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THE SOCIODEMOGRAPHIC DETERMINANTS OF POLISH CONSUMER PERCEPTION OF FOOD QUALITY

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Abstract. Consumer-perceived food quality covers a wide range of aspects, including sensory characteristics, healthful properties, convenience of preparation for consumption or storage. The aim of the research was to identify the main segments of Polish consumers who differ in their perception of quality components of food products, as well as to indicate the main sociodemographic determinants underpinning that distinction. Responses were analyzed divided into clusters in order to distinguish the key consumer segments in the Polish food market. Cluster analysis showed that the three isolated clusters differ significantly in their perceived importance of quality features shaping consumer behaviors in the food market. Additional analysis of variance helped identify the reasons for this differentiation. The isolated segments perceived differently the importance of the following food characteristics: naturalness, visual appeal, shelf life and level of processing, fat content and calorific value, presence of health-promoting ingredients, absence of chemical additives. The views concerning diet compatibility or impact on health also differed significantly. Another differentiator for the compared segments proved to be the manufacturer (brand) of the product.

Keywords: food quality; consumer preferences; food quality management

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1. Introduction

Product quality is seen by consumers as an important determinant of their purchase decisions. Consumers tend to associate quality with a certain set of attributes that a product should have in order to meet their expectations (Grunert, 2002). When considering quality in the context of food products, there are two different approaches currently applied in consumer theory. The first is Lancaster's characteristics demand theory (sometimes referred to as basket theory), which views food as a set of quality attributes that respond to consumer expectations. The second approach is the Becker model in which characteristics which properly meet consumer needs emerge only during the preparation of the product for consumption (Sznajder et al., 1998).

Overall however, the concept of quality defies easy definition. In any case, it can be considered as a set of certain attributes whose order and meaning are different depending on the consumer's sociodemographic profile. It therefore seems justified to view quality through the prism of consumer expectations. Quality means the degree to which a product meets consumer expectations (Pin-Jane Chen and Marta Antonelli, 2020; Baryłko-Pikielna and Wasiaak-Zys, 2004; Becker, 2000; Oude Ophius, van Trijp, 1995).

Consumer-perceived food quality covers a wide range of aspects, including: sensory characteristics, healthful properties, convenience of preparation for consumption or storage (Sajdakowska and Szymborska, 2013; Larson, N.; Story, M. 2009; Grunert, 2002). In most cases, the consumer can assess each of these features only during the preparation of the product for consumption or after direct consumption (Grunert 2002). The literature tends to divide quality features into internal and external. The internal features determine the organoleptic and physicochemical properties of the product, while the external features have to do, among others, with the production process. The external features cannot be perceived in the finished product but refer to the specificity of production and other factors that may have a direct impact on the finished product and are mostly specified on the packaging (Pin-Jane Chen, Marta Antonelli 2020; Darmon, N. and Drewnowski, A., 2015; Gutkowska et al., 2012; Grunert, 2002).

In addition to satisfying basic needs such as hunger or demand for nutrients, consumers also expect food products to fulfill some of the higher-order needs such as: pleasure of consumption, self-realization, ease of preparation. From among numerous expectations towards food, we can distinguish increased vitality, saving time by using highly processed products, organic origin, and biodegradable packaging. All this points to the lack of common understanding as to what exactly constitutes food quality (Pin-Jane Chen and Antonelli M., 2020; Gutkowska et al. 2012; Sajdakowska and Szymborska, 2013).

In the European Union, consumers are increasingly concerned about the link between diet and health. In response to this, the food industry has developed what is known as "functional food". Demand for these products is on the rise in both volume and spending, which adds to the fact that the industry is witnessing changes in which functional attributes are being ascribed to new groups of food products (Barreiro-Hurle J. et al., 2008).

Overall in Europe, consumers rely on heterogenic factors in their food choices, which are related to nutrition and individual and social conditions. Recent studies also highlight the important role of the environment and climate change in consumer food choices (Gifford et al., 2018; Gifford and Chen, 2017; Lombardi et al., 2017; Nielsen et al., 2020). Natural resources (Berger, 2019; Lukas et al., 2016; Ruby et al., 2020), production and the food supply chain all influence purchase decisions as well (Augustin, 2016).

The multidimensional nature of food quality has prompted many authors to develop food-quality characteristics in a way that best reflects available research findings. The tool enabling such ordering is principal component analysis, which allows transforming primary variables into an orthogonal system of latent variables, and therefore to significantly reduce the number of attributes describing quality. Two approaches can be distinguished here. The

first focuses on lab-determined quality parameters; attempts of this kind can be found, among others, in Cozzolino et al. (2019), Granè et al. (2014), Ghosh et al. (2012), Luciano et al. (2009). Borgogrone et al (2001), Iezzoni et al. (1991). The second approach focuses on consumer-perceived quality using the measured importance of individual characteristics and preference-shaping factors in the food market. A study of this kind was conducted several years ago (Cichocka, Pieczonka, 2004) and put forward a "new" role of quality, embedded primarily in the utilitarian, marketing context. In order for marketing activities to suffice, the product must be of the quality that is expected by the consumer - and especially the target consumer.

In this study, we share and discuss findings from our research to check them against these results and see to what extent the perceived quality of food products has changed over the last 15 years. Furthermore this study aimed to find answers for several questions. The main task was to identify the main segments of the Polish food consumer that differ in the perception of the importance of various quality parameters of food products. The research goals were also the determination of the quality structure of the consumer, characteristic for each of these segments, as well as identification of the most important socio-demographic characteristics that determine this differentiation.

2. Materials and methodology

The research was carried out in the second quarter of 2019 and consisted in a survey addressed to Polish residents across all geographic regions. In the main part of the questionnaire, respondents were asked to answer one question, namely: "How important for you is each of these items when shopping for food?". The question comprised a total of 23 characteristics of food products that were considered possible triggers of purchase decisions and consumption behaviors (Table 2).

Respondents indicated the subjective importance of each of these items on a 7-point interval scale with the two extreme values representing: 1 point = extremely unimportant, 7 points = extremely important.

Results were tallied using the Statistica 13.3 software suite. This was done in two stages. The first stage involved multivariate cluster analysis and one-way analysis of variance (ANOVA). Cluster analysis (agglomeration) was carried out using Ward's method against the basis of Euclidean distances. The analysis of variance (Fisher-Snedecor's F-test) was to indicate the differences between the selected clusters in the assessment of the importance of individual primary variables. The testing was performed at the significance level $\alpha = 0.05$. The inference was based on the p-values "p" of test probability. In the second stage, principal component analysis was performed. The following methods were used to extract the number of principal components: Kaiser's and the proportion of variance explained. The values of factor loadings were calculated after a normalized varimax rotation.

3. Results and discussion

A total of 946 respondents aged 18-71 participated in the survey. Their demographics are shown in Table 1.

Table 1. Respondent demographics

	Category	Symbol	N	%
Gender	Woman	W	542	57,3
	Man	M	404	42,7
Age [in years]	18-29	A1	349	36,9
	30-49	A2	316	33,4
	51-71	A3	281	29,7
Education level	Secondary or lower	E1	642	67,9
	Higher education (university diploma holders)	E2	304	32,1
Place of residence	Rural areas	L1	426	45,0
	Urban area	L2	520	55,0

Source: own elaboration

The majority of respondents were women (57.3%). Young people, i.e. below 30 years old, accounted for 36.9% of the sample. The share of those aged 30-49 was 33.4%, while the oldest age group, people over 50, made up 29.7% of the study population. Nearly every 2 out of 3 respondents had a secondary or lower level of education. The survey covered a slightly larger (by 10 percentage points) number of urban dwellers than of rural residents. The overall breakdown into segments was similar to the structure of Poland's population in 2016-2018. In that period, women outweighed men 52% to 48%. As for the population of working age, 34% of its total was composed of people aged 18-29, 36% - those aged 30-49, and roughly 30% - those aged 50-64. About 33% of Poles had a higher level of education. Urban residents accounted for 60% of Poland's population at that time.

Responses were analyzed in clusters to distinguish the key consumer segments in the Polish food market that differ in their perceived quality characteristics shaping shopping preferences and consumption patterns. The analysis covered the values of the average level of importance from among the 23 items listed in the questionnaire, calculated for 24 groups of respondents based on their sociodemographic profile comprising: gender (W, M), age (A1, A2, A3), education level (E1, E2), and place of residence (L1, L2) - for explanation of symbols, see Table 1. The results of the cluster analysis are shown in Fig. 1 as a dendrogram whose shape indicates that the isolated groups of respondents can be assigned to three clusters. These are:

- Cluster A:
 - all women up to 50 years of age;
 - women aged over 50 with higher education, regardless of place of residence;
 - men with higher education living in urban areas;
 - men aged 31-50 with secondary or lower education living in urban areas
- Cluster B:
 - women and men aged over 50 with secondary or lower education, regardless of place of residence
- Cluster C:
 - men aged 18-50 living in the rural areas, regardless of level of education;
 - men aged over 50 with higher education living in rural areas;
 - men aged up to 30 years of age with secondary or lower education living in urban areas.

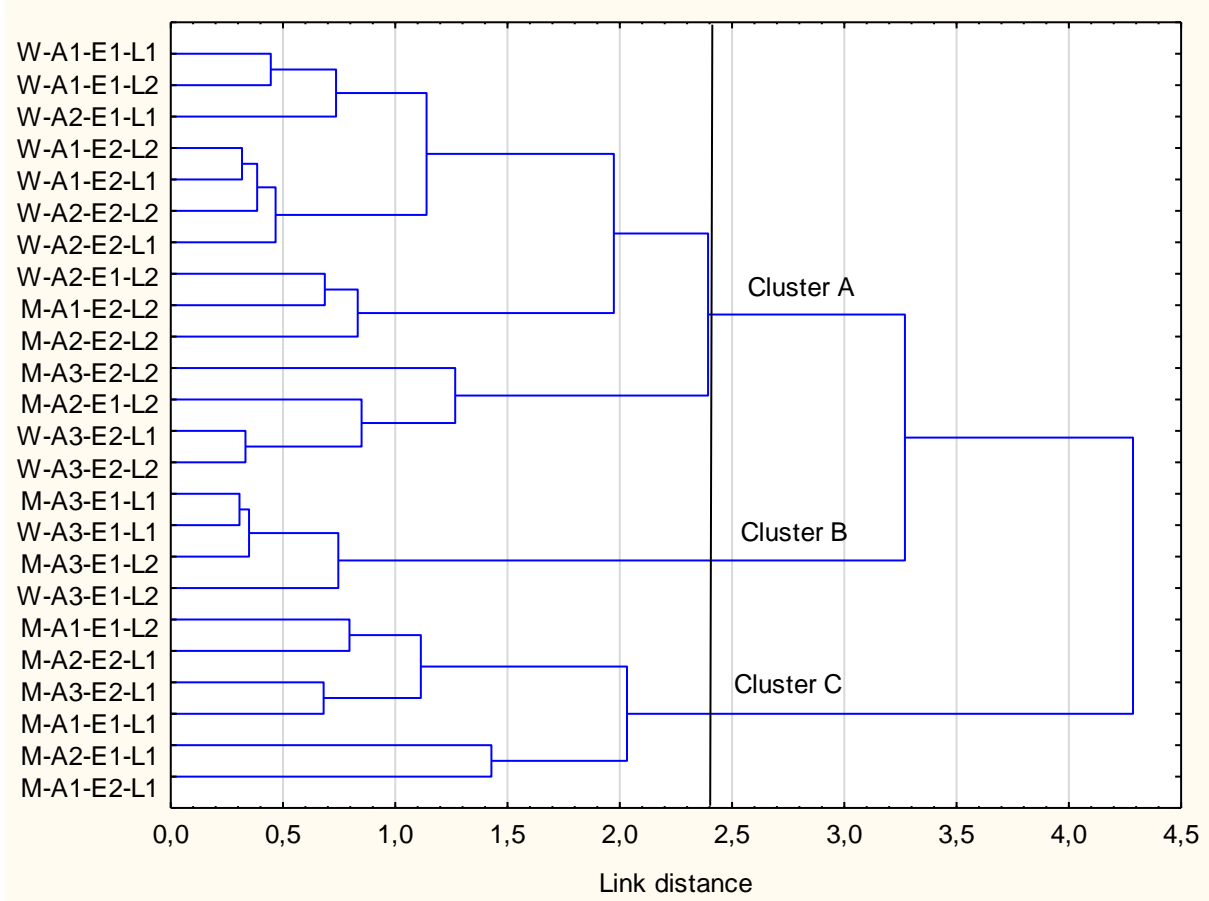


Figure 1. Dendrogram of clusters selected based on the subjective importance of food-product purchase determinants
Source: own elaboration

It can therefore be assumed that these three clusters are segments that differ significantly in their perceived importance of quality properties shaping consumer behavior in the food market. An additional analysis of variance (Table 2) allowed to identify the reasons for this distinction.

Table 2. Differentiation of subjective importance of food-product purchase determinants between selected clusters - F-test results

Property	Cluster A N=662	Cluster B N=81	Cluster C N=203	F-test (p-value)
	Mean ± standard deviation			
Freshness	6,3±1,9	5,9±1,6	6,1±1,8	0,767
Naturalness	5,8±2,2	5,6±1,8	4,1±2,4	0,023*
Pleasant taste and aroma	5,9±1,5	6,3±1,3	6,0±1,3	0,745
Visual appeal	3,6±0,9	4,9±1,3	5,8±1,5	0,001*
Nutritional values	6,5±2,1	6,2±2,3	6,3±1,8	0,878
Low fat content	6,8±1,2	6,1±2,4	3,6±0,4	0,000*
Low caloric value	6,8±1,3	6,0±2,1	3,8±0,6	0,000*
Health-promoting ingredients	6,5±1,1	5,3±1,3	4,9±1,5	0,003*
Dietary compatibility	5,6±2,2	5,2±2,5	3,1±1,1	0,002*
Impact on looks and figure	5,9±2,4	2,9±1,2	2,3±0,4	0,001*
Impact on well-being	4,6±1,9	5,1±2,2	4,8±1,3	0,514
Absence of contaminants	6,0±1,3	5,6±0,8	5,5±0,7	0,522
Absence of chemical additives	5,8±1,6	5,2±1,2	3,9±1,2	0,005*

Shelf life (durability)	4,6±0,5	5,2±0,6	4,3±1,4	0,045*
High level of processing	4,9±2,2	3,2±1,1	4,8±0,6	0,033*
Ease of preparation	5,5±1,7	5,8±1,4	6,0±2,6	0,416
Has advertising	4,1±0,8	3,2±0,3	3,4±0,1	0,089
Stand-out factor	4,9±1,2	2,5±0,2	2,6±0,3	0,001*
Manufacturer (brand)	3,8±0,9	5,6±1,5	4,1±0,5	0,001*
Eco-friendly packaging	5,4±2,3	5,2±0,9	5,3±2,4	0,826
Aesthetic packaging	4,9±0,5	4,7±0,7	5,1±1,4	0,678
Convenient packaging	3,6±1,1	3,9±0,8	4,0±1,4	0,667
Packaging size	4,1±1,5	4,4±1,7	3,8±1,9	0,415

Source: own elaboration

P-values lower than 0.05 give grounds to reject the null hypothesis in the F-test. This means that the segments isolated in the cluster analysis differ in their perceived importance of the following properties: naturalness, visual appeal, shelf life, level of processing, fat content, calorific value, health-promoting ingredients, absence of chemical additives. Feedback for compatibility with a specific diet, the possibility of standing out among friends and the impact on physical appearance also differs markedly across the sample, while the importance of brand further differentiates the compared segments.

Compared to the other two clusters, Cluster A reports the lowest ratings for the importance of acceptable visual organoleptic features while scoring highest for impact on looks and figure and for stand-out factor. Cluster B, meanwhile, reports the highest expectations for shelf life and attaches greatest importance to brand. Finally, Cluster C is more inclined than the other clusters to look out for aesthetic packaging while paying less attention to nutritional properties such as naturalness, dietary compatibility, calorific value, fat content, and absence of chemical contaminants.

Also noteworthy are the values reported collectively for the importance given to individual items. These range from roughly 3.5 points to approximately 6.5 points, which means from "moderately important" to "very important". This shows that the set of answers did not contain any items that would be irrelevant to consumers.

Subsequently, the numerical feedback was subjected to principal component analysis, preceded by testing for two prerequisites to apply this method, that is, determination of a correlation matrix between primary variables and calculation of Cronbach's alpha. The correlation matrix showed that each variable is significantly correlated with at least five others, meaning the first prerequisite was met. The Cronbach alpha stood at 0.95, which indicates a very good reliability of the set of original variables. In fact, this value significantly exceeds the reliability threshold of 0.6.

Principal component analysis was performed separately for the three isolated consumer segments, that is, for Clusters A, B and C.

Responses from Cluster-A consumers allowed to identify 6 principal components related to the importance of the assessed quality properties. The subsequent eigenvalues were as follows: 3.79; 2.43; 2.34; 1.74; 1.55; 1.06. The remaining eigenvalues were lower than 1.0, meaning the Kaiser criterion was met. In total, the distinguished principal components explain 84.7% of the pooled variance of the results. The values of the factor loadings (rounded off ≥ 0.7) allow for an unambiguous assignment of each primary variable to the next principal component (Table 3).

Table 3. Principal component analysis results for Cluster A

Property	Principal component					
	1	2	3	4	5	6
	Factor loadings					
Freshness	0,022	0,230	0,116	0,930	0,089	0,005
Naturalness	0,192	0,706	0,020	0,187	0,235	0,106
Pleasant taste and aroma	0,186	0,169	0,036	0,724	0,049	0,078
Visual appeal	0,157	0,038	0,196	0,704	0,227	0,044
Nutritional values	0,925	0,051	0,153	0,023	0,213	0,077
Low fat content	0,766	0,126	0,195	0,050	0,125	0,214
Low caloric value	0,682	0,330	0,416	0,230	0,089	0,103
Health-promoting ingredients	0,192	0,806	0,020	0,187	0,068	0,099
Dietary compatibility	0,186	0,669	0,267	0,124	0,049	0,143
Impact on looks and figure	0,058	0,038	0,696	0,004	0,227	0,137
Impact on well-being	0,025	0,751	0,153	0,316	0,213	0,077
Absence of contaminants	0,066	0,004	0,195	0,050	0,925	0,011
Absence of chemical additives	0,118	0,010	0,297	0,023	0,697	0,351
Shelf life (durability)	0,164	0,057	0,229	0,071	0,039	0,844
High level of processing	0,173	0,064	0,137	0,088	0,738	0,281
Ease of preparation	0,338	0,062	0,206	0,004	0,008	0,678
Has advertising	0,345	0,294	0,055	0,188	0,436	0,387
Stand-out factor	0,264	0,158	0,748	0,041	0,471	0,068
Manufacturer (brand)	0,062	0,147	0,856	0,264	0,228	0,006
Eco-friendly packaging	0,369	0,182	0,667	0,401	0,051	0,008
Aesthetic packaging	0,268	0,411	0,512	0,026	0,099	0,006
Convenient packaging	0,145	0,168	0,344	0,055	0,181	0,066
Packaging size	0,336	0,345	0,197	0,057	0,169	0,008

Source: own elaboration

As for Cluster-A respondents, there are six main pointers of food quality, all of which drive, independently of each other, preferences and purchase decisions. The first principal component is correlated with those variables that relate to the traditionally understood nutritional value, also associated with a low content of ingredients that are high in calories. These are the properties directly related to product health. Ozimek (2006) developed in fact a similar system of consumer-perceived importance regarding food-quality characteristics. This may indicate an entrenched stereotype that the sine qua non condition of food products is their nutritional value which is independent of other parameters.

The second component focuses on product naturalness, the presence of health-promoting ingredients and those ingredients which - in the opinion of nutritionists at least – constitute added value in dietary nutrition or influence well-being. If anything, this confirms that "healthy" food, by bringing the consumer additional benefits beyond just the nutritional value, has become a new multidisciplinary trend among consumers (Asioli et al., 2017; Grunert, 2011; Hansen et al., 2017; Hoek et al., 2017; Aertsens et al., 2009). According to the Food and Agriculture Organisation (2019), a balanced and healthy diet is one that promotes all pillars of the person’s health and well-being, and is at the same time accessible, safe, and culturally acceptable. The link of naturalness with this principal component also proves that pro-health food is not only about the presence of health-promoting ingredients but also carries a low level of food processing. As reported by several authors (Ozimek, 2006; Żakowska-Biemans, Kuc, 2009; Sajdakowska, Żakowska-Biemans 2009), naturalness is one of the product’s main properties that is

increasingly appreciated by Polish consumers. Unsurprisingly perhaps, this association is most prevalent for organic products (Gutkowska, Ozimek; 2005; Żakowska - Biemans 2011b).

The third principal component refers to the product's symbolic value, being accompanied by two characteristic properties: impact on looks and figure and stand-out factor. Correlated with this component are also: brand and eco-friendliness of packaging, which the literature has long considered to be marketing determinants. This correlation indicates that the Cluster-A segment willingly "submits" to marketing-mix recommendations and perceives these trends as a fashionable market and nutritional behavior.

The fourth principal component is mainly about freshness, which is accompanied by taste and aroma and properties that are perceptible either during or after the purchase. Overall, consumers thought these were the characteristics that best describe product freshness. Two conclusions can be drawn from this, one of them being that organoleptic parameters are accompanied by freshness, as has been echoed in the literature (Yiridoe, E.K et al., 2005) where commodity-specific attributes are reported to include variables such as visual appeal, taste, freshness, etc.. And so, the fourth principal component contains the most important organoleptic characteristics for consumers, thus paving the way for being referred to – as per nomenclature proposed by Szczucki (1970) – as "sensory attractiveness".

Szczucki's quality structure, put forward in the same study, is also confirmed by the next two areas indicated by Cluster-A participants.

The fifth principal component represents the safety of consumption. Interestingly, Cluster-A respondents assess the importance of this area regardless of the scores of other properties. Consumers understand this area to signify the absence of contaminants from various sources, the absence of chemical additives, and a high level of food processing. Given the inclusion of this last parameter, consumers seem to express their confidence in the preservation methods used by the processing industry.

The sixth principal component revolves around product accessibility, which encompasses shelf life and ease of preparation – both components that facilitate the use of the product in a home setting. The absence of packaging (size, convenience) in this group is probably due to the market being already saturated with various packaging options.

Let us also note that Cluster-A consumers considered the presence of health-promoting or dietary ingredients and the impact on looks or well-being in general to be very important (Table 2), with these items being rated markedly higher than in Clusters B and C. This may be owed partly to the distinction of two orthogonal quality values: pro-health and symbolic. Another factor is that 84.3% of Cluster-A consumers were women, the majority below 50 years of age. It is therefore possible to compare the perception of quality by this group with the quality structure determined for an all-female group in Cichocka and Pieczonka (2004), who found that women distinguish five mutually orthogonal areas. In addition to the traditional approach, where the health and nutritional value of a product is determined, sensory quality and accessibility add to the product's symbolic value. The same study goes on to argue that women have an emotional approach to purchased goods and consider some of them as playing a symbolic role in their lives.

Moving on, three independent areas can be distinguished for the perceived food quality among Cluster-B consumers (Table 4). Here, the analysis indicated three principal components related to the importance of the assessed qualitative characteristics. The subsequent eigenvalues were: 4.79; 1.43; 1.02. Together, these three principal components explain 74.9% of the pooled variance of the results.

The first principal component, in addition to nutritional values, determines parameters such as: low calorific value, dietary compatibility, impact on well-being, absence of contaminants, absence of chemical additives. These

characteristics represent the overall healthiness of the food product. Consumers perceive them as important due to their effect on the body by means of providing nutrients, lack of preservatives or other chemical additives, and low industrial processing.

The following properties are meanwhile related to the second main component in this cluster: freshness, naturalness, pleasant taste and aroma, visual appeal. These features can be clearly called generally organoleptic, as consumers can visually evaluate some of them at the time of purchase, therefore knowing what to expect in terms of preparation and consumption.

The third principal component reflects product accessibility, as it encompasses ease of preparation and high level of processing. These are the properties that significantly facilitate the use of the product in a household setting.

When analyzing responses from Cluster-B consumers, we noticed they attached much more importance than Clusters B or C to shelf life and brand. One of the reasons for this may be the fact that Cluster B comprised mostly people over 50 for whom shelf life, storage and loyalty towards the brand are important due to their purchase and nutritional habits shaped in the times of a centrally-planned economy and a producer-driven market. From the mid-1970s, Poland's economy fell on a downward slope, plunging into ever greater lows. In the summer of 1980, the disruption of supplies expanded to nearly all items, causing the already long queues in stores to become even larger. The shortage of meat and its derivatives, as well as of all chocolate products, was estimated at 25%, and at 20% for cheese products. The supply of most articles was below the levels recorded in 1975 (Kaliński. J., 2005). That is why this model of consumer quality structure can be called, after Polish researchers in the 1930s, the traditional model.

Also in the opinion of Cluster-C consumers the quality characteristics of food products form three independent areas (Table 4). In this case, the analysis identified three principal components for which the eigenvalues are: 6.79; 3.43; 1.15. Together, these three principal components explain 78.5% of the pooled variance of the results. The consumer-perceived quality structure for this group of respondents differs significantly from that for Cluster-B consumers.

This becomes particularly noticeable in the absence of parameters that make up the sensory attractiveness of the product. In Cluster C, freshness is correlated with the second principal component, pleasant taste and aroma - with the third, and visual appeal - with the first. A conclusion can therefore be drawn that the quality structure proposed by this cluster differs substantially from the traditional concept proposed by Szczucki. Analyzing the results listed in Table 4, we see that the characteristics that make up the subsequent latent variables are much closer to the structure proposed by Nelson (1974).

Visual appeal aside, the first principal component is correlated with parameters referred by Nelson as a set of sought-after parameters, i.e. those that consumers can initially assess at the time making a purchase decision. These include: advertising, brand, aesthetic packaging, convenient packaging, all describing a food product more broadly, allowing it to stand out, reflecting its commercial attractiveness and the demand for something that is elegant and in vogue. Each of these characteristics can be perceived by the consumer when actually shopping for products.

The second principal component, apart from freshness, determines parameters such as: naturalness, pleasant taste and aroma, nutritional value, low fat content, low calorific value, presence of health-promoting ingredients, absence of contaminants. These properties can be attributed to those expected by the consumer, but which cannot be assessed when making a purchase decision or during preparation and consumption. As such, they pertain to the second component and can be referred to as a set of good-faith features, in line with Nelson's proposal. Our results do indeed confirm the findings shared in Shafie and Rennie (2012) and in Mauracher et al. (2013), who argue that food safety, human and environmental health as well as sensory characteristics such as nutritional value, taste,

freshness and appearance all influence food preferences among consumers, in the case of their studies that food being organic.

The third principal component is related to ease of preparation, as well as a high level of processing and shelf life. All these properties have one thing in common: the consumer can assess, as it were "experience", each of them when preparing the product for consumption. In line with Nelson's nomenclature, this principal component could be called the area of empirical parameters.

As shown by our results, the structure proposed by Szczucki was fully replaced in Cluster C by that proposed by Nelson. When choosing a food product, this segment of consumers does not judge quality based on the set of beneficial properties arising from consumption. For them, properties that are present at every stage of contact with the product are those that truly matter. A characteristic feature of this group is that it is made up of men of different ages, which may confirm the findings shared by Cichocka and Pieczonka (2004).

In result of literature review, it can also be concluded that quality in marketing terms refers to those product elements that are appropriately interpreted and perceived by buyers (Wiśniewska, Malinowska, 2011). Pieczonka (2009) demonstrates that the marketing approach is itself nothing else but a specific set of characteristics. A similar interpretation is proposed in a EC-commissioned study by L. Dries and M.C. Manacini where properties are grouped into three categories: seeking, experience, and trusting. Our own research findings overlap with the strategy proposed by other authors (Wiśniewska, Malinowska, 2011; Iwanicka, 2015).

To summarize, attention should be paid to how public perception of the importance of particular areas of food quality evolves over time in consumer-market countries.

Juxtaposing the results of our own research with those from fifteen years ago (Cichocka and Pieczonka, 2004), we see that the rank and importance of certain quality pointers were at markedly different levels. While accessibility and functionality were be the most sought-after characteristics in the 1970s, these preferences did not quite stand the test of time as consumers shifted their focus towards "healthiness" and accessibility. As noted by Cichocka and Pieczonka (2004), such changes in the perception of quality spring not only from economic factors but also from evolving social preferences. Fast forward fifteen years and consumers no longer view "healthiness" as the overriding determinant of food quality.

Table 4. Principal component analysis results for Clusters B and C

Property	Cluster B			Cluster C		
	Principal component					
	1	2	3	1	2	3
	Factor loadings					
Freshness	0,422	0,830	0,116	0,222	0,730	0,416
Naturalness	0,192	0,676	0,020	0,192	0,806	0,020
Pleasant taste and aroma	0,186	0,869	0,154	0,186	0,169	0,954
Visual appeal	0,264	0,738	0,196	0,944	0,038	0,196
Nutritional values	0,725	0,441	0,153	0,025	0,751	0,153
Low fat content	0,066	0,369	0,195	0,066	0,968	0,195
Low caloric value	0,822	0,530	0,416	0,422	0,830	0,416
Health-promoting ingredients	0,192	0,106	0,020	0,192	0,706	0,020
Dietary compatibility	0,686	0,169	0,254	0,186	0,169	0,454
Impact on looks and figure	0,344	0,038	0,196	0,344	0,038	0,196
Impact on well-being	0,725	0,051	0,153	0,025	0,051	0,153
Absence of contaminants	0,666	0,429	0,195	0,066	0,968	0,195
Absence of chemical additives	0,718	0,010	0,022	0,118	0,010	-0,022
Shelf life (durability)	0,129	0,057	0,030	0,129	0,057	0,830
High level of processing	0,173	0,064	0,737	0,173	0,064	0,837
Ease of preparation	0,092	0,062	0,806	0,092	0,062	0,706
Has advertising	0,188	0,436	0,332	0,688	0,066	0,322
Stand-out factor	0,041	0,471	0,284	0,368	0,426	0,215
Manufacturer (brand)	0,264	0,228	0,065	0,745	0,392	0,249
Eco-friendly packaging	0,401	0,051	0,697	0,479	0,326	0,398
Aesthetic packaging	0,213	0,077	0,179	0,703	0,124	0,087
Convenient packaging	0,125	0,214	0,668	0,811	0,235	0,149
Packaging size	0,089	0,103	0,745	0,357	0,334	0,206

Source: own elaboration

Conclusions

Our analysis shows there are three segments of Polish consumers, each significantly different in terms of how they perceive behavior-shaping quality characteristics in the food market. The following properties showed disparities across all three groups: naturalness, visual appeal, shelf life and level of processing, fat content and caloric value, health-promoting ingredients, absence of chemical additives. Significant discrepancies were also found for dietary compatibility and impact on health, as well as for brand.

Cluster-A consumers perceive six food quality areas in total. Quality properties in these areas determine, independently of each other, preferences and purchase decisions. Let us note that, for this segment, the following product characteristics were very important: the presence of health-promoting or diet-compatible ingredients, and the impact of product on appearance and general well-being. Cluster-A consumers rated the importance of these items significantly higher than the other two groups. Cluster-B consumers perceive the quality of food products in a way that corresponds to the traditional model prevalent in Poland until the late 1980s, that is a producer-driven market. Meanwhile, Cluster-C consumers are more likely to seek food quality in three independent areas, which Nelson refers to as: sought-after, assuming good faith, and empirical.

Besides, the very structure of perceived food quality among Polish consumers has changed over the last 15 years. Around the year 2005, Polish women abandoned the three-dimensional quality model to incorporate two additional independent areas: that of pro-health and symbolic value. Currently, a similar structure of quality is observed among consumers below 50 years of age, both women and men, except that in their case the emergence of dietary, rather than pro-health, value can be observed. Lastly, while fifteen years ago the marketing quality structure proposed by Nelson could be ascribed to all men, today it remains true only for the segment comprising men living in rural areas.

Four important determinants of consumer-perceived food quality in Poland refer to sociodemographic variables. These are: gender, age, education level, and place of residence.

It should be noted, that the presented results might constitute a starting point for analogous studies involving consumers from other populations living in European countries. These studies would have a significant utilitarian value, as they could be used both in the management of the quality of the food sector products and in the marketing of food products.

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