



Consumers' knowledge about the determinants fo a sustainable diet

Deliverable No. 2.1

SUSFANS DELIVERABLES

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The deliverable will report on Task 2.1. Drawing on the results of a web-survey, it will discuss the importance of incorporating national and regional habits into metrics and models for the SFNS diet.



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Abstract

Background. The aim of the survey is to determine sustainable food behaviour from a consumer perspective, to get insights in consumer perceptions of sustainability, to measure determinants of sustainable food behaviour and to identify similarities and differences across European countries. The goal of identifying such determinants is to find out which behaviour consumers are willing to change under which conditions and translate this into metrics and models for a sustainable and healthy diet.

Methods. In this study we conducted a web-survey among 5043 respondents in total from 5 countries (The Netherlands, Denmark, Czech Republic, France, Italy). Respondents were retrieved from existing consumer panels and roughly equally distributed over countries. The sample was representative for age, gender, degree of urbanisation and education level.

Results. The data suggest that important aspects of consumer perceptions of sustainable food consumption are: seasonal fruits and vegetables, food waste, water use and use of natural resources. Self-reported intake of sustainable foods shows that seasonal/local food was the most frequent sustainable food behaviour, followed by free range products/products with a sustainability logo/smaller portions, followed by organic/fair trade products, and least frequently vegetarian products. When they were asked about replacers of meat, the respondents were most open to animal-based products (fish, cheese and eggs), to which they are, on average, moderately open. The second favourite alternative are plant-based products to which they are, on average, not so open. Consumers are least open to new products like insects or in vitro meat. Overall, consumers are, on average, not really conscious when it comes to sustainable consumption. Within domains of sustainable consumption, consumers are most conscious about sustainable consumption from an economic viewpoint (caring for long-term economic and personal well-being), followed by the social viewpoint (maximize beneficial impact on society) and least conscious about sustainable consumption from an environmental viewpoint (including recycling, packaging, resources and energy, local production, climate). Country, demographics, general and specific psychographic, and food choice motives are all important determinants of openness to meat alternatives.

Conclusion. The results give us insight in how consumers see sustainable food behaviour and to what degree they perform sustainable behaviours. We see that consumers are not really conscious about sustainable consumption. When we look at domains within sustainable consumption, results show that consumers are most conscious about sustainable consumption from an economic viewpoint compared to a social or environmental viewpoint. Results also show that consumers have a positive attitude and a neutral interest in sustainable consumption which suggests they might be somewhat willing to change towards

sustainable food consumption. Consumers' most frequent sustainable consumption behaviour is eating seasonal/local food and eating free range products/products with a sustainability logo/smaller portions. In terms of openness to alternatives for meat, animal-based products are most popular. The degree to which consumers are open to sustainable food depends on their demographic as well as psychographic characteristics.

Introduction

Aim

The overall aim of SUSFANS is to strengthen food and nutrition security in Europe, by advising food policy makers regarding healthy and sustainable food production and consumption. Work package 2 contributes to this aim by providing a better understanding of consumers' drivers of dietary change and their responses to dietary recommendations regarding sustainable and health food consumption. Recommendations for improvement of dietary patterns will only be effective when consumers are willing to change their diets. Therefore, insight into the drivers of food choices is crucial.

The aim of the web-survey in task 2.1 is to identify drivers of change of food diets across different countries. Determinants of sustainable and healthy food consumption will be studied and similarities and differences across European countries (DK, IT, FR, CZ and NL) will be investigated. The goal of identifying such determinants is to find out which behaviour consumers are willing to change under which conditions. Such insights are important to take into consideration in modelling the options for more sustainable and healthy diets.

Sustainable food consumption

Sustainable food consumption covers a wide variety of topics. The Dutch government uses a definition comprising respect for the environment, animals and humans (LNV, 2009). Many studies define sustainability in a similar way by including the environment, animal welfare and Fair Trade (e.g. Grunert & Juhl, 1995; Lockie, Lyons, Lawrence, & Mummery, 2002; Reynolds, 2002). In addition, the definition of the World Commission on Environmental Development (WCED, 1987), focussing on balancing the needs of current consumer and future generations is often used for describing sustainability. In short, sustainable food can be defined as food that is produced, processed, packaged, transported and traded with respect for people, animals and the environment, without compromising future generations.

In 2011, the Health Council of the Netherlands published a report in which guidelines for a healthy diet were evaluated from an ecological perspective (Health Council of the Netherlands, 2011). This report formulated two dietary guidelines which would lead to health and ecological gains simultaneously: the

use of less animal-based and more plant-based diets and a decrease in energy intake from snacks and beverages for those with excess body weight. The strategy where consumption of unsustainable products is reduced (and replaced by other foods with a lower environmental impact) is called curtailment and is an important pathway to reduce the environmental impact of one's diet (Foresight, 2011; Garnett, 2011; Jungbluth et al., 2000; Verain et al., 2015). In addition a food product can be replaced by similar products that are produced in a more environmentally-friendly and/or animal-friendly way (e.g. organic food or free-range meat) (see Vanhonacker; van Loo, Gellynck & Verbeke, 2013; Verain et al., 2015).

In this study we define sustainable food consumption as consumption of sustainable food products in combination with curtailment of food intake, especially the intake of unsustainable product categories. This entails a diet that contains high levels of plant-based products and low levels of animal-based products.

Determinants of food choices

Consumer food choices are determined by consumer characteristics. These determinants include demographics (e.g. gender, age) and psychographics (e.g. knowledge, attitude). Demographic variables that turn out to be important in food choice are age, gender, income, and education. Psychographic determinants of general food choice include for example several food-related motives such as the importance of price, taste, health, involvement with food, food neophobia, and openness to new foods. More specific, determinants of sustainable food choice include sustainable food knowledge, attitudes toward sustainable food consumption, social and personal norms, and perceived effectiveness of sustainable behaviour (Aertsens, Verbeke, Mondelaers, & van Huylenbroeck, 2009; Arvola et al., 2008; Bezencon & Blili, 2011; de Boer, Hoogland, & Boersema, 2007; Dowd & Burke, 2013; Lindeman and Vaananen, 2000; Tanner & Kast, 2003; Toma, McVittie, Hubbard, & Stotta, 2011; Verain et al., 2012; Vermeir & Verbeke, 2006).

Content

This report presents an overview of the web-survey, in which the determinants of sustainable and healthy food consumption are explored. The report includes the method, the results and the discussion. In the section where we discuss the method we will elaborate on how the survey was conducted, who participated and which measures were included. In the section where we discuss the results we report our findings about consumers' perceptions on sustainable and healthy food, their behaviours regarding sustainable and healthy food consumption and determinants of food consumption. Also, differences between the Netherlands, Denmark, Czech Republic, France and Italy are discussed. Finally in the discussion we write down our conclusions and take a critical look at our work.

Method

Procedure and respondents

Data collection took place with an online survey in five European countries: The Netherlands, Denmark, Czech-Republic, France and Italy. These countries were selected to obtain a spread across North, South and Eastern Europe.

The survey has been developed in English and has been translated with forward and backward translation by professional translators. In addition, these translations were checked by native speaking researchers from the SUSFANS consortium on understanding of the wording and jargon used in the questionnaire.

The draft questionnaire was tested in a quantitative pilot. It was an online questionnaire in which we tested a range of questions and items that had not been validated before. The pilot was conducted in the Netherlands (N=100) and Czech Republic (N=100). Reliability of items was tested with factor structures and reliability analysis (Cronbach's alpha) and by looking at the means and percentages of the answers. Small adaptations in terms of terminology or including items have been done after the pilot and the knowledge questions were adapted.

Respondents were recruited by MSI-ACI, a market research company that can blend different consumer panels and sample sources for each study through one controlled platform, coordinated from The Netherlands. Quota were set to get a good spread on gender, age, education and degree of urbanisation. Participants had to be 18 years of age or more to be eligible for participation. Data collection took place in spring 2016, in all countries simultaneously. All respondents from the survey and pilots were paid for their participation.

For the final survey, a total of 5116 respondents was recruited: 1021 in the Netherlands, 1021 in Denmark, 1038 in Czech Republic, 1018 in France and 1018 in Italy. 73 participants have been excluded from the analyses because they showed low dispersion on a whole range of items, indicating that they did not seriously fill out the questions. 17 participants show zero variation in their answers to all of the seven-point scales, indicating no serious participation. 56 participants show zero variation in their answers to the final ten seven-point scale questionnaires, indicating boredom at the end of the survey.

Measures

The questionnaire consisted of three parts. First, measures on sustainable and healthy food behaviours have been included. Second, specific psychosocial variables related to healthy and sustainable food choices have been included. Third, general underlying factors such as values, motives and socio-demographic characteristics have been included. For all scales, items were presented in a random order, unless indicated otherwise. All scales have been

checked by conducting exploratory factor analyses with oblique rotation. Reliability of the scales have been checked with Cronbach's alpha.

Consumer perception of sustainable and healthy food behaviour

Respondents were asked to select from a long list of items, which of the aspects in their opinion have to do with sustainability of food. From the items they selected, they were asked to indicate their top 5 of most important aspects. The same questions were repeated for healthiness of food, with a different set of items related on healthiness. Next, respondents were asked to rank the four sustainability domains on which SUSFANS focusses (balanced and sufficient diets; reduced environmental impact; viable and socially balanced agri-food business; global food and nutrition security), from most important to least important.

Sustainable food intake

Respondents were asked to indicate for a range of sustainable food behaviours how many days a week they eat them at their main meal. The items were based on Verain, Dagevos and Antonides (2015) for the measurement of the consumption of sustainable food products and curtailment of unsustainable food categories. Factor analysis identified four underlying factors with a total explained variance of 67%. The first factor included 5 items measuring the consumption of organic and fair trade consumption (Cronbach's alpha .903). The second factor consists of three items on the consumption of seasonal and local products (Cronbach's alpha .779). The third factor included five items on meat replacement (Cronbach's alpha .830) and the last factor combined seven items on free range products, products with a sustainability logo and small portions of meat and dairy (Cronbach's alpha .891).

Hierarchy of foods

Respondents were asked 'If you were to eat less meat during dinner in the future, to what extent would you be open for the following alternatives?'. A range of possible meat-replacing products was included. Respondents had to rate their openness to these alternatives on a seven-point scale from 'Not at all' to 'A lot'. The included products call to mind the hierarchy of food (Twigg, 1983), including both animal-based and plant-based options. Factor analysis shows three underlying factors: one factor combining all animal-based alternatives (Cronbach's alpha .751), one factor combining all plant-based alternatives (Cronbach's alpha .842) and one factor combining new innovative alternatives (insects and in vitro meat) (Cronbach's alpha .741). Together, the factors explain 58% of the variance.

Consciousness for fair consumption and pro-environmental lifestyle

Consciousness for fair consumption was measured with a scale developed by Balderjahn, Peyer and Paulssen (2013). Respondents were asked to indicate on

a 7-point scale (1= strongly disagree, 7=strongly agree) to what extent they agreed with 19 sustainability beliefs. The beliefs included environmental, social and economic aspects of sustainability. The question for the environmental and social aspects was as follows: 'I buy a product only if I believe that (during the manufacturing)... (e.g. '... it is made from recycled materials' or '...workers are not abused'). The question for the economic aspects was as follows: 'Even if I can financially afford a product, I buy a product only if I believe that... (e.g. '...I really need this product')'. In the second part of the question, the respondents were asked for the same aspects what the importance of them is for them. The question for the environmental and social aspects was as follows: 'How important is it for you personally that (during the manufacturing)...'. The question for the economic aspects was as follows: 'Even if you can financially afford a product, how important is it for you personally that...'. The corresponding items for the beliefs-part and the importance-part were multiplied in order to obtain one score per aspect. For interpretation purposes, the score was divided by 7 to allow interpretation at the same 7-point scale level as most other variables. The reliability (Cronbach's alpha) of the three subscales was high: .951 for the environmental component, .969 for social component and .933 for the economic component.

To measure general pro-environmental lifestyle, respondents were asked to indicate the frequency (1=never, 7=always) with which they perform 17 sustainable actions. The scale has been developed by Whithmarsh and O'Neill in 2010. Example items include 'turn off lights you're not using', 'share a car journey with someone else' and 'recycle'. The items were combined into one scale, explaining 32% of the variance (Cronbach's alpha .857).

Knowledge

Both objective and subjective knowledge have been included in the survey. Subjective knowledge was measured with the scale developed by Flynn and Goldsmith (1999) and was framed for sustainable food and healthy food respectively. Respondents were asked 'In your opinion, how informed are you about sustainable/healthy food?' and was answered on a seven-point scale from 'totally disagree' to 'totally agree'. The scale consists of five items. Example items are 'I know pretty much about sustainable food' and 'Compared to most other people, I know less about healthy food' (reversed). The items scored on two factors, that we due to reversed items and therefore we forced them on one factor. The explained variance was 50% for subjective knowledge towards sustainable food with a Cronbach's alpha of .744. For subjective knowledge towards healthy food, the explained variance was 53% with a Cronbach's alpha of .770.

For objective knowledge, a scale was developed with statements that had to be answered with 'true' or 'false'. 16 statements about sustainability and 12 statements about health were included. The statements were mainly self-developed. The health statements were partly based on ISAFRUIT deliverable D

1.2.4. The items had been piloted and were adopted if necessary. Example statements for sustainability were 'Fairtrade food is always organic' and 'In terms of environmental impact there is no difference between eating chicken or eating beef'. Example statements for healthy food were 'It is generally recommended to eat at least two portions of fruit each day' and 'Meat is a source of iron'. The percentage of correct answers for sustainability and health respectively has been calculated. In addition, in order to check the perceived difficulty of the selected statements, respondents were asked to indicate what they thought about the sustainability and health questions respectively, on a seven-point scale from 'very difficult' to 'very easy' and from 'hard to understand' to 'easy to understand'.

Willingness to pay for environmentally friendly products

Willingness to pay for environmentally friendly products was assessed with three items developed by Laroche, Bergeron and Barbaro-Forleo (2001). The items had to be answered on a seven-point scale from 'Totally disagree' to 'Totally agree'. The items were 'It is acceptable to pay 10 percent more for a food product that is produced, processed and packaged in an environmentally friendly way', 'I would accept paying 10 percent more taxes to pay for an environmental clean-up program' and 'I would be willing to spend an extra 8 euros a week in order to buy less environmentally harmful products'. The items load on a single factor, explaining 79% of the variance. Cronbach's alpha is .863.

Attitude towards sustainable and healthy food

Attitude towards sustainable food and attitude towards healthy food have been asked with six bipolar items. Three items for cognitive attitude (worthless-valuable, useless-useful and harmful-beneficial) and three items for affective attitude (unattractive-attractive, bad-good, annoying-nice) have been included, based on Crites et al. (1994). The items for attitude towards sustainable food load on a single factor and explain 80% of the variance and have a Cronbach's alpha of .950. The items for attitude towards healthy food also load on a single factor and explain 77% of the variance and have a Cronbach's alpha of .939.

General sustainability and health interest

General health interest was assessed with eight items, developed by Roininen et al. (1999). Respondents were asked to rate on a 7-point scale (1=totally disagree, 7=totally agree) to what extent they agree with the eight items. Example items are 'The healthiness of food has little impact on my food choices' (reversed) and 'I always follow a healthy and balanced diet'. Factor analysis resulted in two underlying factors, due to reversed items. Therefore we forced the items onto a single factor, explaining 43% of the variance (Cronbach's alpha=.808). General sustainability interest was assessed in a similar way. Items were based on Roininen et al. (1999) and were adapted for sustainability. Example items are 'The sustainability of food has little impact on my food choices' (reversed) and 'I always follow a sustainable diet'. Again, factor analysis resulted in two

underlying factors due to reversed items. Therefore we forced the items onto a single factor explaining 45% of the variance (Cronbach's $\alpha=.824$).

Descriptive social norm

Descriptive social norms on sustainable diets was assessed with five items, adapted from Povey et al. (2000). Respondents were asked to indicate on a 7-point scale (1=not at all, 7=to a great extent) whether they think several groups eat sustainable diets. Items included 'people who are important to me', 'my colleagues/classmates', 'my friends', 'my family', 'the average Dutch [adjusted to the country of the respondent] person'. The five items belong to one underlying factor, explaining 72% of the item variance. The reliability is very high, with a Cronbach's α of .901.

Perceived effectiveness of sustainable behaviour

Perceived effectiveness of sustainable behaviour was measured with three items developed by Vanhonacker et al. (2013) (based on Ellen, Wiener and Cobb-Walgren, 1991) and adjusted for sustainable food consumption instead of meat consumption. Respondents were asked to rate on a 7-point scale to what extent they agreed (1=totally disagree, 7=totally agree) with the statements (e.g. One person alone can do very little for the sustainability of our food consumption.). The items loaded on a single factor, but the reliability seriously improved by deleting one of the items ('An individual person can make a difference in the sustainability of our food consumption by carefully selecting the products'). Therefore, only the two remaining items were combined in one perceived effectiveness score with a Cronbach's α of .700.

General food motives

General food motives were assessed with the food choice questionnaire, developed by Steptoe, Pollard and Wardle (1995). Three or four items for each of the original 9 components were included in the questionnaire, as well as a range of self-developed items on sustainability. Respondents were asked to indicate for 42 aspects to what extent the aspects were important to them for the food they eat on a typical day (1=not at all important, 7=very important). Based on a factor analysis, the best option was to combine the items into eight underlying factors: price (2 items, Cronbach's $\alpha=.745$), weight control (4 items, Cronbach's $\alpha=.845$), familiarity (3 items, Cronbach's $\alpha=.728$), convenience (3 items, Cronbach's $\alpha=.825$), sensory appeal (4 items, Cronbach's $\alpha=.812$), natural and seasonal (6 items, Cronbach's $\alpha=.900$), mood (4 items, Cronbach's $\alpha=.829$) and sustainable (15 items, Cronbach's $\alpha=.946$). The three items to measure importance of health do not load on a single factor. One of the items (contains a lot of vitamins and minerals) was included in the weight control factor, the other two items were not included in the further analyses. In addition, the item measuring importance of fair trade was deleted.

General food involvement

General food involvement was measured with seven items developed by Bell and Marshall (2003). Respondents were asked to indicate on a 7-point scale (1=totally disagree, 7=totally agree) to what extent they agree with the statements. Example statements are 'during the day I think a lot about food' and 'a good meal is important to me'. The items load on a single factor, explaining 59% of the variance with a Cronbach's alpha of .875.

Food neophobia

Food neophobia was measured with the food neophobia scale developed by Pliner and Hobden (1992). Respondents were asked to indicate on a 7-point scale (1=totally disagree, 7=totally agree) to what extent they agree with ten statements, such as 'I am constantly sampling new and different foods' and 'I don't trust new foods (reversed)'. The items load on two factors due to reversed items, therefore they were forced onto a single factor, explaining 34% of item variance. Cronbach's alpha is .762.

Socio-demographic variables

Finally, a range of socio-demographic characteristics were asked: gender, age, education, income, degree of urbanisation, family status, height and weight. Height and weight were combined into one Body Mass Index score (BMI), by dividing square-height (in meters) by weight (in kilograms).

Results

Preparatory analyses and sample demographics

In total 5043 participants were analysed in this web-survey. 2483 participants were male (49.2%) and the mean age was 42.3 (SD=13.4) with a range from 18 to 65. Participants were from five different countries (NL: 1002; DK: 1006; CZ: 1034; FR: 1003; IT: 998). The demographic profile of the respondents in terms of education, income, degree of urbanisation of living area and family status are described in Appendix I. The mean BMI of the sample is 25.4, and in the different countries the BMI is as followed: NL: 25.5; DK: 26.2; CZ: 26.3; FR: 24.3; IT: 24.4.

In this study we analysed data of 5043 respondents in total from 5 countries (The Netherlands, Denmark, Czech Republic, France, and Italy). Respondents were roughly equally distributed over countries and sexes.

Sustainable and healthy (food) behaviour

In this part, we aim to measure sustainable food behaviour. How do consumer conceptualise this and which behaviour do they report. The goal is to: First, get a better operationalisation of sustainable food behaviour. Second, quantify per country which aspects of sustainability are important to consumers and how often certain behaviours are reported. This can also be translated to the different strategies for sustainable food consumption that consumers can use. Third, these variables will be the outcome variables when we analyse which determinants are underlying consumers' sustainable food behaviour and choices for the different strategies.

Perception of food sustainability & the most important aspects of sustainability in food

Respondents were asked to select from a long list of aspects, which of the aspects in their opinion had to do with sustainable food. In the total sample, seasonal fruits and vegetables, food waste, water use and use of natural resources are most often perceived as aspects of sustainable food. Countries differ in their perceptions, but these four aspects are often mentioned in all five countries. Seasonal fruits and vegetables is particularly often mentioned in France (by 49,0%) and food waste in Denmark (by 41,3%).

In addition to these four aspects, in the Netherlands air and water pollution is often perceived as an aspect of sustainability. In Denmark, organic food consumption and animal welfare are often mentioned. In Czech Republic, healthy food and land use stand out. In France, local and regional food and

transportation distance are often mentioned. Finally, in Italy, food safety was often mentioned (see Table).

Table 1 Perception of sustainability aspects (% mentioned)¹

	Total	NL	DK	CZ	FR	IT
Seasonal fruits and vegetables	35.9	31 ^a	31.6 ^{a,b}	33.0 ^{a,b}	49.0 ^c	35.2 ^b
Food waste	34.0	29.2 ^a	41.3 ^b	36.2 ^c	27.0 ^a	36.1 ^c
Water use	32.4	36.6 ^a	30.8 ^b	36.6 ^a	31.8 ^b	26.2 ^c
Use of natural resources	31.9	39.3 ^a	29.2 ^b	35.2 ^a	25.2 ^c	30.2 ^b
Air and water pollution (e.g. nitrogen, ammonia, nitrates, phosphorus)	29.3	34.3 ^a	31.4 ^a	27.4 ^b	22.8 ^c	30.7 ^{a,b}
Animal welfare	29.3	32.1 ^a	41.5 ^b	22.9 ^c	23.1 ^c	27.2 ^d
Healthy food	28.4	24.5 ^a	25.8 ^a	42.0 ^b	18.6 ^c	30.6 ^d
Organic food	28.1	30.8 ^a	39.4 ^b	17.9 ^c	25.8 ^d	26.8 ^d
Food safety	27.8	27 ^a	28.5 ^{a,b}	31.8 ^b	19.9 ^c	31.4 ^b
Local or regional food	27.7	20 ^a	27.7 ^{b,c}	30.5 ^c	34.6 ^d	25.7 ^b
Use of pesticides	27.6	30.4 ^{a,b}	32.4 ^b	20.5 ^c	26.7 ^a	28.4 ^a
Land use	26.7	27 ^a	14.1 ^b	39.6 ^c	25.2 ^a	27.2 ^a
Transportation distance of food	26.0	25.6 ^a	27.3 ^a	21.4 ^b	32.2 ^c	23.6 ^{a,b}
Recyclability of packaging	25.1	29.5 ^a	33.7 ^b	24.0 ^c	14.5 ^d	24.0 ^c
Fair trade	23.7	30.9 ^a	29.4 ^a	15.7 ^b	19.6 ^c	23.1 ^c
Amount of packaging	23.0	23.7 ^a	23.5 ^a	18.3 ^b	18.8 ^b	17.5 ^b
Greenhouse gas emissions (e.g. CO ₂ and methane)	22.6	31.8 ^a	28.8 ^{a,b}	14.0 ^c	13.4 ^c	25.4 ^b
Soil degradation	21.1	18.5 ^a	24.5 ^b	23.5 ^b	17.8 ^a	21.1 ^{a,b}
Deforestation	20.6	24.9 ^a	24.9 ^a	17.0 ^b	13.5 ^c	22.9 ^a
Use of antibiotics in animals	20.3	28.7 ^a	26.5 ^a	15.5 ^b	10.6 ^c	20.1 ^d
Fair wages for producers	19.9	24.6 ^a	24.6 ^a	14.5 ^b	18.3 ^c	17.6 ^{b,c}
Affordable food	19.2	14.8 ^a	15.2 ^a	33.8 ^b	10.6 ^c	21.2 ^d
Biodiversity	18.8	19.2 ^a	14.5 ^b	11.1 ^c	26.7 ^d	22.7 ^e
Balanced diet	18.4	10.7 ^a	15.9 ^b	29.6 ^c	17.6 ^b	17.9 ^b
Global food availability	17.8	18.2 ^a	17.1 ^a	22.1 ^b	13.1 ^c	18.3 ^a
The amount of meat consumption	16.6	20.6 ^a	15.3 ^b	15.1 ^b	16.8 ^b	15.1 ^b
Ethical working conditions	15.3	16.1 ^a	18.0 ^{a,b}	11.3 ^c	11.2 ^c	19.9 ^b

Child labour	9.7	16.4 ^a	12.0 ^b	4.4 ^c	5.4 ^c	10.2 ^b
Malnutrition	7.6	6.8 ^{a,b}	6.0 ^{a,b}	5.2 ^b	8.0 ^a	11.9 ^c

¹ More than one answer allowed; therefore percentages do not add up to 100. Colours correspond with the value from dark red to dark blue.

*Different subscripts per row indicate significant different values.

Out of the list of aspects that the respondent had selected as part of sustainable food, the respondent was asked to indicate the top five of most important sustainability aspects. The aspects that were most often selected in the top five are shown in Table . Interestingly, the aspect that is most often mentioned in the top 5 is different for all five countries. Seasonal fruits and vegetables is most often mentioned in the top five in the entire sample, but does not appear in the top five in the Netherlands, Denmark and Czech Republic for example. Food waste is second most often mentioned in the top five, but does not appear in the top five of the Netherlands, Denmark and France. Water use scores third, but does not appear in the top five of Italy. Use of natural resources scores only in the top five of the Netherlands, and air and water pollution does not appear in the top five of Czech Republic and France.

Table 2 Most often mentioned in top 5 as most important aspects of sustainable food

	Total	NL	DK	CZ	FR	I
1.	Seasonal fruits and vegetables	Use of natural resources	Animal welfare	Land use	Seasonal fruits and vegetables	Food waste
2.	Food waste	Water use	Recyclability of packaging	Water use	Local or regional food	Seasonal fruits and vegetables
3.	Water use	Air and water pollution	Air and water pollution	Food waste	Transportation distance	Food safety
4.	Use of natural resources	Animal welfare	Water use	Use of natural resources	Water use	Air and water pollution
5.	Air and water pollution	Greenhouse gas emissions	Use of antibiotics in animals	Affordable food	Use of pesticides / biodiversity	Healthy food

In addition to looking at the frequencies of which the aspects were mentioned in the top five, we also checked which of the aspects were most often mentioned on place one of the top five, without considering the answers on place two to place five (not shown in the Tables). Unexpectedly, different aspects come up now. This means that these aspects are either mentioned as most important, or are not mentioned at all in the top 5. In the total sample, healthy food is mentioned most often (by 7,3%) as the most important aspect of sustainability. In the Netherlands, animal welfare (7,3%) and use of natural resources (7,3%) are most often mentioned on the first place. For Denmark this is animal welfare (9,7%), for Czech Republic this is healthy food (14,3%), for France seasonal fruits and vegetables (10,2%) and for Italy healthy food (7,5%).

Seasonal fruits and vegetables, food waste, water use and use of natural resources were most often mentioned as aspects of sustainable food and are considered most important. In all countries these aspects were frequently chosen. Interestingly, however, the aspects that are most often mentioned in the top 5 of important sustainability aspects are very different across countries.

Next to the four aspects that are often mentioned in the total sample, in The Netherlands also air and water pollution was frequently mentioned and was considered important. In Denmark organic food and animal welfare were often mentioned and considered important. In Czech Republic healthy food and land use were often mentioned as aspects of sustainable food, but health does not appear in the top five of most important aspects. In France local and regional food and transportation distance were often mentioned and also considered important. In Italy food safety was often mentioned and considered important.

Perception of food health & the most important aspects of health in food

Similar to the questions about sustainability, respondents were asked to select from a long list of aspects, which of the aspects in their opinion had to do with health. In the total sample, vitamins, fibre, proteins, and minerals were most often mentioned (Table 3). Food safety was the fifth most often mentioned aspect and was especially often mentioned in The Netherlands, Czech Republic, and Italy. Fatty acids (Denmark and France), calories (Denmark and Czech Republic), and cholesterol (Italy) were also often mentioned.

Table 3 Perception of health aspects (% mentioned)

	Tota l	NL	DK	CZ	FR	IT
Vitamins	52.2	40.6 ^a	59.5 ^b	47.6 ^c	71.5 ^d	41.8 ^a
Fibre	45.3	32.5 ^a	54.3 ^b	41.6 ^c	62.8 ^d	35.2 ^a
Proteins	39.6	24.2 ^a	48.4 ^b	34.7 ^c	59.5 ^d	31.5 ^c
Minerals	39.0	33.5 ^a	39.1 ^b	35.7 ^{a,b}	58.2 ^c	28.8 ^d
Food safety	35.4	43.3 ^a	28.7 ^b	42.1 ^a	19.8 ^c	43.1 ^a

Fatty acids (e.g. omega-3)	34.2	26.4 ^a	41.2 ^b	27.9 ^a	45.7 ^c	30.0 ^a
Calories	32.6	30.9 ^a	42.0 ^b	40.2 ^b	18.1 ^c	31.7 ^a
Sugar	27.0	32.4 ^a	35.8 ^a	26.4 ^b	16.1 ^c	24.4 ^b
Cholesterol	26.9	26.9 ^a	32.4 ^b	24.2 ^a	10.2 ^c	40.9 ^c
Weight	26.0	27.4 ^{a,b}	29.9 ^{b,c}	32.6 ^c	14.2 ^d	25.8 ^a
Immune system	25.8	25.0 ^a	27.3 ^{a,b}	29.3 ^b	20.0 ^c	27.2 ^{a,b}
Unsaturated fat	24.8	31.1 ^{a,b}	33.2 ^b	15.8 ^c	16.3 ^c	28.0 ^a
Salt	24.7	33.0 ^a	34.9 ^a	21.9 ^b	10.1 ^c	23.5 ^b
Digestion	23.2	18.2 ^a	25.8 ^b	26.8 ^b	17.7 ^a	27.5 ^b
Saturated fat	21.3	27.6 ^a	29.4 ^a	13.4 ^b	7.9 ^c	28.6 ^a
Cardio-vascular diseases	20.6	25.0 ^a	27.5 ^a	16.1 ^b	6.8 ^c	27.8 ^a
Blood pressure	19.5	21.6 ^a	21.4 ^a	21.0 ^a	10.9 ^b	22.8 ^a
Brain functioning	15.8	15.0 ^{a,b,c,d}	16.8 ^{c,d}	18.2 ^{b,c}	13.3 ^a	15.7 ^{a,b,c,d}
Tiredness	14.8	15.0 ^a	18.7 ^b	20.5 ^b	8.4 ^c	11.4 ^d
Mood	13.9	8.9 ^a	19.1 ^b	12.0 ^c	17.3 ^b	12.4 ^c
Stress	13.8	14.2 ^a	14.3 ^a	18.7 ^b	7.1 ^c	14.4 ^a
Muscle strength	12.7	12.8 ^a	11.5 ^a	12.3 ^a	13.5 ^a	13.3 ^a
Bones	12.2	12.1 ^{a,b,c}	14.8 ^{c,d}	9.8 ^b	12.1 ^{a,b,c}	12.5 ^{a,c}
Concentration	11.7	16.0 ^a	13.6 ^{a,b}	10.9 ^{b,c}	8.4 ^c	9.6 ^c
Nervous system	11.7	13.1 ^a	9.4 ^b	15.2 ^a	8.3 ^b	12.2 ^a
Satiety	11.2	18.3 ^a	7.8 ^b	11.8 ^c	8.3 ^b	10.1 ^{b,c}

¹ More than one answer allowed; therefore percentages do not add up to 100. Colours correspond with the value from dark red to dark blue.

*Different subscripts per row indicate significant different values

Out of the list of aspects that the respondent had selected as part of healthy food, the respondent was asked to indicate the top five of most important aspects. Again vitamins, fibre, proteins, minerals, and food safety were most often chosen in the top five of most important aspects (Table). For Italy, also cholesterol was often mentioned as important.

Table 4 Most often mentioned in top 5 as most important aspects of healthy food

	Total	NL	DK	CZ	FR	IT
1.	Vitamins	Food safety	Vitamins	Vitamins	Vitamins	Food safety
2.	Fibre	Vitamins	Fibre	Food safety	Fibre	Vitamins

3.	Proteins	Minerals	Proteins	Fibre	Proteins	Cholesterol
4.	Minerals	Salt	Calories	Calories	Minerals	Fibre
5.	Food safety	Fibre	Fatty acid	Minerals	Fatty acid	Calories

In addition to looking at the frequencies with which the aspects were mentioned in the top five, we also checked which of the aspects was most often mentioned on the first place as most important sustainability aspect (not shown in the Tables). In the total sample, food safety is mentioned most often (by 18,9%) as the most important aspect of healthy food, followed by vitamins (11,9). In the Netherlands, food safety (22,7%) and vitamins (9,0%) are most often mentioned as most important aspects. For Denmark this is food safety (13,8%) and vitamins (11,4%), for Czech Republic this is food safety (25,0%), vitamins (8,4%) and calories (8,1%), for France vitamins (23,5%), proteins (13,4%) and food safety (8,3%) and for Italy food safety (24,8%), cardiovascular disease (7,4%) and vitamins (7,2%).

Vitamins, fibre, proteins and minerals were most often mentioned as aspects. Food safety was the fifth most often mentioned aspect and was especially often mentioned in The Netherlands, Czech Republic, and Italy. Fatty acids (Denmark and France), calories (Denmark and Czech Republic), and cholesterol (Italy) were also often mentioned.

These four aspects also appear in most of the top fives of most important aspects of healthy foods. Vitamins most often appear in the top five in The Netherlands, Denmark, Czech Republic and France, whereas food safety most often appears in the top five in The Netherlands and Italy.

Ranking of the main SUSFANS goals

Respondents were also asked to rank the four SUSFANS goals (Table). On average, reduced environmental impact and viable and socially balanced agrifood business were considered most important. Reduced environmental impact was ranked first or second in The Netherlands, Czech republic and France, but third in Denmark and Italy. Viable and socially balanced agrifood business was ranked first or second in all countries except for Czech Republic where it was ranked lowest. Global food and nutrition security was ranked lowest or second lowest in all countries except Denmark where it was ranked first.

Table 5 Average ranking sustainability domains

	Total	NL	DK	CZ	FR	IT
1.	Reduced environmental impact	Reduced environmental impact	Global food and nutrition security	Reduced environmental impact	Viable and socially balanced agri-food	Balanced and sufficient diets

					business	
2.	Viable and socially balanced agrifood business	Viable and socially balanced agrifood business	Viable and socially balanced agrifood business	Balanced and sufficient diets	Reduced environmental impact	Viable and socially balanced agrifood business
3.	Balanced and sufficient diets	Balanced and sufficient diets	Reduced environmental impact	Global food and nutrition security	Global food and nutrition security	Reduced environmental impact
4.	Global food and nutrition security	Global food and nutrition security	Balanced and sufficient diets	Viable and socially balanced agri-food business	Balanced and sufficient diets	Global food and nutrition security

Again, we also checked which of the domains is most often mentioned on the first place in the five countries (not shown in the Tables). In The Netherlands, this is Global food and nutrition security (35,1%), in Denmark this is balanced and sufficient diets (41,0%), in Czech Republic this is viable and socially balanced agrifood business (37,9%), in France this is balanced and sufficient diets (39,5%) and in Italy this is global food and nutrition security (45,3%).

Across all countries, reduced environmental impact is the sustainability domain that is most often ranked as most important, followed by viable and socially balanced agrifood businesses. Balanced and sufficient diets scores on the third place and global food and nutrition security on the last place. Interestingly, the countries differ greatly in the importance order of the sustainability goals. In Denmark, for example, global food and nutrition security scores highest whereas overall, this aspect ranks lowest.

Self-reported sustainable food intake

Overall

When the scores of all countries are combined, we see that seasonal/local products are reported to be consumed most often ($p < .01$), namely around 3 to 4 days a week, followed by free range products/products with a sustainability logo/smaller portions ($p < .01$). In third place consumers eat organic/fair trade products ($p < .01$). Finally vegetarian products are consumed the least on about 1,5 days a week ($p < .01$) (see Figure 1).

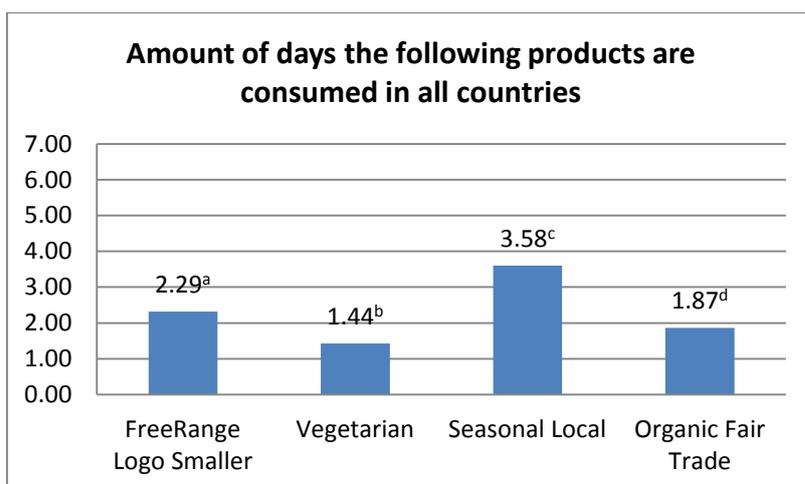


Figure 1 Amount of days a week products are consumed in all countries combined

Note: Different subscripts indicate significant different values

Self-reported intake of seasonal/local food was the most frequent sustainable food behaviour, followed by free range products/products with a sustainability logo/smaller portions. In third place consumers eat organic/fair trade products. Vegetarian products are reported to be consumed the least.

The Netherlands score relatively low on all sustainable food behaviours, and specifically on seasonal/local products. In Denmark more intake of organic/fair trade and free range products/products with a sustainability logo/smaller portions were reported. Czech Republic scores relatively low on all sustainable food

Differences between countries

Results show that in Denmark and France respondents significantly more often eat free range/smaller portions/products with a sustainable logo than the other countries ($p < .01$) (see Table 61). The consumption of vegetarian products is significantly higher in Italy than in the other countries ($p < .01$). Also in Denmark respondents significantly less often eat vegetarian products than Czech Republic ($p = .008$) and France ($p = .000$). Regarding the consumption of seasonal/local products, results show that the consumption is significantly higher in Italy than in the other countries ($p < .01$). Also in The Netherlands and Denmark consumers eat seasonal/local products significantly less often than in Czech Republic and France ($p < .01$). Finally, concerning the consumption of organic/fair trade products, in Denmark and Italy the consumption is significantly higher than in the other countries ($p < .01$). Also The Netherlands, Denmark and France significantly differ from each other ($p < .01$).

Table 61 Self-reported sustainable food intake per country (number of days a week)

	NL	DK	CZ	FR	IT
Free range / logo / smaller portion	2.14 ^a	2.51 ^b	2.16 ^a	2.56 ^b	2.12 ^a

Vegetarian	1.33 ^{a,b}	1.18 ^a	1.39 ^b	1.48 ^b	1.82 ^c
Seasonal / local	3.02 ^a	3.08 ^a	3.67 ^b	3.79 ^b	4.35 ^c
Organic / Fair Trade	1.66 ^a	2.23 ^b	1.30 ^c	1.96 ^d	2.26 ^b

Note: Different subscripts per row indicate significant different values

Hierarchy of foods

Overall

In all countries consumers are most open to animal-based products (cheese, fish and eggs) as an alternative to meat ($p < .01$). The average score is 4.74, which indicates that they are moderately positive about replacement of meat by other animal-based product. Openness to plant-based alternatives scores just below the scale midpoint, indicating a moderately negative openness to plant-based alternatives. Consumers are the least open to new types of products like insects or in vitro meat as an alternative to regular meat ($p < .01$) (see Figure 2).

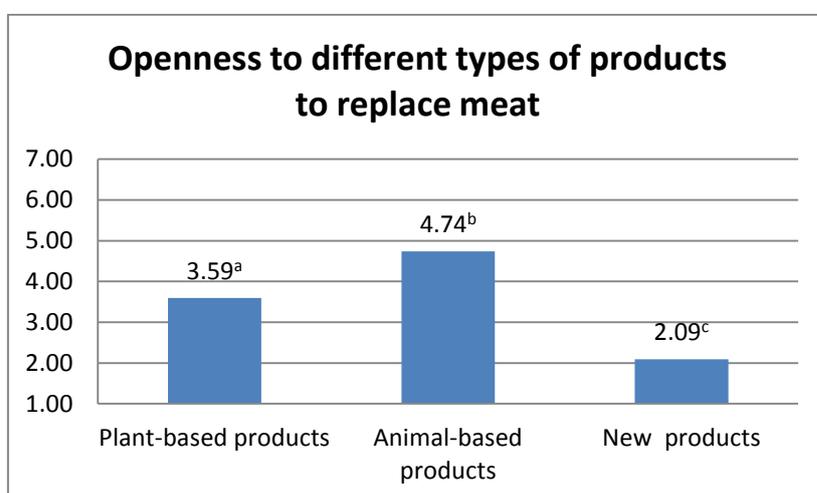


Figure 2 Openness to different products instead of meat in all countries on a 7-point scale

Note: Different subscripts indicate significant different values

Differences between countries

Results show that respondents from the Czech Republic are significantly more open to animal-based products instead of meat than in France ($p < .05$). France and Italy, are more open than those in The Netherlands and Denmark ($p < .01$) (see Table). Nevertheless it was considered the best alternative in all countries. Regarding plant-based alternatives, results show that respondents in Italy and France are significantly more open than in the other countries ($p < .05$). Also Denmark is significantly less open to plant-based alternatives than the other countries ($p < .05$). Finally, France is significantly more open to new types of products as alternatives for meat than all the other countries except the Netherlands ($p < .01$). The Netherlands is significantly more open to new types of alternatives than Denmark and Czech Republic ($p < .05$). Czech Republic consumers are significantly less open to new alternatives than all the other countries ($p < .01$).

Table 7 Openness to several types of meat-replacing products per country

	NL	DK	CZ	FR	IT
Animal-based products	4.50 ^a	4.55 ^a	5.00 ^b	4.82 ^c	4.85 ^{b,c}
Plant-based products	3.52 ^a	3.33 ^b	3.51 ^a	3.72 ^c	3.88 ^d
New products	2.22 ^{a,b}	2.04 ^c	1.77 ^d	2.34 ^a	2.08 ^{b,c}

Note: Different subscripts per row indicate significant different values

Overall, consumers are most open to animal-based products (fish, cheese and eggs) as an alternative to meat, on average, they are moderately positive. The second favourite alternative are plant-based products to which they are, on average, a moderately negative. Consumers are least open to new products like insects or in vitro meat.

Noticeably, in Czech Republic consumers are more open to animal-based meat alternatives as compared to the other countries and least open to new products as meat alternatives. Italian consumers are most open to plant-based alternatives as compared to the other countries.

Consciousness for sustainable consumption: beliefs x importance

Overall

All countries taken together, consumers are most conscious about sustainable consumption from an economic viewpoint (even if I can afford a product, do I need it / is it useful, etc.) ($p < .01$) (see Figure 3). Consumers are least conscious about sustainable consumption from an environmental viewpoint (I only buy a product when: It is made of recycled materials/ can be disposed of in an environmentally friendly way, etc.) ($p < .01$). Consciousness about sustainable consumption from a social viewpoint (I only buy a product when: No child labour is involved / No workers are abused, etc.) scores in the middle. Overall, however, consciousness of sustainable consumption is on average moderately low, with scores between 3.14 (environmental viewpoint) and 3.70 (economic viewpoint).

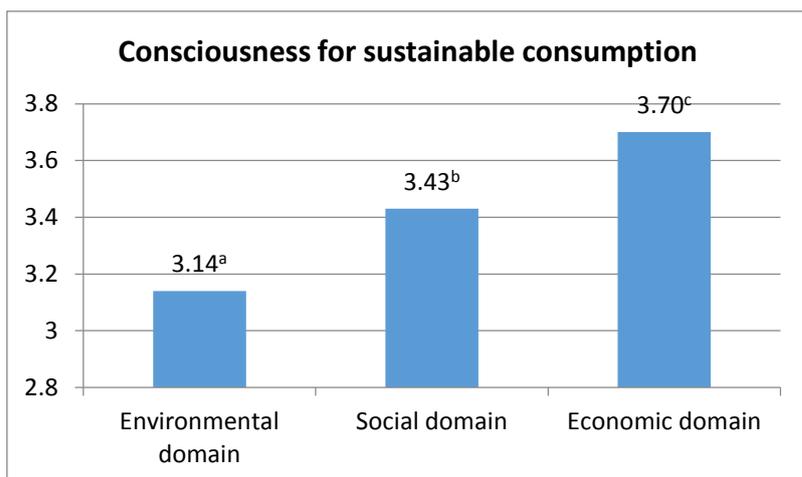


Figure 3 Consciousness for sustainable consumption in all countries on a 7-point scale

Note: Different subscripts indicate significant different values

Differences between countries

Italian consumers score highest on consciousness about sustainable consumption from an environmental viewpoint compared to all the other countries ($p < .01$) (see table 8). In Denmark and the Netherlands, respondents have the lowest scores ($p < .01$). Italy scores highest on consciousness about sustainable consumption from a social viewpoint compared to all the other countries ($p < .01$). And France scores higher than Czech Republic, Denmark and the Netherlands ($p < .01$). Again, Italy scores highest on consciousness about sustainable consumption from an economic viewpoint compared to all the other countries ($p < .05$). And Denmark and the Netherlands score lower than the other countries ($p < .01$).

Table 8 Consciousness for sustainable consumption per country

	NL	DK	CZ	FR	IT
Environmental viewpoint	2.80 ^a	2.59 ^a	3.20 ^b	3.40 ^b	3.73 ^c
Social viewpoint	3.22 ^a	3.07 ^a	3.20 ^a	3.57 ^b	4.09 ^c
Economic viewpoint	3.39 ^a	3.32 ^a	3.91 ^b	3.73 ^b	4.12 ^c

Note: Different subscripts per row indicate significant different values

Overall, consciousness of sustainable consumption is on average moderately low. Consumers are most conscious about sustainable consumption from an economic viewpoint, followed by the social viewpoint, and least conscious about sustainable consumption from an environmental viewpoint. Italy is most conscious from all three viewpoints and The Netherlands and Denmark (and Czech republic only from a social viewpoint) are least conscious.

Sustainable behaviour

Overall

Consumers were asked to what extent they perform sustainable behaviours, like turning of the lights, drive economically, recycle etc. (see Figure 4). All the countries taken together, consumers score 4.2 out of 7 ($SD=1.0$) on sustainable behaviour, which indicates that on average they rate their sustainable behaviour neither frequent nor infrequent.

Differences between countries

Results show that in Denmark respondents perform significantly less sustainable behaviours than the other countries ($p<.01$) and that in Italy respondents perform significantly most sustainable behaviours ($p<.01$). French consumers also performs significantly more sustainable behaviour than those in Czech Republic, Denmark and The Netherlands ($p<.01$).

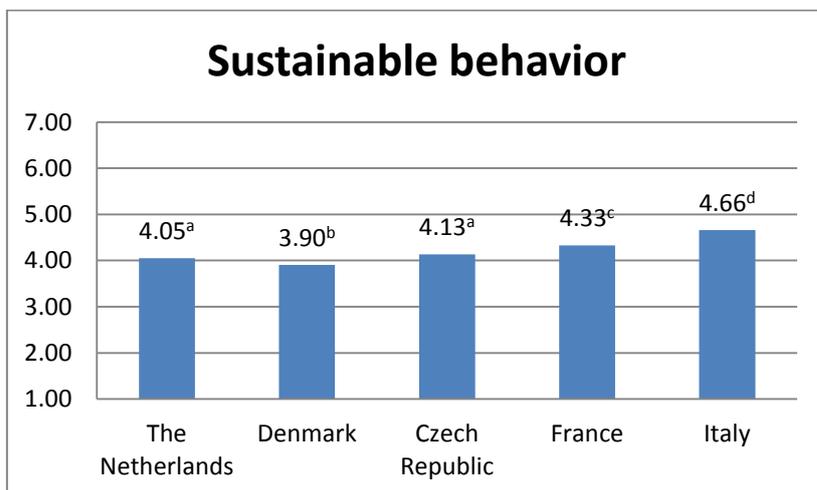


Figure 4 Sustainable behaviour scores on a 7-point scale

Note: Different subscripts indicate significant different values

Overall, respondents score their self-reported frequency of performing a range of sustainable behaviours (e.g. turning off lights) as neither frequent nor infrequent. Danish consumers perform significantly less sustainable behaviours than those in the other countries and Italians perform significantly most sustainable behaviours.

Sustainable food specific underlying values, motives, etc.

The variables described in this section will be used to determine which determinants are underlying consumers' sustainable food behaviour and choices

for the different strategies. These are variables framed specifically for sustainable (and healthy) food behaviour and are based on the literature study.

Knowledge

Overall

Overall, all countries score higher on subjective knowledge about healthy food than on subjective knowledge about sustainable food ($p < .01$). Also in terms of objective knowledge, all countries have a higher percentage of right answers on healthy food questions than on sustainable food questions ($p < .01$). The objective knowledge questionnaire were developed for this study, the results show that the scales performed well. On average the number of percentage of right questions was between 57 and 63% for sustainable food and between 66 and 69% for healthy food which suggests that the questions were not too easy or too difficult.

Differences between countries

Comparing the countries, respondents from the Czech Republic significantly score lower on subjective knowledge about sustainable food than all the other countries ($p < .01$). Also Italy scores significantly higher than The Netherlands and Denmark ($p < .01$). On objective knowledge towards sustainable food, The Netherlands and Denmark have the highest score compared to the other countries ($p < .05$) which is in contrast with their low score in subjective knowledge. Czech Republic has a higher score than France and Italy ($p < .05$) and Italy has the lowest score compared to all the other countries which is in contrast with their high score on subjective knowledge ($p < .05$) (see table 9).

Knowledge on health shows a somewhat different pattern. For subjective knowledge, Danish, Dutch and Italian respondents have somewhat higher scores and the French and Czech somewhat lower. Italy has the highest score on objective knowledge towards healthy food compared to Czech Republic and France ($p < .01$). France has the lowest score compared to all the countries except Czech Republic ($p < .01$) which is in line with their low score on subjective knowledge (see table 9).

Table 2 Subjective and objective knowledge

	Total	NL	DK	CZ	FR	IT
Subjective knowledge sustainable food	3.83	3.82 ^a	3.81 ^a	3.57 ^b	3.94 ^{a,c}	4.03 ^c
Objective knowledge sustainable food	60.89	63.20 ^a	63.10 ^a	61.24 ^b	59.43 ^c	57.45 ^d
Subjective	4.36	4.40 ^{a,b}	4.50 ^a	4.30 ^{b,c}	4.23 ^c	4.37 ^{a,b,c}

knowledge healthy food Objective knowledge healthy food	68.11	68.66 ^{a,c}	69.01 ^{a,c}	67.15 ^{a,b}	66.19 ^b	69.56 ^c
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Note: Different subscripts per row indicate significant different values

Overall, all countries score higher on subjective knowledge about healthy food than on subjective knowledge about sustainable food. Czech Republic significantly scores lower on subjective knowledge about sustainable food than all the other countries whereas the Italian have the highest scores. On objective knowledge towards sustainable food, The Netherlands and Denmark have the highest score compared to the other countries, whereas Italians have the lowest scores.

Willingness to pay

Overall

All countries taken together, consumers are not particularly willing to pay extra for a sustainable product ($M=4.0$; $SD=1.6$) (see Figure 5). We also see that consumers are more willing to pay extra for a premium on a sustainable product than for a tax of an equal amount in support of an environmental service ($p<.01$).

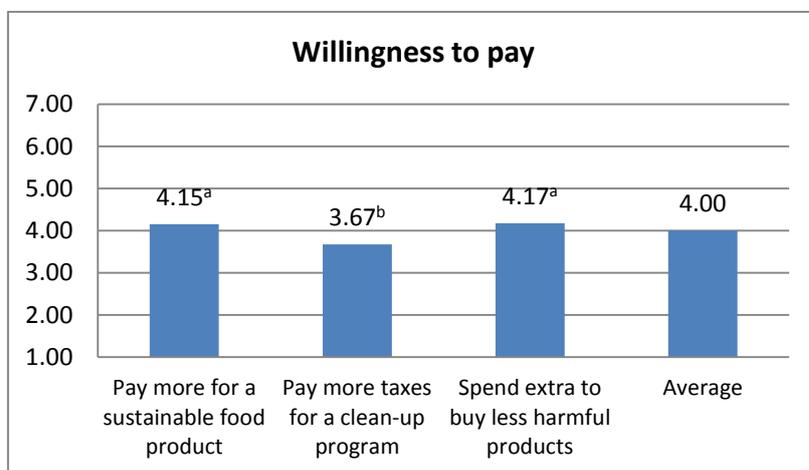


Figure 5 Willingness to pay for a sustainable product in all countries on a 7-point scale

Note: Different subscripts indicate significant different values

Differences between countries

Willingness to pay 10% extra for a sustainable food product is highest in Italy compared to the other countries ($p<.01$). Also Denmark is willing to pay significantly more than France, Czech Republic and The Netherlands ($p<.01$). The Netherlands is least willing to pay 10% extra for a sustainable product

compared to the other countries ($p < .01$). Willingness to pay 10% more taxes for an environmental clean-up program is highest in Italy compared to the other countries ($p < .01$). Also France is willing to pay significantly more than Denmark, Czech Republic and The Netherlands ($p < .01$). Finally, willingness to pay 8 euro's more to buy less harmful products is highest in Czech Republic and Italy compared to the other countries ($p < .01$). The Netherlands is willing to pay the least for less harmful products compared to the other countries ($p < .01$). Also Denmark is willing to pay significantly more for less harmful products than France ($p < .01$) (see Table).

Table 10 Willingness to pay (WTP) for sustainability

	NL	DK	CR	FR	IT
Average WTP score	3.49 ^a	4.00 ^b	3.99 ^b	3.94 ^b	4.58 ^c
WTP +10% for a sustainable product	3.67 ^a	4.33 ^b	3.99 ^c	4.09 ^c	4.68 ^d
WTP +10% tax for environmental clean-up program	3.22 ^a	3.40 ^a	3.42 ^a	3.83 ^b	4.49 ^c
WTP to spend +8 euro's per week for less harmful products	3.58 ^a	4.26 ^b	4.57 ^c	3.89 ^d	4.56 ^c

Note: Different subscripts per row indicate significant different values

Overall, consumers are not particularly willing to pay extra for a sustainable product. Consumers are less willing to pay extra taxes than to pay extra for a sustainable or less harmful product. Italian consumers are most willing to pay extra.

Attitude, interest, norms, perceived effectiveness

Table 3 Attitude, interest, norm and effectiveness

	Total	NL	DK	CZ	FR	IT
Attitude towards sustainable food	5.51	5.32 ^a	5.66 ^b	5.42 ^a	5.43 ^a	5.74 ^b
Attitude towards healthy food	5.86	5.75 ^{a,c}	5.85 ^{a,b}	5.93 ^b	5.68 ^c	6.06 ^d
Interest in sustainable food	3.99	3.87 ^a	3.80 ^a	3.88 ^a	4.05 ^b	4.37 ^c
Interest in healthy food	4.39	4.36 ^a	4.30 ^{a,b}	4.34 ^{a,b}	4.22 ^b	4.74 ^c
Descriptive norm towards sustainable eating	3.92	4.17 ^a	3.78 ^{b,c}	3.64 ^b	3.83 ^c	4.20 ^a
Perceived	3.84	3.67 ^a	4.02 ^b	3.79 ^{a,c}	3.97 ^{b,c}	3.75 ^a

effectiveness
towards
sustainable food
consumption

Note: Different subscripts per row indicate significant different values

Overall attitude

Overall, consumers in all countries have positive attitudes towards sustainable food as well as towards healthy food. Attitude towards healthy food is significantly more positive than towards sustainable food ($p < .01$) (see Table 3).

Differences between countries in attitudes

Italy and Denmark have the highest attitude towards sustainable food compared to the other countries ($p < .01$). Italy also has the highest attitude towards healthy food compared to the other countries ($p < .05$) and Czech Republic has a higher attitude towards healthy food than The Netherlands and France ($p < .01$). Finally France has the lowest attitude towards healthy food compared to the other countries (except the Netherlands) ($p < .01$).

Overall interest

Overall, consumers' score neutral on interest in sustainable food. Interest in healthy food is slightly above neutral. Consumers are generally more interested in the healthiness of food than in the sustainability of food ($p < .01$) (see Table 3).

Differences between countries in interest

Italy has most interest in sustainable food than all the other countries ($p < .01$), and France has more interest in sustainable food than Czech Republic, Denmark and The Netherlands ($p < .01$) (see Table 11). Italy also has most interest in healthy food than all the other countries ($p < .01$). Also France has less interest in healthy food than the Netherlands ($p < .05$).

Overall descriptive norm

All countries taken together, consumers report to have a descriptive norm of 3.92 out of 7 ($SD=1.2$), indicating a neutral norm (see Table 3).

Differences between countries in descriptive norm

Italy and the Netherlands have a higher descriptive norm than the other countries ($p < .01$). Czech Republic has a lower descriptive norm than France, but Denmark does not differ from either Czech Republic or France.

Overall perceived effectiveness towards sustainable food consumption

All countries taken together, consumers report to have a perceived effectiveness score of 3.84 ($SD=1.5$) (see

Table 3).

Differences between countries in perceived effectiveness towards sustainable food consumption

Denmark has the highest perceived effectiveness towards sustainable food consumption compared to the other countries (except for France) ($p<.01$). France has a higher perceived effectiveness than The Netherlands and Italy ($p<.05$).

Consumers have positive attitudes towards sustainable and towards healthy food. Respondents reported a neutral interest in sustainable food and a somewhat positive interest in healthy food. Healthy food is valued higher than sustainable food in terms of attitude and interest. In terms of norms, the descriptive norm towards sustainable eating is on average about neutral which indicates that consumers consider their social peers were not so much concerned nor unconcerned about sustainability. Finally, consumers were somewhat negative about the belief that they can effectively influence sustainable food consumption as an individual; the average score on perceived effectiveness was just below neutral.

Italian and Danish consumers have the most positive attitude towards sustainable food and Italian consumers have the most positive attitude towards healthy food. Italian consumers also report higher interest in both sustainable and healthy food as compared to the other countries. The descriptive norm was most positive in the Netherlands and Italy. The perceived effectiveness is highest in Denmark (although not significantly different from France).

General food involvement and food neophobia

Table 12 General food involvement and food neophobia

	Total	NL	DK	CR	FR	IT
General food involvement	4.92	4.80 ^a	4.71 ^a	4.84 ^{a,b}	4.95 ^b	5.33 ^c
Food neophobia	4.34	4.54 ^a	4.55 ^a	4.15 ^b	4.35 ^c	4.16 ^b

Note: Different subscripts per row indicate significant different values

Overall general food involvement

All countries taken together, consumers report to have a food involvement score of 4.9 ($SD=1.1$) on a 7-point scale (see

Table 32).

Differences between countries in general food involvement

Italy has the highest involvement with food compared to the other countries ($p < .01$). And France has a higher food involvement than The Netherlands and Denmark ($p < .05$).

Overall food neophobia

All countries taken together, consumers report to have a food neophobia score of 4.3 ($SD = 0.9$) on a 7-point scale (see Table 32).

Differences between countries in food neophobia

The Netherlands and Denmark have the lowest food neophobia compared to all the other countries ($p < .01$). On the other hand Italy and Czech Republic have the highest food neophobia compared to all the other countries ($p < .01$).

Overall, consumers are rather involved with food. Consumers in Italy are most involved.

Overall, consumers score average on food neophobia, not being very food neophobic nor very open to new foods. Consumers in The Netherlands and Denmark are most open to new products and consumers from Italy and Czech Republic are least open.

General food motives

Overall

All countries taken together, consumers base their food choices mostly on sensory characteristics, like smell and taste ($p < .01$) (see Figure 6). Consumers base their food choices the least on familiarity ($p < .01$). Sustainability and health motives are less important than convenience, natural/seasonal/local, price and sensory characteristics, but more important than familiarity motives ($p < .05$).

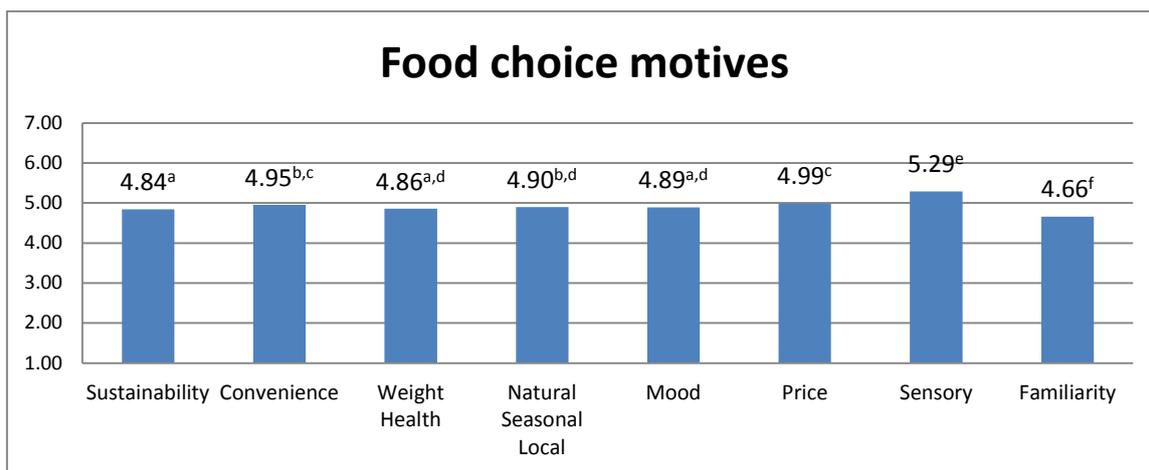


Figure 6 General food choice motive scores on a 7-point scale

Note: Different subscripts indicate significant different values

Differences between countries

Country differences in food choice motive scores are described in Table 13. Italy takes **sustainability** motives in consideration most compared to the other countries ($p < .01$) and Denmark the least ($p < .01$). Also The Netherlands finds sustainability motives less important than Czech Republic and France ($p < .05$).

Italy takes **convenience** motives in consideration most compared to the other countries ($p < .01$) and Czech Republic finds convenience motives more important than France, Denmark and The Netherlands ($p < .01$).

Italy takes **weight and health** motives in consideration most compared to the other countries ($p < .01$) and Denmark the least ($p < .01$). Also Czech Republic finds weight and health motives more important than The Netherlands and France ($p < .05$).

Italy takes **Natural, seasonal, local** motives in consideration most compared to the other countries ($p < .01$) and Denmark and The Netherlands the least ($p < .01$).

Italy and Czech Republic take mood motives in consideration most compared to the other countries ($p < .01$) and Denmark the least ($p < .01$).

Italy takes **price** motives in consideration most compared to the other countries (except for Czech Republic) ($p < .05$) and Denmark the least ($p < .01$). Czech Republic finds price motives more important than France ($p < .01$).

Italy and Czech Republic take **sensory** motives in consideration most compared to the other countries ($p < .01$) and Denmark the least ($p < .01$).

Czech Republic takes **familiarity** motives in consideration most compared to the other countries (except for Italy) ($p < .01$) and Denmark the least ($p < .01$). Also the Netherlands finds familiarity motives less important than Italy, France and Czech Republic ($p < .01$).

Table 13 Food choice motives

	NL	DK	CZ	FR	IT
Sustainability	4.71 ^a	4.48 ^b	4.89 ^c	4.89 ^c	5.25 ^d
Convenience	4.86 ^a	4.73 ^a	5.08 ^b	4.81 ^a	5.28 ^c
Weight control and health	4.82 ^a	4.47 ^b	4.99 ^c	4.70 ^a	5.32 ^d
Natural, seasonal and local	4.51 ^a	4.37 ^a	5.06 ^b	5.08 ^b	5.49 ^c
Mood	4.75 ^a	4.39 ^b	5.18 ^c	4.86 ^a	5.25 ^c
Price	5.06 ^{a,b}	4.41 ^c	5.21 ^{a,d}	5.01 ^b	5.23 ^d
Sensory appeal	5.28 ^a	5.12 ^b	5.26 ^a	5.29 ^a	5.49 ^c
Familiarity	4.58 ^a	3.84 ^b	5.07 ^c	4.87 ^d	4.94 ^{c,d}

Note: Different subscripts per row indicate significant different values

All countries taken together, consumers base their food choices mostly on sensory characteristics, like smell and taste and least on familiarity. In addition, sustainability and health motives are less important than convenience, natural/seasonal/local, price and sensory characteristics. Looking at differences between countries it is striking that Italian consumers attach the most value to almost all the motives, except for familiarity. Denmark considers sustainability motives as well as health/weight motives least important, and Denmark together with the Netherlands attaches the least importance to natural/ seasonal/ local.

Explaining sustainable consumption behaviour

In this section we will look into which characteristics influence openness to different types of products as replacers of meat (animal-based, plant-based, new/unknown).

Three hierarchical regression analyses have been conducted with openness to animal-based product, plant-based products and new product as alternatives of meat as the dependent variables. In Block 1, country and demographic variables have been included. In the second block, general psychosocial variables (general food involvement and food neophobia) were added. In the third block, specific psychosocial variables for sustainable food were added and in block 4, specific psychosocial variables for health were added. In the last block, general food choice motives were introduced.

Almost all underlying values, motives, and characteristics that we included in this study were associated with openness to different types of products as

replacers of meat (animal-based, plant-based, new/unknown) but effect sizes were generally small (See appendix II). For demographics in the first block, the results confirm the country differences that were reported earlier. Most countries differed from each other in openness to the different categories of meat alternatives. Women, older respondents, and higher educated consumers were more open to animal-based meat alternatives, whereas consumers with a lower income were less. Women, younger respondents, and higher educated consumers were more open to plant-based meat alternatives, whereas consumers with a lower income were less. Men, younger respondents, and higher educated consumers were more open to new meat alternatives, whereas consumers with a lower income were less.

For aspects related to general food choice in the second block both a higher food involvement and higher food neophobia were related to higher openness to all categories of meat alternatives. For the other variables in the third and fourth block (aspects related more directly to sustainable food and aspects related to healthy food respectively) more mixed results were found. For animal-based products consumers with a positive attitude towards sustainable food and towards healthy food, a lower subjective knowledge about sustainable food, a lower general sustainability interest and a higher descriptive norm towards sustainable eating are more open. For plant-based products, consumers with a more positive attitude towards sustainable food, a higher general sustainability interest, a higher descriptive norm towards sustainable eating, higher subjective knowledge about healthy food, and higher general interest in health food are more open. For new products, consumers with a less positive attitude towards sustainable food and towards healthy food, lower perceived effectiveness towards sustainable food consumption, a higher descriptive norm towards sustainable eating and lower general interest in health food are more open.

Finally, for general food motives (in the fifth block) the following patterns were found: Natural/seasonal/local motives and sensory motives were related to higher openness towards animal-based products. Sustainability motives, weight control and health, and natural/seasonal/local motives were related to more openness towards plant-based products while sensory motives and familiarity motives were related to lower openness. Weight control and health and mood motives were related to more openness and sensory motives to less openness towards new products.

Almost all underlying values, motives, and characteristics that we included in this study were associated with openness to different types of products alternatives for meat (animal-based, plant-based, new/unknown) but effect sizes were generally small. For all alternatives, country differences were found. For plant-based products, consumers who have a higher general food interest, who are less neophobic, and who have a more positive attitude towards sustainability, a higher sustainability interest and a higher descriptive norm towards sustainable eating are most open. For animal-based products, consumers who have a higher general food interest, who are less neophobic, who have a more positive attitude towards sustainable food and healthy food are most open. For new products, consumers who are male and younger, have a more positive descriptive norm towards sustainable eating, more negative attitude towards health, and find sensory motives for food in general less important are most open.



Conclusion and general discussion

Summary of the main results and their implications

Sustainable behaviour

For consumers, important aspects of sustainability are: Seasonal fruits and vegetables, food waste, water use and use of natural resources. These aspects were most often mentioned as aspects of sustainable food and are considered most important. Interestingly, ethical aspects such as fair trade and global food availability and health aspects scored low. For most consumers, the definition of sustainable food thus seems more narrow and focussed on the environmental aspect.

Self-reported intake of sustainable foods shows that seasonal/local food was the most frequent sustainable food behaviour, followed by free range products/products with a sustainability logo/smaller portions, followed by organic/fair trade products, and least frequently vegetarian products. It would be interesting to see to which degree consumers are actually aware of these aspects in the supermarket. Previous studies on logos for example, showed that consumers are not so aware of sustainability logos (Grunert, Hieke & Wills, 2014).

When respondents were asked about alternatives for meat, they were most open to animal-based products (fish, cheese and eggs), but on average, still only moderately positive. The second favourite alternative for meat are plant-based products to which they are, on average, moderately negative. Consumers are least open to new products like insects or in vitro meat. Consumers are thus most open for the alternative that has the least benefits in terms of (environmental) sustainability. For a replacement of meat by plant-based alternatives there seems to be a longer way to go and for new products consumers are generally not open. It would be interesting to see to what degree consumers are aware of the different sustainability impacts of meat alternatives. And to further explore which subgroups of the populations are open to the more sustainable alternatives. The paragraph on drivers later in this section gives some first insights on this topic.

Overall, consciousness of sustainable consumption is on average moderately low. Consumers are most conscious about sustainable consumption from an economic viewpoint, followed by the social viewpoint, and least conscious about sustainable consumption from an environmental viewpoint. For general sustainable behaviours (e.g. turning off lights) consumers indicate to perform these neither frequent nor infrequent. For policy, it thus seems most relevant to focus communication and interventions on the economic (e.g. only buy what you really need) and social viewpoint rather than on environmental viewpoint (e.g. recycling). Or to focus on increasing consciousness from an environmental

viewpoint. Note that consumers are thus most conscious to the economic and social viewpoint but that their perception of the concept “sustainability” is more focussed on the environmental aspect.

Underlying factors of sustainable behaviour

In terms of attitude, we see that healthy food is higher valued than sustainable food. On average, consumers report to have positive attitudes towards both sustainable and healthy food and they have a somewhat positive interest in healthy food, but a neutral interest in sustainable food. Also, consumers (believe to) know more about healthy food than about sustainable food. On average, they score moderately positive on their perception of their own health knowledge and moderately negative on perception of their own sustainability knowledge. The finding that health is perceived more positive by consumers than sustainability confirms earlier results that health can function as a carrier for sustainable food behaviour, because those concepts are often linked in the perception of consumers (Verain et al., 2016).

In terms of norms, the descriptive norm towards sustainable eating is neutral, which indicates that consumers didn't think their social peers eat sustainable diets frequently nor infrequently. Consumers are also not particularly willing to pay extra for a sustainable product and if they do, they would rather pay extra for a product than pay extra taxes on a product for clean-up programs. Finally, consumers weren't totally convinced that they could effectively influence sustainable food consumption as an individual. Overall, this confirms that social norms and perceived efficacy are not strong drivers towards sustainable food consumptions. Again, more research is needed to see how these underlying factors could be influenced.

For food in general, consumers are rather involved with food and not food neophobic nor very open to new foods. The results on drivers of behaviour show that food involvement and (lack of) food neophobia are also important factors related to openness to meat alternatives. This might thus be a way to increase sustainable food consumption, by increasing involvement in food and decreasing food neophobia.

Consumers base their food choices mostly on sensory characteristics, (e.g. smell and taste) and least on familiarity. Sustainability and health motives are less important than convenience, natural/seasonal/local, price and sensory characteristics. So when introducing new food choices, these results should be taken into consideration. A good sensory quality seems an important prerequisite to successfully introduce new food choices (De Boer, Schösler & Boursema, 2013).

Differences between countries

In The Netherlands air and water pollution were frequently mentioned as aspects of sustainable food, and also considered important. Consumers in The Netherlands score relatively low on all sustainable food behaviours, and

specifically on seasonal/local products. For food choice in general, they find natural/ seasonal/ local the least important. They are also among the countries that are least conscious about sustainable food and least open to new products. On objective knowledge towards sustainable food, however, they have one of the highest scores and also the descriptive norm was most positive in the Netherlands.

In Denmark organic food and animal welfare were most often mentioned as aspects of sustainable food and considered important. Also, more intake of organic/fair trade and free range products/products with a sustainability logo/smaller portions were reported. They have one of the most positive attitudes towards sustainable food, highest perceived effectiveness, and highest objective knowledge score. On the other hand, Danish consumers perform significantly less sustainable behaviours, are also among the countries that are least conscious about sustainable food, and are least open to new products. For food in general, the Danish considered sustainability motives, natural/ seasonal/ local, and health/weight motives less important.

In Czech Republic healthy food and land use were often mentioned as aspects of sustainable food. Czech Republic scores relatively low on all sustainable food behaviours, and specifically on organic/fair trade consumption, and also low on subjective knowledge. Noticeably, in Czech Republic consumers are more open to animal-based meat alternatives as compared to the other countries and least open to new products as meat alternatives.

In France local and regional food and transportation distance were often mentioned and also considered important. French respondents had a relatively high intake of free range products/products with a sustainability logo/smaller portions.

In Italy food safety was often mentioned and considered important. Italian consumers scored high on many sustainable behaviours and underlying factors. They reported higher intake of seasonal/local food, vegetarian food and organic/fair trade food and reported to perform sustainable behaviours the most. They were most open to plant-based alternatives, most conscious from all three viewpoints, have the highest scores on subjective knowledge, are most willing to pay extra, have the most positive attitude towards sustainable food, have higher interest in sustainable food and report a more positive norm. In contrast, Italians have the lowest scores on objective knowledge about sustainable food. For food in general, they are most involved and attach the most value to almost all the motives for food choice, except for familiarity.

Drivers of change

Almost all underlying values, motives, and characteristics that we included in this study were predictors of openness to different categories of meat alternatives (animal-based, plant-based, new/unknown) but effect sizes were generally small. For openness for plant-based products, consumers who have a

higher general food interest, who are less neophobic, and who have a more positive attitude towards sustainability, a higher sustainability interest and a higher descriptive norm towards sustainable eating are most open. For animal-based meat alternatives, consumers who have a higher general food interest, who are less neophobic, who have a more positive attitude towards sustainable food and healthy food are most open. For new products, consumers who are male and younger, have a more positive descriptive norm towards sustainable eating, more negative attitude towards health, and find sensory motives for food in general less important are most open.

Discussion: limitations of the study

The main strength of the study are the methods and data collection procedures. We used mostly validated questionnaires and also the self-developed questionnaires performed well. A large sample was included from 5 countries and divers in terms of demographic characteristics. Finally, the research procedure was thorough with translations - back translations and a quantitative pilot to ensure a good quality of the instruments. As with any research design, a number of limitations need to be kept in mind:

- The main caveat of the study relates to the interpretation of self-reported data. The replies of the respondents are of hypothetical nature since they are not measured while the actual behaviour is conducted (e.g. choosing food in supermarkets). This means that self-reported behaviour such as sustainable food intake might not always correspond with true behaviour, for example due to imperfect recall. Also, reported intentions, such as importance of food motives or willingness to pay may in the end not determine purchase and eating behaviour due to the presence of other (contextual) factors (e.g. price promotions, lack of time, etc.). This effect of upward bias in hypothetical settings has been studied extensively for choice experiments in the lab (e.g. List and Wallet, 2001). Finally, self-reported answers can always be influenced by social desirability. It is therefore likely that the positive attitudes and reported sustainable and health behaviour are positively biased.
- Related to this, we cannot exclude the possibility that differences in the results between countries are attributable to cultural differences in scale use.
- The items of the objective knowledge questionnaire were developed by Dutch researchers. This might (partly) explain the higher scores in The Netherlands since the topics and specific examples could be biased by the topics in Dutch media.

Since there are no theoretical models on sustainable food consumption the nature of the results is mostly descriptive with many underlying variables and

different outcome variables. This resulted in a large number of analyses. Also, a large sample results in a higher power of the study where small differences are significant. Therefore, the effect sizes should also be considered when translating the results to implications.

Conclusion

Recommendations for improving dietary patterns towards a more sustainable diet are most effective when they are in line with consumers' attitudes and willingness to change. The aim of this task was therefore to get a better understanding of consumers' drivers of dietary change regarding sustainable consumption.

The results give us insights in how consumers see sustainable food behaviour and to what degree they perform sustainable behaviour. As discussed in the introduction, consumers can adopt different strategies or behaviours to change or replace their unsustainable food intake (e.g. meat). Eating seasonal/local food and to a lesser degree free range products/products are the most popular strategies. In terms of directions for willingness to change their meat-consumption, other animal-based products (e.g. cheese, eggs and fish) are the most popular alternatives. For new products like in vitro meat or insects their doesn't seem to be a lot of enthusiasm. A survey cannot directly answer the question how willing consumers are to change but the results give some insights that are small but positive in favour of sustainable food consumption. We see that on average, consumers report to have a positive attitude and a neutral interest in sustainable food.

Consumers are most conscious about sustainable consumption from an economic viewpoint (even if I can afford a product, do I need it / is it useful, etc.) compared to a social (I only buy a product when: No child labour is involved / No workers are abused, etc.) and an environmental viewpoint (I only buy a product when: It is made of recycled materials/ can be disposed of in an environmentally friendly way, etc.). Also, the degree to which they perform sustainable food behaviours depends on their demographic as well as psychographic characteristics. Almost all underlying values, motives, and characteristics that we included in this study were associated with openness to different types of products as alternatives for meat (animal-based, plant-based, new/unknown). Only, the general food motives convenience and price were unrelated.

Finally, country differences give us some insights in specific points of attention that should be considered in the final recommendation. Consumers in the different countries have somewhat different views on sustainability and are to some degree driven by different variables underlying sustainable food behaviour.

References

- Aertsens, J., Verbeke, W., Mondelaers, K., & Van Huylenbroeck, G. (2009). Personal determinants of organic food consumption: a review. *British Food Journal*, 111(10), 1140-1167.
- Arvola, A., Vassallo, M., Dean, M., Lampila, P., Saba, A., Lähteenmäki, L., & Shepherd, R. (2008). Predicting intentions to purchase organic food: The role of affective and moral attitudes in the Theory of Planned Behaviour. *Appetite*, 50(2), 443-454.
- Bezençon, V., & Blili, S. (2011). Segmenting the market through the determinants of involvement: The case of fair trade. *Psychology & Marketing*, 28(7), 682-708.
- De Boer, J., Hoogland, C. T., & Boersema, J. J. (2007). Towards more sustainable food choices: Value priorities and motivational orientations. *Food Quality and Preference*, 18(7), 985-996.
- De Boer, J., Schösler, H., & Boersema, J. J. (2013). Motivational differences in food orientation and the choice of snacks made from lentils, locusts, seaweed or "hybrid" meat. *Food Quality and Preference*, 28(1), 32-35.
- Dowd, K., & Burke, K. J. (2013). The influence of ethical values and food choice motivations on intentions to purchase sustainably sourced foods. *Appetite*, 69, 137-144.
- Grunert, S. C., & Juhl, H. J. (1995). Values, environmental attitudes, and buying of organic foods. *Journal of Economic Psychology*, 16(1), 39-62.
- Health Council of the Netherlands (2011). *Richtlijnen geode voeding ecologisch belicht*. Den Haag: Gezondheidsraad.
- LNV. (2009). *Nota Duurzaam Voedsel: Naar een duurzame consumptie en productie van ons voedsel*.
- Lockie, S., Lyons, K., Lawrence, G., & Mummery, K. (2002). Eating 'green': Motivations behind organic food consumption in Australia. *Sociologia Ruralis*, 42(1), 23-40.
- Lindeman, M., & Väänänen, M. (2000). Measurement of ethical food choice motives. *Appetite*, 34(1), 55-59.
- List, J.A. & Gallet, C.A. (2001). What Experimental Protocol Influence Disparities Between Actual and Hypothetical Stated Values? *Environmental and Resource Economics*, 20, 241.
- Grunert, K. G., Hieke, S., & Wills, J. (2014). Sustainability labels on food products: Consumer motivation, understanding and use. *Food Policy*, 44(0), 177-189.
- Raynolds, L. T. (2002). Consumer/Producer Links in Fair Trade Coffee Networks. *Sociologia Ruralis*, 42(4), 404-424.
- Tanner, C., & Wölfling Kast, S. (2003). Promoting sustainable consumption: Determinants of green purchases by Swiss consumers. *Psychology & Marketing*, 20(10), 883-902.
- Toma, L., McVittie, A., Hubbard, C., & Stott, A. W. (2011). A structural equation model of the factors influencing British consumers' behaviour toward animal welfare. *Journal of Food Products Marketing*, 17(2-3), 261-278.
- Verain, M. C. D., Sijtsema, S. J., & Antonides, G. (2016). Consumer segmentation based on food-category attribute importance: The relation with



healthiness and sustainability perceptions. *Food Quality and Preference*, 48, 99-106.

Vermeir, I., & Verbeke, W. (2006). Sustainable food consumption: Exploring the consumer “attitude–behavioural intention” gap. *Journal of Agricultural and Environmental ethics*, 19(2), 169-194.

Annexes

Annex I Demographic characteristics of the sample

Education levels in the five countries

	Low education	Medium education	High education
Total	23.0%	51.6%	25.4%
Netherlands	12.0%	46.5%	41.5%
Denmark	18.4%	77%	4.6%
Czech Republic	27.5%	56.7%	15.9%
France	45.4%	36.5%	18.1%
Italy	11.8%	40.9%	47.2%

Income levels in the five countries

	Low income	Medium income	High income
Total	41.0%	44.7%	8.6%
Netherlands	38.6%	46%	15.3%
Denmark	51.6%	37.7%	10.7%
Czech Republic	29.1%	62.8%	8.2%
France	45.8%	47.5%	6.8%
Italy	50.7%	43.4%	5.9%

Degree of urbanisation of living area in the five countries

	In a village not adjacent to a city	In a village adjacent to a city	In a city with less than 30.000	Between 30.000 and 100.000	In a city with more than 100.000
Total	15.1%	16.8%	21.0%	22.0%	25.2%
Netherlands	22.5%	13.6%	14.9%	25%	24.2%
Denmark	14.2%	14.7%	20.5%	23.6%	27%
Czech Republic	13.9%	14.4%	27.9%	19.4%	24.4%
France	11.8%	24.5%	25.6%	18.1%	19.9%
Italy	13%	16.6%	16%	23.9%	30.4%

Family status in the five countries

	Married with children at home	Married without children at home	Married without children	Single with children at home	Single without children at home	Single without children	Living with parents
Total	31.9%	11.3%	16.5%	6.0%	5.0%	21.1%	10.5%
Netherlands	26.8%	11.6%	18%	6.0%	4.7%	24.0%	9.9%
Denmark	19%	18.1%	14.2%	7.4%	7.3%	26.8%	8.7%
Czech Republic	34.2%	11.2%	19.9%	6.4%	7.2%	10.6%	11.7%
France	37.4%	8.4%	16.1%	6.5%	4.5%	24.6%	5.8%
Italy	42%	7.0%	14.4%	3.9%	1.3%	19.5%	16.6%

Annex II Regressions on openness to different categories of meat alternatives

	Animal-based products			Plant-based products			New products		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	<i>B</i>
Step 1									
Constant	4.587	0.086		4.117	0.087		3.175	0.093	
Dummy Netherlands	-0.102	0.063	-0.029	0.122	0.063	0.034	0.135	0.068	0.034*
Dummy Czech Republic	0.434	0.059	0.135***	0.134	0.059	0.041*	-0.358	0.063	-0.099***
Dummy France	0.298	0.059	0.094***	0.411	0.059	0.127***	0.284	0.064	0.080***
Dummy Italy	0.233	0.060	0.073***	0.419	0.061	0.130***	-0.050	0.065	-0.014
Gender	-0.312	0.037	-0.120***	-0.297	0.037	-0.113***	0.495	0.040	0.170***
Age	0.007	0.001	0.076***	-0.007	0.001	-0.066***	-0.025	0.002	-0.225***
Dummy low education	-0.305	0.059	-0.099***	-0.548	0.059	-0.176***	-0.276	0.064	-0.080***
Dummy medium education	-0.099	0.049	-0.038*	-0.282	0.049	-0.107***	-0.272	0.053	-0.093***
Dummy low income	-0.124	0.040	-0.048**	-0.100	0.040	-0.038*	-0.166	0.043	-0.056***
Dummy high income	0.018	0.067	0.004	0.055	0.068	0.012	-0.111	0.073	-0.022
Step 2									
General food involvement	0.277	0.017	0.234***	0.246	0.017	0.206***	0.045	0.019	0.034*
Food neophobia	0.237	0.019	0.171***	0.171	0.020	0.121***	0.066	0.022	0.042**
Step 3									
Subjective knowledge about sustainable food	-0.045	0.017	-0.040**	0.012	0.017	0.011	0.037	0.019	0.029
Attitude towards sustainable food	0.165	0.016	0.155***	0.143	0.016	0.133***	-0.051	0.018	-0.043**
General sustainability interest	-0.043	0.021	-0.035*	0.212	0.021	0.169***	-0.002	0.024	-0.002
Descriptive norm towards eating sustainable	0.088	0.016	0.083***	0.112	0.016	0.105***	0.294	0.017	0.249***
Perceived effectiveness towards sustainable food consumption	-0.018	0.012	-0.021	-0.013	0.012	-0.016	-0.055	0.013	-0.058***



Step 4									
Subjective knowledge about healthy food	0.004	0.020	0.004	0.072	0.020	0.064^{***}	-0.040	0.022	-0.032
Attitude towards healthy food	0.135	0.023	0.115^{***}	0.020	0.022	0.017	-0.220	0.025	-0.167^{***}
General interest towards healthy food	0.001	0.024	0.000	0.067	0.024	0.052^{**}	-0.079	0.027	-0.056^{**}
Step 5									
Sustainability motives	-0.020	0.027	-0.020	0.100	0.026	0.098^{***}	0.031	0.029	0.027
Convenience motives	-0.014	0.019	-0.013	0.029	0.019	0.028	0.010	0.021	0.009
Weight control and health motives	0.044	0.023	0.042	0.069	0.023	0.065^{**}	0.117	0.026	0.099^{***}
Natural/seasonal/local motives	0.093	0.027	0.089^{**}	0.098	0.027	0.092^{***}	-0.007	0.030	-0.006
Mood motives	0.013	0.023	0.012	0.021	0.023	0.019	0.069	0.025	0.056^{**}
Price motives	0.012	0.016	0.012	0.030	0.016	0.030	0.035	0.018	0.032
Sensory motives	0.053	0.025	0.043[*]	-0.115	0.025	-0.092^{***}	-0.241	0.028	-0.174^{***}
Familiarity motives	-0.005	0.021	-0.005	-0.112	0.021	-0.107^{***}	-0.031	0.023	-0.027

Notes. * $p < .05$; ** $p < .01$; *** $p < .001$. Outcomes are presented only for the variable that was first added in this step, variables from previous steps were included but their statistics are not included in the table again.

Animal-based: $R^2 = .048$ for step 1; $\Delta R^2 = .092$ for step 2 ($p < .001$); $\Delta R^2 = .027$ for step 3 ($p < .001$); $\Delta R^2 = .007$ for step 4 ($p < .001$); $\Delta R^2 = .009$ for step 5 ($p < .001$).

Plant-based: $R^2 = .062$ for step 1; $\Delta R^2 = .062$ for step 2 ($p < .001$); $\Delta R^2 = .074$ for step 3 ($p < .001$); $\Delta R^2 = .006$ for step 4 ($p < .001$); $\Delta R^2 = .020$ for step 5 ($p < .001$).

New products: $R^2 = .114$ for step 1; $\Delta R^2 = .003$ for step 2 ($p < .001$); $\Delta R^2 = .062$ for step 3 ($p < .001$); $\Delta R^2 = .020$ for step 4 ($p < .001$); $\Delta R^2 = .017$ for step 5 ($p < .001$).