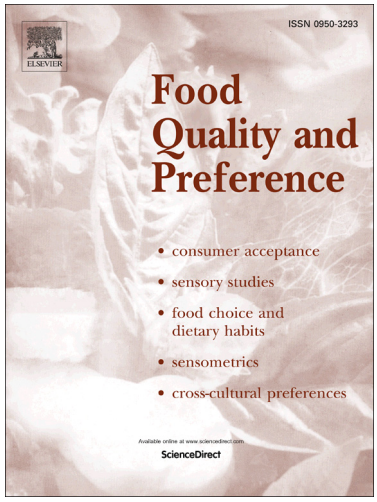

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PII: S0950-3293(18)30900-5
DOI: https://doi.org/10.1016/j.foodqual.2019.04.008
Reference: FQAP 3696

To appear in: *Food Quality and Preference*

Received Date: 4 December 2018
Revised Date: 22 March 2019
Accepted Date: 16 April 2019

Please cite this article as: Apostolidis, C., McLeay, F., To meat or not to meat? Comparing empowered meat consumers' and anti-consumers' preferences for sustainability labels, *Food Quality and Preference* (2019), doi: https://doi.org/10.1016/j.foodqual.2019.04.008

To meat or not to meat? Comparing empowered meat consumers' and anti-consumers' preferences for sustainability labels

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Abstract: An increasing awareness of the impact of high levels of meat consumption on health and environmental sustainability is leading to a growing number of consumers reducing or avoiding

meat. To address gaps in the literature, we compare and contrast the importance of the seven sustainability-related labels for three consumer groups (meat eaters, meat reducers and vegetarians) using a choice experiment involving 600 UK respondents (200 meat eaters, 200 meat reducers, 200 vegetarians). Type of meat, price and fat content labels have the largest overall impact on consumer choices. The impact of carbon footprint, method of production, origin and brand labels varies across consumer groups.

We subsequently use latent class analysis to identify heterogeneous intra-group consumer segments, based on their preferences, and highlight the socio-demographic differences between them. For meat eaters, three consumer segments are identified (empowered, traditional and price conscious meat eaters). Meat reducers are divided into health curtailers and sustainable consumers, while only one segment of vegetarians is identified. By drawing on signalling theory and the consumer empowerment and anti-consumption literature, we identify links between sustainable consumption, consumer empowerment and anti-consumption and provide valuable insights for policymakers and practitioners seeking to utilise food labels to encourage more sustainable consumption.

Keywords: Meat anti-consumption; Empowered consumers; Meat reducers; Food labels; Sustainable consumption; Choice experiment

1. Introduction

Meat is increasingly being criticised as an unsustainable and unhealthy food choice, due to health risks and environmental concerns associated with its high carbon footprint and inefficient use of resources (Cliceri et al., 2018; de Boer & Aiking, 2017 and 2019; Weibel et al., 2018). In 2015, the World Health Organisation called for a reduction in meat consumption, characterising several processed meat products as carcinogenic (Bouvard et al., 2015). Furthermore, a recent study by Oxford University reports that, in most middle- and high-income countries, red meat consumption exceeds recommended levels (Springmann et al., 2018). The same authors argue that a health tax on red and processed meat could prevent more than 220,000 deaths and save over US$40 billion in healthcare costs every year. An alternative, arguably more effective and less disruptive approach, involves encouraging individuals to voluntarily adopt more sustainable meat consumption patterns by targeting specific segments of consumers with interventions that motivate behaviour change (Wiebel et al., 2018; Apostolidis & McLeay, 2016a). This includes strategies and policies to encourage meat reduction or the substitution of meat with more sustainable protein products, such as plant-based meat-free alternatives, also known as meat substitutes (de Boer, Schösler & Aiking, 2014; Verain, Dagevos & Antonides, 2015).

Globally, businesses and policymakers are searching for effective ways to encourage more sustainable food consumption and inform consumers of the social, environmental and economic sustainability-related characteristics of their food (e.g. Hawkes et al., 2015; Grunert, Hieke & Wills, 2014). As these characteristics generally involve 'invisible', credence attributes (such as method of production, country of origin and animal welfare), it is often difficult for consumers to acquire all the relevant information necessary to inform their choices (Fernqvist & Ekelung, 2014; Grunert, Hieke & Wills, 2014). In the case of food products, food labelling schemes have been advocated to communicate these unobservable characteristics and enable better-informed consumer choices (Ardeshiri & Rose, 2018; Van Loo et al. 2014). For example, the UK's Food Standards Agency (2013) suggests the use of a traffic light labelling system (green, amber, red) to communicate the nutritional content of food products, while the Carbon Trust has developed a carbon footprint label to communicate the impact of production on the environment. However, information overload and

cognitive biases may mislead consumers and limit the effectiveness of food labels to provide information on credence attributes (Schuldt, 2013; Leathwood et al., 2007).

Providing consumers with easily accessible information when they are making purchasing decisions is becoming increasingly important, due to the increasing presence of 'empowered' consumers in the market. These consumers use their purchases as 'votes', to express their values and beliefs and influence businesses to develop 'better' products (Shaw, Newholm & Dickinson, 2006; Spaargaren & Oosterveer, 2010). In the context of meat, 'consumer empowerment' can refer to 'meat eaters', who purposefully purchase more sustainable meat, as well as 'meat reducers' who decide to consume 'less but better' meat products (Apostolidis & McLeay, 2016b; de Bakker & Dagevos, 2012). In addition to empowered consumers, a growing number of meat 'anti-consumers' abstain from consuming meat or particular meat products (Armstrong Soule & Sekhon, 2018). In several countries, including the UK, there is a growing number of consumers reducing meat consumption or adopting vegetarian or vegan diets (Rosenfeld, 2019; Mintel, 2017a).

The current paper reports the results of the second and final stage of a two-part project, that investigated consumer preferences for the sustainability-related attributes and associated labels in the case of meat/meat-free products. In the first part of this project, we examined the impact of sustainability-related food attributes on the choices of UK consumers, using a representative sample of UK consumers (*reference hidden for review*), revealing that consumer preferences vary across meat eaters, meat reducers and vegetarians. Other studies also corroborate that meat consumption (and anti-consumption) can be influenced by ethical, health and sustainability concerns (e.g. Hodson & Earle, 2018; Latvala et al., 2012; Peschel et al., 2016; Tosun & Gürce, 2018). Despite the suggested links between sustainability-related food attributes and meat consumption patterns, previous researchers have not compared the preferences of consumers with different meat consumption patterns for the labels used to communicate the sustainability-related characteristics. Therefore, in this paper we report the findings of the second stage of the project in which, by drawing upon signalling theory and the consumer empowerment and anti-consumption literature, we extend our previous choice experiment in order to compare the preferences between equal numbers of UK meat eaters, meat reducers and vegetarians. The specific objectives of this research are to:

1) Compare and contrast the importance of sustainability labels for three consumer groups (meat eaters, meat reducers and vegetarians).

2) Use latent class analysis to identify heterogeneous intra-group consumer segments, based on their preferences for different sustainability labels.

3) Highlight any socio-demographic differences that exist between the segments.

4) Draw on signalling theory and the consumer empowerment and anti-consumption literature to explain the results and their implications.

Mince (also known as ground meat) and meat-free mince are used in the experiment, due to their popularity and availability in the market (de Boer, Schösler & Aiking, 2014; Koistinen et al., 2013). By using both meat and meat-free mince in our experimental design, we are able to examine and compare preferences of people belonging in different consumer groups and segments, thereby contributing to existing knowledge and practice. As vegetarians and meat reducers have an increasing presence and power in the market, our research can assist efforts encouraging more

sustainable diets and demarketing (i.e. discouraging the consumption of) unsustainable products (Armstrong Soule & Sekhon, 2018).

1.1 Consumer Empowerment, Anti-Consumption and Sustainable Consumption

The role of empowered consumers, who 'vote' through their purchases for the product attributes they like, has been widely recognised in the literature (e.g. Spaargaren & Oosterveer, 2010; Shaw, Newholm & Dickinson, 2006). The active engagement of empowered consumers and their significant power in the marketplace is driving changes in the market, as businesses do not generally invest in products that consumers are unwilling to buy (Papaoikonomou & Alarcón, 2017; Shaw, Newholm & Dickinson, 2006). In contrast to empowered consumers, who use their purchasing power to influence businesses within a market, 'anti-consumers' reject the consumption of particular products, or abstain from the market altogether (Lee et al., 2011).

Vegetarians and vegans are obvious examples of anti-consumers in the meat market. Recent reports suggest that in the UK as many as 9% of the population follow a vegetarian diet. Furthermore, over a quarter of UK meat consumers (28%) have limited the amount of meat they eat, while a further 14% has expressed intentions to reduce their meat consumption in the future (Mintel, 2017a). This highlights another aspect of anti-consumption which refers to practices of avoidance of particular products, instead of completely abstaining from the market (Cherrier, Black & Lee, 2011; Black & Cherrier, 2010). Meat reducers (also known as flexitarians) can be considered as empowered consumers, if they only eat products that fulfil specific criteria (i.e. 'less but better' meat), as well as anti-consumers, if they generally avoid specific meat products (Apostolidis & McLeay, 2016b; de Boer, Schösler & Aiking, 2014). Chatzidakis and Lee (2013) explain this distinction between empowered consumers and anti-consumers, as the difference between reasons *for* and reasons *against* particular products. This means there is a difference between consumers whose choices are based on reasons in favour of particular product attributes (e.g. consumers eating meat substitutes because they like their taste) and those who are opposed to specific product attributes (e.g. consumers that choose meat substitutes because they disagree with animal killing). Accordingly, "*an anti-consumer of meat (vegetarian) may avoid meat owing to concerns about animal welfare, but it is unlikely that those who consume meat do so because they want animals to be killed*" (Chatzidakis & Lee, 2013, p. 191).

The difference between the reasons for and against consumption is particularly important in the cases of anti-consumers, considering that moving from consumption to anti-consumption is not a one-way process. For example, research suggests that meat anti-consumers may decide to move from following a meatless diet to consuming meat, if they feel that certain meat products fit their lifestyles, ideologies and beliefs (Hodson & Earle, 2018). Therefore, it is not appropriate to consider the behaviour of vegetarians or vegans as directly opposite to that of meat eaters. This emphasises the importance of research which simultaneously compares and contrasts the preferences of meat eaters, vegetarians and meat reducers. In the current study we address this issue, by comparing the impact that food labels have on the choices of these three consumer groups.

1.2 Encouraging Sustainable Consumption through Food Labels

Sustainability is a multidimensional concept. According to the World Commission on Environmental Development (WCED, 1987), sustainability has a temporal dimension (related to trade-offs between present and future) and a social dimension (related to trade-offs between consumers and the

society in general). In the late 1990's, Elkington (1998) introduced the Triple Bottom Line approach to explain the different aspects of sustainability; social, environmental and economic sustainability. In this study, we follow the Triple Bottom Line view when exploring the links between sustainability and meat labels.

Communicating the benefits of sustainable food is often challenging, as many ethical, environmental and health related food characteristics are credence attributes that cannot be easily evaluated by consumers (Grunert, 2005). This can create information asymmetries between producers and consumers (for example sharing information on the method or environmental impact of production), which can make product choices more difficult (Grunert, Hieke & Wills, 2014). Consequently, when consumers are uncertain about the quality of a product, they may opt for cheaper alternatives to minimise their risk, driving more expensive (but higher quality) products out of the market (Moussa & Touzani, 2008). For instance, although people express an interest in sustainability-related characteristics of meat, the demand for more sustainable meat and meat-free products is still low, as they tend to be more expensive than conventionally produced options (Mintel, 2017b; Apostolidis & McLeay, 2016b).

Product labelling can enable the effective communication of information on the credence attributes that individuals are interested in (Micheletti & Stolle, 2015). In his seminal work, Spence (1973) defines this communication of information about the characteristics of a product as 'signalling'. Signals are "a marketer-controlled, easy-to-acquire informational cue, extrinsic to the product itself that consumers use to form inferences about the quality or the value of the product" (Bloom & Reve, 1990, p. 59). These signals are particularly important in situations where consumers need to form judgements of product quality under uncertainty such as when products are characterised mostly by credence attributes (Grunert, 2005). In the food marketing literature, food labels have been advocated as reliable and useful signals, which allow consumers to make inferences regarding the quality of the products (Apostolidis & McLeay, 2016a; Koistinen et al., 2013; Grunert, 2005). As a signal, a food label is designed to assist consumer choices by transforming credence features into attributes that consumers can search for prior to purchasing, hence reducing potential information asymmetry (Karstens & Belz, 2006; Jahn, Schramm & Spiller, 2005). For example, food labels may enable consumers to identify characteristics related to social, environmental and economic sustainability, such as nutritional values (Koistinen et al., 2013), origin (Pouta et al., 2010; Kuchler, Krissoff & Harvey, 2010), carbon footprint (Apostolidis & McLeay, 2016b) and production method (Van Loo et al., 2014).

Despite consumers' interest in sustainability food labels (e.g. Koistinen et al., 2013; Pouta et al., 2010), this interest is not always translated in higher sales, due to low levels of motivation or a poor understanding of these labels (e.g. Grunert, Hieke & Wills, 2014; Larceneux, Benoit-Moreau & Renaudin, 2012; Tobler, Visschers & Siegrist, 2011). For instance, the results of stage one of this project suggest that although labels relating to type of meat, fat content, origin and price are major factors that influence choice, other labels such as carbon footprint and production method labels play a secondary role in determining consumers' choices of meat/meat substitutes. These findings are also supported by other authors who found that consumer preferences, willingness to pay and adoption of some of the sustainability-related labels (including carbon footprint, organic and animal welfare labels) is still relatively low (Peschel et al., 2016; Van Loo et al., 2014). Nevertheless, the impact that sustainability labels have on consumer choices and willingness to pay is largely dependent on consumer segments. Several studies have identified small segments of consumers (based on their knowledge, preferences, pro-environmental attitudes, psychometrics and demographics) for whom sustainability-related labels had a significant impact on their choices

(Peschel et al., 2016; Koistinen et al., 2013). In the first stage of the project, we identified that meat consumption patterns can also influence the impact of these labels (*reference hidden for review*). Our initial results supported the findings of Latvala et al. (2012) who argue that several reasons may lead to changes in meat consumption patterns, including healthiness, animal welfare and environmental reasons. The above discussion highlights the importance of investigating the differences in consumer preferences for sustainability food labels between groups of consumers with different meat consumption patterns.

From a signalling perspective, labels might complement but also compete with one another or with other signals, such as brands and prices, in their influence on consumer choices (Larceneux, Benoit-Moreau & Renaudin, 2012). This leads to the contradiction that, although consumers may have positive attitudes towards sustainability, they may not always choose the most sustainable products, as they focus on the labels representing the attributes they consider to be most important (Van Loo et al., 2014). In addition, choices are susceptible to various signalling biases associated with the quality inferences consumers make. Schuldt (2013) argues that food labels may create a 'halo' effect when positive information on a particular attribute results in positive inferences about other product attributes as well. For example, a product with a 'locally produced' label may be in very high demand, because consumers perceive it as a better-quality alternative than similar products without this label (Lee & Yun, 2015). Similarly, Leathwood et al. (2007) describe a 'magic bullet' effect, which occurs when consumers overgeneralise information on one product attribute, assuming benefits in other product attributes as well. For example, a consumer might inaccurately infer from a low-fat label that the product will also be low in calories or sugar. Furthermore, Balcombe, Fraser and Di Falco (2010) suggest that consumers are more likely to use labels to avoid food products high in harmful ingredients (e.g. high fat content) than use labels to consciously identify healthier products (e.g. low fat content), which emphasises the importance of food labels for demarketing unsustainable and unhealthy products. However, the use of labels to demarket unsustainable products may cause a 'boomerang effect', as consumers may attach positive attributes to these 'forbidden' product labels (Yakobovitch & Grinstein, 2016; Van Kleef & Dagevos, 2015). For instance, higher fat content in meat may be associated with better quality and taste (Scozzafava et al., 2016; Grunert, 2005).

Given the inconsistencies in the results of previous studies that have explored food labels and consumer product choices, further research focusing on the effect of a range of signals is needed. In this paper, we contribute to the ongoing debate and calls for further research by comparing the preferences of meat eaters, as well as people avoiding or reducing meat, for sustainability labels.

2. Methodology and methods

In the first stage of this study (*reference hidden for review*), we used a Discrete Choice Experiment (DCE) to study consumer preferences for meat and meat substitutes, using a representative sample of 247 UK consumers. In this research, we extend this choice experiment to involve 600 respondents (200 meat eaters, 200 meat reducers and 200 vegetarians) in order to examine the impact that sustainability-related food labels have on their choices. DCEs can provide results that have high external validity (Louviere, Hensher & Swait, 2000) and are strongly related to actual market behaviour, since they 'force' consumers to consider the trade-offs between product attributes (Mueller et al., 2010). Furthermore, DCEs have been associated with other research benefits such as reducing respondents' hypothetical bias, which lead to deviations between stated

and actual behaviour (Hoyos, 2010), and thus have been advocated as a useful approach to inform policies and marketing strategies (e.g. Van Loo et al., 2014; Van Wezemael et al., 2014).

2.1 Selection of Choice Attributes and Levels

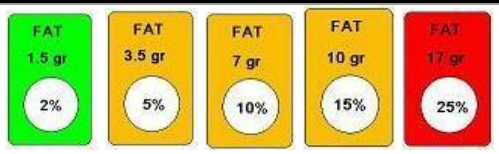
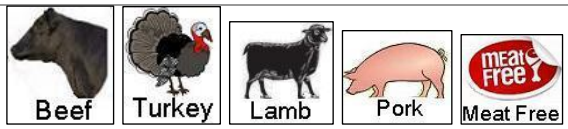
An in-depth understanding of the sustainability-related attributes of meat/meat-free products and associated food labels was developed by systematically reviewing academic literature and government reports on meat and meat substitutes (e.g. Van Loo et al., 2014; Van Wezemael et al., 2014). As explained in our introduction, the Triple Bottom Line approach was adopted to identify the attributes and labels relating to the social, environmental and economic sustainability.

The relevance of specific attributes for UK consumers and their links to real-life food labels was validated through a series of four focus groups – an attribute validation method recommended and used in DCE studies (e.g. Coast et al., 2012; Louviere, Hensher & Swait, 2000; Nocella et al., 2012). The first three focus groups separated participants into meat eaters, meat reducers and vegetarians, while the last focus group session included participants from all three consumer groups. Confirming the results of the first stage of our project (*reference hidden for review*), seven key attributes and associated labels were identified: *fat content*, *carbon footprint*, *type of mince*, *production method*, *brand/point of purchase*, *price* and *origin*. To enhance the reliability of the results, the levels for each attribute should be realistic and support trade-offs between attributes (Coast et al., 2012). Therefore, the levels in Table 1 were identified for the validated attributes, based on primary market research in the four largest (in terms of market share) UK food retailers (Mintel, 2016). In addition, the selection of attributes and levels was supported by consultation with experts on food production, relevant literature and pilot tests (Coast et al., 2012). The review of the literature and the information from the focus groups and the primary market research also enabled the identification of the most appropriate food labels to use in our experiment.

In line with the Food Standard Agency's (2013) recommendations and market research information, in this study fat content was presented using grams of fat per 70gr portion and percentage of the Guideline Daily Amount (GDA). The traffic light system (green, amber, red) recommend by the Food Standards Agency was used to communicate low, medium and high fat contents. Primary market research conducted in food retailers as part of this research confirmed that commonly used labels such as flags and type of meat logos are frequently used to present the type and origin of mince. The increasing popularity of meat substitutes in all groups of consumers (de Bakker & Dagevos, 2012; Mintel, 2017b) was also confirmed by our focus group and market research findings. Therefore, a meat substitute (meat-free mince) was included in our experiment.

The product's origin information was provided in line with the European Commission Council Regulations (European Commission, 2013), which suggest that labels should indicate whether the meat comes from EU member states or third countries. The Carbon Trust's official label was employed to communicate the carbon footprint of the products. Method of production included an organic logo and a 'GM Free' logo. Information was provided to respondents based on the EU regulations stipulating that at least 95% of an organic product's ingredients should meet the necessary standards of organic production (European Commission, 2007). Finally, a 'GM Free' logo was used in the experiment. In the UK there are no specific rules that govern the use of 'GM free' claims on food labels, however claims can be made if they are accurate and not misleading (Food Standard Agency, 2013).

Table 1 Attribute descriptions and levels

Attribute	Levels	Labels used
Fat content (g per 70g portion and % GDA)	2% (1.5g) 5% (3.5g) 10% (7g) 15% (10g) 25% (17g)	
Carbon footprint (kg CO_2 per 500g pack of product)	1Kg 3 Kg 6Kg 13Kg 20Kg	
Method of production	Organic Not organic/ GM free Conventional	
Type of mince	Beef Turkey Lamb Pork Meat free	
Brand	My butcher Quorn Supermarket own label	  Supermarket Own label
Region of origin	Locally produced UK Imported (EU country) Imported (non-EU country)	
Price	£2	

	£3	
	£4	
	£5	

2.2 Choice Experiment Design

The Sawtooth CBC software package was employed to generate a fractional factorial design, focusing on ensuring level balance and near-orthogonality for each respondent (Johnson et al., 2013). The generated choice experiment design included four survey versions, each including 20 choice tasks. In each choice task, respondents had to choose between three different mince products, described based on the seven aforementioned attributes and levels, plus an opt-out alternative ("none of these"). The opt-out option was particularly useful, as respondents were not forced to choose any of the available options if they did not find any of them appropriate. The first draft of the survey was pilot tested with 100 respondents in a supermarket environment to ensure comprehensiveness and confirm the survey instrument's face and content validity (Green & Gerard, 2009; Hoyos, 2010).

2.3 Data Collection and Analysis

Data was collected between May 2013 and February 2015 from two UK regions with diverse reported patterns of meat consumption– the Northeast (one of the regions with the highest meat consumption in the UK) and the Southeast (lowest reported meat consumption) of England (Mintel, 2014). The surveys took place inside actual food retailers and the questionnaire was administered by experienced interviewers using face-to-face interviews. The target population was respondents over 18 years old, who were asked to self-identify themselves as: 1. meat eaters (i.e. meat consumers who make no conscious effort to reduce their meat consumption) 2. meat reducers (i.e. people who have purposefully reduced the amount of meat in their diets) or 3. vegetarians (i.e. people rejecting all types of meat from their diets), (Apostolidis & McLeay, 2016b; de Bakker & Dagevos, 2012). In order to reduce the hypothetical bias of the experiment, a 'cheap talk' approach has been adopted by the interviewers, discussing with the respondents the tendency to exaggerate stated preferences during the questionnaire completion (Carlsson, Frykblom & Lagerkvist, 2005).

Following an approach consistent with the first stage of our project, which focussed on meat/meat-free choices, a multinomial logistic regression approach was employed using the Sawtooth Software to study consumer preferences for the various labels (for more information please see *reference hidden for review*). The results of multinomial logistic regression analysis reveal the utilities consumers associate with various attribute levels and allows the estimation of consumer preferences for different product attributes. To evaluate the goodness-of-fit of the model and reveal how much better the identified model can explain consumer preferences, the Percent Certainty value (also known as, McFadden pseudo R-squared) is calculated. Additionally, since all level utilities are measured using a common unit, ranges of utilities within attributes can be compared to explore the relative importance of each label for consumer preferences (Baba et al., 2016). The relative importance of an attribute represents the difference between the highest and lowest utility values of each attribute, divided by the sum of the ranges of all attributes and is expressed as a percentage of the sum of the utility ranges for all attributes (Baba et al., 2016).

Several studies on food choices concluded that heterogeneity is an issue to take into account in explaining consumer preference for food products (e.g. Weibel et al., 2018; Jensen et al. 2018). A latent class approach was therefore used to divide individuals in each of the three groups into segments, based on their preferences. Latent class analysis is based on the assumption that instead of one homogeneous population, a mixture of segments exists, and it attempts to create different models that improve the predictive ability for each segment (Boxall & Adamowicz, 2002).

3. Results

The samples' demographics (Table A.1, Appendix A) indicate that over 75% of the respondents are solely or jointly the food shoppers in their household, indicating high levels of involvement and a strong knowledge of the market (Drichoutis, Lazaridis & Nayga, 2005), which benefits the reliability and the validity of the experiment. A large percentage of self-identified vegetarians (approximately 72%) reported that they regularly or occasionally purchase meat products for their partners, family members or guests, which indicates that meat purchasing is not only limited to meat eaters and emphasises the importance of including vegetarians in our choice experiment. A small percentage of meat eaters (approximately 17%) and meat reducers (approximately 20%) revealed that reasons not included in the survey (such as vegetarian family members, religion, food intolerance and allergy-related issues) influenced their purchasing choices.

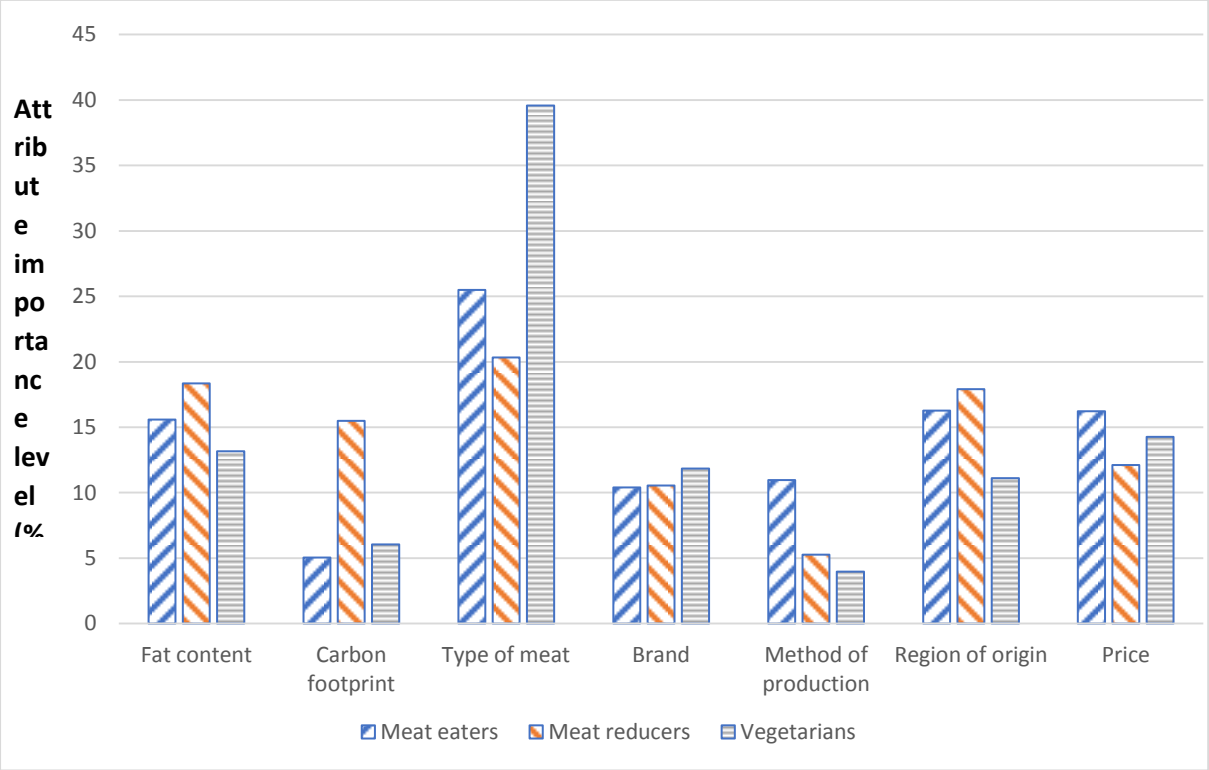
3.1 Consumer Preferences of Meat Eaters, Meat Reducers and Vegetarians for Sustainability Food Labels

The results of the three multinomial logistic models (Table B.1, Appendix B) provide a list of the attribute level utilities for the three groups, allowing a better understanding of consumer preferences for sustainability labels. If the utility value of an attribute level is high, consumer preferences for the associated label will also be higher than for the other labels/levels. The associated utilities demonstrate that all seven label types have a significant impact on the choices of consumers in the three groups. The relative importance for each attribute, which indicates the overall preferences for each label type, is presented in Figure 1.

Type of mince is the main driver of choice for all consumer groups. In line with existing market research, highlighting strong consumer preferences for beef meat due to its taste, texture and familiarity (e.g. Mintel, 2016), meat eaters show high preferences for beef mince. As expected, vegetarians prefer meat-free mince, generally avoiding meat products which highlights their 'meat anti-consumer' status. However, meat reducers appear to be more flexible as the overall impact of type of mince is not as strong as it is for meat eaters or vegetarians. This suggests that, in addition to their efforts to reduce meat consumption, meat reducers appear to be willing to change to different meat products and introduce meat substitutes into their diets.

The relative importance of fat content labels is significant for all respondent groups but are most important for meat reducers. The relative importance of price is also high for all consumer groups, however it is not as strong for meat reducers (12%) as it is for the other two consumer groups (approximately 16% for meat eaters and 14% for vegetarians), indicating their lower price sensitivity. As expected, the direction of effect of price is generally negative implying that demand decreases as price increases.

Figure 1 Relative Attribute importance for each Consumer Group



The origin labels are important for meat consumers, both meat eaters and meat reducers. Nevertheless, level utilities indicate that meat eaters place more emphasis on UK-produced labels, while meat reducers opt for locally produced food labels. In general, vegetarian consumers are less concerned about the origin of their food, however they are still more likely to choose domestically produced food products than imported products. Carbon footprint labels have only a moderate impact on the choices of both vegetarians and meat eaters. Interestingly, meat reducers demonstrate the highest levels of interest in reducing their impact on the environment, by opting for products with lower carbon footprint labels. Brand, point of purchase and production method labels have a significant but comparatively limited impact on consumer choices. Generally, organic meat purchased from a butcher is preferred by meat eaters, while for meat-free products the Quorn brand is favoured.

3.2 Types of Meat Consumers and Anti-Consumers

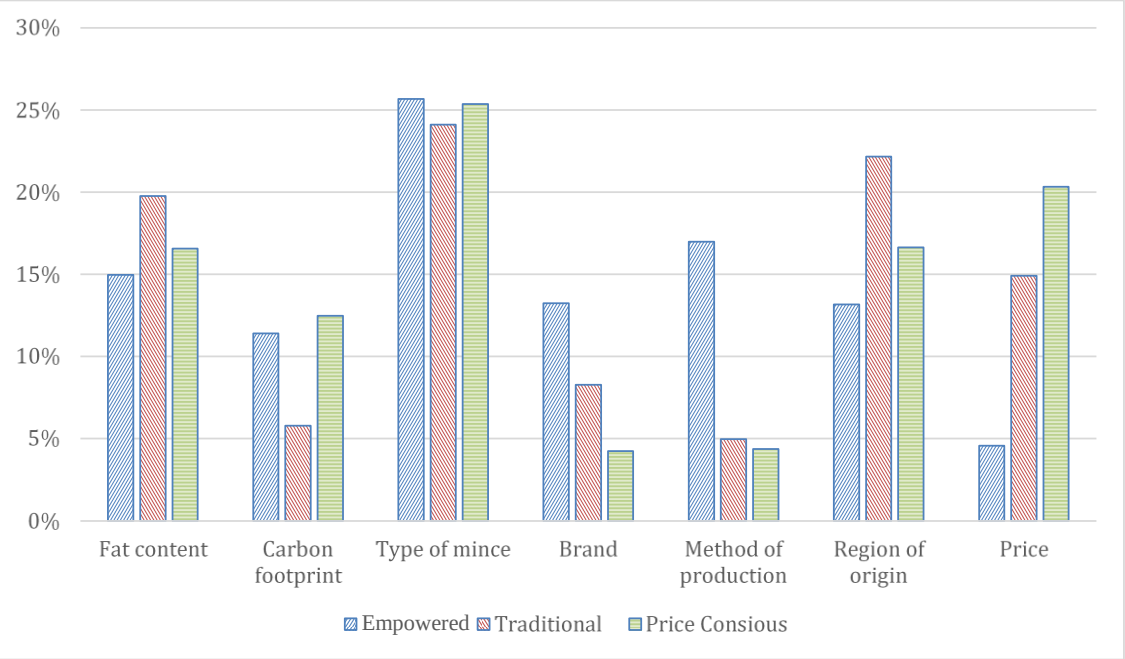
The model fit statistics of the three multinomial logistic models suggest that although to a large extent they can explain consumer preferences, the predictive ability of the models could be improved (particularly for meat eaters and meat reducers) as there is a level of diversity within these groups (approximately 58% certainty for meat eaters and 60% for meat reducers). Therefore, latent class analysis was used to segment the consumer groups and elicit the preferences of the different segments.

The Akaike information criterion (AIC), the Bayesian information criterion (BIC) and corrected AIC (CAIC), as well as the significance and the signs of the parameters were used to determine the number of segments (Nocella et al., 2012). For all consumer groups, models with 1–6 segments were analysed (Tables C.1-C.3, Appendix C). The Log-likelihood statistics suggested that the latent class

approach improved the goodness of fit of the models for meat eaters and meat reducers, supporting our initial hypothesis that consumers with different preferences exist within these consumer groups. For vegetarian consumers the separation of the sample in more than one segments only resulted in a small improvement of some of the criteria, while there was only a minor increase to the Percent certainty value. This suggests that one model is sufficient to explain the behaviour of vegetarian consumers.

In the case of meat eaters, the examination of the values of the criteria (AIC, BIC, CAIC) deriving from the estimation process showed that there is a clear improvement of all four criteria up to the model with three segments. In the model with four segments the CAIC criterion worsens slightly while the other criteria improve very little. Therefore, the results indicate that a model with three segments is appropriate. Based on each segment's level utilities (Table D.1 Appendix D), the relative attribute importance for each segment is presented in Figure 2. Most level utilities were statistically significant at the 99% level. The three identified segments have been named according to their preferences for the different food labels: *price conscious* (63% of the meat eaters), *traditional* (19%) and *empowered* (18%) meat eaters. Price conscious meat eaters are heavily influenced by the type and price of the product, while the impact of the sustainability labels is comparatively limited. Traditional meat eaters show strong preference for beef mince and their choices are driven by the origin and the fat content of the product. Finally, empowered consumers actively seek for low fat content, low carbon footprint and organic production food labels, while price has a limited impact on their choices.

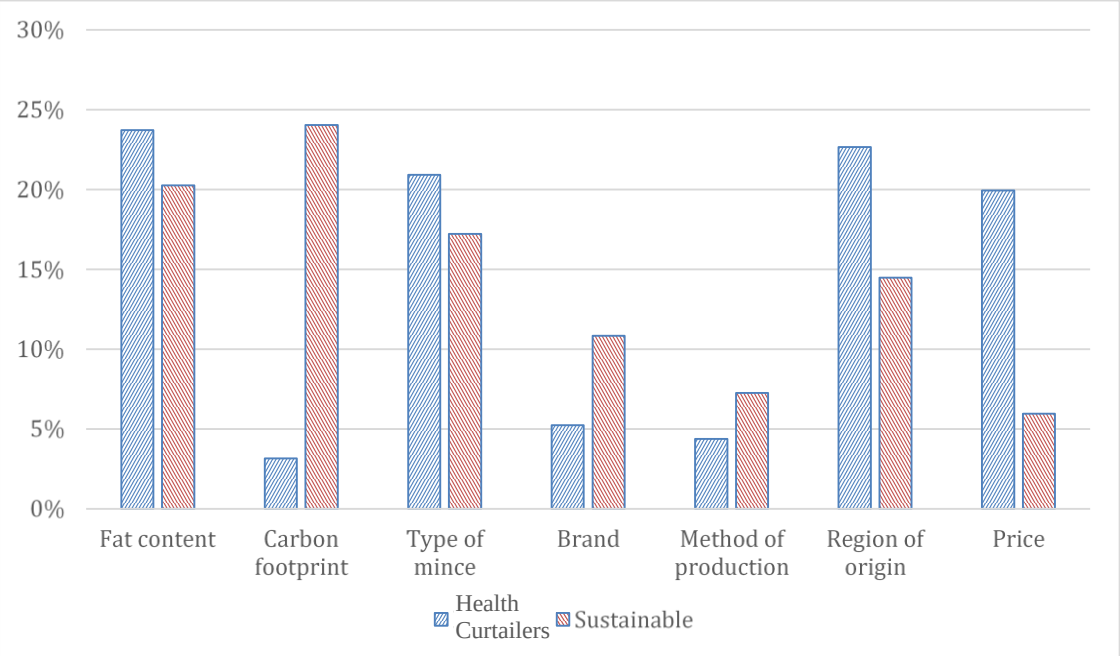
Figure 2 Relative Attribute Importance for Meat Eaters (n=200)



For meat reducers, two segments are identified. Based on the relative attribute importance for these two segments (Figure 3) and the utilities presented in Appendix E (Table E.1) the two segments have been named as: *health curtailers* (82% of meat reducers) and *sustainable consumers* (18%). The choices of health curtailers are mainly driven by the fat content and the origin labels of products, which have been associated with perceptions of healthiness and food safety (e.g. Lee & Yun, 2015). Only a small percentage of meat reducers are driven by product labels relating to environmental sustainability, such as carbon footprint and method of production labels. These sustainable consumers try to avoid unsustainable products based on the information presented on their labels.

When using latent class analysis to compare segments in different groups, it is important to ascertain that there are meaningful differences in the nature of the identified latent classes (e.g. Finch, 2015; Collins & Lanza, 2010; McCutcheon, 1987). Although comparing the significance of the differences between individual level utilities across the segments in different populations might not lead to meaningful results, the use of invariance testing to confirm the heterogeneity among the groups is recommended (*ibid*.). The first step is to determine whether the number of latent classes is the same across groups, using exploratory LCA with each group independently. If the number of identified classes differs across groups, this means that the latent structure of the distinct groups are absolutely heterogeneous, and therefore no further invariance assessment is required (Finch, 2015; Collins & Lanza, 2010; McCutcheon, 1987). Since in our analysis the number of identified segments vary in the three consumer groups, we can safely assume that the preferences of the different segments are heterogeneous. Therefore, meaningful comparisons between the different segments can be made.

Figure 3 Relevant Attribute Importance for Meat Reducers (n=200)



3.3 Socio-Demographics of the Different Consumer Segments

Recently scholars have argued that socio-demographic variables can assist the identification of meaningful differentiations between segments in the context of sustainable food choices (e.g. Peschel et al., 2016; Pouta et al., 2010). In our research, statistically significant inter-segment differences exist regarding the gender, age, income and household structure of the respondents (Table 2).

For instance, a higher proportion of the empowered meat eaters, health curtailers and sustainable consumers are female and earn a high income. This corroborates findings of earlier studies, highlighting that high income, female consumers are more likely to be driven by health or sustainability related characteristics (Apostolidis & McLeay, 2016b; Grunert, Hieke & Wills, 2014; Peschel et al., 2016). On the other hand, the traditional and price conscious meat eater segments

have a relatively large number of male consumers, however traditional consumers tend to be older than price conscious consumers. Finally, vegetarian consumers are mainly represented by younger, mid-level income, female consumers.

Table 2 Chi-square analysis results (n=600)

		Meat eaters			Meat reducers		Vegetarian	
		Empowered	Traditional	Price conscious	Healthier	Sustainable		Chi Square/ *p-value*
Gender	Male	30.6%	50%	40.3%	14.3%	29.7%	25.5%	22.810
	Female	69.4%	50%	50.7%	85.7%	70.3%	74.5%	*<0.000*
Age	18-24	5.6%	18.4%	24.6%	8.6%	5.4%	16.0%	44.315
	25-34	2.8%	7.9%	21.4%	6.7%	18.9%	12.0%	*<0.01*
	35-44	16.7%	21.1%	12.7%	15.3%	8.1%	22.0%	
	45-54	30.6%	10.5%	8.7%	17.8%	24.3%	18.0%	
	55-64	25.0%	31.6%	19.8%	28.8%	24.3%	18.0%	
	>65	19.4%	10.5%	12.7%	22.7%	18.9%	14.0%	
Income	<10000	9.7%	20.0%	27.1%	30.3%	11.1%	25.4%	46.147
	10000-20000	25.8%	37.1%	21.2%	24.3%	25.0%	29.8%	*<0.000*
	20000-30000	25.8%	22.9%	18.6%	18.4%	33.3%	20.8%	
	30000-40000	25.8%	5.7%	13.6%	11.8%	5.6%	9.4%	
	>40000	13%	14.3%	19.5%	15.1%	25%	14.6%	
Household	Children	25.2%	14.6%	36.4%	34.6%	54.2%	26.7%	13.572 *0.055*
	Partner	69.2%	76.2%	54.5%	46.2%	79.2%	66.7%	10.826 *<0.001*
	Other Adult	8.4%	14.3%	16.7%	19.2%	16.7%	26.7%	8.043 *0.154*
	Only myself	24.3%	23.8%	12.5%	42.3%	12.5%	13.3%	8.157 *0.148*
Region of residence	Northeast	36.1%	71.1%	47.6%	45.7%	69.4%	50%	16.440
	Southeast	63.9%	28.9%	52.4%	54.3%	30.6%	50%	*<0.01*

a. For every variable no more than 20% of the cells have expected count less than 5.

Knowledge of the socio-demographic characteristics of consumer segments can support customer profiling and the development and implementation of marketing and communication strategies to address sustainability challenges. For example, researchers argue that although interest in nutrition increases with age (e.g. like the empowered meat eaters in this study), this interest might be counteracted by difficulties in processing information in high age groups, which suggests the need for more direct labelling approaches (Grunert, Hieke & Wills, 2014).

4. Discussion

Some scholars highlight the role of empowered consumers and anti-consumers in the context of sustainable consumption (e.g. Armstrong Soule & Sekhon, 2018), while a second stream of research investigates how food labels could be used to encourage more sustainable meat consumption (de Boer, Schösler & Aiking, 2017; Koistinen et al., 2013). This study combines these streams of research, to enhance the understanding of the impact of sustainability-related labels on the choices of consumers located in different stages of the meat-eating continuum.

4.1 Meat eaters – Segments and Characteristics

Empowered meat eaters not only avoid product characteristics that do not fulfil their criteria, but actively 'vote' for products with food labels they like through their choices. These consumers are also more likely to pay a premium for healthier and more sustainable products. This is evidenced by the very high utilities associated with low fat content, low carbon footprint and organic production food labels and the relatively low importance of price. This supports the argument that, despite the small size of the segment, empowered consumers can trigger changes in the market and drive businesses to adopt a sustainability focus (Shaw, Newholm & Dickinson, 2006). This is also supported by the fact that, although they are not interested in reducing their meat consumption, empowered consumers demonstrate a strong preference for the Quorn brand (in the cases where they opt-for a meat-free product), indicating a vote of confidence for the brand focusing on communicating the health and sustainability benefits of their products (Mintel, 2017b).

Traditional meat eaters are mainly influenced by the type of meat, origin and fat content of their products. Although fat content is an important meat attribute for most consumers, traditional meat eaters are the only segment where the 'boomerang' effect for fat content labels is noticed. This means that, traditional meat eaters avoid both low-fat and high-fat labels and show stronger preferences for mid-level fat content instead. This could be due to the reported association of fat with tenderness and taste in meat (Grunert, 2005; Scozzafava et al., 2016). Therefore, for traditional consumers, a low-fat food label did not result in the same positive impact as for empowered or price conscious meat eaters. This suggests that nutrition labelling is not a panacea when it comes to demarketing unhealthy products. Furthermore, origin labels have a very strong impact on the choices of this segment, particularly in terms of strong preference for domestically and locally produced food. Although studies suggest that origin labels can be used by consumers as proxies for quality, healthiness, environmental friendliness and food safety (e.g. Jensen et al. 2018; Lee & Yun, 2015), this association is not always correct (Kemp et al., 2010). This potential 'halo' effect of origin labels could be overcome if they are combined with additional sustainability-related information, such as carbon footprint, to avoid biases in the long term.

Price conscious consumers form the largest segment of meat eaters. This highlights the fact that, although information provided on food labels may influence consumer behaviour, other factors (such as lower prices) can impede sustainable consumption. In our earlier study on meat consumption, we identified this segment as a 'bad influence', due to the strong impact of price on their choices, which makes changing behaviour for sustainability purposes more difficult (*reference hidden for review*). From a signalling theory perspective however, this strong impact of prices could be caused by uncertainty and information asymmetry in the market, as uncertain consumers opt for lower priced alternatives to reduce the risk taken (Moussa & Touzani, 2008). This can make demarketing unsustainable options more challenging.

Overall, despite the presence of the empowered meat eaters segment, our findings indicate that for meat eaters, food labels need to be supported by additional strategies to increase their effectiveness

as a mechanism for encouraging more sustainable food consumption practices. As traditional and price conscious consumers are the majority of meat eaters, strategies and policies focusing on sustainability need to reduce bias and information asymmetry through provision of information and consumer education. In addition, developing strategies that internalise the environmental and social costs of unhealthy and unsustainable products, would result in an increase in the prices of these options, which may drive price conscious consumers to more sustainable alternatives (Springmann et al., 2018).

4.2 Meat reducers – Segments and Characteristics

Health curtailers represent the majority of meat reducers. In comparison to empowered meat eaters, health curtailers are less 'pro-active', generally focusing on avoiding undesirable product characteristics, such as fatty, imported products, using these labels as reasons against choosing a product. Additionally, these consumers demonstrate a higher probability amongst meat reducers to choose the "none" option (instead of the available products in the choice sets). This means that they are more likely to avoid meat, if they cannot find a product that meets their requirements. This finding corroborates those of earlier studies that emphasise how fat content which is linked to un-healthiness and decreasing personal wellbeing, is one of the main drivers of meat reduction (e.g. Apostolidis and McLeay, 2016a; Koistinen et al., 2013). In the UK, the relatively high importance of fat content labels may also be a result of the recent focus of nutritional policies and educational campaigns aimed at promoting healthier food products (Hawkes et al., 2015).

Sustainable consumers represent a smaller segment of meat reducers who use food labels to avoid unsustainable products. Consumers in this segment show strong preferences for low carbon footprint, local and organic production food labels and are less price sensitive than other meat reducers. As a considerable portion of consumers are still relatively uninformed or sceptical about environmental sustainability labels (Grunert, Hieke &Wills, 2014; Peschel et al., 2016; Tobler, Visschers & Siegrist, 2011), sustainable consumers can be considered as the early adopters of these less commonly used labels and therefore a relevant target group for marketers and policymakers seeking to promote more sustainable consumption.

The large number of health-conscious meat reducers highlights the effectiveness of recent efforts and interventions aimed at informing and educating people regarding the use of nutrition labels and origin information. However, the strong preference for nutrition labels increases the risks of magic bullet and boomerang effects. Healthier nutrition labels (e.g. low fat content) can be incorrectly associated with additional health benefits (e.g. low calories) and decrease 'consumption guilt', which can lead to an increase in the consumption of potentially unsustainable products (e.g. high carbon footprint products). On the other hand, despite their small size, sustainable consumers can be used as role models for sustainable consumption and provide useful information for the development of meat reduction strategies and policies. Interestingly, despite the efforts of food manufacturers to promote meat-free alternatives as a healthier and more sustainable meat substitute, these products still do not feature highly in the preferences of meat reducers (for both the health conscious and sustainable segments). This suggests that these consumers are not willing to replace the meat in their diets with meat-free alternatives.

4.3 Vegetarians

Although existing literature describes vegetarians as 'sustainable consumers' (e.g. Hodson & Earle, 2018; Ruby, 2012), our findings support their identification as 'anti-consumers'**.** As expected, vegetarian consumers are most likely to use the animal origin of food products as a reason against meat consumption, regardless of carbon footprint, region of origin and method of production labels. At the same time, they try to avoid high-fat and high-price meat-free alternatives. Additionally, they are more likely to choose none of the available alternatives in the experiment, further supporting their characterisation as anti-consumers, who primarily decide on which products to avoid based on reasons against particular attributes.

This does not mean however, that vegetarian consumers are not interested at all in sustainability. Earlier studies indicate that the limited range of options available to vegetarians may drive them to focus more on a small number of attributes that concern them the most (e.g. Apostolidis & McLeay, 2016a). Our results raise the possibility that meat-free labels may be acting as a heuristic signal of a more sustainable and ethical product, without consumers considering any of the additional market information. Therefore, this halo effect of a meat-free label might discourage consumers from seeking more information to evaluate the sustainability and ethical attributes of food products. This may result in further issues in the long term, as meat substitutes become more prominent in the marketplace.

5. Limitations and further research

Although the choice of examining specific food labels and logos in our experiment increases the reliability of the study, it is not without shortfalls. Different countries and industries use different labelling systems to inform consumers about the credence attributes of the products. Additionally, in real-life several other factors may influence food choices, since eating is a social practice, which makes investigating consumer behaviour quantitatively very challenging. Nevertheless, the findings of this research provide a stepping-stone towards understanding better the decision-making process of meat (anti-)consumers and lays the foundations for further research looking into sustainability labelling. This could include the examination of the values and attitudes that drive the relationships between sustainability food labels and consumer choices. Additionally, our study did not specifically focus on vegan's (due to the small percentage of vegans in the UK) which are sometimes categorised in a similar way to vegetarians but have many differences (Rosenfeld, 2019). However, we acknowledge that they are an important and growing consumer segment, whose choices may be driven by motivations that are different to other consumers. Additional research of this nature that incorporates vegans and compares the factors that influence their choices with other consumers would be able to provide further insights in the behaviour of this segment.

6. Conclusions

Building on the first stage of a two-part study, focusing on consumer preferences for sustainable meat and meat substitutes, in this paper we present the results of the first choice experiment research that compares consumer preferences of meat eaters, meat reducers and vegetarians regarding sustainability food labels. We identify six intra-group segments based on their preferences for the different food labels. Only a small group of meat eaters (empowered meat eaters) appear to be motivated by altruistic reasons and actively 'vote' through their purchases for more sustainable products. Similarly, a small percentage of meat reducers are currently reducing their meat consumption for reasons related to environmental sustainability, with the majority of consumers (over 80%) reducing their meat consumption for self-focused, health-related reasons. Additionally, although studies have linked anti-consumption with sustainable consumption (Verain, Dagevos & Antonides, 2015), the impact of the majority of the sustainability labels on the choices of meat anti-consumers (vegetarians) is limited. Finally, we identify differences in the socio-demographic

characteristics of the various segments, to support customer profiling and the development of effective strategies and policies.

From a theoretical perspective, in this paper we draw on signalling theory and our results emphasise the importance of reducing information asymmetry in the market to drive more sustainable behaviours. However, various biases and effects, including 'boomerang', 'halo' and 'magic bullet' effects, may influence the effectiveness of food labels and lead to undesired results. Our findings can assist food marketers and policymakers, who can use this knowledge to develop more tailored strategies and policies to fit the needs of increasingly important consumer groups such as meat reducers and vegetarians. Our research suggests that, although food labels can be an effective point-of-purchase tool, policies and strategies need to move beyond providing information and focus on facilitating consumer empowerment and motivation. This can be supported by clear market signals, consumer education, and price-based policies and strategies, to demarket unsustainable products and encourage the transition to more sustainable consumption patterns.

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Appendix A

Table A.1 Socio-demographic characteristics of the sample

		Meat eaters (n=200)	Meat reducers (n=200)	Vegetarians (n=200)
Gender	Male	92	64	50
	Female	108	134	146
Age	18-25	34	16	32
	26-35	16	28	28
	36-45	30	38	44
	46-55	42	38	36
	56-65	52	56	36
	>65	26	44	24
Household income	<£10000	32	30	68
	£10000 -19999	46	41	38
	£20000-29999	48	40	40
	£30000-39999	26	20	18
	£40000-49999	20	37	16
	>£50000	12	20	12
Household members	Children	52	56	72
	Partner/spouse	128	114	92
	Other adults	48	50	70
	Only myself	32	38	30
Food shopper	Yes, sole	62	62	76
	Yes, joint	118	98	104
	No	20	38	20
Other reasons	Yes	8	26	18
	No	192	174	176

Appendix B

Table B.1 Estimated effects for the three consumer groups

	Meat eaters			Meat reducers			Vegetarians		
Chi-square		4343.48			3501.39			7289.93	
Percent certainty		58.3			60.2			75.2	
Variable	**Effect**	**St Error**		**Effect**	**St Error**		**Effect**	**St Error**	
Fat content									
2	0.61	0.052	**	1.008	0.068	**	0.846	0.106	**
5	0.477	0.048	**	0.447	0.048	**	0.276	0.112	**
10	0.139	0.049	**	-0.061	0.051	*	-0.376	0.132	**
15	-0.323	0.054	**	-0.253	0.053	**	-0.18	0.103	*
25	-0.903	0.065	**	-0.875	0.050	**	-1.126	0.106	**
Carbon footprint									
1	0.231	0.053	**	0.589	0.053	**	0.04	0.137	
3	0.169	0.049	**	0.159	0.049	**	0.107	0.114	
6	-0.066	0.049	*	-0.011	0.053		0.105	0.104	
13	-0.186	0.054	**	-0.26	0.055	**	-0.027	0.115	
20	-0.315	0.055	**	-0.477	0.053	**	-0.225	0.111	**
Type of mince									
Beef	1.359	0.054	**	1.223	0.052	**	-0.945	0.287	**
Turkey	-0.146	0.056	**	-0.254	0.055	**	-0.928	0.271	**
Lamb	0.166	0.053	**	-0.314	0.055	**	-1.384	0.312	**
Pork	0.02	0.058		-0.403	0.062	**	-1.515	0.362	**
Meat Free	-1.398	0.107	**	-0.252	0.085	**	4.772	0.219	**
Brand									
Quorn	-0.369	0.114	**	0.059	0.059		0.517	0.142	**
Butcher shop	0.415	0.067	**	0.263	0.048	**	-0.191	0.234	
SM own label	-0.046	0.060		-0.322	0.090	**	-0.326	0.122	**
Method of production									
Organic	0.176	0.034	**	0.15	0.034	**	0.137	0.082	*
Not organic/ GM free	-0.063	0.033	*	-0.086	0.034	**	-0.005	0.078	
Conventional	-0.113	0.033	**	-0.064	0.034	*	-0.133	0.071	*
Country/region of origin									
Imported (EU)	-0.293	0.047	**	-0.429	0.050	**	-0.387	0.092	**
UK	0.762	0.041	**	0.694	0.040	**	0.65	0.107	**
Local	0.505	0.043	**	0.77	0.043	**	0.497	0.104	**
Imported (Non EU)	-0.975	0.053	**	-1.035	0.059	**	-0.76	0.116	**
Price									
2	0.894	0.042	**	0.748	0.051	**	0.88	0.099	**
3	0.458	0.043	**	0.317	0.043	**	0.704	0.117	**
4	-0.529	0.048	**	-0.232	0.047	**	-0.591	0.119	**
5	-0.966	0.050	**	-0.663	0.041	**	-1.192	0.101	**
NONE	-0.651	0.066	**	1.283	0.053	**	4.444	0.157	**

*Note: * indicates significance at the 0.1 level ** indicate significance at the 0.05 level*

Appendix C

Table C.1 Criteria for number of segments for meat eaters (n=200)

	Meat Eaters				
Groups	LL	Pct Cert	AIC	CAIC	BIC
1	-2910.54	58.29	5919.01	6445.54	6217.02
2	-2709.60	66.71	5609.19	6292.12	6197.12
3	-2610.24	68.70	5458.48	6313.94	6194.94
4	-2490.98	70.09	5267.96	6295.95	6152.95
5	-2430.04	72.31	5194.08	6294.60	6227.60
6	-2333.75	73.24	5049.50	6222.54	6231.54

Table C.2 Criteria for number of segments for meat reducers (n=200)

	Meat Reducers				
Groups	LL	Pct Cert	AIC	CAIC	BIC
1	-3039.20	60.18	6412.40	7630.47	7463.47
2	-2949.54	69.70	6281.07	7674.19	7483.19
3	-2854.15	70.52	6138.30	7706.46	7481.46
4	-2801.40	71.47	6080.79	7824.01	7585.01
5	-2747.70	72.44	6021.40	7939.67	7686.67
6	-2713.92	73.05	6001.84	8095.16	7808.16

Table C.3 Criteria for number of segments for vegetarians (n=200)

	Vegetarians				
Groups	LL	Pct Cert	AIC	CAIC	BIC
1	-1380.12	75.10	2806.25	2974.00	2951.00
2	-1246.87	77.50	2587.74	2930.54	2883.54
3	-1147.88	79.29	2437.75	2955.60	2884.60
4	-1084.37	80.44	2358.74	3051.62	2956.62
5	-1060.22	80.87	2358.45	3226.38	3107.38
6	-1026.40	81.48	2338.80	3381.78	3238.78

Appendix D

Table D.1 Level utilities per segment for meat eaters

Meat eaters									
	Empowered 18% (n=36)			**Traditional 19% (n=38)**			**Price Conscious 63% (n=126)**		
	Utilities	St Error		Utilities	St Error		Utilities	St Error	
Fat content									
2	1.28	0.15	**	-0.39	0.07	**	0.56	0.14	**
5	0.18	0.14	*	1.01	0.07	**	0.63	0.16	**
10	-0.15	0.13		0.66	0.06	**	0.77	0.15	**
15	0.12	0.13		-0.40	0.07	**	-0.05	0.15	
25	-1.12	0.17	**	-0.88	0.09	**	-1.92	0.23	**
Carbon footprint									
1	1.11	0.14	**	-0.01	0.07		1.31	0.16	**
3.5	0.68	0.15	**	0.18	0.07	**	0.25	0.16	*
6	-0.55	0.15	**	-0.37	0.08	**	-0.22	0.17	
13	-0.73	0.19	**	0.08	0.07		-0.71	0.18	**
20	-0.51	0.22	**	0.11	0.07	*	-0.63	0.28	**
Type of meat									
Beef	1.90	0.14	**	1.60	0.07	**	1.87	0.15	**
Turkey	1.23	0.14	**	-0.71	0.08	**	-0.65	0.17	**
Lamb	0.78	0.15	**	-0.38	0.08	**	-2.25	0.21	**
Pork	-1.69	0.21	**	-0.37	0.08	**	0.60	0.17	**
Meat Free	-2.22	0.26	**	-0.15	0.11		0.43	0.16	**
Brand									
Quorn	1.15	0.23	**	0.32	0.12		0.45	0.30	*
Butcher shop unlabelled	-0.17	0.15	*	0.23	0.08	**	-0.21	0.19	
Super market own label	-0.98	0.13	**	-0.56	0.06	**	-0.24	0.16	*
Method of Production									
Organic	1.45	0.23	**	0.28	0.05	**	0.27	0.10	**

Not organic/ GM free	-0.17	0.15		-0.09	0.05	*	-0.44	0.11	**
Conventional production	-1.28	0.13	**	-0.19	0.05	**	0.18	0.10	*
Country/region of origin									
Imported (EU)	-0.71	0.12	**	-0.62	0.07	**	-0.11	0.14	**
UK	1.06	0.11	**	0.94	0.06	**	0.72	0.13	**
Local	0.71	0.12	**	0.85	0.06	**	1.05	0.13	**
Imported (Non EU)	-1.06	0.16	**	-1.18	0.08	**	-1.65	0.20	**
Price									
2	0.50	0.12	**	0.64	0.05	**	1.50	0.16	**
3	-0.23	0.12	*	0.39	0.06	**	0.65	0.14	**
4	-0.13	0.13		-0.25	0.07	**	-0.34	0.15	**
5	-0.13	0.11		-0.79	0.07	**	-1.81	0.27	**
NONE	0.46	0.14	**	0.55	0.07	**	0.73	0.19	**

*Note: * indicates significance at the 0.1 level ** indicate significance at the 0.05 level*

Appendix E

Table E.1 Level utilities per segment for meat reducers

Meat reducers						
	Health curtailers 82% (n= 164)			**Sustainable 18% (n =36)**		
	Utilities	St Error		Utilities	St Error	
Fat content						
2%	1.03	0.06	**	1.19	0.15	**
5%	0.60	0.06	**	0.24	0.14	*
10%	-0.15	0.06	**	-0.20	0.13	*
15%	-0.33	0.06	**	0.05	0.13	
25%	-1.15	0.08	**	-1.29	0.17	**
Carbon footprint						
1	-0.16	0.07	**	1.38	0.14	**
3.5	0.02	0.06		1.30	0.14	**

6	-0.13	0.06	**	0.78	0.15	**
13	0.13	0.06	**	-1.71	0.20	**
20	0.13	0.06	**	-1.55	0.26	**
Type of meat						
Beef	1.46	0.06	**	1.21	0.14	**
Turkey	-0.46	0.07	**	0.69	0.15	**
Lamb	-0.35	0.07	**	-0.52	0.15	**
Pork	-0.40	0.07	**	-0.90	0.19	**
Meat Free	-0.25	0.10	**	-0.49	0.21	**
Brand						
Quorn	0.18	0.11	*	0.73	0.22	**
Butcher shop unlabelled	0.12	0.07	*	-0.13	0.14	
Super market own label	-0.30	0.06	**	-0.60	0.13	**
Method of Production						
Organic	0.25	0.04	**	0.81	0.10	
Not organic/ GM free	-0.16	0.04	**	0.04	0.09	
Conventional production	-0.09	0.04	**	-0.85	0.09	
Country/region of origin						
Imported (EU country)	-0.48	0.06	**	-0.73	0.12	**
UK	0.87	0.05	**	0.86	0.11	**
Local	0.81	0.05	**	0.68	0.12	**
Imported (Non EU country)	-1.21	0.07	**	-0.91	0.15	**
Price						
2	0.88	0.05	**	0.51	0.12	**
3	0.36	0.05	**	-0.22	0.12	*
4	-0.30	0.06	**	-0.14	0.13	
5	-0.95	0.06	**	-0.16	0.11	*
NONE	1.06	0.06	**	0.49	0.13	**

*Note: * indicates significance at the 0.1 level ** indicate significance at the 0.05 level*

Research highlights

- Using a choice experiment we evaluate preferences for sustainability labels
- We compare the preferences of meat eaters, meat reducers and vegetarians
- Type of meat, price and fat content labels have the largest overall impact on consumer choices.
- Latent class analysis identified different segments within the three consumer groups