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Willingness to reduce food choices in favour of sustainable alternatives – the role of government and consumer behaviour

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Abstract. Despite greater emphasis being placed on research into ethical consumer behaviour, there is still no clear view of the magnitude of willingness to reduce food choices in favour of sustainable alternatives (WTRFCIFOSA), while the role of government is also under the microscope, more specifically how willing it is to take the initiative in keeping only organic food on the shelves. This study advances a new concept by theorising "willingness to reduce food choices for sustainable alternatives". The concept emerged from assessing consumer behaviour, ethical attributes, health attributes, and the roles played by both government and food producers in relation to naturalness. It is theorised that WTRFCIFOSA would lead to the consumption of natural and organic food. At present, consumers themselves have no willingness to switch to organic consumption. Moreover, ethical and health attributes, government, and food producers have no significant impact on convincing consumers to opt for organic/natural food. It is therefore suggested that governments should introduce the concept of mandatory consumption of sustainable alternatives by reducing the range of unnatural and less ethical food choices for consumers, because naturalness is a significant moderator in the process.

Key words: food, ethical consumer behaviour, sustainable alternatives

Introduction

Over the most recent decades, there has been an escalation in the production of sustainable food as well as consumption, as it has emerged as a key issue with an increased level of awareness among consumers. A plethora of research has showed that social, ethical, and environmental problems are multiplying across the globe because of the various conventional methods of production and consumption of food (Garnett 2013; Reisch et al. 2013; Verain et

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al. 2015; Yamoah et al., 2014). In particular, a high level of concern remains for the agri-food sector; therefore, several attempts have been made to improve the ethical (Sroka & Szanto, 2018), social and environmental situations as well as the food supply chain by using labelling, certification and various differentiation strategies that are effective in creating sustainability within specific markets (Abeliotis et al. 2010; Aikin, 2011, 2014; De Haen & Requillart, 2014; Verain et al., 2012; Yamoah et al., 2014).

In the last two decades, sales of ethical products that follow one or more social, welfare, and environmental principles (Shaw & Clarke, 1999; Tallontire, 2000; Bezençon & Blili, 2010; Davies & Crane, 2010) have grown in relative terms, and have therefore led to the assumption that levels of consumer understanding has improved, as they consider various social and ethical aspects when buying products (Auger & Devinney, 2007). Ethical consumerism has gained importance due to growth in sales of ethical products (Carrigan & De Pelsmacker, 2009). However, though the focus of marketing studies has remained on ethical consumption, willingness to reduce consumption choices in favour of sustainable alternatives is still under research (Yamoah et al., 2014). There is no specific definition for "sustainable food"; thus, there is a perception regarding what the contributing factors forming sustainable food are. In this regard, various factors such as the environmental and economic situations, motives, values, and culture play a role (De Carvalho et al., 2015; Grunert et al., 2014; Sautron et al., 2015).

Conversely, apart from frequent labelling items or simply focusing on ethical and/or environmental attributes of sustainability, there is no comprehensive scheme explaining what sustainable food is. Such attributes of sustainability play a pivotal role in creating differentiation in the global food sector (Codron et al., 2005; Franz et al., 2010; Grolleau & Caswell, 2006; Jahn et al., 2005). As a result, it is essential that further research investigates effective and efficient communication along with the differentiation strategies related to food products and their respective sustainable contribution. Thus, this study aims to investigate the willingness to reduce food choices in favour of sustainable alternatives on the UK food consumer market, while considering ethical and healthy attributes, naturalness, and the role of the government and food producers.

1   Literature review

A plethora of research has showed that, in the majority of economies, sustainability has emerged as a major concern, especially in the agri-food sector where it is the centre of discussion (Codron et al., 2005; Grunert, 2011; Reisch et al., 2013; Sidali et al., 2012; Vermeier & Verbeke, 2006). Interestingly, in relation to sustainable food consumption, a wide range of attributes are evident in relation to product differentiation, enabling and assisting agri-food ventures that enhance the worth and value of commodities (Codron et al., 2005, Dosi & Moretto, 2001; McEachern & McClean, 2002; Sidali et al., 2016). Furthermore, a constructive corporate image develops and is nourished due to sustainable businesses that take ethical, social, and environmental responsibility into account (Carlson et al., 1996; Morris et al., 1995). Presently, however, there is no widely accepted definition of sustainability. Equally, there is no standard approach to the concept of sustainable food (Johnston et al., 2007; Reisch, 2011). Looking at food production, however, there are already quite a few products that are marketed as being more sustainable than others due to their specific attributes, such as environmental or

ethical aspects. These businesses used such credible and accepted attributes that they are labelled and certified in a manner that enables consumers to identify them directly (Caswell & Padberg, 1992; Jahn et al., 2005). As of now, there is no general label for sustainable food, but ethical, social, and environmental dimensions being the focus of any scheme is reflected in fair trade, organic, or eco labels (Sidali et al., 2016). Over the years, there has been a steady increase in such market niches (Fair Trade 2013; Sahota 2013). Consumers often affiliate themselves with more sustainable types of products, with higher environmental benefits, health benefits, or which demonstrate greater fairness towards food producers (von Meyer-Höfer et al., 2015). With the rise in awareness of consumption issues across the globe, there is higher demand for sustainable products (BBMG, GlobeScan and SustainAbility 2012; National Geographic and GlobeScan 2012; SustainAbility and GlobeScan 2012).

The global consumer market has expanded due to the emergence of globalisation because there are no boundaries for the exchange of goods, information, and people as the market has shrunk into one global village (Sidali et al., 2016). Hence, researchers have found that due to the globalisation phenomenon, there is not only a global segment of increasingly global consumer markets for fashion, products, and music, but also for sustainable goods, particularly among middle-class, well-educated segments (Craig & Douglas, 2006; Court & Narasimahan, 2010; Douglas & Craig, 2011; Miller, 1998; Shermach, 1995). However, there is no denial of the increasing importance of sustainable food across the globe (Nash, 2009), yet research related to the subject still remains fragmented to some extent (Grunert et al., 2014). A large number of studies have concentrated on environmental sustainability while only focusing on the single dimension of sustainable food consumption (Sidali et al., 2016). A plethora of research has revealed that the well-established literature related to sustainability has tended towards environment-friendly consumption and organically produced product consumption (Aertsens et al., 2009; Honkanen et al., 2006; Loureiro et al., 2001; Roberts 1996). There is conventionalised criticism regarding the organic sector being unable to capture consumers' market potential. Yet, attempts to do so have been made by researchers who viewed fair trade as a component of ethical consumption (Adams & Raisborough 2010; McCluskey et al., 2009) or animal welfare (Honkanen & Olsen, 2009; Lagerkvist and Hess 2011).

In such a scenario, research by De Cavalho et al. (2015) and Sautron et al. (2015) are just two examples of studies that have focused solely on sustainability. Even the recent study by Sidali et al. (2016) has explored naturalness, heath-related attributes, and ethical attributes to some extent, but the role of government in this regard is not explored in any great detail. The study by Sautron et al. (2015) considered sustainability concerns as a choice motivator among a variety of food choices, whereas De Cavalho et al. (2015) primarily drew attention towards sustainability consciousness among consumers while opting for food consumption. They considered sustainability a five-dimensional construct. Often researchers have used a uni-dimensional approach to study sustainability consumption (Grunert et al., 2014), which is a reason for low generalisability. Furthermore, there is limited evidence regarding how those five-dimensional constructs, namely health-related attributes, naturalness, ethical attributes, the role of government, and the role of producers interlinked with consumer choices, and which factor among them is more dominant in terms of its overall effect.

Sidali et al. (2016) argued that ethical attributes, naturalness, and health-related attributes showed that consumer expectations are relatively higher and diverse in terms of sustainable

food from social, ecological, and economic perspectives. Similarly, the FAO (2010) and the United Nations Environment Program (2010) found that these three aspects are highly effective in determining consumer behaviour towards sustainable consumption. A plethora of studies have showed that consumer behaviour could largely be influenced by these different dimensions (De Cavalho et al., 2015; Lee & Wall, 2012; Sautron et al., 2015; Sidali & Hemmerling, 2014). Interestingly, those studies provided evidence in the context of both advanced and emerging countries. However, the role of producers and government has not yet been sufficiently explored to assess its effectiveness in terms of ethical, health-related and naturalness issues. Stevens (2010) argued that sustainable development relies strongly on consumers as well as the approach and initiative taken by the producers. The government has a greater part to play in promoting sustainable consumption and ensuring producers follow national schemes for reducing negative impact (Stevens, 2010). However, there is a visible gap in sustainable consumption due to the weakened role of the government in implementing national schemes to ensure that food choices of consumers tend towards sustainable alternatives. Moreover, 1) market failures (regulations, taxes, subsidies) or 2) systems failures (labels, communications, education, public procurement) are found to be less effective public policy tools for promoting sustainable production and consumption (Stevens, 2010). Zaccaï (2008) argued that environmental product regulations suit the general perspective of sustainable consumption while consumers' role in the process is a more vital aspect. Additionally, the same study revealed that adequate knowledge of the diversity inherent in consumers' attitudes, as well as their actions being taken into consideration even on a limited basis in terms of product policy formulation, is the key to sustainable consumption (Zaccaï, 2008). However, the study also revealed that environmental product regulations are well constructed, but it is essential for consumers to understand the situation and improve their sustainable alternative choices.

Sidali et al. (2016) revealed that the ethical dimension hinted towards the visible fact of consumers, in contrast to social attributes (e.g. fair trade), having relatively higher expectations when it comes to environmental friendliness attributes (for instance, environmentally friendly packaging, or reduction of greenhouse gas emissions) on an international scale. It reflects the fact that environmental consciousness is higher among consumers, irrespective of its type; however, an interesting feature has been the higher level of environmental consciousness when compared to social consideration in relation to sustainability. This was due to the fact that environmental awareness is spreading far and wide among global consumers and they are indeed affected by climate changes and environmental degradation (Sidali et al., 2016). Nevertheless, as yet there is no conclusive evidence regarding the links between ethical attributes and willingness to change food choices in favour of sustainable alternatives.

The second dimension is naturalness, explored by Sidali et al. (2016) whose work revealed that this dimension primarily consists of various promises related to produce being original and organic, in other words free of artificial and chemical substances, while there is no genetic modification to the inputs of the product. It is an essential aspect of organic products that the items are produced in accordance with organic production standards, which is a common agenda among consumers who are conscious of using produce that has an adverse effect on the environment (Sidali et al., 2016). The work of von Meyer-Höfer et al. (2015) revealed that safety, freshness, and good taste are some of the personal health-related benefits interlinked

with sustainable food as vital altruistic motivation for consumers. Sautron et al. (2015) also argued from the empirical perspective that naturalness differs from health when a methodological approach is applied to examining sustainable consumption. Therefore, although health and naturalness are highly correlated, these are distinctive sub-dimensions of sustainability that should be treated as standalone dimensions. In particular, food safety has emerged as the most important feature for consumers as there have been recent scandals across the globe reflecting the fact that foods are not often dealt with in a safe manner (Sidali et al., 2016).

The study by Sidali & Hemmerling (2014) revealed that, in relation to sustainable food, consumers have higher expectations that producers will respond in an ethical and appropriate manner to seasonal production. However, consumers are less willing to take the initiative to travel significantly longer distances in order to consume sustainable food. For instance, the findings of a study by Sirieix et al. (2011) showed that consumers are not eagerly enthusiastic about travelling long distances to buy seasonal food from particular regions, instead choosing to consume food which is easily accessible. There is a likely visible trend indicating that sustainable food is often associated with trendy lifestyles, healthy living and sustainability (Sidali et al., 2016).

The major contribution of this study is that it helps to understand the willingness of the consumers to alter their food choices in favour of sustainable alternatives. Furthermore, the study also offers an opportunity to enhance the body of knowledge from a managerial perspective in relation to the expectations of consumers, especially the use of sustainable goods for agri-food in advanced economies; as well as providing an insight into how the government can use an effective strategy to promote sustainable consumption in the market. Additionally, the distinctive sub-dimensional approach, viewing health and naturalness as different components, is a further reason to move from a traditional to a more diverse approach to investigating consumer behaviour in relation to sustainable consumption.

Based on the analysed literature, the following hypotheses were formulated:

H1: *Consumers significantly affect their own willingness to reduce food choices in favour of sustainable alternatives.*

H2: *Ethical attributes significantly affect consumers' willingness to reduce food choices in favour of sustainable alternatives.*

H3: *Food producers significantly affect consumers' willingness to reduce food choices in favour of sustainable alternatives.*

H4: *Government significantly affects consumers' willingness to reduce food choices in favour of sustainable alternatives.*

H5: *Health-related attributes significantly affect consumers' willingness to reduce food choices in favour of sustainable alternatives.*

H6: *Naturalness significantly affects consumers' willingness to reduce food choices in favour of sustainable alternatives.*

2   Research methodology

To test the research hypotheses in this explanatory study, a large-scale survey of UK supermarket Fairtrade shoppers was undertaken from November 2018 to February 2019 by means of an online consumer survey developed through Monkey Survey, enabling participants to fill it out any time on the Internet. Using loyalty card data from UK supermarkets attained through networking and connection, sampling methodology was employed as this technique helped to identify (and filter) particular participants who were responsible for the better part of their household shopping. Hence, as part of the research strategy, area cluster sampling was employed by targeting supermarket shoppers in six regions in the UK (Northern Ireland, Scottish Borders, Wales and the West of England, Northern Scotland, East of England, and Southern England). We used area cluster sampling to ensure we had fair representation through regional quotas; 16% is thus the quota for each region. A total of 1601 usable questionnaires were completed and returned which were used in this study, reflecting a response rate of over 58%. This ensured that there was an appropriate ratio of sample size to the observed variables (Hair et al., 2010; Faizan & Haque, 2019). The selective extrapolation method which was employed in this study helps to avoid non-response bias (Armstrong & Overton, 1977).

The questionnaire was conducted in English, and was partially adapted from the work of Sidali et al. (2016). The questionnaire asked the respondents the following question: Which characteristics should a sustainable healthy food product have? Respondents were obliged to consider the dimensions of ethical attributes, naturalness, and health-related attributes containing a total of 15 items. The options on a seven-point Likert scale were as follows: 1 = strongly disagree; 2 = disagree; 3 = somewhat disagree; 4 = neither agree nor disagree; 5 = somewhat agree 6 = agree; 7 = strongly agree. The following questions contained the ranking of chief actors (i.e. consumers, government, or producers) responsible for ensuring the availability of sustainable alternatives for consumption. The first part of this question asked participants who they think should be responsible for ensuring or deciding that sustainable food should be available on the market. The second part sought participants' views on which chief actor (i.e. consumer, government, or producer) must do more to make sustainable healthy food highly visible on the market. There was also an open-ended question to facilitate thematic analysis regarding the issue of whether governments should be allowed to reduce consumer food choice by asking food producers and retailers to supply exclusively sustainable healthy food products. Subsequently, respondents were asked: "Without considering price, how much of your freedom in terms of food choice are you willing to give up to ensure that your regular supermarkets supply sustainable healthy foods?" by offering the following options: 1) none of my food choice, 2) some of my food choice, and 3) all of my food choice. Lastly, respondents were asked to prioritise the following factors in response to the question: "What will it take for you to eat only sustainable healthy foods all the time?" - 1) good taste, 2) freshness, 3) ease of preparation, 4) and right portion size. The responses were saved in an Excel spreadsheet and converted into a SmartPLS file for analysis. It took the respondents approximately 15 minutes to answer the questions.

3   Results, Analysis, and Discussion

The current study employed SmartPLS 3.2.8 software to validate the partial least square structural equation modelling (PLS-SEM) (Ringle et al., 2018). The PLS-SEM contains two-

steps: firstly the reliability and validity of the measurement scale is determined through the measurement model, followed by structural model that examines the relationship between variables of interest (Hair, Jr. et al., 2014).

3.1 Measurement Model

The measurement model was used to test the reliability and validity of the scale. The reliability of the model was evaluated by means of Cronbach's alpha and composite values. According to Nunally & Bernstein (1994), the acceptable values of Cronbach's alpha and composite reliability should be greater than 0.6, which is the minimum acceptable value. Moreover, the average variance extracted (AVE) values should be more than 0.50 to validate the internal consistency of the scale (Hair, Jr. et al., 2014; Haque, Nair & Kucukaltan, 2019; Kot, Haque, & Kozlovski, 2019). The present study found the values of Cronbach's alpha, composite reliability and AVE to meet the threshold criteria - the results can be seen in Table 1 and Figure 1. Hence, the measurement model is acceptable.

Table 1 Reliability and validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Ethical Attributes	0.619	0.634	0.787	0.554
Health Attributes	0.839	0.911	0.898	0.747
Naturalness	0.89	1.163	0.917	0.734

Furthermore, the measurement model used the Fornell and Larcker Criteria to validate the discriminant validity of the scale. This was tested by comparing the correlation matrix values with the square root of the AVEs in the diagonals. The current study presented the results in Table 2. All values of the square root of the AVEs in the diagonals are higher than the intercorrelation with other constructs, thus confirming the discriminant validity.

Table 2. Fornell and Larcker Criteria (discriminate validity)

	Ethical Attributes	Health Attributes	Naturalness
Ethical Attributes	0.744		
Health Attributes	0.543	0.864	
Naturalness	0.553	0.541	0.857

Moreover, the heterotrait-monotrait ratio of correlations (HTMT) is a new criteria by which to evaluate the discriminant validity (Hair, Jr. et al., 2014). The values of HTMT should be less than 1. The results of this study gave all values of HTMT as less than 1. The results can be seen in Table 3.

Table 2 Heterotrait-monotrait ratio (HTMT)

	Ethical Attributes	Health Attributes	Naturalness
Ethical Attributes	0.781		
Health Attributes	0.775	0.671	
Naturalness	0.721	0.631	0.598

Table 3 Cross loading

Cross loading

	Ethical Attributes	Health Attributes	Naturalness
EA1	**0.649**	0.452	0.41
EA5	**0.816**	0.577	0.505
EA6	**0.758**	0.239	0.345
HRT1	0.459	**0.888**	0.465
HRT2	0.498	**0.91**	0.48
HRT3	0.469	**0.791**	0.489
NAT1	0.529	0.463	**0.824**
NAT2	0.482	0.525	**0.855**
NAT3	0.473	0.461	**0.948**
NAT4	0.496	0.533	**0.793**

Furthermore, the cross-loadings showed that three attributes each of ethical attributes and health-related attributes and four items of naturalness have been considered; the rest were excluded because the scores did not meet the minimum required criteria. Ensuring animal welfare, environmentally friendly packaging and reducing greenhouse gas emissions are the ethical factors which contribute most in relation to sustainable consumption because these factors have loaded accepted values, whereas ensuring fair payment of producers, ensuring working and living conditions for food producers and environmentally friendly production scored below par. Among health-related attributes, safe and fresh products and health benefits are essential aspects while high nutritional value is found to be insignificant in relation to sustainable consumption. Interestingly, all the components of naturalness considered, namely being free from genetically modified organism, free from chemical pesticides, free from synthetic fertilisers and free from artificial additives, are all important elements in relation to sustainable consumption.

Table 4 Regression Analysis

R^2

	R Square	R Square Adjusted
Willingness to Reduce Food Choice in Favour of Sustainable Alternatives	0.05	0.041

R^2 is too low, therefore good fit should be used to determine if the model is a good fit for analysis.

Table 5 Fitness of the Model

Model Fit		
	Saturated Model	Estimated Model
SRMR	0.07	0.093

According to Garson (2016), there are many methods of validating the fitness of a model such as R^2, f^2, VIF and SRMR. The current study employed the SRMR method to validate the fitness of the model. SRMR calculates the approximate fitness of the research model. Hu & Bentler (1998) presented that the research model has sufficient fitness if SRMR is less than 0.08. Moreover, according to Henesler et al., (2014), the lenient cut-off value is 0.10 of SRMR. The present study found acceptable values, the results of which can be seen in Table 2. The saturated model and estimated model are low but acceptable in the social sciences. Subsequently, the next step was to measure the path analysis by establishing the direct relationship between research variables.

3.2 Structural Model

Figure 1 Average Variance Extraction
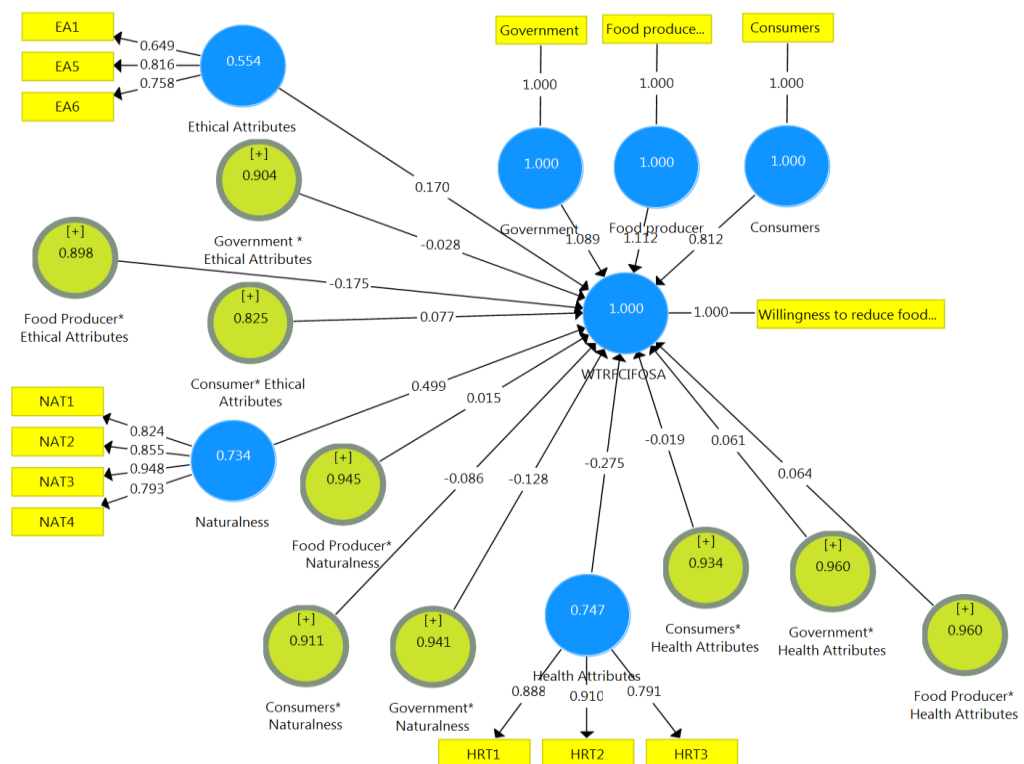
Table 7. Structural Model

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Consumers (C) -> Willingness to reduce food choices in favour of sustainable alternatives (WTRFCIFOSA)	0.795	0.243	4.816	0.165	0.869
Ethical Attributes (EA) -> Willingness to reduce food choices in favour of sustainable alternatives (WTRFCIFOSA)	0.17	0.09	0.136	1.252	0.211
Food producer (FP) -> Willingness to reduce food choices in favour of sustainable alternatives (WTRFCIFOSA)	1.095	0.508	4.992	0.219	0.827
Government (G) -> Willingness to reduce food choices in favour of sustainable alternatives (WTRFCIFOSA)	1.069	0.429	5.459	0.196	0.845
Health Attributes (HA) -> Willingness to reduce food choices in favour of sustainable alternatives (WTRFCIFOSA)	-0.275	-0.318	0.248	1.108	0.268
Naturalness (N) -> Willingness to reduce food choices in favour of sustainable alternatives (WTRFCIFOSA).	0.499	0.466	0.253	1.97	0.049

After the successful validation of the measurement model, the current study evaluates the structural model using three different criteria such as path co-efficient and model fitness. The bootstrapping option was used to test the statistical significance of the path co-efficient. The hypotheses of this study have been tested through the T-value 1.96 at the 0.05 significance value. However, the path co-efficient values should be greater than the 1.96 t-value and less than the 0.05 significance value in order to be retained; otherwise they should be rejected. Therefore, the results of the direct relationship can be seen in Table 4. H6 is retained as its obtained values are more than 1.96 at the 0.05 significance level (t-value: $1.97 > 1.96$, $p < \alpha$;

0.049 < 0.05; Table 7). In other words, naturalness statistically significantly affects the willingness to reduce consumers' sustainable food choices. In this regard, present findings partially support the work of Sautron et al. (2015) and Sidali et al. (2016) that naturalness should be treated as a separate dimension of sustainability, rather than mixing it with health-related attributes. Since this study found naturalness to be significant and health-related factors to be insignificant when it comes to willingness to reduce food choices in favour of sustainable alternatives, we therefore have conformation that the two components represent separate dimensions of sustainability. However, this finding contradicts the earlier work of Sirieix et al. (2011) and von Meyer-Höfer et al. (2015). On the other hand, H1, H2, H3, H4 and H5 are rejected as their recorded values are less than 1.96 at the 0.05 significance level (C-->WTRFCIFOSA t-value: $1.65 < 1.96$, $p > \alpha$; $0.869 > 0.05$; EA-->WTRFCIFOSA t-value: $1.25 < 1.96$, $p > \alpha$; $0.211 > 0.05$; FP-->WTRFCIFOSA t-value: $0.219 < 1.96$, $p > \alpha$; $0.827 > 0.05$; GOV-->WTRFCIFOSA t-value: $0.196 < 1.96$, $p > \alpha$; $0.84 > 0.05$; HA-->WTRFCIFOSA t-value: $1.108 < 1.96$, $p > \alpha$; $0.268 > 0.05$; Table 7). In other words, consumers, ethical attributes, health attributes, food producers and government do not statistically significantly affect the willingness of consumers to reduce their food choices in favour of sustainable alternatives. Hence, the present findings differ from the work of Cavalho et al. (2015), Lee & Wall (2012), Sidali & Hemmerling (2014), Sidali et al. (2016), Stevens (2010), Sautron et al. (2015), and Zaccaï (2008) by finding no significant relationship with the different aspects considered in relation to WTRFCIFOSA, while confirming only the work of Sautron et al. (2015) and Sidali et al. (2016) in this regard that naturalness and health attributes are different. In particular, the work of Zaccaï (2008) contradicts the viewpoint that consumer willingness plays an important role in sustainable consumption. On the other hand, the work of Stevens (2010) to a large extent supports the thesis that government has a role in promoting sustainable consumption through the formulation and implementation of public policy. Nevertheless, the finding that only naturalness is interlined closely with WTRCIFOSA while all others are insignificant is unique. Detailed analysis also revealed that being free of genetically modified organisms, chemical pesticides, synthetic fertilisers and artificial additives are all important components of naturalness that play a role in improving the consumption choices of consumers.

Since all considered attributes in the direct relationship excluding naturalness have been found insignificant, we therefore hypothesise that perhaps these attributes may have a significant moderation effect. As a result, the following hypotheses are generated:

H7: *Ethical attributes significantly moderate the relationship between consumers and willingness to reduce food choices in favour of sustainable alternatives.*

H8: *Ethical attributes significantly moderate the relationship between food producers and willingness to reduce food choices in favour of sustainable alternatives.*

H9: *Ethical attributes significantly moderate the relationship between consumers and willingness to reduce government in favour of sustainable alternatives.*

H10: *Health attributes significantly moderate the relationship between consumers and willingness to reduce food choices in favour of sustainable alternatives.*

H11: *Health attributes significantly moderate the relationship between food producers and willingness to reduce food choices in favour of sustainable alternatives.*

H12: *Health attributes significantly moderate the relationship between government and willingness to reduce food choices in favour of sustainable alternatives.*

H13: *Naturalness significantly moderates the relationship between consumers and willingness to reduce food choices in favour of sustainable alternatives.*
H14: *Naturalness significantly moderates the relationship between food producers and willingness to reduce food choices in favour of sustainable alternatives.*
H15: *Naturalness significantly moderates the relationship between government and willingness to reduce food choices in favour of sustainable alternatives.*

Figure 2. Relationship between variables and moderation effect
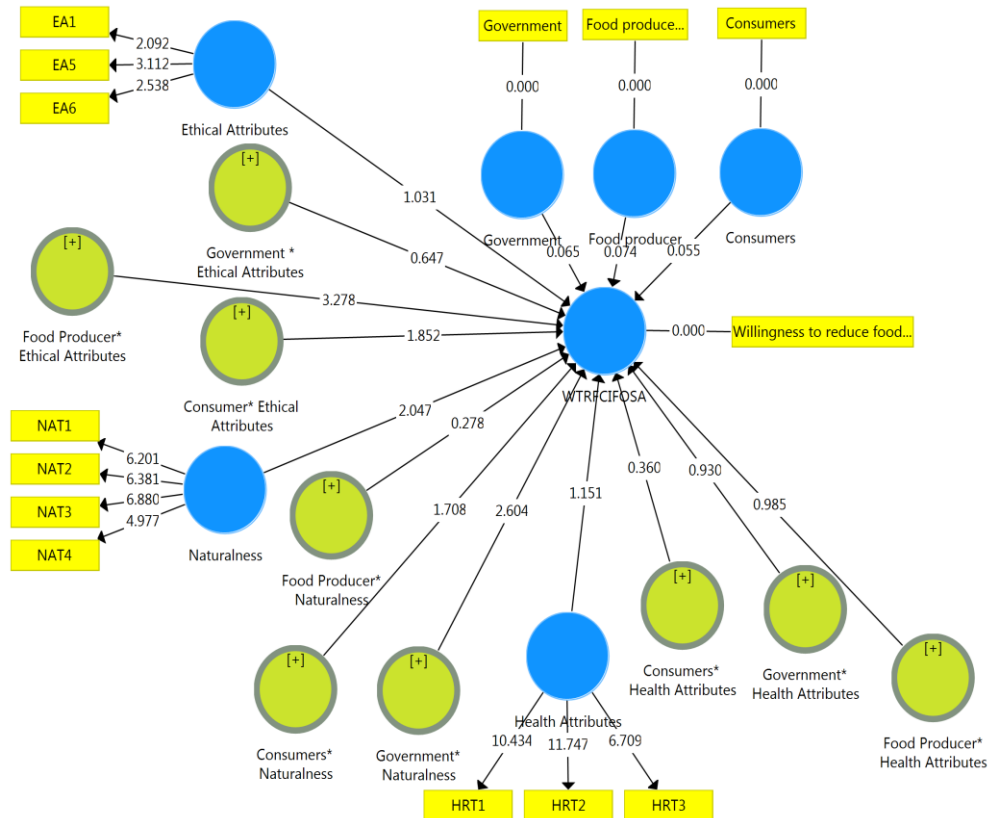
Table 6 Moderation results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Consumers*Ethical Attributes -> Consumer Food Choice	0.077	0.089	0.038	2.033	0.043
Food producer*Ethical Attributes -> Willingness to Reduce Consumer Food Choice	-0.175	-0.15	0.05	3.489	0.001
Government*Ethical Attributes -> Willingness to Reduce Consumer Food Choice	-0.028	-0.013	0.037	0.741	0.459
Consumers*Health Attributes -> Willingness	-0.019	-0.011	0.058	0.326	0.744

to Reduce Consumer Food Choice					
Food producer*Health Attributes -> Willingness to Reduce Consumer Food Choice	0.064	0.067	0.067	0.948	0.344
Government*Health Attributes -> Willingness to Reduce Consumer Food Choice	0.061	0.07	0.064	0.952	0.342
Consumers*Naturalness -> Willingness to Reduce Consumer Food Choice	-0.086	-0.077	0.053	1.612	0.108
Food producer*Naturalness -> Willingness to Reduce Consumer Food Choice	0.015	0.02	0.055	0.28	0.78
Government*Naturalness -> Consumer Willingness to Reduce Food Choice	-0.128	-0.122	0.049	2.591	0.01

After determining the direct relationship, the next step was to investigate the moderating effect of consumers, government and food producers between ethical attributes, health attributes and naturalness and WTRFCIFOSA. Again, the values are measured by assessing the obtained values against the threshold value (more than 1.96 at the 0.05 significance level). Interestingly, ethical attributes have a significant moderating effect between consumers and willingness to reduce consumer food choices (t-value: 2.033 > 1.96, $p < \alpha$; 0.043 < 0.05; Table 8) as well as food produces and willingness to reduce consumer food choices (t-value: 3.489 > 1.96, $p < \alpha$; 0.001 < 0.05; Table 8), thus, H7 and H8 are retained while H9 is rejected as ethical attributes do not significantly moderate the relationship between government and willingness to reduce consumer food choices (t-value: 0.741 < 1.96, $p > \alpha$; 0.459 > 0.05; Table 8). Health attributes have been found to have no statistically significant moderating role between variables of interest. Therefore, H10, H11 and H12 are rejected. In other words, health attributes do not moderate the relationship among consumers, food producers and government and willingness to reduce consumer food choices (t-value: 0.326 < 1.96, $p > \alpha$; 0.744 > 0.05; t-value: 0.948 < 1.96, $p > \alpha$; 0.344 > 0.05; t-value: 0.952 < 1.96, $p > \alpha$; 0.342 > 0.05, Table 8). Lastly, naturalness is a significant moderator between government and willingness to reduce consumer food choices (t-value: 2.59 > 1.96, $p < \alpha$; 0.01 < 0.05) while it has no significant moderating effect between consumers and willingness to reduce consumer food choices (t-value: 1.612 < 1.96, $p > \alpha$; 0.108 > 0.05; Table 8) nor food producers and willingness to reduce consumer food choices (t-value: 0.28 < 1.96, $p > \alpha$; 0.78 > 0.05; Table 8). Thus, H13 and H14 are rejected while we fail to reject H15.

The findings indicate that, in relation to WTRFCIFOSA, consumer and food producers are moderated by ethical attributes, which nonetheless fail to moderate the relationship between government and WTRFCIFOSA. In other words, government cannot use ethical attributes to ensure there is a willingness among consumers to switch to sustainable alternatives. Previously, health and naturalness were treated as being the same, but recent studies have shown that the two are sub-dimensions of sustainability; therefore, both were separately tested to assess their moderating effect. The results showed that health attributes have no significant moderating role

in the relationships among consumers, food producers and government and willingness to reduce food choices in favour of sustainable alternatives. On the other hand, naturalness, which was previously the only attribute found to have a significant linkage with WTRFCIFOSA, was investigated to assess its moderating effect. The results confirmed that it moderates only the relationship between government and WTRFCIFOSA. This strongly indicates that government is the only body that can use the potential of naturalness as a main factor to make it a mandatory feature in consumer choice because it is the most sustainable alternative in the market. Nonetheless, the work of Stevens (2010) is supported to a larger extent, while Zaccaï (2008) is contradicted through present findings. In other words, government should be able to introduce policy to ensure that consumers and food producers are bound to deal with sustainable food in the market. It could be argued that government is the main body that can have an effect on changing consumer choices by introducing mandatory reform so that consumers switch to sustainable alternatives while giving up their other food choices.

Table 7 Effect size

Effect Size	
Ethical Attributes	0.001
Health Attributes	0.002
Naturalness	0.005

The next step in the research was to determine the moderation slope. Results showed that all independent variables have a weak moderating effect. Hence, it is found that naturalness has a weak moderating role along with ethical attributes in relation to the considered variables.

Conclusions

This study concludes that willingness to reduce food choices in favour of sustainable alternatives is significantly affected by naturalness. Moreover, the moderating effect of naturalness is weak yet statistically significant in determining the relationship between government and willingness to reduce food choice in favour of sustainable alternatives. The study clearly found that health attributes and naturalness are two distinctive sub-dimensions of sustainability and should always be treated separately when measuring the relationship. It is also theorised that the government plays a significant role in the process of ensuring sustainable consumption, because the magnitude of naturalness has been established through this research. Our research found that the responsibility for ensuring the availability of organic food on shelves rests with the government. There is a need for the government to implement a mandatory policy pertaining to naturalness on the market. Detailed analysis also revealed that being free of genetically modified organisms, chemical pesticides, synthetic fertilisers and artificial additives are all important components of naturalness that play their respective roles in improving the consumption choices of consumers. Consumers themselves and food producers have lower levels of willingness to promote health attributes and create ethical awareness to ensure sustainable consumption. Thus, the major responsibility for implementing

sustainable consumption by reducing food choices for consumers lies with the government. This could be specifically achieved through using naturalness factors.

This study concludes by advancing the fresh concept of theorising *"willingness to reduce food choices in favour of sustainable alternatives"* by finding the direct and moderating effects of the variables of interest considered. The study continued to propose that organic and natural food consumption is largely possible when governments reduce food choices for the consumers by offering only sustainable alternatives. Analysis of the UK consumer market revealed that sustainable consumption is a concern and the majority of people are less willing to overcome significant obstacles in order to opt for only organic and natural food. Government has the potential to introduce mandatory policy which could have the effect of making organic and natural food a sustainable alternative for consumers by reducing their less ethical food range choices.

Despite all ethical considerations taken into account during this study, there are certain limitations therein. As of now, the study is region-specific because only the UK food market has been explored. Ideally, it would be interesting to consider a comparative study to measure the variables of interest in contrasting economies, such as a comparison between emerging and advanced economies, to see if there is higher, lower or no variation among the considered variables. This would also delimit region specificity by having a broader generalisation in the cross-cultural context. Additionally, this study largely focused on numeric expression to determine the relationship. In other words, the study focuses on mathematical objectivity by concentrating on factual truths, while qualitative methods would have revealed hidden embedded useful truths to provide a deeper understanding of the practical implications. It is therefore recommended that future researchers consider the use of a Delphi technique to include an expert panel and individual interviews with consumers to provide a more detailed exploration of the research phenomena.

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