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Premium, popular and basic olive oils: mapping product segmentation and consumer profiles for different classes of olive oil

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Abstract

Purpose – Urban metropolitan consumers react to the different qualitative categorizations of the product thus creating homogeneous market segments. The aim of this paper is to identify specific market segments which allow for the definition of homogeneous olive oil consumer targets.

Design/methodology/approach – This study was based on the stated preferences of consumers and emphasizes the role that different quality scales of olive oil have in the eye of the consumer. The data, collected through a questionnaire, were analysed by means of inferential and multivariate statistics techniques, that is, the study specifically entailed a factorial and cluster analysis.

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Findings – This paper explores olive oil market segments broken down by the different quality levels of existing products, thus trying to identify main consumer preferences. Our outcomes suggest the existence of three main quality classes of olive oil consumer: basic, popular and premium.

Research limitations/implications – Even though we gathered data and information from a broad sample, the study does not fully reflect the average Italian population since we based our study on a convenience sample of northern Italian consumers. A more extended sample is needed to test our hypothesis in other regional areas.

Practical implications – The outcomes derived from this study provide useful insights both for marketers and olive oil producers by allowing more efficient strategic decisions in terms of product segmentation.

Originality/value – This study, aimed at matching olive oil market segments and consumer preferences, shows the existence of three well-defined quality classes of olive oil consumer: basic, popular and premium. In addition, this study ascertains for the first time how the attitude towards local products is positively influenced by family origin as a result of an inter-generational attitude.

Keywords Quality signals, Olive oil categories, Organic olive oil, Basic olive oil, Premium olive oil

Paper type Research paper

Nomenclature

Symbol	*Description*
CA	Cluster Analysis
EVOO	Extra-Virgin Olive Oil
KMO	Test of Kaiser–Meyer–Olkin
GIs	Geographical Indications
PC	Principal Component
PCA	Principal Component Analysis
PGI	Protected Geographical Indication
PDO	Protected Designation of Origin
WTP	Willingness To Pay

1. Introduction

Product segmentation has been the subject of several marketing research studies due to large enterprises segmenting their products into different brands in order to satisfy the demand of consumers with different socio-economic characteristics (Desai, 2001; Onwezen and Bartels, 2011; Salazar-Ordóñez *et al.*, 2018). Several contributions focused on product differentiation and took into account several food products differentiated by price, label, nutrition content (Wirthgen, 2005; James *et al.*, 2009) and health attributes (Roselli *et al.*, 2017; Lombardi *et al.*, 2021). In addition, consumer understanding of differentiated food choices based on country and geographical origin as well as on organic label has been addressed by several authors (Cicia *et al.*, 2002; Insch and Jackson, 2014; Thøgersen *et al.*, 2017).

In the agro-food sector there have been a fair number of contributions on preference for product segmentation, first of all in the wine industry, since this product is highly differentiated. Thus, several authors have identified different categories and quality levels (Cembalo *et al.*, 2014; Di Vita *et al.*, 2019a), but scant attention has been paid to other important agro-food product categories.

In the case of olive oil, a large strand of literature focused on high-quality categories, such as GIs and organic olive oil; several authors shed light in segmenting extra-virgin olive oil categories (Scarpa and Del Giudice, 2004; Dekhili *et al.*, 2011; Roselli *et al.*, 2017) but many aspects related to hierarchically-differentiated categories of olive oil have been under-investigated or not explored at all. For example, scarce attention has been paid to consumption of medium or low-end olive oil as such. Therefore, it would be interesting to

extend the analysis to olive oil, thus focusing on different quality level categories and comparing the main factors that affect olive oil preferences.

In fact, in recent years, this product has set out on a path of progressive differentiation based both on the quality "tout court" (enhancement of certain sensory characteristics) and on main credence attributes such as Protected Designation of Origin (PDO), Protected Geographical Indication (PGI), local production and organic certification (Del Giudice *et al.*, 2018; Panico *et al.*, 2014). This has led some authors and researchers to hypothesize and identify some quality classification criteria by analysing the role of multiple labelling on consumer choices and preferences (Perito *et al.*, 2019; Perez *et al.*, 2020; Di Vita *et al.*, 2021a). To date however, studies on preferences for different quality levels of the oils have not yet been carried out in a systematic way.

Studies on olive oil consumption have examined the motivations and choices of consumers with regard to label and certification; however, there are still further elements to be explored.

This paper contributes to extending the current literature by verifying whether the well-established market segments based on defined price and quality thresholds exist. In addition, this study also contributes to investigating the consumers' intention to purchase medium and low-quality olive oil such as basic or common.

A certain paucity of studies persists on these latter aspects and aiming to fill this gap, this paper intends to provide a first approach to olive oil market segmentation based on the different quality levels corresponding to different price ranges, while at the same time providing a profile of consumers who make up different olive oil market segments.

The hypothesis is that the consumer in urban metropolitan areas reacts to the different qualitative classifications of the product thus creating specific and homogeneous market segments. To corroborate our intuition, the survey focused on answering the following research questions:

(1) To what extent does a well-established product segmentation in the urban olive oil market exist?

(2) Are different quality levels of olive oils clearly ascribable to a homogeneous class of consumers?

In order to identify specific market segments which allow for the definition of homogeneous consumer targets, this paper introduces a systemic approach to preferences in terms of product differentiation for the first time, proposing a classification of olive oils in relation to their location in terms of quality and price range. The work therefore divided olive oils into common olive oils (basic), Italian brand oils (medium), premium oils characterized by EU recognition (PDO, PGI and organic) and ultra-premium olive oils, recently recognized as top of the line.

The remainder of this paper is structured as follows: the first section reports a theoretical background of olive oil consumption according to the main olive oil categories and typologies; in the second section the conceptual framework and the research method are set out. The third section presents the results derived from a two-block principal component analysis and a subsequent cluster analysis. The last section discusses and concludes the study.

2. Theoretical background of olive oil categories

Given the existence of specific categories of oils corresponding to defined olive oil typologies with different price ranges, this section presents and summarizes the main contribution of existing literature on olive oil consumption using the four category-based diagrams for assessing the quality level of olive oil, reported in the introduction.

2.1 Basic olive oil

The term "Basic" was used for the first time to categorize the high degree of heterogeneity of wines. Within the basic wine category, price and packaging were found to be important drivers in the wine choice of consumers (Cembalo *et al.*, 2014). Other studies, aiming to analyse product differentiation for wines, highlighted a difference between low and high-priced wines, where private labels play a relevant role in the choice of basic and premium wines, while collective reputation expressed as geographical indication is more important for high priced wines (Caracciolo *et al.*, 2016). While the basic wine segment has been examined in several studies and consists of product differentiation based on a different quality scale (Carew *et al.*, 2017; Di Vita *et al.*, 2019a), by observing the existing literature, we found a very limited number of studies regarding the attitudes and behaviour of consumers towards basic olive oil.

A prior research paper on basic olive oil found price to be one of the most important determinants in consumer preference in olive oil (García *et al.*, 2002). Subsequently another study addressed the assessment of the consumers' purchase intention towards own-label olive oil; the authors show how it is influenced by consumer attitudes such as perceived utility, price, brand loyalty and trust (Chaniotakis *et al.*, 2010). Few references were found regarding consumers' choices of bulk olive oil. Prior research found that bulk olive oil, not yet bottled for retail sale and sold hermetically sealed in 5-litre tin containers, is mainly distributed in the domestic markets of Mediterranean countries, such as the southern regions of Italy, Greece and Spain (Di Vita *et al.*, 2013; Krystallis and Ness, 2005). Since consumers show a limited interest in bulk olive oil it has not yet been fully investigated by academics; nevertheless, in light of the growing interest shown by consumers in locally marketed products, distributed regionally in bulk by individual farmers (Krystallis and Ness, 2005; Di Vita *et al.*, 2013), the analyses of consumer behaviour towards this highly heterogeneous product with high-quality characteristics could be worthy of further study.

2.2 Common olive oils (private label and well-known brands)

In this subsection we have included the main contributions that private label and well-known brands (Italian-sounding brands such as Carapelli, Bertolli, Monini, Sasso, De Cecco, etc.) have on consumer behaviour. We decided to include private labels in this class because, as reported in recent literature, retailers' private labels are strong competitors of well-known brands in the high-quality olive oil market segment (Cavallo *et al.*, 2018), despite, in rare cases, being able to occupy even the low-quality segment market.

Indeed, the literature emphasized the preference of consumers for traditional brands and private labels, both with an increasing information value and reassuring features for the consumer. A study based on olive oil consumption in the Greek market found that consumers showed a high intention of purchasing supermarket own brands, as well as being willing to pay a modest price premium for olive oils distributed by private companies (Chaniotakis *et al.*, 2010).

In contrast to what was observed for wine (Caracciolo *et al.*, 2016), it seems that the olive oil consumer attaches more importance to a collective reputation than to a private one. A recent research paper showed that extra virgin olive oil sold in large retail stores with private labels have lower prices than the average price (Romo Munoz *et al.*, 2015) and price, above all in a perceived economic crisis, showed a strong positive lead of consumers with a preference for private label oils (Chaniotakis *et al.*, 2010).

Another study evaluated the WTP for different olive oil labels, thus highlighting that consumers are only willing to pay a premium for olive oils traded under private label. The authors showed a higher propensity of consumers towards supermarket own-brand, since they seemed to prefer it to the brands usually purchased (Vlontzos and Duquenne, 2014).

The intention to buy a private-labelled olive oil seems to be influenced by the same variables that affect premium olive oil consumption, that is to say that price, perceived benefits and consumer trust are among the most important drivers of consumption (Chaniotakis *et al.*, 2010).

Despite the fact that the literature pointed out the importance that consumers attach to traditional brands, few studies have evaluated and measured the importance of "brand renown" among consumer preferences (Del Giudice *et al.*, 2015). In summarizing previous results, the role of brand as a quality driver for loyal and brand-engaged consumers emerges, while private label entails a negative willingness to pay and is attractive only to poorly informed consumers and those more involved in discounted or low-priced products (Caracciolo *et al.*, 2020).

2.3 Premium and ultra-premium olive oil

The literature on oils we included in the premium class contains a high number of contributions, while we noticed scant attention paid to ultra-premium olive oils, due to their limited availability in the markets and consequently on the number of related studies.

We introduce the term "premium" in this paper for the first time to identify the high-end olive oils that include Geographical Indications (GIs), such as PDO and PGI, and organic certification. The literature points out that a GIs label exerts a positive effect on consumer olive oil choices (Scarpa and Del Giudice, 2004; Menapace *et al.*, 2011), while other studies found that geographical indications (PDO/PGI) and organic labelling increase the willingness of consumers to pay an additional price with respect to conventional olive oil (Roselli *et al.*, 2016, 2018a). Consumers ascribe an additional quality level to both certifications and despite organic and GIs labels being clearly distinguished by consumers, a certain correlation between these certifications exists (Roselli *et al.*, 2018a). As regards consumer preference for organic olive oil, further studies revealed increasing attention paid to organic and eco-labelled olive oils (Giannoccaro *et al.*, 2019).

Analogous results were also obtained by Kalogeras *et al.* (2009) for organic olive oil in non-traditional producing areas. Based on a Dutch study of stated consumer preferences, the authors assess a positive WTP for different organic olive oils. In fact, within this class no differences exist between traditional consumers and those living in non-traditional producing areas. Indeed, the regional origin of consumers also plays a relevant role in addressing the olive oil buying choices of PGI olive oil. Consumers in new producing areas, such as California, focus their attention on product familiarity (Santosa *et al.*, 2010) while Italian consumers are more concerned about geographical origin (Panzone *et al.*, 2016). Regarding geographical origin and consequently the role of the country-origin effect on consumer choices, recent studies have emphasized how highly significant it is (Mtimet *et al.*, 2011; Dekhili *et al.*, 2011; Bimbo *et al.*, 2020; Trentinaglia *et al.*, 2021). The importance attached to the origin cues and consumer preference is not universal since it varies according to market characteristics and depends on the reputation and image of the producing region (Chamorro *et al.*, 2020; Dekhili and d'Hauteville, 2009); therefore it can be considered as a very important product attribute which, can be implicitly, albeit partially, included in PDO and PGI signals.

Concerning super-premium extra-virgin olive oil, a recent study identified and analysed the hedonic price of such Italian olive oils (Cacchiarelli *et al.*, 2018). In this case it was observed that a premium price on the highest-class olive oil category oils depends on the varietals of the olives, mono-cultivar and the local cultivars, as well as on the certifications of origin (PDO/PGI). In addition, small bottle size (0.250 and 0.500 ml) and the organic label are also associated with a price premium (Cacchiarelli *et al.*, 2018).

Finally, even functional olive oils could be ascribable to the ultra-premium class. Several studies have explored the innovative technologies in extra virgin olive oil extraction (Stillitano *et al.*, 2019) and their healthful effects on consumer choices by analysing consumer

reaction to health claims (Pichierri *et al.*, 2020) or the role of a higher content of functional agents such as polyphenols (Di Vita *et al.*, 2020b). Despite current evidence not having found a significant willingness to pay for these innovative products (Cavallo *et al.*, 2020), an increased demand for functional olive oils is expected in the near future, which will result in an additional premium price (Roselli *et al.*, 2018b), at least for more motivated and health-conscious consumers (Di Vita *et al.*, 2020b; Roselli *et al.*, 2020).

3. Methodology

3.1 Data collection and conceptual framework

This study was based on the stated preferences of consumers and emphasizes the role that different quality scales of olive oil have in the eye of the consumer. Data were gathered from anonymous questionnaires that were administered by trained interviewers. Before collecting the answers to be used for the analysis, validation of the questionnaire was performed through a pilot survey of 25 olive oil consumers. A pre-test was necessary to verify the questions were complete and effective and to make corrections to the questionnaire possible. Data were collected in the metropolitan areas of Milan and Turin, which are considered as representative of northern Italian urban areas (Di Vita *et al.*, 2020). The interviews were carried out from Monday to Saturday between 10.00 a.m. and 3.00 p.m., with an average time per interview of between 10 and 15 min. In addition, only those responsible for purchasing food products were interviewed in order to make the answers more reliable. Respondents were stopped and interviewed while making purchases at large retail stores after a random recruitment walk (Annunziata and Vecchio, 2013; Di Vita *et al.*, 2020a).

We collected 330 complete questionnaires; this sample size is considered adequate to conduct multivariate analyses and to increase the reliability of the models (Taherdoost *et al.*, 2014). The socio-demographic characteristics of the sample are shown in Table 1.

The questionnaire contained different sections and was administered to a convenience sample of consumers. This sampling method implies that results should be interpreted with caution because of the lower possibility of inference to the general population; however, it is a sampling approach widely used in the literature because the validity of the results is not affected (Sama *et al.*, 2019; Testa *et al.*, 2019; Di Vita *et al.*, 2021a).

Characteristics	Percentage	Characteristics	Percentage
Gender		*Age group*	
Male	44.3	18–30	21.9
Female	55.7	31–45	30.2
		40–60	34.7
Education		Over 60	13.2
High school graduate	52.7		
Bachelor's degree or higher	47.3	*Household unit*	
		1–2 members	45.8
Monthly net income		From 3 to 4 members	44.3
0–1,000 euros	4.8	Over 4 members	9.9
1,001–1,500 euros	20.4		
1,501–2,000 euros	12.0	*Parents or Grandparents of southern Italian origin*	
2,001–3,000 euros	18.3	Yes	55.1
3,001–4,000 euros	10.2	No	44.3
4,001–5,000 euros	3.3	No answer	0.6
Over 5,000 euros	3.9		
No answer	27.1		

Table 1. Socio-demographic characteristics of the sample

A series of coded options, organized in four main sections, was proposed to the interviewees who were asked to choose the one most consistent with their opinion or behaviour. Questions were aimed at coding attitudes and preferences of the interviewed subjects and their families and were organized as binary questions (yes/no answers), multiple choice answers in the case of place of purchase and seven-point Likert scale.

For instance, regarding the place and frequency of purchase, the following question was asked: "Where do you prefer to buy olive oil and how often?" where 1 = never; 2 = sometimes, 3 = very often. The previous question included multiple purchasing places such as supermarkets and local producers.

With respect to the questions on Likert scales, an example might be the following: "Could you please indicate the levels of importance and reasons for consuming extra virgin olive oil?" Here 1 = not important while 7 = very important. This question also had many possible answers, for instance healthfulness or nutritional properties. The complete list of questions and answers used in the multivariate analysis is provided as a table in Table A1.

The first questionnaire section included the variables related to the general characteristics of olive oil consumption, such as habits, frequency of consumption and points of purchase. The second section was aimed at gathering information about personal motivations and beliefs of the interviewees as well as intrinsic attributes (sensory characteristics) and extrinsic cues of olive oil, such as brand, producer's reputation, origin. The selection of the variables included in the first and second sections of the questionnaire and used for the statistical analyses was carried out through the analysis of recent literature regarding contributions on olive oil consumption (Santosa *et al.*, 2013; Carlucci *et al.*, 2014; Del Giudice *et al.*, 2015; Bernabéu and Díaz, 2016; Cavallo *et al.*, 2018; Cacchiarelli *et al.*, 2018; Roselli *et al.*, 2018a; Perito *et al.*, 2019; Cavallo *et al.*, 2019). Different types of variables were used to match consumer behaviour with different patterns of consumption through multivariate analysis. The third section of the questionnaire focused on capturing the socio-economic characteristics of respondents (gender, employment, native region, income, etc.). Finally, since the paper is focused on the different quality levels of the oil, a classification of different olive oil classes was proposed in the fourth section. According to this preliminary olive oil classification (reported in Table 2), consumers were asked to express their preferences for these different quality classes.

The classification of oils was developed through a market survey based on price collection and qualitative profile. The survey covered two urban areas; for each area two different types of retail store were considered: hypermarkets and supermarkets, located in residential areas, excluding city centres and low-income neighbourhoods.

As a first step, product recognition of those on the supermarket shelves was carried out in order to select the main virgin and extra-virgin olive oil categories by considering prices and typologies.

Price categories were fixed using both mean, for basic and ultra-premium, and price ranges, for popular and premium. The pricing thresholds for basic (maximum sales

Class	Category	Price	Origin	Characteristics
Basic	Virgin Olive Oil	<4.99 euro	Extra-EU	Unknown brand
Popular	Extra-Virgin Olive Oil	5.00–7.99 euro	EU	Private label; Italian sounding brand: i.e. Bertolli, Carapelli, Monini, Sasso, De Cecco, etc.
Premium	Extra-Virgin Olive Oil	8.00–16.99 euro	100% Italian	PDO, Organic, PGI
Ultra Premium	Extra-Virgin Olive Oil	>17.00 euro	100% Italian	Varietals, Limited Reserve, Collection

Table 2.
Classification of Olive oil classes

price) and ultra-premium olive oils (minimum sales price) were derived from an arithmetical average of different prices collected at the supermarkets and hypermarkets used in the study. Moreover, the range of values we considered for popular and premium was derived by selecting the maximum and minimum price levels. To reduce the effect of outliers and to establish a representative price level, price promotions were not included in our survey.

The criteria for classifying oils also considered the quality level of olive oils, expressed in terms of label or brand typology, certification process or product (geographic origin, organic production).

Once prices and quality levels of the olive oil categories were identified and defined, each product was detected, classified and re-assigned to a main class that was generated based on previous literature and the market survey. Consequently, a four-class scheme for assessing the quality level of olive oil was achieved. As reported in Table 1, the virgin olive oil price is equal to or less than 4.99 euros per 0.75 cl bottle, while popular or medium brands are priced at between 5.00 and 7.99 euros. The high-end olive oil segment included premium class olive oils, with a price of between 8.00 and 16.99 euros/litre, and finally the ultra-premium class, with a price of over 17.00 euros/litre.

3.2 Statistical approach

The data collected through the questionnaires were analysed by means of inferential and multivariate statistics techniques, specifically the study entailed a factorial and cluster analysis (Chinnici *et al.*, 2002, 2016a, 2016b).

The first part of the analysis developed some descriptive statistics to understand consumer attitudes towards olive oil. In the next step, a Principal Component Analysis (PCA) (Formula 1) was applied in order to reduce the information included in the original variables onto a lower dimension space (Verde *et al.*, 2015) that was subsequently used to identify homogeneous consumer groups through Cluster Analysis (CA).

$$Y_i = W_{i1} X_1 + W_{i2} X_2 \ldots + W_{ip} X_p \tag{1}$$

$X_1, X_2, \ldots$ and X_p represent the original standardized variables and $W_{i1}, W_{i2}, \ldots W_{ip}$ are the relative weights related to each of these variables. The PCA allows us to verify which variables are able to "explain" the main characteristics of consumption by synthesizing the description of the phenomenon, while at the same time limiting the loss of information in terms of explained variance. This has been achieved by converting the original set of correlated variables into a new set of orthogonal variables. Varimax rotation has been used to simplify the interpretation of PCA results and to maximize the sum of variance of the square loadings (Kaiser, 1960). For this reason, the factor loadings in the result tables will refer to the rotated components, as well as the explained variance.

This statistical technique was carried out separately for blocks of homogeneous variables (Jolliffe, 2002), corresponding to the two sections of the questionnaire for a total of 24 variables: first, PCA was carried out on 12 variables related to the general characteristics of olive oil consumption; after that, PCA 2 was carried out on 12 variables linked to the personal motivations of respondents as well as to the intrinsic and extrinsic attributes of olive oil.

With regard to the choice of values, we selected the factors with an eigenvalue greater than 1 (Kaiser, 1960). Finally, in the analysis of the factor matrix, we considered the minimum value of 0.35 (Overall and Klett 1972; De Lillo *et al.*, 2007).

Verification of the goodness of the model was made through *Kaiser–Meyer–Olkin* (KMO) and Bartlett's test (Formula 2) based on partial correlations between the variables.

$$\mathrm{KMO} = \sum_{i}^{p}\sum_{j\neq i}^{p} r^2\ ij \Big/ \sum_{i}^{p}\sum_{j\neq i}^{p} r^2\ ij + \sum_{i}^{p}\sum_{j\neq i}^{p} c^2\ ij \qquad (2)$$

The KMO test results are included in the range of 0–1. Low index values suggest the inadequacy of the analysis, because the correlation between couples of variables cannot be explained by the variance shared by the entire set of variables. For this reason, it is recommended that the results of the KMO test should not be less than 0.5 while results above 0.7 are considered to be good (Kaiser and Rice, 1974).

Regarding the assessment of the goodness of the model, the Bartlett test is commonly used to evaluate the hypothesis that the correlation matrix coincides with the identity matrix (Kumara and Canhua, 2010). When the Bartlett test is not significant, this indicates that the identity matrix may coincide with the correlation matrix, consequently the use of the factorial model may not be appropriate.

Finally, in order to identify homogeneous groups among consumers, a cluster analysis was carried out by using the *k*-mean method on the factor scores obtained by PCA. The *k*-mean method is a non-hierarchical classification method that allows us to build clusters through an iterative process by minimizing the Euclidean distances between centroids (Steinley, 2006).

Once the clusters were obtained, to verify the effective differentiation based on socio-demographic characteristics, inferential statistics were carried out. Specifically, the test chosen was chi-square; in fact this method can be used for frequency analysis because it allows for verification of the association or independence of two categorical variables (Franke *et al.*, 2012).

4. Results

4.1 Result of principal component analysis (PCA)

The first PCA block (Table 3), which was carried out on 12 variables related to the general characteristics of olive oil consumption, allowed us to obtain four PCs that explain about 60.0% of the total variance. Regarding the fit of the model, the values of the KMO test (0.666) and the Bartlett test (0.000) are significant.

Table 3.
Rotated component matrix of general characteristics of olive oil consumption

	PCs			
	1 - inexpensive and healthy	2 - local consumption	3 - high-end olive oil consumption	4 - mid-quality consumption
Buying direct from local producer	0.091	*0.788*	−0.084	−0.210
Hypermarket	−0.107	−0.118	0.097	*0.783*
Glass bottle (frequency)	0.040	0.021	−0.209	*0.717*
PDO olive oil (frequency)	0.121	−0.127	*0.727*	0.002
Bulk Olive oil (tin package)	0.152	*0.808*	0.097	0.180
Healthfulness	*0.640*	0.014	*0.481*	0.070
Dietetic and nutritional properties	*0.572*	0.107	*0.470*	0.103
Use for cooking	*0.739*	0.019	0.039	−0.074
Use for condiments and sauces	*0.784*	0.117	−0.121	−0.083
Italian origin	*0.453*	*−0.430*	−0.048	0.315
Regional origin	−0.084	0.343	*0.544*	*−0.363*
Local origin	−0.098	*0.469*	*0.509*	−0.303
Total Variance	*18.1*	*15.4*	*13.5*	*13.0*
KMO test	0.662			
Bartlett test	0.000			

The first component extracted explains 18.1% of the variance and tends to emphasize the use function attributed to extra virgin olive oil. In fact, this PC explains a peculiar consumption pattern of Extra Virgin Olive Oil (EVOO). Consumers in this group commonly use olive oil in the kitchen for dressings and sauces, and they also deemed it as being good for personal wellness. In fact, they recognize important health properties (+0.640) in olive oil and that is probably why olive oil is widely used both for the preparation of condiments such as sauces (+0.784) as well as for cooking different dishes (+0.739). Moreover, the preference is given to national olive oil (+0.453). In view of the variables expressed by this component, it has been named *"inexpensive and healthy olive oil consumption"*.

The second component explains 15.4% of the variance and characterizes the consumption of olive purchased from local producers (+0.788) as olive oil in bulk (+0.808). This interpretation is reinforced by the fact that consumer preferences are mainly oriented towards locally produced olive oil (+0.469) and negatively associated with nationally produced olive oil (−0.430). For these reasons, this PC can be defined as *"consumption related to short food supply chains"*.

The third component extracted was called *"high-end olive oil consumption"* and explains 13.5 % of the variance. This component is characterized by the consumption of PDO olive oil (+0.727) and it associates olive oil consumption with the intake of higher nutritional properties (+0.470) and healthfulness (+0.481). Moreover, the variables of this component include an interest in locally (+0.509) and regionally (+0.544) produced olive oil, which highlights the strong link between the PDO quality certifications and the territory.

The last component extracted is called "*mid-quality consumption*" and explains 13.0 % of the variance. It describes common olive oil consumption, wherein consumers tend to purchase olive oil at the hypermarket (+0.783), preferring glass bottle packaging (+0.717) and Italian origin (+0.315). This component is negatively correlated with the consumption of regionally produced olive oil origin (−0.363), thus suggesting that consumers are mainly oriented towards medium quality olive oil with national origin.

The second PCA block included variables linked to the personal motivations of the interviewees and to the intrinsic and extrinsic attributes of olive oil, taking into account the different quality classes of olive oils. The PCA performed on this group of 12 variables summarized the information in four PCs with a total explained variance of 62.4 % (Table 4.).

The first component explained, with 18.5% of variance, characterizes the profile of consumers looking for olive oil with strong intrinsic attributes. In fact, pungent taste (+0.842), bitter taste (+0.852) and spicy taste (+0.754) are significant and as such they are deemed as positive organoleptic attributes for olive oil. Given the peculiarities of the variables expressed in this PC, it can be identified as *"strong sensory attributes"*.

The second PC explains 16.0% of the overall variance and is characterized by consumers oriented towards medium and low-level olive oil. In fact, the variables expressed in this PC are: *"I usually consume medium level olive oil"* (+0.813), for its affordability, often due to promotional sales (+0.893). Moreover, the variable *"I consume low level olive oil for its affordability"* (+0.644) is also expressed. As a result, it has been called *"price-sensitive consumption"*.

The third component explains 14.9% of total variance and is defined as *"reliability of production"*. This component is characterized by the importance attributed to the reputation of producers of certified olive oils (PDO, PGI, Organic) (+0.765), and by the higher organoleptic quality attributed to these oils (+0.475). In addition, this component ascribes a significant importance to olive oil obtained from 100% Italian olives (+0.710) and cultivated with low environmental impact techniques (+0.633).

Finally, the last PC explains 13.0% of the overall variance and characterizes the consumption oriented towards the intrinsic characteristics of high-quality olive oil. The more

	PCs			
	1 - strong sensory attributes	2 - price sensitive consumption	3 - reliability of production	4 - mild taste and visual appearance
Producer's label reputation of high-end olive oil	0.084	−0.080	*0.765*	0.022
Organoleptic properties of high-end olive oil	−0.114	−0.095	*0.475*	*0.489*
Popular brand and private label	−0.079	*0.813*	0.056	0.161
Affordability (promotional sales)	−0.113	*0.893*	0.080	0.037
Price of low-quality olive oil	0.162	*0.644*	−0.097	−0.146
Pungent taste	*0.842*	−0.032	0.182	0.066
Bitter taste	*0.852*	−0.031	−0.032	0.006
Spicy taste	*0.754*	0.045	−0.041	0.328
Fruity taste	0.265	0.116	0.078	*0.768*
Green colour	0.096	−0.021	0.085	*0.747*
100% Italian olives	−0.151	0.061	*0.710*	0.124
Low environmental impact production techniques	0.229	0.089	*0.633*	0.069
Total Variance	*18.5*	*16.0*	*14.9*	*13.0*
KMO test	0.645			
Bartlett test	0.000			

Table 4.
Rotated component matrix of personal motivations of consumption

significant variables are those related to the high-quality organoleptic characteristics of olive oil (+0.489), based on the mild sensory attributes such as fruity taste (+0.768) and green colour (+0.747). For these reasons the component was defined as *"mild-taste and visual appearance-based consumption"*.

4.2 Results of cluster analyses

This section presents the main outcomes derived from the application of the CA to the eight PCs whose results led to the identification of four homogeneous clusters. The main characteristics of these groups are shown in Table 5, whereby the factorial scores in the centroids obtained by the *K*-mean application method are reported.

The first group shows a high sensitivity to the healthful and nutritional properties of the product; for these reasons olive oil is widely consumed as crude olive oil or used for cooking. Due to the remarkable attitude towards local products this cluster can be described as "*locally produced olive oil consumers*". Socio-demographic characteristics represent 19.4% of the sample and are characterized by the high percentage of households containing two individuals (53%), of southern Italian origin (64%) and with a high-level of education (59%). It is likely that as so many of these consumers are from a family of southern Italian descent, they attach importance to the local product, probably coming from their own family's region of origin, as they tend to buy their EVOO in tins directly from the producer. On the contrary, the propensity to consume high-end olive oil certified as PDO is very low.

The second cluster represents 24.2% of the sample. This group shows a high frequency of PDO-labelled olive oil consumption, which is appreciated for its healthful and nutritional

	Clusters				
	Local olive oil consumers 1 ($n = 64$)	Premium olive oil consumers 2 ($n = 80$)	Popular olive oil consumers 3 ($n = 94$)	Basic olive oil consumers 4 ($n = 92$)	p-value
Inexpensive and healthy	0.547	−0.154	0.700	−0.962	0.000
Local consumption	0.948	0.565	−0.792	−0.342	0.000
High-end olive oil consumption	−0.860	0.976	0.163	−0.417	0.000
Mid-quality consumption	0.240	−0.387	0.224	−0.059	0.000
Strong sensory attributes	0.149	0.328	−0.473	0.094	0.000
Price sensitive consumption	0.030	−0.727	0.312	0.292	0.000
Reliability of production	0.307	0.359	0.404	−0.939	0.000
Mild taste and visual appearance	−0.188	−0.017	0.627	−0.495	0.000
Household numbers (up to 2)	0.53	0.51	0.50	0.32	0.004
Household numbers (from 3 to 4)	0.42	0.40	0.45	0.49	
Household numbers (over 4)	0.05	0.09	0.05	0.20	
Southern origins (No)	0.36	0.28	0.57	0.53	0.000
Southern origins (Yes)	0.64	0.73	0.43	0.47	
Education (Up to high school *level*)	0.41	0.51	0.51	0.63	0.049
Education (Bachelor's degree or higher)	0.59	0.49	0.49	0.37	

Table 5.
Values of final cluster centres

properties. They are origin-conscious consumers, preferring olive oil with strong territorial linkage; moreover, these consumers also attach importance to the intense sensory characteristics of the product. Finally, the attention paid to the geographical origin of the olives and to the sustainable manufacturing methods of olive oil, highlights the search for high-quality products of this cluster, which can be called "*premium olive oil consumers*". In addition, this cluster is characterized by households of two individuals (51%) and by a limited presence of families with more than four members (9 %), while educational level is equally distributed between high (51%) and medium-low level (49%).

The third group represents 28.5% of the sample. Their attitude towards medium quality olive oil, commercial and popular brands (such as Dante, Carapelli, Sasso, Monini, etc.) as well as the attention to the method of production and the origin of the olives, is remarkably expressed. For these reasons, this group has been titled "*popular olive oil consumption*". The third cluster also includes consumers with a strong propensity towards Italian-origin olive oils, but not necessarily bought from the producer since the custom of purchasing olive oil directly from the local producer is very limited. This group displays a consumption based on health and dietetic-nutritional reasons, so olive oil is largely used not only for cooking but also to prepare uncooked olive oil-based sauces and condiments. Finally, these consumers

also pay attention to a mild taste and to the visual appearance of the product. Although it also includes families with two members, we found a considerable presence of families with three to four members (45%), as well as a large number of people southern origin (57%). The level of education is equally distributed between high (51%) and medium-low level (49%).

The fourth cluster includes 27.9% of the sample. It shows scant interest in high-end and local olive oil. In addition, little attention is paid to the sensory characteristics of the product. In this cluster consumers are mainly focused on the price and on the product, so it is possible to categorize this cluster as "*basic olive oil consumers*". This cluster is strongly characterized by medium (49%) and large size families (20%), while the level of education is medium-low (63%).

5. Discussion

This paper aims to explore the olive oil market segments broken down by the different quality levels of existing products, thus trying to identify main consumer preferences. Consequently, since the outcomes of PCA were functional in developing the cluster analyses, this section only discusses these latter results.

The variables expressed in the first cluster, "*locally produced olive oil consumers*", highlight the importance that consumers attach to local production, considered to be of higher quality. This outcome is consistent with previous findings (Chan-Halbrendt *et al.*, 2010), thus emphasizing the importance that small niche markets have for the olive oil trade (Di Vita *et al.*, 2015) since consumers have more trust in the quality of local processors (Carlucci *et al.*, 2014; Chamorro *et al.*, 2020). Although our sample comes from northern Italy, this cluster found a high number of consumers of southern Italian origin; many of them show a strong bond with their parents' southern roots. This result, which confirms how southern-origin consumers show a higher propensity to buy local olive oil (Di Vita *et al.*, 2013), suggests that the attitude towards local products could reasonably be transmitted from parents or relatives, such as grandparents or aunts and uncles, to children; therefore, the propensity towards local food is also dependent on an inter-generational attitude. In the "local consumer cluster", as well as tradition, we also discovered the co-existence of food habits and healthfulness. These three different aspects seem to converge into a specific consumer profile, thus highlighting the association among the perceived healthfulness of olive oil, the consumption of local products and eating habits. These results are consistent with previous studies which highlighted the importance of traditions in olive oil consumption (Yangui *et al.*, 2014), the use of olive oil in cooking (Yangui *et al.*, 2016), and the perception of the healthfulness of the product (Krystallis and Ness, 2005; Di Vita *et al.*, 2020b). Moreover, educational level was also found as a consumption driver of olive oil, as similarly evidenced in other studies concerning olive oil motivators (Kalogeras *et al.*, 2009; Delgado and Guinard, 2011).

The consumers included in the second cluster, "*premium olive oil consumers*", show a marked preference towards high-end olive oil, their choices being negatively correlated to price sensitivity. Furthermore, this cluster shows a direct relationship between high-end olive oil and "strong" sensory attributes, suggesting that consumers of premium olive oil also consider a strong sensory profile, due to the high level of bitterness and pungency, as a quality driver of the product. In our study it emerges that even the characteristics of spiciness and bitterness can be moderately appreciated by premium olive oil consumers. This result appears consistent with a recent contribution by Cavallo *et al.* (2019), where the authors found that even though bitterness is a little or unappreciated sensory characteristic, there exists a limited consumer niche market that seems to appreciate bitter-tasting foods, such as coffee, chocolate and alcoholic beverages, probably because these consumers are conscious of the high health properties deriving from a bitter or pungent taste (Cavallo *et al.*, 2019). Consequently, our results introduce the idea that this trend also involves olive oil consumers, given that bitter taste has been detected as a characteristic of interest to a niche group of olive oil consumers.

The consumers included in this cluster also show a certain propensity for locally produced olive oil, and it is in line with what was previously expressed in the literature where local origin and high-end olive oil are often associated (Di Vita *et al.*, 2013; Panico *et al.*, 2014). Also in this cluster the link between family origins and the bias towards certified quality olive oil and ties to territory seem evident. In fact, the connection between certified olive oil and its geographical origin is well known in the literature, which is particularly important for consumers from southern Italy (Panico *et al.*, 2014).

The results of this study are also consistent with those of Panico *et al.* (2014) which indicate fruitiness as prominent among different sensory characteristics preferred by consumers, since the third cluster, identified as "*popular olive oil consumption*", is represented by consumers who appreciate well-known olive oil brands. Consumers in this cluster also attach importance to the sensory attributes of the product, particularly those related to the mild taste of olive oil. Indeed, the third cluster shows that consumption is mainly oriented towards the health aspects of olive oil and its use in cooking. In addition, these consumers appear to be price sensitive with a preference for olive oil purchased mainly in supermarkets. This result seems consistent with previous findings of Vlontzos and Duquenne (2014), which showed a trust in and propensity of consumers to buy known brands, as well as the brands usually purchased. Moreover, the purchasers included in this cluster negatively perceive the importance of local olive oil and prefer the olive oil sold at large retail stores, confirming what was previously indicated in the existing literature (Perito *et al.*, 2019). Additionally, this cluster highlights the importance of product reliability, in relation to the Italian origin of the olives, as had previously been demonstrated in the literature by a study of the attitudes of Italian olive oil consumers (Panico *et al.*, 2014).

The fourth cluster, *"basic olive oil consumers"*, shows a consumption based mainly on the affordability of the product, highlighting a segment of olive oil consumers that are not interested in certification or product characteristics but only in its low price. The importance of family size as a driver for the choice of olive oil has been clearly expressed in the literature (Tsakiridou *et al.*, 2006). In this cluster a greater presence of medium-sized households emerges, so it is possible that larger families, due to economic motivations, tend to purchase basic olive oil. Level of education has also been recognized in the literature as an important variable for the choice of product (Tsakiridou *et al.*, 2006; Gámbaro *et al.*, 2013). Our study shows that the selection of basic olive oil tends to be associated with consumers with a medium-low level of education.

On the basis of the findings of the CA, it can be affirmed that the starting hypothesis of the present paper is widely supported by the results, that is to say that consumer preferences identify different and homogeneous market segments that appear to be directly linked to the qualitative categorizations of olive oil. Once our intuition was corroborated, we went on to answer the previous research question addressed in the paper. The survey allowed us to positively answer the first question: in fact there exists a well-established segmentation of urban consumption in the olive oil market even in traditionally non-producing regions. In addition, the analysis also found that a direct relationship between product differentiation and market segmentation in the olive oil sector exists. Concerning the second question, our results show that the quality classifications of olive oil have been clearly defined and identifiable even for urban consumers. Consumers in metropolitan areas are often far from agricultural production areas, therefore their perception of agro-food products is strongly influenced not so much by traditions and use of these products but rather by their beliefs and by stimuli that the products themselves evoke.

Finally, we found evidence that different quality levels of olive oils can be reasonably ascribable to a homogeneous target of consumers with differentiated preferences and quite a distinctive socio-demographic identity.

6. Conclusion

6.1 Major insights

Even though the profiles of the consumers identified by the clusters have some common traits and some similarities, our outcomes clearly show the existence of three main quality classes of olive oil consumers: basic, popular and premium. With regard to the basic olive oil consumer, we found that medium and large-sized families are prevalent in this segment; which is also characterized by a consumption of affordable-priced olive oil. Popular olive oil consumers focus their attention on private label and well-known brands. This group of purchasers displays a preference for mild-tasting olive oils bought primarily at large retail stores. Finally, premium olive oil purchasers ascribe high importance to high-end olive oil with "strong" sensory attributes and strong links to geographical origin. No defined market segment for ultra-premium olive oils was found, probably because this type of production is not yet widely sold; in addition, high prices, limited production and insufficient knowledge contribute to a restricted circulation among olive oil consumers.

Moreover, our study ascertains for the first time how the attitude towards local products is positively influenced by family origins and as such the consumption of local olive oil could be the result of an inter-generational attitude. Moreover, a certain appreciation for bitter-tasting olive oil has been detected for a niche group of olive oil consumers.

6.2 Implications

The outcomes derived from this study contribute to the body of knowledge by expanding the empirical evidence on olive oil consumers by segmenting their preferences in different classes of olive oil. In particular, this study sheds light on leading consumers towards certified olive oil with GIs and private label production (Di Vita *et al.*, 2021b; Perito *et al.*, 2019; Chaniotakis *et al.*, 2010; Vlontzos and Duquenne, 2014), thus paying special attention to the basic olive oil class, which has not or has scarcely been explored at all. It also provides practical insights for marketers and producers by allowing more efficient strategic decisions in terms of product differentiation. In this regard, the results afford novel insights that allow us to better understand and evaluate the behaviour of the olive oil firms in terms of labelling strategies. It implies that olive oil market efficiency can be increased by matching olive oil market segments and consumer preferences. For example, olive oil producers could better differentiate high-end products by providing explicit health information to better match novel consumer needs (Roselli *et al.*, 2017). Moreover, the role of promotional sales should not be underestimated in order to reach even the price-sensitive consumer with higher quality and locally produced olive oil, in particular those of the "popular olive oil consumers" group. This would seem to suggest the need for a more explicit price discrimination for previously detected olive oil classes which could be sold at different prices by producers for different customer profiles of each specific market.

Based on these considerations, producers could develop new design methods based on the quality attributes of specific olive oil typologies and according to the socio-demographic characteristics of consumers and their motivations. Belonging to a recognized and shared qualitative olive oil class would certainly help to increase the reputation of this product at a broader level.

6.3 Limitation and further research

Even though we gathered data and information from a broad sample, the study does not fully reflect the average Italian population since we based our study on a convenience sample. A more extended and representative sample is needed to test our hypothesis in other regional areas. Nevertheless, the fact that the outcomes of this study have be interpreted with exceeding care, this research has shed light on drivers of consumption for differently labelled virgin and extra-virgin olive oil.

Future studies ought to investigate the consumer purchasing drivers for quality-differentiated tiers of olive oil in markets of traditional producing countries. In fact, research could be developed in order to replicate this study in other geographical contexts or countries. In addition, consumer interest in different classes of extra virgin olive oil could be assessed through cross cultural studies, to appreciate how cultural and regional influences may affect consumer behaviour and purchase intention (Ferraris *et al.*, 2019), and to identify different olive oil market segments. Finally, it would be interesting to explore the aspects linked to price discrimination, thus combining market price evaluation and consumer utility for attributes that contribute to the differentiation of olive oil into homogeneous classes. For this purpose, several behavioural variables, such as subjective norms and perceived behavioural controls, could be utilized together to describe consumer behaviour (Arun *et al.*, 2021).

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Annex

Table A1. Summary of the variables used in the multivariate analysis

Variables	Questionnaire section	Range	Mean	Sd
Where do you prefer to buy olive oil and how frequently?				
Buying direct from local producer	1st	1–3	1.38	0.54
Hypermarket	1st	1–3	1.59	0.57
What is the frequency of consumption for the following types of extra virgin olive oil?				
Glass bottle	1st	1–7	3.62	2.38
PDO olive oil	1st	1–7	3.41	2.18
Bulk Olive oil	1st	1–7	2.93	2.30
Could you please indicate the levels of importance and reasons for consuming extra virgin olive oil?				
Healthfulness	1st	1–7	5.25	1.81
Dietetic and nutritional properties	1st	1–7	5.07	1.85
Could you specify the main functions of extra virgin olive oil?				
Use for cooking	1st	1–7	5.32	1.85
Use for condiments and sauces	1st	1–7	5.00	1.88
What is the origin of the oil usually consumed?				
Local origin	1st	1–7	2.63	2.18
Regional origin	1st	1–7	2.94	2.23
Italian origin	1st	1–7	5.46	2.00
How important is the reputation of the producer when choosing the following categories of olive oil?				
Producer's label reputation of high-end olive oil	2nd	1–7	5.36	1.64
How much do the following personal motivations influence the consumption of a high-end olive oil (PDO; PGI, Organic)?				
Organoleptic properties of high-end olive oil	2nd	1–7	5.10	1.85
Could you indicate why you would consume a medium-level olive oil and a low-level olive oil?				
Popular brand and private label	2nd	1–7	3.48	2.44
Affordability (promotional sales)	2nd	1–7	3.49	2.55
Price of low-quality olive oil	2nd	1–7	2.10	2.61
How much are the following characteristics important for olive oil consumption?				
Sensory attributes				
Pungent taste	2nd	1–7	3.89	1.94
Bitter taste	2nd	1–7	3.13	1.92
Spicy taste	2nd	1–7	3.73	1.73
Fruity taste	2nd	1–7	4.27	1.75
Green colour	2nd	1–7	4.36	1.74
Credence attribute				
100% Italian olives	2nd	1–7	5.79	1.62
Low environmental impact production techniques	2nd	1–7	4.44	1.69

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