1 here]

Semi-structured interviews captured the diversity of views on the determinants of restaurant food choice and the role played in it by the carbon footprint alongside health-related information as displayed on restaurant menus. The average duration of interviews was between 25 and 40 minutes. A token of appreciation in the form of a money-off voucher to be redeemed in the partner restaurant was offered to interview participants. Interviews were digitally recorded and transcribed to retrieve verbatim quotations that were further employed to support the arguments developed in the write-up of the project results. A thematic framework was devised to categorise and analyse the outcome of interviews (Table 2).

Themes were developed iteratively, based on the literature review's findings and accounting for any new evidence which had emerged from interviews (Veal 2006).

[Insert Table 2 here]

4. Data analysis and discussion

A new restaurant menu was well perceived by consumers and no negative feedback about the re-design changes made was recorded. However, customer reaction to the presentation of the different information blocks on the new menus varied. Presenting data on provenance of the key ingredients was particularly commended by the interview participants (Table 2):

> *'This menu is very interesting, it's really fascinating because you can just do a little comparison... Because you got salts from China, so you see the idea of mass produced things come further away. You can see the pepper is from Vietnam as well the honey is from Mexico that's crazy, wow, it's really strange when you actually breaking down, this's quite an international menu. The salmon's from Chile, seriously? I've been to Chile, wow that's just places you want to go, really. I just find it very fascinating I've seen it in some supermarkets, but not in restaurants'* (Sally)

Provenance of food ingredients was repeatedly referred to as one of the determinants of consumer choice when eating out and displaying this information on restaurant menus was welcomed. This may partially demonstrate the effect of the 'experience economy' in restaurant food choice with customers willing to know more about the qualities of the products they consume (Fiore *et al.* 2007):

'Seeing the location of where food is sourced from, that's kind of new to me. I've never seen a menu like that because, you know, if it's sourced locally, that will definitely persuade me to go in a certain direction. Well, I'm ordering because then you know the amount of miles that the food has been transported, and also I'm concerned about animal welfare and all that kind of stuff. So, you know if the meat has come a long way, that will probably determine if I'm ordering that kind of stuff, so I find this useful' (Charles)

While acknowledging the important role played by the issues of 'local produce' and 'animal welfare' in his food choice, Charles makes reference to the problem of 'food miles' which suggests that he associates local food with being more environment-friendly. This assumption was tested on other participants and the outcome shown that most customers valued locally sourced ingredients not only because of the benefits they generate for the local economies, but also due to the perceived better environmental quality. This finding adds further evidence to the call for policy intervention designed to educate the public on that the local produce does not necessarily impose smaller environmental impacts if life cycle thinking is applied (Wong and Hallsworth 2012). While the emphasis on the benefits of the local food for the local economies should be retained, the reasons for some local ingredients to have more detrimental environmental effect than the imported ingredients should be revealed and better explained to the public.

In addition to provenance, all participants noticed and highly commended the display of the information blocks that contained nutritional and calorific values. Nutrition numbers, the amount of calories and the origin of ingredients were repeatedly mentioned as the top-3 determinants of restaurant food choice, surpassing price (Table 2):

'This menu is obviously different. I think it's quite good to have the nutritional information because when I'm cooking myself on a weekly basis, I'm usually careful about what the content is, and when you go out, sometimes that goes out of the window. And I think it'd be quite useful to have that information when you go out to eat… Wetherpoons [a chain of British pubs], they have actually started doing that now, so they list the calories and things, but not as much detail, but they do list the calories and it makes such a big difference to what you actually eat' (Erica)

'I think it's a fantastic idea [to have nutritional and calorific information displayed on restaurant menus], I'm kind of vaguely familiar with the calories of certain types of food but it's only vague familiarity, obviously you cannot memorize all of it, you can check it on your phone which will take a little bit of time, but this just provides a convenient experience and obviously it makes the menu look more attractive, doesn't it? And less sophisticated because it just becomes more of a marketing gig but I suppose in a matter of time people will get used to it and I think it's important' (Paul)

Paul suggests that food service operators that opt to provide nutritional and calorific values of foodstuffs on their menus may have better public appeal; he also believes that provision of this information on restaurant menus is likely to become mainstream in the future. This is partially due to the growing societal health concerns as accelerated by the 'experience economy' and partially because of the enhanced regulatory measures developed by national

authorities to encourage more responsible consumer food choice. This implies that those catering operators that seize this opportunity sooner are likely to positively distinguish themselves from competition.

Above, Erica refers to the positive example of JD Wetherspoon, a popular British pub chain, which has recently chosen to update its menus with calorific information, thus showing the empirical feasibility of this business concept and highlighting its appeal to prospective clientele (Hogan 2015). This is in line with the vision recently expressed by some local policy-makers in the UK who urge food service providers to display calorific facts on their menus to prevent obesity (Cooper 2015). Furthermore, below Charles suggests that displaying the nutritional and calorific values may particularly appeal to the older demographics of restaurant visitors as well as to the working professionals. This is because they possess more disposable income, which reduces the importance of the cost factor when dining out, while having more health and subjective well-being concerns (Grazin and Olsen 1997):

> *'My main driver is exactly what you have on the menu here, the energy, the calories, stuff like that, as I get older, it's just harder to keep the weight off, so I'm more interested in eating right and as healthy as I possibly can, but again cost, price that kind of thing has actually decreased since I'm earning more money than I was'* (Charles)

The 'traffic light' labelling system employed by the re-designed menu to display the food nutrition facts was valued by the participants due to the appeal of the colour scheme used and its general familiarity from the UK grocery retail experience. While the 'traffic light' label is

not perfect (Squires and Waterfield 2014), food service operators may consider integrating it in their menus to enable informed consumer choice and educate customers about the health attributes of the food provided. Furthermore, given that consumers acknowledge the role of this label in shaping their food choice, both in grocery retail (Brimelow 2007) and, as this study demonstrates, in food service provision, designated policies may be required to reinforce its application in the catering sector:

> *'The traffic light system, this's another thing that isn't universalized throughout restaurants and supermarkets in general, but it may make you consider buying what it is you're buying and maybe select what you'd not normally go for'* (Jack)

> *'At a restaurant, the first thing I'd notice would be the colour sequence definitely, and certainly the red, it's like a traffic light system. Okay, maybe I should avoid that, so immediately I see the red, I'm thinking, okay, I'm not going to eat that which is quite funny because I don't even count calories and stuff like that, so looking at this menu, I'd discount that because of the Reds straightaway. And I'd probably lean towards the green because of the psychology behind it, like how does that look. So, I know certain foods that I can eat, so, yeah, but definitely the colours what put me off'* (Sally)

While the participants' feedback on displaying food provenance, nutritional and calorific information on the menu was positive, there was a split of opinions on the presentation of the carbon footprint values. About half of participants noticed the numbers presented and took them into consideration when placing food orders as indicated by Rena below (Table 2):

'I was really tempted to choose the burger, but since I saw that the carbon portion was higher, I switched to the vegetarian sausage. It [carbon footprint values] is something kind of new, it's really good to try and it's unique' (Rena)

Concurrently, the other half claimed they did not consider the carbon footprint values when ordering food (Table 2). This participant category was subject to further careful exploration as to identify the main reasons for excluding this information from the decision-making process. It was revealed that the carbon information was either unnoticed or poorly understood which led to its exclusion. Importantly, when the explanation was provided as to what the carbon footprint figures on the menu represented, half of this category's participants opted to see the carbon information on display when dining out in the future (Table 2):

'I didn't consider the carbon footprint values, because I don't actually know what that means… Oh, wow, ok, so is that the higher the number, the higher the value? Well, I guess now that I know what that is, it might actually have an impact or influence. Because, actually, I'm looking at these, I'm looking at that is quite high and the rest are relatively quite a lot lower than that particular one, so that might make me think, actually, do I want that, I wouldn't necessarily choose that one' (Mary)

'I didn't notice the carbon intensity values, no, but that is interesting. I've never seen it before but I'd definitely like to see stuff like that, just because my politics

and my views on life and pollution. I'd probably need it explained in a bit more detail though what the number actually equates to in real terms' (Charles).

Both Mary and Charles, while being positive, raise an important issue related to the effective employment of the carbon footprint values in restaurant menu design, namely the necessity to explain to consumers what the figures stand for in the context of food service provision. This is in line with evidence from the sector of grocery retail (see, for example, Hartikainen *et al.* 2014; Upham *et al.* 2011) which reports that the public finds it difficult to conceptualise the carbon label attached to grocery items without additional explanation. When applied in the context of food service provision, this signifies a serious problem. This is because catering establishments can only succeed in affecting consumer choice via pro-environmental 'nudging' when such intervention initiatives are supported politically. This support should foremost aim at educating consumers on the issue of climate change. There is a danger that poor public knowledge on the climate implications of their food choice can diminish the value of business commitment to adopt environmental management practices in catering. This has potential to discourage the industry from more active involvement in pro-environmental initiatives and hamper adoption of 'social marketing' and 'nudging'. This finding also confirms that the outcome of some market research and academic evidence that is based on measuring consumer *attitudes*, rather than their actual *behaviour*, should be taken with caution as consumer statements about the importance of the environmental, including climate, qualities of food in their restaurant food choice do not necessarily replicate empirically.

There were a number of participants who were sceptical about the carbon footprint values as the determinants of restaurant food choice (Table 2). This was partially associated with poor knowledge of the concepts of carbon footprint and climate change while, partially, the

credit was given to the larger importance attributed to other food qualities, most notably nutrition, calories, provenance and animal welfare, as demonstrated by Freya and Linda:

> *'I wouldn't even know what that [carbon footprint values] meant to be honest; I guess how much cooking has gone into it?.. Oh, CO_2 so the beef burger will be quite high because they fart, because cows fart a lot. But, no, I probably wouldn't take that into consideration than whether it was locally sourced and whether it was free range'* (Freya)

> *'To be honest, I know little about that [carbon footprint]. So, if I had that menu in my hand, I wouldn't pay attention to this. It is more likely that I'd pay attention to the traffic light system, more than the carbon intensity values, because I have no idea about it'* (Linda)

The desire to 'unwind' and 'have a good time' when dining out was referred to as the key reason for discounting the carbon footprint values. The unique nature of the eating out experience in terms of its relative infrequency and the 'special spirit' attached to it was also given as an explanation:

> '*Seeing these [carbon footprint values] on the menu is really annoying, because I don't even… well, maybe, I should understand it more? At a quick glance, see if I'm in a restaurant by now, I've had a quick gulp or two of wine, I'm thinking … what??? I'm in some sort of math test now; to me I just think I'm not going to take much notice of it. Although I'm probably quite contradictory, because I'm*

interested in environmental matters and I do care about where things come from, but I suppose maybe partly because I'm not used to seeing it put down like that, I could probably get used to it, although I appreciate the need to be environment friendly in my daily life when I'm visiting a restaurant, I want to have a nice experience and not get too worried about the state of the world' (June)

'I think [the carbon footprint values] would only have an impact depending on how often you've been out, so if you're eating out occasionally, like I do, like for an occasion things, like that, it's probably not going to have such an influence because you're going there for an occasion, just to have a nice time. If you're to go out once or twice a week, you might try to be a bit more considerate because you know that you're still going out in a few days' time, do you see what I mean?' (Erica)

This finding complements the outcome of various tourism and leisure-related studies that set out to better understand environmental attitudes and behaviour of tourists and found that the infrequent nature of holidaying negatively affects consumer choice and makes it less environmentally responsible (see, for instance, Cohen and Higham 2011; Gössling and Peeters 2007; Gössling *et al.* 2012). Indeed, tourists tend to pay less attention to the environmental issues, including climate change, when on holiday as tourism is seen as an opportunity to 'switch off' and forget about the day-to-day troubles and commitments, where the work- or household-related environmental duties and chores (for example, recycling and use of energy-saving bulbs at home; use of public transport when travelling to work) are classed as being one of those. This study enables to establish identical parallels in the context of dining out.

5. Conclusions

With the accelerating pressures imposed on the environment by the global food systems, catering operators have an important stake to play in mitigating the magnitude of these impacts, thus facilitating the progress of food service provision towards the goal of environmental sustainability. Inter alia, mitigation can be achieved via consumer choice architecture; here, the constructs of 'social marketing' and pro-environmental 'nudging' are of particular relevance to managers and policy-makers given that they can aid in manipulating customer decision-making. When applied in the context of catering, these tools can be concerned with the re-design of restaurant menus. The re-design can provide customers with a set of factual information related to the health and environmental qualities of the food offered, thus ultimately facilitating more societally and climate benign consumer choice.

This study presented the outcome of an 'intervention' experiment project undertaken to better understand the determinants of restaurant food choice in a UK casual dining restaurant, including the role of carbon footprint values. The intervention demonstrated that while some consumers would like to know more about the carbon footprint of their restaurant food choice and would prefer seeing the carbon figures on a menu, there were some who saw this information redundant. The future of carbon labelling of restaurant menus in the UK is therefore uncertain and calls for more research. The key problem rests in poor public understanding of the concept of carbon footprint in general, and as applied in the context of food service provision in particular. This signifies an opportunity for managerial intervention and policy-making reinforcement which should aim at educating the general public about the climate significance of their restaurant food choice. This is particularly important given that consumers seem to view the construct of 'food miles' in a negative light, drawing the associations with imported food as being less environmentally benign, also in terms of its

carbon impacts. In contrast, local food is seen favourably because it is considered fresher and more climate-friendly. Scientific evidence challenges this dominant public vision; hence, dedicated policies and managerial actions should be developed to better broadcast this scientific outcome to the general public to contest the misconception.

This study indicated that catering providers should consider re-designing their menus by presenting information on the nutritional and calorific qualities of food alongside food provenance. The rising health and personal well-being consciousness pinpoints a strong public demand in the UK for the display of such factual information on restaurant menus. It can be particularly relevant to those food service operators catering for the older demographics and the working professionals as these have higher health concerns and possess more disposable income. The recent example of JD Wetherspoon demonstrates that presenting this information on restaurant menus can be a feasible business concept which food service providers should strive to pursue to win custom and gain competitive advantage.

In terms of future research, the representativeness and the generalisability of this study' outcome should be enhanced through the application of a large-scale, quantitative public opinion survey. Future research should look at the different political and cultural contexts (for instance, comparing the UK against the rest of Europe), food service sectors (for example, comparing casual and fine dining catering) and dining out experiences (for instance, comparing lunch time restaurant guests with evening visitors). Managerial opinions on menu re-design as a tool of consumer choice architecture should also be sought. Existing studies on managerial opinions are rare which hinders understanding of the practical feasibility of menu re-design as a means of nudging consumer choice when dining out. More solid empirical evidence will inform food policy-making and managerial practices in the UK which may ultimately re-shape the nature of the food service industry and enhance its preparedness for

the on-going and up-coming challenges associated with the changes in consumer demand driven by the health- and environment-related considerations.

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Table 1. Interview participants (n=18).

Pseudonym	Gender	Approximate age	Reported education level
Rena	Female	In her 20s	No University degree
Erica			Undergraduate degree
Mary			
Linda			Postgraduate degree
Sally		In her 30s	No University degree
Katie			
Suzie			Undergraduate degree
Freya		In her 40s	
June		In her 50s	No University degree
Michael	Male	In his 20s	
John			Undergraduate degree
Sean			
Jack		In his 30s	
Paul			
Nick			
Sam		In his 40s	Postgraduate degree
Tim			No University degree
Charles		In his 50s	

Table 2. Coding structure with themes and codes. The TOTAL figure demonstrates the number of citations assigned for each code.

Themes	**Main codes**	**TOTAL**	
		Number of participants	**% of participants**
Determinants of consumer choice	Provenance of ingredients	16	89
	Nutritional values	13	72
	Calorific values	11	61
	Price	10	56
	Methods of food production	5	28
	Animal welfare	5	28
	Carbon footprint values	3	17
	Allergens	2	11
Attitudes to 'food miles'	Negative	12	67
	Undecided / Do not know	6	33
	Positive	-	-
Have you noticed / paid attention to / taken into consideration the food carbon footprint values presented on the menu?	No	10	56
	Yes	8	44
Should the food carbon footprint values be presented on the menu in the future?	No, definitely	5	28
	Yes, but explained what they stand for	5	28
	Yes, definitely	4	22
	Undecided / Do not know	4	22

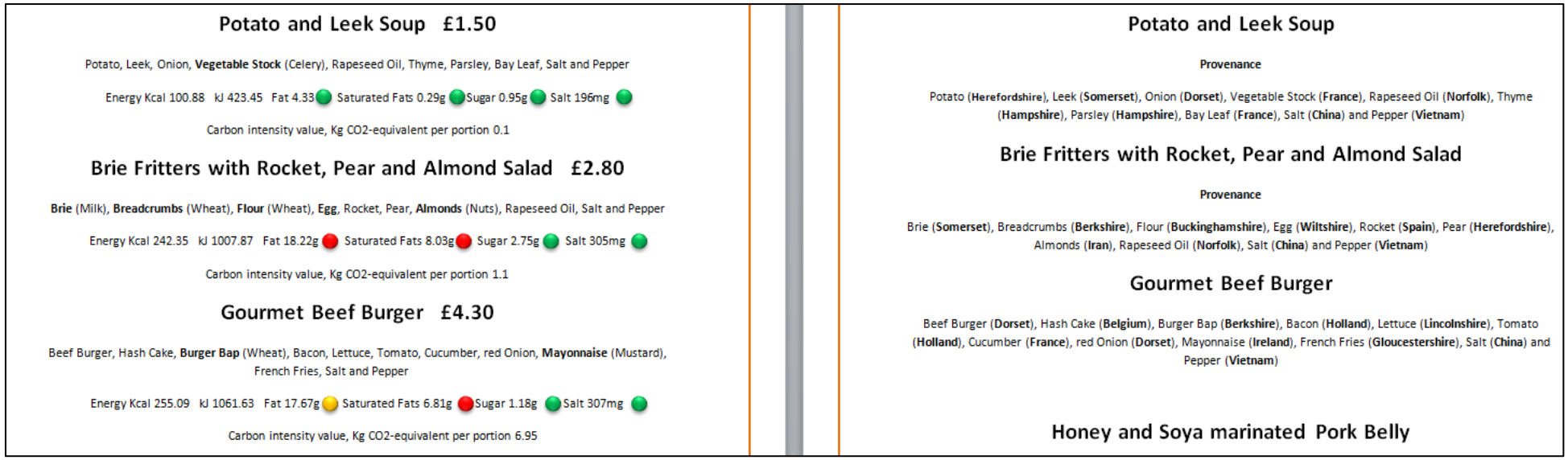

Figure 1. Extract from a re-designed restaurant menu used in the ‘intervention’ project.