energies

MDPI

Article

Segmentation of Food Consumers Based on Their Sustainable Attitude

Michał Gazdecki [1,*], Elżbieta Goryńska-Goldmann [1], Marietta Kiss [2] and Zoltán Szakály [2]

[1] Department of Economics and Economy Policy in Agribusiness, Poznań University of Life Sciences (PULS), Wojska Polskiego Str. 28, 60-637 Poznań, Poland; gorynska-goldmann@up.poznan.pl
[2] Faculty of Economics and Business, Institute of Marketing and Commerce, University of Debrecen (UD), 4032 Debrecen, Hungary; kiss.marietta@econ.unideb.hu (M.K.); szakaly.zoltan@econ.unideb.hu (Z.S.)
* Correspondence: michal.gazdecki@up.poznan.pl

Abstract: The proposed study aims to segment consumers based on a sustainable approach to the consumption of food. The shift in consumers' attitudes towards more balanced food consumption can be one of the sustainability drivers for entire food chains and may result in more sustained energy usage in the whole food chain and implementation of farm to fork strategy to the practice. We considered consumers' attitudes as a multidimensional construct. Under this assumption, we asked respondents a series of questions related to the cognitive, behavioral, and affective components of an attitude. Data were collected from a market survey run among 433 consumers. We identified three consumer segments. The "Doers" segment exhibits sustainable behavior to a greater extent than the others. At the same time, they have less knowledge about the concept of food sustainability while the affective dimension was developed on an average level. The "Conscious" segment had well-developed cognitive and affective dimensions (which might indicate their openness to the information about sustainability positive feelings), however, it was not reflected in their behavior. Finally, the "Reluctant" segment, did not show a sustainable attitude towards food consumption in any of the analyzed dimensions. Answering the question of how common sustainable attitudes are may help in determining the market potential and in developing product and promotion strategies.

Keywords: sustainable consumption; responsible consumption; consumer segmentation; sustainable attitude; food products; consumers behavior

Citation: Gazdecki, M.; Goryńska-Goldmann, E.; Kiss, M.; Szakály, Z. Segmentation of Food Consumers Based on Their Sustainable Attitude. *Energies* **2021**, *14*, 3179. https://doi.org/10.3390/en14113179

Academic Editor: Dimitrios A. Georgakellos

Received: 24 April 2021
Accepted: 24 May 2021
Published: 29 May 2021

1. Introduction

It is hard to disagree that to combat climate changes the current consumption patterns must be altered globally [1–9]. The process of transformation of consumption plays an important role in facing environmental challenges, both globally and locally, and the sense of responsibility for the society, future generations, and the planet [10–20]. The Sustainable Development Goal (SDG) 12 Ensure sustainable consumption and production patterns defined by the European Commission have become a focal point of action until 2030 (Agenda 2030) [21]. This is reflected in the published strategy Farm to Fork [22,23] and the newest edition of the report "The State of Food Security and Nutrition in the World 2020" [24], where it was underscored that consumption patterns conforming to sustainable food consumption (SFC) will be playing a key role in achieving sustainable development, climate goals and satisfying the needs of the ever-growing population. Such processes are crucial nowadays as food markets are assessed as unbalanced. Production of raw materials and food processing requires a high energy input, creating negative side effects, such as greenhouse gas emission, food losses, and environmental burden.

The socio-economic transformation brought about qualitative and quantitative changes in food consumption. Other than by reducing the quantity of used goods and

services, SFC can be also achieved by creating more appropriate consumption patterns, all with respect to the basic life needs and aspirations to improve the lives of current and future generations. Any changes to the structure of food consumption require the support of public policy, due to the presence of the lock-in effect [25,26]. Consumption patterns that make food consumption more sustainable should be popularized, and consumers should be perceived as actors playing the main role in creating a transition to a more sustainable food system [20,27–33]. Partha et al. [6] have correctly noted that the success of transition will depend on how individuals and households are convinced to change their consumption patterns and how the state cares, during the transformation of the model, about any vulnerable groups (i.e., those unaware or not motivated to alter their consumption) and indifferent groups [34].

Given the reasonable use of goods and services [26,35], the possibility of elimination of numerous, negative social and environmental effects and the preservation of natural resources for future generations, the sustainable food consumption model is desired [36], and it is necessary to implement strategies aimed at achieving it. This justifies the need to introduce systematic studies on consumers aiming to identify their ability to alter behaviors and a context that fosters such a change [37–41]. The understanding of phenomena present in the area of consumption forms the basis to design processes present in food supply chains, thanks to which they will be able to evolve in the direction of more sustainable processes [14,37,42–45].

Changes in consumption stem from the changing preferences and behaviors of consumers. Vermeir et al. [18] emphasize that although food preferences may be difficult to change, they may still develop in short periods, due to the dynamic transformations happening in the social, cultural, and economic environment. The analysis of behaviors of consumers, while considering the economy of sustainable development, calls for the analysis of signs of behaviors and their causes [3,4,46]. SFC studies, whose scope has been constantly expanding, show that the consumers' interest in SFC is lower than expected [43,47,48], while the scale of signs is not yet large [49,50]. The latest analyses show that despite the popularity of the idea of sustainable consumption and production, Europeans have not yet learned the concept of sustainable development (SD) well and cannot always identify it, with a marginally small number of the surveyed pointing that it is connected with nutrition [51,52]. The share of organic food in EU's market is estimated at 4%, and only 0.3% in Poland (with over 7% in Denmark and 4.4% in Germany) [53,54]. Still, the importance of food's health and environmental aspects are reflected in the growing trends, such as conscious, smart, critical, ethical, green, responsible, ecological, fair, shared, individual consumption, prosumption, deconsumption, food sharing, and freeganism [8,25,48,55–60]. "The Reflection Paper towards a Sustainable Europe by 2030" [61] shows that around 43 million people in the EU still cannot afford to eat a good quality meal every second day.

Further transformations of attitudes and behaviors of food consumers are required for SFC to grow, with such attitudes and behaviors possible to evaluate and identify based on segmentation [47,62]. There are plenty of literary resources discussing the issues of segmentation, with most of them often leading to distinguishing sub-groups, in turn allowing the identification of behaviors and motivations, along with an in-depth analysis of the character of attitudes [37,51]. Although many studies focus on the selection of sustainable food and consumption behaviors, the research efforts on consumer segmentation from the point of view of SFC are still limited [36,41].

Consumer segmentation is performed based on various criteria. Some of the criteria characterize the consumer as an individual and some as a group of consumers. For example, the first group may include consumption patterns, purchasing behaviors, motivation, the manner of perceiving a product, content perception, the level of satisfaction of needs, etc. [47,63,64]. The use of segmentation criteria describing groups of consumers has developed along with the world's globalization and expansion of planning horizons of tar-

get markets by international corporations with macro-criteria (such as economic prosperity, political and cultural system, infrastructure), which started to be used for international market segmentation purposes [65,66] segmentation of groups of potential customers, from abroad.

The identification of consumer segments based on balancing their attitudes towards food consumption is of fundamental importance for the further development of SFC, especially in the practical aspect. Any efforts aiming to alter unsustainable attitudes and behaviors of consumers should be focused on learning and understanding ways to influence consumers to change their behaviors towards more sustainable food, positioning sustainable food, creating effective strategies and information campaigns [7,26,46,56,62,67,68]. The knowledge of consumer profiles allows the creation of a more efficient information and education policy, maintained both by the government and NGOs.

The purpose of this paper is to segment consumers based on a sustainable approach to the consumption of food. The prospects for a more sustainable consumption depend on the ability to improve the innovativeness level of consumers, enterprises, and science and of government and public institutions. Undoubtedly, the creation of a favorable environment that promotes development of consumption sustainability requires a closer cooperation between the academic environment, industry, government, and social organizations. In the context of the topic addressed in this paper, it is important to know consumer attitudes towards sustainable food consumption. The consumer segmentation presented in this paper narrows that gap.

2. Review of Studies on Consumer Segmentation with Regard to SFC

The review of studies on consumer segmentation in relation to the concept of SFC has been prepared as the result of searching databases of scientific publications. The search covered the articles made accessible from 1990 until March 2020 in Web of Science and Scopus. Publications were selected if the searched phrases appeared in one of the following elements: thematic sections, keywords, titles, and abstracts. The following phrases were selected for searching: "food", "consumption", "segmentation", "segment", followed by "sustainable consumption" and "cluster analysis".

The search of the Scopus base yielded 24 records, while the Web of Science database returned 13 records. When assessing the usefulness of publications using Moher's et al. [69] method, twenty-seven papers published after 2010 were identified (Figure 1).

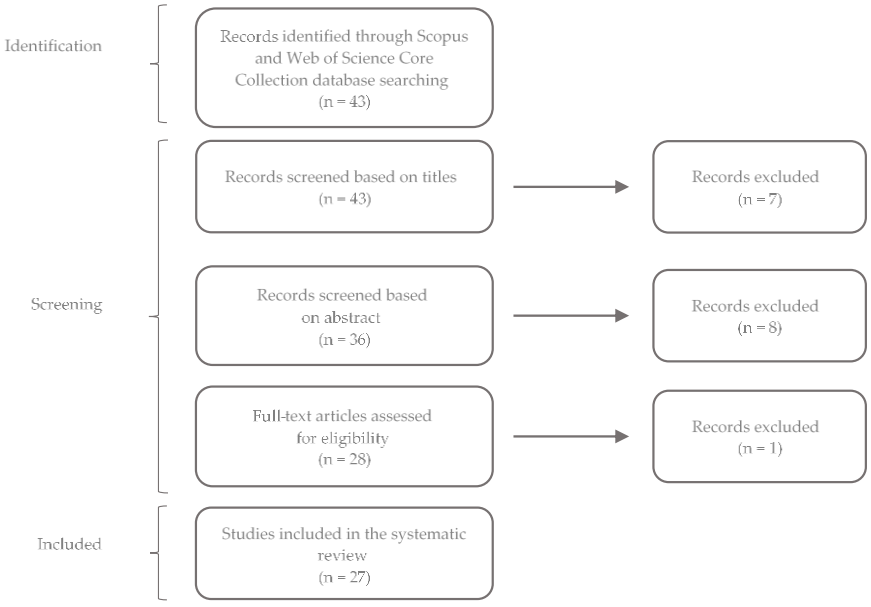

Figure 1. Selection of literary sources.

Dominant subject areas (categories) of the publications were agricultural and biological sciences, environmental sciences, social science, economics, econometrics and finance, business, green sustainable science technology, and environmental engineering. Analyzing the findings by country, it was found that a significant part of them were from Europe, especially Italy, Germany, and the Netherlands. The studies within the analyzed area have been performed, among others, by: Wageningen University and Research Centre (4 publications); Parthenope University of Naples (2); Gent University (2); Aarthus University (2); University of Gottingen (2). The articles have been analyzed and evaluated in terms of usefulness by two, independent scientific institutions (UPP and UD). To be included in the project, an article had to be prepared based on original data. The details of every publication have been identified by the first researcher, then verified by the second researcher and presented in the collective list in Table 1. Any publications that failed to satisfy these criteria have been excluded from analysis.

Table 1. Overview of the 27 selected papers.

No.	Author	Ref. No.	Regional Scope	No. of Respondents	Investigated Factors	No. of Segments	Types of Segments
1	Vanhonacker, F., Van Loo, E.J., Gellynck, X., Verbeke, W.	[68]	Belgium	n = 221	– Socio-demographic – Economic – Behavioral – Environmental sustainability	5	Conscious; Active; Unwilling; Ignorant; Uncertain.
2	Verain, M.C.D., Dagevos, H., Antonides, G.	[7]	Netherlands	n = 942	– Socio-demographic – Economic – Behavioral – Psychosocial	4	Unsustainers; Curtailers; Product-oriented consumers; Sustainers.
3	Bronnmann, J., Asche, F.	[70]	Germany	n = 485	– Socio-demographic – Economic – Behavioral – Environmental sustainability	2	Model 1; Model 2.
4	Thøgersen, J.	[71]	10 European countries, covering the five regions North, South, East, West and Central Europe	n ≈ 335 in each country (total ≈ 3350)	– Socio-demographic – Lifestyle	5	FRL segment 1 (“Everyday food providers”); FRL segment 2 (“Food ignoramuses”); FRL segment 3 (“Enthusiastic food consumers”); FRL segment 4 (“Uninvolved food consumers”); FRL segment 5 (“Traditional family oriented food consumers”).
5	Lavelle, M.J., Rau, H., Fahy, F.	[72]	Ireland (Northern Ireland and the Republic of Ireland; County Galway, Derry/Londonderry, and Dublin)	n = 1500	– Socio- demographic – Economic – Behavioral – Environmental sustainability	4	Dark; Greens; Browns; Yellows; Light-Greens.
6	Gerini, F., Alfnes, F., Schjøll, A.	[47]	Norwegian	n = 948	– Socio-demographic – Economic – Behavioral	3	Segment purchasing the most organic food; Occasionally purchase organic products; Segment

							attempts to avoid organic products.
7	Verain, M.C.D., Sijtsema, S.J., Dagevos, H., Antonides, G.	[73]	Netherlands	n = 829	– Socio-demographic – Economic – Behavioral – Behavioral	3	Cluster 1 ("Pro-selves"); Cluster 2 ("Average consumers"); Cluster 3 ("Conscious consumers".
8	Stranieri, S., Baldi, L.	[74]	Italy (Lombardy Region)	n = 351	– Socio-demographic – Economic – Behavioral – Environmental sustainability	3	Favorable; Sceptical; Mistrust.
9	Van Huy, L., Chi, M.T.T., Lobo, A., Nguyen, N., Long, P.H.	[75]	Vietnam	n = 203	– Socio-demographic – Economic – Psychographic – Lifestyle	3	Conservatives; Trendsetters; Unengaged.
10	Mózner Z. V.	[76]	Hungary	n = 975	– Socio-demographical – Economic – Environmental sustainability	6	Cluster 1 ("Meat- and vegetable-based meal consumers"); Cluster 2 ("Milk and meat consumers"); Cluster 3 ("Average consumers"); Cluster 4 ("Fruit, vegetable and dairy product consumers"); Cluster 5 ("Bread and bakery product consumers"); Cluster 6 ("No milk and dairy product consumers").
11	Annunziata, A., Mariani, A.	[62]	Italy (Campania Region)	n = 200	– Socio-demographic – Economic – Behavioral	3	Green; Egocentric; Sustainability oriented.
12	Aprile, M.C., Mariani, A.	[77]	Nepal (South of Italy	n = 400	– Socio-demographic – Economic – Environmental sustainability	4	Orientated to sustainability labels; Kind-hearted; Power seekers; Environmentalists.
13	Prokeinová, B. R., Paluchová, J.	[78]	Slovakia	n = 318	– Socio-demographic – Economic	4	Consumers—non-students in terms of consumer behavior

					– Behavioral – Environmental sustainability		when purchasing food; Consumers—students in terms of consumer behavior when purchasing food; Consumers—non-students in terms of consumption; Consumers—students in terms of consumption.
14	La Lama, G.C. M-D., Estévez-Moreno, L.X., Villarroel, M., María, G.A., Sepúlveda, W.S.	[79]	Mexican	n = 843	– Demographic – Environmental sustainability	3	Skeptical; Concerned; Ethical.
15	Hölker, S., von Meyer-Höfer, M., Spiller, A.	[80]	Germany	n = 1049	– Socio-demographic – Economic – Behavior – Values	5	Cluster A; Cluster B; Cluster C; Cluster D; Cluster E.
16	Palmieri, N., Forleo, M.B.	[26]	Italy	n = 257	– Socio-demographic information – Behavioral	7	Cluster 1 (“Scared & closed”); Cluster 2 (“Scared & open”); Cluster 3 (“Neophiliac & sensitive”); Cluster 4 (“Neutral”); Cluster 5 (“Phobic & careful”); Cluster 6 (“Not phobic & open”); Cluster 7 (“Fearless & unconcerned”).
17	Sogari G., Pucci T., Aquilani B., Zanni L.	[81]	Italy	n = 2597	– Demographic – Economic – Environmental sustainability – Behavioral	2	Millennials; Non-millennials.
18	Janßen D., Langen N.	[82]	Germany	n = 787	– Behavioral: – Environmental sustainability	3	Price-sensitives; Label choosers; Price-conscious label discriminators.

19	Yildirim, S., Candan, B.	[83]	Turkey	n = 453	– Demographic – Economic – Values – Personal value	2	Cluster 1 (" Self—developers—Social environmentalist"); Cluster 2 ("Self-challengers—Functional environmentalist").
20	Hasanzade, V., Osburg, V.-S., Toporowski, W.	[84]	Germany	n = 249	– Demographic – Behavioral – Affective factors (i.e., assessing)	3	Ethically motivated consumers; Price oriented consumers; Price-quality oriented consumers.
21	Risius, A., Hamm, U., Janssen, M.	[85]	Germany	n = 459	– Socio-demographic – Economic – Behavioral:	5	Average consumers (Class 1); COO oriented consumers (Class 2); Sustainability oriented consumers (Class 3); Premium-price oriented consumers (Class 4); Low-price oriented consumers (Class 5).
22	Wang, O., Somogyi, S.	[86]	China	n = 643	– Socio-demographic – Economic – Psychological – Behavioral	2	Sustainable-selfish-pioneer; Sustainable-selfish-conservative.
23	Jakubowska, D., Radzyminska, M.	[87]	Poland, Czech Republic	n = 631 (323—Czech Republic; 308 – Poland)	– Values – Environmental sustainability	2	Cluster 1; Cluster 2.
24	Ghvanidze, S., Velikova, N., Dodd, T.H., Oldewage-Theron W.	[88]	United States, United Kingdom, Germany	n = 1048	– Socio-demographic – Economic – Behavioral	4	Cluster 1 ("Apathetic Consumers"); Cluster 2 ("Health-Conscious Diners"); Cluster 3 ("Holistic Perfectionists"); Cluster 4 ("Ethical Advocates").
25	Su, C.-H., Tsai, C.-H., Chen, M.-H., Lv, W.Q. U.S.	[89]	United States	n = 812	– Sociodemographic – Economic – Environmental sustainability (i.e., environmental awareness)	3	Gen Z consumers with high environmental consciousness (sustainable activists); Gen Z consumers moderate ecological

							awareness (sustainable believers); Gen Z consumers with low environmental consciousness (sustainable moderates).
26	Hrubá, R.	[90]	Czech Republic	n = 331	– Sociodemographic – Lifestyle	2	Cluster 1; Cluster 2; Cluster 3; Cluster 4.
27	Krystallis, A.	[91]	Greece	n = 506	– Socio-demographic – Economic – Affective factors (i.e., assessment) – Behavioral	4	Cluster 1 (“Eco-friendly, intensive farming supports”); Cluster 2 (“Indifferent”); Cluster 3 (“Sustainable farming supports”); Cluster 4 (“Ambiguous”).

The following categories of variables were specified after the analysis of the papers (Table 1): environmental sustainability, socio-demographic, psychographic, economic, behavioral, affective factors, lifestyle, values. Food consumption is a complex issue and calls for a broader perspective [41,92]. In order to explain the consumers' behaviors, the researchers used in their studies wide ranges of variables connected to the lifestyle [71,75], personal traits [7,86], values [80,90,93], preferences, purchasing behaviors [7,26,47,62,70,78,81,84–86], behaviors related to food consumption, the consumers' attitude to sustainable food consumption [62,75,78,91], environmental issues [68,70,72–74,76,77,79,81,82,88–91] and behaviors that would limit sustainable choices [62,70,72,73,75,76,78,79,81,88,89].

The authors of the analyzed works employed various statistical methods to identify consumer segments. Factor analysis and cluster analysis are among the most used ones [26,62,68,71–76,79,80,87–90,93]. The other methods included modelling (e.g.: logit model [70]; latent class modelling (LCM) [85]; conceptual model [81]; mixed logit model [47], conjoint analysis model [62,84,91]), the use of selected techniques with regard to data mining [78] and multivariate analysis [77]. The following part of the paper presents individual categories of variables identified in the analyzed papers.

2.1. Socio-Demographics

Socio-demographics have been used in most of the cited works. This type of variable is one of the commonly used variables in consumer behavior studies [7,73,81]; they are easy to measure and strongly determine consumer's behaviors, which in turn makes them work well as a basis of segmentation.

Gender of consumers was considered in 21 papers (Table 2). For instance, Gen Z segments of the U.S. sustainable food market differ with respect to gender. In addition, Verain et al. [7] stated that "unsustainers" and "product-oriented" consumers were more often male than female compared with "curtailers". Analyzing two sub-samples characterized by different age: "millennials" (18–35 years) and "non-millennials" (36–88 years) revealed that gender is significant and positive only in the category of "non-millennials", while the income level is significant and positive for "millennials". Sogari et al. [81] who ran a study on the vine market noted that "if in the past wine was seen as mainly a male beverage, in recent years more and more females are becoming wine aficionados". Significant gender differences across segments were shown by Su et al. [89], who analyzed consumer groups based on environmental consciousness.

Table 2. Socio-demographic factors used in the analyzed papers.

Socio-Demographic Factors	Numbers Refer to the Studies List in Table 1
Age group	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 24, 26, 27
Gender/Sex	1, 2, 3, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 21, 24, 25, 27
Educational level	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 22, 24, 25, 27
Household size/Mean household size	3, 5, 9, 10, 11, 21
Living environment (rural or urban)/Domicile/Residence/Type of settlement	1, 8, 10, 12, 13
Marital status/Partnership/Married	3, 11, 22, 27
Occupation	19, 22, 27
Social status	12, 13
Origin/Ethnicity	14, 26
Family member/Kids/Children/	3, 9, 11
Family composition (number of household members)/Household composition	2, 7
Residential region/Area of residence	25, 27

Country class	4, 24,
Leisure time activity	10
Housing tenure	5

Age of consumers was taken into consideration in 22 papers; in 7 out of the 22 papers noted, significant age differences depended on the consumer segment [7,68,70,73–75,81]. For example, Vanhonacker et al. [68] concluded that the "Unwilling" segment were the youngest on average and significantly younger than the "Active" and the "Uncertain" (the oldest segment). Further, the "Conscious" were significantly younger than the "Uncertain". The "Unwilling" segment was the opposite of the "Active" segment and combined a high personal footprint with a low personal relevance.

Education of consumers was considered in 21 of the analyzed papers. Seven articles showed that education significantly diversifies the consumers' behaviors and attitudes [68,70,72,74,75,79,88]. Vanhonacker et al. [68] found that the large majority of the "Conscious", "Active" and "Unwilling" consumers were higher educated, while a more balanced distribution in education level was found among the "Ignorant" and the "Uncertain". Ghvanidze et al. [88] stated that the "Apathetic" segment had high levels of education and income.

Other variables used in the discussed papers, but on a smaller scale, were, among others: household size [62,70,72,75,76,85], living environment/residence (or type of settlement) [68,74,76–78], family composition/household composition [7,73], and country class [71]. Some of the least used variables in this category included social status, origin/ethnicity, living environment (rural or urban), occupation, family composition, household size, family member, housing tenure, partnership, kids, residential region, country class and leisure time activity.

2.2. Environmental Sustainability

11 out of the 27 articles used environmental sustainability variables (Table 3) [68,70,72,74,76–79,81,82,87,90]. Various, detailed variables were identified among these, such as footprint-related, certificates, pro-environmental habitual activity, environmental awareness and related to the product and/or production process.

Table 3. Environmental sustainability factors used in the analyzed papers.

Environmental Sustainability Categories	Environmental Sustainability Items	Numbers Refer to the Studies List in Table 1
Footprint related	Self-evaluation of personal footprint	1
	Personal relevance of the ecological footprint	1
	Ecological footprint of food consumption (ecological footprint (gha) = quantity consumed per year per person (kg) × ecological footprint intensity (gha/kg))	10
Certificates	Sustainable certification	3
	Sustainability labels on products	18
	Attitude to using sustainability labels: (1) Propensity to read labels before consuming food products, (2) Degree of knowledge regarding sustainability labels.	12
Pro-environmental habitual activity	Bought reusable products instead of disposable ones, Reduced energy use, Reduced water use, Shopped or paid a bill online, Avoided products with excess packaging, Repaired items instead of purchasing new ones	5
Sustainability attitude	Attitude about animal welfare	14

	Environmental attitudes and values: (1) Believe the condition of the natural environment affects the quality of produced food, (2) Environment pollution is a consequence of today's people's lifestyle.	23
Environmental awareness	Environmental involvement, Environmental values for purchasing environmentally friendly products, Importance of perception of sustainable food, Environmental protection, Product attributes, Food choices associated with healthy eating habits.	25
Related to the product and/or production process	Shelf life of food products (e.g., fresh-cut salad with an extended shelf-life date)	8
	Main constructs have been extrapolated: (1) Product/Process, (2) Supply chain, (3) Energy types and their use, (4) Soil/Landscape preservation	17

Two of the discussed publications focused on the selection and consumption of food and the related impact on the environment measured by the "ecological footprint" [68,76]. Vanhonacker et al. [68] show that numerous consumers fail to see the impact of animal production on the natural environment. They also point to the presence of alternative behaviors in relation to conventional meat consumption, for which eating habits and cultural patterns must be adapted. However, the readiness to pay higher prices is significantly lower than the readiness to consume. Mózner [76], however, has noted that consumers who ate more fruit, vegetables, and milk products did not have a smaller ecological footprint in terms of the entire food consumption.

Three publications examined the issue of food certification [70,77,82]. The used certification systems differ in terms of information value, methods of assigning and conducting monitoring activities. The impact of the origin certificate on consumers has been confirmed by Bronnmann and Asche [70], who showed that consumers were more willing to pay a higher price and were more eager to make purchases, all in relation to wild fish. Similar results confirming the readiness to pay a higher price have been also obtained by Aprile and Mariani [77], Janßen and Langen [82], and La Lama et al. [79].

The consumers' focus on environmental protection issues have been also considered in the studies by Jakubowska and Radzymińska [87] and by La Lama et al. [79]. Consumers can be divided into ones expressing strong pro-environment attitudes (and health-related values) and ones that do not take environmental aspects into account when selecting food [87]. Similar results have been obtained by Su et al. [89] who stated that the sustainable food market can be segmented according to environmental awareness. Sogari et al. [81] have identified a connection between the selection of a product and the consumer's engagement in the purchasing process and their environmental protection awareness.

2.3. Behavioral Factors

Behavioral changes have been used in 19 out of 27 articles [7,26,47,62,68,70,72,74,76,78,80–82,84–86,88,91]. An overview of examples of the factors that have been included in the segmentation studies of the cited authors can be found in Table 4. The behavioral factors consisted mostly of buying behavior and general food choice motives/attribute importance by food category sustainability, general/life attitude, consumption habits, occasional behavior, ethical issues, consumer preferences for product information related to environmental issues.

Table 4. Behavioral factors used in the analyzed papers.

Behavioral Categories	Behavioral Items	Numbers Refer to the Studies List in Table 1
Buying behavior	Consumption frequency	8, 17
	Responsibility for food purchases within household	1
	Purchaser or not main food purchaser in the household	3
	Purchase frequency of organic food products	6
	Purchase intentions for sustainable shellfish species	22
	Food shopping frequency	8
	Consumers' purchase frequency	17
	Average price for product	17
	Use social media to gather information on product before buying	17
	Consumer preferences and their attitudes towards food choice	16
	Consumer perceptions and their attitudes towards edible seaweed	16
	Willingness to pay measures for the respective attributes	18
General food choice motives/attribute importance by food category sustainability	Price	2, 8, 20, 21
	Healthiness	2, 11
	Taste	2
	Trust	8
	Country of origin	21
	Sustainability label	21
	Safety of product	8
	Claim	21
	Freshness	8
	No-buy option	21
	Environmentally friendly packaging	11
	Locally produced to support local farmers	11
	Produced in an uncontaminated environment	11
	Obtained in an environmentally friendly way	11
General/life attitude	Animal welfare rights	11, 20
	Healthy life attitude	8
	Food involvement	2
	Life values	7
	Health-conscious lifestyles	24
Ethical issues	Diet, agreement regarding the dietary guideline	7, 15
	Produced in full respect of human rights, without exploiting women and children	11
	Ethical concern about production processes	24
Consumption habit	Stage in the transition towards healthier towards more sustainable eating	7
	Sustainable consumption	13
	Consumption frequency variables	27
	Healthy dietary patterns	24
Occasional behavior	(1) Purchased energy efficient appliance, (2) Installed insulation, (3) Switched to renewable energy supplier, (4) Purchased an energy efficient car	5
Consumer preferences for product information related to environmental issues	Concerns about the environment	20
	Low carbon emission	11
	Obtained in an environmentally friendly way	11
	Produced in an uncontaminated environment	11

A few of the issues used for the purposes of establishing consumer segmentation are their behaviors related to purchasing ecological food products and their willingness to pay the price. For example, considering the willingness to pay measures for the respective attributes, it has been noted that the buyers of ecological food were more inclined to pay a premium for ecological products [47,62]. Vanhonacker et al. [68] and Palmieri and Forleo [26] have confirmed that consumers were more inclined to buy products perceived as more sustainable. Consumers exhibiting a more sustainable approach are also more willing to buy innovative products.

An important aspect is also the identification of factors behind the selection of food, with health and quality attributes playing an important role [62]. Risius et al. [85], who segmented fish consumers, emphasized the major importance of the country of origin. Lots of attention was also paid to connecting consumer values with purchasing behaviors. An example could be the attention paid by humans to the natural environment or the well-being of animals [93]. Verain et al. [7] found that food involvement and personal norms with regard to healthy and sustainable food positively affect sustainable food choices. Annunziata and Mariani [62] emphasized that the importance of ethical values (i.e., that food was produced with complete observance of human rights or with no abuse to women and children) and environmental values (e.g., that food was produced in an uncontaminated environment, in an eco-friendly manner and with support for local farmers).

The behaviors are related to the level of the consumers' awareness about sustainability, as confirmed by Prokeinová and Paluchová [78] with regard to the younger consumers who choose environmentally friendly and socially acceptable products more willingly than their parents.

2.4. Psychographic Factors

Psychographic variables have been used as a basis for segmentation in three of the analyzed papers [7,75,86]. Verain et al. [7] have confirmed that social and personal norms, ability, subjective knowledge, and food involvement significantly differentiate meat consumers' behaviors. For example, "product-oriented consumers differ from each other in that the product-oriented attach more importance to social norms and have a higher ability to judge sustainably produced food, and subjective knowledge on sustainable products". Van Huy et al. [75] have focused, among other aspects, on the attention to healthy food, love of cooking, convenience, and love of local and organic food. Wang and Somogyi [86] have examined the level of acceptability of crustaceans from sustainable production among Chinese consumers. They have found that personal standards significantly influence the purchase intentions of consumers.

2.5. Economic Factors

A wide range of economic variables, such as net household income per month, financial status of household, and employment status, were used as segmentation criteria or profiling variables. For example, Verain et al. [7] have identified four consumer segments that differ significantly regarding economic factors, e.g., segments named "Curtailers" have lower incomes compared to the "Sustainers" segment. The study by Van Huy et al. [75] has highlighted a nexus between the identified segments and the level of income of the consumers. Yildirim and Candan [93] have concluded that most green product buyers were at a high level of income. These results show that a more prominent presence of sustainable attitudes can be expected from the wealthier consumers.

The employment status has been included in three articles, and only in one study, significant differences across segments have been found by Lavelle et al. [72], who stated that respondents differ in their uptake of occasional and habitual pro-environmental behaviors. Considerable differences exist between the two behavior groups with regard to

key socio-demographic variables, such as employment status and income, as well as residential location and housing tenure.

2.6. Affective Factors

Two of the presented articles considered the affective factors. In one of them, Krystallis [91] has taken into account consumers' assessments related to environmental factors, the perception of processing and well-being of animals in the case of processed meat. On the other hand, Hasanzade et al. [84] have analyzed the connection between ethical product attributes (e.g., ethical criteria of animal welfare, environmental protection, and labor and human rights) with the selected elements of behaviors.

2.7. Lifestyle and Values Factors

As shown by Aydin and Ünal [93], the lifestyle of consumers is related to the sustainability of consumption behaviors. In the publications of Thøgersen [71] and Van Huy et al., [75] the food-related lifestyle (FRL) model developed by Grunert et al. [94] has been used. For example, Thøgersen [71] investigates how the country of residence and FRL interact in shaping (un)sustainable food consumption patterns. The analysis has revealed that the outcome variables vary significantly across FRL segments. Further, after controlling for FRL, the direct effect of country class is highly significant for meatless suppers and marginally significant for buying organic food but non-significant for eating beef and food innovativeness. Van Huy et al. [75] have stated that the FRL model enables better understanding of how consumers employ food and its culinary aspects to achieve certain values in their lives. The acceptance of a specific lifestyle by consumers plays an important role in creating a "green economy" [95].

Consumer value-related approach represents a study by Hölker et al. [80] which developed consumer segmentation based on the human–animal relationship. The segmentation has been prepared according to specific values, such as animal rights, utilitarianism, new contractarian approach, abolitionism, original anthropocentrism, and anthropocentrism with indirect duties. At the same time, Yildirim and Candan [83] have found that green product buyers could be segmented into subgroups according to their personal values and consumption values. Significant differences regarding personal values, especially related to environmental matters, have been confirmed by Jakubowska and Radzymińska [87] as well.

The presented content proves that there are studies on consumer attitudes and behaviors in relation to SFC. Most of the researchers have focused on capturing individual factors or groups of factors allowing the identification of symptoms of sustainable behaviors of consumers. The researchers focused on environmental aspects (food choices and practices beneficial to the environment). It is also understood that other factors can also impact attitudes, which are basic determinants of human behavior [96]. Some of the studies have specified the attitude of consumers towards food categories (e.g., organic products), while some other towards products (e.g., fish, seaweed, lettuce, wine). The authors of all studies considered the behavioral component and many studies also accounted for the attitude's affective component [26,71–75,79,86–89]. It is worth noting that accounting for consumer attitudes in three dimensions was an infrequently taken approach, which forms a theoretical basis for the considerations in our article. A similar perspective has also been applied by, for instance, Jakubowska and Radzymińska [87], La Lama et al. [79], Palmieri and Forleo [26], Thøgersen [71], Van Huy et al. [75], Vanhonacker et al. [68].

3. Methodological Approach

The article is based on results of the authors' own surveys conducted by means of direct interviews. The study aims to identify sustainable consumer behaviors with regard to food consumption.

The general methodological approach is presented in Figure 2. A plan for collecting the data was developed, with the assumption that the goal would be to distinguish consumer segments by the level of sustainability of food consumption. The plan covered: developing a method of selecting consumers for the study and organizing the study itself, namely training interviewers and determining the time frame of the study. Afterward, a questionnaire was developed and put to test, ultimately serving to collect the research material. Once the data had been collected, the raw material was subjected to formal and substantive evaluation. The prepared material was then subjected to clustering by means of a non-hierarchical clustering algorithm. The distinguished segments were then described.

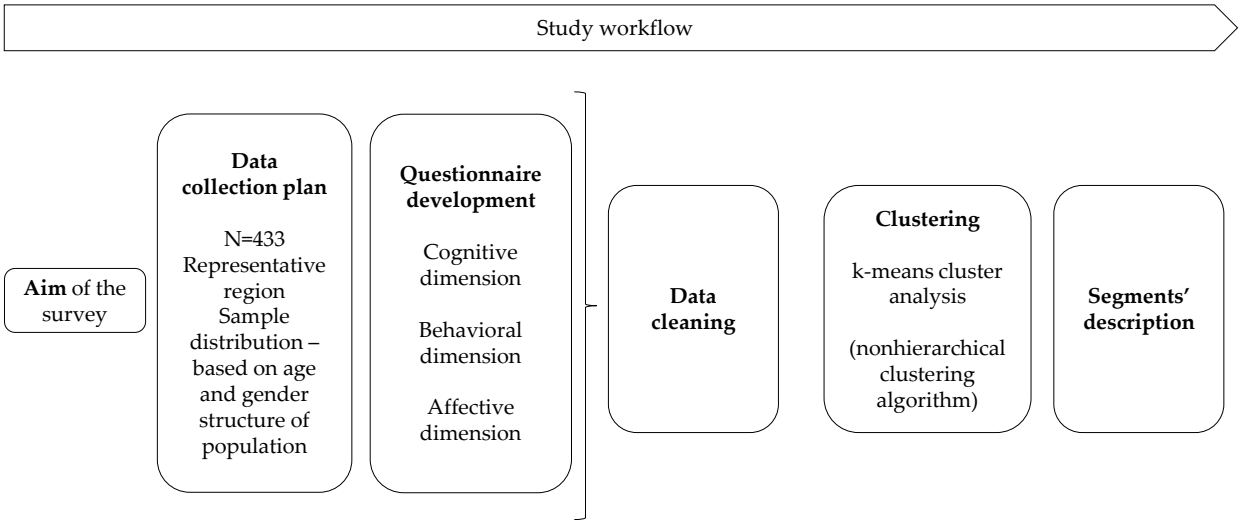

Figure 2. Methodological approach of the research.

3.1. Selection of Respondents

The respondents selected for the study are adults, over 18 years of age, living in the region of Wielkopolska, Poland. The region was selected because: (1) the inhabitants of economically developed regions usually have higher education levels and higher revenues, etc., which means this concept is more widespread in such regions; (2) new directions in food consumption and nutrition usually spread among larger urban agglomerations, inhabitants of regions developed socially and economically, for whom they are certain, sought for a model of food consumption; (3) Wielkopolska is one of the best economically developed regions in Poland (in terms of gross GDP and growth, foreign capital involvement concentration and investment expenses, unemployment rate, revenues, education, and human capital potential) [97].

The quota sampling method was used for the selection of respondents for the study. Public statistics data served as a basis to determine the sample's structure that reflected the structure of Wielkopolska inhabitants in terms of age and gender. The sample was 433 individuals. The social and demographic characteristics of the survey's participants is presented in Table 5.

Table 5. Respondents sample structure.

Characteristic	Item	Percent
Gender	Female	54.04
	Male	45.96
Age (years)	18–24	16.40
	25–34	16.40
	35–44	19.40
	45–54	15.47
	55–64	16.40
	65 and more	15.94
Education	Elementary and junior high	5.31
	Basic vocational	17.78
	Secondary	24.48
	Post-secondary/senior high	18.48
	Higher	33.26
Number of household's members	1 person	9.93
	2 persons	29.33
	3 persons	24.25
	4 persons	21.27
	5 persons and more	14.78
Self-assessment of household budget	We live in serious poverty—we have not enough to meet daily needs	0.91
	We live frugally—we have to manage our finances very carefully	13.86
	We live like average people—we have enough for daily needs, but must save for major purchases	44.57
	We live well—we can afford a lot, without having to save for specific purposes	36.03
	We live very well—we can afford certain luxuries	4.62

3.2. Questionnaire Development and Data Collection

Coming from the concept of the approach proposed by Breckler [98], which assumes three-dimensionality of attitudes towards SC, the questionnaire used in the survey has been divided into three parts. Each part contained questions related to the cognitive, behavioral, and affective components, respectively. Questions characterizing food consumption sustainability were asked within each area.

The first version of the questionnaire was subjected to pilot tests. The test consisted of 30 personal interviews with individuals who represented the target group. The purpose of the test was to check the questionnaire:

- in the formal aspect, namely whether the instructions and the formatting of the document are clear and facilitate the efficient work of the interviewers,
- in the content aspect, i.e., identification of questions for which there is little variation in answers, making them impossible to use as a basis for segmentation or profiling variables.

After collecting remarks from interviewers who did pilot tests and following the analysis of respondents' answers, the necessary corrections were introduced, mainly related to the formulation of questions. The final questionnaire, used in the study, is the result of the introduction of these changes.

The face-to-face interviews for the study were performed between November and December 2019.

3.3. Data Cleaning

The collected material was subjected to post hoc data cleaning approach. The procedure of data cleaning assumes they are verified by the researchers (Exploratory Data Analysis) [99] and consisted of checking outliers in order to identify any errors that would occur during uploading or digitizing the data; checking the presence of any missing values and replacing them with a median, if found; and checking for any duplicated records in the database and removing such duplicates, if found. The cleaned database was subjected to statistical analysis.

3.4. Data Analysis-Clustering

We used a k-means cluster analysis (non-hierarchical clustering algorithm), which groups objects on a set of user-selected characteristics. The resulting clusters should exhibit high internal (within-cluster) homogeneity and high external (between-cluster) heterogeneity. Thus, if the classification is successful, objects within clusters will be close together when plotted geometrically and different clusters will be far apart. Cluster analysis was chosen because of the data reduction procedure, which is done objectively by reducing the information from an entire population or sample to information about specific groups, as a large number of observations are meaningless unless classified into manageable groups [100].

Based on selected questions within each of the SC dimensions (cognitive, behavioral, and affective), 3 indices were created, by transforming all variables into dichotomic ones and aggregating sums of answers. There are two types of variables:

- dichotomic (1/0)—no transformation was done;
- ordinal (scales 1–3, 1–5 or 1–7)—top box answers were recoded into 1.

Because of the different number of variables used for each dimension, it was necessary to make sure we worked with roughly equal amplitudes within each index. Cluster analysis is sensitive to different scales, as it uses distance measures, therefore by using a mean and standard deviation values of each section, we standardized them with z-score transformation ($z = (x - \mu)/\sigma$) [101], to eliminate the impact of larger standard deviation.

Description of Dimensions

As the three-dimensional model of attitudes was employed, each dimension was reflected by the number of questions in the questionnaire (Table 6). For the cognitive dimension, 6 questions (22 variables in the data) were used to measure and to differentiate respondents by their awareness of the sustainable consumption concept. The behavioral dimension covers 4 questions, representing 28 variables in the data. In the affective dimension, we used 2 questions, based on which 17 variables in the data were created.

Table 6. Segmentation variables used for the study.

Dimension	Question	Variables	Score
Cognitive	(1) Have you heard about the following trends—consumer phenomena?	– Deconsumption – Responsible consumption – Collaborative consumption – Eco-consumption – Prosumption – Freeganism – Smart shopping – Cocooning – Globalization – Over-consumption – Regionalization – Ethno-centrism	1 point if yes

		–	Tradition	
	(2) Which of the listed trends are interesting to you? Please indicate the ones with which you identify to the highest degree (multiples choice possible)	–	Responsible consumption	1 point if yes
		–	Collaborative consumption	
		–	Eco-consumption	
		–	Prosumption	
		–	Freeganism	
	(3) Are you familiar with the concept of sustainable consumption?	–	Yes	1 point if yes
		–	No	
	(4) Do you look for information about food, consumption, and food market?	–	Yes	1 point if yes
		–	No	
	(5) How often do you acquire information (e.g., by reading, watching TV programs, listening to the radio) about food, consumption, and food market?	–	Daily	1 point if: Daily 4–5 times a week 2–3 times a week
		–	4–5 times a week	
		–	2–3 times a week	
		–	Once a week	
		–	2–3 a month	
		–	Once a month	
		–	Less frequent than once a month	
	(6) During the last year, did you get any information about sustainable food consumption?	–	Yes	1 point if yes
		–	No	
	(7) Have there been any changes in nutrition in your household in the last 5 years?	–	Yes	1 point if yes
		–	No	
	(8) Have there been any changes in food sourcing in your household in the last 5 years?	–	Yes	1 point if yes
		–	No	
Behavioral	(9) Please indicate your attitude to the examples of behaviors listed below, on a numerical scale ranging from 1 to 5, where 1 means "I strongly disagree" and 5 "I strongly agree".	–	I segregate waste, if possible	1 point if 5 or 4 on the scale
		–	I buy food products in recyclable and biodegradable packaging	
		–	I go shopping with my reusable bag	
		–	I try to store, process, or pass on to others any food that has not been fully consumed	
		–	I buy food products from local/domestic producers, despite the fact that they may be more expensive	
		–	I am willing to spend more time buying food that I want	
		–	I save money and limit waste production by buying food in bigger packaging	
		–	I use low-processed food when preparing meals at home	
		–	I avoid highly-processed food	
		–	I avoid wasting food in my household	
		–	I support local producers by buying their products	
		–	I treat meals as a chance to start relations with others	
		–	I care about the nutrition of my family members	
	(10) In the past (3–5 years ago) was it:	–	I segregate waste, if possible	1 point if

	less important = 1, equally important = 2, more important = 3, for you?	– I buy food products in recyclable and biodegradable packaging – I go shopping with my reusable bag – I try to store, process, or pass on to others any food that has not been fully consumed – I buy food products from local/domestic producers, despite the fact that they may be more expensive – I am willing to spend more time buying food that I want – I save money and limit waste production by buying food in bigger packaging – I use low-processed food when preparing meals at home – I avoid highly-processed food – I avoid wasting food in my household – I support local producers by buying their products – I treat meals as a chance to start relations with others – I care about the nutrition of my family members	3 on the scale
Affective	(11) Which of the actions listed below have you heard about?	– "Po stronie natury"/English: „On the nature side by Żywiec Zdrój" (Żywiec Zdrój) – "Zadbaj o środowisko"/English: „Take care about the environment" (Carlsberg Polska) – "Danone dla środowiska"/English: Danone for the environment (Danone) – "Tworzenie wspólnej wartości"/„Creating the value together" (Nestle) – "Życie w sposób zrównoważony"/„Sustanaible life" (Unilever) – "Kto nie przyniesie—odpada"/Who will not bring—will be dismissed (Coca-Cola HBC Polska, Tesco Polska and Carlsberg Polska)	1 point if yes
	(12) The following is a list of various statements and each one of them has potential benefits and inconveniences for you. Consider every approach and decide if it is ultimately BENEFICIAL or DISADVANTAGEOUS for you.	– I buy local products, but spend more time shopping – I support local economy by consuming local products, but pay more for them – I buy food in smaller portions, but use more packaging – By not shopping "to stockpile for later" I lose the benefit of promotional prices for certain food products – I improve the quality of consumed food, but at the same time I reduce the amount of consumed food – Avoiding excessive, disadvantageous consumption requires self-control and self-discipline – I am ready to pay more for higher quality products – Being a sustainable consumer means that I have to be engaged in the life of a local community – Responsible shopping means that I have to be more committed and spend time on preparing shopping lists	1 point if "beneficial"

	– Exchanging, lending and other forms of sustaining communitarianism mean that I have to spend time and be committed – Buying any new products or services means that I have to spend time and effort on research

3.5. Clustering

When running the analysis, the number of clusters was specified as 2, 3 and 4, to compare them and find the best solution. As the 2-cluster solution gave the result of data division into negative values of cognitive, behavioral, and evaluative indices for one cluster and positive for another one, that does not provide an insightful interpretation. As we needed to choose a better solution from two options, i.e., 3-clusters and 4-clusters, we run a validation procedure and assessed differences of cognitive, behavioral, affective indexes between clusters. Considering that in the 4-cluster solution there are more pairs with an insignificant difference, we decided to choose a 3-cluster solution for further interpretation.

The relative centers of each cluster on a standardized scale, are presented in Table 7, and reflect differences between the clusters. The first cluster has the highest values of behavioral aspect, which means that this group represents the most sustainable pattern of behavior. The second one is the only one with positive values for cognitive aspects, so respondents with the highest awareness level. The third group includes respondents with the lowest values for each aspect.

Table 7. Final cluster centers.

	Cluster		
	1	**2**	**3**
Zscore (cognitive)	−0.42567	1.1596	−0.55525
Zscore (behavioral)	0.81631	0.14434	−0.76766
Zscore (affective)	0.14786	0.68968	−0.6525

The ANOVA analysis allows determination of the importance of each index with the relative weight. For the 3 indices, F values are large and all of them are significant ($p < 0.001$), indicating that they have a significant impact on the results for the 3-cluster solution (Table 8).

Table 8. ANOVA analysis for 3 clusters.

	Cluster		**Error**		**F**	**Sig.**
	Mean Square	**df**	**Mean Square**	**df**		
Zscore (cognitive)	125.531	2	0.421	430	298.328	0.000
Zscore (behavioral)	95.835	2	0.559	430	171.468	0.000
Zscore (evaluative)	68.157	2	0.688	430	99.118	0.000

To validate the analysis, we created cluster membership and compare, whether mean values of each cluster are significantly different within each index. All 3 clusters are significantly different, so we can reject the null hypothesis, that the group means are all equal in all indices:

- Affective—$F(2.430) = 99.118$, $p < 0{,}001$;
- Behavioral—$F(2.430) = 171.468$, $p < 0{,}001$;
- Cognitive—$F(2.430) = 298.328$, $p < 0{,}001$.

Nevertheless, we have results showing that not all group means are equal, so we should check whether pair comparison shows a significant difference.

To sum up, there are 3 clusters that describe and differentiate all observations:

- Cluster 1—low cognitive, high behavioral, high affective;
- Cluster 2—high cognitive, low behavioral, high affective;
- Cluster 3—low cognitive, low behavioral, low affective.

4. Results

As a description of the results, we will first present a synthetic description of segments, followed by the characteristics of their representatives within three attitude dimensions. We identified three segments (clusters) and based on the dominant characteristics named them as: cluster 1—"Doers", cluster 2—"Conscious" and cluster 3—"Reluctant" their characteristics can be presented on the basis of the data in Table 9.

Table 9. Consumer segments.

	Feature Level	**Cluster**			**The Whole Sample**
		Doers	**Conscious**	**Reluctant**	
Attitude dimension	Cognitive, Zscore	−0.4256 Low	1.1596 High	−0.5552 Low	.
	Behavioral, Zscore	0.81631 High	0.14434 Moderate	−0.7676 Low	.
	Affective, Zscore	0.14786 Moderate	0.68968 High	−0.6525 Low	.
		Percent (%) or mean value			
Gender	Woman	56	61	47	54
	Man	44	39	53	46
Age	18–24 years	14	24	13	16
	25–34 years	11	27	13	16
	35–44 years	16	21	21	19
	45–54 years	17	18	13	15
	55–64 years	22	5	21	16
	65 and more years	20	6	20	16
	Mean age	48.10	36.47	47.03	44.19
Education	Other	6	2	9	6
	Vocational school	19	5	27	18
	Secondary school	27	20	26	24
	Post-secondary school	24	15	17	18
	University	24	58	21	33
Number of people in a household	1–2 people	39	35	42	39
	3–4 people	46	50	43	46
	5 and more people	15	15	15	15
Village/town/city	Village	42	28	24	31
	Town below 10,000 inhabitants	5	5	3	4
	Town from 10,000 to 49,999 inhabitants	14	11	10	12
	Town from 50,000 to 99,999 inhabitants	7	7	11	9
	Town 100,000 inhabitants and more	31	48	51	44
Material conditions	Bad	0	1	10	4
	Neither good, nor bad	38	33	47	40
	Good	61	66	41	55
	DK/ND	1	0	2	1
Self-assessment of household budget	We live in serious poverty—we have not enough to meet daily needs	0	0	1	0
	We live modestly—we have to manage our finances very carefully	13	4	23	14
	We live like average people—we have enough for daily needs, but must save for major purchases	47	41	45	45

	We live well—we can afford a lot, without having to save for specific purposes	36	45	29	36
	We live very well—we can afford certain luxuries	2	10	2	5
	DK/ND	1	0	1	1
Total family income	PLN 1001-2000	13	8	18	14
	PLN 2001-3000	22	11	24	20
	PLN 3001-4000	26	23	28	26
	PLN 4001-5000	21	27	16	21
	PLN 5001-6000	9	15	5	9
	PLN 6001 and more	9	15	9	11

Cluster 1—segment "Doers"

This segment included 31% of food consumers. These are action-oriented people, whose consumption-oriented behaviors show a higher number of sustainable behaviors than in the case of other people, despite the fact that their knowledge about sustainable consumption is low and their opinions about this concept are moderately positive. This means that the reasons behind their (sustainable) behaviors may come from other areas, e.g., the socialization or upbringing process, material situation, living environment, etc. This segment shows a significantly higher percentage of people living in rural areas. The members of this segment have diversified incomes, whose distribution is similar to the one in the examined sample. These people are slightly older than the average for the examined group.

Cluster 2—segment "Conscious"

This segment included 30% of food consumers. The individuals in this segment have a high value of indexes within the cognitive and affective dimensions of attitudes, but a noticeably lower intensity of sustainable behaviors. These consumers have a better understanding of and a more positive attitude towards the sustainability concept but have not yet introduced a higher number of sustainable behaviors. However, their higher awareness may be considered a good foundation to grow into a fully sustainable attitude. This segment has a higher representation of women. It is also a segment with a major share of young people and the highest share of individuals with higher education in the identified segments (which may determine the higher level of awareness). The group's higher level of income and satisfaction from material status should be also underscored.

Cluster 3—segment "Reluctant"

This segment included 39% of food consumers. This group consists of individuals with negative attitudes towards the idea of sustainable consumption, manifested both in the low awareness of concepts, negative opinions of them, and low importance of sustainable behaviors. The group is nearly equally represented by men and women, with age distribution similar to the distribution in the examined group. The representatives of this segment may be encountered in towns of various sizes. The profiling data show that this segment is more often populated by individuals with lower education, whose material situation is poor (they declare lower satisfaction with their incomes and that their incomes are lower).

Segment characteristics in the cognitive sphere

Significant differences can be spotted among segments in the cognitive sphere. The individuals in the "Conscious" segment had a high awareness of the terms used for describing sustainable consumption behaviors. In total, 87% of its representatives have met with the term "sustainable consumption". In the case of "Doers" and "Reluctant" segments, this was 36% and 19%, respectively. We can also observe a high activity of the "Conscious" segment individuals in the search for information about food and a high amount of the retained information. The "Reluctant" segment individuals declare looking for information about food in the least degree (17% of the segment's representatives). Additionally, they pay little attention to information about consumption sustainability.

Segment characteristics in the behavioral sphere

The readiness to introduce changes in nutrition is mainly declared by individuals in the "Doers" and "Conscious" segments (67% and 70%, respectively)—however, these changes are of a different nature. The representatives of the "Doers" segment refer to the sustainability concept to a higher degree (e.g., increasing the share of fruit and vegetables in their diets, preparing meals by cooking them themselves). They also more frequently declared limiting undesirable behaviors such as eating fried meals and meals with a high-fat content, consuming sugar, salt, and stimulants. The "Doers" representatives limited meat consumption to the highest degree. The members of the "Conscious" segment would introduce similar changes, but they were declared with lower frequency. This segment dominates only in terms of introducing healthy and organic products to the diet. The nutritional changes were the least common in the "Reluctant" segment, declared by around 1/3 of the segment's participants. Moreover, they were related to the sustainable consumption principles to a lower degree than in the remaining segments.

The individuals in the "Does" and "Conscious" segments more often declared changes related to sourcing food for their households. The use of large retail facilities (such as supermarkets and hypermarkets) grew among the "Doers". This could be related to the fact that half of the members of this segment live outside towns, which is where structural changes to retail have been happening in the recent years, leading to changes in purchasing models. Different behaviors are represented by the representatives of the "Conscious" and "Reluctant" segments, both very similar to each other in terms of the place of living. The "Conscious" segment was more eager to use smaller, specialized shops and marketplaces. On the other hand, the "Reluctant" segment preferred large-size retailer and increased the importance of online shopping for food.

The "Does" and "Conscious" segments are changing their behaviors related to sourcing food in the direction convergent with sustainability principles, but they are doing it differently. For example, the "Doers" more frequently declare limiting wastage. For the "Conscious" segment, however, making food products autonomously and purchasing low-processed products are more typical.

Segment characteristics in the affective sphere

Certain similarities emerge between the "Doers" and the "Conscious" segments, and a major difference in relation to the "Reluctant" segment. The two first segments have a positive attitude towards sustainable consumption principles and appreciate the impact of such behaviors on the local communities, environment, and local economy. Still, the individuals in the "Conscious" segment are firmer in this regard than the "Doers". For example, they have a higher propensity to pay more for organic products or spend extra time on sustainable behaviors, e.g., searching for information on nutrition principles. The individuals in the "Reluctant" segment, on the other hand, assess various signs of sustainable consumption as disadvantageous for them.

Contrary to our expectations, not all consumers are interested in food and sustainable consumption. The "Doers" are interested in food for various reasons, which fail to cover the issue of sustainable consumption. There may be an impression that this topic is disregarded by such individuals. The "Conscious" segment consisted of consumers actively looking for information about food and nutrition, sensitive to the issues of sustainable consumption.

5. Discussion

The results we obtained expand the current consumer segmentation models with regard to attitudes towards sustainability. Similar to several studies conducted in other countries [7,47,62,73–75,79,82,84,89], we proposed three segments of consumers.

Consumers have varying awareness on consumption sustainability (behavioral aspect), buying and eating behaviors reinforcing responsibility towards the planet and future generations (behavioral aspect), the perception of promotional messages related to the balancing of food product choices, and the subjective evaluation of benefits for con-

sumers resulting from sustainable behaviors (affective aspect). The study is one of numerous papers about profiling food consumers based on a three-element attitude dimension in relation to SFC.

5.1. Cognitive Dimension

Our studies have revealed that the information about environmental, economic, and social consequences of excessive consumption are factors that foster the popularization of sustainable attitudes. The force of various media should be used to reduce adverse behaviors [16,75,102] by building SC awareness and affecting consumption behaviors, as supported by e.g., Hasanzade et al. [84], Prokeinová and Paluchová [78], Sogri et al. [81], Wang and Somogyi [86], Verain et al. [73]. A better understanding of the characteristics of consumers via segmentation facilitates the preparation of a more effective communication strategy. Public institutions, food producers, and commerce should take steps leading to a better understanding of food and nutrition, potential benefits for the environment, responsibility for the planet and future generations. The existence of a connection between the type of consumers and susceptibility to messages communicated, for example, via social media has been indicated by Sogari et al. [81] claiming that "the greater the importance the consumer places on the product/process dimension of environmental sustainability, the higher the self-selection in market segments". The researchers also pointed to the need to increase the possibilities of communicating the activities of enterprises in environmental protection. Hasanzade et al. [84] have added to the literary references the differentiation of consumer segments due to behaviors resulting from the way they react to messages, additionally showing the need to carefully select information about products (e.g., the product's ethical character). However, not all studies confirm the need to differentiate communication efforts. According to Verain et al. [73] there exist messages that can have a universal character and reach all consumer groups.

5.2. Behavioral Dimension

Labelling products as environmentally friendly and promoting "new food" may be helpful in reinforcing sustainable consumer choices [74,85,103]. The results of our studies show that marking food products as healthy and organic may be important for the "Conscious" segment. This segment is similar to the "Trendsetters" segment that appeared in the study by Van Huy et al. [75].

Nevertheless, our study fails to provide a detailed insight into the issue of a sustainable diet, which is discussed, for example, by Verain et al. [7,73] who have confirmed that consumer segments are differentiated by the approach to health and eating healthy, organic food products. The interest in healthy eating has been also noted by Van Huy et al. [75], who noted that the interest in healthy nutrition is positively related to organic, locally sourced food.

Verain et al. [73] have proved that individuals oriented toward sustainable growth have been limiting the consumption of meat after learning about the benefits this approach provides both to their health and the environment. This is also confirmed by our study since the inclination to eat meat has been used to differentiate the segments. Meat consumption has been limited to the highest degree by the "Doers", closely trailed by the "Conscious" segment.

The results of our study show a relation between the place of residence of consumers and their sustainable attitudes. It seems that people living in rural areas have "natural" sustainable attitudes (mainly in the behavioral dimension), which may be related to the specific characteristic of the rural environment as a place for living and working. La Lama et al. [79] also point to the role played by the place of residence of consumers, additionally pointing to other factors such as income, lifestyle, access to frequently updated information, and telecommunication technologies.

Vermeir et al. [18] have stated that "many consumers express environmental concern but do not consistently act on it. That is, consumer attitudes toward environmental sustainability are mainly positive, but there is a notable gap between favorable disposition and actual purchase of sustainable food products, i.e., the attitude-behavior gap". Similar conclusions can be formulated on the basis of our segmentation—the "Conscious" segment shows a well-developed cognitive and affective dimension of the attitude, with a less developed behavioral dimension.

5.3. Affective Dimension

The affective dimension proves the consumers' positive approach towards the concept and principles of sustainable consumption and their commitment to the idea. The results we have obtained show that this is fostered by the consumers' higher material status, although this is not the only condition. The "Conscious" segment is quicker to see health benefits coming from SC than the "Doers". This segment shows similarities to consumers of cluster 3 in the research conducted by Verain et al. [73], who pay close attention to SC attributes. In the segmentation done by La Lama et al. [79] one of the segments is "Skeptical". It consists of consumers with an egocentric approach and little contact with modern food production practices, who are reluctant to pay higher prices for welfare-friendly products. The segment is similar to our "Reluctant" segment, showing a negative attitude towards the sustainability concept. Groups of consumers with a negative attitude towards SC have a significant impact on the development of the market of products covered by this concept. The research conducted by Gerini et al. [47] has shown that consumers may exhibit positive attitudes towards sustainable products, while being reluctant to pay higher prices for them. If most consumers are not willing to pay more for, e.g., organic products, whose production is more costly, such products will not be able to capture a higher share of the market. The growth of the market for sustainable products and services should be supported by good access to information [27,47,104,105]. The factor supporting the growth of this market may include references to consumer ethnocentrism and localism, as discussed, for example, by Van Huy et al. [75] on the basis of studies conducted among consumers in Vietnam, and to personal responsibility [47].

6. Conclusions

Conclusions in two areas may be formulated on the basis of our work. The first conclusion applies to the review of papers on food consumer segmentation based on the sustainability concept. The second one covers the segmentation and characterization of such segments in the region of Wielkopolska, Poland.

It may be concluded, on the basis of the literature review, that eight categories of variables are used for the purposes of segmentation of consumers with regard to food consumption. These were: environmental sustainability, socio-demographic, psychographic, economic, behavioral, affective factors, lifestyle, and consumers' values. The factors related to the environment and consumption behaviors should be considered the dominating category. The multi-faceted nature of consumer attitudes leads researchers to use a wide range of variables related to lifestyle, values, preferences, and consumers' attitude towards sustainable food consumption and environmental issues. Given the significant diversity of the used factors, it may be also observed that individual papers most usually put emphasis on one of the dimensions of the attitude. The theoretical foundation of the approach to segmentation proposed by us is the concept of a three-element attitude structure, thanks to which factors that may be indicators of sustainability can be approached comprehensively. The results we obtained prove that such an approach is efficient in the segmentation of consumers.

The consumers' segmentation model proposed in that paper contributes to the knowledge about consumers' sustainable behavior and might be used for further research development and as well as by practitioners and consumer policymakers. Identified segments represent a different potential for adoption of sustainable behaviors what implies

the necessity of implementing various methods of promoting the idea of sustainability among them.

Two of the identified segments ("Doers" and "Conscious") represent a certain escalation of sustainable attitudes, and the characteristics of these segments show that they may grow in the future. The representatives of the third segment ("Reluctant") are negatively oriented towards the sustainability concept. Taking into account the distribution of the size of individual segments, it may be assumed that around 60% of consumers make up a group that may positively modify their attitudes towards sustainable consumption. Consequently, this group is the target of activities that may be taken to support the development of sustainable attitudes. A universal set of activities promoting sustainable food consumption attitudes should cover activities in two main areas. The first one would be to build consumer awareness in relation to the concepts of sustainability and sustainable consumption, along with the derived benefits. This area should mainly impact the "Doers"—thanks to the reinforcement of the consumers' knowledge it will be possible to achieve the effect of further intensification of behaviors. The second area would be activities incentivizing to take sustainable activities, on the basis of the already developed consumer awareness.

Understanding and recognizing consumers' attitudes and behaviors is useful for industrial practitioners and decision-makers making efforts to transition into more sustainable food systems. Information and communication strategies should be built upon full knowledge about food consumers from a given region, taking into consideration the three-dimensional nature of their attitudes. By adapting the content of messages to the profiles of specific consumer segments, emphasis should be applied to informing about benefits coming from the consumption of sustainable food, in order to motivate the sensitive segments and to raise the consumers' awareness about the benefits stemming from the pursuit of the sustainable food consumption model.

Limitations and Recommendations for Further Research

A conclusion can be drawn from our literary research that the food consumption segmentation proposition presented in the article is one of very few propositions that apply to the concept of making food consumption attitudes sustainable and is based on a three-element attitude concept. Maintaining such an approach in the future will make result comparison possible, leading to a better understanding of the consumers.

Our study is limited by a relatively low sample size and its regional reach, which implicates the need to continues similar studies, but in pan-regional and international scope. It is also worth expanding the future studies with qualitative elements, for a better understanding of mechanisms of shaping sustainable attitudes.

The knowledge of signs of sustainable consumption and factors that determine it is still emerging and needs intensive studies. It would be beneficial to direct such future studies at methods of combating any factors that hinder the popularization of sustainable attitudes. Examples of valuable directions would be the impact of retail structure on making food consumption behaviors sustainable, or the characteristics of one's living environment as a factor determining the sustainability of attitudes. Additionally, depending on the type of food considered by consumers, their attitudes can be differentiated.

Author Contributions: Conceptualization M.G., E.G.-G., M.K. and Z.S.; methodology M.G., E.G.-G., M.K. and Z.S.; software M.G. and E.G.-G.; validation M.G. and E.G.-G.; formal analysis M.G. and E.G.-G.; investigation M.G. and E.G.-G.; resources M.G., E.G.-G., M.K. and Z.S.; data curation M.G. and E.G.-G.; writing—original draft preparation M.G. and E.G.-G.; writing—review and editing M.G., E.G.-G., M.K. and Z.S.; visualization M.G. and E.G.-G.; supervision M.G. and E.G.-G.; project administration M.G. and E.G.-G.; funding acquisition, M.G. and E.G.-G. All authors have read and agreed to the published version of the manuscript."

Funding: This research received no external funding.

Data Availability Statement: Not applicable.

Acknowledgments: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. European Commission. *Proposal for a Concil Decision on the Conclusion on Behalf of the European Union of the Paris Agreement Adopted under the United Nations Framework Convention on Climate Change$—Publications Office of the EU. COM/2016/0395 Final—2016/0184 (NLE);* European Commission: Brussels, Belgium, 2016.
2. Ivanova, M.; Baste, I.; Lee, B.; Belliethathan, S.; Gelil, I.A.; Gupta, J.; Haas, P.M.; Habtezion, Z.; Halpaap, A.; Mo-hamed-Katerere, J.C.; et al. *Global Environmental Outlook 5, United NationsEnvironment Programme: Chapter 17, GlobalResponses*; University of Massachusetts Boston: Boston, MA, USA, 2012; Volume *36*.
3. OECD. Promoting Sustainable Consumption. In *Good Practices in OECD Countries*; OECD: Paris, France, 2008.
4. Sala, S.; Anton, A.; McLaren, S.J.; Notarnicola, B.; Saouter, E.; Sonesson, U. In quest of reducing the environmental impacts of food production and consumption. *J. Clean. Prod.* **2017**, *140*, 387–398, doi:10.1016/j.jclepro.2016.09.054.
5. Scholl, G.; Rubik, F.; Kalimo, H.; Biedenkopf, K.; Söebech, Ó. Policies to promote sustainable consumption: Innovative approaches in Europe. *Nat. Resour. Forum* **2010**, *34*, 39–50, doi:10.1111/j.1477-8947.2010.01294.x.
6. Partha, D.; Ulph, A; Southerton, D. *Sustainable Consumption: Multi-Disciplinary Perspectives,* 1st ed.; Sir Partha, D., Ulph, A., Southerton, D., Eds.; Oxford University Press: New York, NY, USA, 2014; ISBN 978-0-19-967935-5.
7. Verain, M.C.; Dagevos, H.; Antonides, G. Sustainable food consumption. Product choice or curtailment? *Appetite* **2015**, *91*, 375–384, doi:10.1016/j.appet.2015.04.055.
8. Vermeir, I.; Verbeke, W. Sustainable Food Consumption: Exploring the Consumer "Attitude—Behavioral Intention" Gap. *J. Agric. Environ. Ethics* **2006**, *19*, 169–194, doi:10.1007/s10806-005-5485-3.
9. Almond, R.E.A.; Grooten, M.; Petersen, T. *Living Planet Report 2020—Bending the Curve of Biodiversity Loss*; World Wildlife Fund (WWF): Gland, Switzerland, 2020.
10. Chesson, J. Sustainable Development: Connecting Practice with Theory. *J. Environ. Assess. Policy Manag.* **2013**, *15*, 1350002, doi:10.1142/s1464333213500026.
11. Comim, F.; Tsutsumi, R.; Varea, A. Choosing sustainable consumption: A capability perspective on indicators. *J. Int. Dev.* **2007**, *19*, 493–509, doi:10.1002/jid.1384.
12. Dubas-Jakóbczyk, K; Kocot, E; Czerw, A; Juszczyk, G; Karwowska, P; Menne, B. Health as an Investment in Poland in the Context of the Roadmap to Implement the 2030 Agenda for Sustainable Development and Health 2020. Available online: https://www.euro.who.int/en/countries/poland/publications/health-as-an-investment-in-poland-in-the-context-of-the-roadmap-to-implement-the-2030-agenda-for-sustainable-development-and-health-2020-2018 (accessed on 19 November 2020).
13. European Commission. Future of the Common Agricultural Policy, 2020. Available online: https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/future-cap_en (accessed on 19 January 2021).
14. FAO. *Online Food Loss and Waste Database. Dataset of Food Loss and Waste Esti Mates from Grey Literature, National and Sectoral Reports*; FAO: Rome, Italy, 2020.
15. Guzmán-Rincón, A.; Carrillo-Barbosa, R.; Martín-Caro, L.; Álamo, E.; Rodríguez-Cánovas, B. Sustainable Consumption Behaviour in Colombia: An Exploratory Analysis. *Sustainabilty* **2021**, *13*, 802, doi:10.3390/su13020802.
16. Lazzarini, G.A.; Zimmermann, J.; Visschers, V.H.; Siegrist, M. Does environmental friendliness equal healthiness? Swiss consumers' perception of protein products. *Appetite* **2016**, *105*, 663–673, doi:10.1016/j.appet.2016.06.038.
17. Oslo Roundtable Oslo Roundtable on Sustainable Production and Consumption. Available online: https://enb.iisd.org/consume/oslo004.html (accessed on 19 November 2020).
18. Vermeir, I.; Weijters, B.; de Houwer, J.; Geuens, M.; Slabbinck, H.; Spruyt, A.; van Kerckhove, A.; van Lippevelde, W.; de Steur, H.; Verbeke, W. Environmentally Sustainable Food Consumption: A Review and Research Agenda from a Goal-Directed Perspective. *Front. Psychol.* **2020**, *11*, 1603, doi:10.3389/fpsyg.2020.01603.
19. Wang, H. Analysis on the Changes in Consumer Behavior and Marketing Countermeasure. *SHS Web Conf.* **2015**, *17*, 1007, doi:10.1051/shsconf/20151701007.
20. Bjelle, E.L.; Wiebe, K.S.; Többen, J.; Tisserant, A.; Ivanova, D.; Vita, G.; Wood, R. Future changes in consumption: The income effect on greenhouse gas emissions. *Energy Econ.* **2021**, *95*, 105114, doi:10.1016/j.eneco.2021.105114.
21. Agenda 2030 Sustainable Consumption and Production/Department of Economic and Social Affairs. Available online: https://sdgs.un.org/topics/sustainable-consumption-and-production (accessed on 12 February 2021).
22. European Commission. *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Closing the Loop—An EU Action Plan for the Circular Economy;* European Commission COM (2015) 614 final. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:52015DC0614&from=EN (accessed on 20 April 2021).
23. European Commission. *Communication from The Commission to The European Parliament, The Council, The European Economic and Social Committee And The Committee Of The Regions A Farm to Fork Strategy for a Fair, Healthy and Environ-Mentally-Friendly Food System*; European Union: Brussels, Belgium, 2020; p. 23.
24. FAO, IFAD, UNICEF, WFP & WHO. *The State of Food Security and Nutrition in the World 2020*; FAO: Rome, Italy, 2020.

25. Lorek, S.; Spangenberg, J.H. Sustainable consumption within a sustainable economy—Beyond green growth and green economies. *J. Clean. Prod.* **2014**, *63*, 33–44, doi:10.1016/j.jclepro.2013.08.045.
26. Palmieri, N.; Forleo, M.B. The potential of edible seaweed within the western diet. A segmentation of Italian consumers. *Int. J. Gastron. Food Sci.* **2020**, *20*, 100202, doi:10.1016/j.ijgfs.2020.100202.
27. Gazdecki, M.; Goryńska-Goldmann, E. *Relationships on Food Markets—Consumers' Perspective*; 1st ed.; Poznan University of Life Science: Poznan, Poland, 2018; ISBN 978-83-7160-922-0.
28. Łuczka, W.; Smoluk-Sikorska, J. *Sustainable Consumption—Between Theory and Practice*; Vytautas Magnus University: Kaunas, Lithuania, 2017; pp. 1161–1162.
29. Sargant, E. *Sustainable Food Consumption*; Environmental Policy; Wageningen Academic Publishers: Wageningen, The Netherlands, 2014; Volume 11. ISBN 978-90-8686-263-4.
30. Vittersø, G.; Tangeland, T. The role of consumers in transitions towards sustainable food consumption. The case of organic food in Norway. *J. Clean. Prod.* **2015**, *92*, 91–99, doi:10.1016/j.jclepro.2014.12.055.
31. Potter, H.K.; Röös, E. Multi-criteria evaluation of plant-based foods—Use of environmental footprint and LCA data for consumer guidance. *J. Clean. Prod.* **2021**, *280*, 124721, doi:10.1016/j.jclepro.2020.124721.
32. EIT Food. *The Future of Food. Conference Report*; EIT Food: Leuven Belgium, 2020; p.26.
33. Puigdueta, I.; Aguilera, E.; Cruz, J.L.; Iglesias, A.; Sanz-Cobena, A. Urban agriculture may change food consumption towards low carbon diets. *Glob. Food Secur.* **2021**, *28*, 100507, doi:10.1016/j.gfs.2021.100507.
34. Peano, C.; Merlino, V.M.; Sottile, F.; Borra, D.; Massaglia, S. Sustainability for Food Consumers: Which Perception? *Sustainability* **2019**, *11*, 5955, doi:10.3390/su11215955.
35. Aschemann-Witzel, J.; Ares, G.; Thøgersen, J.; Monteleone, E. A sense of sustainability? How sensory consumer science can contribute to sustainable development of the food sector. *Trends Food Sci. Technol.* **2019**, *90*, 180–186, doi:10.1016/j.tifs.2019.02.021.
36. Kamenidou, I.C.; Mamalis, S.A.; Pavlidis, S.; Bara, A.E.-Z.G. Segmenting the Generation Z Cohort University Students Based on Sustainable Food Consumption Behavior: A Preliminary Study. *Sustainability* **2019**, *11*, 837, doi:10.3390/su11030837.
37. Henchion, M.; McCarthy, M.; Resconi, V.C.; Troy, D. Meat consumption: Trends and quality matters. *Meat Sci.* **2014**, *98*, 561–568, doi:10.1016/j.meatsci.2014.06.007.
38. Higgs, S. Social norms and their influence on eating behaviours. *Appetite* **2015**, *86*, 38–44, doi:10.1016/j.appet.2014.10.021.
39. Mullee, A.; Vermeire, L.; Vanaelst, B.; Mullie, P.; Deriemaeker, P.; Leenaert, T.; de Henauw, S.; Dunne, A.; Gunter, M.J.; Clarys, P.; et al. Vegetarianism and meat consumption: A comparison of attitudes and beliefs between vegetarian, semi-vegetarian, and omnivorous subjects in Belgium. *Appetite* **2017**, *114*, 299–305, doi:10.1016/j.appet.2017.03.052.
40. Rizkalla, N.; Erhan, T.P. Sustainable Consumption Behaviour in The Context of Millennials in Indonesia—Can Environmental Concern, Self-efficacy, Guilt and Subjective Knowledge Make a Difference? *Manag. Sustain. Bus. Manag. Solutions Emerg. Econ.* **2020**, *25*, 43, doi:10.7595/management.fon.2020.0001.
41. Verain, M.C.; Bartels, J.; Dagevos, H.; Sijtsema, S.J.; Onwezen, M.C.; Antonides, G. Segments of sustainable food consumers: A literature review. *Int. J. Consum. Stud.* **2012**, *36*, 123–132, doi:10.1111/j.1470-6431.2011.01082.x.
42. Maciejewski, G.; Mokrysz, S.; Wróblewski, Łukasz Segmentation of Coffee Consumers Using Sustainable Values: Cluster Analysis on the Polish Coffee Market. *Sustainability* **2019**, *11*, 613, doi:10.3390/su11030613.
43. Muñoz-Sánchez, V.-M.; Pérez-Flores, A.-M. The Connections between Ecological Values and Organic Food: Bibliometric Analysis and Systematic Review at the Start of the 21st Century. *Sustainability* **2021**, *13*, 3616, doi:10.3390/su13073616.
44. Majewski, E.; Komerska, A.; Kwiatkowski, J.; Malak-Rawlikowska, A.; Wąs, A.; Sulewski, P.; Gołaś, M.; Pogodzińska, K.; Lecoeur, J.-L.; Tocco, B.; et al. Are Short Food Supply Chains More Environmentally Sustainable than Long Chains? A Life Cycle Assessment (LCA) of the Eco-Efficiency of Food Chains in Selected EU Countries. *Energies* **2020**, *13*, 4853, doi:10.3390/en13184853.
45. Bajan, B.; Mrówczyńska-Kamińska, A.; Poczta, W. Economic Energy Efficiency of Food Production Systems. *Energies* **2020**, *13*, 5826, doi:10.3390/en13215826.
46. Vanhonacker, F.; Verbeke, W. Buying higher welfare poultry products? Profiling Flemish consumers who do and do not. *Poult. Sci.* **2009**, *88*, 2702–2711, doi:10.3382/ps.2009-00259.
47. Gerini, F.; Alfnes, F.; Schjøll, A. Organic- and Animal Welfare-labelled Eggs: Competing for the Same Consumers? *J. Agric. Econ.* **2016**, *67*, 471–490, doi:10.1111/1477-9552.12154.
48. Furno, M.; del Giudice, T.; Cicia, G. Organic consumers' profile beyond the mean. *Org. Agric.* **2021**, 1–13, doi:10.1007/s13165-020-00333-z.
49. Łuczka, W. Zrównoważona konsumpcja i uwarunkowania jej rozwoju. *Handel Wewnętrzny* **2016**, 6, 136–145.
50. Scalvedi, M.L.; Saba, A. Exploring local and organic food consumption in a holistic sustainability view. *Br. Food J.* **2018**, *120*, 749–762, doi:10.1108/bfj-03-2017-0141.
51. Rejman, K.; Kaczorowska, J.; Halicka, E.; Laskowski, W. Do Europeans consider sustainability when making food choices? A survey of Polish city-dwellers. *Public Health Nutr.* **2019**, *22*, 1330–1339, doi:10.1017/s1368980019000326.
52. Śmiglak-Krajewska, M.; Wojciechowska-Solis, J. Consumption Preferences of Pulses in the Diet of Polish People: Motives and Barriers to Replace Animal Protein with Vegetable Protein. *Nutrients* **2021**, *13*, 454, doi:10.3390/nu13020454.
53. BÖWL Die Bio-Branche 2018. Zahlen. Daten. Fakten. Available online: https://www.boelw.de/service/mediathek/broschuere/die-bio-branche-2018/ (accessed on 12 February 2021).

54. Nestorowicz, R. Asymetria wiedzy a rozwój rynku żywności ekologicznej w Polsce. *Handel Wewnętrzny* **2018**, 5, 212–224.
55. Balderjahn, I.; Peyer, M.; Paulssen, M. Consciousness for fair consumption: Conceptualization, scale development and empirical validation. *Int. J. Consum. Stud.* **2013**, *37*, 546–555, doi:10.1111/ijcs.12030.
56. Bryła, P. Organic food consumption in Poland: Motives and barriers. *Appetite* **2016**, *105*, 737–746, doi:10.1016/j.appet.2016.07.012.
57. Carrington, M.; Chatzidakis, A.; Goworek, H.; Shaw, D. Consumption Ethics: A Review and Analysis of Future Directions for Interdisciplinary Research. *J. Bus. Ethic* **2021**, *168*, 215–238, doi:10.1007/s10551-020-04425-4.
58. Goryńska-Goldmann, E.; Adamczyk, G.; Gazdecki, M. Awareness of Sustainable Consumption and Its Implications for the Selection of Food Products. *J. Agribus. Rural. Dev.* **2016**, *10*, 301–308, doi:10.17306/jard.2016.57.
59. Luchs, M.G.; Phipps, M.; Hill, T. Exploring consumer responsibility for sustainable consumption. *J. Mark. Manag.* **2015**, *31*, 1449–1471, doi:10.1080/0267257x.2015.1061584.
60. Łuczka, W.; Kalinowski, S. Barriers to the Development of Organic Farming: A Polish Case Study. *Agriculture* **2020**, *10*, 536, doi:10.3390/agriculture10110536.
61. European Commission. *Reflection Paper towards a Sustainable Europe by 2030*; European Commission: Bruxelles, Belgium, 2019.
62. Annunziata, A.; Mariani, A.; Angela, M. Consumer Perception of Sustainability Attributes in Organic and Local Food. *Recent Patents Food, Nutr. Agric.* **2018**, *9*, 87–96, doi:10.2174/2212798410666171215112058.
63. Nie, C.; Zepeda, L. Lifestyle segmentation of US food shoppers to examine organic and local food consumption. *Appetite* **2011**, *57*, 28–37, doi:10.1016/j.appet.2011.03.012.
64. Niedermeier, A.; Emberger-Klein, A.; Menrad, K. Which factors distinguish the different consumer segments of green fast-moving consumer goods in Germany? *Bus. Strat. Environ.* **2021**, *30*, 1–6, doi:10.1002/bse.2718.
65. Grunert, K.G. International segmentation in the food domain: Issues and approaches. *Food Res. Int.* **2019**, *115*, 311–318, doi:10.1016/j.foodres.2018.11.050.
66. Steenkamp, J.-B.E.; Ter Hofstede, F. International market segmentation: Issues and perspectives. *Int. J. Res. Mark.* **2002**, *19*, 185–213, doi:10.1016/s0167-8116(02)00076-9.
67. De Jonge, J.; van Trijp, H.C.M. Meeting Heterogeneity in Consumer Demand for Animal Welfare: A Reflection on Existing Knowledge and Implications for the Meat Sector. *J. Agric. Environ. Ethic*-**2012**, *26*, 629–661, doi:10.1007/s10806-012-9426-7.
68. Vanhonacker, F.; van Loo, E.J.; Gellynck, X.; Verbeke, W. Flemish consumer attitudes towards more sustainable food choices. *Appetite* **2013**, *62*, 7–16, doi:10.1016/j.appet.2012.11.003.
69. Moher, D.; Liberati, A.; Tetzlaff, J.; Altman, D.G.; The PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med.* **2009**, *6*, e1000097, doi:10.1371/journal.pmed.1000097.
70. Bronnmann, J.; Asche, F. Sustainable Seafood from Aquaculture and Wild Fisheries: Insights from a Discrete Choice Experiment in Germany. *Ecol. Econ.* **2017**, *142*, 113–119, doi:10.1016/j.ecolecon.2017.06.005.
71. Thøgersen, J. Sustainable food consumption in the nexus between national context and private lifestyle: A multi-level study. *Food Qual. Prefer.* **2017**, *55*, 16–25, doi:10.1016/j.foodqual.2016.08.006.
72. Lavelle, M.J.; Rau, H.; Fahy, F. Different shades of green? Unpacking habitual and occasional pro-environmental behavior. *Glob. Environ. Chang.* **2015**, *35*, 368–378, doi:10.1016/j.gloenvcha.2015.09.021.
73. Verain, M.C.D.; Sijtsema, S.J.; Dagevos, H.; Antonides, G. Attribute Segmentation and Communication Effects on Healthy and Sustainable Consumer Diet Intentions. *Sustainabilty* **2017**, *9*, 1–19, doi:10.3390/su9050743.
74. Stranieri, S.; Baldi, L. Shelf Life Date Extension of Fresh-Cut Salad: A Consumer Perspective. *J. Food Prod. Mark.* **2017**, *23*, 939–954, doi:10.1080/10454446.2017.1266545.
75. Van Huy, L.; Chi, M.T.T.; Lobo, A.; Nguyen, N.; Long, P.H. Effective Segmentation of Organic Food Consumers in Vietnam Using Food-Related Lifestyles. *Sustainability* **2019**, *11*, 1237, doi:10.3390/su11051237.
76. Mózner, Z.V. Sustainability and consumption structure: Environmental impacts of food consumption clusters. A case study for Hungary. *Int. J. Consum. Stud.* **2014**, *38*, 529–539, doi:10.1111/ijcs.12130.
77. Aprile, M.C.; Mariani, A. Young People's Propensity to Use Sustainability Labels on Food Products: A Case Study in the South of Italy. *Qual. Access Success* **2015**, *16*, 75–79.
78. Prokeinová, R.B.; Paluchová, J. Identification of the Patterns Behavior Consumptions by Using Chosen Tools of Data Mining—Association Rules. AGRIS -Line Pap. *Econ. Inform.* **2014**, *6*, 1–10.
79. La Lama, G.C.M.-D.; Estévez-Moreno, L.X.; Villarroel, M.; Rayas-Amor, A.A.; María, G.A.; Sepúlveda, W.S. Consumer Attitudes Toward Animal Welfare-Friendly Products and Willingness to Pay: Exploration of Mexican Market Segments. *J. Appl. Anim. Welf. Sci.* **2018**, *22*, 13–25, doi:10.1080/10888705.2018.1456925.
80. Hölker, S.; Von Meyer-Höfer, M.; Spiller, A. Animal Ethics and Eating Animals: Consumer Segmentation Based on Domain-Specific Values. *Sustainability* **2019**, *11*, 3907, doi:10.3390/su11143907.
81. Sogari, G.; Pucci, T.; Aquilani, B.; Zanni, L. Millennial Generation and Environmental Sustainability: The Role of Social Media in the Consumer Purchasing Behavior for Wine. *Sustainability* **2017**, *9*, 1911, doi:10.3390/su9101911.
82. Janßen, D.; Langen, N. The bunch of sustainability labels—Do consumers differentiate? *J. Clean. Prod.* **2017**, *143*, 1233–1245, doi:10.1016/j.jclepro.2016.11.171.
83. Yıldırım, S.; Candan, B. Segmentation of Green Product Buyers Based on Their Personal Values and Consumption Values. *Environ. Values* **2015**, *24*, 641–661, doi:10.3197/096327115x14384223590212.
84. Hasanzade, V.; Osburg, V.-S.; Toporowski, W. Selecting decision-relevant ethical product attributes for grocery shopping. *Manag. Decis.* **2018**, *56*, 591–609, doi:10.1108/md-12-2016-0946.

85. Risius, A.; Hamm, U.; Janssen, M. Target Groups for Fish from Aquaculture Consumer Segmentation Based on Sustainability Attributes and Country of Origin. *Aquaculture* **2019**, *499*, 341-347.
86. Wang, O.; Somogyi, S. Consumer adoption of sustainable shellfish in China: Effects of psychological factors and segmentation. *J. Clean. Prod.* **2019**, *206*, 966–975, doi:10.1016/j.jclepro.2018.09.189.
87. Jakubowska, D.; Radzymińska, M. Health and environmental attitudes and values in food choices: A comparative study for Poland and Czech Republic. *Oeconomia Copernic.* **2019**, *10*, 433–452, doi:10.24136/oc.2019.021.
88. Ghvanidze, S.; Velikova, N.; Dodd, T.H.; Oldewage-Theron, W. Are Sustainable Consumers Health Conscious? A Segmentation Study of Wine Consumers. *J. Food Prod. Mark.* **2019**, *25*, 690–711, doi:10.1080/10454446.2019.1640160.
89. Su, C.-H.; Tsai, C.-H.; Chen, M.-H.; Lv, W.Q. U.S. Sustainable Food Market Generation Z Consumer Segments. *Sustainability* **2019**, *11*, 1–14, doi:10.3390/su11133607.
90. Hruba, R. Lifestyle Segmentation of Czech Food Shoppers: How Sustainability and Corporate Social Responsibility Correspond to Consumers´ Lifestyles/International Business Information Management Association (IBIMA). *Sustain. Econ. Dev. Appl. Innov. Manag*. **2018**, 6364–6374. Available online: https://ibima.org/accepted-paper/lifestyle-segmentation-of-the-czech-food-shoppers-how-sustainability-and-corporate-social-responsibility-correspond-to-consumers-lifestyles (accessed on 20 April 2021).
91. Krystallis, A. 'Citizens vs. Consumers: 0–1': Is Consumption Behaviour Congruent with Citizens' Attitudes towards Sustainable Pork Production? In *Markets, Business and Sustainability*; Bentham Science Publishers: Sharjah, UAE, 2015; p. 229. ISBN 978-1-68108-026-0.
92. Hrubá, R. Lifestyle segmentation of Czech food shoppers. *Ekonomia* **2019**, *25*, 53–59, doi:10.19195/2084-4093.25.2.4.
93. Aydın, H.; Ünal, S. A Study on the Effects of the Consumer Lifestyles on Sustainable Consumption. *Inquiry* **2016**, *1*, doi:10.21533/isjss.v1i2.30.
94. Grunert, K.G.; Brunsø, K.; Bisp, S. *Food-Related Life Style: Development of a Cross-Culturally Valid Instrument for Market Surveillance*; Aarhus University, MAPP Centre: Aarhus, Denmark, 1993.
95. Binder, M.; Blankenberg, A.-K. Green lifestyles and subjective well-being: More about self-image than actual behavior? *J. Econ. Behav. Organ.* **2017**, *137*, 304–323, doi:10.1016/j.jebo.2017.03.009.
96. Fishbein, M.; Ajzen, I. *Predicting and Changing Behavior: The Reasoned Action Approach*; Taylor & Francis: London, UK, 2011; ISBN 978-1-136-87473-4.
97. Rosner, A.; Stanny, M. *Socio-Economic Development of Rural Areas in Poland*; The European Fund for the Development of Polish Villages Foundation (EFRWP): Institute of Rural and Agricultural Development, Polish Academy of Sciences (IRWIR PAN): Warsaw, Poland, 2017; ISBN 978-83-941050-6-8.
98. Breckler, S.J. Empirical validation of affect, behavior, and cognition as distinct components of attitude. *J. Pers. Soc. Psychol.* **1984**, *47*, 1191–1205, doi:10.1037/0022-3514.47.6.1191.
99. Dasu, T.; Johnson, T. Exploratory Data Mining and Data Cleaning: An Overview. In *Exploratory Data Mining and Data Cleaning*; Wiley: Hoboken, NJ, USA, 2003; pp. 1–16. ISBN 978-0-471-44835-8.
100. Hair, J.F.; Black, W.C.; Babin, B.J.; Anderson, R.E. *Multivariate Data Analysis: Pearson New International Edition*, 7th ed.; Pearson: London, UK, 2013; ISBN 978-1-292-02190-4.
101. Kreyszig, E. Advanced Engineering Mathematics, 10th ed.; Wiley, Hoboken, NJ, USA, 2018; p. 444.
102. Goryńska-Goldmann, E. Disadvantageous Behavior for Achieving Sustainable Food Consumption According to Consumer Opinions. *Rocz. Ann.* **2019**, *3*, doi:10.22004/ag.econ.302765.
103. Miglak-Krajewska, M.; Wojciechowska-Solis, J.; Viti, D. Consumers' Purchasing Intentions on the Legume Market as Evidence of Sustainable Behaviour. *Agriculture* **2020**, *10*, 424, doi:10.3390/agriculture10100424.
104. Thøgersen, J.; Jørgensen, A.-K.; Sandager, S. Consumer Decision Making Regarding a "Green" Everyday Product. *Psychol. Mark.* **2012**, *29*, 187–197, doi:10.1002/mar.20514.
105. Marek-Andrzejewska, E.M.; Wielicka-Regulska, A. Targeting Youths' Intentions to Avoid Food Waste: Segmenting for Better Policymaking. *Agriculture* **2021**, 11, 284. https://doi.org/10.3390/agriculture11040284.