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What consumers want in a sustainability food label: Results from online co-creation workshops in the United Kingdom, Ireland and Denmark

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Introduction: Changes in consumers' decision-making relating to food play an important role in the sustainable transition of the food system. However, assessing sustainability across choice alternatives is complex. A holistic or multi-dimensional 'summary' sustainability label for food could help consumers make more informed choices, but it is important that such a label is developed taking consumers' perception and understanding of sustainability into consideration. Hence, it is necessary to understand consumers' needs and wants in a sustainability food label. The objective of this study is therefore to explore in-depth consumer perceptions and preferences for sustainability as a concept in food production as well as for a sustainability label for food.

Method: A total of six online co-creation workshops were carried out in the UK and Ireland (3 groups, $n = 24$) and Denmark (3 groups, $n = 21$) using an interactive platform, where participants over the course of two weeks discussed and engaged in creative tasks related to food and sustainability.

Results: Results show that consumers in lack information about the sustainability of food products. There were differences with regards to which of 10 pre-tested indicators of sustainability (nature preservation, climate change, animal welfare, fair wages, biodiversity, pollution, health, equality, economic growth and culture) were perceived as most important. The information participants discussed as relevant for a sustainability label included transportation, the degree of processing, and packaging, with some country differences. Consumers acknowledged the complexity of designing and understanding a sustainability food label and existing nutrition labels served as inspiration for creating a sustainability label. Consumers recommended more responsibility to be taken by retailers and food producers through public information campaigns to create awareness.

Discussion: Pros and cons of co-creating a sustainability label with consumers online are discussed as well as the implications for consumers, the food industry and policy makers.

KEYWORDS

consumers, understanding, sustainability, food, online workshops

1 Introduction

It is well-known that dietary change and food choices have a high impact on climate change (Bajželj et al., 2014; Steffen et al., 2015; Aleksandrowicz et al., 2016). More sustainable dietary patterns can be promoted by appealing to individual consumers' willingness to choose, e.g., fair trade products (Ribeiro-Duthie et al., 2021), but for sustainable choices to have a noticeable effect (Giesler and Veresiu, 2014; Carrington et al., 2015), it is a prerequisite that consumers have the ability to make informed choices at the point of sale. It is also important that this does not only hold for a minority of very educated or very engaged consumers, but instead for the majority of consumers. Easily understandable labelling on food that communicates sustainability aspects is expected to facilitate such informed choice, and thus, is explicitly called for in the EU Policy program (European-Commission, 2020a).

In the context of sustainable food labels, some of these institutions bring certification and empowerment a long (see, e.g., Smith and Raven, 2012), which is also important for understanding how consumers (users) assess sustainability in food. Hence, assessing sustainability of food production across diverse sustainability indicators (such as, i.e., pollution, equality and economic growth) and developing a sustainability labelling scheme is not an easy and straightforward task. It is a complex issue ranging from assessment of the impact and the weighing against different impact categories; choice architecture elements such as selection of information type and level of detail to be conveyed to consumers; design choices in the visualisation and placement of the label, regulatory background and policy struggles for or against a sustainability label, as well as the efforts in educating consumers on how to use the label (Leach et al., 2016; Annunziata et al., 2019; Asioli et al., 2020).

However, the pivotal success criteria of such a label is that it is understood and becomes a preferred and trusted cue to a preferable credence characteristic of the food—the sustainability aspect (Grunert et al., 2014; Aschemann-Witzel et al., 2019; Asioli et al., 2020; Futtrup et al., 2021). A basic starting point for this journey is to understand where consumers are currently "located" with regard to understanding and envisioning sustainability, in order to be able to incorporate this in the design of a sustainability label. Hence, the objective of this study is to explore consumers' perceptions and preferences for sustainability in food as well as a sustainability label for food by using online co-creation workshops. The findings contribute to a better understanding of consumers' perceptions, preferences and ideas on a concept of sustainability in food and sustainability labelling of food, thereby contributing to the literature on sustainable consumption with a "bottom-up" approach to consumer perception of sustainability in food. The results provide insights on how sustainability indicators can be communicated to consumers on food products in terms of packaging, labels and other information for them to make more sustainable food choices. Also, the results can help companies, NGOs, and policy makers in negotiating how to design and agree on a sustainability labelling scheme that can support consumers in making informed, sustainable food choices.

2 Literature review on the sustainability of food products

Literature on the sustainability transition of food systems has in recent years focused on also including users (the demand side) to capture the more dynamic interactions between systems and users (Zurek et al., 2022; Lamine and Marsden, 2023), when introducing new innovations as, for instance, more sustainable food products or sustainable food labels (Mylan et al., 2015, 2019). Geels (2004) has specifically identified six key dimensions (industry, user preferences, scientific knowledge, culture, policy and technology) which each have "associated institutions, actors, and resources that explain dynamic stability and unfolding trajectories in societal functions such as food provisioning" (Geels, 2004, p. 234). The importance of consumers in the sustainable transition of food systems is underlined by Zurek et al. (2022), who state that "although agricultural activities and land-use change are leading to a higher proportion of food system emissions than postfarm-gate activities, consumer dietary choices are a substantial factor driving decisions made on the farm" (Zurek et al., 2022, p. 1). Hence, consumers' behaviour, their perception of food sustainability and how they possibly can be guided by sustainable food labels to make sustainable choices is important to explore.

Social marketing suggests that for any societally beneficial behaviour to "sell" successfully, it is important to first understand what the "customer" in question values about the "product", or which inconvenience or "price" acts as a barrier (Kotler and Zaltman, 1971; Andreasen, 1995; Rundle-Thiele et al., 2019). Increasingly, though, marketers do not only do research *on* customers, but have begun to innovate and co-create *with* their customers, particularly as online communities have made this interaction easy (Cova et al., 2006; Antorini et al., 2012; Greer and Lei, 2012; Filieri, 2013; Jacobsen et al., 2021). Co-creation provides involvement in developing a product, idea, or policy, and allows stakeholders or consumers to feel empowered, perceive ownership, and be committed to the outcome (Van Trijp, 2014; Steg and De Groot, 2019).

At the present time, sustainability—and in particular for companies seeking to contribute to it—is understood to be connected to the sustainable development goals (SDG) of the United Nations phrased in 2015 (UN, 2015). The 17 goals represent the different aspects of what the UN decided would need to be achieved for "sustainability" to become a reality. Sustainability consultant John Elkington has suggested that companies should seek to balance their economic goals with the environmental and social effects of their operations, which have been referred to as "the triple bottom line" or "3 Ps" (People, Profit, Planet) (Elkington, 1998). Seghezzo (2009) has argued for a five-dimensional sustainability framework consisting of "place" (the three dimensions of space), "permanence" (time), and "persons" (a human dimension) is more inclusive, plural, and useful to outline specific policies towards sustainability. Hence, sustainability seems to be in continuous conceptual expansion and incorporating new dimensions across time (Ehgartner, 2018).

Companies have sought to live up to the 3 Ps via their corporate social responsibility actions using sustainability indicators, which provide information on how the company contributes to sustainable development (Krajnc and Glavič, 2005). Hence, sustainability is rather clearly defined at the systems-level. That means it is not necessarily possible to say whether a single product is sustainable or not, because it depends on the system in which it is produced, used and consumed. When companies communicate their products as sustainable, it is typically a relative statement, saying that the product or service, compared to alternatives, contributes considerably more to the achievement of certain sustainable development aspects. The same holds for when consumers consider a product as a sustainable

product—typically they do so because the product is characterized by being "better" in an aspect they regard as part of sustainability (Sánchez-Bravo et al., 2021).

These aspects can contribute to achievements in different types of social needs such as healthy life expectancy, sanitation, income, education, equality etc. (O'Neill et al., 2018). It can also be contributions to achievements in different types of environmental protection such as climate change, biodiversity, pollution, freshwater use, etc. (Steffen et al., 2015). The Food and Agricultural Organization suggests a definition of a sustainable diet that can also be used to highlight which aspects foods might need to contribute to, in order to contribute to a sustainable food system, and recommends the following: "Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resource" (Burlingame, 2010, p. 7).

However, what consumers expect and what experts suggest as important aspects of more sustainable foods, might not necessarily fully overlap—this has for instance been found in regards to food packaging (Otto et al., 2021). Consumers do not have access to the same type of information and expertise (see, e.g., Peschel et al., 2016), they might not pay much attention to sustainability information (Mancini et al., 2017), their awareness of sustainable food products can be low (Schäufele and Hamm, 2017), or there might exist a gap between their attitudes and behaviour, when it comes to engaging in buying sustainable foods (Vermeir and Verbeke, 2006). Also, their perception of sustainability and what is important is influenced by, e.g., media coverage, their own experience, values and attitudes (see, e.g., Grunert et al., 2014) as well as social norms and habits (White et al., 2019). This takes place in the current sustainability labelling landscape, which is recently characterized as too complex and filled with ambiguous information (Torma and Thøgersen, 2021), and where the choice architecture, which refers to tools that change the decisions consumers make by altering the way choices are presented to the decision maker without altering the assortment or the prices (Johnson et al., 2012; Theotokis and Manganari, 2015), does not fully support consumers in making sustainable choices (see, e.g., Panzone et al., 2021). Sustainability labels have previously been found to have limited effects on consumers' food choices (Hoogland et al., 2007; Grunert et al., 2014; Lazzarini et al., 2018), but these studies did not have an exploratory approach to elicit consumers' perceptions. Hence, our study contributes to the existing literature on consumer studies on sustainable food consumption by having a bottom-up approach to sustainability labelling in food, which is essential for capturing consumer understanding and challenges.

3 Materials and methods

The online consumer workshops were conducted to obtain a deeper understanding of consumers' knowledge, attitudes and preferences regarding sustainability labels on food products and barriers for buying sustainable food as well as to get input on what information consumers would like in a sustainability label. The online setting has been found suitable to studies which focus on the generation of new ideas (see, e.g., Richard et al., 2021), and where collaborative and interactive processes between consumers are in focus (Bettiga et al., 2018). Also, online qualitative research has many recognised advantages including time and location flexibility, cost-effectiveness, the potential for greater geographic reach and diversity of participants, and greater anonymity (Hesse-Biber and Griffin, 2013; Richard et al., 2020; Benson et al., 2021). However, the Covid-19 pandemic was also an influential factor, when deciding to carry out the workshops online. The study obtained ethical approvals from both the ethical committee at Queen's University Belfast (MHLS 20_80) and Aarhus University, Denmark (2020-0086301).

3.1 Procedure

A total of six online workshops were conducted with consumers in Denmark (DK) in June 2020 (3 workshops, $n = 21$) and in the United Kingdom and Ireland (UK & IRL) (3 workshops, $n = 24$) in July 2020. These countries were chosen, since the 2019 Europe Sustainable Development Report, which assess where each country stands with regard to achieving the Sustainable Development Goals, has Denmark as the leading country in the European Union in terms of sustainability (no. 1 out of 28 in 2019), while the UK & IRL scores average in terms of sustainability (no. 12 and no. 13, respectively, out of 28 in 2019) (SDSN, 2019). "Sustainability" has been similarly high on the societal agenda and among consumers in these countries, as for example highlighted by the relatively high share or ratio of growth of organic products in the market (Willer et al., 2020).

The workshops utilised an online platform named "Revelation" developed for qualitative research by the market research agency Focus Vision (for details, see Benson et al., 2021). Here, participants can access tasks, discussions, upload files, interact with other participants and ask for technical help. Also, they can access a personal dashboard for overview during the study. The first and the second authors were moderators in the workshops in Denmark and the UK & IRL, respectively, and they received a basic introduction to the platform.

Each workshop had a duration of 14 days. This timespan was considered suitable, as it gave participants sufficient time to get into the subject and conduct the tasks without adding extra pressure in their everyday life. First, participants received a short video, where the moderator introduced the aim of the workshop; to obtain more knowledge on consumers' perception and attitudes towards sustainability labels on food. Participants were informed that they should expect approximately three hours of work across the 14 days of the workshop. Participants were asked to log in daily and attend to the tasks. Most tasks were open for several days, thereby not forcing participants to be online at a specific time, which might be incompatible with their everyday life. In case of questions, participants could write to the moderator, and for technical issues, the platform had a hotline, participants could contact.

The content of the workshops progressed from traditional focus group tasks and discussions to creative co-creation tasks with the purpose of firstly, gathering insights into participants' understanding and perception of sustainability in food and secondly, creating consumer-derived ideas for a sustainability label (see the full script in Appendix A). The variation of tasks and methods was selected to increase engagement as well as to trigger different perspectives on the issue. For all tasks, participants responded in writing or by uploading pictures, and they were asked to explain their choices and ideas. They were also encouraged to comment and respond to the other group participants' answers, just as the moderator also could ask participants

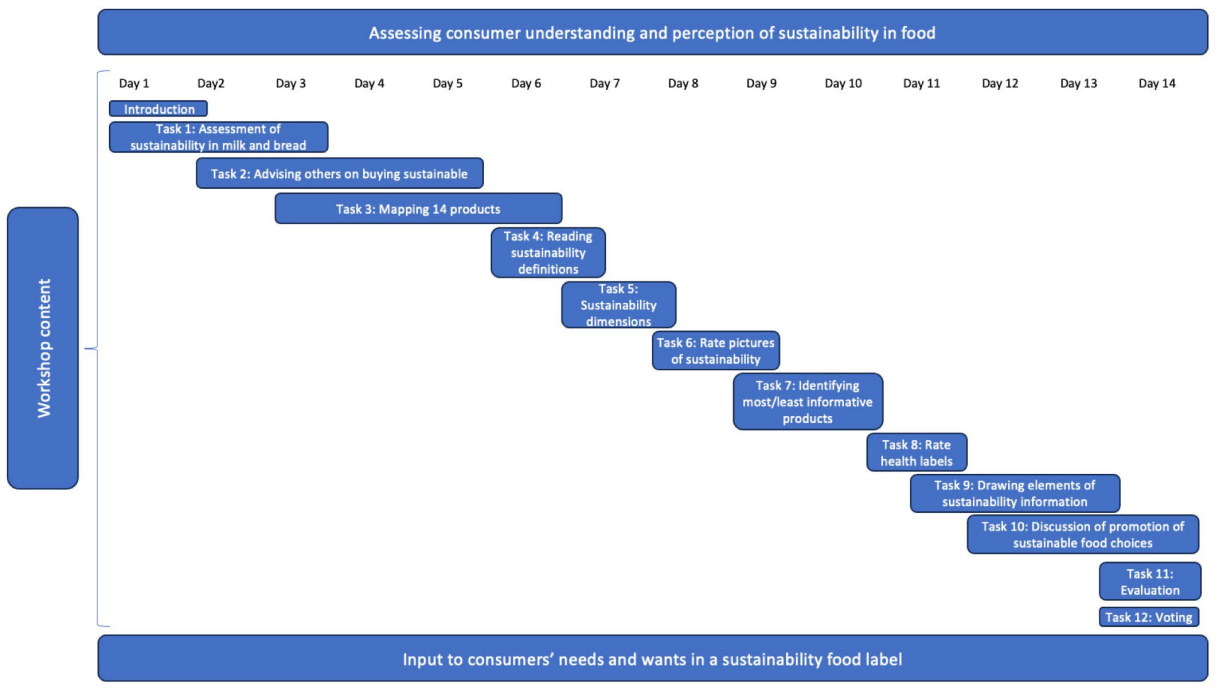

FIGURE 1
Research framework and workshop content.

to explain their answers in more detail. Figure 1 depicts the research framework and the tasks carried out during the workshop.

Participants were asked to assess the sustainability of two products (milk and bread), to advise others on how to eat more sustainably by using a vignette (Grønhøj and Bech-Larsen, 2010) about a young couple, and to place 14 selected products in a system of coordinates on self-selected axes on a two-dimensional space (as in a projective mapping exercise (see, e.g., Risvik et al., 1994; Varela and Ares, 2012). After these questions and tasks, respondents moved to the co-creation tasks, where they had to rate pictures depicting sustainability topics, rank indicators of sustainability according to perceived importance, identify the most and least sustainable products within two product categories in an online shopping setting using a best-worst scaling approach (Louviere et al., 2015), rate alternative front-of-pack health labels and draw and explain how a sustainability label should be conveyed.

At the end of the workshop, participants were asked to evaluate the workshop (six questions on whether the online workshop had been interesting/good/useful), whether they learned something from the online workshop and from the interaction with other participants and whether time allocated to each task was sufficient. These questions were evaluated on a scale from 1 = Not at all to 7 = Very much. There were also three open-ended questions on what they liked the most, the least and what could be improved regarding the online workshop. They were also asked to vote for the persons with the most realistic and practical ideas, the most creative and crazy ideas, the most thoughtful comments, and the most active peer in the group. Winners received a gift certificate worth 15 € in UK & IRL and 27 € in DK.[1]

1 The difference was due to higher costs of living in Denmark.

3.2 Sample

Participants were recruited by the market research agency Userneeds, who has a consumer panel, which consists exclusively of registered users, who have given consent to participate in market research and opinion polls. Enrolment in the panel is by invitation only, so there is no opt-in option, which adds to the representativity of the panel. Through this pre-recruited probability-based panel, potential participants were asked four screening questions: Whether they worked professionally with sustainability and food (screened out if they did), whether they bought groceries for their household (screened out if *never* on a scale from 1 = *never* to 5 = *always*), whether their decision to buy food was impacted by their concern with sustainability (screened out if *never* on a scale from 1 = *never* to 5 = *always*) and whether they had bought at least one dairy product (milk, yoghurt, cheese etc.) during the past 6 months (screened out if not). There were quotas on age, gender and education to ensure a fairly national representative group composition.

Participants were informed that participation was voluntary and that they could withdraw from the study at any point. They were also informed that their answers would be anonymised in the reporting. All participants were compensated by the market research company Userneeds with a 100€ gift certificate for their time and effort.

3.3 Data analysis

The data consisted of text responses extracted from the platform and transferred to Excel. Uploaded PowerPoint files and pictures had to be downloaded separately from the platform. The first phase of the coding involved familiarization with the data, which was achieved by

reading all text responses and looking at the pictures and PowerPoint files, while noting preliminary observations, but also having the workshop script in mind. This was done by the first and second author on data from their respective countries, and notes were compared. Next, a predominantly data-driven initial coding of text responses and pictures was performed for each workshop task at a time. It was decided to continue with a content analysis approach, which is generally considered a useful technique for making valid and replicable inferences (Krippendorff, 2004)—especially when the aim was to obtain a deeper understanding of consumers' preferences, attitudes and inputs regarding a sustainability label for food. For selected research questions (such as preferences for pictures and indicators of sustainability), a summative approach to content analysis was applied (Hsieh and Shannon, 2005), since it is useful when counting preferences. One point was given each time a participant chose a picture/indicator and the total amount of points were counted. Due to the relatively small sample size, it was decided to treat the data from all six workshops as one data set, but highlighting obvious differences among the countries. The coding process identified four main themes (not necessarily following the order of the tasks): (1) Consumers' general perceptions of sustainability, (2) Consumers' perception of sustainability in food, (3) Consumers' assessment of sustainability in food and (4) Preferences for a sustainability label for food. These four themes structure the analysis below.

4 Results

A total of 30 participants were recruited for the workshops in the UK & IRL and 26 for the workshops in DK. Six participants in the UK & IRL and five in DK did not complete at least 80% of the tasks; hence, they are not included in the reporting of this study. Table 1 displays the socio-demographic characteristics of the participants. All six groups consisted of at least seven participants with at least three males in each group. In the UK & IRL, participants were slightly younger (mean age ranging from 35.3 to 41.8 years in the three groups) than the DK participants (mean age between 39.3 and 45). Participants were between 18 and 71 years of age in the UK & IRL and between 23 and 66 in DK. In all six groups, the majority of participants were employed and a few were students, one retired (in DK) and one unemployed (in the UK & IRL).

4.1 General perceptions of sustainability indicators through visualization choice

As a baseline, participants' general perceptions of sustainability were assessed using exposure to visualizations, as this is a recommended method for understanding consumer needs (van Kleef et al., 2005). Participants were asked to identify top-3 of 10 pre-selected images (see Appendix B for pictures already screened for conveying sustainability in a pre-test with 10 participants) that best reflected sustainability for them and explain why. Figure 2 provides an overview over the results, which were obtained by counting the number of participants choosing a certain picture.

In the UK & IRL, the top-3 pictures reflecting sustainability for the participants were the plant shoot picture (16 points), planet Earth (12 points) and solar panels (9 points), whereas in DK, it was windmills (17 points), solar panels (13 points) and plant shoot and rainforest on a shared 3rd place (8 points). Arguments for preferring the plant shoot picture among UK & IRL participants were varied; for some the picture reminded them of the role of growing food and eating a plant-based diet, for others protecting new life and the planet, and for a third group, the important roles of plants. For instance, one participant demonstrated knowledge about the role of plants and CO_2:

> "*Replanting trees is a small, but massively impactful act that would improve our planet greatly—it would reduce global warming (which is a growing issue that needs to be focused on), remove CO_2 and provide more O_2 in the atmosphere and also provide habitats and shelters for wildlife.*" (female, group 2)

Other participants stated that the picture was associated with vulnerability, innocence and that human activity is key. For instance, one participant argued:

> "*Because it is a more intimate view: a pair of hands holding a seedling. I think this shows how fragile the balance is, and also suggests individual action—what we can do personally to help conserve our environment.*" (female, group 1)

The second-most preferred picture among UK & IRL participants was the picture of planet Earth. Participants stated that the blue planet made them think about the world as a unity and that sustainability cannot be obtained locally. One said:

> *"Seeing the Earth as a whole always reminds me that it is not infinite and it is easier to imagine resources depleting and running out."* (male, group 1)

A picture of solar panels was third-most preferred among UK & IRL participants and the main reason for choosing this picture was the associations to renewable energy. One participant mentioned:

> "*Renewable energy that does not consume the Earth's natural resources or result in pollution. We will always have a need for energy, so these methods are sustainable.*" (male, group 1)

For the Danish participants, windmills were the most preferred picture repeating the arguments of renewable energy and avoidance of fossil fuels. Interestingly, there were nuanced arguments about windmills being pollution free while producing energy, but that the production and discarding of windmills could harm the environment. The majority of Danish participants choosing this picture also stated that windmills are "a symbol" of sustainability in a Danish context due to the massive production and installation of windmills in Denmark. One stated:

> *"Denmark is a role model for many other countries when it comes to wind energy."* (female, group c)

Danish participants' second-preferred picture was of solar panels and arguments were along the same line as for the windmills: Being pollution free, utilising natural resources (the sun) and being a technology well-mastered in Denmark. One participant also mentioned the economic benefit of having solar panels:

TABLE 1 Background characteristics of participants.

	UK & IRL (*n* = 24)			Denmark (*n* = 21)		
	Group 1	Group 2	Group 3	Group a	Group b	Group c
Participants, *n*	9	8	7	7	7	7
Female/male	5/4	5/3	4/3	3/4	4/3	3/4
Age, mean	41.8	35.3	39.0	41.4	39.3	45.0
Youngest	18	19	25	26	23	25
Oldest	71	54	62	66	57	63
Student	1	1	0	1	1	1
Employed	6	7	7	6	6	5
Retired	1	0	0	0	0	1
Unemployed	1	0	0	0	0	0

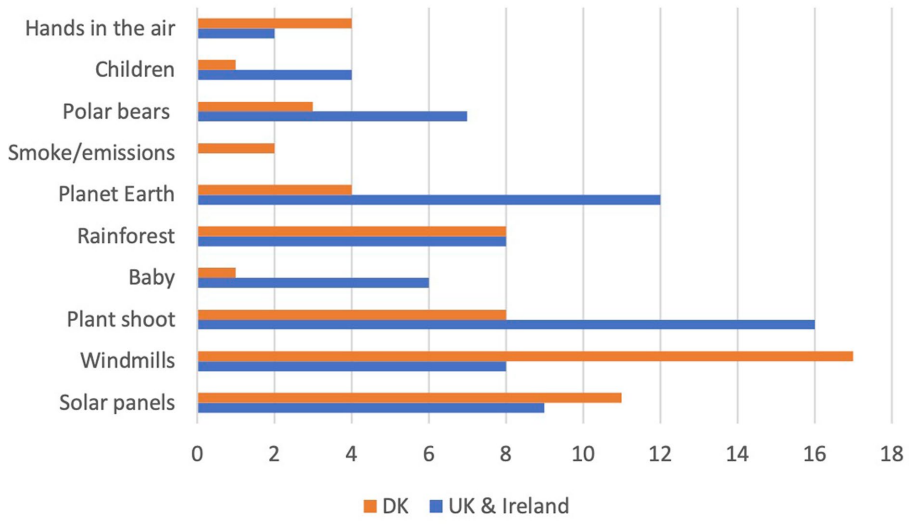

FIGURE 2
Preferences for pictures conveying sustainability, UK & IRL and DK.

> *"Since solar panels convert sunlight to electricity by using the Earth's natural resources, it is both climate friendly and there is a cost saving."* (male, group a)

One participant even highlighted solar panels as a "moral" obligation:

> *"Since we utilize natural resources, everybody should have solar panels on their roof or in their garden."* (male, group c)

Among Danish participants, the picture of the plant shoot and the rainforest obtained an equal number of votes (8). The arguments for the plant shoot picture mirrored those of UK & IRL participants, while arguments for the rainforest picture were the importance of avoiding deforestation, securing biodiversity and the important role of the rainforest in reducing CO_2.

Overall, this task showed that participants in both UK & IRL and DK had somewhat similar preferences for pictures conveying sustainability on a general level, and the quotes demonstrated an understanding of the different aspects of sustainability. Next, indicators of sustainability in the specific area of food are presented.

4.2 Indicators of sustainability in food through preference and sorting

Mirroring the picture task, participants were also asked to pick the three indicators of sustainability (from a list of 10 pre-tested indicators) that they think are most important to display on a food sustainability label. The results were again obtained by counting the number of participants choosing a certain indicator. Nature preservation was clearly the most important indicator for UK & IRL participants (15 points), with climate change coming second (11 points) and a shared third place to animal welfare and fair wages (10 points). Among Danish participants, there was less variation between the top-3: Fair wages received 10 points, climate change and biodiversity 9 points each and animal welfare and pollution 8 points each. Figure 3 provides an overview over the preferences.

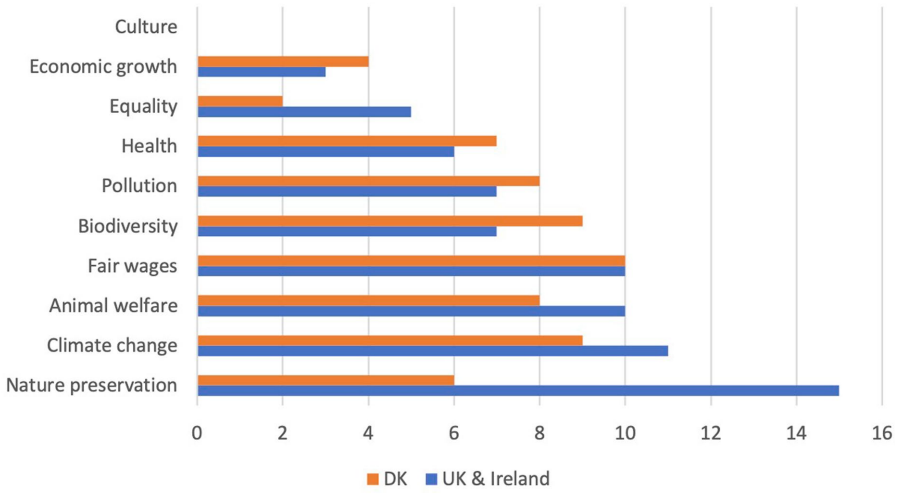

FIGURE 3
Preferences for sustainability dimensions, UK & IRL and DK.

Arguments for choosing nature preservation among UK & IRL participants included the importance of nature to both humans and animals and the need for biodiversity. One participant reflected on the farm to fork cycle of food production and how it was important to preserve nature:

> *"I believe it is imperative to highlight how buying/using a particular product can help in some small way to preserving natural life wherever possible. I think that people are keen to understand the whole field to fork process and if the treatment of animals or benefits to the natural world can be highlighted on labelling, then I see this is a positive thing."* (male, group 2)

Participants choosing the indicator of climate change argued for its importance by mentioning it as "the biggest danger" humans face, and that focus should be on the global impact and consumers should see "the bigger picture." One participant explained:

> *"I believe that looking after the natural environment is crucial to sustainable development, as humans are reliant on natural resources to develop economies and societies. This is one of the pillars of sustainable development. I believe that preventing and even reversing climate change can also promote biodiversity and pollution as these both must be addressed as part of working towards reversing climate change."* (female, group 3)

A number of participants, even though they singled out their top-3 indicators, mentioned several other indicators of importance as well, as they perceived them as interrelated. This was especially the case for the third and fourth preferred indicators of animal welfare and fair wages. Several participants mentioned the importance of treating both animals and humans fair, and that both indicators impacted the sustainability of food products. One participant stated:

> *"I tried to choose the ones that implied most generally ensuring the welfare of nature, people and animals (…) I would like to see these on food packaging as they'd give me a good overall idea."* (female, group 1)

The Danish participants argued that the most selected indicator of fair wages is key to ensure sustainability. A number of them argued that if people have fair working conditions, they engage more with the world. One participant stated:

> *"Fair working conditions are necessary. It raises awareness and the desire to participate in the improvement processes that are necessary for sustainability."* (male, group a)

Other participants mentioned the "Fairtrade label" as being equivalent to the indicator of fair wages, and several stated that they look for the Fairtrade label when buying food products.

The Danish participants' arguments for the climate change indicator were along the lines of the participants from UK & IRL: That climate change is a threat to all living creatures and that fighting climate change plays a big role in securing the continued existence of the world as we know it. The Danish participants also demonstrated knowledge of the importance of securing biodiversity:

> *"It is important that we preserve as many animals and plants. The balance of nature suffers irreparable damage if either plants or animals become extinct. It can affect food chains and thus ecological collapse."* (male, group c)

Animal welfare and pollution occupied a shared third place, and Danish participants argued for the importance of animal welfare to ensure good quality in the food production. Some were, however, unsure on how animal welfare related to sustainability. One participant said:

> *"Of course, animal welfare means a lot. I do not really know if it also affects sustainability, but I think that if you have that perspective in animal husbandry, you will also think sustainably."* (male, group 1)

Absence of pollution was mentioned as a precondition for ensuring good conditions for plants, animals and humans, and reduced pollution was important for ensuring good quality of food products.

A third task was designed to identify how consumers perceive sustainability in food. Here, participants were asked to sort 14 pictures of different food products into a system of coordinates arguing for both the choice of axis labels and the placement of food products.

Examples of participants' uploaded pictures can be found in Appendix C. Here, we highlight the most important findings.

Across all groups, participants used a number of different aspects to label the axes: plant-based, naturalness, degree of processing, food miles, local, carbon foot print, packaging (both type and amount), health and the more general term of sustainability. In each country, two participants sorted according to sustainability only. This may have been a misunderstanding of the instructions.

In general, UK & IRL participants mainly considered the degree of processing, the resources required in producing a product as well as the packaging used, e.g., recyclable or not. However, some participants did recognise that information regarding the production process or recyclability of packaging would be useful, since the lack of it made it difficult to place the products. A number of participants appeared to use the general term "sustainability" in sorting the products. Further investigation suggested that many used this term as synonymous with "the environment". Food miles or locality, carbon footprint, gases, and land/water use were often specified to explain sustainability. A few participants also mentioned that health was an important factor to consider alongside sustainability, or noted a link or overlap between some indicators, e.g., natural foods (such as apples) typically have less packaging. In addition, some participants recognised that there may be different circumstances affecting these variables, perhaps leading to conflicts in placing products along the axes. For example, depending on the season, certain fruits and vegetables may need to be imported or, depending on the shop, these might be sold loose or in packaging.

DK participants also mainly considered the degree of processing of the foods, but another important aspect to them was whether the product was produced locally (in DK) to reduce transportation and hence, the carbon foot print. Some participants mentioned that it was difficult to sort the products, when there was little information about the origin of the products indicating the importance of transportation. A number of DK participants also paid attention to the packaging (recyclable or reduced), and some demonstrated awareness of buying products in season. As with the UK & IRL participants, some DK participants also used the general term "sustainability" in sorting the products and explained it with land/water use, food miles, locality or carbon footprint.

In both countries, participants recognised that sustainability can include many different aspects, and that one individual's definition may be different to another's. Interestingly, a few participants in both countries noted that just because a product is sustainable in one way, e.g., low air miles, does not mean it is necessarily sustainable in another way, e.g., recyclable packaging. They mentioned the potential for companies to use this to deceptively market products.

In the last task to assess consumers' perception of sustainability in food, consumers were asked to advise a young couple (described in a vignette) to buy more sustainable food products. In both countries, participants mentioned that the couple should look for retailers with a sustainable profile, shop signage as well as packaging and labelling to find more sustainable food products. This quote is illustrative of how most participants in both countries advised the couple:

> *"They should look to buy items which are organic and with low food miles in reusable or recyclable packaging."* (female, group 1)

Searching the Internet for general information about sustainability in food was also mentioned in both countries. UK & IRL participants specifically suggested that the couple should look at the source of ingredients in food products to understand if a food is sustainable. They also recommended buying local products with low food miles and products with minimal or recyclable packaging. A few also mentioned looking at the production process (the Fairtrade label) and organic food. DK participants focused more strongly on buying organic Danish products of local origin or products with other labels of sustainability (such as Fairtrade, MSC). DK participants also recommended the couple to buy products with minimal or recyclable packaging.

Participants also gave advice on how to change the couple's purchase habits and diet. Here, UK & IRL participants clearly recommended reducing dairy consumption and adopting a vegan, vegetarian or plant-based diet. Again, there were suggestions to buy local as well as buying organic foods, buying from specialist shops and being willing to try new foods. The majority of DK participants suggested paying attention to reducing food waste by planning grocery shopping and meals, cooking from scratch and using scraps. Reducing meat and dairy consumption and adopting a vegan, vegetarian or plant-based diet was also mentioned, but to a lesser extent.

4.3 Sustainability assessment of food products through product search

To get a clearer idea of how consumers assess sustainability in food products, they were asked to assess the level of sustainability of two widely used (non-branded) products; bread and milk. The results showed a number of differences between the two countries. UK & IRL participants commented that often there was little information available regarding sustainability in the actual store, but that the primary source of sustainability information was on the packaging and labelling, where participants looked for recycling information, the origin or source of the product or ingredients. Participants also mentioned food or travel miles as an element they would look for as well as an organic label, the production process, and animal welfare.

DK participants' primary source of sustainability information was the packaging and labels, but they also underlined that they looked for the Danish organic label and the keyhole label (which are recognized by 98% and 94% of Danes, respectively[2]). A number of participants also mentioned that products produced in Denmark were more

2 https://lbst.dk/nyheder/nyhed/nyhed/danskerne-kender-det-roede-oe-maerke-og-har-tillid-til-det/; https://altomkost.dk/nyheder/nyhed/nyhed/kigger-du-efter-noeglehullet-naar-du-handler/

sustainable than imported goods due to less transportation highlighting the added value of local goods. Some also mentioned buying products close to "best before date" in order to reduce food waste.

In both countries, there was a clear theme of participants not being sure or not knowing about the sustainability of milk and bread. Some participants suggested that the products are not sustainable in general. Some also provided reasons for their poor environmental/sustainability credentials such as travel miles, pesticide/chemical, water and land use. They also commented that it is complex to assess the sustainability of products, since there are so many factors impacting whether a product is sustainable or not—and this assessment cannot be made by regular consumers. One DK participant said:

> *"It requires you being a professor to assess what is most sustainable. If you look at the packaging and transport, buy the bread fresh from the baker. If you look at used energy in the baking process, factory-baked bread will be best. If you look at consumption, it is the amount of fibre and the thickness of the slices (thicker slices give greater satiety and less cold cuts), and if you look at the sustainability of the grain, then it must be organic (in terms of pesticides), but conventional in terms of yield per square meter. And that's how you can keep going."* (male, group c)

When participants were asked to go to the online store of retailers and identify specific products/brands in the categories of strawberry yoghurt and chocolate bars conveying most and least sustainability, findings are not directly comparable, since UK & IRL participants had to choose among the selection of products from Tesco's website, while DK participants accessed the Bilka website. At the Tesco website, UK & IRL participants could choose from 26 products in the strawberry yoghurt category and 187 products in the chocolate bar category, while DK participants could choose among 32 products in the strawberry yoghurt category and 58 products in the chocolate bar category.[3]

Overall, UK & IRL participants identified the Yeo Valley strawberry yoghurts to be most informative regarding sustainability. Some participants also preferred the Onken yoghurt. Participants noted the information provided with these brands detailed the source or locality of the ingredients and processing, the natural aspect of the food, as well as the recycling information for the packaging. One participant explained:

> *"Yeo Valley was the most helpful, they not only specified where the ingredients came from but also that it is a family farm, organic and also how recyclable the packaging was, just excellent."* (male, group 3)

In terms of chocolate bars, Green & Black's was commonly mentioned as most informative given its stated ethical and sustainable practices (i.e., Fairtrade) as well as the organic nature of the product.

A wider variety of brands were chosen as being least informative for both yoghurts (Nestlé Ski, Tesco, Frubes) and chocolate bars (Galaxy, Cadbury, Kinder). Indeed, a few participants mentioned that there were many products which were uninformative, particularly regarding packaging and source of ingredients. A few participants commented that some companies were based in one country but may have imported ingredients from another. Only a few participants across all groups noted sustainability certification (B Corp certification on the Danone yoghurt).

Among the DK participants, strawberry yoghurt from Naturmælk ("Nature milk") was identified as being most informative in terms of sustainability, however, the Arla yoghurt was also mentioned quite often. Participants noted the organic labels (both DK and EU organic labels), animal welfare labels and Fair-Trade labels for the products alongside information about the processing. They also mentioned the FSC label and that the looks of the packaging indicated responsible use of paper. In terms of chocolate bars, Raw Truffles was most commonly mentioned as most informative given the stated vegan and organic nature of the product, but also Anton Berg. Hershey's and Crunchy Chocolate were mentioned. As among the UK & IRL participants, DK participants also identified a wider variety of brands being least informative for both yoghurts (e.g., Kløver, Danonino, Actimel) and chocolate bars (e.g., unbranded chocolate coins, Storck Knoppers and Lion Bar). Some participants explained that based on the ingredients, they knew that the product was not sustainable. One participant said:

> *"This product does not inform about sustainability, but it contains palm oil, and that is bad for the environment."* (female, group a)

Other participants mentioned excessive packaging as a reason to deem a product unsustainable, such as this participant:

> *"It signals to be a very cheap product, where every single coin is wrapped in two pieces of aluminium and a cheap plastic net."* (female, group c)

A number of the DK participants mentioned that there were many products which were surprisingly uninformative. Figure 4 provides examples of the most and least preferred products in both countries.

4.4 Preferences regarding a sustainability food label through label assessment and creation

In the search for input on how to make a sustainability label for food, participants were asked to rate the usefulness of existing front-of-pack (FOP) health labels on a scale from 1 (least useful) to 5 (most useful), which could serve as inspiration for a sustainability label. The scores are presented in Figure 5.

Overall, the Nutri-score was the most preferred FOP health label followed closely by the Nutri-wheel. However, the latter was considerably more preferred among UK & IRL participants than DK

3 For the chocolate bar category in both countries, it is worth mentioning that the large number of products is mainly due to the fact that chocolate bars from the same brand (e.g., Cadbury) are present in many different versions (whole nut, caramel etc.), but also different sizes (e.g., 110g, 200g, 360g), and that a number of the products are bundles of chocolate bars (such as four Snickers wrapped together). Hence, the selection of chocolate bar products was smaller than the number of products indicate.

FIGURE 4
The most and least preferred strawberry yoghurts and chocolate bars in terms of conveying sustainability among UK & IRL and DK participants.

	Overall (n = 45)	UK & Ireland (n = 24)	DK (n = 21)
Nutri-score	161	85	74
Nutri-wheel	159	107	61
GDA	129	67	54
Warnings	109	55	51
Keyhole label	106	48	62

FIGURE 5
Overall and country scores for the usefulness of existing front-of-pack health.

participants. The keyhole was considered useful by more DK participants than UK & IRL participants. The reasons for participants' preferences of the Nutri-score and Nutri-wheel label included the label giving an overview, being clear and distinct by using colours. One DK participant noted the Nutri-score's similarity to other sustainability labels:

> *"I think it is a clear label. It is good with the bright colours. And it is similar to the label we know from electrical appliances, where I think most people recognize that the green colour and 'A' is best."* (female, group a)

Some more general views among UK & IRL participants included the ease and speed of reading the labels. One participant explained:

> *"A traffic light system like the one in Label 4 [Nutri-score] is easy to spot at a glance and get a quick snapshot—useful if you are shopping in a rush, although it only allows one overall rating to be displayed."* (female, group 1)

Participants were also given the creative task of making their own sustainability label for food and explain which elements they included and why. The examples (either drawn by hand, in PowerPoint or explained in writing) can be categorized into three as shown in Figure 6.

In both countries, the abstract labels were made by participants (mainly those who did not draw in PowerPoint), who provided pictures of labels with colours, symbols (such as the earth symbol) and logos. Others depicted use of existing labels such as the organic, Fairtrade, animal welfare label, or the logo for recycling packaging. Some even suggested to use the United Nation's Sustainable Development Goals (SDG) as a label. Other participants created various indicators for sustainability.

The indicators most often portrayed among UK & IRL participants were packaging composition or recycling, country of origin or information about ingredients and Fairtrade. Some participants presented summary scores for sustainability, and a few presented these as individual scores for specific indicators. Participants also included mention or links to supplementary materials such as websites or through QR codes.

Among the DK participants, the indicators most often portrayed were organic, packaging composition and recycling, country of origin or information about ingredients, Fairtrade and animal welfare. Quite a number of DK participants wanted an overall sustainability logo to make it easier to assess the sustainability of a product. There was a widespread use of existing labels and certifications such as the Danish and EU organic logo, the Fairtrade logo, animal welfare logos and the FSC label. Some DK participants presented scores for sustainability by using the SDG goals or foot prints indicating in percentages how sustainable a product was. Also, here, a few presented these as individual scores for specific indicators. Very few of the DK participants suggested to use QR codes for more information.

The two analysed tasks spurred much discussion between participants as to how more detailed sustainability information could be conveyed if it did not fit on the packaging label. In both countries, ideas included adding shelf edge labels, leaflets and other store signage

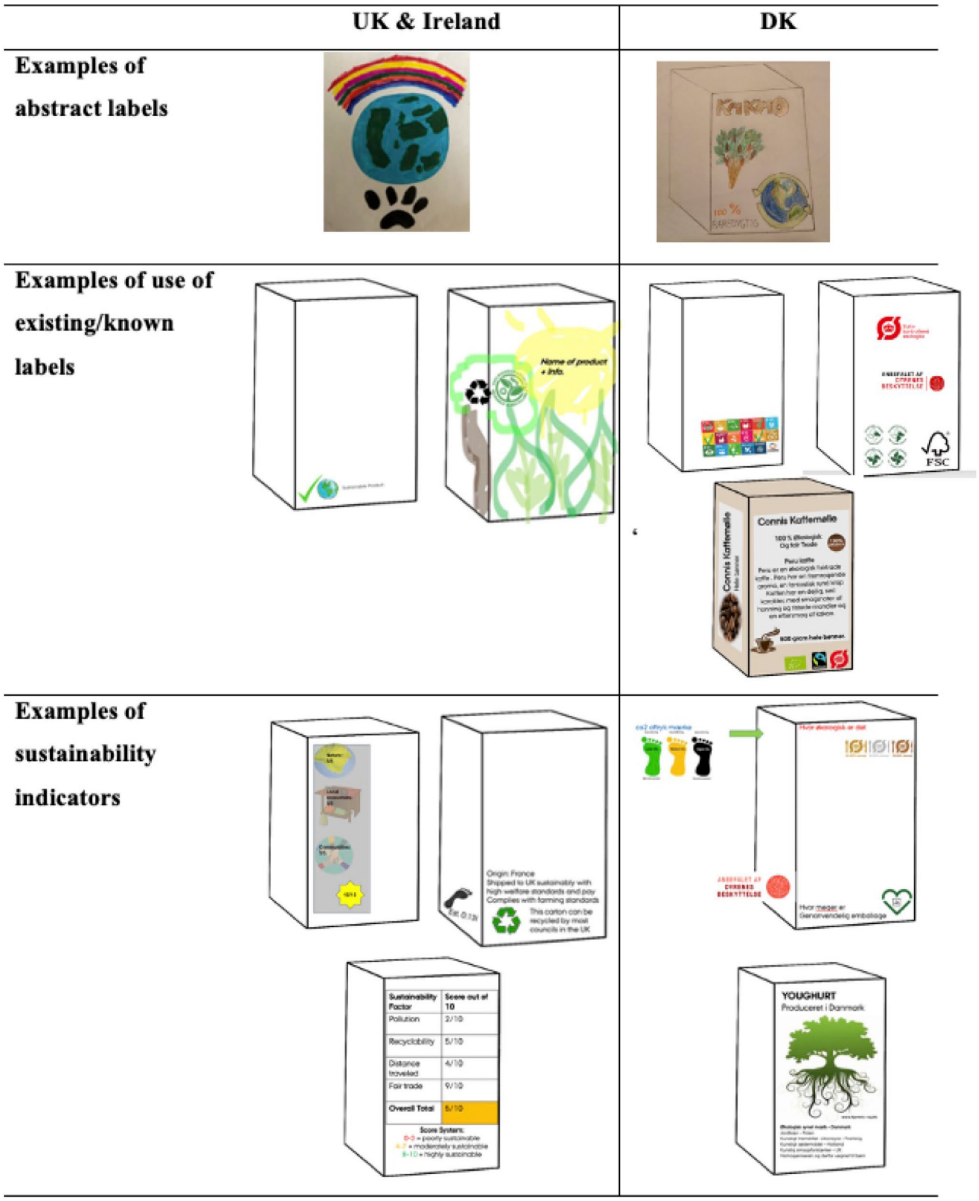

FIGURE 6
Examples of sustainability labels for food made by UK & IRL and DK participants.

to market sustainable products more clearly. A UK & IRL participant mentioned that not all consumers use modern technology to obtain more information:

> *"I reluctantly admit that I am old (and old school) so [I] do not have a smart phone which would allow me to scan QR codes. Even if I had a smart phone, would I be bothered enough to have my phone in hand as I was shopping? I doubt it. Think of the time it would add to a shopping trip."* (female, group 1)

One of the DK participants mentioned the need for catering for consumers not interested in sustainability:

> *"[It is a] good idea with QR codes, but of course it requires active action and to see the content. (…) However, I think more aggressive information is needed, something people (also not interested) cannot avoid seeing and hearing."* (female, group b)

Especially DK participants mentioned that retailers and producers should take more responsibility for informing consumers about sustainability and use this actively in their marketing. UK & IRL participants also mentioned the need for increasing consumer consciousness of sustainability through wider information campaigns. In both countries, the media, TV advertising and social media were suggested as potential channels for campaigns. Participants also mentioned that retailers can encourage more sustainable choices, through the use of dedicated sustainable foods sections, promotions, and discounts.

5 Discussion

This study explored consumer perceptions and preferences for a sustainability label for food contributing with insights into how to develop a sustainability food label, thereby contributing to the literature on consumer studies on sustainable food consumption. Through six online co-creation workshops with consumers in UK & IRL and DK, we found that participants had a basic knowledge of sustainability indicators (renewable energy, fair wages, animal welfare, local produce etc.), and the majority of participants mentioned that sustainability was important in food, and they identified various sustainability aspects (such as packaging, transportation, degree of processing) of food products. Country differences included more focus on the aspect of nature conservation in sustainability in general and plant-based diets for food in UK & IRL, and a reference to windmills in sustainability in general, and more focus on food waste in DK when it comes to food sustainability. However, when it came to the more concrete assessment of sustainability in food, the results clearly showed that participants struggled with weighing the different indicators of sustainability against each other to arrive at an overall assessment of a specific food product. This is also found in previous studies (e.g., Grunert et al., 2014; Sánchez-Bravo et al., 2021). It is particularly apparent that environmental sustainability aspects are more prominent for the consumers [which is also found elsewhere; see Bangsa and Schlegelmilch (2020)], while social ones are less obvious for them to reflect on.

Another distinct result was that participants in all countries thought—especially based on the specific task of looking for sustainability information on products in an online supermarket—that sustainability information was inadequate, if not lacking on food products; both on the actual products, but also in the retail setting. Hence, products displaying sustainability information were clearly identified as the most informative, thereby having an advantage of receiving attention from sustainability-concerned consumers, but even these products were not considered informative enough. Since sustainability labelling is considered one of the most effective tools for reducing the information asymmetry between sellers and buyers regarding sustainability issues (Torma and Thøgersen, 2021), there is a huge potential for producers to inform consumers even more about the sustainability of their products. Despite this and despite that both consumers and food sector stakeholders appear to be "ready" for sustainability labelling, it is unlikely that sector stakeholders can agree on a consistent application on all products according to Futtrup et al. (2021).

Consumers knew of and had preferences for existing health front-of-pack labels, but when asked to create a sustainability label for food products, participants struggled—despite the inspiration from health labels—to create a label including all the perceived necessary aspects of sustainability and—at the same time—being easy to read and understand. This became especially clear when participants presented their labels (Figure 6) and commented on the labels from the other participants. Besides numerous participants lacking graphical skills, many participants also underlined the complexity of capturing all relevant sustainability indicators in one label and that they needed more knowledge and expertise to understand such labels. Based on this, several participants gave up developing their own label further due to this complexity. This is in line with findings from a recent study, where a number of barriers for implementing a more holistic sustainability label on food were identified. Here it was found that it is challenging to convey complex information in an easy fashion to consumers, since there are many aspects of sustainability and their relevance and impact can vary between products, producers, supply chains, and even from one product batch to the next (Futtrup et al., 2021).

Hence, the results clearly highlight that a fundamental understanding of various indicators of sustainability is necessary for consumers, and the more they know, the more demands they have for sustainability labels. They also acknowledge that sustainability of food products is extremely complex. The results give insights into how sustainability indicators can be communicated on food products in terms of packaging, labels and other information. In all countries, consumers wanted producers, retailers and policy makers to take more responsibility for communicating sustainability in food products, so the consumers could more easily be guided to enact responsible consumer behaviour (Giesler and Veresiu, 2014; Torma and Thøgersen, 2021).

5.1 Limitations and future research

This was a qualitative study and, hence, the sample sizes were small and the generalisability limited. However, we had enforced quotes on age, gender and education to ensure a fairly national representative group composition, which adds to the validity, as well as the fact that it was a pre-recruited probability-based panel. We had four screening questions to ensure that consumers had at least some experience with buying food and had some consideration regarding sustainability when doing so, which helped us recruit relevant participants for the purpose of our study.

In addition, we enhanced the validity of the findings by running three co-creation workshops in two countries with a duration of 14 days each. Related to that, there was no verbal interaction between participants, even though there could have been, but then we could not have followed the same script in all groups, which would have made the data more difficult to compare. Also, the duration allowed participants to go back and comment or change their answers, which gave participants a better chance of reflecting on own and other participants' input and comments thereby underlining the co-creation approach. However, our data does not document how often this was done by participants, but it is the moderators' impression that it happened relatively seldom. In all countries, the number of visits to the platform during the 14 days were between 8 and 18 to solve all tasks. Participants' evaluation of the workshops (1 = Not at all, 7 = Very much) showed that they found the co-creation workshops both interesting (UK & IRL_{mean} 6.2; DK_{mean} 6.2) and useful (UK & IRL_{mean} 5.8; DK_{mean} 5.8), and that the time for each task was sufficient (UK & IRL_{mean} 5.6; DK_{mean} 5.7).

The study is one example of how consumers' inputs and preferences can be approached in certain geographical locations, hence, the generalisability is limited. The online workshops were conducted in what we identified as average and leading countries in terms of sustainability (SDSN, 2019), and, therefore, there were no countries scoring low on sustainability in our study. This might have resulted in different views, if consumers were less familiar with sustainable foods—however, the participants were screened for not

being experts in sustainability, but they were also screened out if they were not at all concerned with sustainability.

It might appear from the analysis that only Danes were concerned with organic labelling. However, the frequent mentioning of the Danish organic label among Danish consumers across the different tasks might be due to the widespread recognition of the label in DK and Danish consumers being leading in buying organic food products (Organic Denmark, 2021). Hence, it does not necessarily imply that UK & IRL consumers are not aware of organic labelling, and it should be mentioned that the EU organic label could be found on food products in all three countries at the time of the study. The reason might be that the Soil Association organic logo in the United Kingdom is not as well-known among consumer compared to the Danish one.

Another important limitation is that we did not look into the relation between consumer understanding and preferences for sustainability information formats and the actual environmental impact of different mentioned products. This was considered too complex to calculate on a daily basis for all the different products mentioned.

We suggest that future research should focus on generalizability of our findings through representative cross-sectional surveys and online choice experiments with consumers in, for instance, EU, to secure a broader picture of differences in consumers' understanding and perception of sustainability of food and sustainable food labels. Such experiments could test the potential mismatch of consumers' perception of sustainability with available quantitative evidence from sustainability assessments of food products. This would provide policy makers and label developers with interesting insights to where consumers are struggling the most, which could be used for more targeted communication. In addition, such experiments could compare the familiarity of sustainability labels (existing vs. new ones), and they could also control for brands, as consumers might have strong sustainability associations to certain brands. Also, longitudinal studies of not only actual labels, but also the introduction to the market (communication, campaigns etc.) could be beneficial for understanding more about consumers' perception of sustainability food labels and potential barriers for understanding and using them actively when buying food. More information on consumers' understanding of products' environmental impact through life cycle analysis would also be beneficial for pointing out where consumers have special difficulties to assess sustainability of different products.

5.2 Conclusions and implications

Overall, this study contributes with a bottom-up approach providing a deeper understanding of consumers' associations, preferences and co-created ideas on sustainability as a concept in food and sustainability labelling on food in DK, UK & IRL. It shows that there can be country differences in the relative importance of different sustainability aspects. Consumers focus to a greater extent on environmental sustainability aspects. We conclude that the challenges consumers identify with regards to assessing sustainability in food and developing a sustainability food label are as follows: having basic knowledge of sustainability, weighing sustainability indicators and creating a summary sustainability label that is easy to read and understand. If such a label could be developed, it would help consumers make more sustainable food choices. This is valuable input to food producers, retailers and policy makers: Food producers can optimize the sustainability communication of their products [ideally without greenwashing their products (Seele and Gatti, 2015)], and retailers can assist consumers by including relevant and fact-based sustainability information in the physical and online retail setting, thereby taking more responsibility, as called for by consumers. Policy makers have introduced nutritional food labels, and hence, they have experience to draw on when creating and introducing a similar overall holistic, multi-dimensional summary sustainability label as has been discussed at the EU-level. Such a sustainability food label (and certification) supports EU's Farm to Fork Strategy (European-Commission, 2020b) as it would help promote sustainable food consumption. However, in our small sample of three countries we found some differences in consumers' understanding of sustainability in food as well as their requirements to a sustainability food label. Creating a holistic, multi-dimensional summary sustainability food label that is perceived as understandable and as a support for sustainable food choices among consumers in 27 very different EU countries is a huge challenge—also when it comes to the uptake of such a label. However, in the event of success, such a label might change the whole setup for using sustainability information in the food industry and thereby facilitating a choice architecture for consumers that will support more sustainable food choices.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The study obtained ethical approvals from both the ethical committee at Queen's University Belfast (MHLS 20_80) and Aarhus University, Denmark (2020-0086301). Informed consent was given from the participants to participate in this study.

Author contributions

SP: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Visualization, Writing – original draft. TB: Conceptualization, Data curation¸ Formal analysis, Investigation, Methodology, Validation, Writing – review & editing. GT: Investigation, Methodology, Writing – review & editing. RF: Conceptualization, Investigation, Methodology, Writing – review & editing MD: Conceptualization, Funding acquisition, Project administration, Supervision, Writing – review & editing. JA-W: Conceptualization, Funding acquisition, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing, Validation.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/frsus.2023.1342215/full#supplementary-material

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