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Consumer Preferences for Olive Oil in Spain: A Best-Worst Scaling Approach

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Abstract: This paper studies the preferences of consumers for olive oil in Spain, which is the largest producer and consumer of olive oil worldwide. Olive oil is a prominent, sustainable, healthy, and distinctive product associated with the Mediterranean diet. Based on a survey conducted among a sample of 402 consumers, we apply the Best Worst Scaling method to measure the importance of some attributes that influence consumer preferences for olive oil. Our results show that consumers rate price, geographical origin, protected designation of origin label, and olive variety, as important product attributes. Conversely, attributes such as organic label certification, size, and packaging material are considered less important. As the perceived importance of olive oil attributes differs across individuals, we further estimate a five-class solution and describe each class in terms of knowledge and consumption of Extra Virgin Olive Oil (EVOO) and the socio-demographic characteristics of the respondents. Finally, we discuss the implications of studying consumer preferences for olive oil and provide managerial insights.

Keywords: Mediterranean diet; sustainable food consumption; food attributes; extra virgin olive oil; best-worst scale; Aragon

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1. Introduction

Globalisation is leading to a standardisation of all kinds of products in all markets, but in the food sector, there are still differences in the consumption habits of some products. Even though foods are becoming increasingly similar in terms of their characteristics, there are still differences in food consumption habits, which may vary based on culture, geographical region, or culinary traditions. Despite the trend towards standardisation, food consumption habits still exhibit diversity and particularities among consumers. One such products is olive oil, which holds significant cultural importance as a cornerstone of the Mediterranean diet, known worldwide for its sustainability and health benefits. The global olive oil market is projected to grow from EUR 14.19 billion in 2022 to EUR 17.79 billion by 2029, at a compound annual growth rate (CAGR) of 3.28% in the forecast period, 2022–2029 [1]. These growth expectations on a global scale are due to both changes in consumer demand for healthier diets and the health benefits of olive oil [2]. Spain is not only the world's leading consumer of olive oil, but also the largest producer, accounting for two-thirds of the world's olive oil production [3]. The olive grove occupies an area of 2.7 million hectares spread over most regions and is an essential pillar for the sustainability of the rural economy in Spain.

When purchasing a food product such as olive oil, consumers may value attributes that are specific to each olive oil (such as taste, colour, and flavour) as well as common to different groups of olive oils (such as price, production method, and geographical origin). According to the literature, the characteristics of olive oil that influence its purchase are numerous and can be differentiated into intrinsic and extrinsic attributes. The former was

defined as those that cannot be changed or manipulated without simultaneously modifying the physical characteristics of the olive oil, including its taste, colour, and flavour. Extrinsic attributes are related to the product but are not part of the physical product, such as brand and price [4–11]. Alternatively, they can be classified into search attributes, which refer to visual attributes that can be assessed prior to purchase (e.g., packaging, colour, and price), experience attributes, which can only be assessed after consuming the product (e.g., taste, smell, flavour), and credence attributes, which unlike search and experience attributes, are product quality characteristics that cannot be ascertained through direct experience (e.g., production method, geographical origin, health-related attributes, and processing techniques). Consequently, consumers cannot know with certainty the presence of these quality dimensions in a product unless additional information is provided on the product characteristics [12,13].

This paper explores and contrasts consumer preferences for olive oil in Spain. It studies the relative importance that consumers give to various attributes that influence their shopping decisions, using the Best Worst (BW) method. They have been limited attempts to segment olive oil consumers according to their preferences, employing different methodological approaches, with most studies conducted in the Mediterranean countries [2,14–16]. Thus, we assume that consumers' preferences for olive oil are heterogenous, and our research question is whether the importance of the olive oil attributes differs among individuals. To address this, we employed a Latent Class (LC) model and estimated a typology consisting of five different classes of consumers with different preferences across them but with homogeneous preferences among the individuals that integrate each class. Finally, the differences and similarities across the classes are explained using the consumers' socio-demographic characteristics, their reported frequency of consumption and their level of knowledge about EVOO. To do that, we conducted an online survey to olive oil consumers in Aragon through a structured questionnaire reaching 402 respondents which is described in detail in the next section.

2. Materials and Methods

2.1. Survey Description and Questionnaire Design

Data were collected through an online survey implemented by a specialised market research company, which is based in the northern part of Spain, and it is operating in this market for more than 20 years. The company owns a consumer panel since 2005 that is certified by ISO 20252 [17]. An online survey was used due to its convenience, cost-effectiveness, and ability to reach a larger and more diverse population in a shorter period. This survey was conducted in the first week of March 2021 in Aragon, a region located in the northeast of Spain that is considered representative of the country's general population (see Table A1 in Appendix A). The sample was randomly stratified by gender, age, and province of residence according to the population figures of the region. This region consists of three provinces, Huesca, Teruel, and Zaragoza and consumers from these three provinces were included in the final sample. For a sampling error of $\pm 5\%$, and a confidence level of 95.5% when estimating proportions for the more conservative scenario, the final size of the sample was 402. Prior to the fieldwork, a pilot survey involving 20 individuals was conducted to ensure clarity of the questions, assess general comprehension, and evaluate the duration of the interview.

The final questionnaire consisted of four parts. The first part contained general questions about olive oil consumption and purchasing habits. Additionally, an "objective knowledge" approach was used to assess consumers' knowledge for the highest quality olive oil, which is extra virgin olive oil (EVOO). This approach consists of a knowledge quiz where respondents received different questions on the topic and were asked to indicate if they were true, false, or they did not know. Different knowledge quizzes have been used for food products [18,19]. Respondents were presented with six statements related to EVOO. The statements were: (1) EVOO is a natural product, (2) EVOO has similar health benefits as olive oil, (3) EVOO is obtained from olives of lower quality, (4) EVOO is extracted

mechanically, (5) EVOO has the same taste as regular olive oil, and (6) EVOO is obtained through a refining process. Only statements 1 and 4 were accurate (true). A score of 1 was assigned for correct answers and a score of 0 when incorrect or unknown responses. Based on these responses, an aggregated index was created to assess respondents' knowledge of EVOO, ranging from 0 to 6. The second part contained questions on the consumption and purchase habits of EVOO and olive oil with Protected Designation of Origin (PDO) European Union label, as well as the BW questions. As this study was part of a larger project, the questionnaire included other sections that are not reported in this paper. The final section included questions related to the respondents' sociodemographic characteristics including age, family size, income, education level, and province of residence.

2.2. Olive Oil Attributes Investigated

Attribute selection was based on a meta-analysis of consumers' stated preferences for olive oil, where Del Giudice et al. [7] reviewed 78 articles published between 1994 and 2014, concluding that most studies investigated preferences for intrinsic EVOO attributes (such as taste, appearance, and colour) and extrinsic attributes (such as packaging, label certification, and brand). Various studies indicated that geographical origin (country, region, locality . . .) was the most highly valued attribute, while European Union designations of origin, such as Protected Geographical Indication (PGI) or PDO, have not fully captured their potential as differentiation and protection tools. Another group of attributes related to food safety and traceability include organic certification. Consumer choices were influenced by information on traceability, with the origin of the olives being the most important element for olive oil traceability. Other relevant attributes were brand, especially traditional brands, and those from private companies. Price was considered an indicator of quality. Sensory attributes, such as colour and flavour, were also highly valued. Additionally, oils with enhanced sensory characteristics (e.g., pungent, bitter, and fruity) were preferred [7]. Latino et al. [13] conducted another review of 47 published papers from 2011 to 2020, confirming that the olive oil sold on the market encompasses a combination of credence attributes (e.g., origin, sustainable-related attributes, brand, safety and health-related statements, and production process) and search and experience attributes (e.g., package features or colour, taste, and flavour) that influence consumers' purchasing decisions. Furthermore, the study of consumer acceptance and preferences for olive oil with credence attributes related to the sustainability of the production process has received increasing attention from academics given the current global trend promoting a socioeconomic model of sustainable production and consumption [16,20]. The study also highlighted that a recent body of literature has focused on product nutritional information and health claims in shaping consumers' acceptance and preferences, which in some cases has little impact on their choices [21–23]. In our case, as data were collected online and it was not possible to examine and test the olive oil, the potential consumer could only observe certain search attributes (e.g., packaging, price) and credence attributes (e.g., production method, geographical origin, and processing techniques). Table 1 shows the seven attributes selected for assessment in this study.

Table 1. Attributes of the olive oil assessed in the study.

Name	Definition
Price	Price
Origin	Geographical origin of production
PDO	Protected Designation of Origin label
Variety	Olive variety
Organic	Organic label
Size	Size of the packaging (1 L, 0.5 L . . .)
Packaging	Packaging material (glass, plastic, tin . . .)

These attributes, identified in previous literature as determinants of consumer preferences, were combined into seven groups of three elements each, following a balanced incomplete block design. This design ensures that each attribute appears the same number of times (i.e., three times) in all choice sets and that, within each choice set, each pair of attributes only appears once [24,25]. In our study, we asked respondents to indicate the most and least product attributes that influenced their preference when buying olive oil. An example of a choice set is presented in Table 2.

Table 2. Example of a question presented to respondents.

"Imagine you are going to buy extra virgin olive oil (EVOO). Tick the one reason that most will influence your choice and the one that will influence the least".		
Most		Least
☐	Price	☐
☐	Variety	☐
☐	PDO	☐

2.3. Best Worst Method Description

The BW method was used to measure the importance consumers attached to different product attributes. There are two general ways to measure importance, directly, or indirectly. Direct approaches measure the importance of different dimensions by asking people to state the level of importance using several elicitation scales such as a rating scale or a constant sum scale. Indirect approaches try to infer the importance by deriving the outcome measure from individual choices using methods such as BW or Discrete Choice Experiments (DCE) [26]. As Mueller and Lockshin [27] point out, the BW presents several advantages in relation to rating scales. Because BW is based on choices of the most important (best) and least important (worst) alternatives, it is free of the scale bias inherent in rating scales and has greater discrimination than rating scales. In addition, the assumption of interval distances in rating scales is frequently violated. Potoglou et al. [28] compare the BW and the DCE finding that although both decision-making methods do reveal similar preference patterns, the BW involves less cognitive burden for respondents and provides more information than traditional DCE. This finding was also corroborated by van Dijk et al. [29]. In addition, the advantage of the BW is that it reduces the variance in the use of the scale and makes it possible to discover the true relative similarities and differences in consumer preferences [27]. Furthermore, the BW method can accurately identify small consumer classes [30]. Since the individuals identify extreme options (the best and the worst alternatives), the interval confidence diminishes and the estimated parameters become more accurate, implying more precise inferences about individuals' preferences. This is the reason why the BW method represents a valid tool to measure overall preferences and preference heterogeneity across people [31].

The BW method is a choice valuation method based on the random utility theory of decision-making [32]. It prompts participants to indicate the most (best) and least (worst) important product attribute among a sub-set of alternatives, following an experimental design out of the total set of product attributes.

First, information on the best and worst choices is aggregated at the sample level using different measures [27]. The number of times an attribute is chosen as most important (best) and least important (worst) is summed across all choices, and the number of worst choices is subtracted from the number of best choices, resulting in the Best-minus-Worst (B-W) scores. This difference is then divided by the number of respondents and multiplied by 100, yielding the Best Worst Scaling (BWS). The BWS score represents the average number of times an attribute was selected as most or least important and, in our case, since each attribute appears three times, it ranges between three and minus three. However, to facilitate interpretation, BWS can be transformed by calculating the square root of the

best divided by the worst (sqrt (B/W)), the standardised ratio scale, or the standardised importance weight.

Second, we assume that respondents simultaneously solve the best–worst choice task and choose the one that maximised the differences between the two attributes in the pair. Then, if the best-worst choices for the attributes are exploded into all six implicit pair-wise choices, we get 42 "pseudo-observations" for each respondent. In the BW method, the respondent chooses a pair of attributes that maximises the utility difference in the best–worst pair chosen. Then, the probability that respondent n chooses attribute i as best and attribute j as worst is the probability that the difference in utility between U_i and U_j is greater than all other possible utility differences in the choice set as follows:

$$P(i/i,j) = P(U_i) > P(U_j). \quad (1)$$

According to Lancaster [33] model combined with the random utility model [32], the utility depends on the product attributes and is assumed to be a random variable, which for the nth individual choosing alternative j in choice set t can be represented as:

$$U_{njt} = \beta X_{njt} + \varepsilon_{njt} \quad (2)$$

where β is a vector of coefficients of the explanatory variables X_{njt} (product attributes) and ε_{njt} is an independent identically distributed error term over time, people, and alternatives. Traditionally, it was assumed that consumers' preferences were homogeneous, and conditional logit models were fitted [32]. However, we assumed that consumer preferences for the different attributes were heterogeneous, and a Latent Class (LC) model was used. This model assumes that preferences are different for several groups or classes of individuals and homogeneous within each class.

For our empirical application and for the selected attributes, the utility function is defined as:

$$U_{njt/s} = \beta_{1s} Price_{njt} + \beta_{2s} Origin_{njt} + \beta_{3s} PDO_{njt} + \beta_{4s} Variety_{njt} + \beta_{5s} Organic_{njt} + \beta_{6s} Size_{njt} + \varepsilon_{njt/s}, \quad (3)$$

where $n = 1, \ldots, 402$ are the respondents; $j = 1, \ldots, 6$ are the pair-wise choice within the choice set; $t = 1, \ldots, 7$ is the choice set; β_{js} is a random vector of class attribute parameters and $\varepsilon_{njt/s}$ is the error term N(0, σ^2). *Packaging* was the attribute used as a reference.

The coefficients for the attributes are estimated by maximising the likelihood function in the state of incomplete prior information on class allocation or choice probabilities [34]. The number of classes is endogenously determined jointly with the coefficients. To select the number of classes, four information statistics for different class specifications (from 1 to 6) are calculated: the Akaike information criterion (AIC), the modified Akaike information criterion (AIC3), the Bayesian information criterion (BIC), and the $\overline{\rho}^2$, called the Akaike likelihood ratio index [35]. The preferred specification would be the one with the lowest AIC, AIC3, and BIC and the highest $\overline{\rho}^2$. However, as mentioned by Swait [36], the optimal number of classes should not only be determined based on statistical criteria but also by considering whether additional classes provide meaningful information, with the goal of achieving class parsimony. In addition, Louviere et al. [37] suggest that the search for additional classes should be stopped when the model begins to deteriorate, indicated by very large standard errors. The LC model was estimated using NLOGIT 6.0 [38].

To assess the differences among the obtained classes, we conducted a series of bivariate analyses between the classes and the socio-demographic characteristics of respondents, the frequency of EVOO consumption, and their EVOO knowledge index. We used a χ^2 test or analysis of variance (Bonferroni test) depending on the type of variables considered [39]. The statistical analyses were performed using STATA 17.0 [40].

3. Results

3.1. Sample Description

The socio-demographic characteristics of the sample and the Aragonese and Spanish populations are presented in Table 3. The sample was representative of the population in terms of gender, age, and province of residence. However, it should be noted that participants in elementary studies are underrepresented due to the exclusion of children under 18 years of age. Conversely, individuals with secondary education and higher are slightly overrepresented, which is common in most studies as individuals with higher education tend to be more likely to respond to questionnaires [41].

Table 3. Socio-demographic characteristics of the sample and the population of the region and Spain. Data expressed in percentage (%), otherwise stated.

Characteristics	Indicator	Sample (n = 402)	Aragon Population [a]	Spanish Population [b]
Gender	Male	49.0	49.0	49.0
	Female	51.0	51.0	51.1
Age (years)	Average ± SD [c]	50.2 ± 20.4	44.9	43.6
	18–44 years	43.5	38.0	35.2
	45–54 years	15.9	19.0	20.4
	≥55 years	40.6	43.0	44.2
Education attained	Elemental	8.0	14.1	20.4
	Secondary	56.2	53.3	46.4
	Higher	35.8	32.5	33.2
Monthly personal net income	<1076 €	32.8	n/a	n/a
	1076 –1350 €	18.2	n/a	n/a
	>1350 €	49.0	n/a	n/a
Household size (num. of memb.)	Average ± SD [c]	2.8 ± 1.2	2.4	2.5
Province of residence	Huesca	17.2	17.0	
	Teruel	10.0	10.3	
	Zaragoza	72.9	72.9	

[a] IAEST [42]; [b] INE [43]; [c] SD: standard deviation. Not available: n/a.

Half of the respondents were female (51%), with an average age of 50. The average household size in the sample accounts for 2.8, slightly higher than the average household size in Aragon and Spain. The average monthly net income per capita was 1350 €, and about 49% of the interviewees had an income higher than this average. On the contrary, 32.8% of households had a net per capita income below 1076 € per month. Most respondents resided in the province of Zaragoza. About half of the respondents had completed secondary studies and 36% had attained higher education.

3.2. Importance of Attributes: Aggregated Analysis

Table 4 presents the aggregated results for olive oil attributes ranked from top to bottom according to the mean BWS, ratio scale, and relative importance weight.

Table 4. Importance of olive oil characteristics: best and worst counts and scores.

Attributes	Best	Worst	B-W	BWS	Sqrt (B/W)	Std. Ratio Scale	Std. Imp. Weight
Price	702	191	511	127	1.92	100	24.5
Origin	609	196	413	103	1.76	92	22.5
PDO	455	283	172	43	1.27	66	16.2
Variety	431	401	30	7.5	1.04	54	13.2
Organic	310	379	−69	−17	0.90	47	11.5
Size	212	621	−409	−102	0.58	30.5	7.5
Packaging	95	743	−648	−161	0.36	18.5	4.6

Results indicate that the most relevant attributes in order of importance for consumers when shopping olive oil are *price*, geographical *origin* of production, *PDO* label, and olive *variety*. The least important attributes are those related to *packaging* material, *size* of the packaging, and the *organic* label certification.

3.3. Modelling Heterogeneity: Latent Class Estimations

The statistical indicators for selecting the optimal number of classes in the estimation of Equation (3) from 1 to six classes are shown in Table 5.

Table 5. Statistics to determine the optimal number of classes.

Number of Classes	Number of Parameters	Log Likelihood at Convergence (LL) [1]	[2] AIC	[3] AIC3	[4] BIC	[5] $\overline{\rho}^2$
1	6	−4434.17	8880.34	8886.34	4441.98	0.10
2	12	−4186.57	8397.14	8409.14	4202.19	0.14
3	18	−4091.32	8218.65	8236.65	4114.75	0.16
4	24	−4035.77	8119.55	8143.55	4067.01	0.17
5	30	−3994.39	8048.78	8078.78	4033.44	0.18
6	36	−3986.85	8045.68	8081.68	4033.70	0.18

[1] Restricted log likelihood evaluated at zero LL (0): = −4909.6; [2] AIC: Akaike information criterion; [3] AIC3: Bozdogan AIC; [4] BIC: Bayesian information criterion; [5] $\overline{\rho}^2$: Akaike likelihood ratio index.

As the number of classes increases, the LL calculated at convergence and the AIC, AIC3 and BIC decrease sharply up to class 5 and stabilise at class 6. The $\overline{\rho}^2$ statistic also increases up to class 5 and remains constant at class 6. In addition, the value of the estimated parameters in the model for six classes started to deteriorate, resulting in larger standard errors, and one of the classes included only 5% of respondents. Therefore, based on these considerations, the optimal number of classes selected was five.

Table 6 shows the results of the estimation of the LC model for five classes, as well as the one-segment model. In the one-segment model, all the estimated parameters were statistically different from zero at the 1% significance level and positive, as expected. This confirms that all the attributes considered in the analysis of olive oil preferences were positively valued by the interviewed individuals compared to packaging, which was used as the reference level and deemed the least important. In addition, the value of the estimated coefficients aligns with the same order of importance of the attributes as observed in the previous descriptive analyses in Table 4: *price*, *origin*, *PDO*, *variety*, *organic*, *size*, and *packaging*.

Looking at the significance of the estimated parameters in the five-class model, it is evident that the importance of attributes varies across classes, as expected. To characterise these classes, we use the estimated β_j parameter values and signs for the attributes. Based on these results, the classes can be named accordingly. Class 1, which accounts for 24.3% of the sample aligns closely with the attribute ratings observed in the one-segment model. This class can be considered representative of the average olive oil consumer and referred to as the "standard consumers". They prioritised *price*, the geographical *origin* of the production, and the quality designation (*PDO*). Class 2, with 11.3% of respondents, can be labelled as "organic seekers" because they attached the highest valuation to the *organic* label certification compared to the other attributes. In this class, the parameter estimate of the *organic* attribute is 76 times higher than that of the variety attribute. Furthermore, the *packaging* is also the second most valued attribute, since all the rest have a negative sign and the estimated parameter for *variety* is not statistically different from the *packaging* one. Class 3 is the largest group with 27.2% of the sample. The most important attributes were the quality (*PDO*) and the *origin* of production, and, to a lesser extent, the attributes *organic* and *variety*. The negative sign for size, the only one in this class, indicates that it is the least valued attribute of all, behind the packaging. Hence, this class can be named "Quality & origin lovers". In Class 4, representing 14.2% of the sample, all attributes are found to be

statistically significant. *Price*, *origin*, *variety*, and quality (*PDO*) were the most important attributes. However, the high significance and negative sign of *organic* indicates that this certification was the least important, therefore, we labelled it as "organic indifferent". Class 5 comprises 23% of consumers and is mainly characterised by the importance of *price*, with *size* and *origin* having relatively less significance. This indicates that these consumers are seeking olive oil at the best price and prefer it to be sold in large containers or in bulk. Consequently, this class can be named "best price-buyers".

Table 6. Estimated parameters of the olive oil attributes for the five classes.

Attribute	One-Segment	Class 1	Class 2	Class 3	Class 4	Class 5
Price	1.475 (25.50) ***	4.142 (11.38) ***	−0.235 (−1.01)	0.998 (5.65) ***	2.279 (7.80) ***	3.094 (11.19) ***
Origin	1.343 (23.72) ***	2.709 (10.15) ***	−0.119 (−0.52)	2.565 (11.20) ***	1.863 (7.43) ***	1.019 (6.78) ***
PDO	1.043 (19.13) ***	2.575 (9.23) ***	−0.412 (−1.77) *	2.608 (11.45) ***	1.320 (5.28) ***	0.146 (0.94)
Variety	0.875 (16.20) ***	1.693 (7.09) ***	0.008 (0.04)	1.951 (9.71) ***	1.772 (6.85) ***	0.167 (1.12)
Organic	0.757 (14.15) ***	1.900 (7.08) ***	0.609 (2.86) ***	2.021 (10.24) ***	−0.770 (−2.30) **	0.207 (1.47)
Size	0.338 (6.30) ***	0.534 (2.81) ***	−0.470 (−2.58) ***	−0.024 (−0.17)	0.481 (2.28) **	1.227 (7.91) ***
Class Size (%)	100	24.3	11.3	27.2	14.2	23.0
Designation		Standard consumers	Organic seekers	Quality & origin lovers	Organic indifferent	Best price buyers

Note: ***, ** and * statistical significance at 1%, 5% and 10% levels, respectively.

On the other hand, classes 1, 4, and 5, which account for 61.5% of respondents, have the highest estimates for *price* while the price had a small value in classes 2 and *3.* This finding indicates however that almost two tiers of respondents placed the highest importance on the *price* when buying olive oil. Geographical *origin* was the second most valued attribute in classes 1, 3 and 4, accounting for 65.7% of respondents. Class 2 values *origin* the least among the classes but more than *price*, *PDO*, and *size*. The quality attribute (*PDO*) was the highest-rated attribute in class 3 (27.2% of respondents) and the third ranked in class 1 (24.3%). Class 2 is also the one that values quality the least (*PDO*) among the rest of the attributes. *Variety* was valued second in class 2 (11.3%) and decreasingly in all other classes. *Organic* certification was ranked first in class 2 (11.3%) and last in class 4 (14.2%). *Volume* was rated second in class 5 (23.0%) and last in classes 2 and 3 (38.5%). Finally, *packaging* was the worst rated (6th and 7th) in all classes except in class 2, where it was considered the third most important attribute.

To profile the classes of consumers, the Pearson chi-square or the Bonferroni tests for the socio-demographic characteristics, the frequency of EVOO consumption and its knowledge were calculated. Table 7 presents the statistically significant results for these characteristics, with significance levels of at least 10%. "Standard consumers" (Class 1) closely resembled the general sample in terms of the consumer characteristics outlined in Tables 3 and 7. "Organic seekers" (Class 2) and "Best-price buyers" (Class 5) consisted of younger people with less knowledge about EVOO. However, these two classes differed in terms of the province of residence. Class 2 had a higher proportion of consumers from Huesca and a lower proportion from Teruel, while Class 5 had a higher proportion of consumers from Zaragoza. On the other hand, the "organic indifferent" (Class 4) were more knowledgeable about EVOO and had a higher proportion of respondents with lower

income levels. "Quality & origin lovers" (Class 3) consisted of older people who had a higher income level and a lower proportion of residents from the province of Zaragoza.

Table 7. Characterisation of consumer preference classes.

Consumer Characteristics	Standard Consumers	Organic Seekers	Quality & Origin Lovers	Organic Indifferent	Best Price Buyers	(*p*-Value) [1]
Socio-demographic characteristics (%)						
Age	50.9 [a]	47.7 [b]	54.1 [a]	51.6 [a]	45.3 [b]	6.4 (0.00) ***
Income						
Less than 1076 €	36.1	34.1	24.1	45.6	31.6	14.4 (0.07) *
Between 1076 and 1350 €	15.5	14.6	22.3	7.0	14.2	
More than average (1350 €)	48.5	51.2	53.6	47.4	44.2	
Province						
Huesca	15.5	24.5	19.6	10.5	16.8	13.9 (0.08) *
Teruel	11.3	2.4	15.2	12.3	4.2	
Zaragoza	72.2	73.2	65.2	77.2	79.0	
EVOO consumption frequency						
Daily	51.5	43.9	72.3	65.2	48.4	28.8 (0.00) ***
Several times a week	14.4	14.6	8.0	17.5	20.0	
Sometimes a week	11.3	7.3	10.7	3.5	10.6	
Sometimes a month	22.7	34.1	8.9	15.8	21.0	
Knowledge on EVOO index	3.2 [a]	2.3 [b]	3.3 [a]	3.6 [a]	2.7 [b]	4.6 (0.00) ***

[1] The Pearson chi-square test was used for income, province and EVOO consumption frequency. The analysis of variance and the Bonferroni test were used for age and knowledge of EVOO index. [a,b] indicate that means were statistically different among classes using the Bonferroni test. *** and * meaning statistical significance at 1% and 10%, respectively.

4. Discussion

There is a plethora of previous studies that investigate consumer preferences for olive oil attributes well documented in two literature review papers [7,13]. Most of them are focused on Mediterranean countries and use different conjoint approaches. In addition, many of these studies have examined the potential heterogeneity among consumers' preferences for olive oil attributes and have further explored different consumer profiles ([19,20,44], among others). Building upon the hypothesis of heterogeneity in consumer preferences for olive oil attributes at the time of purchase, we provide further evidence regarding consumers in a region that is representative of the entire country's population using the BW method. We study a set of attributes that have been identified as important for consumers in previous empirical papers, namely *price*, *origin, PDO*, *variety*, *organic*, *size*, and *packaging*. Our findings confirm the existence of this heterogeneity, and we identify five consumer classes with different sociodemographic characteristics, consumption frequency, and knowledge of EVOO. One consumer group aligns with the preferences and characteristics of the standard consumers ("Standard consumers"). For consumers who possess greater knowledge of EVOO, but have lower income levels, the *organic* attribute holds the least importance ("Organic indifferent"). On the contrary, people with less knowledge of EVOO and younger ranked the *organic* attribute ("Organic seekers") and the *price* ("Best price buyers") as their top preferences. Finally, a group of older consumers, which includes a higher proportion of people with higher income levels residing in the province of Zaragoza, valued *PDO* and *origin* as the most important attributes ("Quality and origin lovers").

Although we have identified five differentiated consumer profiles in Spain based on the perceived importance of olive oil attributes, we can affirm that *price* is the most important factor for 61.6% of the interviewees ("Standard consumers", "Best price buyers",

and "Organic seekers" classes). This result is in line with previous findings [44–50]. In contrast, these results differ from those of Chrysochou et al. [2] where the most important attribute is the quality indicator (i.e., extra virgin and virgin) followed to a lesser extent by price. Thus, in non-producing countries where olive oil is less prevalent among eatable fats, price has been considered an indicator of product quality [2,7,14,45] and consumers from these non-producing countries tend to often purchase more expensive olive oils [51]. Additionally, in non-producing areas, attributes related to the region or country of origin of the olive oils have been found to have a greater influence on the purchase decision than the price [52–54]. However, consumers in traditional olive oil-producing areas tend to prioritise local production and prefer olive oil produced closer to their area of consumption over oils from distant regions [51,52,55–58]. The *origin* of production was rated as the second most important attribute for 65.7% of respondents ("Quality & origin lovers", "Standard consumers", and "Organic indifferent"). Regarding the EU *PDO* label, respondents rated it positively, with 27.2% of respondents considering it as the most valued attribute ("Quality & origin lovers"), and 24.3% of participants ranking it as the third most valued attribute, after *price* and *origin* ("Standard consumers"). These results are consistent with the research findings of Erraach et al. [59,60] who examined consumers' valuation of quality labels for Andalusia (Spain) and Naples (Italy), the world's largest producer and consumer countries. Considering that the consumption of organic food is less widespread in Spain than in central and northern European countries, we found that the EU *organic* certification label was rated as the third least important attribute in our sample, except for the minority class of "organic seekers" (11.3% of respondents) who ranked as first this attribute. These results are in line with Yangui et al. [58] who observed a negative WTP for the organic attribute in their analysis of olive oil preferences in northeastern Spain. They concluded that consumers perceived a disutility from the organic attribute, as they are unwilling to pay a price premium for a healthy product per se. Similarly, the findings of [8,59,60] pointed out that in Spain the efficacy of eco-labels is not entirely guaranteed, and consumers doubt the credibility of the information provided by marketers. On the contrary, the findings of Aprile et al. [61] concluded that respondents are willing to pay a high price for the *organic* label, following the *PDO* label. For the "Organic seekers" class, after the EU *organic* certification, the *variety* of olives used to produce the oil, and the *packaging* material are the next most valued attributes. In the remaining four classes, the *packaging* is ranked sixth or seventh in terms of importance.

5. Conclusions

The standard olive oil consumer prioritises *price*, *origin*, and *PDO* above all else. However, our research has identified four more classes with distinct attribute valuations. For a small minority (11.3% of respondents), *organic* certification is the most important attribute while for the "Organic indifferent" (14.2% of respondents), this certification is the least important. Conversely, the largest class (27.2%) attaches more importance to the *PDO* and the *origin* of production. Finally, there is a group of consumers that appreciate overall the *price* and the *size* of the package.

Based on the provided consumer segments, olive oil producers should consider some of the following aspects to tailor marketing strategies considering each segment: *Standard consumers (24.3%)*: Highlight affordable pricing to attract these price-conscious consumers. Emphasise the specific region of origin, associating it with quality. Communicate the PDO designation prominently to assure consumers of the product's quality and adherence to traditional production methods. Emphasise the overall value of the olive oil in terms of price, quality, and origin. *Organic seekers (11.3%)*: Promote the organic label certification prominently, highlighting the product's adherence to organic standards and the benefits for health and the environment. Use eco-friendly packaging materials and emphasise the product's sustainability. Highlight the health advantages of organic olive oil, such as being free from pesticides and harmful chemicals. Share information about your brand's commitment to organic farming practices and supporting local communities. *Quality &*

origin lovers (27.2%): Highlight the specific regions or counties of origin, emphasising the products' superior quality and authenticity. Share stories about the traditional production methods, cultural heritage, and expertise behind the product. Introduce limited edition or reserve ranges to cater to consumers looking for exclusive and high-quality options. *Organic indifferent (14.2%)*: Emphasise the competitive pricing and overall value of the product. Highlight the diverse range of origins and olive varieties available, providing options to cater to different preferences. Emphasise easy-to-use packaging and the product's versatility in various culinary applications. Compare the quality and value of your olive oil with non-organic alternatives, highlighting superiority. *Best price-buyers (23%)*: Emphasise the best price offerings, discounts, and cost-effective solutions to attract price-sensitive consumers. Highlight larger container sizes or bulk purchase options, catering to consumers seeking economical choices. Run promotional campaigns, limited-time discounts, or bundle deals to create a sense of urgency and value. Highlight the affordability and cost-effectiveness of the product without compromising quality. Remember to continuously analyse market trends and consumer preferences to adapt your marketing strategies and stay relevant in the ever-changing market.

This work acknowledges some limitations. Although we include the most important olive oil attributes detected from previous studies, the results can be conditioned by the number and type of attributes considered. The exclusion of some experience attributes (e.g., taste, flavour, and acidity) may have some impact on the results, although as pointed out by Del Giudice et al. [7], the origin of the product determines the sensory characteristics of the olive oil, as it is closely related with the agronomic techniques used in the olive production. In addition, this study has been conducted in one Mediterranean country and the results should be put in this context, in other words, no extrapolation to other non-Mediterranean countries can be made.

Therefore, further research may replicate our study in non-Mediterranean countries to investigate differences in attribute preferences across geographical contexts and provide results with higher external validity. Lastly, conducting a comprehensive investigation by considering both intrinsic and extrinsic characteristics could involve measuring a wider range of attributes. This includes incorporating experience-based attributes (e.g., taste) in various scenarios (e.g., tasting, and non-tasting) to ensure a more thorough analysis. Encompassing sensory qualities and other relevant factors would lead to a more comprehensive understanding of olive oil consumer preferences.

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Appendix A

Table A1. Population by sex and age in Spain and Aragon in 2022 (number, %).

	Total	Sex		Age					
		Female	Male	0–19	20–34	35–44	45–54	55–64	>65
Spain	47,385,107	51	49	19.2	16.3	15.1	16.1	13.6	19.6
Aragon	1,326,315	50.6	49.4	18.4	15.3	14	16	14.2	22.1

Source: [42,43].

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