Identifying key attributes in sustainable food choices: An analysis using the food values framework

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ABSTRACT

As consumers are key players in the transition towards a sustainable consumption pattern, this study aims to assess what consumers consider most important in sustainable food products in terms of food values and their relative weight in the product purchase decision. A cross-national investigation was conducted among Danish and Italian consumers. Using a Best-Worst Scaling approach, consumers were segmented based on their preferred food values and profiled according to various individual self-identities. Three consumer classes were identified: "private benefit seekers" (35%), "sustainability focused" (32.3%), and "naturalness and health driven" (32.7%). Consumers interested in health and those caring about sustainable aspects were found to share the same identity profile. Since private values, namely healthiness and price, attract the majority of consumers, marketers and policymakers are encouraged to build upon such aspects to promote sustainable consumption rather than relying only on sustainability values being sufficient in themselves.

1. Introduction

Consumers are crucial in driving the transition towards a sustainable food system.[1] Sustainability in the food domain is a key concern globally, as demonstrated by the 2030 Agenda of the United Nations (United Nations, 2015), and, in Europe, by the European Green Deal's Farm to Fork (F2F) strategy (European Commission, 2020). However, while consumers express strong interest in sustainability, to define this complex concept remains challenging for them (Mastroberardino et al., 2019; van Bussel et al., 2022). Previous research on the conceptualisation of sustainable food in consumers' minds has primarily focused on exploring people's stated meanings (Stancu et al., 2020) or priorities among predefined definitions (Peano et al., 2019). However, which food

attributes consumers associate with sustainable food has not yet been thoroughly explored.

Lusk and Briggeman (2009) defined the fuzzy concept of food quality by identifying 11 abstract attributes of food, namely naturalness, safety, environmental impact, origin, fairness, nutrition, taste, appearance, convenience, price, and tradition. These attributes, known as food values, cover a wide range of aspects of food consumption and are effective in explaining consumers' choices between food products (Bazzani et al., 2018). Public values such as environmental impact and fairness would be expected to prevail in the evaluation of sustainable food.[2] Conversely, individuals were found to associate sustainability with healthy eating, traditional foods, and nourishment (Barone et al., 2020). Taste has been identified as a significant external motivation in

[1] A food system can be deemed as sustainable if it "delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised" (FAO, 2018).
[2] In this work, the term sustainable with respect to food consumption encompasses the environmental and social dimensions of the sustainability concept, in line with previous works (see, for instance, Janssen and Langen, 2017; Asioli et al., 2020; Bangsa and Schlegelmilch, 2020). Food attributes are deemed as sustainable only if implying the production of positive externalities for the whole society, such as environmental benefits or the ethical and social outcomes, unlike food characteristics incorporating private gains (e.g., health or nutritional aspects). The aim is to emphasise that sustainable attributes differentiate products according to non-use characteristics (public attributes), while healthy, taste, or nutritional attributes relate to the individuals' direct use of the food (private attributes) (Lusk et al., 2007).

driving sustainable food behaviour during the buying phase (Stancu et al., 2020), and there is a close connection between consumer perceptions of healthy eating and sustainable diets (Van Loo et al., 2017). Nonetheless, how the overall food attributes asset affects preferences for sustainable food remains unexplored.

Individual self-identities have been recognised as an important driver of sustainable consumption behaviours (see, for instance, Gatersleben et al., 2019; Stancu and Lähteenmäki, 2022). Identity theory assumes that people engage in behaviours consistent with the concept that they have of themselves, the so-called self-identity (Reed et al., 2012). The influence of self-identity also extends to preferences and consumption, since individuals generally tend to focus on goods that act as "reminders and confirmers" of their perceived identity (Qasim et al., 2019). For instance, environmental identity is positively related with the consumer intention to buy organic and fairtrade foods (Gatersleben et al., 2014; Qasim et al., 2019). Similarly, ethical identity has a significant positive influence on green purchase intention (Amin and Tarun, 2022). Arguably, diverse self-identities can relate to the various food values driving preferences for sustainable food. However, as far as we can determine, these relationships have never been investigated.

To promote sustainable consumption patterns, it is crucial to understand what consumers consider sustainable food and identify the values driving people when purchasing such products. Based on these premises, this study aimed to assess which food values are more important to consumers when it comes to sustainable food purchases. Additionally, to explore the heterogeneity among individuals, we implemented a segmentation analysis based on the evaluation of sustainable food according to the food values and profiled the consumer segments based on multiple individual self-identities. The following research questions guided the study.

1. Which food values drive sustainable food consumption?
2. Which are the market segments based on different priorities for the food values for sustainable food choices?
3. Are there differences in the consumer segments according to the individual self-identities?

To the best of our knowledge, this work is the first attempt to investigate the concept of sustainable food in terms of food values and explore the differences among cross-cultural market segments. The findings provide behavioural insights that can be useful to trigger sustainable food choices, and ultimately, facilitate the transition towards a sustainable food system.

2. Conceptual background

2.1. Food values

Consumer food preferences and habits are not static. Instead, they may change according to the consumers' interests, concerns, needs, or knowledge. Nonetheless, the underlying set of values that orientate food choices are deemed to be relatively stable (Bazzani et al., 2018; Cerroni et al., 2022). The pioneering research on food values conducted by Lusk and Briggeman (2009) identified 11 food values,[3] which can be seen as intermediary values or end-states of existence[4] associated with food purchase and consumption.

Despite varying in importance across cultures and regions,[5] the food values were found to significantly relate to actual grocery store purchases; hence, they can effectively explain consumer food preferences and guide marketing decisions (Lusk, 2011; Pappalardo and Lusk, 2016; Sun et al., 2023). Furthermore, the food values can be used to investigate food choices regardless of the specific category under investigation since they are general constructs that capture the multiple dimensions of food consumption and embrace more specific product attributes (Lusk and Briggeman, 2009; Bazzani et al., 2018). Indeed, the scale has been applied to explain and predict consumer demand for organic food (Lusk, 2011), functional food (Pappalardo and Lusk, 2016), and food nanotechnology (Yang and Hobbs, 2020), as well as to observe changes in food preferences during the COVID-19 pandemic (Cerroni et al., 2022). We firstly decided to investigate the relative importance of food values among consumers in the decision-making process for sustainable food.

In the study, a modified version of the original food value scale proposed by Lusk and Briggeman (2009) was applied. To investigate the sustainable food concept, the animal welfare value that was recently added to the initial scale by Bazzani et al. (2018) was included, as it can be considered an essential facet of food sustainability and consumers are increasingly interested in this issue (Bangsa and Schlegelmilch, 2020). The seasonality value was also added since this element affects the environmental impact of food production (Macdiarmid, 2014) and is an important component of sustainable diets according to consumers (Stancu et al., 2020). Furthermore, the nutrition value was more broadly interpreted, acknowledging not only the type and amount of nutrients taken in through the food, but also the overall positive role the food exerts on individual health. Therefore, the overarching value of healthiness was taken into consideration for this study. Additionally, the taste and appearance values were merged as these are the two principal sensory cues that contribute to the overall sensory experience of food.[6]

Lastly, the safety value, defined as "the extent to which consumption of food will not cause illness", constitutes a non-negotiable attribute, unlike other food values, such as taste, origin or environmental impact, that may actually be traded off against others in consumers' mind. According to the European Union's General Food Law Regulation (178/2002), food products must be safe for human consumption before they can be sold. Therefore, failing to meet this requirement means that the food will not reach the shelf. As a result, consumers have no potential to choose an unsafe product or evaluate safety as of minor importance compared to the other food values. As our research scope was to provide a ranking of values that can actually differ in importance among consumers, we found it reasonable to exclude safety, that must come in first place, from our research.

2.2. Consumer self-identities

Self-identities are defined as the "category labels" that represent the subjective view of the self (Reed et al., 2012). People tend to think and behave in coherence with their perception of themselves (Stryker and

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[3] The food value scale is made up of the set of values plus each value's definition.

[4] The idea of intermediary values is grounded in the means-end chain theory (Gutman, 1982). The means-end chain technique links product attributes to end-states of existence. Since end-states were considered too abstract to be of practical relevance to food policy or marketing communication strategies, Lusk and Briggeman (2009) conceived the set of food values as the intermediary values of the chain to the final end-states of existence.

[5] The relative weight of food values in the consumer decision-making process can change according to cultural and regional differences. American consumers were found to prioritise the values of safety, nutrition, taste, and price (Lusk and Briggeman, 2009; Ardebili and Rickertsen, 2023). On the European side, Norwegians were seen to favour safety, naturalness, taste, and animal welfare (Bazzani et al., 2018), whereas Italian consumers were found to attribute higher importance to taste, origin, safety, and naturalness (Piracci et al., 2022).

[6] We decided to combine taste and appearance as it would have been difficult to disentangle their impact on the consumer decision-making process for food. Visual characteristics set expectations concerning taste and strongly affect taste perception (Piqueras-fiszman and Spence, 2015). Food that is considered visually appealing is perceived by consumers as tasting better than food that is not aesthetically pleasing (Zellner et al., 2014). In the event a food is visually unappealing, consumers may even be unwilling to try it, regardless of how good it may taste.

Burke, 2000). Consequently, self-identities can affect all aspects of the individual, such as personal goals, everyday behaviour, consumption habits, or food preferences (Gatersleben et al., 2014; Qasim et al., 2019). Recently, Gatersleben et al. (2019) argued that since consumers simultaneously manage multiple self-identities, an action can be the result of several types of identity. Therefore, in this research, it was hypothesised that multiple self-identities can relate to different food values driving sustainable food choices.

Previous literature has captured the importance of pro-environmental self-identity as a driver of several pro-environmental behaviours, such as recycling, energy saving, carbon offsetting, and food waste aversion (Whitmarsh and O'Neill, 2010; Van der Werff et al., 2013; Stancu and Lähteenmäki, 2022). Similarly, moral self-identity was found to drive socially sustainable behaviours like buying fairtrade products (Gatersleben et al., 2019) or partaking in civic engagement activities (Sunil and Verma, 2018). Although the social facet of sustainability is often neglected, literature indicates that consumers are becoming more sensitive towards the ethical sphere of consumption (Piracci et al., 2022). Therefore, pro-environmental and moral self-identities were both expected to describe individuals prioritising environmental impact, fairness, and animal welfare values in their sustainable food choices.

Given the strong relationship between health and sustainability in diets from the consumer perspective (Aschemann-Witzel, 2015; Van Loo et al., 2017), healthy self-identity was included in this study. It was hypothesised that this self-identity would characterise consumers interested in the healthiness value when considering sustainable products.

Frugal and thrifty self-identities have been studied as possible drivers of sustainable behaviours (Gatersleben et al., 2019; Stancu, 2021). Frugality centres around avoiding wasting resources and resisting overconsumption, whereas thriftiness encompasses the skills of getting the best value for the money spent and preserving economic standing (Evans, 2011). Hence, it was expected that these self-identities describe consumers who favour the price value, as both self-identities are associated with saving money. Yet, the frugal self-identity with avoidance of resource waste is likely to be linked more strongly to sustainable consumption than the thrifty self-identity (Gatersleben et al., 2019; Stancu, 2021).

The Schwartz value of self-transcendence entails concerns for the wellbeing of others (either persons or entities) and the need to prioritise society's interests over one's own. Self-transcendence is closely aligned with sustainability principles and, accordingly, was found to predict sustainable behaviours (Lee and Cho, 2019). Therefore, we hypothesised that individuals driven by values consistent with sustainability, including environmental impact, fairness, and animal welfare, would be characterised by the self-transcendent identity.

3. Methods

3.1. Data collection and sample

To take into account country-specific patterns in the ranking of food values, we conducted a multi-country study. Italy and Denmark were selected for the research since these two countries show different patterns in regard to sustainable food consumption. Assuming organic products as a reliable proxy for interest in sustainable foods, Denmark has the highest market share of organic products at the global level (13.4%) and the highest per capita consumption in Europe, € 344 (FiBL and IFOAM – Organics International, 2019). The Italian per capita consumption, instead, is € 60, below the overall European average level of € 84 (FiBL and IFOAM – Organics International, 2019). On the other hand, the Italian eating pattern is more influenced by traditional and local products (Boncinelli et al., 2017) than the Danish dietary style; and valuing traditional and local production also configure as a means to pursue environmental and economic sustainability in the food supply

chain.

An online survey was conducted among Italian and Danish food consumers between May and July 2022.[7] Participants were recruited through two professional panel recruitment agencies, Toluna and Userneeds, and were closely representative of the respective country population according to age and gender (see Appendix A). Individuals outside the age range of 18–70 years were excluded. The questionnaire was distributed in the participants' native languages. Twenty-two straight-liners (i.e., no variance in their response behaviour) were removed from the sample, resulting in a final sample size of 1000 participants: 487 Italian and 513 Danish. The sociodemographic composition of the sample is reported in Table 1.

3.2. Best-worst scaling

We implemented a Best-Worst Scaling (BWS) approach (Finn and Louviere, 1992) to understand the relative importance of food values in consumers' choice of sustainable foods. BWS is a widely adopted method in food economics and marketing research (see, inter alia, Pappalardo and Lusk, 2016; Bazzani et al., 2018; Peano et al., 2019; Cerroni et al., 2022) and specifically for cross-cultural applications (see, for instance, Lockshin and Cohen, 2011; Chrysochou et al., 2022). During a series of choice tasks, participants are asked to indicate which items they prefer the most and the least among a specific list. The underlying assumption is that the selected pair maximises the difference on a priority scale of preferences, which is the reason BWS is also known as "maximum difference scaling." The method aims to elicit the extent to which each item

Table 1
Socio-demographic composition of the sample.

	Denmark (N = 513)		Italy (N = 487)		Total (N = 1000)	
	N	%	N	%	N	%
Gender						
Male	257	50.10	234	48.05	491	49.10
Female	255	49.71	252	51.75	507	50.70
Other	1	0.19	1	0.21	2	0.20
Age Category						
18–34	166	32.36	89	18.28	255	25.50
35–50	149	29.04	209	42.92	358	35.80
51–70	198	38.60	189	38.81	387	38.70
Education						
No high school diploma	36	7.02	37	7.60	73	7.00
High school diploma	231	45.03	270	55.44	501	50.10
Higher education (bachelor's degree or higher)	246	47.95	180	36.96	426	42.60
*Budget available for grocery shopping**						
High	262	51.07	211	43.33	473	47.30
Medium	183	35.67	229	47.02	412	41.20
Low	68	13.26	47	9.65	115	11.50
Role in grocery shopping						
Responsible or co-responsible	442	86.16	439	90.14	881	88.10
Occasionally doing the grocery shopping	58	11.31	44	9.03	102	10.20
Never doing the grocery shopping	13	2.53	4	0.82	17	1.70

Notes. *High refers to the statement "there is enough money to buy the foods I want"; medium to "There is some need to consider prices, which limits some choices when buying food"; and low to "There is a need to consider prices carefully, which limits many choices when purchasing food". These options could be selected in response to the question "If you think about the amount of money available for grocery shopping in your household, which of these statements best suits you".

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[7] The study received ethical approval from the Research Ethics Committee of Aarhus University (approval registration number BSS-2022-029).

is preferred or has priority when describing a concept/product (Peano et al., 2019).

The main advantage of BWS is that it overcomes the limits affecting common rating scales (e.g., Likert scales). Rating scales allow individuals to state that multiple items are of similar priority without having to discriminate across them. As a result, people tend to answer that all issues are important to them. Conversely, BWS forces respondents to make trade-offs between the different items as they can only pick one choice as the most preferred and one as the least preferred (Lusk and Briggeman, 2009; Bazzani et al., 2018). The second advantage is that of scale invariance. It is known that personal interpretations of rating scale values vary between individuals, and this scalar inequivalence issue is exacerbated in cross-country studies (Beuthner et al., 2018). BWS, however, can be seen as an invariant measurement method since it is based on choices rather than ratings. Therefore, the BWS method is considered the appropriate tool for cross-national segmentation studies (Mueller Loose and Lockshin, 2013). The third advantage of a BWS approach is that it allows for the measurement of individual-level scales (Lusk and Briggeman, 2009) and is recommended over other stated preference approaches, e.g. choice experiments, which only provide information on what is more preferred (Louviere et al., 2015).[8]

In our application, respondents were asked to indicate which food values are the most and least important to them when choosing to buy sustainable foods instead of their conventional counterparts. A Best-Worst (BW) choice task sample is shown in Fig. 1.

The full set of food values included in the BWS was adapted from the original food value scale by Lusk and Briggeman (2009) and the modified version of Bazzani et al. (2018). The final list is provided in Table 2.

The eleven food values were allocated in 11 BW choice tasks, each covering five items, following a Balanced Incomplete Block Design (BIBD). The BIBD experimental design was generated using the software R (package bwsTools) and is fully provided in Appendix B.

3.3. Survey design

The first section of the questionnaire was devoted to implementing the BWS instrument. The second section contained several measures (the items are reported in Appendix C). We evaluated six different consumer self-identities with relevance to sustainable consumption: pro-environmental, moral, healthy, frugal, thrifty, and self-transcendent. The pro-environmental self-identity was measured through the items developed in Van der Werff et al. (2013). The remaining self-identities were assessed by adapting the Van der Werff et al. (2013) and Gaterslebent et al. (2019) scales.[9]

The need for information on sustainable food was measured using the four-item scale adapted from Hung et al. (2017). Knowledge about sustainable food was assessed at two levels, namely subjective and objective, following Brucks (1985). Subjective knowledge was collected through a reduced version of the scale proposed by Flynn and Goldsmith (1999). To gather objective knowledge, participants were provided with a set of statements on sustainable food and asked to indicate whether the statement was true or false or whether they didn't know. The self-identities, need for information, and subjective knowledge were measured on 7-point scales ranging from 1 (totally disagree) to 7 (totally agree). The corresponding variables included in the analyses were constructed as the average of the items for each scale. The objective knowledge measure was computed as the percentage of correct answers.

In the last section of the survey, participants were asked their socio-demographic information.

A pilot study (N = 74) was conducted beforehand to assess the clarity and validity of the measurement instruments included in the survey.

The procedures followed for the data analyses are detailed in Appendix D. The individual BWS evaluations (BW scores) allowed us to understand the most and least important food values guiding sustainable food choices according to each country. Then, the BW scores were used for a cross-country segmentation based on the respondents' most preferred food values. The segments were profiled according to the self-identities, knowledge, need for information and sociodemographic variables.

4. Results

4.1. Relative importance of the food values in sustainable food

The scatter diagram (Fig. 2) reports the mean BW scores against the standard deviations of the BW scores, illustrating the ranked order of the food value preferences in the two countries. In the Danish sample, the most important food value driving sustainable food choices was taste and appearance, followed by animal welfare, naturalness, and price. The least considered values were tradition, convenience, and fairness. In the Italian sample, consumers prioritised naturalness, healthiness, animal welfare, and environmental impact in their sustainable food choices. Convenience, tradition, and price were the least relevant values to their decisions.

The BW scores tended to be more concentrated for the Italian respondents, whereas among the Danish respondents, there was a higher degree of variability, as denoted by the more pronounced dispersion of the scores and the higher variation range of the standard deviations. On average, both Italian and Danish respondents agreed on the importance of fairness and tradition with the lowest standard deviations. Preferences for price and convenience, instead, tended to be heterogeneous, regardless of the country. The analysis of variance provided in Appendix E indicates that the BW scores differed significantly across the two countries, excluding the values of origin, fairness, and convenience. Nonetheless, as shown by the two plots, the overall positioning of the food values tended to be consistent between Denmark and Italy, with the exceptions of price and taste and appearance. This corroborates the use of a cross-national segmentation approach (Lockshin and Cohen, 2011; Mueller Loose and Lockshin, 2013; Chrysochou et al., 2022).

4.2. Segmentation analysis

We applied a latent class cluster procedure based on the individual BW scores to identify consumer classes with similar patterns of preference ratings. The selection of the optimal number of classes is detailed in Appendix F.

Table 4 reports the average BW scores of the food values for the three determined classes. The first consumer class (35%) scored highest on the values of price and taste and appearance. Likewise, the healthiness value was considered an important driver. Since the class prioritised the strictly utilitarian values when purchasing sustainable products, these consumers were labelled as "private benefit seekers." The scores for the environmental and ethical dimensions were all negative.

The second class (32.3%) attaches great importance to animal welfare, environmental impact, and fairness. For this reason, the class was labelled as "sustainability focused". Consumers in this class considered the values of naturalness and healthiness to be relevant, whereas the values of price and taste and appearance scored the lowest compared to the other classes.

Lastly, the third class (32.6%) valued naturalness, healthiness, and seasonality when choosing sustainable food products. These values, along with the value of origin, scored the highest compared to the other classes. Therefore, consumers in the third class were labelled as "naturalness and health driven".

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[8] If, instead, participants stated in a previous question that they never purchased sustainable foods before (N = 96), they were asked to indicate the most and least important food values if they were to consider buying sustainable food rather than the conventional alternative.

[9] The scales used to measure the healthy, frugal, and thrifty self-identities were previously validated in Stancu (2021).
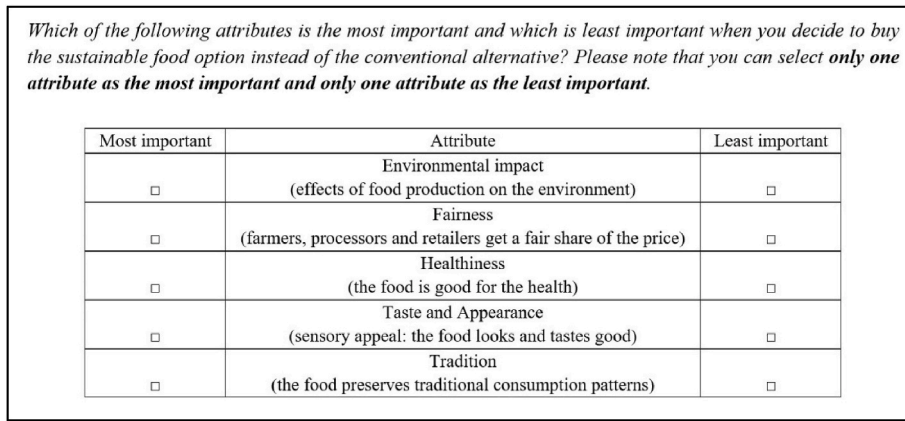
Fig. 1. An example of best-worst choice task included in the survey.

Table 2
List of the food values considered for the study.

Food value	Description
Naturalness	Made without additives or modern food technologies like genetic engineering, hormone treatment, and food irradiation
Seasonality	The food is produced during its own natural production period
Environmental impact	Effects of food production on the environment
Origin	Whether the food is produced locally in Denmark/Italy
Fairness	Farmers, processors, and retailers get a fair share of the price
Healthiness	The food is good for the health
Taste and appearance	Sensory appeal: the food looks and tastes good
Animal welfare	Well-being of farm animals
Convenience	How easy and fast the food is to cook
Price	Price you pay for the food
Tradition	The food preserves traditional consumption patterns

4.3. Class profiling

The descriptions of the classes according to the self-identities, need for information, and objective and subjective knowledge are reported in Table 5. Consumers in the second and third classes scored highest on the environmental, moral, healthy, and self-transcendent self-identities. On the other hand, the "private benefit seekers" were more prone to see themselves as thrifty individuals compared to the other consumers. The "sustainability focused" class showed a higher interest in receiving and seeking sustainability-related information than the other classes. In terms of knowledge levels, the "private benefit seekers" exhibited a lower degree of both subjective and objective knowledge about sustainable foods. Overall, the "sustainability focused" consumer profile was not significantly different from the "naturalness and health driven" consumer profile, with the only exception being the need for information.

Table 6 presents the socio-demographic background, frequency of consuming sustainable food, and diet characterisation of the three classes. The price-oriented class consisted of more male, younger, and less educated consumers. The available household budget for grocery shopping did not discriminate between the classes, whereas the role in grocery shopping differed. The second and third classes had a higher proportion of responsible or co-responsible figures. In addition, the "sustainability focused" consumers had a higher consumption frequency of sustainable foods compared to the rest of the sample. The class also comprised the highest proportion of flexitarian and the lowest share of omnivore consumers. Conversely, the "private benefit seekers" class tended to consume fewer sustainable foods and included the highest share of omnivore respondents.

5. Discussion and implications

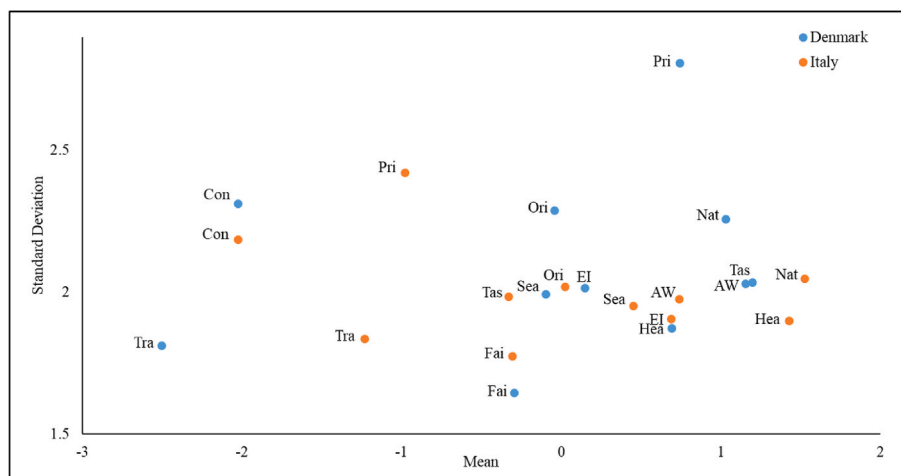This study aimed to investigate which food values are the most

Fig. 2. Average individual best-worst scores and relative standard deviations in Denmark and Italy.
Notes. Nat: Naturalness; Sea: Seasonality; EI: Environmental impact; Ori: Origin; Fai: Fairness; Hea: Healthiness; Tas: Taste and appearance; AW: Animal welfare; Con: Convenience; Pri: Price; Tra: Tradition.

Table 4

Average best-worst scores for the three classes obtained from the Latent Class cluster analysis.

Food value	Class 1	Class 2	Class 3	F	p-value
	Private benefit seekers	Sustainability focused	Naturalness and health driven		
Naturalness	−0.29 [a]	1.70 [b]	2.52 [c]	217.19	<0.001
Seasonality	−0.62 [a]	−0.07 [b]	1.26 [c]	93.15	<0.001
Environmental impact	−0.66 [a]	1.91 [b]	0.08 [c]	211.32	<0.001
Origin	−0.44 [a]	−0.18 [a]	0.63 [b]	23.29	<0.001
Fairness	−0.91 [a]	0.61 [b]	−0.54 [c]	83.11	<0.001
Healthiness	0.66 [a]	0.64 [a]	1.88 [b]	50.08	<0.001
Taste and appearance	1.58 [a]	−0.75 [b]	0.40 [c]	123.3	<0.001
Convenience	−0.23 [a]	−2.98 [b]	−3.01 [b]	263.12	<0.001
Price	2.49 [a]	−1.76 [b]	−1.21 [c]	459.78	<0.001
Animal welfare	0.10 [a]	2.74 [b]	0.11 [a]	302.27	<0.001
Tradition	−1.68 [a]	−1.86 [a,b]	−2.12 [b]	4.45	0.012
Class size (%)	35	32.3	32.7		
Danish (%)	43.47	28.65	27.88	$\chi^2(2) = 33.42$	<0.001
Italian (%)	26.08	36.14	37.78		

Notes. The superscripts [a–c] indicate significantly different means in each row following ANOVA post hoc Tukey tests ($p < 0.05$).

important in the choice of sustainable foods and to classify and profile consumers according to their preferences and multiple individual self-identities.

Overall, our findings highlight that consumers prioritise various external domains in their purchase decisions of sustainable food, suggesting potential ambiguity of the concept. What people consider a "sustainable product" may not necessarily be so. This strengthens the need for a better education of consumers about the meaning and importance of sustainable food consumption. Nonetheless, this task can be challenging as the definition of sustainable food is still unclear. Making informed choices regarding sustainable goods should be based upon an exhaustive and clear definition establishing the boundaries of what sustainability entails and excludes.

Our results indicate that consumers favour food values related to the direct use of the food (private values) over those concerning non-use characteristics (public values), such as those pertaining to sustainability, in line with Verain et al. (2016) and Grunert et al. (2018). Consumers prioritise private values as these provide individual private benefits and directly affect their personal consumption experience. Sustainability issues, instead, are perceived as something distant in time and space from the self. To mitigate this tendency, building a stronger connection and sense of proximity between consumers and sustainability aspects could be a potential strategy. This would be achieved by

emphasising the tangible impacts of neglecting societal and environmental crises in daily life, thereby increasing the salience and weight of sustainable (public) values in consumer choices. Considering the social dimension is often neglected, devoting more attention in the public debate to agri-food social sustainability issues, such as labour rights infringement and unfair income to farmers, could help reinforce the consumer ethical consciousness while helping build a holistic approach towards sustainability. One of the critical points of inadequate communication relies on limited media coverage and provision of fragmented information. More efforts should be spent to spread systematic and comprehensive information on the multifaceted nature of sustainable agriculture (Smith et al., 2021).

Additionally, it is worth pointing out that private values are also easier to evaluate and compare for consumers than public ones. Sustainability characteristics are credence attributes, i.e., people cannot assess them through search, experience, or even after having the product tested. Consumers would favour the public values of the product more if they could perceive them as truthful. Improving the credibility of the firms and/or institutions designated to cope with the information asymmetries could foster the importance of sustainability values (Rousseau and Vranken, 2013). To this end, implementing strategies to increase the consumers' perceived regulatory efficacy and trust could promote more sustainable eating patterns (Shahabi Ahangarkolaee and Gorton, 2021).

The animal welfare value was highly considered for sustainable purchases in both Denmark and Italy, an exception compared to the other sustainability values. This was expected in Denmark since the country has a strong regulatory regime and monitoring systems for animal welfare and is regarded as one of the most proactive countries in the world in this field (World Animal Protection, 2022). Conversely, it was surprising in Italy as there are less pronounced societal demands for animal welfare and no national regulation that goes beyond the EU requirements (Vogeler, 2019). The increasing interest in animal welfare across Europe is consistent with the F2F strategy recognising the urgent need to improve animal welfare legislation and ensuring that consumers can make purchase decisions according to their moral preferences (Bonnet et al., 2020; Molitorisová and Burke, 2022).

Our findings indicate that the overall preference patterns for the food values were fairly similar in many aspects across Denmark and Italy. However, high variability was found in participants' responses. To cope with this underlying heterogeneity, a cross-national segmentation approach was applied. By doing so, the study contributes to the discussion on sustainable food consumption by defining three distinct consumer classes based on different preferred food values for their purchase decisions: "private benefit seekers," "sustainability focused," and "naturalness and health driven." The result is consistent with the segmentation of sustainable food consumers provided through a literature review by Verain et al. (2012). Therefore, we substantiated the validity and persistence of this pattern with empirical evidence.

The "private benefit seekers" were strongly oriented towards private values, such as price, taste and appearance, and exhibited less emphasis

Table 5

Profiling for the three classes obtained from the Latent Class cluster analysis.

	Class 1	Class 2	Class 3	F	p-value
	Private benefit seekers	Sustainability focused	Naturalness and health driven		
Pro-environmental SI	4.45 [a]	5.70 [b]	5.52 [b]	118.00	<0.001
Moral SI	5.33 [a]	5.84 [b]	5.79 [b]	29.00	<0.001
Healthy SI	4.61 [a]	5.41 [b]	5.51 [b]	62.12	<0.001
Frugal SI	4.89 [a]	5.43 [b]	5.44 [b]	27.98	<0.001
Thrifty SI	5.47 [a]	5.08 [b]	5.17 [b]	12.29	<0.001
Self-transcendent SI	5.15 [a]	5.76 [b]	5.62 [b]	43.02	<0.001
Need for information	3.62 [a]	5.23 [b]	4.71 [c]	120.97	<0.001
Subjective knowledge	3.25 [a]	4.27 [b]	4.09 [b]	50.24	<0.001
Objective knowledge	0.65 [a]	0.70 [b]	0.70 [b]	5.34	0.005

Notes. The superscripts [a–c] indicate significantly different means in each row following ANOVA post hoc Tukey tests ($p < 0.05$). SI: Self-Identity.

Table 6

Class composition (%) in terms of socio-demographic characteristic, consumption frequency of sustainable food, and diet characterisation.

	Class 1	Class 2	Class 3	χ^2	*p*-value
	Private benefit seekers	Sustainability focused	Naturalness and health driven		
Gender				12.17	0.002
Male	56.57	45.82	44.34		
Female	43.43	54.18	55.66		
Age category				43.19	<0.001
18–34	33.71	24.15	18.04		
35–50	40.29	32.82	33.94		
51–75	26	43.03	48.01		
Education				9.90	0.042
No high school diploma	8	9.29	4.59		
High school diploma	53.14	44.89	51.99		
Higher education (bachelor's degree or higher)	38.86	45.82	43.43		
*Budget available for grocery shopping**				7.76	0.101
Low	14.29	10.22	9.79		
Medium	43.71	40.25	39.45		
High	42	49.54	50.76		
Role in grocery shopping				24.60	<0.001
Responsible or co-responsible	81.43	90.09	93.27		
Occasionally doing the grocery shopping	15.71	8.67	5.81		
Never doing the grocery shopping	2.86	1.24	0.92		
Frequency of sustainable food consumption				134.83	<0.001
Never or rarely	24.57	6.19	7.95		
Sometimes	50.29	28.17	40.37		
Often or always	24.14	65.63	51.68		
Diet				37.21	<0.001
Omnivore	86.29	71.52	78.29		
Flexitarian	8.57	20.43	15.9		
Pescetarian	3.43	1.55	2.75		
Vegetarian	1.14	2.79	1.22		
Vegan	0	1.55	0.31		
Other	0.57	2.17	1.53		

on sustainability-related values. Consistently, the class had a more pronounced thrifty self-identity than the other consumers, which indicates a remarked attention to cost, and economic worth. The thriftiness of these consumers justifies their negative score towards the sustainability values. Sustainable products are generally higher-priced than their conventional counterparts (Stancu et al., 2020). From a managerial perspective, this specific market share would not be gained unless price reduction strategies are applied on sustainable products. From a policy point of view, an effective strategy to promote sustainable consumption among these consumers could be to eliminate the trade-off between price and sustainability by ensuring the affordability of sustainable food options. This class was found to have the highest rate of individuals on a low budget for grocery shopping, suggesting the need to make sustainable food accessible to low-income families. The primary

goal of a policy aimed at encouraging sustainable consumption should be to prioritise the affordability of sustainable food. Policy instruments such as subsidies for sustainable food production, implementing mandatory sustainability requirements, or tax incentives could help to achieve changes in sustainable purchase patterns among low-income consumers.

The second class, the "sustainability focused" consumers, preferred the food values consistent with sustainability, that is, the animal welfare, environmental, and ethical values. The third class, the "naturalness and health driven" consumers, attached importance to the absence of "artificialness" and the positive benefits of the food products on personal health. These classes were found to be very close due to several reasons. First, both naturalness and healthiness are benefits typically demanded in environmental-friendly food (Aschemann-Witzel et al., 2013). In addition, the second class was also interested in the origin and seasonality of the foods which can be regarded as sustainability-related. Prioritising the proximity and proper season of foods is a means of remunerating territorial producers, supporting the local economy, and reducing carbon emissions. Third, in terms of how consumers see themselves, we found that the health-oriented consumers were described by the same identities as the sustainability-focused. Furthermore, these two classes were more knowledgeable about sustainable food, both in terms of the subjective and objective dimensions, and showed a higher level of need for sustainability-related information than the price-driven class. Therefore, this study corroborates the strong connection between health and sustainability from the food consumer's perspective, as per Aschemann-Witzel (2015) and Van Loo et al. (2017). In addition, we provided empirical evidence that policy and marketing strategies aimed to target healthy- and sustainability-involved consumers address a very similar individual profile. From a policy perspective, communication-based tools such as information and education campaigns aimed at encouraging healthy and sustainable eating can be combined to strengthen their effectiveness. These instruments can be more effective when leveraging certain consumer self-identities. The points of synergy between these two positive trends, such as reducing meat consumption, increasing plant-based food intake, and avoiding chemicals or processed products, should be harnessed. Focusing on the healthy properties of sustainable eating habits, which are more appreciated and widespread among consumers, could produce positive environmental spill-over effects. This could help facilitate the transition towards more sustainable consumption patterns.

Our findings provide managerial insights for producers on how to use identity labelling to nudge sustainable food purchases. Identity labelling is a novel form of information provisioning that leverage the individual self-identity to trigger virtuous behaviours (Schwartz et al., 2020) and has been proven an effective marketing strategy to increase demand for certain products (Lin and Nayga, 2022; Ortega et al., 2022). Drawing upon our results, identity labels that hinge upon the pro-environmental, moral, frugal, healthy, and self-transcendent self-identities can attract sustainability- and healthy-motivated individuals. Marketers and retailers could take advantage of introducing claims such as "this is for green consumers" or "for ethical and fair consumers" to sell sustainable foods and boost their revenue. Further research could test the effectiveness of these novel information tools and validate our findings.

The contribution of our study to the current sustainability debate is twofold. Firstly, the preference patterns for sustainable food and the three consumer segments emerged consistently across countries, despite their significant cultural differences. The two countries were selected to acquire spread across North and South Europe and represent two extremely diverse food cultures and traditions, i.e., the Scandinavian and Southern Mediterranean. This suggests that our segmentation results and implications can be considered not unique to Denmark and Italy, but rather apply to other European and developed countries as well. Therefore, the study findings are relevant for the implementation of European policy strategies aimed at addressing the major challenge of sustainable food consumption. Second, our research strengthens the

importance of using cross-national segmentation analysis methods, as proposed by Grunert (2019), to identify consumer groups with similar needs and wants beyond national or cultural boundaries. This approach can become essential to pursue globally relevant goals. European policymakers could effectively calibrate and design their communitarian and harmonised policy strategies accounting for heterogeneities while also leveraging consumer similarities across countries.

5.1. Limitations and future research

Several limitations should be acknowledged for the interpretation of this study's results, thus providing recommendations for future research. As a direct measurement scale, BWS can only capture consumers' preferences for attributes they are consciously aware of. Attributes exerting a subconscious impact on choice, e.g., smells, colours, or shelf position, cannot be accounted for by this method. Non-rational purchase behaviours such as those driven by heuristics or cognitive biases also fail to be considered. Moreover, BWS responses may have been prone to non-attendance due to the complexity of the choice tasks, i.e., too many items or too many tasks, resulting in misinterpreted discrimination among the values. However, the BWS method was chosen to overcome the limits inherent within common rating scales such as cultural response bias, thereby allowing us to implement cross-cultural research. This method is the more desirable approach to conduct cross-national segmentation (see, inter alia, Lockshin and Cohen, 2011; Mueller Loose and Lockshin, 2013; Grunert, 2019; Chrysochou et al., 2022). Notwithstanding the limitations of BWS, we maintain that our study lays out significant empirical evidence on the investigated topic and can serve as a reference for future research. To validate our findings, a natural progression would be to conduct studies through incentive-compatible approaches analysing consumer preferences (e.g., experimental auctions and real choice experiments) and implement field experiments to overcome non-real setting issues.

Moreover, the class profiling establishes correlational effects between the food values and the self-identities; no causal relationships have been proven. Further investigation could aim to explore causality effects between the identified consumer classes and the psychographic and demographic characteristics of respondents.

The study was built to address the food concept. However, the importance of food values in the context of sustainability may be contingent upon the specific food category. Nonetheless, our primary research objective was to investigate the idea of sustainable food at a broader level. Our findings could serve as a guide in the design and implementation of sustainable policy strategies, which also considers the overall food category. Further empirical evidence focusing on specific food products would be beneficial for refining marketing strategies that require a more targeted approach. In addition, it would be interesting to explore possible interactions between multiple identities or the potential influence of external factors like societal norms and marketing techniques in sustainable food choices. It would help to further understand what drives the differences between the consumer classes.

Our study was conducted in Denmark and Italy, which are both developed Western countries. Therefore, the generalisability of our findings is culturally bound to Europe or, at most, Western countries. To determine cross-cultural validity, it would be valuable to replicate the study with consumers from developing countries.

Lastly, the present work recognises that the social aspect of sustainability is often overlooked, however our examination of the topic is limited as it goes beyond our research scope. Future research should further this issue to fill the literature gap as it would be crucial for promoting a holistic approach towards sustainable consumption.

6. Conclusions

Applying a cross-national segmentation approach, the study identifies three consumer classes prioritising different values for their

sustainable food choices: the "private benefit seekers," "sustainability focused," and "naturalness and health driven". The study points out that consumers oriented towards sustainability and health share the same profile in terms of pro-environmental, moral, frugal, healthy, and self-transcendent self-identities.

This work highlights the importance of understanding consumer heterogeneity and the interplay between private and public values in shaping sustainable food choices. It emphasises the need for tailored marketing strategies, policy interventions for affordability, and effective communication to bridge the gap towards sustainability values, ultimately favouring the shift towards a sustainable food system. Combining the policy goals of achieving more sustainable and healthy diets could be an effective approach as these aspects appeal to consumers with equal self-image perception.

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CRediT authorship contribution statement

Giovanna Piracci: Conceptualization, Methodology, Data curation, Formal analysis, Investigation, Software, Validation, Visualization, Writing – original draft, Writing – review & editing. **Leonardo Casini:** Conceptualization, Methodology, Supervision, Formal analysis, Validation, Writing – review & editing. **Caterina Contini:** Conceptualization, Methodology, Supervision, Formal analysis, Validation, Writing – review & editing. **Catalin Mihai Stancu:** Conceptualization, Investigation. **Liisa Lähteenmäki:** Conceptualization, Methodology, Supervision, Formal analysis, Validation, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jclepro.2023.137924.

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