

An approach to the perceptions of Spanish consumers on food sustainability through the use of projective techniques

FRANCISCO J. MESÍAS*, JUAN A. FERNÁNDEZ**, ANDRES HERRILLO***,
ALFREDO J. ESCRIBANO****

DOI: 10.30682/nm2301c
JEL codes: Q01, Q1, Q5

Abstract

Increasing social concern regarding the environmental impact caused by the growth of the world's population and the need to produce food has led to terms such as sustainability and sustainable food production and consumption to become a current subject of discussion. However, consumers are yet not fully familiar with the concept of sustainability and what it actually entails. This paper uses projective techniques as the ideal methodology to overcome these limitations and analyse the meaning of sustainability for Spanish consumers. Results show that consumers associate sustainability with the environment, although when it is referred to food, other concepts such as local food/proximity and responsible consumption also emerge. Also, while consumers find a clear association between sustainability and organic production, this is not so clear when health is also involved. Finally, respondents' lifestyles served us as a basis to identify three consumer groups with notable differences in terms of their perception of sustainability. These results point to the need for policies that promote sustainable food production and its awareness by consumers to help mitigate environmental degradation.

Keywords: *Consumer perceptions, Sustainability, Food, Qualitative research.*

1. Introduction

The concept of sustainability could be considered to be currently in fashion. In fact, on a brief literary review, references about “*sustainable production*” (Escribano *et al.*, 2020), “*sustainable development*” (Abreu *et al.*, 2019) and “*sustainable consumption*” (Song *et al.*, 2019), among others, can be found. This shows the complexity of sustainability as a concept which is reflected by

the lack of consistent definitions in the literature.

The Brundtland Report presented in 1987 by the World Commission on Environment and Development of the UNO, was the first attempt to approach sustainability, although it focused on sustainable development (World Commission on Environment and Development, 1987). In fact most implementation studies do not present a definition of sustainability, even when assessing it (Moore *et al.*, 2017).

* Faculty of Agriculture - Universidad de Extremadura; Instituto Universitario de Investigación en Recursos Agrarios, Universidad de Extremadura, Badajoz, Spain.

** Faculty of Agriculture - Universidad de Extremadura, Badajoz, Spain.

*** Faculty of Veterinary Science - Universidad de Extremadura, Cáceres, Spain.

**** Independent consultant, Cáceres, Spain.

Corresponding author: andreshg@unex.es

In the present study and with the end of providing a clear framework for the participants, the following definition has been used: “Sustainability refers to meeting society’s current needs without compromising the ability of future generations to meet theirs, ensuring a balance between economic growth, environmental stewardship and social well-being. There are several related concepts, such as environmental sustainability (which emphasizes preserving biodiversity without having to give up economic and social progress), economic sustainability (which seeks the profitability of activities in a sustainable manner) and social sustainability (which seeks population cohesion and stability)” (Horrillo *et al.*, 2021).

Food consumption is an area with one of the greatest impacts on environmental sustainability. However, many consumers are not fully aware of the association between their food consumption and the environmental impact of food production (Eldesouky *et al.*, 2020). Therefore, it could be said that sustainable food consumption refers to patterns that are compatible from an economic, social and environmental point of view at all food system levels, including food production, processing, distribution, food purchasing and disposal of resulting waste (Pack, 2007).

On the other hand, the growing social concern for the environmental impact caused by the need to produce food in order to meet the world’s demand (Florindo *et al.*, 2017) has made consumers become increasingly interested in the way their food is produced and the production methods employed (Briggeman and Lusk, 2011).

Such trend has led to the emergence of a number of sustainability labelling projects in the food industry (Caputo *et al.*, 2013; Gadema and Oglethorpe, 2011) aimed at providing consumers with information on the sustainability of food. Logos are amongst the most popular instruments in this regard, with the most recognisable ones being Fair Trade, Rainforest Alliance and various others relating to animal wellbeing and carbon footprint (Eldesouky *et al.*, 2020; Grunert *et al.*, 2014).

Nevertheless, the lack of familiarity of consumers with the concept of sustainability makes it difficult for them to assess and compare the various products on offer (Kemp *et al.*, 2010).

This makes food companies become interested in discovering how consumers perceive the concept of sustainability so that the information provided in promotional actions or labelling can be both appreciated and capable of influencing consumer purchasing behaviour.

In this context, segmenting sustainable food consumers, with the identification of different purchasing and consumption profiles, is also highly relevant. For this purpose, variables relating to consumer behaviour and perceptions, such as lifestyles, must be taken into account, given the limitations that sociodemographic variables provide in this regard (Verain *et al.*, 2012). Dagevos (2005) argues that sociodemographic characteristics have lost a great deal of their capacity to explain the current consumer groups, which is also in line with the conclusions drawn by Diamantopoulos *et al.* (2003). The latter authors highlighted a limited capability of sociodemographic characteristics to determine the profile of consumers who are concerned about the environment. For that reason (Verain *et al.*, 2012) recommend that variables such as lifestyles, personality and behavioural traits should be taken into account for segmentation studies on sustainability.

Therefore, the purpose of this study is to explore Spanish consumers’ perceptions regarding the terms sustainability and sustainable food production and consumption, whereby qualitative research techniques have been used. These techniques involve less structured tasks than quantitative methodologies and therefore allow for a more in-depth exploration of consumers’ behavior and perceptions (Vaca and Mesías, 2014). Qualitative research can be used to approach a problem and its causes, discover the nature of a problem, help identify alternatives and relevant variables and formulate hypotheses (Guerrero *et al.*, 2009; Stewart and Shamsasani, 2014). This is why these methodologies have been widely used in the agri-food sector with diverse applications such as the study ready-to-eat food (Vidal *et al.*, 2013), the creation of new food products (Banović *et al.*, 2016) and the development of quality brands in agroforestry systems (Escribano *et al.*, 2020).

Furthermore, this paper can help fill in the knowledge gap existing amongst farmers, food

industry and consumers in relation to key matters, such as the meaning of sustainability and identification of consumer segments with different sustainable food behaviour. Therefore, the present study is timely and useful not only for the scientific community but also for the food industry, as the results obtained could be useful for the development of new products, marketing strategies, and communication campaigns, related to issues such as sustainable packaging or environmental labelling (carbon footprint, eco-labelling). Also, public institutions could benefit from this study when defining sustainable consumption education programmes.

2. Background

Since the concept of sustainability became relevant in the mid-1980s, it has turned into a benchmark for development as well as a challenge for governments around the world. In those early days, warnings about the negative environmental consequences of economic development and globalization were already being raised, and the search for possible solutions to the problems arising from industrialization and population growth was beginning. Thus, achieving sustainable development to avoid dangers such as climate change, water scarcity, inequalities and hunger became a global challenge for mankind, who must promote sustainable development through social progress, environmental balance and economic growth.

A number of recent studies have reviewed the terms sustainability and sustainable development. Thus, Ruggerio's work (2021) presents these two concepts and details their similarity and their applicability to real systems. These two terms are so closely associated that they have been frequently used as synonyms, even in academic and scientific fields, as can be found in the literature (Olawumi and Chan, 2018; Sartori *et al.*, 2014). However, different studies point out that sustainable development is a contradictory concept due to the impossibility of maintaining infinite economic growth on a limited planet (Redclift, 2005; Sachs, 1999) and highlight the contradictions between their objectives (Spaiser *et al.*, 2017). All this reveals that the debate on both concepts is still open and evidences the

need to deepen the academic discussion on their meanings (Whyte and Lamberton, 2020).

Agricultural and agro-industrial activity, given its inherent nature, involves numerous activities which affect sustainability, especially from an environmental point of view. Thus, and in contrast to the environmental sustainability approach, which advocates that nature is not an inexhaustible source of resources that must be used rationally and protected, agriculture is faced with the challenge of feeding an increasing number of human beings, which leads to deforestation to expand crops and pastures, depletion and pollution of aquifers due to the intensification of agriculture, etc. (Infante-Amate and González de Molina, 2013; Notarnicola *et al.*, 2012).

There are also relevant impacts in the social and economic dimensions, such as the declining farmer incomes and their effect on rural depopulation, or the problems associated with fluctuating food prices and supply chains, critical to achieving an ambitious target such as the second Sustainable Development Goal (Agnusdei and Coluccia, 2022).

In this context, agrifood systems have always played a prominent role in relation to sustainable development and sustainability. Although it is difficult to find exhaustive analyses in this regard, some authors, carry out a systematic review and analyze their relationship with sustainability (El Bilali *et al.*, 2021). The problem faced by the food systems of the future comes from the fact that, although more than enough food is produced, food and nutritional security for everyone must be achieved, addressing at the same time sustainability challenges. All the above stresses the urgency of fostering the transition to sustainable agri-food systems (El Bilali *et al.*, 2019).

Other authors (Nematollahi and Tajbakhsh, 2020) have focused on sustainable supply chain management in both the agricultural and livestock sectors, as the lack of sustainability in the agri-food sector has been an issue for more than a decade now. This lack of sustainability comes, on the one hand, from the shortcomings of its economic model and, on the other, from the serious problems affecting it, such as scarcity of resources, food waste or generation of residues. All this, in turn, contributes to climate change, loss of biodiversity and desertification. In this

scenario, authors such as (Esposito *et al.*, 2020) reviewed the existing literature and proposed alternatives to this situation, such as the application of the Sustainable Development Goals or tools like circular economy.

Finally, sustainable agri-food supply chains are another link that is experiencing a positive trend in this sustainable transition and represent a challenging research topic that is capturing the attention of many academics. Recently, Agnusdei and Coluccia (2022) based their analysis on identifying homogeneous areas in the field of agri-food supply chains, investigating the role of innovation technology in the transition towards sustainability. These authors concluded that blockchain technology appears as a central issue in the field of food security.

One of the most relevant aspects in terms of the sustainability of food consumption and production is food packaging. A review by (Otto *et al.*, 2021) delves into the general view of the European consumer regarding the environmental impact of bulk or packaged food. This paper concludes that the studies conducted so far on this topic in Europe focus only on consumers' perception, without a link to scientific data on packaging sustainability. In other words, consumer perception differs to a large extent from the scientific conclusion on environmentally friendly sustainable packaging. This makes a long-term improvement of consumer purchasing behavior unlikely.

In line with the above, one of the consequences brought about by the Covid-19 pandemic has been the increase in online sales and with it, the use of packaging for e-commerce (Kim, 2020). Also worth mentioning is the work of (Escursell *et al.*, 2021), which reviews the evolution of packaging over the last century through a compilation of the scientific literature and places special emphasis on e-commerce packaging, focusing on its environmental implications. Also relevant regarding consumer perception of packaging sustainability is the role of labeling. Thus, another paper by (Torma and Thøgersen, 2021) proposes sustainability meta-labeling to reduce ambiguity and information overload on packaging sustainability labels. This would facilitate consumer decision making and contribute to the evolution towards sustainable and responsible consumption.

3. Materials and methods

3.1. Projective techniques

Within the overall concept of qualitative research, projective techniques are one of the groups of techniques that have been increasingly used in marketing and consumer behavior studies (Boddy, 2005; Steinman, 2009). Projective techniques can be described as covert (subjects are aware that they are taking part in a study even without knowing what the researcher is measuring) and unstructured (their response alternatives are not limited or determined by the researcher) (Steinman, 2009). They were originally developed in the clinical field of personality assessment and personality disorders and have been used in marketing research since the 1940s (Boddy, 2005; Donoghue, 2000).

Projective techniques are based on the principle that presenting respondents with ambiguous or little-structured stimuli can help bring out their feelings and their unconscious desires. Respondents are free to react to such stimuli showing their own point of view and, since there are no correct or incorrect answers, they can be expected to project their unconscious feelings in their answers (Donoghue, 2000). Such techniques can be deemed to be an attempt to encourage respondents to project motivations, beliefs or attitudes towards the matters under study.

Additionally, projective techniques can help solve the problem that arises when consumers are unwilling - or unable - to be completely honest when answering complex questions about their perceptions or attitudes towards certain concepts or technologies. In these context they may be reluctant to share their own opinions, be unfamiliar with the topic under study, or simply lack the confidence to respond (Donoghue, 2000; Eldesouky and Mesias, 2014). Since the use of these techniques makes it easier to analyze consumer issues, difficult to study otherwise, they were chosen for this research. Among the various projective techniques, word association and free-listing were selected in this study as those that could best allow to achieve the research objectives.

3.1.1. *Word association*

The word association technique is applied by asking respondents to say the first thing that comes to mind when they hear a term or a word. Participants may also be asked to read a list of words and say whatever comes to mind in relation to that list (Mesias and Escribano, 2018). Word association is considered as one of the most effective techniques in market research, being also easier to apply in comparison to other techniques. For this reason, its use is quite frequent in the study of food consumption (Banović *et al.*, 2016; Eldesouky *et al.*, 2015; Martins *et al.*, 2019).

This technique, in association with other projective or qualitative techniques, can be used as a starting point for the analysis of consumers (Mesias and Escribano, 2018). For this reason, in this study it was decided to complement it with the free listing technique.

Two word-association exercises were prepared, and respondents were asked to say what ideas or concepts came to mind when hearing the term sustainability (1st task) and sustainable food production and consumption (2nd task).

3.1.2. *Free listing*

Free listing is a qualitative technique whereby participants are asked to list as many items or ideas as they can in relation to a specific subject matter (Carrillo *et al.*, 2014). This approach enables to obtain data –specifically, concepts or sentences – that refer to a single concept field (Bernard, 2006).

Free listing can be used to understand the cultural and cognitive domains of each individual and to gain insight into consumer attitudes, especially when they are faced with a novel environment, such as the production and consumption of sustainable products (Elghannam and Mesías, 2018).

Although this is a simple tool, its potential and ease of application make it a widely-used qualitative technique (Morizet *et al.*, 2011). Specifically, it has been used in various pieces of research on food such that of (Machín *et al.*, 2014), who explored the reasons underlying the selection of food in different contexts; that of (Ares *et al.*, 2015) on the associations between food consumption and wellbeing; or the one by (Elghannam *et al.*, 2018) on the development of

short distribution channels for food. The application of free listing in this research, was carried out through the following question: “Please, list the food products that you are aware of whose production is sustainable”.

3.2. *Data collection*

Data collection was performed by drafting a questionnaire on Google Forms (www.docs.google.com) which was distributed in October-November 2020 in Spain. This type of online tool is increasingly used for research purposes (Elghannam and Mesías, 2018; Viana *et al.*, 2016) due to its flexibility, low cost and the speed of collection of the information in comparison with traditional surveys. In spite of these benefits, it also has certain drawbacks, such as the difficulty to obtain representative samples and the potential bias.

The questionnaire included an initial section consisting of the projective tasks described above, followed by a number of questions regarding lifestyle and sociodemographic aspects of the participants. A pilot questionnaire was sent to 10 consumers (not included in the final sample) in order to ascertain the validity and clarity of the questions included in the study. The participants were contacted by email using databases created by the research team from previous studies. Although 178 answers were received, the final sample consisted of 162 consumers (59.4% women and 40.6% men; 39.6 years old as average) who provided full and valid answers for the analysis.

The final number of surveys is in line with the samples used in other qualitative studies (Dos Santos *et al.*, 2015; Elghannam and Mesías, 2018; Vaca and Mesías, 2014), being also considered to be adequate for the introductory nature of this paper.

3.3. *Segmentation*

Cluster analysis was used in this document in order to allow a more in-depth study, identifying homogeneous subgroups of consumers that could reveal different perceptions towards sustainability. The inputs used were the lifestyles of

the respondents, as it was thought that, although the consumer may find it hard to define their perception of sustainability, there are life and consumption habits (their lifestyles) that can reflect their “sustainable” viewpoint.

Calculations were made using the Cluster module of the IBM SPSS 21 statistical package, using a two-step procedure. Thus, and although hierarchical cluster is frequently used in qualitative research (Antmann *et al.*, 2011; Bernal-Gil *et al.*, 2020; Menegassi *et al.*, 2019; Vidal *et al.*, 2015) it was decided to use a combination of hierarchical and non-hierarchical (k-means) clustering, as different authors recommend this mixed approach, which allows the advantages of one method to compensate for the weaknesses of the other (Hair *et al.*, 2014; Malhotra and Birks, 2006).

Firstly, a hierarchical clustering with Ward’s Method was conducted using the abovementioned input variables. The final number of clusters was decided based on the agglomeration coefficient provided by SPSS (Hair *et al.*, 2014) with two solutions with 3 and 4 clusters being obtained. Subsequently, K-means cluster analyses were carried out using the cluster centroids from the hierarchical analysis as the initial cluster seeds for the non-hierarchical procedure. Finally, the criteria used to decide the definitive solution were based, as recommended by (Hair *et al.*, 2014) on the size of the clusters obtained, the significant differences between the clusters across the clustering variables and the external validation through the interpretation of the clusters. Taking all this into account, a 3-segment solution was finally selected. A variance analysis showed that all the segments differed significantly ($p < 0.001$) from each other with respect to the variables included in the analysis, which confirmed the validity of the results.

3.4. Data analysis

The data analysis was performed in a similar way for the word association and free listing tasks. Once the responses were collected for each task, expressions or terms with similar meanings were initially identified and then grouped up in categories. This task was performed independently by two members of the research team,

and the final categories were later on agreed upon together with their denominations.

In order to make the analysis easier, a maximum limit of 3% responses per category was established. Thus, where a category was not mentioned by at least that amount of respondents, it would be classified under another category with a similar meaning until the minimum required was achieved. Finally, the frequency of mention was defined for the final categories by counting the number of participants who had mentioned the various specific terms while completing each task.

4. Results

4.1. Word association and free listing for the overall sample

The categories identified with the term “sustainability” during the first word association task are shown in Table 1.

Table 1 shows how those concepts respondents mainly associated with sustainability were related to the environment, accounting for 45% of the mentions. Although to a much lesser extent, the association of sustainability was also strong with terms relating to equality, and again to a lesser extent, with organic and natural.

The following exercise was oriented to identify the relationship between sustainability and food. Table 2 shows the categories that were associated with sustainable food production and consumption.

When introducing the concept of food, the association between sustainability and the environment remains as the most relevant concept. However, the category “*Efficient and responsible production/consumption*” also appears firmly (over 33% of the mentions). This may be due to the abundant information consumers receive about input abuse in some intensive systems and the habitual waste of food in the developed world. Finally, Table 3 shows the results of the free listing exercise.

One of the most relevant aspects presented in table 3 is the association of the term organic with various food products, which accounts for 45% of the mentions. However, the term Fair Trade, which could also be expected to be as-

Table 1 - Frequency of mention for the word association task “Please tell us what ideas/ concepts come to mind when hearing the term *sustainability*”.

<i>Category</i>	<i>Concepts</i>	<i>Frequency of mention (%)</i>
Environment	Environment	30.97
	Carbon footprint	2.21
	Recycling	4.87
	Renewable energy	2.21
	Planet	0.88
Equality	Balance	8.85
	Future	7.96
	Survival	1.33
	Preserve, conserve	0.88
	Ethics	0.44
	Eradicate hunger	0.44
Organic and natural	Organic	8.85
	Natural, autochthonous products	4.42
	Meet human needs	1.77
	Health benefits	0.88
	Quality	0.44
Responsibility	Responsibility	5.31
	Resource optimisation	3.98
	Responsible consumption	2.65
	Self-management	0.44
Economy	Saving	3.10
	Economy	2.21
	Circular economy	1.77
	Local and social economy	1.33

Table 2 - Frequency of mention for the word association task “Please tell us what ideas/ concepts come to mind when hearing the term *sustainable food production and consumption*”.

<i>Category</i>	<i>Subcategory/Comment</i>	<i>Frequency of mention (%)</i>
Environmentally-friendly production	Producing without compromising the environment	39.06
	Producing without negative effects on the used resources	3.13
Efficient and responsible production/consumption	Producing only what is necessary	10.16
	Optimising the resources with the least contamination	10.94
	Efficient resource management	7.03
	Efficient purchasing avoiding waste	5.47
	Producing without energy consumption	0.78
	Respect of animal wellbeing	1.56
Healthy and natural diet	Use of local, seasonal products	6.25
	Organic and natural production	6.25
	Balanced diet	0.78
	Production of more healthy food	0.78
Equality	Producing without compromising future generations	4.69
	Fair price	2.34
	Avoid world malnutrition	0.68

Table 3 - Frequency of mention for the free listing task “Please, list the food products that you are aware of whose production is sustainable”.

<i>Category</i>	<i>Subcategory/Comment</i>	<i>Frequency of mention (%)</i>
Fruit and vegetables	Organic fruit and vegetables	30.53
	Grapes	4.35
	Cherries	2.27
	Figs	2.27
General food	Coffee	6.85
	Honey	4.35
	Oil	4.35
	Rice	2.27
Egg products	Organic eggs	15.32
Snacks	Nuts	6.85
	Olives	2.27
Meat and meat products	Lamb	2.27
	Pork	2.27
	Beef	2.27
	Cold cuts	2.27
Dairy products	Milk	4.35
	Cheese	2.27

sociated with sustainability by consumers, has only received 2% of the mentions. This can be explained by its lesser presence in the markets and the higher level of unawareness of consumers about its characteristics and meaning.

4.2. Segmentation according to lifestyle

Table 4 shows the various lifestyles of the segments obtained, whereas Table 5 shows their sociodemographic characteristics.

Cluster 1 shows the highest scores for the variables relating to recycling, showing also a significantly higher score for the use of non-contaminant means of transport and the concern about food processing. This is the group with the highest percentage of women and the lowest incomes, and includes occasional food buyers. Accordingly, this segment has been named “Occasional buyers concerned about recycling and the environment”. Cluster 2 is the group giving the highest scores to all variables relating to concerns about health and diet. These are also middle-high income consumers that would fall within the definition of “foodies”, this is, food lovers,

as they spend time cooking and they enjoy trying new recipes. This segment has therefore been named “Foodies concerned about their health and diet”. And finally, Cluster 3 is the only group with a majority of men. It shows scores that are lower than the average for all the variables and, in general, the lowest of the three groups. These have been named “Indifferent consumers”.

4.3. Word association and free listing by cluster

Once the groups were defined, the analyses were carried out again for each cluster, with the results being shown on Tables 6, 7 and 8.

From the data in Table 6 it can be highlighted that the group “Indifferent consumers” places nearly 90% of their mentions in categories such as “*Environment*” and “*Equality*”, whereas the other two groups, which could be defined as more sustainability-aware, show significant percentages of mention for “*Organic and natural*”, “*Responsibility*” and “*Economy*”. Table 7 shows the results of word association with “Sustainable food production and consumption” for every cluster.

Table 4 - Description of the clusters' lifestyles (%).

<i>Variable</i>	<i>Cluster 1 (n = 40)</i>	<i>Cluster 2 (n = 66)</i>	<i>Cluster 3 (n = 56)</i>	<i>Total (n = 162)</i>	<i>Sig.^a</i>
I exercise regularly	4.33	5.31	3.96	4.60	***
I contribute to energy and water saving	5.90	5.83	4.75	5.48	***
I keep my salt consumption under control	4.48	6.02	4.13	4.98	***
I recycle using the various bins	6.68	6.20	5.09	5.94	***
I frequently eat out	2.13	3.34	2.87	2.88	***
I like to try new dishes/ food	5.93	5.97	4.69	5.52	***
I take my time to cook the food I eat	5.23	5.91	4.58	5.28	***
I voluntarily check my health periodically	3.38	5.46	3.26	4.18	***
I eat red meat in moderation	4.83	5.71	4.20	4.97	***
I am concerned about the impact of food on my health	5.83	6.52	5.20	5.89	***
I try to buy products with recycled packaging	5.75	5.35	3.20	4.71	***
I frequently eat fruit and vegetables	6.18	6.59	4.66	5.82	***
I read the labels on food	5.23	6.05	3.87	5.09	***
I try to walk or use a bicycle to move around	5.95	4.17	3.38	4.34	***
I care about how farm products are processed (fruit, vegetables, meat, milk ...)	5.83	5.71	3.44	4.96	***

^a Significance: * $p < 0.1$. ** $p < 0.05$. *** $p < 0.01$; n.s.: not significant.

Table 5 - Description of the sociodemographic variables of the clusters (%).

	<i>Variable</i>	<i>Cluster 1</i>	<i>Cluster 2</i>	<i>Cluster 3</i>	<i>Total</i>	<i>Sig.^a</i>
Gender	Women	72.50	61.50	47.30	59.40	**
	Men	27.50	38.50	52.70	40.60	
Age of the respondent	18–35 years old	47.50	41.50	50.90	46.30	n.s.
	36–50 years old	30.00	33.80	25.50	30.00	
	> 50 years old	22.50	24.60	23.60	23.80	
Family size	1–2	32.50	33.80	21.80	29.40	n.s.
	3–4	55.00	53.80	65.50	58.10	
	5 +	12.50	12.30	12.70	12.50	
Education	Primary school	10.00	3.10	14.50	8.80	n.s.
	Secondary school	12.50	12.30	16.40	13.80	
	University	77.50	84.60	69.10	77.50	
Monthly income	< € 1,500	28.60	14.10	20.00	19.50	*
	€ 1,500–€ 2,500	28.60	32.80	28.00	30.20	
	€ 2,501–€ 3,500	25.70	23.40	42.00	30.20	
	> € 3,500	17.10	29.70	10.00	20.10	
In charge of food shopping?	Always	45.00	63.10	45.50	52.50	*
	Occasionally	55.00	36.90	54.50	47.50	

^a Significance: * $p < 0.1$. ** $p < 0.05$. *** $p < 0.01$; n.s.: not significant.

Table 6 - Frequency of mention per cluster (%) for the word association task: “Please tell us what ideas/ concepts come to mind when you hear the term *sustainability*”.

Category	Subcategory/Comment	Cluster 1	Cluster 2	Cluster 3
Environment	Environment	20.65	25.93	37.25
	Carbon footprint	5.16	1.23	3.92
	Recycling	5.16	4.94	9.80
	Planet Renewable energy	1.75		1.96 3.92
Equality	Balance	10.33	7.41	15.69
	Future	13.74	7.41	7.84
	Survival Preserve, conserve Ethics Eradicate hunger		1.23 1.23	1.96 1.96
	Organic	13.84	11.11	5.88
Organic and natural	Natural, autochthonous products	5.16	4.94	
	Meet human needs Health benefits Quality		1.23 1.23	3.92
	Responsibility	3.41	8.64	
Responsibility	Resource optimisation Responsible consumption Self-management	3.41 5.26	2.47 3.70 2.47	1.96
	Economy	6.82		
	Saving	3.51	1.23	
Economy	Economy	3.51	1.23	
	Local and social economy Circular economy	1.75	7.40 3.70	

Table 7 - Frequency of mention per cluster (%) for the word association task: “Please tell us what ideas/ concepts come to mind when hearing the term *sustainable food production and consumption*”.

Category	Subcategory/Comment	Cluster 1	Cluster 2	Cluster 3
Environmentally-friendly production	Producing without compromising the environment	36.36	45.61	31.58
	Producing without negative effects on the used resources	6.06		5.26
Efficient and responsible production/ consumption	Producing only what is necessary	6.06	5.26	21.05
	Optimising the resources with the least contamination	12.12	14.04	5.26
	Efficient resource management		3.51	13.16
	Efficient purchasing avoiding waste	15.15	3.51	
	Producing without energy consumption Respect of animal wellbeing	6.06	3.51	2.63
Healthy and natural diet	Use of local, seasonal products		14.04	
	Organic and natural production		5.26	13.16
	Balanced diet	3.03		
	Produce more healthy foods	3.03		
Equality	Producing without compromising future generations	9.09	1.75	5.26
	Fair price Avoid world malnutrition	3.03	1.75	2.63

Table 8 - Frequency of mention per cluster (%) for the free listing task “Please, list the food products that you are aware of whose production is sustainable”.

Category	Subcategory/ Product	Cluster 1	Cluster 2	Cluster 3
Fruit and vegetables	Organic fruit and vegetables	26.32	46.15	46.15
	Grapes	5.26		
	Cherries			7.69
	Figs			7.69
Overall diet	Coffee	5.26	3.85	
	Honey		7.69	
	Oil	10.53		
	Rice		3.85	
Egg products	Organic eggs	21.05	11.54	15.38
Snacks	Nuts	5.26	3.85	15.38
	Olives	5.26		
Meat and processed meat products	Lamb		3.85	
	Pork	5.26	7.69	
	Beef		3.85	
	Cold cuts	5.26		
Dairy products	Milk			7.69
	Cheese	5.26	3.85	

Cluster 1, in agreement with its characteristics, presents the highest percentage of mentions for the categories relating to the environment and recycling (efficient and responsible consumption), although it also reveals more mentions than the other two groups in terms of equality. Cluster 2, which is more concerned with diet and health, shows the highest number of mentions in the category “*Healthy and natural diet*”, although it presents, like Cluster 1, the majority of mentions in “*Environmentally-friendly production*”. Finally, Cluster 3 reveals a singular behaviour, since, although its associations with the term sustainability are focused on the environment, when the concept of food is presented to consumers they focus primarily on efficient and responsible production. This group was also the one that least mentioned respect for the environment. Table 8 shows the results of the free listing exercise per cluster.

Table 8 shows that the term organic is widely mentioned by the three consumer segments, specially by Clusters 2 and 3, with over half the mentions. On the other hand, Cluster 3 presents the lowest variety of answer, which may be justified by the gender of its members and/ or the fact that they are responsible for food purchasing only occasionally.

5. Discussion

The results reveal that the use of projective techniques in this study has been effective to show that participants are familiar with the concept of sustainability, although they mostly associate it to the environment and ecology, i.e., environmental sustainability. Nonetheless, it can be assumed that the use of this type of unstructured techniques would explain the wide variety of responses. That would not have been the case with more direct techniques given the difficulty encountered by an average citizen when defining such a complex concept as sustainability.

When participants were asked about sustainability and food, the environment was again the most-frequently mentioned category. Therefore, the awareness of the population/ consumers about the environment has been the main channel to understand the concept of sustainability. In this sense, consumers have a major role as agents of environmental change, as they can adopt different consumption patterns and thus contribute to sustainable development (Barr *et al.*, 2011a, 2011b).

From the health point of view, the increasing number of chronic health conditions relating to

current dietary habits is another important reason for the change in consumption patterns. This has made the promotion of healthier and more sustainable eating habits necessary, both by public and private sectors (Grunert *et al.*, 2014; Willett *et al.*, 2019). This change in consumer attitude has been reinforced by the organic marketing initiatives that emerged in the 70s and by the fact that consumers relate organic products to high-quality standards (Zanoli and Naspetti, 2002).

The remaining dimensions of sustainability (economic and social) received fewer mentions, which is in line with previous studies such as that of (Sánchez-Bravo *et al.*, 2021). The latter similarly conclude that consumers are not fully aware of the meaning of sustainability and tend to associate sustainable production with organic production and high-quality products.

However, other concepts emerged that have also been identified in previous research studies such as local/proximity food (De Canio and Martinelli, 2021), or responsible consumption and food waste reduction (Grunert *et al.*, 2014). Health-related aspects have not been mentioned very frequently, in line with the findings of other authors (Van Loo *et al.*, 2015; Wong *et al.*, 2020). They stated that, within the context of food choice, aspects such as sensorial quality or healthiness tend to be relevant and can displace sustainability, which would have, therefore, little relation to these attributes. It could also be argued that the fact of presenting food production and consumption in the same task could generate doubts in consumers, since they have a very limited vision of food productive dimension. However, it was considered that this would increase the ambiguity of the stimulus presented, which could result in a richer response from the participants.

Further studies such as that of García-González *et al.* (2020) in Spain, evaluated the level of awareness, attitudes and behaviour of the adult population towards the concepts of sustainability and environment, finding a positive attitude toward the selection of sustainable food. However, the concept and attributes that define a sustainable diet continue to be confusing for the majority of the population. In this sense, research studies such as that of Berry (2019) point at the Mediterranean diet as a model of sustaina-

ble and healthy diet, which additionally provides economic and sociocultural benefits. Nevertheless, they conclude that, due to the current eating habits, this diet is not consumed by the majority of the Mediterranean population and they highlight the need to promote it. In this regard, the creation of platforms for the transition towards sustainable food systems in the Mediterranean area – such as SFS-Med Platform (Capone *et al.*, 2021) – are a valuable resource.

The association or lack of differentiation found between the terms organic and sustainable presents challenges for food producers, since environmental aspects are those where organic and conventional foods differ the least (Hartmann *et al.*, 2021). In this sense, Sazvar *et al.* (2018) stated that, in terms of food, the words sustainable and organic are strongly interrelated and may be used interchangeably by consumers, whereas Ditlevsen *et al.* (2020) pointed that consumers of organic products mainly base their choice on environmental aspects. Additionally, as general concern for environment and sustainability increases, so has the popularity of “green marketing” (Sarkar, 2012), defined as “the comprehensive management process that is responsible for identifying, forecasting and meeting the needs of clients and the society in a profitable and sustainable manner” (Peattie, 2001). Moreover, Sarkar (2012) suggests that the purpose of “green marketing” is to educate and encourage people to go green and change their lifestyles and their behaviour.

Despite the high number of mentions regarding the carbon footprint of food production – and which may be associated with the fact that the concept has been in the market for some years now – consumers are still not fully familiar with it, nor with its application in food labelling (Siegrist and Hartmann, 2019). Moreover, they do not consider these attributes relevant in food production (Escribano *et al.*, 2021) despite growing public concern about climate change, a fact that has been reflected in the mentions obtained in this study. This is also in line with other studies (Hartikainen *et al.*, 2014) where it is highlighted that consumers do not associate carbon footprint with environmental sustainability, which reveals the need for educating consumers on the environmental impact of food.

In line with the above, when comparing the preferences of consumers for the various labels in Belgium, Van Loo *et al.* (2014) found that labels related to animal wellbeing and free-range rearing were preferred to carbon footprint label. Nevertheless, more recent studies such as that of Mostafa (2016) showed that consumers are willing to pay more for products with carbon labelling in Egypt. However, current research studies (Eldesouky *et al.*, 2020; Feucht and Zander, 2018) show that purchasing decisions for more environmentally friendly products continue to be negatively affected by consumers' lack of knowledge.

All of the above reveals the difficulty of bringing the concept of sustainability closer to consumers, not only because its broad scope and lack of specificity. Consequently, consumers' motivations and their social and/or environmental commitment can become either facilitators or barriers to the dissemination of the term and its implementation in the food production and distribution sectors. In this context, Valls-Bedeau *et al.* (2021) conclude that in order to achieve the transformation to sustainable food systems, many factors will undoubtedly have to be considered, although environmental sustainability and consumer awareness of climate change are key.

Regarding the effect of citizen's social profiles on their perception of the term sustainability, there is consistency of some of the characteristics of the clusters identified in this paper with those obtained in other research studies on perception of sustainability. Thus, Peano *et al.* (2019) found greater participation of women in the segments with more sensitivity towards the environment and the origin of production and who valued local production, while García-González *et al.* (2020) found that women were more interested in sustainability and sustainable consumption, which is in agreement with this study, since clusters with a majority of women presented more detailed comments.

Although in this paper the level of education did not throw significant differences between the clusters, it can be observed that the "Occasional buyers concerned about recycling and the environment" and the "Foodies concerned about their health and diet" include a greater percentage of people with higher education (universi-

ty), which is consistent with previous studies (Mancini *et al.*, 2017). These authors found that a higher academic level is associated with greater concern about environmental issues and sustainability. However and even though Bollani *et al.* (2019) concluded that Millennials were more concerned about sustainability and environmental issues, these consumers have been mainly identified here as "Indifferent consumers".

6. Conclusions

The use of qualitative research techniques and specifically projective techniques has made possible to study Spanish consumer perceptions on a complex and diffuse concept such as sustainability. These qualitative methodologies have allowed an initial approximation towards an aspect that consumers are not fully aware of. The projective techniques used herein made it easier for respondents to fill in the questionnaire. In addition, they can also be used in surveys via the mobile phone and the PC, which helps reduce costs and time required to collect data.

Out of the three traditional pillars of sustainability (social, economic and environmental) the environmental component has been the most easily identified by consumers, with the economic one being the least commented on. When trying to associate sustainability and food, the environment was again the most mentioned category, although other concepts arose such as local/proximity food or responsible consumption. Despite the relevant role that food selection plays in our health, it is worth noticing that consumers do not associate that concept with sustainability, even though sustainable food products are usually related to traditional and less intensive production systems.

Based on the respondents' lifestyles, it was possible to identify three well-differentiated consumer groups. Although the association between sustainability and environment was the most relevant in all the segments, those more concerned about environment, recycling, health and diet were indeed aware of the complexity of the term sustainability.

Another relevant finding in this study is the clear association between sustainability and organic production, terms that can be considered

as interchangeable in the consumers' view. This in turn may strengthen the demand of these types of products with those consumers who are aware of the need of sustainable food systems.

In spite of such opportunities for the agrifood producers, consumers are scarcely familiar with the concept of sustainability. This makes it more complex for them to evaluate and compare the various products on offer and can therefore cause confusion. It is thus necessary to educate and inform consumers about the concept of sustainability so that they can value the information provided by producers and it can have an impact on their purchasing behaviour.

In this sense, public institutions must implement policies and instruments that, on the one hand, promote the production and marketing of sustainable food as a way to contribute to mitigate environmental deterioration and climate change and, on the other hand, may influence consumers to become aware and value food produced in this way. For this purpose, it is essential that they understand the implications of sustainability, not only in its narrow environmental side, but in its entire social and economic extent.

Given that this study is a first qualitative approach, its conclusions cannot be directly generalized, although it is considered that the results obtained may have a wide applicability in the Spanish context regarding the development of future quantitative research and the planning of marketing actions.

References

- Abreu I., Nunes J.M., Mesias F.J., 2019. Can Rural Development Be Measured? Design and Application of a Synthetic Index to Portuguese Municipalities. *Social Indicators Research*, 145: 1107-1123. <https://doi.org/10.1007/s11205-019-02124-w>.
- Agusdei G.P., Coluccia B., 2022. Sustainable agrifood supply chains: Bibliometric, network and content analyses. *Science of the Total Environment*, 824: 153704. <https://doi.org/10.1016/j.scitotenv.2022.153704>.
- Antmann G., Ares G., Varela P., Salvador A., Coste B., Fiszman S.M., 2011. Consumers' texture vocabulary: Results from a free listing study in three Spanish-speaking countries. *Food Quality and Preference*, 22: 165-172. <https://doi.org/10.1016/j.foodqual.2010.09.007>.
- Ares G., de Saldamando L., Giménez A., Claret A., Cunha L.M., Guerrero L., de Moura A.P., Oliveira D.C.R., Symoneaux R., Deliza R., 2015. Consumers' associations with wellbeing in a food-related context: A cross-cultural study. *Food Quality and Preference*, 40: 304-315. <https://doi.org/10.1016/j.foodqual.2014.06.001>.
- Banović M., Krystallis A., Guerrero L., Reinders M.J., 2016. Consumers as co-creators of new product ideas: An application of projective and creative research techniques. *Food Research International*, 87: 211-223. <https://doi.org/10.1016/j.foodres.2016.07.010>.
- Barr S., Gilg A., Shaw G., 2011a. 'Helping People Make Better Choices': Exploring the behaviour change agenda for environmental sustainability. *Applied Geography*, 31: 712-720. <https://doi.org/10.1016/j.apgeog.2010.12.003>.
- Barr S., Gilg A., Shaw G., 2011b. Citizens, consumers and sustainability: (Re)Framing environmental practice in an age of climate change. *Global Environmental Change*, 21: 1224-1233. <https://doi.org/10.1016/j.gloenvcha.2011.07.009>.
- Bernal-Gil N.Y., Favila-Cisneros H.J., Zaragoza-Alonso J., Cuffia F., Rojas-Rivas E., 2020. Using projective techniques and Food Neophobia Scale to explore the perception of traditional ethnic foods in Central Mexico: A preliminary study on the beverage Sende. *Journal of Sensory Studies*, 35: e12606. <https://doi.org/10.1111/joss.12606>.
- Bernard H.R., 2006. *Research methods in Anthropology. Qualitative and quantitative approaches*, 4th ed. Lanham: Altamira Press.
- Berry E.M., 2019. Sustainable Food Systems and the Mediterranean Diet. *Nutrient*, 11: 2229. <https://doi.org/10.3390/nu11092229>.
- Boddy C., 2005. Projective techniques in market research: valueless subjectivity or insightful reality? A look at the evidence for the usefulness, reliability and validity of projective techniques in market research. *Int. J. Mark. Res.*, 47: 239-254. <https://doi.org/10.1177/147078530504700304>.
- Bollani L., Bonadonna A., Peira G., 2019. The Millennials' Concept of Sustainability in the Food Sector. *Sustainability*, 11: 2984. <https://doi.org/10.3390/su11102984>.
- Briggeman B.C., Lusk J.L., 2011. Preferences for fairness and equity in the food system. *European Review of Agricultural Economics*, 38: 1-29. <https://doi.org/10.1093/erae/jbq033>.
- Capone R., Fersino V., Stamataki E., Cerezo M.,

- Kessari M., Dernini S., El Bilali H., 2021. Sustainability of Food Systems in the Mediterranean Region. *New Medit*, 20(3): 131-143. <https://doi.org/10.30682/nmsi21i>.
- Caputo V., Nayga R.M., Scarpa R., 2013. Food miles or carbon emissions? Exploring labelling preference for food transport footprint with a stated choice study. *The Australian Journal of Agricultural Resource Economics*, 57: 465-482. <https://doi.org/10.1111/1467-8489.12014>.
- Carrillo E., Fiszman S., Lähteenmäki L., Varela P., 2014. Consumers' perception of symbols and health claims as health-related label messages. A cross-cultural study. *Food Research International*, 62: 653-661. <https://doi.org/10.1016/j.foodres.2014.04.028>.
- Dagevos H., 2005. Consumers as four-faced creatures. Looking at food consumption from the perspective of contemporary consumers. *Appetite*, 45: 32-39. <https://doi.org/10.1016/j.appet.2005.03.006>.
- De Canio F., Martinelli E., 2021. EU quality label vs organic food products: A multigroup structural equation modeling to assess consumers' intention to buy in light of sustainable motives. *Food Research International*, 139: 109846. <https://doi.org/10.1016/j.foodres.2020.109846>.
- Diamantopoulos A., Schlegelmilch B.B., Sinkovics R.R., Bohlen G.M., 2003. Can socio-demographics still play a role in profiling green consumers? A review of the evidence and an empirical investigation. *Journal of Business Research*, 56: 465-480. [https://doi.org/10.1016/S0148-2963\(01\)00241-7](https://doi.org/10.1016/S0148-2963(01)00241-7).
- Ditlevsen K., Denver S., Christensen T., Lassen J., 2020. A taste for locally produced food - Values, opinions and sociodemographic differences among 'organic' and 'conventional' consumers. *Appetite*, 147, 104544. <https://doi.org/10.1016/j.appet.2019.104544>.
- Donoghue S., 2000. Projective techniques in consumer research. *Journal of Family Ecology and Consumer Sciences*, 28: 47-53. <https://doi.org/10.4314/jfec.v28i1.52784>.
- Dos Santos B.A., Bastianello Campagnol P.C., da Cruz A.G., Galvão M.T.E.L., Monteiro R.A., Wagner R., Pollonio M.A.R., 2015. Check all that apply and free listing to describe the sensory characteristics of low sodium dry fermented sausages: Comparison with trained panel. *Food Research International*, 76: 725-734. <https://doi.org/10.1016/j.foodres.2015.06.035>.
- El Bilali H., Callenius C., Strassner C., Probst L., 2019. Food and nutrition security and sustainability transitions in food systems. *Food and Energy Security*, 8: e00154. <https://doi.org/10.1002/fes3.154>.
- El Bilali H., Strassner C., Ben Hassen T., 2021. Sustainable Agri-Food Systems: Environment, Economy, Society, and Policy. *Sustainability*, 13: 6260. <https://doi.org/10.3390/su13116260>.
- Eldesouky A., Mesias F., 2014. An insight into the influence of packaging and presentation format on consumer purchasing attitudes towards cheese: A qualitative study. *Spanish Journal of Agricultural Research*, 12: 305-312. <https://doi.org/10.5424/sjar/2014122-5520>.
- Eldesouky A., Mesias F.J., Escribano M., 2020. Perception of Spanish consumers towards environmentally friendly labelling in food. *International Journal of Consumer Studies*, 44: 64-76. <https://doi.org/10.1111/ijcs.12546>.
- Eldesouky A., Pulido A.F., Mesias F.J., 2015. The Role of Packaging and Presentation Format in Consumers' Preferences for Food: An Application of Projective Techniques. *Journal of Sensory Studies*, 30: 360-369. <https://doi.org/10.1111/joss.12162>.
- Elghannam A., Arroyo J., Eldesouky A., Mesias F.J., 2018. A cross-cultural consumers' perspective on social media-based short food supply chains. *British Food Journal*, 120: 2210-2221. <https://doi.org/10.1108/BFJ-11-2017-0633>.
- Elghannam A., Mesías F.J., 2018. Social networks as a new marketing channel for animal food products: A qualitative study in Spain. *Archivos de Zootecnia*, 67: 260-268. <https://doi.org/10.21071/az.v67i258.3662>.
- Escribano A.J., Peña M.B., Díaz-Caro C., Elghannam A., Crespo-Cebada E., Mesías F.J., 2021. Stated Preferences for Plant-Based and Cultured Meat: A Choice Experiment Study of Spanish Consumers. *Sustainability*, 13: 8235. <https://doi.org/10.3390/su13158235>.
- Escribano M., Gaspar P., Mesias F.J., 2020. Creating market opportunities in rural areas through the development of a brand that conveys sustainable and environmental values. *Journal of Rural Studies*, 75: 206-215. <https://doi.org/10.1016/j.jrurstud.2020.02.002>.
- Escursell S., Llorach-Massana P., Roncero M.B., 2021. Sustainability in e-commerce packaging: A review. *Journal of Cleaner Production*, 280: 124314. <https://doi.org/10.1016/j.jclepro.2020.124314>.
- Esposito B., Sessa M.R., Sica D., Malandrino O., 2020. Towards Circular Economy in the Agri-Food Sector. A Systematic Literature Review. *Sustainability*, 12: 7401. <https://doi.org/10.3390/su12187401>.
- Feucht Y., Zander K., 2018. Consumers' preferences for carbon labels and the underlying reasoning. A mixed methods approach in 6 European countries.

- Journal of Cleaner Production*, 178: 740-748. <https://doi.org/10.1016/j.jclepro.2017.12.236>.
- Florindo T.J., de Medeiros Florindo G.I.B., Talami ni E., da Costa J.S., Ruviano C.F., 2017. Carbon footprint and Life Cycle Costing of beef cattle in the Brazilian midwest. *Journal of Cleaner Production*, 147: 119-129. <https://doi.org/10.1016/j.jclepro.2017.01.021>.
- Gadema Z., Oglethorpe D., 2011. The use and usefulness of carbon labelling food: A policy perspective from a survey of UK supermarket shoppers. *Food Policy*, 36: 815-822, <https://doi.org/10.1016/j.foodpol.2011.08.001>.
- García-González Á., Achón M., Carretero Krug A., Varela-Moreiras G., Alonso-Aperte E., 2020. Food Sustainability Knowledge and Attitudes in the Spanish Adult Population: A Cross-Sectional Study. *Nutrients*, 12: 3154, <https://doi.org/10.3390/nu12103154>.
- Grunert K.G., Hieke S., Wills J., 2014. Sustainability labels on food products: Consumer motivation, understanding and use. *Food Policy*, 44: 177-189. <https://doi.org/10.1016/j.foodpol.2013.12.001>.
- Guerrero L., Guàrdia M.D., Xicola J., Verbeke W., Vanhonacker F., Zakowska-Biemans S., Sajdakowska M., Sulmont-Rossé C., Issanchou S., Contel M., Scalvedi M.L., Granli B.S., Hersleth M., 2009. Consumer-driven definition of traditional food products and innovation in traditional foods. A qualitative cross-cultural study. *Appetite*, 52: 345-354. <https://doi.org/10.1016/j.appet.2008.11.008>.
- Hair J.F., Black W.C., Babin B.J., Anderson R.E., 2014. *Multivariate Data Analysis*, 7th ed. Harlow: Pearson Education Limited.
- Hartikainen H., Roininen T., Katajajuuri J.-M., Pulkkinen H., 2014. Finnish consumer perceptions of carbon footprints and carbon labelling of food products. *Journal of Cleaner Production*, 73: 285-293. <https://doi.org/10.1016/j.jclepro.2013.09.018>.
- Hartmann C., Lazzarini G., Funk A., Siegrist M., 2021. Measuring consumers' knowledge of the environmental impact of foods. *Appetite*, 167: 105622. <https://doi.org/10.1016/j.appet.2021.105622>.
- Horriillo A., Fernández J.A., Escribano A.J., Mesías F.J., 2021. ¿Cómo entienden los consumidores la producción y consumo sostenibles de alimentos? Un estudio preliminar. In: *XIII Congreso de Economía Agroalimentaria, Libro de Actas*. Cartagena: Ediciones UPCT, pp. 529-533. <https://doi.org/10.31428/10317/10312>.
- Infante-Amate J., González De Molina M., 2013. "Sustainable de-growth" in agriculture and food: An agro-ecological perspective on Spain's agricultural system (year 2000). *Journal of Cleaner Production*, 38: 27-35. <https://doi.org/10.1016/j.jclepro.2011.03.018>.
- Kemp K., Insch A., Holdsworth D.K., Knight J.G., 2010. Food miles: Do UK consumers actually care? *Food Policy*, 35: 504-513. <https://doi.org/10.1016/j.foodpol.2010.05.011>.
- Kim R.Y., 2020. The Impact of COVID-19 on Consumers: Preparing for Digital Sales. *IEEE Engineering Management Review*, 48: 212-218. <https://doi.org/10.1109/EMR.2020.2990115>.
- Machín L., Giménez A., Vidal L., Ares G., 2014. Influence of Context on Motives Underlying Food Choice. *Journal of Sensory Studies*, 29: 313-324. <https://doi.org/10.1111/joss.12110>.
- Malhotra N.K., Birks D.F., 2006. *Marketing Research. An Applied Approach*. Harlow: Pearson Education.
- Mancini P., Marchini A., Simeone M., 2017. Which are the sustainable attributes affecting the real consumption behaviour? Consumer understanding and choices. *British Food Journal*, 119: 1839-1853. <https://doi.org/10.1108/BFJ-11-2016-0574>.
- Martins I.B.A., Oliveira D., Rosenthal A., Ares G., Deliza R., 2019. Brazilian consumer's perception of food processing technologies: A case study with fruit juice. *Food Research International*, 125: 108555. <https://doi.org/10.1016/j.foodres.2019.108555>.
- Menegassi B., de Moraes Sato P., Scagliusi F.B., Mobarac J.C., 2019. Comparing the ways a sample of Brazilian adults classify food with the NOVA food classification: An exploratory insight. *Appetite*, 137: 226-235. <https://doi.org/10.1016/j.appet.2019.03.010>.
- Mesías F.J., Escribano M., 2018. Projective techniques. In: Ares, G., Varela, P. (eds.), *Methods in Consumer Research*, vol. 1. *New Approaches to Classic Methods*. Amsterdam: Elsevier Ltd, pp. 79-102.
- Moore J.E., Mascarenhas A., Bain J., Straus S.E., 2017. Developing a comprehensive definition of sustainability. *Implementation Science*, 12: 110. <https://doi.org/10.1186/s13012-017-0637-1>
- Morizet D., Depezay L., Masse P., Combris P., Giboreau A., 2011. Perceptual and lexical knowledge of vegetables in preadolescent children. *Appetite*, 57: 142-147. <https://doi.org/10.1016/j.appet.2011.04.006>.
- Mostafa M.M., 2016. Egyptian consumers' willingness to pay for carbon-labeled products: A contingent valuation analysis of socio-economic factors. *Journal of Cleaner Production*, 135: 821-828. <https://doi.org/10.1016/j.jclepro.2016.06.168>.
- Nematollahi M., Tajbakhsh A., 2020. Past, present, and prospective themes of sustainable agricultural supply chains: A content analysis. *Journal*

- of *Cleaner Production*, 271: 122201. <https://doi.org/10.1016/j.jclepro.2020.122201>.
- Notarnicola B., Hayashi K., Curran M.A., Huisingsh D., 2012. Progress in working towards a more sustainable agri-food industry. *Journal of Cleaner Production*, 28: 1-8. <https://doi.org/10.1016/j.jclepro.2012.02.007>.
- Olawumi T.O., Chan D.W.M., 2018. A scientometric review of global research on sustainability and sustainable development. *Journal of Cleaner Production*, 183: 231-250. <https://doi.org/10.1016/j.jclepro.2018.02.162>.
- Otto S., Strenger M., Maier-Nöth A., Schmid M., 2021. Food packaging and sustainability – Consumer perception vs. correlated scientific facts: A review. *Journal of Cleaner Production*, 298: 126733. <https://doi.org/10.1016/j.jclepro.2021.126733>.
- Pack A., 2007. *The Environmental sustainability of household food consumption in Austria: A socio-economic analysis*. Scientific Report, no. 17. Wegener Center for Climate and Global Change, University of Graz.
- Peano C., Merlino V.M., Sottile F., Borra D., Massaglia S., 2019. Sustainability for Food Consumers: Which Perception? *Sustainability*, 11: 5955. <https://doi.org/10.3390/su11215955>.
- Peattie K., 2001. Towards sustainability: The third age of green marketing. *The Marketing Review*, 2: 129-146. <https://doi.org/10.1362/1469347012569869>.
- Redclift M., 2005. Sustainable development (1987-2005): An oxymoron comes of age. *Sustainable Development*, 13: 212-227. <https://doi.org/10.1002/sd.281>.
- Ruggerio C.A., 2021. Sustainability and sustainable development: A review of principles and definitions. *Science of Total Environment*, 786: 147481. <https://doi.org/10.1016/j.scitotenv.2021.147481>.
- Sachs W., 1999. Sustainable Development and the Crisis of Nature: On the Political Anatomy of an Oxymoron. In: Fischer F., Hajer M. (eds.), *Living with Nature*. Oxford: Oxford University Press, pp. 23-41. <https://doi.org/10.1093/019829509X.003.0002>.
- Sánchez-Bravo P., Chambers V.E., Noguera-Artiaga L., Sendra E., Chambers IV E., Carbonell-Barrachina Á.A., 2021. Consumer understanding of sustainability concept in agricultural products. *Food Quality and Preference*, 89: 104136. <https://doi.org/10.1016/j.foodqual.2020.104136>.
- Sarkar A.N., 2012. Green Branding and Eco-innovations for Evolving a Sustainable Green Marketing Strategy. *Asia-Pacific Journal of Management Research and Innovation*, 8: 39-58. <https://doi.org/10.1177/2319510X1200800106>.
- Sartori S., Latrónico F., Campos L.M.S., 2014. Sustainability and sustainable development: A taxonomy in the field of literature. *Ambiente & Sociedade*, 17: 1-22. <https://doi.org/10.1590/1809-44220003490>.
- Sazvar Z., Rahmani M., Govindan K., 2018. A sustainable supply chain for organic, conventional agro-food products: The role of demand substitution, climate change and public health. *Journal of Cleaner Production*, 194: 564-583. <https://doi.org/10.1016/j.jclepro.2018.04.118>.
- Siegrist M., Hartmann C., 2019. Impact of sustainability perception on consumption of organic meat and meat substitutes. *Appetite*, 132: 196-202. <https://doi.org/10.1016/j.appet.2018.09.016>.
- Song L., Lim Y., Chang P., Guo Y., Zhang M., Wang X., Yu X., Lehto M.R., Cai H., 2019. Ecolabel's role in informing sustainable consumption: A naturalistic decision making study using eye tracking glasses. *Journal of Cleaner Production*, 218: 685-695. <https://doi.org/10.1016/j.jclepro.2019.01.283>.
- Spaiser V., Ranganathan S., Swain R.B., Sumpter D.J.T., 2017. The sustainable development oxymoron: quantifying and modelling the incompatibility of sustainable development goals. *International Journal of Sustainable Development & World Ecology*, 24: 457-470. <https://doi.org/10.1080/13504509.2016.1235624>.
- Steinman R.B., 2009. Projective techniques in consumer research. *International Bulletin of Business Administration*, 5: 37-45.
- Stewart D.W., Shamsasani P.N., 2014. *Focus groups: theory and practice*. Newbury Park (CA): SAGE Publications Inc.
- Torma G., Thøgersen J., 2021. A systematic literature review on meta sustainability labeling – What do we (not) know? *Journal of Cleaner Production*, 293: 126194. <https://doi.org/10.1016/j.jclepro.2021.126194>.
- Vaca S.I., Mesías F.J., 2014. Percepciones de los consumidores españoles hacia las frutas de Ecuador: Un estudio preliminar cualitativo con técnicas proyectivas. *ITEA-Información Técnica Económica Agraria*, 110: 89-101. <https://doi.org/10.12706/itea.2014.006>.
- Valls-Bedeau J., Rezaei M., Pera M., Morrison J., 2021. Towards food systems transformation in the Mediterranean region: Unleashing the power of data, policy, investment and innovation. *New Medit*, 20(3): 5-16. <https://doi.org/10.30682/nm2103a>.
- Van Loo E.J., Caputo V., Nayga R.M., Seo H.S., Zhang B., Verbeke W., 2015. Sustainability labels on coffee: Consumer preferences, willingness-to-pay and

- visual attention to attributes. *Ecological Economics*, 118: 215-225. <https://doi.org/10.1016/j.ecolecon.2015.07.011>.
- Van Loo E.J., Caputo V., Nayga R.M., Verbeke W., 2014. Consumers' valuation of sustainability labels on meat. *Food Policy*, 49: 137-150. <https://doi.org/10.1016/j.foodpol.2014.07.002>.
- Verain M.C.D., Bartels J., Dagevos H., Sijtsma S.J., Onwezen M.C., Antonides G., 2012. Segments of sustainable food consumers: a literature review. *International Journal of Consumer Studies*, 36: 123-132. <https://doi.org/10.1111/j.1470-6431.2011.01082.x>.
- Viana M.M., Silva V.L.S., Deliza R., Trindade M.A., 2016. The use of an online completion test to reveal important attributes in consumer choice: An empirical study on frozen burgers. *Food Quality and Preference*, 52: 255-261. <https://doi.org/10.1016/j.foodqual.2015.11.016>.
- Vidal L., Ares G., Giménez A., 2013. Projective techniques to uncover consumer perception: Application of three methodologies to ready-to-eat salads. *Food Quality and Preference*, 28: 1-7. <https://doi.org/10.1016/j.foodqual.2012.08.005>.
- Vidal L., Giménez A., Medina K., Boido E., Ares G., 2015. How do consumers describe wine astringency? *Food Research International*, 78: 321-326. <https://doi.org/10.1016/j.foodres.2015.09.025>.
- Whyte P., Lamberton G., 2020. Conceptualising Sustainability Using a Cognitive Mapping Method. *Sustainability*, 12: 1977. <https://doi.org/10.3390/su12051977>.
- Willett W., Rockström J., Loken B., Springmann M., Lang T., Vermeulen S., Garnett T., Tilman D., DeClerck F., Wood A., Jonell M., Clark M., Gordon L.J., Fanzo J., Hawkes C., Zurayk R., Rivera J.A., De Vries W., Majele Sibanda L., Afshin A., Chaudhary A., Herrero M., Agustina R., Branca F., Lartey A., Fan S., Crona B., Fox E., Bignet V., Troell M., Lindahl T., Singh S., Cornell S.E., Srinath Reddy K., Narain S., Nishtar S., Murray C.J.L., 2019. Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *Lancet*, 393: 447-492. [https://doi.org/10.1016/S0140-6736\(18\)31788-4](https://doi.org/10.1016/S0140-6736(18)31788-4).
- Wong E.Y.C., Chan F.F.Y., So S., 2020. Consumer perceptions on product carbon footprints and carbon labels of beverage merchandise in Hong Kong. *Journal of Cleaner Production*, 242: 118404. <https://doi.org/10.1016/j.jclepro.2019.118404>.
- World Commission on Environment and Development, 1987. *Our Common Future*. Oxford: Oxford University Press.
- Zanoli R., Naspetti S., 2002. Consumer motivations in the purchase of organic food: A means-end approach. *British Food Journal*, 104: 643-653. <https://doi.org/10.1108/00070700210425930>.