# CONSUMER PRIORITIES IN FOOD QUALITY CHARACTERISTICS: EMPIRICAL FINDINGS FROM TÜRKIYE[*]

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**Abstract**

This study investigates the prioritization of food quality characteristics among Turkish consumers and explores the influence of socio-demographic factors on these preferences. The findings reveal that healthiness, freshness, and aroma are paramount for consumers, while nutritional value receives comparatively lower importance. Statistically significant variations in rankings underscore distinct priorities among consumers, with differences observed across socioeconomic groups and in regard to gender. University graduates and individuals with higher incomes prioritize freshness and healthiness, indicating the impact of education and income on preferences. Notably, even among low-income consumers, price ranks as the least important characteristic. The study highlights the complex interactions between consumer preferences and socio-demographic factors, emphasizing the need for nuanced marketing strategies. The results challenge the common belief that higher prices imply higher quality, emphasizing the significance of health-related attributes in shaping consumer choices.

**Keywords:** Food quality characteristics, consumer priorities, food producers, food retailers, geographical location, external food characteristics, natural food characteristics

**JEL Classification:** N34, P36, P46

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## 1. Introduction

Consumers' biological food requirements remain uniform, but decision-making processes diverge during food shopping. These decisions are contingent on consumers' personal priorities regarding food characteristics, eating habits, and local food culture. The significance and priority assigned to specific food attributes by consumers also offer insight into their perspectives on food quality. Notably, in Turkey, 89.3% of consumers consider food quality as one of the crucial factors influencing their food choices (Ministry of Trade, 2018).

Food quality is the most important food attribute motivating consumers during shopping. For 90% of consumers, the most important characteristic is food quality, a significant composite characteristic for consumers (Ministry of Trade, 2018). This includes external factors, such as appearance (size, shape, color, gloss, and consistency), texture, and flavor or factors such as federal grade standards (e.g., of eggs), as well as natural factors (chemical, physical, microbial). In many countries, food quality is regulated by a government agency. For example, food quality in the United States is regulated and monitored by the Food Safety Act 1990. Generally, quality evaluation of food consists of two stages: The first one precedes the purchasing act, and the second one is related to what happens after the purchasing act when food is being consumed. Regarding the first stage, at the point-of-purchase, consumers use both explicit cues (e.g., color, price, and claims) and subtle cues communicated through packaging design, i.e., graphics, material, and color (Magnier, Schoormans, & Mugge, 2016). According to the 1970 Yearbook of Agriculture, quality is the measure or expression of goodness (Ferree, 1973). Food quality is a central issue in today's food economics, and in the last few decades consumers' concerns for healthier lifestyles, environment protection and conservation are driving forces reshaping consumers' food buying intentions and perspectives on food quality (Grunert, 2005).

The degree of importance consumers attach to food properties also serves as an indicator of their level of awareness. Understanding what consumers consider significant when purchasing food is crucial for those aiming to enhance consumer awareness, including public health officials and retail food sellers. Consumers make purchases based on the belief that such choices will fulfill one's recognized needs (Agyekum, Haifeng, & Agyeiwaa, 2015). Selecting a product to meet specific needs relies on consumers' perception that its food quality can satisfy such needs. Consumers' initial impression of a food item is shaped by its fundamental sensory attributes, such as appearance, texture, and flavor. While many business managers tend to focus on technical aspects of product production, most customers assess a product based on its overall quality and the level of satisfaction it provides (Agyekum, Haifeng, & Agyeiwaa, 2015). By understanding consumers' opinions on food characteristics and their prioritization of food attributes, food retailers can more effectively manage the process of food production and sales in a rational manner.

When providing food products at the point of sale, both producers and distributors need to consider the factors that define a modern consumer who exhibits heightened interest and concern regarding several aspects. These include food safety, a growing awareness of the connection between food, nutrition, and health, general well-being, an increasing demand for easily disposable and environmentally friendly food packaging, as well as convenient food options of products easy to prepare in line with changing lifestyles. It is evident that consumers' varying degrees of preference for certain food product features serve as the basis for identifying different consumer groups (Baryłko-Pikielna, 2003).

Food markets serve as meeting points for consumers and food producers, providing trading organizations with direct contact opportunities with their customers. The interactions between traders and customers play a significant role in shaping buying patterns and influencing customer satisfaction with their purchases. Sellers have long recognized the importance of establishing contact with customers, particularly when reinforcing their ability to learn about product features that resonate with their specific desires, as this often determines success in the market. However, the role of vendors in the success of trading enterprises is diminishing due to the increasing influence of "virtual instruments" or packaging (Nowicki & Sikora, 2012). The food market has witnessed a deepening fragmentation of consumer needs, accompanied by a clear process of diversification in terms of consumers' expectations from specific foods. The distribution system is rapidly adapting to respond to consumer needs and desires, leading producers to adjust their supply accordingly. Additionally, aggressive, and product-specific advertising is being employed to persuade consumers to choose specific products (Gutkowska & Ozimek, 2005). Today's consumers have a range of options when making purchases through different types of trading organizations, each offering diverse assortments, product prices, additional services, while enjoying varying levels of popularity among consumers (Gutkowska & Ozimek, 2005).

Turkey exhibits diverse cuisines and eating habits across different geographical regions (Güler, 2010), leading to variations in consumer food choices during shopping. The importance consumers place on different food characteristics when purchasing these diverse foods reflects one's sensitivity concerning nutritional awareness. In recent years, there has been an increasing tendency to prioritize food choices based on healthiness and nutritional value. Thus, it becomes crucial to examine the role of nutritional value and health benefits of food during the shopping process. Considering consumers' preference priorities for foods is a vital factor that influences their ability to meet their nutritional needs and the overall profitability of all participants in the supply chain. Food characteristics that consumers consider are significantly influenced by local food culture, geographic location, and eating habits. In the Black Sea region, the basic cuisine consists of anchovy, hazelnut, tea, corn flour, and commonly consumed vegetable dishes. Frying and roasting methods are prevalent

in the Black Sea cuisine. The local cuisine also features black cabbage as the main crop, alongside vegetables like chard and nettle. Milk and dairy product consumption is relatively low in this region. In Eastern Anatolia, meat and dairy products are staple foods, while vegetable and fruit production are limited due to geographical constraints, which means they are less consumed. Grain products such as bulgur (cracked wheat) and pastries are popular, and dry legumes are frequently included in meals. The region is known for its use of dried vegetables and fruits, tarhana (a yogurt, wheat flour, and tomato soup with herbs), jams, pickles, and pickled vegetables. Herb cheese is a famous food in the Van area. In South-Eastern Anatolia, meat, particularly mutton and lamb, is the main source of food, and frying and roasting are common cooking methods. Raw meatballs, pilafs, and sweet desserts prevail, and breakfasts often include pistachios and cream. In central Anatolia, flour-based foods and meats are prominent, with reduced consumption of vegetables and fruits in winter. Delicatessen products are popular in the Kayseri region, and cereal products such as cut-in soup, noodles, pasta, and pastries are commonly consumed. Casserole-style cooking of vegetables is popular during the summer months. The Aegean region is renowned for its healthy and light dishes, with a focus on olive and olive oil-based dishes, along with increased consumption of vegetables and fish. The Mediterranean region shares similarities with the Aegean region but also has its own distinct features. In Adana and surrounding areas, the use of tail fat in meat dishes is common, and pickles, turnip juice, local mezes (such as tahini and dried beans), and spices are prevalent. Frying, roasting, boiling, and steaming are commonly employed cooking methods. The Marmara region, similar to the Aegean region, features olive oil-based meals. Istanbul, located in the Marmara region, serves as a melting pot, bringing together cuisines from various regions due to its population of 15 million composed of people from different parts of Turkey.

Contextual effects and expectations are only two examples of the many factors that can affect judgments of food and food quality. Numerous others fall into either the category of physiological influences (e.g. hunger and satiety, sensory adaptation level) or cultural and ethnic influences (Cardello A. V., 1995a). Food quality is classified based commercial, price and nutritional quality, referring to for example cleanliness, firmness, color, size and shape, freshness, texture, aroma (commercial quality) and to essential nutrients (carbohydrates, amino and fatty acids) and biologically active compounds (vitamins, dietary fiber, flavonoids, carotenoids, phytosterols, phenolic acids and glycosylates) regarded as aspects for nutritional quality (Edwards‐Jones, et al., 2008). Apart from nutritional values, organoleptic aspects (such as taste, color, fragrance) also determine the quality of a food product (Noordhuizen & Metz, 2005). In this study, 16 food quality characteristics are first considered under two groups as characteristics that belong to the food itself and characteristics that people add to the food. When considering the characteristics of food, several factors come

into play. Healthiness refers to foods that are low in fat, sugar, salt, and additives and high in fiber. The concept of "healthiness" is relative to conventional versions of the same food, such as low-fat milk compared to whole-fat milk, and such assessment depends on the overall diet (Darrall, 1992). Freshness relates to the recent picking or harvesting of vegetables and fruits, the recent slaughtering of meat animals, and the recent catch of fish. Color refers to the natural hue, lightness, and saturation of food items. Odor is the property of certain substances, in very small concentrations, to stimulate chemical sense receptors (Encyclopedia Britannica, 2020) of food. *Shelf life* is the period of time during which a material or food may be stored and remain suitable for use (Merriam-Webster, 2020). Production technique refers to the mode of production, whether it is being conventional, organic, or follows Good Agricultural Practices (GAP). Locality indicates the place where the food is produced, such as a city, region, or rural area close to consumer's residence. Aroma represents the attribute of a substance that can be recognized through the senses of smell, taste, and touch primarily perceived within the mouth. *Aroma* is the attribute of a substance recognized through the senses of smell and taste, as well as touch when perceived within the mouth. Tasting occurs chiefly on the tongue through the taste bud, which are stimulated by five fundamental taste sensations, sweet, salty, sour, bitter, and umami (Encyclopedia Britannica, 2020). *Nutritive value* encompasses the contents of food and the impact of its constituents on the body; nutrients include carbohydrates, fats, proteins, minerals, additives, enzymes, vitamins, sugar, cholesterol, and salt. Generally, food labels provide consumers with information on the nutritional value of a product.

Consumers also attach significant importance to external attributes of food quality. Price represents the monetary amount required to acquire a specific product. Packaging involves the processing of food for future sale. The selling place refers to the location where food is sold. A brand refers to a specific type of product or food that is associated with a particular company and carries its own name. A label is a small piece of paper or material that provides information about the item it is attached to. Hygiene encompasses practices and processes aimed at maintaining cleanliness, particularly in order to prevent disease. Eating habits encompass the reasons, choices, and methods by which individuals consume food, including the types of food they eat, their dining companions, as well as how they acquire, store, use, and dispose of food (Encyclopedia.com, 2020).

Examining the geographical influence on consumer priorities related to food quality characteristics is crucial for several reasons. Different regions often have distinct culinary traditions, cultural practices, and environmental factors that shape consumers' preferences. By understanding how geographical location influences consumer priorities in food quality characteristics, food producers and retailers can tailor their products to better meet the specific preferences and demands of different regions.

Geographical variations in consumer preferences enable effective market segmentation. Analyzing how consumer priorities differ across different geographical regions allows businesses to develop region-specific marketing strategies, product formulations, and branding approaches to better resonate with local consumers' tastes. Geographical influence can provide valuable insights for product development. By understanding which food quality characteristics are of higher importance in specific regions, food producers can adjust their product formulations, packaging, labeling, and sourcing strategies to align with the preferences of target markets. Recognizing and leveraging geographical variations in consumer priorities can provide a competitive advantage. Businesses that understand and cater to the unique preferences of different regions can differentiate themselves from competitors, build stronger customer loyalty, and capture larger market shares in specific geographical areas. Geographical influence on consumer priorities concerning food quality characteristics may also shed light on sustainability concerns and environmental impacts. By examining regional preferences, businesses can identify opportunities for promoting sustainable practices, support local agriculture, and reduce the environmental footprint associated with food production, distribution, and consumption.

## 2.  Theoretical Background and Aim of the Study

Consumer priorities for food quality characteristics are influenced by various theoretical frameworks and factors. The hedonic theory suggests that consumers evaluate and prioritize food quality based on the sensory and experiential aspects of a product. Factors such as taste, texture, aroma, and appearance play a significant role in determining consumer preferences. Consumers tend to prioritize sensory attributes that provide pleasure and satisfaction while consuming food (Cardello, 1994).

According to the expectancy-disconfirmation theory, consumers form expectations about a product's quality based on previous experiences, information, and advertising. When their actual experience matches or exceeds their expectations, they tend to be satisfied. If there is a disconfirmation, whether positive or negative, between expectations and experience, this may influence consumer priorities concerning food quality characteristics (Oliver, 2014). Consumer priorities for food quality also depend on one's health and nutrition concerns. This can be influenced by various factors, including nutritional knowledge, dietary preferences, cultural beliefs, and personal health goals. Consumers may prioritize food products that offer higher nutritional value, such as essential nutrients and biologically active compounds, so as to meet their specific health and dietary requirements (Grunert, Hieke, & Wills, 2012). Consumers are concerned about the safety and potential risks associated with food consumption (Verbeke, 2006). Factors such as cleanliness, freshness, and hygiene practices in food production and handling can significantly influence consumer priorities. Food safety certifications, labeling, and transparent information about ingre-

dients and production methods can also impact consumer perceptions and priorities in regard to food quality characteristics. Consumer priorities related to food quality can be influenced by socioeconomic factors such as income, educational level, and cultural background (Wansink, 2004). Affordability and price often play a role in consumer decision-making, especially for consumers with limited financial resources (Padel & Foster, 2005). Different socioeconomic groups may prioritize different aspects of food quality based on their specific needs and preferences.

It's important to note that consumer priorities when considering food quality characteristics can vary across individuals and cultures. Additionally, contextual factors such as product availability, marketing strategies, and social influences can also shape consumer preferences and priorities.

The objective of this study is to explore the factors and priorities of consumers across various geographical areas in Turkey concerning attributes related to food quality. These attributes encompass natural aspects such as healthiness, aroma, food value, production technique, color/shape, odor, as well as external factors such as freshness, hygiene, shelf life, eating habits, locality, labeling, price, selling place, packaging, and brand (Figure 1).
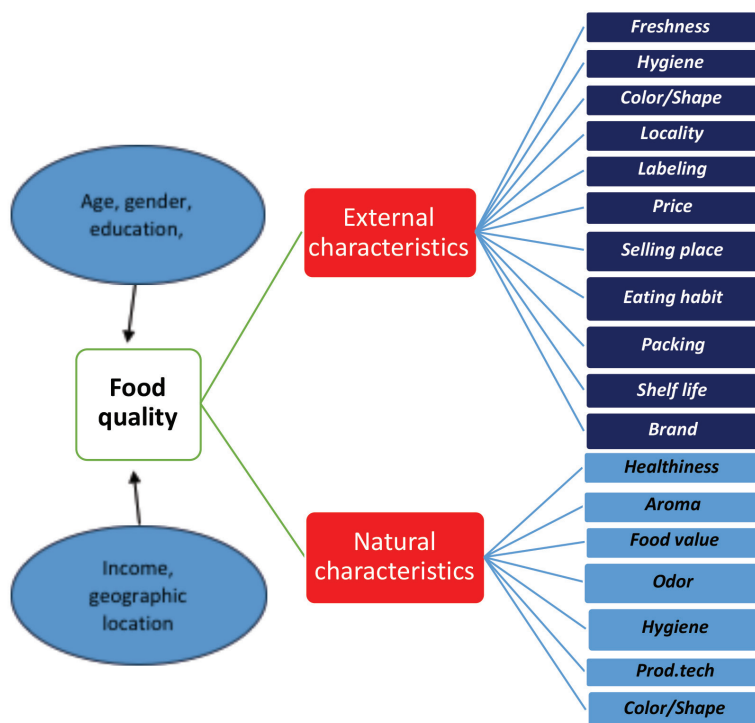


**Figure 1:** External and natural food characteristics

Studying the geographical influence on consumer priorities regarding food quality characteristics allows businesses to effectively target specific markets, tailor their products, and gain a competitive edge by understanding and meeting the preferences of different regions. It also provides insights into sustainability and environmental considerations related to food production and consumption.

## 3.  Literature Review and Research Hypotheses

No study has been found in Turkey and across the world that takes into account how consumers prioritize food quality characteristics; this absence highlights a potential gap in knowledge that may hinder informed decision-making by businesses, policy-makers, and other stakeholders, namely, food producers and food industry retailers. Addressing this gap through relevant research can lead to improved market responsiveness, consumer satisfaction, and public health outcomes.

A study carried out among Belgian and Romanian consumers identifies the importance that consumers attach to selected quality, health, and environment selected cues of food products purchased. Their findings suggest that investigated consumers most frequently assess food quality based on freshness, taste, and appearance (Petrescu, Vermeir, & Petrescu-Mag, 2020). Another study concluded that food quality cues as well as nutritional attributes affected consumer food choices during the COVID-19 pandemic regardless of gender (Anis, Rahman, & Khalid, 2022). Gültekin and Veuphuteh found that the moderating role of health consciousness is significant concerning food quality-purchase intention and price sensitivity-purchase intention relationships in both samples (Gültekin & Veuphuteh, 2023). In their study, Lambotte, Cara and Bellasen aimed to analyze the behavior of French consumers with respect to food products under various quality labels (organic, label rouge, and geographical indications). They found that product attributes are more often related to regular organic behavior than household characteristics. In particular, product availability and product family (vegetables, eggs, milk, etc.) play a key role whereas low-price organic products are not associated with more regular consumption (Lambotte, Cara, & Bellassen, 2020). A study by Guzek, Glabska, Sajdakowska and Gutkowska obtained results suggesting that in the case of application of novel packaging, a higher level of knowledge may be a reason for a consumer's rejection of the products contained, but the appearance and taste of products may contribute towards higher acceptance of novel packaging (Guzek, Głąbska, Sajdakowska, & Gutkowska, 2020). Findings of Zhang and Jakku suggest that consumers value the importance of various food attributes in a hierarchical order, and there is significant heterogeneity in consumers' food preferences (Zhang & Jakku, 2020). Aşkan, Topcu and Şahin reported that physiological needs of the consumers residing in region I were based on the physiological and physical quality of the water they prefered to consume; consumers in region II relied on the chemical quality of tap water, and consumers in region III

focused on cost advantages of tap water depending on its chemical quality (Aşkan, Topcu, & Şahin, 2021). The results of a study by Liguori, Sortino, Gianguzzi, Inglese and Farina confirmed that mango ripening leads to increased expression of quality and sensory attributes, as well as aromas, tropical flavor, and taste (Liguori, Sortino, Gianguzzi, Inglese, & Farina, 2018). Wang, Han, Jiang and Wu found that fresh food purchasing online is quite different from non-food products because of its unique features, i.e., perishability, low cost and frequent purchases, low value-volume ratio, and high relevance to safety and health (Wang, Han, Jiang, & Wu, 2022). Zaibet, Bachta, Lajimi and Abbassi found a strong concern about hygiene among other quality attributes and strong awareness about quality and quality assurance schemes in general. Consumers are also motivated by habits of consuming home-made products for hygiene and taste reasons (Zaibet, Bachta, Lajimi, & Abbassi, 2004). The results of a study by Lestari, Pradani and Digdowiseiso showed that price perception had a positive and significant effect on customer loyalty, while both food quality and menu variations had an insignificant effect on customers' loyalty. In addition, food quality had a positive and significant effect on ordering decisions. Meanwhile, menu variations produced an insignificant effect on ordering decisions. Similarly, menu variations showed an insignificant effect on ordering decisions. Price perception had a positive and significant effect on customer loyalty, while both food quality and menu variations had an insignificant effect on customer loyalty (Lestari, Pradani, & Digdowiseiso, 2022). A study conducted by Oakes & Slotterback revealed that gender, age, and dieting status are significant predictors of the primary food characteristic that individuals consider when evaluating the healthiness of foods (Oakes & Slotterback, 2002). Smed and Hansen conducted a separate study which found that individuals with higher levels of education exhibit lower preferences for health in comparison to those with lower levels of education. The study suggested that variations in taste preferences, rather than differences in health preferences, account for the healthier dietary choices observed among individuals with higher education levels (Smed & Hansen, 2016). In a study by Grunert, a food quality model was developed, and the formation of quality expectations were analyzed (Grunert K. G., 2002). Some studies have shown that consumers perceive the price as a quality cue: the higher the price, the higher the subjective quality perception (Rao, 2005; Jo & Sarigollu, 2007).

Within the aims of the study, premise hypotheses are as follows:

Hypothesis 1: Price is of higher priority among the food quality characteristics Turkish consumers consider.

Hypothesis 2: Healthiness is of a higher priority among the food quality characteristic Turkish consumers consider.

Hypothesis 3: Consumers of certain characteristics tend to prefer food based on its natural features.

Hypothesis 4: Consumers of certain characteristics tend to prefer food based on its external features.

Hypothesis 5: Socioeconomic factors influence consumers' prioritization of food quality characteristics, i.e., different socioeconomic groups display different rankings.

### 3.1 Sampling and Data

To determine the sample size for this study, one representative city was chosen from each of the seven geographical regions in Turkey. The number of households was utilized to calculate the appropriate sample size using the formula below (Miran, 2021).

$$n = \frac{Np(1-p)}{(N-1)\sigma_{\hat{p}_x}^2 + p(1-p)}$$

n : Sample size

N: 7,313,860 (Total number of households in the selected cities)

$\sigma_{\hat{p}_x}^2$: 0.0006507601 (Variance of proportion with a 95% confidence level and a 5% margin of error)

p=0.50

To obtain the maximum sample size, we assigned a value of 0.50 for p (probability) and q (complement of p). With a 95% confidence level and a 5% margin of error, the calculated sample size is 1086. The sample size was then distributed among various age groups, genders, income levels, and cities according to predetermined quotas, ensuring proportional representation based on the groups' respective shares in the total population. The reason for choosing quota sampling is that it offers several advantages for our study. By setting quotas for various demographic factors, such as age, gender, income levels, and cities, researchers can ensure that the sample accurately represents the population. This helps in generalizing the findings of the study for the larger population and allows researchers to quickly and conveniently select participants based on specific criteria without the need for a complete sampling frame. Quota sampling allows for the inclusion of participants from different demographic groups, ensuring sample diversity. This diversity can help capture a range of perspectives and experiences related to food choices and preferences across different regions of Turkey. It provides a broader understanding of consumer behavior and priorities. Quota sampling also facilitates the comparison of results across different regions and demographic groups. By setting consistent quotas across regions and demographic categories, researchers can analyze and compare findings to identify patterns and variations in consumers' priorities and preferences related to food quality characteristics. In line with the corresponding demographic quota, consumers who engage in food shopping at a well-established retail chain, which operates under

different names across all geographic regions of Turkey catering to diverse income levels, have willingly taken part in the survey.

Table 1 presents the selected provinces according to regions, along with the number of households and survey counts.

**Table 1:** Number of interwiews by regions

| Geographical Region | Representative City | Population | Number of Households | % | Number of interviews |
|---|---|---|---|---|---|
| Aegean | İzmir | 4,061,078 | 1,015,270 | 13.9 | 151 |
| Marmara | İstanbul | 14,160,471 | 3,540,118 | 48.4 | 525 |
| Central Anatolia | Ankara | 5,045,087 | 1,261,272 | 17.2 | 187 |
| Mediterranean | Antalya | 2,158,269 | 539,567 | 7.4 | 80 |
| South-Eastern | Şanlıurfa | 1,801,984 | 450,496 | 6.2 | 67 |
| Doğu Anadolu | Erzurum | 766,733 | 191,683 | 2.6 | 29 |
| Black Sea | Samsun | 1,261,814 | 315,454 | 4.3 | 47 |
| **Total** | | **29,255,436** | **7,313,860** | **100.0** | **1086** |

*3.2 Method*

Among the food quality characteristics examined, a total of 16 factors were identified as influential factors in food shopping for consumers in Turkey. These factors include food value, eating habits, hygiene, odor, taste/flavor, healthiness, freshness, shelf life, color, locality, label, production technique, selling place, packaging, price, and brand (Grebitus, 2008).

In order to assess the food characteristics, consumers were requested to provide ratings using a Likert scale, which is an ordinal measurement method used to gauge attitudes by having individuals respond to a set of statements indicating their level of agreement or importance. Within this study, participants were presented with a series of statements, and for each statement, they were asked to indicate their level of agreement or disagreement using a five-point scale (Brace, 2008). The scale employed in this study ranged from 1 to 5, with 1 indicating unimportance, 2 representing little importance, 3 denoting moderate importance, 4 indicating importance, and 5 signifying very importance.

The data representing priorities, obtained from the scores assigned by consumers on the Likert scale to food quality characteristics, were utilized for the following purposes: 1) Hierarchical cluster analysis was conducted to determine the cluster membership of the food characteristics based on the scores. 2) Two-step Euclidean cluster analysis was employed to predict the importance of the food characteristics and identify customer segments. In the final phase of the analysis, the Friedman test was

employed to assess differences among the priority ratings assigned to the food quality characteristics. This test facilitated the identification of homogenous subset groups. To conduct the Friedman test, the original numerical scores were first converted to ranks and then analyzed. This test was chosen because the scores given to the food characteristics were derived from repeated measures taken from related samples. The Friedman test allowed for the examination of whether the priorities of the food characteristics were equal or not, based on their ranking. Multiple comparisons were made to form homogenous subsets of the food characteristics with respect to their ranks. Kendall's W coefficient of concordance was also used to measure agreement among consumers regarding the ranking of the food characteristics (Miran, 2021).

Both the Friedman test and Kendall's W coefficient of concordance were applied to analyze the socio-economic features of the consumers. Kendall's coefficient of concordance, proposed by Maurice G. Kendall and Bernard Babington Smith, is a measure of agreement among several quantitative or semi-quantitative variables used to assess a set of objects of interest. In the context of social sciences, these variables often represent judges assessing different subjects or situations. Kendall's coefficient of concordance and Milton Friedman's two-way analysis of variance without replication by ranks share a close relationship. They address hypotheses concerning the same data table and utilize the same $\chi2$ statistic for testing, differing only in the formulation of their respective null hypotheses (Legendre, 2010).

We also focus solely on the natural and external characteristics of food in order to achieve more concise results using an approach of only two directions. In other words, we aimed to understand which consumer characteristics influenced consumers' preference for food based on its external features and which characteristics influenced consumers' preference for food based on its natural features. To achieve this, separate logit models (Miran, 2023; Greene, 2018) were used to analyze and determine which consumer characteristics played a role in their preference for food based on their external and natural attributes.

### 3.3 Descriptive Statistics of the Sample

Data for this study were obtained from seven distinct geographical regions in Turkey. The average age of consumers was approximately 38 years, and the average household size slightly exceeded 3 individuals (Table 2).

**Table 2:** Consumers' descriptive statistics

| Variable | Mean | Median | Minimum | Maximum |
|---|---|---|---|---|
| Age | 37.93 | 35 | 18 | 80 |
| Household size | 3.34 | 3 | 1 | 11 |

Of the consumers', 47.9% identified as male and 52.1% as female. In terms of income level, 37.3% were classified as low income, 27.6% as middle income, and 35.1% as high income. Additionally, 65.8% of consumers held a university degree (Table 3).

**Table 3:** Descriptive statistics of consumers' categorical properties

| Conusmer Properties | | Frequency | % |
|---|---|---:|---:|
| Gender | Male | 520 | 47.9 |
| | Female | 566 | 52.1 |
| | Total | 1086 | 100.0 |
| Education | Mid-school and lower | 121 | 11.1 |
| | High school | 250 | 23.0 |
| | University and higher | 715 | 65.8 |
| | Total | 1086 | 100.0 |
| Income | Low class ( -1999 TL) | 404 | 37.3 |
| | Middle class (2000-4999 TL) | 299 | 27.6 |
| | High class (5000 TL + ) | 379 | 35.1 |
| | Total | 1082 | 100.0 |
| City | Ankara | 187 | 17.2 |
| | Antalya | 80 | 7.4 |
| | Erzurum | 29 | 2.7 |
| | İstanbul | 525 | 48.3 |
| | İzmir | 151 | 13.9 |
| | Samsun | 47 | 4.3 |
| | Sanliurfa | 67 | 6.2 |
| | Total | 1086 | 100.0 |
| Age | Age <=25 | 268 | 24.7 |
| | 25<Age<=50 | 578 | 53.2 |
| | Age >50 | 240 | 22.1 |
| | Total | 1086 | 100.0 |

## 4.  Empirical Results

Cluster analysis was conducted to group food quality characteristics into homogeneous categories. The two-step Euclidean cluster analysis resulted in the formation of five distinct homogeneous clusters, which are presented in Table 4.

**Table 4:** Two-step Euclidean cluster analysis results for food characteristics

| Cluster 1 | Cluster 2 | Cluster 3 | Cluster 4 | Cluster 5 |
|---|---|---|---|---|
| Hygiene, healthiness, freshness, color, odor, shelf life, aroma production technique, locality, eating habits, nutritive value | Price | Packing | Selling place, brand | Labelling |

As observed, cluster 1 primarily consists of the intrinsic characteristics of food, while the externally added characteristics are distributed across clusters 2 to 5. The two-step Euclidean cluster analysis yielded predicted importance scores for the food characteristics, and the pattern of relative importance is outlined in Table 5. Findings highlight the paramount importance of food being healthy, followed closely by aroma, both of which scored above 0.90 out of 1.00. Notably, nutritive value ranked sixth with an importance score that was less than half of the score for food healthiness. This indicates a relative lack of consumer concern for the nutritive aspect of food, as it even falls behind the importance attributed to the odor of food.

**Table 5:** Scores of importance by food characteristics

| Food Characteristics | Level of Importance |
|---|---|
| Healthiness | 1.0000 |
| Aroma | 0.9446 |
| Freshness | 0.9053 |
| Eating habit | 0.5618 |
| Odor | 0.5238 |
| Nutritive value | 0.4397 |
| Hygiene | 0.4232 |
| Color | 0.3556 |
| Locality | 0.3442 |
| Shelf life | 0.3168 |

## 4.1 Priorities of the Food Quality Characteristics

To establish statistically significant priority values for food characteristics, the Friedman test was conducted. The mean ranks of food characteristics following the Friedman test are presented in Table 6. Findings indicate that consumers throughout Turkey consistently prioritize the healthiness and freshness of foods when making their shopping choices. Conversely, price, packaging, and brand are at the lowest ranking position, while production technique falls within the middle rank range. The results of the Friedman test confirm the statistical significance of the ranks assigned to food properties. It is evident that consumers assign different levels of priority to each food quality characteristic. Additionally, the Kendal's W coefficient is calculated at 0.172, indicating a moderate level of agreement among consumers regarding the ranking of food characteristics. According to Kendall's interpretation guidelines, this level of concordance exceeds a small effect and falls within the moderate effect range, suggesting a considerable level of agreement among consumers when determining the priority levels of food characteristics.

**Table 6:** Descriptive statistics of food quality characteristics and their priority ranking*

| Food Characteristics | Mean Rank | Minimum | Maximum | Priority as rank mean |
|---|---|---|---|---|
| Healthiness | 1 | 1 | 1 | 1 |
| Freshness | 1 | 1 | 1 | 1 |
| Aroma | 1.07 | 1 | 2 | 2 |
| Hygiene | 1.14 | 1 | 2 | 3 |
| Food value | 2 | 1 | 4 | 4 |
| Odor | 2.07 | 1 | 4 | 5 |
| Shelf life | 2.13 | 1 | 4 | 6 |
| Eating habit | 3 | 1 | 6 | 7 |
| Prod. technique | 3.27 | 1 | 7 | 8 |
| Color/Shape | 3.33 | 1 | 6 | 9 |
| Locality | 4.2 | 1 | 7 | 10 |
| Labeling | 4.33 | 1 | 7 | 11 |
| Price | 5.75 | 1 | 8 | 12 |
| Selling place | 6 | 3 | 9 | 13 |
| Packaging | 6.8 | 4 | 10 | 14 |
| Brand | 7.27 | 5 | 11 | 15 |

* Friedman's test statistic=2793 (p=0.000), Kendals W=0.172

Table 7 displays the mean, minimum, and maximum priorities of the food quality characteristics based on consumer socio-economic characteristics, as determined

**Table 7:** Descriptive statistics of food quality characteristics and their priority ranking by consumer groups

| Food Characteristics | EDUCATION | | | GENDER | | | INCOME | | | CITY | | | AGE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | Min | Max | Mean | Min | Max | Mean | Min | Max | Mean | Min | Max | Mean | Min | Max |
| Packing | 7.00 | 6.00 | 8.00 | 7.00 | 5.00 | 9.00 | 6.29 | 4.00 | 8.00 | 7.67 | 6.00 | 10.00 | 8.3 | 7.0 | 10.0 |
| Food value | 1.67 | 1.00 | 3.00 | 3.00 | 2.00 | 4.00 | 1.57 | 1.00 | 3.00 | 2.67 | 2.00 | 4.00 | 2.7 | 2.0 | 3.0 |
| Eating habit | 2.67 | 1.00 | 4.00 | 3.50 | 2.00 | 5.00 | 2.29 | 1.00 | 3.00 | 4.67 | 4.00 | 6.00 | 4.0 | 3.0 | 5.0 |
| Labeling | 4.67 | 3.00 | 6.00 | 5.50 | 4.00 | 7.00 | 3.43 | 1.00 | 5.00 | 5.33 | 4.00 | 7.00 | 6.0 | 5.0 | 7.0 |
| Price | 6.67 | 6.00 | 8.00 | 6.50 | 5.00 | 8.00 | 5.29 | 2.00 | 7.00 | 5.50 | 1.00 | 8.00 | 7.3 | 7.0 | 8.0 |
| Hygiene | 1.33 | 1.00 | 2.00 | 1.50 | 1.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.3 | 1.0 | 2.0 |
| Odor | 1.67 | 1.00 | 3.00 | 2.50 | 2.00 | 3.00 | 1.57 | 1.00 | 3.00 | 3.33 | 2.00 | 4.00 | 3.3 | 2.0 | 4.0 |
| Aroma | 1.33 | 1.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.0 | 1.0 | 1.0 |
| Brand | 7.67 | 7.00 | 8.00 | 7.00 | 6.00 | 8.00 | 6.86 | 5.00 | 9.00 | 8.00 | 6.00 | 11.00 | 8.0 | 7.0 | 9.0 |
| Shelf life | 2.00 | 1.00 | 3.00 | 3.00 | 2.00 | 4.00 | 1.57 | 1.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.3 | 2.0 | 4.0 |
| Color | 3.67 | 2.00 | 5.00 | 4.50 | 3.00 | 6.00 | 2.14 | 1.00 | 4.00 | 5.00 | 5.00 | 5.00 | 4.7 | 3.0 | 6.0 |
| Heathy | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.0 | 1.0 | 1.0 |
| Selling place | 5.67 | 4.00 | 7.00 | 6.50 | 5.00 | 8.00 | 5.57 | 3.00 | 7.00 | 7.00 | 6.00 | 9.00 | 7.0 | 6.0 | 8.0 |
| Freshness | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.0 | 1.0 | 1.0 |
| Prod.tech. | 3.33 | 2.00 | 5.00 | 5.00 | 4.00 | 6.00 | 2.00 | 1.00 | 3.00 | 5.00 | 4.00 | 7.00 | 4.7 | 3.0 | 6.0 |
| Locality | 3.33 | 2.00 | 5.00 | 5.50 | 4.00 | 7.00 | 3.57 | 1.00 | 5.00 | 5.67 | 5.00 | 7.00 | 5.7 | 4.0 | 7.0 |

through Friedman tests. Priority statistics differs across consumer properties, ranging from a minimum of 1 for freshness and healthiness to a maximum of 2 to 8 for price, and 4 to 10 for packing.

Table 8 presents the results of Friedman tests and Kendall's W statistics for each food characteristic, categorized by the socio-economic properties of consumers. Based on the Friedman test results, it is evident that the food characteristics are ranked differently among consumers of different socio-economic groups. This indicates that consumers assign varying levels of priority to food quality characteristics based on their socio-economic characteristics. However, the level of agreement among different socio-economic groups in ranking food characteristics is not very high. On the contrary, there is a moderate level of agreement, ranging from 12% to 23% within a particular group. This suggests that consumers prioritize food characteristics differently, but with a moderate level of consensus.

**Table 8:** Friedman and Kendal's W test results by consumer socio-economic groups

| Consumer properties | Friedman (Chi Square) | Kendal's W | p value |
|---|---|---|---|
| *Male* | 1127.6 | 0.157 | 0.000 |
| *Female* | 1599.8 | 0.189 | 0.000 |
| *Up to Mid-school* | 228.0 | 0.126 | 0.000 |
| *High school* | 576.0 | 0.154 | 0.000 |
| *University and upper* | 2041.7 | 0.191 | 0.000 |
| *Low income* | 1152.8 | 0.154 | 0.000 |
| *Middle income* | 1109.7 | 0.185 | 0.000 |
| *High income* | 474.4 | 0.212 | 0.000 |
| *Antalya* | 508.4 | 0.181 | 0.000 |
| *Erzurum* | 208.0 | 0.173 | 0.000 |
| *İstanbul* | 73.7 | 0.169 | 0.000 |
| *İzmir* | 1346.1 | 0.171 | 0.000 |
| *Samsun* | 475.0 | 0.213 | 0.000 |
| *Ankara* | 128.7 | 0.183 | 0.000 |
| *Urfa* | 139.6 | 0.139 | 0.000 |
| *Age <=25* | 750.8 | 0.187 | 0.000 |
| *25<Age<=50* | 1524.8 | 0.176 | 0.000 |
| *Age >50* | 606.5 | 0.170 | 0.000 |

For the purpose of easier interpretation, ranks assigned by consumers to food quality characteristics have been grouped into six homogeneous categories: rank 1,

rank 2, rank 3, rank 4, rank 5, and rank 6 (including rank 6 to rank 16). The food quality characteristics that are ranked in the same order of priority are indicated in the same column with the (•) symbol in the following tables. Across all consumer groups, it is evident that freshness and healthiness of food are given the highest priority by all consumers Table 9. It can be observed that both females and males prioritize aroma, freshness, and healthiness characteristics, with males considering hygiene as the second priority and females assigning it as the first priority. Among the 16 food quality characteristics, hygiene and odor consistently hold the second or third place priority rank across all socio-economic groups. While consumers with a university education prioritize only freshness and healthiness, those with lower educational levels include characteristics such as aroma, hygiene, odor, and food value in their first priority category. All income categories prioritize freshness, healthiness, and aroma as the most important characteristics. It is evident that price is not considered the top priority by Turkish consumers. Price becomes relevant only after consumers are satisfied with the aroma, freshness, and healthiness of a food item.

**Table 9:** General ranks of food quality characteristics in Turkey

| Food Characteristics | Priority# | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Healthiness | • | | | | | |
| Freshness | • | | | | | |
| Aroma | • | | | | | |
| Hygiene | | • | | | | |
| Food value | | | • | | | |
| Odor | | | | • | | |
| Shelf life | | | | • | | |
| Eating habits | | | | | • | |
| Production technique | | | | | | • |
| Color/Shape | | | | | | • |
| Locality | | | | | | • |
| Labeling | | | | | | • |
| Price | | | | | | • |
| Selling place | | | | | | • |
| Packing | | | | | | • |
| Brand | | | | | | • |

In summary, healthiness, freshness, and aroma emerge as the most crucial food quality characteristics in Turkey. They are followed by hygiene and nutritional value in the second and third places, respectively, while odor and shelf life occupy the fourth place. The remaining characteristics, including price, are ranked sixth or lower. This suggests that the typical Turkish consumer first focuses on intrinsic food-related characteristics and, once satisfied, takes price into consideration.

Females assign secondary importance to nutritive value, whereas males consider it to be of third importance (Table 10). Eating habits, production technique, locality, and labeling are perceived as higher priorities by females compared to males. Females prioritize the label more than males do. Additionally, females show greater concern about food prices than males. Selling establishment is ranked at the bottom of the priority list for both genders. Brand is also considered a lower priority by both females and males.

**Table 10:** Priorities of Food quality characteristics by gender in Turkey

| Food Characteristics | Gender | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Female | | | | | | Male | | | | | |
| | Priority# | | | | | | Priority# | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 |
| Healthiness | • | | | | | | • | | | | | |
| Freshness | • | | | | | | • | | | | | |
| Aroma | • | | | | | | • | | | | | |
| Hygiene | • | | | | | | | • | | | | |
| Food value | | • | | | | | | | | • | | |
| Odor | | • | | | | | | | • | | | |
| Shelf life | | • | | | | | | | | • | | |
| Eating habit | | • | | | | | | | | | • | |
| Prod.tech. | | | | • | | | | | | | | • |
| Color/Shape | | | • | | | | | | | | | • |
| Locality | | | | • | | | | | | | | • |
| Labeling | | | | • | | | | | | | | • |
| Price | | | | | • | | | | | | | • |
| Selling place | | | | | • | | | | | | | • |
| Packing | | | | | • | | | | | | | • |
| Brand | | | | | | • | | | | | | • |

Consumers with education levels up to mid-school and high school graduation prioritize six food characteristics, namely healthiness, freshness, aroma, hygiene, food value, and odor, as their top priorities. On the other hand, university graduates rank healthiness and freshness as their first priority, followed by aroma and hygiene in second place, and food value and odor in the third. While consumers with up to mid-school and high school education rank price at the fifth priority place, those with a high school education or higher rank price as the least important characteristic. Regardless of educational level, brand consistently ranks as the least important food characteristic among all consumers (Table 11).

**Table 11:** Ranking of food quality characteristics by consumers' education level in Turkey

| Food Characteristics | Education | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Up to Mid-school | | | | | | High school | | | | | | University and upper | | | | | |
| | Priority# | | | | | | Priority# | | | | | | Priority# | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 |
| Healthiness | • | | | | | | • | | | | | | • | | | | | |
| Freshness | • | | | | | | • | | | | | | • | | | | | |
| Aroma | • | | | | | | • | | | | | | | • | | | | |
| Hygiene | • | | | | | | • | | | | | | | • | | | | |
| Food value | • | | | | | | • | | | | | | | | • | | | |
| Odor | • | | | | | | • | | | | | | | | • | | | |
| Shelf life | | • | | | | | | | | | | • | | | • | | | |
| Eating habit | | | | | | | | | | | | • | | | • | | | |
| Prod.tech. | | | • | | | | | • | | | | | | | | | • | |
| Color/Shape | | • | | | | | | | | • | | | | | | • | | |
| Locality | | • | | | | | | | • | | | | | | | | • | |
| Labeling | | | • | | | | | | | • | | | | | | | • | |
| Price | | | | | • | | | | | | | • | | | | | | • |
| Selling place | | | | • | | | | | | | | • | | | | | | • |
| Packing | | | | | • | | | | | | | • | | | | | | • |
| Brand | | | | | | • | | | | | | • | | | | | | • |

Irrespective of their income level, consumers consistently prioritize healthiness, freshness, aroma, and hygiene as the top four food characteristics. Likewise, across all income levels, price, selling place, packaging, and brand are consistently ranked in the last four positions. It is worth mentioning that even among low-income consumers, price is ranked as the least important of food characteristics (Table 12).

**Table 12:** Ranking of Food quality characteristics by consumers' income level in Turkey

| Food Characteristics | Low income | | | | | | Middle income | | | | | | High income | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Priority# | | | | | | Priority# | | | | | | Priority# | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 |
| Healthiness | • | | | | | | • | | | | | | • | | | | | |
| Freshness | • | | | | | | • | | | | | | • | | | | | |
| Aroma | • | | | | | | • | | | | | | • | | | | | |
| Hygiene | • | | | | | | • | | | | | | • | | | | | |
| Food value | | | | • | | | | • | | | | | | • | | | | |
| Odor | | • | | | | | | | | • | | | | | | • | | |
| Shelf life | | | • | | | | | | • | | | | | | • | | | |
| Eating habit | | | | | | • | | | | • | | | | | | • | | |
| Prod.tech. | | | | | | • | | | | • | | | | | | • | | |
| Color/Shape | | | | | • | | | | | | • | | | | | | • | |
| Locality | | | | | | • | | | | | • | | | | | | • | |
| Labeling | | | | | | • | | | | | • | | | | | • | | |
| Price | | | | | | • | | | | | | • | | | | | | • |
| Selling place | | | | | | • | | | | | | • | | | | | | • |
| Packing | | | | | | • | | | | | | • | | | | | | • |
| Brand | | | | | | • | | | | | | • | | | | | | • |

The order of ranking for nutritional properties among different age groups closely resembles that of income groups (Table 13).

**Table 13:** Ranking of Food quality characteristics in Turkey by consumers' age group

| Food Characteristics | Age | | | | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | <=25 | | | | | | 25<Age<=50 | | | | | | Age >50 | | | | | |
| | Priority# | | | | | | Priority# | | | | | | Priority# | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 |
| Healthiness | • | | | | | | • | | | | | | • | | | | | |
| Freshness | • | | | | | | • | | | | | | • | | | | | |
| Aroma | • | | | | | | • | | | | | | • | | | | | |
| Hygiene | • | | | | | | | • | | | | | • | | | | | |
| Food value | | | • | | | | | | • | | | | | • | | | | |
| Odor | | • | | | | | | | | • | | | | | | • | | |
| Shelf life | | • | | | | | | | | • | | | | | | • | | |
| Eating habit | | | | • | | | | | | | • | | | | • | | | |
| Prod.tech. | | | | | • | | | | | | | • | | | • | | | |
| Color/Shape | | | • | | | | | | | | | • | | | | | • | |
| Locality | | | | | | • | | | | | | • | | | • | | | |
| Labeling | | | | | | • | | | | | | • | | | | | • | |
| Price | | | | | | • | | | | | | • | | | | | | • |
| Selling place | | | | | | • | | | | | | • | | | | | | • |
| Packing | | | | | | • | | | | | | • | | | | | | • |
| Brand | | | | | | • | | | | | | • | | | | | | • |

Consumers in Erzurum, Istanbul, Ankara, and Urfa consistently prioritize production technique as a significant food quality characteristic (Table 14).

**Table 14:** Estimated results of logit models for natural and external food quality characteristics

*Cities representing geographical regions of Turkey*

| Food Characteristics | Antalya Priority# | | | | | | Erzurum Priority# | | | | | | İstanbul Priority# | | | | | | İzmir Priority# | | | | | | Samsun Priority# | | | | | | Ankara Priority# | | | | | | Şanlıurfa Priority# | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 |
| Healthiness | • | | | | | | • | | | | | | • | | | | | | • | | | | | | • | | | | | | • | | | | | | • | | | | | |
| Freshness | • | | | | | | • | | | | | | • | | | | | | • | | | | | | • | | | | | | • | | | | | | • | | | | | |
| Aroma | • | | | | | | • | | | | | | • | | | | | | • | | | | | | • | | | | | | • | | | | | | • | | | | | |
| Hygiene | • | | | | | | • | | | | | | • | | | | | | • | | | | | | • | | | | | | • | | | | | | • | | | | | |
| Food value | | | • | | | | • | | | | | | • | | | | | | | • | | | | | | • | | | | | • | | | | | | • | | | | | |
| Odor | | • | | | | | • | | | | | | • | | | | | | | | • | | | | | • | | | | | • | | | | | | • | | | | | |
| Shelf life | | | • | | | | • | | | | | | • | | | | | | | | • | | | | • | | | | | | • | | | | | | • | | | | | |
| Eating habit | | | • | | | | | • | | | | | | • | | | | | | | | • | | | | | • | | | | | • | | | | | • | | | | | |
| Prod.tech. | | | • | | | | • | | | | | | • | | | | | | | | • | | | | | | • | | | | • | | | | | | | • | | | | |
| Color/Shape | | | • | | | | • | | | | | | • | | | | | | | | | • | | | | | | • | | | • | | | | | | • | | | | | |
| Locality | | | | | • | | | | • | | | | • | | | | | | | | | | • | | | | | | • | | | • | | | | | | | • | | | |
| Labeling | | | • | | | | | | | • | | | • | | | | | | | | | • | | | | | | • | | | | • | | | | | | | | • | | |
| Price | | | | | | • | | | | | • | | | • | | | | | | • | | | | | | | | | | • | | | | | • | | | | | | | • |
| Selling place | | | | | | • | | | | | | • | | | • | | | | | | | | | • | | | | | | • | | | | | | • | | | | | • | |
| Packing | | | | | | • | | | | | | • | | | | • | | | | | | | | • | | | | | | • | | | | • | | | | | | | • | |
| Brand | | | | | | • | | | | | | • | | | | | • | | | | | | | • | | | | | | • | | | | | | • | | | | | | • |

## 4.2 Natural and External Food Quality Characteristics by Consumer Properties

To simplify, only the natural and external characteristics of food were considered. The study investigated which characteristics of consumers led them to prefer food based on its external features and which characteristics led them to prefer food based on its natural features. For this purpose, an analysis was conducted using separate logit models (Miran, 2003; Greene, 2018) to examine which characteristics of consumers determine their preference for foods based on their external and natural attributes (Table 15).

**Table 15:** Estimation results of the Logit models for Natural and External food quality characteristics

| Variables | Dependent variable: Natural characteristics | | | Dependent variable: External characteristics | | |
|---|---|---|---|---|---|---|
| | Coeff. | Std. Error | Slope | Coeff. | Std. Error | Slope |
| const | -1.205 | 1.510 | | 0.572 | 1.094 | |
| Male (Ref: Female) | -0.605 | 0.400 | -0.0085 | -0.531 * | 0.281 | -0.023 |
| Education | 0.207 | 0.226 | 0.0028 | 0.060 | 0.167 | 0.003 |
| Married (Ref: Single) | -0.184 | 0.489 | -0.0025 | -0.038 | 0.324 | -0.002 |
| Household size | 0.208 | 0.139 | 0.0028 | 0.171 * | 0.101 | 0.007 |
| Income | -0.021 | 0.075 | -0.0003 | -0.013 | 0.052 | -0.001 |
| Age | 0.087 *** | 0.028 | 0.0012 | 0.036 ** | 0.014 | 0.002 |
| İstanbul(Ref:Antalya) | 1.316 ** | 0.552 | 0.0187 | 0.706 * | 0.410 | 0.030 |
| İzmir(Ref:Antalya) | 1.337 | 0.832 | 0.0122 | 1.216 ** | 0.615 | 0.036 |
| Samsun(Ref:Antalya) | 0.121 | 0.732 | 0.0016 | -0.065 | 0.587 | -0.003 |
| Ankara(Ref:Antalya) | 1.006 * | 0.592 | 0.0103 | 0.470 | 0.450 | 0.017 |
| Şanlıurfa(Ref:Antalya) | 0.705 | 0.726 | 0.0073 | 0.914 | 0.687 | 0.027 |
| Likelihood ratio test: Chi-square(11) | 32.185 [0.0007] | | | 24.056 [0.0125] | | |
| Number of cases 'correctly predicted' | 1052 (97.3%) | | | 1023 (94.6%) | | |

*, **, and *** represent significance at 0.1, 0.05 and 0.01 levels, respectively.

The logit model estimations presented in Table 15 are statistically significant, correctly predicting 97% of cases for natural food quality characteristics and 94.6% of cases for external food quality characteristics. The logit model for natural food qual-

ity characteristics reveals three significant variables: age, Istanbul, and Ankara. Age has a positive relationship with the importance placed on natural food characteristics, indicating that as age increases, consumers prioritize natural attributes in their food preferences. Consumers in Istanbul and Ankara also attribute higher priority to natural food characteristics compared to Antalya.

In the logit model, which focuses on external food characteristics as the dependent variable, five variables were found to be statistically significant. Females place more importance on external characteristics of food compared to males. Larger households also attribute greater importance to external food characteristics. As consumers grow older, their preference for external properties of food tends to increase. Moreover, individuals in Istanbul and Izmir place greater emphasis on external characteristics of foods.

## 5. Discussion

The study confirms that healthiness is highly valued by Turkish consumers, indicating a prioritization of food quality attributes related to nutrition and freshness. This supports the theoretical background that consumers prioritize food products offering higher nutritional value and health benefits and highlights the impact of socioeconomic factors on consumer prioritization of food quality characteristics. Findings show different rankings among socioeconomic groups, with educational level and income playing a role in shaping consumer preferences. This aligns with the theoretical background that socioeconomic factors, such as income and educational level, can impact consumer priorities for food quality. Findings regarding the importance of aroma and freshness align with the hedonic theory, which suggests that consumers prioritize sensory attributes providing pleasure and satisfaction from consuming food. The emphasis on these attributes by both males and females further supports this theory.

Regarding the lower ranking of nutritional value, the findings suggest a lesser emphasis on this attribute by Turkish consumers. This can be seen as a disconfirmation between consumers' expectations and their actual experience, indicating that nutritional value may not be a primary factor in their decision-making process.

The study provides empirical evidence supporting or contradicting specific hypotheses related to consumer priorities based on food quality characteristics. It demonstrates the complex interplay between consumer preferences, socio-demographic factors, and cultural context in shaping food quality priorities. It also highlights the importance of considering diverse cultural contexts in order to enhance understanding of global consumer preferences.

Findings contribute to the theoretical understanding of consumer priorities based on food quality characteristics by providing empirical evidence from the Turkish context. Such understanding reinforces aspects of theoretical backgrounds while also

revealing contrasting findings, emphasizing the need for further research in different cultural contexts so as to gain a comprehensive understanding of consumer behaviors and preferences worldwide. Comparing the findings from the literature review with our study's findings, there are both similarities and differences concerning the emphasis placed on food quality characteristics.

Both our findings and the Ministry of Trade report emphasize the high importance of food quality for consumers. The Ministry of Trade report states that 90% of consumers consider food quality the most important characteristic when shopping, which aligns with our own findings that healthiness, freshness, and aroma are primary food quality characteristics for Turkish consumers. Petrescu et al. (2020) identified freshness, taste, and appearance as key factors influencing food quality assessment, which aligns with our study's finding that freshness and healthiness are highly valued by Turkish consumers. Anis et al. (2022), Guzek et al. (2020), and Zaibet et al. (2004) highlighted the significance of health-related cues and hygiene in consumers' decision-making processes, which is consistent with our own study's finding that healthiness is a primary food quality characteristic for Turkish consumers.

While Anis et al. suggested that nutritional attributes affected consumer food choices, our study found that nutritional value received relatively lower rankings among Turkish consumers (Anis et al., 2022). This indicates a lesser emphasis on nutritional value as a primary food quality characteristic. Lestari et al. (2022) indicated that price perception had a significant effect on customer loyalty, but our study found that price consistently received lower rankings among Turkish consumers, suggesting that it is considered the least important food characteristic. Our study mentions that educational level influences consumers' emphasis on freshness and healthiness. Magnier, Schoormans, and Mugge (2016) mention that consumers use explicit cues, such as color and price, as well as subtle cues communicated through packaging design. Our study highlights regional differences in prioritizing food quality characteristics, indicating that Turkey's diverse cuisines and eating habits lead to variations in consumer food choices. This aligns with the study by Petrescu, Vermeir, and Petrescu-Mag (2020), which found that consumers in Belgium and Romania use freshness, taste, and appearance when assessing food quality.

Both our study and the study of Gültekin & Veuphuteh (2023) highlighted the influence of socioeconomic factors on consumers' prioritization of food quality characteristics. Both studies found that different socioeconomic groups proceeded to different rankings, indicating a moderate level of agreement. Our study examined regional differences and their impact on food quality characteristics, while Aşkan et al. (2021) explored the impact of regional variations on consumers' drinking water consumption preferences.

While various studies conclude that price is significant, this study has yielded the result that price is not the most crucial factor in consumers' consideration of food

quality characteristics. This result seems to challenge the perception among consumers that higher price is indicative of higher quality in the eye of Turkish consumers.

Although there are some similarities between relevant literature findings and our study's findings regarding the importance of freshness, healthiness, and the influence of socioeconomic factors, there are also differences in the emphasis placed on nutritional value and price perception. Our study contributes to the existing literature by providing insights specific to Turkish consumers and highlighting the complex interplay between consumer preferences and sociodemographic factors in shaping food quality priorities.

The study's analysis results have yielded the following responses to the hypotheses: The study does not support the hypothesis that price has a higher priority among food quality characteristics chosen by Turkish consumers. Price consistently received lower rankings among Turkish consumers, and, even among low-income consumers, price was considered the least important food characteristic. The hypothesis that healthiness has a higher priority among food quality characteristics chosen by Turkish consumers is supported by the study. Healthiness was identified as one of the primary food quality characteristics by Turkish consumers, along with freshness and aroma. These characteristics were consistently ranked more highly regardless of consumers' income category. The findings of the study suggest that regional differences influence the priority given to food quality characteristics by Turkish consumers. Consumers in Istanbul and Izmir were found to attach more importance to external characteristics of foods. The study supports the hypothesis that socioeconomic factors influence consumers' prioritization of food quality characteristics, with different socioeconomic groups placing food quality characteristics in different ranking orders. However, the level of agreement among these groups was moderate, indicating a moderate level of concordance in assigning priority levels. The findings of the study support the hypotheses that varying levels of importance are assigned to external and natural characteristics of food. The study found that males give less importance to the external characteristics of food than females. Additionally, the larger the household, the more important the external characteristics of the food are. As age progresses, more importance is given to external properties of foods. The study also pointed out that age and geographical region have an effect on the importance given to natural characteristics of food. We summarize the results related to our hypotheses in Table 16. The study provides evidence to support the majority of the hypotheses, such as the higher priority given to healthiness and the influence of socioeconomic factors on consumers' prioritization of food quality characteristics. However, it also highlights some contrasting findings, such as the lower priority assigned to price and the regional differences in the importance of external characteristics.

**Table 16:** The research hypotheses and the outcome of pertinent statistical evidence

| Hyphotheses | Test | Result |
|---|---|---|
| 1: Price is of higher priority among the food quality characteristics Turkish consumers consider | Friedman test, rank #6 | Reject |
| 2: Healthiness is of a higher priority among the food quality characteristic Turkish consumers consider | Friedman test, rank #1 | Accept |
| 3: Consumers of certain characteristics tend to prefer food based on its natural features | Logit model | Accept |
| 4: Consumers of certain characteristics tend to prefer food based on its external features | Logit model | Accept |
| 5: Socioeconomic factors influence consumers' prioritization of food quality characteristics, i.e., different socioeconomic groups display different rankings | Friedman test | Accept |

## 6. Implications

The priorities given by consumers to food quality characteristics primarily influence food producers and food retailers. The following recommendations can be put forward for these stakeholders. Therefore, food producers and food retailers can align their product offerings with the priorities and preferences of Turkish consumers, thereby enhancing their market competitiveness and meeting consumer demand.

*Food Producers*

As healthiness and freshness have been identified as the primary food quality characteristics for Turkish consumers, food producers should prioritize these aspects in their products. They should clearly communicate and promote the health benefits and

freshness of food items to appeal to consumers' preferences. Aroma was found to be significant for both males and females. Food producers should focus on enhancing the aroma of their products to attract consumers. This could involve using high-quality ingredients, incorporating aromatic spices and flavors, and ensuring proper packaging to retain the aroma. Females ranked hygiene as a higher priority feature compared to males. Food producers should pay attention to ensuring proper hygiene practices throughout production and packaging processes. They also should communicate hygiene standards and practices to build consumer trust and confidence in the products. Socio-economic groups prioritize food quality characteristics in different ranking orders. Food producers should conduct market research to understand the preferences and priorities of specific consumer population segments based on their socio-economic backgrounds. This knowledge can help tailor marketing strategies and products offered accordingly. The larger the household, the more importance was given to external characteristics of food. Food producers should consider the visual appeal, packaging, and presentation of their products to cater to the preferences of larger households. Investing in attractive packaging and appealing graphics can help attract consumers. Consumers in Istanbul and Izmir attach more importance to external characteristics of foods. Food producers should consider regional preferences and adapt their marketing strategies accordingly. This could involve highlighting the external characteristics of food products in these regions through targeted advertising or localized packaging designs. While price received lower ranking places among Turkish consumers, it still becomes a relevant factor once consumers are satisfied with the aroma, freshness, and healthiness of a food item. Food producers should strive to offer products that provide a balance between price and quality. Clearer communication of the value and benefits of products justifies the price to consumers.

The study suggests that future research should delve into the priorities of food quality characteristics in diverse cultural contexts. Food producers can contribute to this research by exploring consumer preferences within specific cultural contexts and refining their strategies accordingly.

*Food Retailers*

Given that healthiness and freshness hold the highest level of importance among Turkish consumers, food retailers should prioritize offering a wide selection of healthy and fresh food options. This could involve sourcing organic or locally grown produce, ensuring proper storage and handling practices, and prominently displaying the freshness of the products. Both males and females assigned significant importance to aroma, freshness, and healthiness, while females ranked hygiene as a higher priority. Food retailers should pay attention to maintaining a clean and hygienic shopping environment, as well as offering products with appealing aromas. This can be achieved through proper store maintenance, effective product placement, and stra-

tegic use of scents or natural fragrances. In the realm of food quality assessment, it is imperative to acknowledge the distinct rankings of food quality characteristics observed among various socioeconomic groups. Food retailers can tailor their product offerings and marketing strategies to cater to specific segments. For example, offering affordable options without compromising healthiness and freshness can attract low-income consumers, while highlighting premium quality and unique offerings can appeal to higher-income groups. Although price received lower rankings among Turkish consumers, it still becomes a relevant factor once consumers are satisfied with the primary characteristics. Food retailers should strive to offer competitive pricing while ensuring the quality and freshness of the products. Promote the value for money proposition through clear pricing strategies, promotions, and discounts.

Within the purview of external characteristics, it is imperative to recognize the regional disparities in their perceived significance. For consumers in Istanbul and Izmir who attach more importance to the external characteristics of foods, retailers can focus on visually appealing packaging, attractive displays, and engaging product presentation. Tailoring marketing efforts to highlight external qualities can help attract consumers in these regions.

In the context of consumer evaluations, it is essential to acknowledge the effect of educational attainment on the discernment of rankings. Food retailers can play a role in educating consumers about the importance of freshness, healthiness, and other quality characteristics. This can be done through informative signage, labeling, and engaging in-store or online content that highlights the nutritional benefits and quality features of different products. In the examination of demographic variables, specifically age and household size, it is imperative to take into consideration their impact and influence. Retailers can adapt their offerings and store layouts to accommodate the preferences of different age groups. For example, promoting convenience and ready-to-eat options for older consumers, and offering family-sized or bulk packaging options for larger households. Consumer preferences and priorities can evolve over time. Food retailers should regularly monitor consumer trends and conduct market research to stay updated on changing preferences. This will help them stay responsive to consumer demands and adjust their product assortment, marketing strategies, and store experiences accordingly.

## 7.  Conclusion

The study's findings indicate that healthiness and freshness are highly valued by Turkish consumers, emphasizing their significance among food characteristics. On the other hand, nutritional value is given relatively lower ranking places, suggesting lesser emphasis on this attribute. The results of the tests further confirm statistically significant variations in ranking food properties, underscoring the distinct priorities assigned by consumers. Additionally, the study examines the impact of socioeconom-

ic factors on consumers' prioritization of food quality characteristics. Results reveal different rankings among socioeconomic groups, with a moderate level of agreement in assigning priority levels.

Gender differences are also noted, with both males and females assigning significant importance to aroma, freshness, and healthiness. However, females prioritize hygiene more than males. Educational level plays a role as well, with university graduates placing greater emphasis on freshness and healthiness compared to those with lower academic achievement levels.

Across various income levels, healthiness, freshness, aroma, and hygiene consistently emerge as top priorities among consumers, regardless of income category. Conversely, price, selling place, packaging, and brand are consistently placed in lower ranks. Notably, even among low-income consumers, price is considered the least important food characteristic.

The study concludes that healthiness, freshness, and aroma are identified as primary food quality characteristics by Turkish consumers. Once consumers are satisfied with these attributes, price becomes a relevant factor in their decision-making process. Moreover, factors such as age, education, income, and location are highlighted as influential in prioritizing food characteristics by consumers. Findings shed light on the complex interplay between consumer preferences and socio-demographic factors in shaping food quality priorities.

In future research, it is recommended that priorities of food quality characteristics should be explored in diverse cultural contexts so as to enhance our understanding of global consumer preferences. Such investigations would contribute towards a more comprehensive understanding of the various factors influencing consumer behaviors and preferences across different societies.

This study has revealed that price is not the most pivotal factor in consumers' assessment of food quality characteristics, contradicting the common belief that higher prices imply higher quality. On the contrary, the hypothesis that healthiness takes precedence is supported, with healthiness, freshness, and aroma identified as primary characteristics across income categories. Regional differences influence priority, particularly in Istanbul and Izmir, where external characteristics are deemed more important. Socioeconomic factors indeed impact prioritization, with different groups displaying varying ranking places and a moderate level of agreement. Additionally, the study notes gender, household size, and age differences in assigning importance to external and natural characteristics of food.

The study provides evidence that supports some hypotheses while highlighting contrasting findings. It underscores the importance of healthiness and the influence of socioeconomic factors on consumers' prioritization of food quality characteristics. Additionally, it sheds light on the lower priority given to price and regional differences concerning the importance of external characteristics.

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