Consumers' food safety perceptions in three Mediterranean countries

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Abstract

The purpose of the study is to investigate and compare consumers' food safety perceptions in three Mediterranean countries (Greece, Italy, and Spain). A survey was carried out based on a structured questionnaire focusing on food safety-related issues concerning food characteristics, the labeling of systems implemented by food companies such as the Quality Management System and the Food Safety Management System, consumer trust in the food supply chain, and consumer illusion of food control. Information was collected from individuals located in those three countries (2,664 respondents), which share common characteristics. The results indicate that there is a significant heterogeneity in consumers' food safety perceptions in the three countries. The Spanish sample has the greatest level of trust in the supply chain in terms of food safety and the highest level of illusion of food control. The Italians evaluate the food characteristics and the QMS-FSMS's labeling higher than the Spanish and the Greeks.
This multinational study brings to light the different types of food safety concerns of consumers from three Mediterranean countries.

***Keywords**: Food safety, Food characteristics, QMS-FSMS's labeling, Trust, Illusion of control.*

1. Introduction

Consumers, food companies, and governments often face foodborne illnesses and virus outbreaks, which are a worldwide concern rather than merely nationally or regionally specific (Popova *et al.*, 2010). Consumers' concerns over food safety have escalated, making them more precise about their food choices and more demanding in terms of healthy and safe food (Liu and Ma, 2016; Gracia and de Magistris, 2016). In other words, nowadays, the consciousness of consumers with regard to the risks of foodborne diseases has been increased (Göbel *et al.*, 2022). According to the European Food Safety Authority (2019), one of the most important factors for Europeans when purchasing food is food safety, since 41% of them declare that they are personally interested in this topic. Thus, over the last few years, food quality and safety has been a concern that has attracted a great amount of public, political, industrial, and research attention (Psomas and Kafetzopoulos, 2015).

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As an emerging field, there are few previous academic empirical studies concerning how food safety is understood and what food safety means to individuals. These topics still remain underdeveloped in the literature (Elliott and Ellison, 2018, p. 2748). Ortega and Tschirley (2017) also state that the knowledge about consumer demands for food safety is limited. Similarly, Bozoglu *et al.* (2019, p. 2380) point out that food safety has not been a common research topic in developed countries from the consumer perspective. Most of the previous studies are related to specific product categories (e.g., meat, fish, fruits, and vegetables) or they focus on a narrow range of food safety attributes (e.g., country of origin, amount of preservatives and pesticides, organic food products) (Bouranta *et al.*, 2019).

It is worth noting that consumer attitudes with regard to food safety appear to vary considerably across different countries, making it difficult for policymakers to create a single and general strategy for multinational export food companies (Mazzocchi *et al.*, 2008; Poinhos *et al.*, 2014). An examination of spatial differences in consumer perception of food safety is important, as it will support the development of effective food safety communication strategies (Ha *et al.*, 2019). According to Brečić *et al.* (2017, p. 857), the differences among consumers are often neglected by marketing strategies that assume that "one size fits all". Market segmentation based on consumers' food safety perceptions should help food supply chains to tailor their communication strategies to different groups of international consumers (Chen, 2012).

The literature gap identified above as well as the differentiation of consumers' food safety perceptions across countries, stimulated the authors of the present study to conduct a multinational study. More specifically, this study was conducted in three Mediterranean countries: Greece, Italy, and Spain, aiming at eliciting consumers' perceptions with regard to food characteristics and the labeling of systems implemented by food companies such as the Quality Management System (QMS) and the Food Safety Management System (FSMS), trust in the food supply chain, and illusion of food control. These developed Mediterranean countries share some common characteristics, which was the reason for their selection.

Specifically, in these countries, agriculture is supported by similar climatic conditions and is considered an important sector for their domestic economies (Eurostat, 2012). Moreover, the Mediterranean crops require high levels of seasonal labor, small and medium-sized family businesses dominate the markets of these Mediterranean countries, and newly-arrived migrants/refugees are recruited in their rural areas helping to reduce labor costs (Corrado, 2018). Moreover, the three countries share a common retail structure, which is characterized by having few European food retailers and many small independent retailers (Grunert *et al.*, 2012). The data also shows that the amount consumers spend on food per capita for Greece (2,510.6 US dollars), Italy (2,986.9 US dollars), and Spain (2,217.9 US dollars) is almost equal (Knoema, 2018). Additionally, the consumers of these countries share similar preferences for the freshness and quality of their food since they follow the same nutritional model based on the Mediterranean diet.

Thus, by asking Greek, Italian, and Spanish consumers about food safety-related issues, this study attempts to find out and justify any significant differences in their perceptions regarding food safety. It should be noted that their perceptions with regard to food safety-related issues might vary due to their cross-cultural differences, historical differences in governance practices, and the occurrence in their countries of food safety incidents (Popova *et al.*, 2010).

The following section of the paper briefly describes the food safety-related issues in the context of the food characteristics, the labeling of systems implemented by food companies such as the QMS and the FSMS, consumer trust in the food supply chain, and consumer illusion of food control. The methodological analysis and results are presented in the two subsequent sections. In the final section of the paper, the results are discussed and the main conclusions and limitations of the study are presented.

2. Literature review

Based on the food quality model formulated by Brunsø *et al.* (2005), three main types of food safety can be distinguished: product-oriented

safety, safety control, and user-oriented safety. Product-oriented safety covers the aspects of the physical product characteristics, that are mainly extrinsic attributes that give a basic description of the food product. The notion of food safety control covers the way the food product has been portrayed following quality or food safety management systems or legislation to ensure that it is safe for consumption. User-oriented safety is a subjective perception from the consumer's point of view (Brunsø *et al.*, 2005). In the absence of sufficient knowledge, consumers' decisions are guided by their trust and illusion of food control. To cover these main types of food safety, this empirical research focuses on food characteristics, the QMS-FSMS's labeling, and consumer trust in and illusion of food control.

2.1. *Food characteristics*

The reporting of fraud in the food supply makes consumers more aware of food safety issues. They realize that food safety is not a given for every food product placed on the market, but it should be considered as a food quality characteristic (Lau *et al.*, 2018). Consumers, mainly in developed societies, have become more discriminating in their food product choices, since they want not only safe but also fresh and healthy food that contributes to their welfare and a balanced diet (Misra and Singh, 2016; Hamam *et al.*, 2022). Thus, the concept of food safety includes an assurance that the food will not harm the consumer and that it has essential nutritional ingredients (Grunert, 2005).

Consumers evaluate different food product characteristics and try to guess how they may influence the safety of food. Their evaluation of food is based on both intrinsic and extrinsic attributes (Wu *et al.*, 2011; Brečić *et al.*, 2017). In most cases, consumers cannot evaluate the intrinsic attributes of food during the retail phase. Before the purchase, they cannot check it directly, except in the case of a food product being available for tasting in the shop (Bouranta *et al.*, 2019).

Djekic and Smigic (2016) point out that food product labels are one of the most important communication channels between food producers and consumers. Hence, consumers' expectations and decisions are mainly influenced by the

level and quality of the information provided on the product package (Akpoyomare *et al.*, 2012; Mirosa *et al.*, 2021). These labeling cues help consumers to make a conscious choice while purchasing their foodstuff. The use of labels to ascertain information is different among international consumers. For example, Annunziata *et al.* (2016) found that U.S. consumers on average tended to pay more attention to nutritional labels when buying wine when compared to Italian, French, and Spanish consumers.

Bearing in mind the above discussion, the following research questions are formulated in order to be answered based on samples of Greek, Italian and Spanish consumers:

RQ1a: *What are the perceptions of the consumers from the three Mediterranean countries with regard to food characteristics?*

RQ1b: *Are there significant differences among the consumers from the three Mediterranean countries with regard to their perceptions concerning food characteristics?*

2.2. *QMS-FSMS's labeling*

The food industry uses the food product quality and safety label on the package to add value and provide food quality and safety assurance. Consumers perceive food quality and safety labels as a guarantee that the labeled products are safer than others. The quality labels confirm that the food manufacturers had tested the product at every production stage before it was put on the market. They are used as part of a strategy to certify the safety characteristics of the labeled food, which transforms food safety into a searchable attribute that affects the acceptability of the labeled food (Wu *et al.*, 2011). For this reason, food companies strive to ensure their food's safety in order to gain external and internal benefits (Rampl *et al.*, 2012). So, they simply implement the hazard analysis of critical control points (HACCP) or adopt private food standards or establish a food safety management system which can be certified according to standards such as, for example, the ISO 22000 international standard and the BRC standard (Psomas and Kafetzopoulos, 2015). In so doing, they follow their country's legislation to ensure and promote

that their food products are safe for consumption. Non-compliance may affect the quality and safety of the food or worse, be a reason for outbreaks of food poisoning that can lead to significant damage to the brand's identity, financial losses, or bankruptcy (Griffith *et al.*, 2010). Thus, food companies should establish a proactive food safety and quality culture in order to ensure food safety, continuous quality improvement as well as good hygiene attitudes among employees (Psomas and Kafetzopoulos, 2015).

The products that have special quality assurance seem to increase consumers' trust, which in turn, positively influences their purchasing behavior (Sadílek, 2019). Britwum and Yiannaka (2019) found that consumers were willing to pay a higher price for a product with a food safety label. They also suggested that the most preferred type of food safety label was one that did not provide information about the intervention and its role in enhancing food safety. However, some studies suggest that not all consumers fully understand what these quality assurance labels mean (Xu and Wu, 2010; Wu *et al.*, 2011). It is still not clear what determines consumers' food safety perceptions with regard to quality labeling and if the importance given to these labels varies between the populations of different countries.

Bearing in mind the above discussion, the following research questions are formulated in order to be answered based on samples of Greek, Italian and Spanish consumers:

RQ2a: What are the perceptions of the consumers from the three Mediterranean countries with regard to the QMS-FSMS's labeling?

RQ2b: Are there significant differences among the consumers from the three Mediterranean countries with regard to their perceptions concerning the QMS-FSMS's labeling?

2.3. *Trust in the supply chain*

Consumers usually cannot rely on their personal experience or knowledge in order to evaluate food safety attributes. Thus, food safety in essence has a strong credence component (Chen, 2012; Bearth *et al.*, 2014). In the absence of sufficient knowledge, consumers' decisions are guided by their trust in the supply chain. Trust

is defined as an individual's general tendency to be willing to depend on others (Love *et al.*, 2013). The fact that consumers trust the long and complex food supply chain (involving farmers, manufacturers, importers, retailers, regulators, etc.) allows them to fully access and highly evaluate the information they have in order to make decisions (Love *et al.*, 2013). Consumers' trust makes them simplify their decision-making process, since their trust reduces the complexity they face regarding whether or not they feel safe while purchasing a certain food. People differ in the extent to which they trust those involved in the food supply chain -from farms to retailers- due to their personal or environmental characteristics. Consumers usually rely on government and industry integrity (Wu *et al.*, 2011). Public intervention is based on the need to guarantee the protection of minimal requirements in terms of consumer health, market information and commercial loyalty along the supply chain (Camanzi *et al.*, 2019). In countries with reliable government agencies, consumers are less likely to have concerns about food quality and safety (Kolodinsky *et al.*, 2003). In some other cases, the government's information had no significant effect on the consumers' perceptions of the risks and benefits, maybe due to the fact that some government agencies are distrusted and their information is ignored by the public. For example, Albanian consumers lack trust in the regulatory system's ability to monitor and guarantee food safety (Kokthi *et al.*, 2015). Based on empirical evidence in three countries (the U.S., the U.K., and France), Yee *et al.* (2008) found that the level of trust in the information provided by food industry affects consumers' perceptions of the risks and benefits of genetically modified foods. Chinese consumers' trust and confidence in the dairy product supply chain were at a moderate and low level with the magnitude of trust being placed in the actors of the supply chain in the decreasing order of government regulators, enterprises, farmers and retailers (Zhang *et al.*, 2022).

Bearing in mind the above discussion, the following research questions are formulated in order to be answered based on samples of Greek, Italian and Spanish consumers:

RQ3a: What is the level of trust in the food sup-

ply chain of the consumers from the three Mediterranean countries?

RQ3b: Are there significant differences among the consumers from the three Mediterranean countries with regard to their trust in the food supply chain?

2.4. *Illusion of food control*

Consumers' perceptions of food safety can be influenced by having an illusion of food control (Frewer *et al.*, 1994; Kennedy *et al.*, 2008). In this case, they subconsciously believe that they can control food product safety and consequently they can purchase products at a desirable level of quality and safety. A frequent bias occurs when consumers use their knowledge, information, experience, and abilities to evaluate food safety and quality effectively (Koc *et al.*, 2019). The consumers' desire for control is associated with their desire to reduce losses and increase their earnings (Koc *et al.*, 2019) when they purchase healthy and safe food. However, most of the consumers do not have specialized food safety knowledge, and consequently, the quality or risks associated with certain food are not fully identified by them. Thus, their evaluation of food is conditioned by their common sense.

Bearing in mind the above discussion, the following research questions are formulated in order to be answered based on samples of Greek, Italian and Spanish consumers:

RQ4a: What is the level of illusion of food control of the consumers from the three Mediterranean countries?

RQ4b: Are there significant differences among the consumers from the three Mediterranean countries with regard to their illusion of food control?

3. Methodology

3.1. *Developing the constructs*

A structured questionnaire was designed to collect the primary data concerning the following latent constructs: food characteristics, QMS-FSMS's labeling, consumer trust in the food supply chain and consumer illusion of food

control. The questionnaire items reflecting these latent constructs were developed with reference to the relevant literature. More specifically, the following five items representing the food characteristics that influence consumers' purchasing decisions were drawn from the studies of Bonnet and Simioni (2001) and Grunert (2005): the type of packaging (glass, plastic, paper, etc.), whether or not the food products are available loose or are packaged, the ingredients of the food, the food's appearance and the information included in the food product label. The QMS-FSMS's labeling was evaluated through a two-item construct which was based on the instruments used in the studies of Krystallis and Ness (2005), Grunert (2005) and Yaya *et al.* (2011). Consumers were invited to express their opinion as to whether quality labels (HACCP-ISO 22000, ISO 9001) are used by companies to provide evidence of their capability to supply food according to legislative and consumer requirements or whether they are used for the purpose of continuous process improvement. The four items with regard to consumer trust in the food supply chain were drawn from the studies of Grunert (2002) and Yaya *et al.* (2011). An example is as follows: "the consumer trusts the food supply chain including farmers, manufacturers, retailers as well as the local authorities in issues related to food safety". Finally, the latent construct of the illusion of food control was operationalized through two items which were drawn from the studies of Panisello and Quantick (2001) and Musa *et al.* (2010). An example of an item is as follows: "food products which are placed on the market are safe to be consumed".

The original questionnaire was in the English language, so it was necessary for it to be translated into the three relevant languages (Greek, Italian, and Spanish). Forward and backward translation procedures were used to verify the translated questionnaires' adherence to the original document and ensure that each question had the same meaning in each language (Brislin, 1970). This method is commonly used in cross-cultural research (Dept *et al.*, 2017). First, the researchers translated the questionnaire items into their native language and then the translated texts were retranslated back into the English language by a translator who did not have access to the original

source. This method helped to identify discrepancies, which led to changes in order that the questionnaire be linguistically and culturally appropriate. Then, the questionnaire was pre-tested within a small sample of consumers (about 50 from each country) to guarantee its readability and to reduce the probability that the questionnaire items could be misunderstood. Based on this feedback, slight modifications were made and some questions were eliminated or modified.

The items took the form of a 7-point psychometric Likert scale (anchored by 1 = "strongly disagree" and 7 = "strongly agree"). The self-administered questionnaire also included a series of questions related to the demographic characteristics of the respondents, such as gender, age, education level, etc., which were drawn from the studies of Krystallis and Ness (2005) and Musa *et al.* (2010).

3.2. *Sampling process*

The structured questionnaire was administered to the general public. The respondents were approached by well-trained interviewers during selected times of the day during one month-long period (January, 2020). The empirical survey was conducted in the same period in three Mediterranean countries (Greece, Italy, and Spain). Research teams of postgraduate business students from each country were stationed outside the entrances of food stores or supermarkets in order to collect quantitative data. The sampling method was similar to that of a mall intercept interview (Malhotra, 2004). By conducting the interview right on the spot, the participants' memory of the experience was fresh given that they were just leaving the food store. Pelletier *et al.* (2016) points out that consumer intercept interviews can be successfully used to recruit a diverse sample of consumers at food retailers. To avoid a time sampling bias, since the characteristics of persons visiting the food stores may vary according to the time of day, the interviews were conducted at different times (Bruwer *et al.*, 1996).

The respondents were selected randomly, using systematic sampling. This sampling method produces results that represent the general population (Sekaran and Bougie, 2016). The only condition for the inclusion of respondents was their being an adult (over 18 years of age) at the time the survey was conducted. A verbal filtering question of selected participants ensured that they met this criterion.

About 7,000 consumers were approached and 2,878 gave their consent to participate in the research study. The purpose of this research was clearly explained to the respondents, and they were assured of total confidentiality and anonymity. They were also informed that the survey would take up to five minutes. The completed questionnaires were checked to exclude obvious incompleteness or extreme answers. In this phase of the survey, 214 questionnaires were rejected. Hence, the total usable sample for data analysis consisted of 2,664 questionnaires, representing a response rate of 38.1%. The final sample consisted of consumers from the three Mediterranean countries: 1,072 from Greece, 1,040 from Italy, and 552 from Spain. The demographic profile of the respondents is presented in Table 1.

The sample includes more women (64.3%) than men (35.7%), given that women are often the key decision makers in family food and nutrition choices (Daivadanam *et al.*, 2015). A total of 1,841 respondents held a university degree or higher, while the rest of the respondents (823) were high school graduates. As far as their occupations are concerned, most of them worked for the private sector (26.9%), about 20.0% of the respondents were students, and 15.2% were self-employed. The unemployed participants made up about 13.3% of those surveyed, a percentage that is close to the national rates of unemployment (ranging from 9.8% in Italy to 16.5% in Greece) (Eurostat, 2020). In terms of income, 37.4% earned family monthly incomes of 600 Euros or less. Finally, the age groups of the respondents were almost equal.

4. Data analysis and results

4.1. *Testing measurement instruments*

The SPSS software (version 26) was used for data analysis. An exploratory factor analysis (EFA) was applied in order to support the

Table 1 - Demographic profile of the respondents (N = 2,664).

Type of Classification	Category	Number of respondents	Percentage %
Nationality	Greek	1,072	40.3
	Italian	1,040	39.0
	Spanish	552	20.7
Gender	Male	952	35.7
	Female	1,712	64.3
Education Background	MSc - PhD	649	24.4
	University graduate	1,192	44.7
	High School	823	30.9
Job occupation	Freelancer	405	15.2
	Employee private sector	717	26.9
	Employee public sector	288	10.8
	Housewife	151	5.7
	Unemployed	355	13.3
	Retired	235	8.8
	Undergraduate student	513	19.3
Family monthly income group	≤ 600€	996	37.4
	601 – 1000€	533	20.0
	1001 – 2000€	803	30.1
	> 2001€	332	12.5
Age group	18-24 years	532	20.0
	25-34 years	566	21.2
	35-44 years	564	21.1
	45-54 years	457	17.2
	55-64 years	545	20.5
Place of residence	City	1,839	69.0
	Village	825	31.0

latent constructs' convergent and discriminant validity. It was employed using the Principal Component factor extraction method with the Orthogonal Varimax rotation method. The data were also tested using the Kaiser-Meyer-Olkin index and the Bartlett Test of Sphericity, both of which were considered satisfactory. The extraction criterion was set as eigenvalue above one. Loadings of ±0.45 are considered statistically significant for sample sizes of more than 150 as in the present research study (Hair *et al.*, 2010). The factor analysis revealed a one-dimensional factor for each latent construct (Table 2).

The internal consistency of the latent constructs range from 0.60 to 0.80 which exceeds the minimum threshold of 0.60, suggesting that these constructs have high internal consistency (Griethuijsen *et al.*, 2014). The analysis verified that the factor loadings of the items exceeded the 0.40 threshold on its parent latent construct with low cross-loading, and moreover that the Average Variance Extracted (AVE) of the latent constructs exceeded the 0.50 threshold, which ensures the convergent validity of the latent constructs (Hair *et al.*, 2010). Discriminant validity was also supported by the AVE for each latent construct being greater than the squared correlation between the construct of interest and the remaining constructs. Thus, studying the evidence of reliability and validity (Table 2), the latent constructs used can be considered generally reliable and valid.

Table 2 - Measurements' accuracy.

Research constructs	Mean	Std Dev	Cronbach alpha (α)	AVE	Factor loading
Food Characteristics	4.94	1.14	0.77	0.53	0.784 0.780 0.746 0.700 0.621
QMS-FSMS's labeling	5.15	1.13	0.71	0.77	0.880 0.880
Trust in the food supply chain	4.04	1.02	0.80	0.63	0.841 0.820 0.783 0.728
Illusion of food control	4.28	1.18	0.60	0.67	0.821 0.821

4.2. *Consumers' perceptions of food safety issues across countries*

Descriptive statistics were applied in order to determine consumers' perceptions with regard to food characteristics and the QMS-FSMS's labeling, trust in the food supply chain and illusion of food control. The mean values and standard deviations of these latent constructs were calculated for the samples of the respondents of the three Mediterranean countries (Greece, Italy, and Spain) (Table 3). In so doing, consumers demonstrating high and low scores for all the latent constructs were identified. More specifically, as far as the food characteristics and the QMS-FSMS's labeling are concerned, the Italians gave the highest scores, followed by the Greeks and finally the Spanish. In terms of consumer trust in the food supply chain and consumer illusion of food control, the Spanish gave the highest scores, followed by the Italians and finally the Greeks.

In order to determine whether there are statistically significant differences among consumers from the three Mediterranean countries with regard to their perceptions concerning food characteristics and the QMS-FSMS's labeling, trust in the food supply chain and illusion of food control, the analysis of variance (ANOVA) was applied. The sample of 2,664 respondents was divided into three sub-samples based on the respondents' nationalities (Greek, Italian, or Spanish). The ANOVA was applied using nationality (the nominal variable) as a factor (independent variable) and the food characteristics, the QMS-FSMS's labeling, consumer trust in the food supply chain, and consumer illusion of food control as the dependent variables. First, ANOVA assumptions with regard to missing values, outliers, data normality, and the homogeneity of variances were tested (Hair *et al.*, 2010). Since it was verified that the results of these tests were satisfactory, the least significant difference (LSD) method was used to explore the differences among consumers' perceptions. The results of this statistical analysis are presented in Table 3, demonstrating that the F-values were significant at the p = 0.01 level in all cases. This means that there are significant differences among consumers from the three Mediterranean countries with regard to their perceptions concerning food characteristics and the QMS-FSMS's labeling, trust in the food supply chain and illusion of food control. In other words, there are no similarities in consumers' perceptions; they display different perceptions for all the issues examined.

The ANOVA analysis was followed by Tukey post hoc comparison tests (Table 3). The results revealed that when comparing the Greeks and the Italians, there are significant differences in terms

Table 3 - ANOVA comparison and results of Tukey post hoc comparison tests based on respondents' nationality.

Attributes	Country	Mean - S.D.	Sig. diff. in means	F-value	Tukey post hoc comparison tests
Food Characteristics	Greece	4.88 – 1.12	0.000	13.781	Greece - Italy Italy - Spain
	Italy	5.08 – 1.02			
	Spain	4.79 – 1.34			
QMS-FSMS's labeling	Greece	5.09 – 1.07	0.000	125.626	Greece - Italy Italy - Spain
	Italy	5.27 – 1.03			
	Spain	5.02 – 1.39			
Trust in the food supply chain	Greece	3.89 – 0.92	0.000	110.987	Greece - Spain Italy - Spain
	Italy	3.90 – 0.88			
	Spain	4.60 – 1.24			
Illusion of food control	Greece	4.08 – 1.01	0.000	31.440	Greece - Italy Greece - Spain Italy - Spain
	Italy	4.36 – 1.21			
	Spain	4.53 – 1.38			

of their perceptions concerning food characteristics and QMS-FSMS's labeling and consumer illusion of food control. However, the Greek and Italian consumers seemed to trust the food supply chain almost equally. It was also observed that the Greek and Spanish consumers have differences in terms of their trust in the food supply chain and illusion of food control, while there were no significant differences in terms of their perceptions regarding food characteristics and QMS-FSMS's labeling. When comparing the Italians and the Spanish, the Tukey tests demonstrated significant differences in the consumers' perceptions concerning food characteristics and the QMS-FSMS's labeling, trust in the food supply chain and illusion of food control.

5. Discussion and conclusions

The absence in the literature of research studies investigating consumers' perceptions with regard to food safety issues as well as the fact these perceptions differ considerably across countries, stimulated the authors of the present study to conduct a multinational study investigating consumers' food safety perceptions. So, the present study focuses on three Mediterranean countries (Greece, Italy, and Spain), consumers of which have not been previously studied in terms of their perceptions concerning food safety issues. The contribution of the present study refers to determining consumers' perceptions with regard to food characteristics and the QMS-FSMS's labeling, trust in the food supply chain and illusion of food control. Determining the differences among consumers from the three Mediterranean countries with regard to their perceptions concerning the above mentioned food safety-related issues, enhances the contribution of the present study both from an academic and a practical perspective. This means that academics, through identifying consumers' food safety perceptions in the context of a specific country, can formulate country-specific theoretical models. On the other hand, practitioners can take into consideration consumers' food safety perceptions to improve company management and production systems and also develop appropriate marketing strategies.

For the purpose of the present study, a sample of 2,664 consumers from the three Mediterranean countries (Greece, Italy, and Spain) was approached. It is worth taking into account that across the selected countries there are similarities in terms of the production and retailing structure, and the population characteristics (for example, their expenditure on food per capita is almost equal and they have the same nutrition model), which justifies the focus of the present study on this specific geographic area.

Based on the present study's findings, Italians can be characterized as more food safety-sensitive than the Spanish and the Greek consumers, since they appreciate more highly the food product's characteristics and the QMS-FSMS's labeling. However, while the Spanish and the Greek consumers do not follow this trend to the same extent as the Italians, both Spanish and Greek consumers have almost the same perceptions with regard to food products' characteristics and the QMS-FSMS's labeling albeit at a lower level than that of the Italians. The fact that all the samples of consumers seem to highly appreciate the food product's characteristics and the QMS-FSMS's labeling, may be justified given that during the last few years, consumers have started reading packaged food labels more, and they have become better informed by the media (television, newspapers, cook books, and the internet) and authorized organizations in a way that has made them more thoughtful in their food choices (Viola *et al.*, 2016). As has already been mentioned, reading food labels helps consumers make healthier food choices. However, sometimes these labels can be misleading, confusing or difficult to understand. Often consumers don't have the time to devote or the knowledge to understand what the different types of information provided on a label mean. A recent survey reveals that while the majority of the Nigerian consumers (70.6%) read the nutritional information, only 64.9% understand the information presented on food labels (Adesina *et al.*, 2022). Thus, the implementation of training programs would increase consumer label-reading skills and boost their confidence in food product quality (Miller *et al.*, 2017). In addition, improvements concerning label design enhance consumer trust (Moreira *et al.*, 2021). The labels have to include the compulsory information in a clear way.

A significant heterogeneity was revealed with regard to consumers' trust in the food supply chain across the three participating countries, which is in line with Bearth *et al.* (2014). More specifically, Spanish consumers have a high degree of trust in the various players that make up the food supply chain. In other words, they do not seem to worry a lot about food safety since they do trust farmers, importers, manufacturers, retailers, and regulators. The level of trust of these consumers in the food supply system in terms of food safety is significantly higher than the level of trust of Italians and Greeks. This means that the Spanish consumers had the characteristics of being trustful (Kennedy *et al.*, 2008), which is in agreement with a similar survey that showed that the Spanish had a high degree of trust in food manufacturers (GfK Global Trust Report, 2017). On the other hand, the level of trust of the Italians and the Greeks in the food supply chain is deemed medium to high. These consumers may believe that the laws and regulations related to food safety are not being fully applied, and this belief may lead to a lack of trust in the processes followed by farmers, manufacturers or retailers, and finally to a lack of trust in the safety of the food they purchase (Popova *et al.*, 2010). This, in turn, may lead to pressure being applied not only to policy makers to step up regulations of the food supply chain, but also to food companies, which must continually review their own production and marketing strategies if they wish to assure food safety and gain the consumers' trust (Scarpato *et al.*, 2017). From the above it can be concluded that consumers' trust in the food supply chain has an effect on their approval of the supply chain itself. However, the consumers' trust in the food supply chain in terms of food safety issues may change over time if severe or extensive safety incidents occur. In such cases, consumers' trust decreases and they become more conscious of their food choices. Moreover, publications in the media about food product recalls or possible outbreaks of foodborne illnesses make consumers more suspicious and cautious, influencing, thus, their trust (Sanlier and Konaklioglu, 2012). Consumers need to play an active role in food safety. They have to act as health-promoting agents, giving feedback on food quality. They should inform supply chain actors when something suspicious is perceived. A customer complaint about a food product may stimulate the mechanisms and thus a foodborne illness is prevented.

Spanish consumers seem also to have the highest level of illusion of food control, since they think that they do have adequate control

over food safety. Italians seem also to believe that food safety is their responsibility and that it is controllable by themselves, however, their illusion of control is somewhat lower than that of the Spanish. The Greeks seem to have the least illusion of food control compared with the Italians and the Spanish. The high level of illusion of food control demonstrated by all the samples of consumers is justified, taking into consideration that their high level of education may help them to be engaged in self-protective behaviors (Milton and Mullan, 2012). However, there are significant differences with regard to the illusion of food control among consumers from the three Mediterranean countries. In a similar survey, it was also found that the perceived efficacy of control and regulations was somewhat lower in Greece than in other European countries including Norway, Germany, Spain, Poland, the U.K., Ireland, the Netherlands, and Portugal (Poinhos *et al.*, 2014), which provides support for the findings of the present study concerning the different levels of illusion of food control among consumers from different countries. Nowadays, new channels such as online shopping websites have been created and many consumers purchase food via the internet (Lang and Hooker, 2013). This method of purchasing requires having a greater level of trust and illusion of food control, since consumers don't have the ability to physically inspect and closely examine the food that they purchase. Moreover, purchasing through internet websites creates concerns about the food quality and safety, which make it more important for food companies to develop suitable marketing strategies for boosting consumers' trust and illusion of food control.

The present study suffers from some limitations. This study deals with factors that are relevant to food safety issues. However, they are not the only ones that are related to consumers' food safety perceptions and influence their food purchasing behavior. Thus, a significant overestimation of the factors that affect consumers' food safety perceptions is possible. Moreover, the findings are based on self-administered questionnaires completed by consumers of only three Mediterranean countries. Based on these limitations, future research studies can be designed.

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