Understanding food sustainability from a consumer perspective: a cross-cultural exploration

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Abstract

To successfully transition to more sustainable diets, it is necessary to understand consumers´ demands and expectations. The present exploratory research shows a cross-cultural study (Spain, Slovakia, Denmark) in which different aspects were included in an online survey: (i) food choice motivations, (ii) the importance that consumers give to different attributes of four product categories: fruit and vegetables, bakery, meat, and fish, and (iii) the concepts that consumers´ relate to the term "sustainability". The results showed preliminary significant differences among countries, suggesting that developing strategies and new products to promote sustainable consumption habits must address these cultural differences.

HIGHLIGHTS

- Different attributes of 4 product categories were assessed and differently valued
- Tastyness and pleasure sensations were the food choice drivers in the 3 countries
- The environmental dimension items were linked to *sustainability* in the 3 countries

KEYWORDS

FOOD CHOICE, FOOD CATEGORIES, FOOD WASTE, ONLINE SURVEY, EUROPEAN REGIONS

INTRODUCTION

The food system is considered one of the main drivers of climate change and its activities require an intensive use of resources (Poore & Nemecek, 2018; Shukla et al., 2019). It is estimated that in a business-as-usual scenario, the effects of the food system on the environment could increase by 50-80 % between 2010 and 2050 (Springmann et al., 2018). A change towards more sustainable production and dietary patterns (e.g., an increase in plant-rich diets, healthy calories, high yields and efficiency, food loss and waste reduction) has been reported to significantly reduce the environmental impact of the food system (Frehner et al., 2021; Osei-Owusu et al., 2022), preventing a higher increase of the targeted increment of 1.5 ºC – 2 ºC in the average global temperature associated to climate change (Clark et al., 2020). However, food preferences, choices, and eating habits are difficult to change, as they are strongly linked with people's lifestyles and their socio-cultural environments (Vermei et al., 2020).

Consumers´ awareness on sustainability has increased during the last years. A recent study made by the European Consumer Organization (2020) revealed that 42,6% of consumers reported a "sustainability concern" when assessing their own eating habits, but "sustainability" was not defined. The World Commission on Environment and Development published in 1987 a definition to understand sustainability as a balance among environmental, social, and economic dimensions (WCED, 1987); from that moment on, different ideas have been proposed on how to reach this equilibrium because every context has its particular necessities. For that reason, some authors have exposed the need to understand how consumers perceive the idea of "sustainable" to succeed in proposing initiatives that seek more viable consumption habits (Simpson & Radford, 2012; White et al., 2019). Additionally, insights suggested by consumers from different

cultures could help promoting a global and sustainable food consumption but focusing on local interests (EAT-Globescan, 2021).

Chen & Antonelli (2020) identified some of the factors affecting food choice and classified them into three main categories: (1) Food-related features: intrinsic and extrinsic, (2) individual differences: biological, physical, psychological, cognitive, and social factors, and (3) society-related features. In the last years, food companies have been trying to adapt or design foods to meet consumer needs and preferences, favoring the selection of their products, and optimizing their processes to reduce the environmental impact of their activities. The consumer has been placed at the center of the reformulation or design process, and several methods have been designed to drive the process and collect consumers' inputs (Busse & Siebert, 2017; Dijksterhuis, 2016).

Pucci et al. (2021) showed that different personal attitudes such as the openness to new foods, the involvement in food trends, or the use of social media, could have a different impact on the adoption of a sustainable diet in different countries (Italy, Poland, Germany, USA, Brazil, Japan, Korea and China). With the aim of increasing understanding on consumers' ideas about sustainability linked to food products, and how to properly communicate food properties to encourage sustainable decisions related to food habits, this study was designed to (i) identify the main food consumption motivations, (ii) identify which attributes related to the concept of sustainability were considered important in different product categories, and (iii) understand the perception of the concept "sustainability" using an online survey disseminated in 3 European regions which represent different European gastronomies (Spain -Mediterranean-, Slovakia -central Europe-, Denmark -North Europe-).

MATERIALS AND METHODS

An online questionnaire was designed and disseminated using the RedJade® sensory software (RedJade Sensory Solutions, LLC; CA, USA). Over 450 adult respondents were reached using the communication channels of the different organizations participating in the research (62 % women, 37 % men, 1 % preferred not to disclose; 5 % from the 18-25 years old group, 36 % from the 26-35 y/o group, 26 % from the 36-45 y/o group, 18 % from the 46-55 y/o group, and 15 % over 56 y/o), and a set of responses was collected from citizens in Spain, Slovakia, and Denmark. From the collected answers, after filtering incomplete questionnaires, 137 responses were used from each country for the data analyses. The first section of the questionnaire was composed by the single-item Food Choice Questionnaire reported by Onwezen et al. (2019), in which the relevance of 11 different dimensions related to food choice motivations have to be rated using a 7-points scale ("1 = completely disagree", "4 = neither agree, nor dis- agree", and "7 = completely agree"). Then, a Check-All-That-Apply (CATA) question was presented, showing 47 terms to be related to the "sustainability" concept; the list of terms was based on the one reported by Simpson & Radford (2012) with slight modifications. Finally, to identify which attributes consumers report as impactful to select different food categories (fruits and vegetables, bakery products, meat, and fish), four CATA questions were included (one for each category); the list of attributes was based on the one reported by Verain et al. (2017), and the questions were introduced with the sentence "it is important to me that *category* products are …". The entire survey was designed in English, reviewed by researchers of the 3 participant countries, and back-translated to Danish, Slovak, and Spanish languages.

Responses to the single-item FCQ were analyzed using a two-ways Analysis of Variance (ANOVA) using "motivation" and "country" as factors, and the interaction motivation*country. The responses to the CATA questions were analyzed using a

Cochran´s Q pairwise comparisons test based on the McNemar-Bonferroni approach to identify significant differences among countries. All the results were analyzed using XLSTAT 2009.6.03 (Addinsoft, USA).

RESULTS

Significant differences were found in the Food Choice responses for both "motivations" and "country" factors, as well as for the interaction "motivation*country". The three explored European countries presented different Food Choice profiles, as shown in Figure 1. Significant differences were detected for 7 of the 11 considered attributes among countries ($p < 0.05$). All countries considered the hedonic aspect of foods important, being "provides me with pleasure sensations" one of the motives with higher ratings. Besides this one, "natural", "healthy" and "affordable", were the most important motives in Denmark, and "healthy", "natural", and "environmentally friendly" were the most important in Slovakia and Spain. Responses from Slovakia highlighted because of the high ratings on the "familiar", and "animal-friendly" aspects of food choice motivations. Previous investigations have detected that one of the main barriers for consumers when selecting a food product was the need to choose between hedonic and low-impact options (Aschemann-Witzel et al., 2019), and therefore the eco-design of a food product needs to also focus in tastiness to be successful. Although there is still a need to fill the gap between intentions and action, acceptance of different food products could be boosted by highlighting the attributes of interests reported by the population of the targeted country (Loy et al., 2016).

Table 1 shows the CATA results, indicating the concepts that were marked by respondents when asked about "sustainability". Significant differences across countries were found in 13 of the 17 items. Spain was the country that showed a wider vision on the meaning of "sustainability", with over 50 % respondents marking 17 terms which

included the environmental (e.g., "environmentally friendly", "minimize waste"), social (e.g., "work ethics", "health"), economic (e.g., "economic balance") and time (e.g., “future generations”, “future”) dimensions. Over 50 % of Slovakian respondents marked eight concepts, which coincided with some of the ones marked by Spanish respondents and that comprised environmental and time dimensions. In the case of Denmark, only four terms were mentioned by over 50 % of respondents, all of them associated with the environmental dimension.

Figure 2 shows the mentioned frequency of the attributes that respondents considered important in different product categories. In the case of Fruits and Vegetables, “healthy”, “have a low usage of pesticides”, and “tasty” were the main concerns for consumers from the three countries (over 50 % of respondents marked those terms). However, significant differences ($p < 0.05$) were found among countries for 13 of the 15 presented terms. Slovakia highlighted because of a higher % of respondents selecting “healthy” and “come from my country”. In general, Spanish and Slovakian respondents selected more attributes than Danish respondents did, including “seasonal”, “produces little waste”, “have no packaging”, “comes from my region”, “locally produced”, and “short transportation distance”. A higher % of Danish consumers marked the “have an ecolabel” option.

For Bakery products, “tasty” was also an important property for the three studied countries. Nevertheless, significant differences ($p < 0.05$) were shown among countries in 11 of the 15 presented terms, with a higher % of respondents from Slovakia choosing “gives little waste” and “comes from my country”, and a higher % of Spanish and Slovakian respondents marking “healthy”, “comes from my region”, “locally produced”, and “short transportation”. “Having an ecolabel” was marked by a higher % of Danish and Slovakian respondents than Spanish ones.

Significant differences were found ($p < 0.05$) in 11 of the 16 presented terms related to Meat products. Slovakia had a larger % of respondents marking “comes from my country”. Spain and Slovakia showed a similar response pattern in some attributes because over 50 % of consumers marked “environmentally friendly”, “animal welfare certification”, and “locally produced”.

In the case of the Fish products, in concordance with the other food categories, the attribute that seemed to be important for more than 50 % of participants of the three countries ($p > 0.05$) was “tasty”. “Healthy” was also a highly mentioned attribute in Slovakia and Spain, as well as “environmentally friendly”, “produces little waste”, “have a short transportation distance” and “have a low carbon footprint”. In addition, while for the Spanish participants, “are caught in a sustainable way” was a highly valued attribute, “low usage of antibiotics” was important for the Slovak respondents.

Findings of the present exploratory research could be summarized highlighting the differences among countries in terms of food choice motivations and perception of sustainable-linked concepts, as well as observing the reasons for choosing specific foods from different categories in the studied countries. Spanish, Danish, and Slovakian respondents showed different ways of understanding the link between food and sustainability, although have a common European regulations framework. Results shown in the present study could be used as a baseline to start researching the role of consumers’ perception and their habits on moving forward a sustainable system. Using different labels adapted to consumers’ understanding and interests, designing guidelines and communication campaigns in which the key communication drivers of each food category are observed, including educational tips related to sustainable food choices at school and university programs may be examples on how to reach different citizen segments, always

trying to address consumers' misconceptions to promote more sustainable habits (e.g.: Lazzarini et al., 2018).

IMPLICATIONS FOR GASTRONOMY

The present manuscript includes a cross-cultural study of 3 European regions on consumers' motivations for choosing general foods, and specific product categories in particular. In addition, the results offer an overview of the different ideas that the concept of "sustainability" arouses in consumers. Although it is a simple exploratory study, findings are relevant to help food developers and the entire HORECA sector drive a more sustainable food system by providing data to better understand consumers and diners of different countries. In a world increasingly concerned about climate change and the environmental impact of certain human activities, the information on how to drive consumer choices to a more sustainable option is essential to promote a successful change.

CONCLUSIONS

Results of the present exploratory research suggested that any food product belonging to different categories needs to be "tasty" to be selected by consumers, and therefore successful in the market. "Sustainability" cannot be disaggregated from "deliciousness" because consumers from the three researched countries highly valued "pleasure sensations" in the Food Choice Questionnaire, and "tastiness" of the different food categories. The responses about the ideas associated with "sustainability" revealed some common thoughts of the three countries: those that are particularly related to the environmental dimension. Therefore, different strategies should be developed depending on the culture to highlight or reinforce the importance of the different dimensions of sustainability to drive the path to a more sustainable consumption. Although preliminary and considered tentative because of the limited participation in each country, the present

214 results could be considered a starting point to deep into the citizens understanding of
215 sustainable food related practices, as well as cultural differences that may impact habits
216 and food choices.

217

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Table and Figure Captions

Table 1. Relative frequency of mentioning different terms associated with "sustainability" marked by over 50% of respondents in at least one country. Different letters within the same row to indicate significant differences among countries ($p \leq 0.05$; pairwise comparisons using the McNemar-Bonferroni approach).

Figure 1. Two-ways ANOVA results of the Food Choice Questionnaire showing the interaction "motivations*country". Legend: Different letters to indicate significant differences among countries by the Food Choice motivation concept.

Figure 2. Frequency of mention of terms that respondents marked when asked about important attributes in a) fruit and vegetables, b) bakery, c) meat, and d) fish products. Legend. Terms marked with (*) were significantly different among countries ($p < 0.05$); dashed line to highlight the 50% threshold.

Table 1.

Concept	Spain	Slovakia	Denmark
Environmentally friendly	0.81 a	0.60 b	0.54 b
Minimizing waste	0.76 a	0.62 ab	0.48 b
Environment	0.76 a	0.62 a	0.51 b
Ecologically friendly	0.75 a	0.45 b	0.45 b
Recycling	0.73	0.58	0.50
Low footprint	0.68 a	0.57 a	0.31 b
Green	0.58	0.44	0.46
Future generations	0.58	0.53	0.36
Personal responsibility	0.58 a	0.53 a	0.32 b
Reduced packaging	0.58	0.48	0.50
Fair trade	0.56 a	0.38 b	0.44 a
Health	0.55 a	0.42 a	0.26 b
Future	0.55 a	0.50 a	0.31 b
Local sources	0.54 a	0.47 a	0.33 b
Workplace ethics (e.g., sweatshop, child labour, ethical labour)	0.53 a	0.38 ab	0.29 b
Balancing money	0.52 a	0.08 b	0.12 b
Managing for the future	0.50 a	0.30 b	0.38 ab

Figure 1.

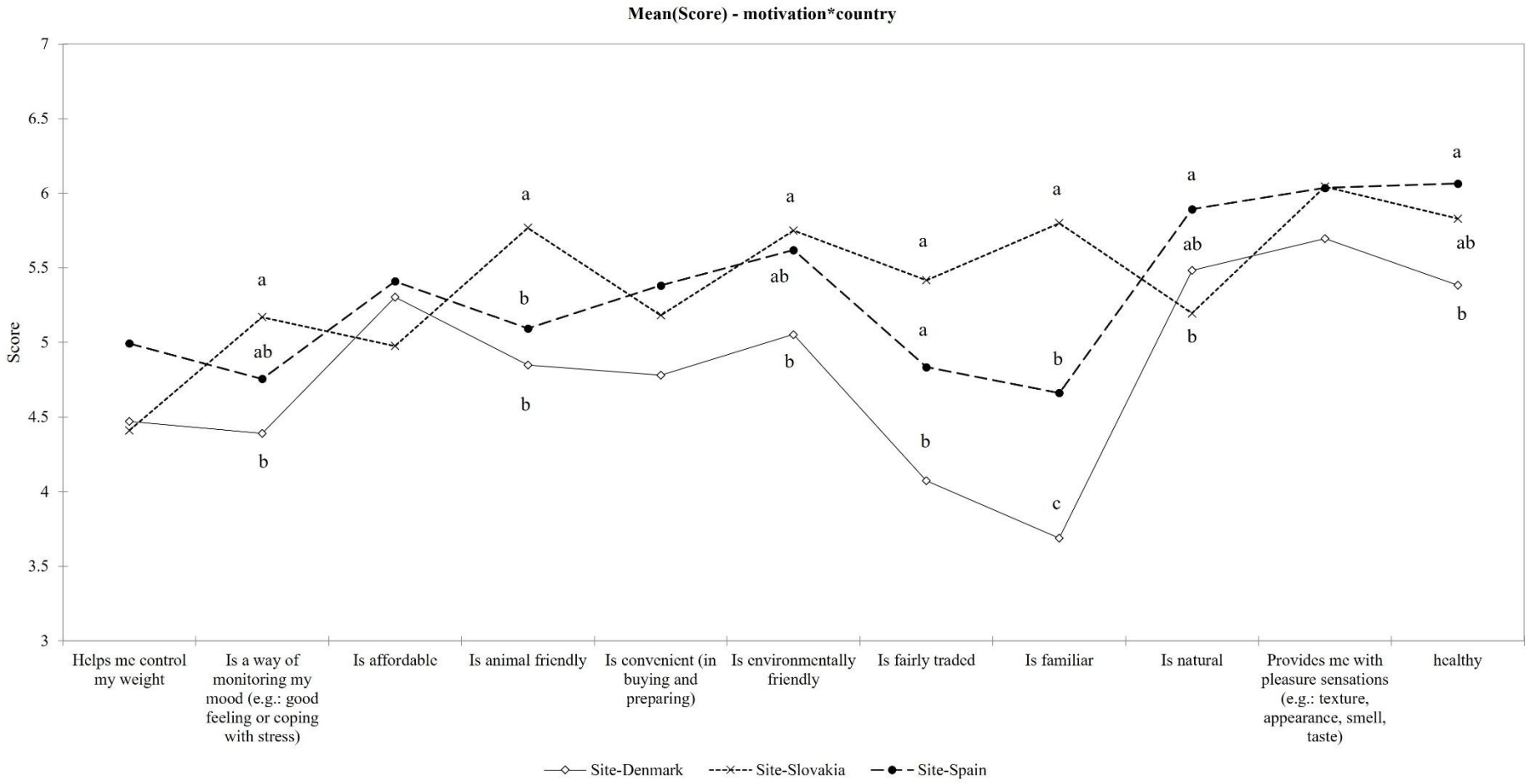
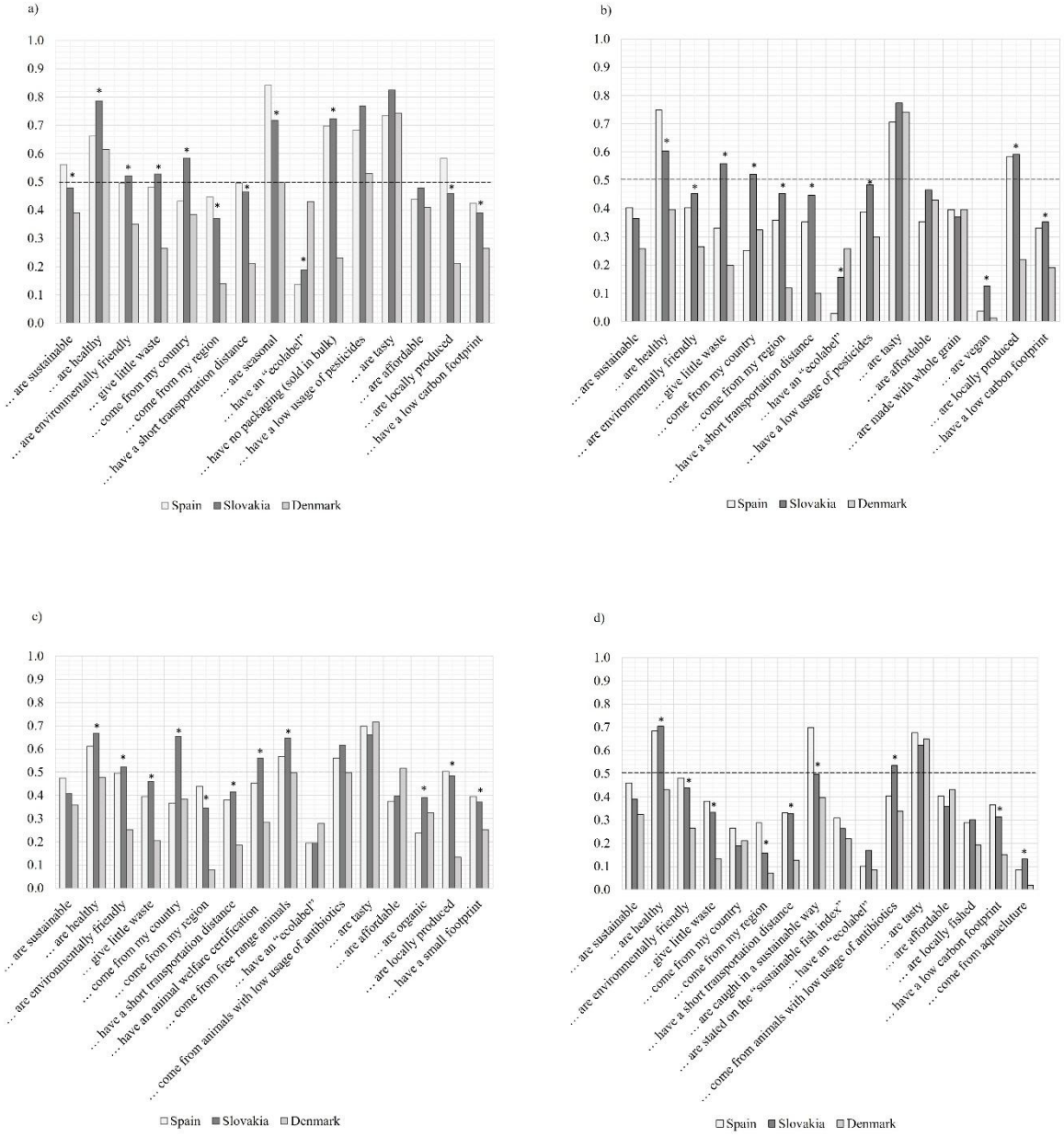

Mean(Score) - motivation*country
Score
7
6.5
6
5.5
5
4.5
4
3.5
3
Helps me control my weight
Is a way of monitoring my mood (e.g.: good feeling or coping with stress)
Is affordable
Is animal friendly
Is convenient (in buying and preparing)
Is environmentally friendly
Is fairly traded
Is familiar
Is natural
Provides me with pleasure sensations (e.g.: texture, appearance, smell, taste)
healthy
Site-Denmark
Site-Slovakia
Site-Spain

Figure 2.


a)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
… are sustainable
… are healthy
… are environmentally friendly
… give little waste
… come from my country
… come from my region
… have a short transportation distance
… are seasonal
… have an "ecolabel"
… have no packaging (sold in bulk)
… have a low usage of pesticides
… are tasty
… are affordable
… are locally produced
… have a low carbon footprint
Spain
Slovakia
Denmark
b)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
… are sustainable
… are healthy
… are environmentally friendly
… give little waste
… come from my country
… come from my region
… have a short transportation distance
… have an "ecolabel"
… have a low usage of pesticides
… are tasty
… are affordable
… are made with whole grain
… are vegan
… are locally produced
… have a low carbon footprint
Spain
Slovakia
Denmark
c)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
… are sustainable
… are healthy
… are environmentally friendly
… give little waste
… come from my country
… come from my region
… have a short transportation distance
… have an animal welfare certification
… come from free range animals
… have an "ecolabel"
… come from animals with low usage of antibiotics
… are tasty
… are affordable
… are organic
… are locally produced
… have a small footprint
Spain
Slovakia
Denmark
d)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
… are sustainable
… are healthy
… are environmentally friendly
… give little waste
… come from my country
… come from my region
… have a short transportation distance
… are caught in a sustainable way
… are stated on the "sustainable fish index"
… have an "ecolabel"
… come from animals with low usage of antibiotics
… are tasty
… are affordable
… are locally fished
… have a low carbon footprint
… come from aquaculture
Spain
Slovakia
Denmark