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LOCAL ORGANIC OR PROTECTED? Detecting the role of different QUALITY SIGNALS AMONG ITALIAN OLIVE OIL CONSUMERS THROUGH A HIERARCHICAL CLUSTER ANALYSIS

**Giuseppe Di Vita ^a, Raffaele Zanchini ^{a,*}, Giacomo Falcone ^b, Mario D'Amico ^c,
Filippo Brun ^a, Giovanni Gulisano ^b**

^a *Department of Agricultural, Forest and Food Science (Disafa), University of Turin, Grugliasco, Italy;*

^b *Department of Agriculture, Mediterranean University of Reggio Calabria, Reggio Calabria, Italy;*

^c *Department of Agriculture, Food and Environment (Di3A), University of Catania, Catania, Italy*

Authors and Corresponding Author

Giuseppe DI VITA Associate Professor at the Department of Agricultural, Forest and Food Science (Disafa), University of Turin, Largo Braccini, 2, 10095 Grugliasco (Torino), Italy.
Email: giuseppe.divita@unito.it

***Raffaele ZANCHINI** Research Fellow at the Department of Agricultural, Forest and Food Science (Disafa), University of Turin, Largo Braccini, 2, 10095 Grugliasco (Torino), Italy
Email: raffaele.zanchini@unito.it Telephone number: 0116708872; Fax number: not available

Giacomo FALCONE Postdoctoral Research Fellow at Department of Agriculture, Mediterranean University of Reggio Calabria, Feo di Vito, 89122, Reggio Calabria, Italy.
Email: giacomo.falcone@unirc.it

Mario D'AMICO Full Professor at the Department of Agriculture, Food and Environment (Di3A), University of Catania, Via S. Sofia 98-100, 95123 Catania, Italy
Email: mario.damico@unict.it

Filippo BRUN Full Professor at the Department of Agricultural, Forest and Food Science (Disafa), University of Turin, Largo Braccini, 2, 10095 Grugliasco (Torino), Italy
Email: filippo.brun@unito.it

Giovanni GULISANO Full Professor at Department of Agriculture, Mediterranean University of Reggio Calabria, Feo di Vito, 89122, Reggio Calabria, Italy.
Email: ggulisano@unirc.it

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Abstract

This paper aims to identify the hierarchical relationship in a consumer's mind with respect to the three main and different quality schemes. With this purpose, we decided to analyse the role that local, organic, and traditional attributes have on consumers' preferences. The survey on the consumption of extra-virgin olive oil was carried out in Italy, through direct face-to-face interviews. Data analysis was carried out by first conducting a conjoint experiment, followed by a clusterization through Ward's method. In this hypothetical scale evaluating the quality of olive oil the three attributes provide consumers with different utilities in the following decreasing order: organic, local, and Protected Geographical Indication label. In addition, we observed the existence of trade-offs between these three quality signals conveying information that is selectively interpretable by consumers. Thanks to this methodological approach, four groups, differing in terms of socio-demographic characteristics and hierarchical preferences towards the certification scheme, were observed.

Keywords: conjoint analysis, cluster analysis, olive oil, certifications schemes, consumer preferences

1. Introduction

The European Union (EU) has established several quality schemes to guarantee the origin and quality of agro-food products. These schemes, which protect the intellectual property rights associated with agro-food products, represent an important tool in trade negotiations; further, they provide a guarantee to the consumer about the genuineness of the food item and the use of the traditional production process in making it (Roselli et al., 2018; Di Vita et al., 2019a). Furthermore, the quality labels represent one of the main elements in highlighting the food policies prevalent in Europe (Jahn, et al., 2005; Grunert and Aachmann, 2016) thus, they also contribute in limiting the phenomenon of agro-food fraud (Bimbo et al., 2019; Kendall et al., 2019; Bimbo et al., 2020). Since the 1990s, the EU has placed a particular emphasis on Geographical Indications (GIs) and organic production; of late, there have been specific policies targeting local production. GI certifications assure that the food originates from specific geographical areas of the EU; they include Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI) (European Commission, 2020). Olive oil producers awarded the GI label have to produce it according to rigorous requirements in terms of varieties, quality of raw materials, and method of production; further, the olives have to be grown, produced, and bottled in a restricted geographical area. In the case of PGI olive oil, the rules regarding the method of production are less restrictive than those in PDO production because any step of the production process can be carried out in the production area eligible for the GI certification (European Commission, 2020).

These signals, along with the organic certification schemes, play an increasingly important role in the differentiation of many agro-food products in the EU countries. An olive oil is certified as organic by the EU if its production combines sustainable and environmental practices, thereby

protecting the region's biodiversity and preserving natural resources (Belletti et al., 2015; Ismea, 2019; Iofrida et al., 2020).

Further, in recent years, local food systems have gained prominence. Despite the fact that the 'local food' concept is not conclusively established and consumers may consider it in different ways, the term has been used to describe food produced near the consumer (Roininen et al., 2006). Under its rural development policies, the EU explicitly recognises the existence of a short supply chain (Regulation (EU) No 1305/2013) and lists specific measure to support the establishment and development of such chains (Regulation (EU) No 807/2014).

These three quality schemes have become increasingly important also for olive oil consumers since they have conveyed into three different credence attributes: local, organic and protected, **becoming the subject** of several studies (Menapace et al., 2011, Roselli et al., 2018; Perito et al., 2019).

Given it has been proven by several authors that credence characteristics play a prominent role in the modern agro-food marketing system (Caswell and Mojduszka, 1996; Fernqvist and Ekelund, 2014; Migliore et al., 2015), it is interesting to verify how these three attributes, that jointly play a prominent role in the **consumer 'choice**, influence the olive oil consumers' preferences.

The existing scientific literature reports several evidences on olive oil consumers' preferences for credence attributes; these include different categories of quality signals linked to the production methods, local productions and origins, and all certification systems related to the environmental and social labels, that **provide to consumers** adequate information about the standards of certified or labelled olive oil (Sheldon, 2017; Del Giudice et al., 2018).

Previous studies support the assumption that **GIs**, as well as the organic and local production, can positively influence the consumers' preferences for olive oil and their willingness to pay (Kalogeras et al. 2009; Panzone et al., 2016). However, **current** literature did not allow to identify whether and how the hierarchical level of preferences differs among these three attributes. **In addition, while the existing literature reports a greater deepening about the main drivers and determinants of PDO olive oil consumption (Erraach et al., 2014; Panzone et al., 2016; Roselli et al., 2018), consumers' preferences for PGI olive oil have been scarcely explored. Therefore, this study aims to contribute to fill the gap concerning consumer's preferences for PGI olive oil, which role has been limited or sometimes doubtful. Consequently, given the absence of comparative research regarding the consumer's preferences for PGI olive oil compared to other certifications, this study complements the literature addressing hierarchical preferences for PGI using olive oil in Italy as case study product.**

The **initial hypothesis** of this study is that the quality signals linked to the origin as well as the production and sale processes lead to different preferences among consumers choosing an extra-virgin oil; as a result, the attributes can be said to provide consumers different utilities. For this reason, the paper aims to evaluate the role that these three important cues have on Italian olive oils consumers' preferences; further, it seeks to verify the attributes to which the consumer assigns a priority **and identify their contributions in the segmentation of the olive oil market.**

Thus, the research questions we intend to answer are the following:

- a) Is there a well-defined quality preference hierarchy among **the** quality signals of extra-virgin olive oil?
- b) Which one among the attributes "PGI", "organic", and "local" represents the best differentiator for olive oil producers?
- c) Do regional differences exist among Italian consumers?
- d) Are there well-established market segments based on homogenous classes of Italian olive oil consumers?

The answers to the above-mentioned research questions might have valuable implications both in terms of policy and marketing perspective. As for public institutions, results provide useful and quantitative insights to evaluate the market effectiveness and suggest the need of a better understanding of costs and benefits of joint labelling policies.

In a market valorisation perspective of olive oil produced with more social and environmentally sustainable methods, this study provides practical insights for producers and stakeholders on the combined effects of two or three quality schemes. Thereby, in an inter-firm relationship context (Awan et al., 2018), farmers could have access to useful information to enhance the extra virgin olive oil sector, by choosing the better differentiation tool in relation to specific market segment and consequently increasing their income. Finally, as for consumer's implications, these certification systems provide a holistic approach to products' characteristics information, thus also avoiding frauds and damage to consumers.

2. Literature review on quality signals of olive oil

This section presents a short literature review of main existing evidences on the topic. With this purpose, the review was addressed to identify the **main** studies on the role of credence **attributes**, **which** summarise the overall **trend of** quality expectation of consumers.

Concerning the quality signals of olive oils, there exists a large strand of literature; **however**, in this section, we mainly present the studies that have analysed consumer perceptions and behaviours towards the quality factors that are directly derived from European policies on food quality

schemes. With this aim, three different categories of quality signals were identified, categorized within the following topics: Geographical Indication, organic and local olive consumption, and purchases drivers.

The search was carried out through the most used search engines and scientific databases, such as Google Scholar, Web of Science, Scopus, and Science Direct. The search keywords, such as “quality cues” and “olive oil”, were associated with the following terms: “quality signals”, “credence attributes”, “consumption”, “consumers”, “choices”, “preferences”, “EU label”, “EU origin”, “quality policies”, “quality label”.

2.1 Geographical Indications in olive oil consumption

There are several quality signals for extra-virgin olive oil, and they have been extensively explored by using different perspectives. Many researchers have emphasised the major role of geographic origin (Cicia et al., 2002) in the utility derived by consumers, while others demonstrated the marketing advantage of using GI quality labels. Some authors argue about consumers’ preferences for credence attributes of extra-virgin olive oil by segmenting the olive oil market in different European countries (Imami et al., 2013; Panico et al., 2014) or using a conjoint approach to detect the importance of attributes, such as origin, quality, and price (Krystallis and Ness, 2005; van der Lans, 2001; Mtimet et al., 2008).

The existing literature has analysed in depth the role of GIs in olive oil consumption, and observed their high importance in addressing consumer’s choices (Scarpa and Del Giudice, 2004; (Roselli et al., 2016, 2018; Tempesta and Vecchiato, 2019; Ilak Peršurić, 2020). The role of the GI label varies in relation to the geographical location of consumers, and their action differs across regional groups; this is because consumers of an olive-oil-producing region are more interested in home-grown products (Panzone et al., 2016). It was also highlighted the positive association between geographical indications and the willingness of consumers to pay a premium price for olive oil (Roselli et al., 2016). Nevertheless, the role of the PDO label has been explored extensively, but rarely along with that of PGI. Studies that focused exclusively on PDO olive oil showed that the PDO label increases the utility of consumers (Erraach et al., 2014; Ballco and Gracia, 2020). Other studies, including those that consider PGI production, have not analysed its role by distinguishing the influence PDO label, with which PGI is often associated. Moreover, those studies only revealed the correlation of GIs with the tradition and heritage evocation as well as the increasing willingness to pay for such labelled olive oils (Fotopoulos and Krystallis, 2001; Philippidis and Sanjuan, 2002). Further, the influence of PGI on olive oil consumers’ behaviour and farm marketing strategies has hardly been analysed. The first work on the topic explored, in managerial terms, the economic,

social, and environmental evaluation of the PGI effect throughout the supply chain, and the authors took into account the views of the farmers to compare the valorisation of PGI, as well as organic and conventional olive oil products in a peripheral area (Kizos and Vakoufaris, 2011). The authors pointed out that small bottlers are the only stakeholder that receive the most benefits while producers not at the expense of the olive farmers.

On the demand side, a few studies focus exclusively on the effects of PGI olive oil on consumer expectations. The first study on it stated that the PGI label dominates the organic nature of the olive oil if associated with PDO (Scarpa and Del Giudice, 2004); in contrast, when their role is analysed separately, the PGI label is found to have a lower importance than an organic one. A second study, which compared these two GIs labels, found a higher willingness to pay for PDO oil than PGI oil; the authors state that consumers consider a PDO olive oil superior to a PGI one (Menapace et al., 2011).

2.2 Organic attribute in olive oil consumption

Organic is a common credence food attribute and is often supported by a specific label or certification. The presence of an organic label positively affects consumer preferences by evoking a favourable belief in regular consumers, primarily with respect to food safety, besides assuaging concerns about environmental sustainability and chemical residues (Tsakiridou et al., 2006). In this regard, Sandalidou et al., (2002) emphasised the high consumer satisfaction derived from organic olive oil owing to its benefits for human health and also demonstrated for the first time the importance of price and packaging in influencing consumers' purchasing behaviour.

Earlier studies showed the relevance of socioeconomic consumer characteristics; in particular, income, household size, and occupation status were found to be crucial drivers of olive oil consumption (Tsakiridou et al., 2006). In addition, the presence of an organic label has a positive correlation with the willingness to pay a price premium (Di Vita et al., 2019b), especially among consumers who consider organic label as an important driver in olive oil purchasing (Santosa and Guinard, 2011; Cicia et al., 2013; Santosa et al., 2013; Cavallo et al., 2018). In many cases, organic oil consumption has been associated with extra-virgin olive oils having GI certification (Roselli et al., 2016, 2018; **Tempesta and Vecchiato, 2019**). The literature has extensively analysed the relationship among organic and PDO olive oil, thus evidencing the quality superiority of a PDO olive oil over an organic olive oil (Yangui et al., 2016; Perito et al., 2019). With this regard, the overlapping between GIs and organic olive oil has been addressed by a recent study (Roselli et al., 2018) that analysed the relationship between GIs and organic olive oil in terms of consumer

behaviour. Other studies have detected how consumers attach a higher value to an organic olive oil than one carrying a PGI label (Menapace et al., 2011; Aprile et al., 2012).

2.3 Local olive oil purchase

Consumer's behaviour toward local food products has generated much interest among academicians; earlier studies highlighted the main drivers and determinants of consumers' choice for local foods (Trobe, 2001; Weatherell et al., 2003). Local foods have been deemed as products with higher quality, and generally been perceived as cheap and convenient (Feldmann and Hamm, 2015) and even sustainable (Polenzani et al., 2020). Consumers' attitude towards locally produced food has been fairly examined through multiple studies that mainly focused on a specific food product, such as wine, eggs, and fresh fruit (Arsil et al., 2014; Chambers et al., 2007; Feldmann and Hamm, 2015; Grebitus et al., 2013). Many scholars have demonstrated the economic advantage of short chains, because they contribute to a reduction in the number of trade intermediaries. Further, buying food directly from producers provides consumers many advantages that are linked to a higher quality of food; this ensures that consumers get fresh and healthy products at a reasonable price (Trobe, 2001).

Origin generates higher quality expectations in consumers who have familiarity with oil, since having information about the origin favourably affects the utility of consumers (Erraach et al., 2014). Further, in any cases, local food has been viewed as a factor associated with the name of a region (Wawrzyniak et al., 2005). Referring to the place of purchase, despite scholars observing that consumers buying in large retail stores, other authors pointed out the importance of electronic commerce channel (Borsellino et al., 2018; Carlucci et al., 2014).

Regarding the socio-demographic characteristic of 'local consumers', many authors have argued about the growing importance of short chains as a driver of the shopping preferences among young consumers (Giampietri et al., 2015; Pugliese et al., 2013). Other studies have observed how elder wealthier people, and consumers living in rural areas are the ones more interested in the origin of the foods they buy and show a higher propensity towards buying local food (Brown et al., 2009; Cholette et al., 2013; Henseleit et al., 2007).

While the local foods literature initially analysed specific fresh agro-food products, such as fresh fruit and vegetables (Bodor et al., 2008; Winkler et al., 2006), the attention of researchers has progressively been extended to all types of food products, including extra-virgin olive oil. Despite the growing importance of direct marketing, the study of consumer's perception and preferences for local olive oil has been scarce (Panzone et al., 2016; Perito et al., 2019); Local attributes were found to be among the most important elements in the purchasing process and local olive oil was

preferred, regardless of the geographical area of consumers (Perito et al., 2019); however, there is little empirical evidence to support these findings. Several authors have highlighted the pronounced ethnocentric tendency in the purchasing process of extra-virgin olive oil (Al Ganideh and Good, 2016), thereby demonstrating the importance of a regional brand as a quality signal that often leads to consumers preferring their own region's olive oil (Panzone et al., 2016).

Finally, the literature has extensively analysed the quality expectations of olive oil consumers and compared PDO, PGI, and organic labels, thus evidencing a certain supremacy in terms of quality shown by PDO with respect to the organic olive oil (Perito et al., 2019; Yangui et al., 2016); however, to the best of our knowledge, no direct comparison has ever been made that simultaneously takes into account the PGI label, as well as organic and local olive oil.

In the light of previous literature, the explanatory variables included in the conjoint experiment were organized according to the content of the review here reported.

3. Methodology

3.1 Data Collection

The survey on the consumption of extra-virgin olive oil in Italy was carried out between October and December 2017. In order to collect a casual sample of Italian olive oil consumers, surveys were conducted in two different geographical areas: the first was located in Northern Italy, in the metropolitan areas of Turin and Milan (n=334), while the second one was carried out in Southern Italy, specifically in the five provincial capitals of the Calabria region (n=375). The final sample consisted of 709 respondents.

A questionnaire was built on the main topics derived from a previous focus group study that was conducted by inviting experts of olive oil marketing that were working as technical consultants, food technologists, and agronomists. During the focus group, participants were invited to discuss the main olive oil consumption patterns linked to olive oil consumption attitudes and place of purchase; in particular, the discussion sought to focus the importance of credence attributes such as quality signals.

The administration of the questionnaires was held at hypermarkets or large-scale retail stores. Both surveys were carried out using the same questionnaire, which was administered through direct face-to-face interviews by trained interviewers after a random walk recruitment of respondents (Annunziata and Vecchio, 2013, [Di Vita et al., 2020a](#)). We based our study on a convenience sample thus limiting inferences to the wider population. The interviews lasted between 15 and 20 minutes. To increase the representativeness of the sample, respondents were selected taking into account their actual involvement and responsibility in food purchases ([Di Vita et al., 2020b](#)).

The questionnaire was divided into three sections. The first section included questions on general features of extra virgin olive oil consumption, such as frequency of purchasing, consumption uses (to cook, to fry etc.) and consumption motivations (healthiness, taste, etc.).

The second part was addressed to collect information about main characteristics of olive oil consumed, such as olives origin, provenance of olive oil and main certification schemes (PDO, PGI, Organic); and finally, the importance of main intrinsic (Colour, Taste, etc.) and extrinsic (Brand, packaging, etc) characteristics. The questions, included in these two sections, were organized both as binary answers (yes/no) and as Likert scale (ranging from 1 to 7), the latter allowed to analyse the variables on ordinary scale and to get a deeper insight of the respondents' characteristics. Likert scales were used to investigate the relevance that consumers give to each attribute in terms of importance, frequency or agreement. For example, concerning the importance ascribed to olive oil attributes, consumers were asked the following question: “which attribute do you believe to be important to value an extra-virgin olive oil? (1: less important - 7: most important); or even: “Do you generally buy bulk or bottled olive oil?” (1: never - 7: very frequently).

Finally, the third section concerns the socio-demographic characteristics of respondents; specifically, provenience, gender, age cohort and family monthly income were investigated.

In addition, a conjoint experiment was carried out by administrating conjoint cards to the same respondents to detect consumers' utility with respect to different attributes and level linked to geographical origin, place of purchase, and production process. The range of three different level of olive oils price was determined by considering the mean value of price according to the high, middle and low end of prices in different retail stores of surveyed areas (Annunziata and Vecchio, 2013).

The socio-demographic characteristics of the sample are shown in Table 1, which describes the total sample in terms of geographical origin (Northern Italy and Southern Italy), gender (male and female), age cohort, and monthly household income. Regarding the age cohorts, we classified our sample according to Brodahl and Carpenter (2011) by identifying the following groups: ‘Millennial generation’, which has respondents born between 1982 and 2000 (20–38 years old); ‘Generation X’ has those born between 1961 and 1981 (39–59 years old); ‘Baby boomers’ consists of those born between 1943 and 1960 (60–77 years old); and the ‘Silent Generation’ (over 77 years old) has respondents born between 1925 and 1942.

Table 1.

3.2 Data analysis

Data analysis was carried out by first conducting a conjoint analysis (CA) followed by a clusterisation based on part-worth estimates through Ward's method. CA is considered an helpful methodological approach to test and assess the utility of consumers and to highlight the relevance of product attributes with respect to a pre-determined combination of different levels of attributes (Saba et al., 2010; Schnettler et al., 2009; Di Vita et al., 2019b).

Conjoint analysis was chosen as suitable method to answer the research questions because it provides many useful output such as the mean relative importance for each attributes and the utility estimate for each level (Annunziata et al., 2013 Annunziata et al., 2016a). As first result we can understand the hierarchy in term of importance of the evaluated attributes. From the second output we can obtain **detailed** information of the attribute levels importance for consumers. In addition, we can estimate the utility pattern for every respondent and carry out **a** cluster analysis on these data to segment the sample (Annunziata et al., 2016a). For these reasons, in this study, we deemed a full profile CA as the most useful method to assess the quality perception of an olive oil. The bundles of attributes comprising the CA were derived from the current literature on olive oil quality labels and local olive oil marketing (Aprile et al., 2012; Menapace et al., 2011).The attributes were selected to verify the perception that consumers have towards different quality signals of olive oil, as shown in Table 2. All the **analysis** were carried out by using IBM SPSS Statistics 25; we also employed R 3.6.2 to validate the appropriate number of clusters.

Table 2.

3.3 The conjoint experiment

To reduce the number of olive oil profiles and remove the collinearity among attributes, the orthogonal design was applied (Annunziata and Vecchio, 2013). The orthogonal design is necessary in conjoint studies because, when compared to full factorial design, it reduces the number of cards shown to the consumers, simplifying their personal choices (Wong et al., 2004). The resulting profiles help consumers to identify the combination of attributes that maximise their utility, so the linear additive composition rule used in a similar research was applied (Di Vita et al., 2019b).

Respondents were asked to rank their choices with regard to the main attributes by taking into account their considerations when purchasing olive oil. Before starting the survey, the conjoint card was pre-tested to ensure the clarity of language and an understanding of method.

Respondents were presented with eight different olive oil profiles that differed in price (EUR 6.00; EUR 10.00; EUR 15.00), PGI label (present/absent), place of purchase (Large Retailer/Local Producer), and organic label (present/absent). Consumers were asked to express their preferences by

ranking the different options, according to their own level of acceptance (Di Vita et al., 2019a) by adopting scale values from 1 to 8, whereby 1 means the lowest preference while 8 denotes the highest preference. The final set of the combinations of attributes is reported in Table 3.

Once obtained the data, we have processed them using the “conjoint” function of SPSS. This function allows to carry out an OLS regression model and to obtain utility estimates that are similar to regression coefficients (Wong et al., 2004). Finally, by means of utilities function, we obtained the “utility” pattern of each respondent.

Table 3.

3.4 Cluster analysis

Next, a hierarchical cluster analysis, carried out by using Ward’s method, was employed to aggregate the sampled consumers in homogeneous groups, according to the part-worth utilities for each attribute level related to the pattern of respondents. The part-worth utilities of individual consumers were subsequently used in the CA; indeed, each consumer has a distinct utility pattern that allows us to categorise them (Annunziata et al., 2016b).

Ward’s method has been widely employed in the CA results for food products, such as processed meat and functional foods (Annunziata and Vecchio, 2013; Hailu et al., 2009); in fact, it allows us to generate clusters with high within-group homogeneity (Shan et al., 2017) by minimising the sum of the square errors. For this reason, we used the squared Euclidean distances as a measure of the distance between the objects (Strauss and Von Maltitz, 2017).

The appropriate number of clusters was obtained by adopting the Dunn index that evaluates the separation among clusters and the internal compactness (Wajrock et al., 2008). The Dunn index, whose values increases as the partitioning improves, allowed to obtain 4 homogenous cluster, to this end the R package NbClust was used (Wajrock et al., 2008, Charrad et al., 2014).

3.5 Inferential statistics

Similarly to other studies (Annunziata et al., 2016b; Hailu et al., 2009), one-way ANOVA was adopted to identify the significant difference among cluster’s part-worth utility attribute. ANOVA is often used in conjoint analysis studies to check whether the identified clusters have significant difference in term of utility (De Pelsmaecker et al., 2017).

To evaluate differences among the socio-demographic characteristics, a chi-square test was carried out, similarly to what has been done in literature (Miraballes and Gámbaro 2018; Shan et al., 2017).

The chi-square test was chosen because it represents a non-parametric test aimed to compare the proportions between two or more groups by verifying the null hypothesis of independence (Franke et al., 2012).

In addition, to assess the results related to the monthly consumption of olive oil obtained in Northern and Southern Italy, the t-test for independent samples was used (Shtudiner et al., 2017). T-test is similar to ANOVA; the main difference is that the first one is designed to compare two groups, while the second one is suitable for multiple comparisons (Rojewski et al., 2012).

The results were obtained in two steps as indicated below. In the first step, a conjoint analysis of the Italian sample was carried out to assess the consumers' perception towards the attributes investigated. Subsequently, conjoint analysis was applied to distinct sub-samples, namely Northern and Southern Italy, to evaluate whether differences exist within different surveyed areas. Lastly, a cluster analysis, with inferential tests, was developed with the aim to better characterize the clusters according to the socio-demographic characteristics of the sample.

4. Results

4.1 Conjoint Analysis

The results of the CA, based both on the Italian sample in its entirety and that for the two regional areas, are shown in Table 4 and Table 5, respectively.

The analysis highlights the fact that the Italian consumers place importance mainly on the price of the product, as evidenced by the mean relative importance for this attribute. Specifically, the products with the highest utility are those with a low to medium price (EUR 6.00–10.00). The production method is the second-most important attribute, given the high positive utility attributed to organic olive oil. Quite interesting is the preference for the place of purchase; the PGI certification provides the lowest average utility.

Table 4.

The results appear to provide more detailed insights when the geographical areas are considered separately. Substantial differences between Northern and Southern Italy are evident, whereas all the attribute levels are statistically significant according to the t-test. The importance of the price is higher for the northern consumers than southern ones; however, this attribute has the highest mean relative score in both areas.

Assuming the general importance attached to the price, which does not constitute the main object of the present study, it becomes crucial to investigate the dynamics of consumer perception toward the

quality signals—PGI, production method, and place of purchase—to better characterise and segment the olive oil market consumers.

In this direction, the second-most important attribute for consumers of both areas is the production method, which shows a positive utility value for organic olive oil; the utility is higher for southern consumers. Consumers of organic olive oil exhibit a certain attitude towards environmental sustainability because the organic product is considered as a mean to support the environment.

While the price dynamics and the role of the organic label exhibit almost similar trends across the two sub-samples, the roles played by PGI and Local seem to be very different.

The different perception that these consumers have about the place of purchase and PGI label is quite interesting and deserves in-depth analysis. The place of purchase is more important for consumers in Southern Italy, who obtain a greater positive utility on purchasing directly from producers. Conversely, the PGI certification represents, for northern consumers, the third major attribute and provides a greater positive utility than that for the southern ones. This result suggests that consumers from Northern Italy are more attracted by this label, which plays a bigger role in their perception of the olive oil's superior quality. However, we are not aware of studies that have separately evaluated the effect of PGI and PDO olive oil for Northern and Southern Italy; so, it is plausible that consumers in Northern Italy have an even greater preference for the PDO olive oil label.

Table 5

4.2 Cluster analysis

In the second part of our study, we carried out a cluster analysis based on the part worth utilities to get a deeper understanding of the sample; this allowed us to aggregate the consumers into four clusters.

The analysis of variance performed on the attribute levels and on the consumption of olive oil showed significant differences among the clusters for each variable investigated. With respect to the socio-demographic characteristics, the gender and age categories, such as Generation X, Baby boomers, and Silent generation, were not significant, as evidenced by the chi-square test. The utilities and the mean relative importance in the groups for each attribute and level are shown in Table 6, while the socio-demographic characteristics and consumption of olive oil are shown in Table 7. Next, we explain how the clusters were named and discussed.

Cluster 1, consisting of '**Low-cost and undifferentiated olive oil lovers**', consist of consumers who place importance mainly on price; in fact, the average value of the relative importance of this factor is the highest for consumers in this group; they also get the maximum utility from low-price

products. These consumers assign little importance to the organic production method or the PGI label; in fact, the utility for the latter attribute in this cluster is the lowest among the four clusters. As a consequence, this group seems to prefer a poorly differentiated olive oil. Moreover, the positive level of utility obtained on purchasing from a large-scale retailer suggests that the consumers of this group buy olive oil mainly from this type of sales channel. With respect to the socio-demographic characteristics, this cluster has a slight incidence of consumers from Northern Italy, with consumers belonging to Generation X dominating. Consistent with the high level of utility shown for affordable products, this cluster has a prevalence of consumers with a monthly family income of less than EUR 1000 and is characterised by a lower oil consumption (2.75 l/month) than that in other clusters.

Cluster 2 can be reasonably identified as comprising **organic olive oil lovers**; this is because it is characterised by consumers who are more sensitive to the sustainable production process, and derive the highest utility level from organic olive oil. At the same time, price has a relatively low importance in this group. Despite the price is **the attribute** that most influences consumer's choices and olive oil preferences, our analysis based on the hierarchical cluster provides evidence that price is not always a relevant factor in all the identified market segments.

The socio-demographic characteristics of this group show that most of these consumers belong to Southern Italy; in fact, it is the cluster with the highest percentage of southern consumers. The dominant age cohort in this cluster is Millennials; this highlights the fact that this generation seems to be interested in organic olive oil. With regard to the income, middle-income consumers (EUR 1000–2000/month) are concentrated in this cluster. Finally, given the high percentage of southern respondents, who come from the traditional olive production area, the consumption per capita (3.58 l/month) is amongst the highest in the four clusters.

The consumers grouped in Cluster 3 were named **High-end metropolitan consumers**. This group of consumers has the highest positive utility for medium to high price olive oil, thereby indicating a preference for highly differentiated olive oil. Moreover, high price has the greatest mean relative importance within this cluster; this leads to the inference that these consumers consider the high price as a major indicator of the quality of olive oil. The attention towards highly differentiated olive oil is attributable to greater interest these consumers place on the PGI label, as is evident when one takes into account the mean relative importance and the highest positive utility obtained from PGI olive oil by the consumers in this cluster. In contrast, the importance attributed to the production method and to the place of purchase is rather low; indeed, the last attribute has the lowest relative average importance across the clusters.

Concerning the socio-demographic features, we observe that this cluster is mainly composed of Northern Italians. This result highlights that **northerners' consumers** consider the price as a better indicator of quality than their southern counterparts.

With respect to the age cohort, Generation X and Silent generation are the most represented in this cluster. This age distribution suggests that this group comprises the elderly, and is characterised by a medium-high age cohort. The most represented household income groups are those with high (EUR 2,000–4,000/month) and very high income (over EUR 4,000/month). This result is consistent with the outcomes for price utility. Finally, we observed that this group has the lowest level of olive oil consumption (2.57 l/month); this suggests that the consumption of olive oil is linked to the geographical areas where olive is traditionally cultivated, and, therefore, consumers of this group—living in non-producing regions—tend to consume less.

The last Cluster 4 includes **Local olive oil and Sustainability-oriented consumers** because they attach greater importance to the purchasing place, preferring to buy directly from the producer, rather than a large-scale retailer and prefer organic production.

Moreover, these consumers obtain a high positive utility from the purchase of medium-price products. In addition, the high utility obtained from mid-range products is consistent with the price (Feldmann and Hamm, 2015) of oils from local producers; their price is not considered too high, as widely established by a large literature on other local products.

Further, these consumers exhibit a higher level of positive utility for organic products than PGI products. This leads us to deduce that the type of product purchased by them is differentiated and linked to the sustainability characteristics of production, especially in the choice of local and organic products. The distribution of origin is fairly balanced between the northern and southern areas, with a slight dominance of the latter. In addition, this cluster presents the highest prevalence of females. Regarding the age component, baby boomers, despite not being significant, have the highest representation, while the household income range within the cluster is the middle one (EUR 1000–2000/ month). With regard to the amount of olive consumed, this group shows a consumption pattern similar to that of the second cluster.

Table 6.

Table 7

5. Discussion

Thanks to a methodological approach based on a conjoint experiment, followed by the creation of a hierarchical cluster, four groups, differing in terms of socio-demographic and hierarchical preferences towards the certification scheme, were observed.

Concerning the main outcomes of conjoint analysis, Italian consumers, both in the northern and southern sub-samples show analogous trends for the attributes 'price' and 'organic production'; however, they highlight some differences in term of general utility. The result shows that consumers in traditional production areas, such as Southern Italy, have a greater propensity to buy organic products, as observed in current literature (Agovino et al., 2017). Further, as the t-test results show, the utility coefficients are quite different. Although they score low on importance, ordinal utilities are found for PGI and local attributes.

The emergence of the role of price attributes is the key finding. Our results corroborate previous studies' (Chan-Halbrendt et al., 2010) findings that the majority of respondents consider price as the most important attribute in buying olive oil. In addition, the results show how price levels are distinctly conjugated within the analysed clusters because price is considered important across the three levels.

By deliberately discussing separately the influence of price on olive oil consumers' choices, thereby confirming its prominent role in detecting olive oil quality (Cicia et al., 2002; Di Vita et al., 2013), we have chosen to focus on the hierarchical relationship between the three credence attributes that are considered as being among the most important; this is because the concept underlying this paper stresses the relationship among local, organic, and PGI characteristics

Our findings support the initial hypothesis - the three attributes provide consumers with different utilities. As a consequence, the existence of a hierarchical scale among organic local and PGI can be satisfactorily confirmed.

This relationship is, in fact, the main innovation of this paper, considering that this is the first attempt at a simultaneous analysis of these three factors. In this hypothetical scale, organic label has become, for Italian consumers, the main factor for evaluating the quality of olive oil; this is because the utility derived, in decreasing order, is organic, local, and PGI label olive oils. This confirms that organic scores more in 'taste' than local and PGI label. This result derives from the fact that we have deliberately decided not to include the PDO variable in our analysis; in fact, ins recent literature authors found it to be the most important credence attribute among the choice factors linked to the purchase of olive oil (Tempesta and Vecchiato, 2019).

Moreover, our results confirm that local and organic attributes are partial substitutes, as shown before by Costanigro et al., (2014). However, in the presence of a partial overlap, the polarisation of

consumers groups towards one of the three specific quality cues is well-defined. As a consequence, we observed the existence of trade-offs between these three quality signals conveying information that is selectively interpretable by consumers. These results also appear to be in line with a previous research regarding local and organic apples (Costanigro et al., 2014). In our case, all three attributes are capable of conveying more quality cues about olive oil.

The corroboration of the initial hypothesis allows us to answer the four research questions. With respect to the first and the second questions, our results allow us to argue that there is a quality preference hierarchy among organic, local, and PGI attributes for extra-virgin olive oil. In addition, each of these three labels can be reasonably considered to be a useful differentiation tool for olive oil producers, either alone or in association with the other two attributes.

Regarding the third question, we observed that there are slight but still significant regional differences among Italian consumers, and these differences are ascribable to the regional identities of respondents as shown by Panzone et al. (2016). In this regard, many authors have argued that consumers' behaviour towards regional and geographical origin of product differs across regional groups because consumers living in traditional olive-producing regions are more concerned about their domestic olive oil (Chan-Halbrecht et al., 2010; Al Ganideh and Good, 2016; Panzone et al., 2016; [Ballco and Gracia, 2020](#)).

In fact, consumers in Northern Italy perceive price as the most important signal of quality; thus, it conveys additional information on the overall value of a product. This result confirms the habit of consumers of considering price as a proxy for quality; price is, in fact, recognised as a prominent quality factor, as revealed in similar studies on olive oil consumption (Cicia et al., 2002; Liberatore et al., 2018). Further, this attitude towards price is more pronounced for consumers in Northern Italy that come from areas where olive oil production is not typical (Di Vita et al., 2013). This can be explained by the fact that for consumers living progressively away from the production area, the price is of the highest importance in detecting the overall quality of a product.

While organic production was definitively deemed as the main utility factor in both areas, hierarchical differences in the relationships between the PGI and local attributes were finally detected between consumers of producing regions (Southern Italy) and those that did not (Northern Italy). Consequently, once the role of price and organic label has been established, PGI would seem to play a greater informative role in non-traditional olive-oil-producing areas, while the 'local' attribute of olive oil is obviously deemed as most important attribute in the areas closest to the manufacturers.

This result is quite consistent with a previous study that found a higher utility for the organic label than PGI attributes of olive oil products (Menapace et al., 2011). In the case of results for PGI,

which are differently from those for PDO, our results undermine the role of GIs, placing PGI below the organic label characteristics in importance.

With regard to the fourth question relating to the existence of homogeneous market segments for each of the three types of certification, we believe that the answer is in the affirmative. In fact, for each of the three attributes, there are well-defined classes of consumers, in terms of preferences and socio-demographic characteristics. In this regard, our findings partially confirm the importance of socio-demographic factors in identifying the main olive oil market segments. While gender is not an important determinant and age is scarcely relevant, our outcomes fully confirm, for two clusters of consumers, the importance of income, as has already been identified in the case of extra-virgin olive oil (Roselli et al., 2018). This last result is consistent with the organic olive oil consumer 'profile' provided by Tsakiridou et al., (2006), who demonstrated how demand for organic olive oil is strongly influenced by the consumers' income.

Table 8.

Interesting insights were obtained by presuming sustainable consumption for the two variables—organic and local.

The literature on organic olive oil consumption reports that gender (men), age (younger), and education (less educated) are considered as negative determinants (Tsakiridou et al., 2006). However, in our study, we observe how some olive oil consumption patterns have changed substantially over the past fifteen years. Despite detecting a slight dominance of females among organic consumers, gender is no longer statistically significant. Moreover, millennials have drastically revised their attitudes towards organic and they represent a very organic-sensitive age group.

Concerning the 'local propensity' of consumers, a majority of the respondents prefer to buy olive oil directly from producers because they recognise its higher quality and a relation with sustainability (Polenzani et al., 2020). This result is again consistent with other studies (Chan-Halbrendt et al., 2010). Indeed, it has been observed that southern 'consumers buy olive oil mainly from local producers, markets, or mills (Di Vita et al., 2013). In the Southern Italy sample, the high importance of 'buying directly from producers' can be explained by the easier access that consumers have to the local markets or producers, as reported by Panzone et al. (2016).

Our results confirm the importance of direct selling by producer in expanding jobs and business opportunities, besides increasing producers' income, especially in rural areas, as previous studies have reported (Di Vita et al., 2015; De Luca et al., 2018; Kumar et al., 2019).

A final result from the composition of clusters is that organic, local, and protected olive oils coexist and are differentiated. These attitudes towards olive oil can lead to the identification of strongly heterogeneous models and beliefs about oil consumption that are matched to specific market segments. Such segments, which may overlap with each other, are well established and fully defined, and can be considered to define a strategic marketing plan by differentiating market niches.

6. Conclusions

6.1 Major insights

The paper assessed the role of the three most important credence attributes associated with certification schemes on the preferences of Italian consumers of olive oils consumer's preferences; the aim was to verify the attributes to which consumers assign priority, as well as establish the most important among the three credence characteristics. **In addition, the identification of four segments differing in terms of socio-demographic characteristics and hierarchical preferences towards the certification scheme, allowed to meet the purpose and address the research questions of paper.**

Concerning the hierarchy relationship among quality signals, price is confirmed as the predominant variable, thus highlighting its function in conveying information, even in the presence of other cues, certifications schemes play an important auxiliary role in conveying more detailed elements of knowledge about the product and, thus, in determining the overall perceived quality.

Through a comparison carried out among local, PGI, and organic labels for olive oil, the existence of a hierarchical relationship between the three certifications was confirmed. Surprisingly, in the 'role-playing of relational correspondences', organic production seemed to be the factor that consumers recognise and to which they assign a fairly high priority for quality detection. In addition, **regional differences among Italian consumers were observed, since northern consumers attach higher importance to price and PGI label, while southern consumers pay more attention to local production and organic certification.**

Concerning the socioeconomic characteristics of the sample, different levels of income and, to a lesser extent, the age influence consumer choice. With respect to the analysis of the three credence attributes, gender does not have a significant influence on olive oil market segmentation; however, these have a minor influence across the age groups. The exception is the Millennials, which is the only age group whose preferences are significantly influenced by local organic and PGI attributes of olive oil. In the case of PGI, our results differ from those for PDO; of the fact that PGI has lower influence than the organic label challenges the commonly held assumption about GIs.

6.2 Academic and practical contributions

This study contributes to the existing literature on olive oil preferences since it is the first paper that identifies the hierarchical relationship in consumers' mind with respect to the three different quality schemes. A further element of novelty is the analysis of the role of the PGI: considering that current literature has mainly focused on aspects of olive PDO production correlated to other variables, such as organic production or local olive oil. Moreover, the hierarchical relationship among the investigated attributes was explored both at regional level (North and South Italy) and by the clusterization of respondents, providing insight on Italian olive oil consumers' characteristics.

This paper provides also several implications for producers and marketers. Considering that organic and local attributes were deemed as the most important drivers of consumers' purchasing process, our results offer encouraging perspectives, in local and environmental terms, for small and medium enterprises, which are generally more drawn to sustainable production processes. There could be business implications for big enterprises because each certification scheme seems to provide interesting perspectives about new business models to enhance the competitiveness of companies in the olive oil industry.

The important marketing implications are related to the PGI label. Although previous literatures have often analysed jointly the effects of PDO and PGI label on consumer choices, thus showing the former's major relevance, our analysis suggests that the role of PGI as a signal for differentiation is less remarkable than organic certification. However, it remains a useful marketing tool, especially for big enterprises, which could use this label for intermediate-level quality production; moreover, it does not seem to be valuable for trade high-end olive oils. At the same time, it can be considered as a valuable territorial marketing tool to enhance the economic performance of small-scale producers, particularly those located in wider geographical areas. As a fact, it could contribute to the development of those marginal or extensive olive orchard areas whereby the olive growing landscape could be associated with the expansion of rural tourism and local agro-food products sales, being, by the way, supported by European food quality policies.

6.3 Policy implications

The results of this study provide interesting insights also for institutions, since it shows the level of interest that Italian consumers attach to different EU quality schemes, by assessing the effects of differentiation policy-instruments provided by EU Regulations. In addition, the comparison of PGI label with organic production methods complements the literature by addressing additional knowledge regarding the growing concern about sustainable food consumption and the opportunity to promote more sustainable business management as well. Finally, this study allows the institutions to get information about the effectiveness of such certifications as mutual tools of enhancement, that could be object of incentives or subsidies.

6.4 Limitations and future research

The limitation of this study is that the analysis was carried out in a national context; it would certainly be advisable for future studies to extend the survey to other Italian and European regions, or even include olive oil consuming countries outside the EU. **Moreover, further evidence could be addressed to evaluate the potential interest of consumers towards other PGI labelled agri-food products.**

A further strand of research could address health concerns about olive by observing whether hierarchical relations exist among different healthy components of olive oil, both for the producing and consuming countries. Finally, because it has been proven that credence attributes, such as PDO, PGI, country of origin, and organic label, allow foods to command a high price premium, it would be interesting to investigate the aspects of the price formation system by comparing the mechanisms for local, organic, and protected olive oils.

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Tables

Table 1. Socio-demographic characteristics of the sample (n=709)

Category	Sample frequency (n)	Sample %
Southern Italy	375	52.89
Northern Italy	334	47.11
Male	392	55.29
Female	317	44.71
Millennials (19-37)	227	32.02
Generation x (38-58)	328	46.26
Baby boomers (59-76)	141	19.89
Silent generation (Ov.76)	13	1.83
<1000	191	26.94
1001-2000	346	48.80
2001-4000	139	19.61
>4000	33	4.65
Mean liter/month (sd)	3.21 - (2.06)	

Table 2. Attributes and levels used in the conjoint analysis

Attributes	Attribute levels
Price	6 €, 10 €, 15 €
PGI	No, Yes
Production method	Conventional, organic
Purchasing place	Large retail, Local producer

Table 3. Cards profile obtained from orthogonal design

Option	Price (€)	PGI	Pruduction Method	Place of purchase
1	10,00	Yes	Conventional	Local Producer
2	15,00	Yes	Organic	Large Retail
3	6,00	Yes	Organic	Local Producer
4	10,00	No	Organic	Large Retail
5	6,00	No	Conventional	Large Retail
6	15,00	No	Conventional	Local Producer
7	6,00	No	Organic	Local Producer
8	6,00	Yes	Conventional	Large Retail

Table 4. Conjoint results (Italy)

Attributes	Attribute levels	Utility Estimate Italy	Mean relative importance
Price	6.00 €	0,441	41,264
	10.00 €	0,349	
	15.00 €	-0,790	
PGI	No	-0,295	13,056
	Yes	0,295	
Production method	Conventional	-0,689	24,344
	Organic	0,689	
Place of purchase	Large retail	-0,352	21,336
	Local Producer	0,352	
Constant		4,390	
Goodness of fit of conjoint analysis		Pearson's R	0,993
		Kendall's tau	0,929
		n (709)	

Table 5. Conjoint results in northern and southern Italy

Attributes	Attribute levels	Utility Estimate	Mean relative importance	Utility Estimate	Mean relative importance
		north		south	
Price	*** 6.00 €	0.530	50.109	0.362	33.386
	** 10.00 €	0.432		0.276	
	*** 15.00 €	-0.962		-0.638	
PGI	*** No	-0.329	15.497	-0.265	10.882
	*** Yes	0.329		0.265	
Production method	*** Conventional	-0.443	19.304	-0.909	28.833
	*** Organic	0.443		0.909	
Place of purchase	*** Large retail	-0.290	15.090	-0.408	26.899
	*** Local Producer	0.290		0.408	
Constant	***	4.368		4.410	
Goodness of fit of conjoint analysis		Pearson's R	0.993	Pearson's R	0.993
		Kendall's tau	1.000	Kendall's tau	0.929
		n (334)		n (375)	

*p < 0.05; **p < 0.01; ***p < 0.001

Table 6. Conjoint results based on cluster analysis

Attributes	Attribute levels	Utility Estimate Cluster 1	Mean relative importance	Utility Estimate Cluster 2	Mean relative importance	Utility Estimate Cluster 3	Mean relative importance	Utility Estimate Cluster 4	Mean relative importance
Price	*** 6.00 €	2.168	59.608	0.237	22.460	-1.855	53.236	0.348	34.637
	*** 10.00 €	-0.193		0.013		0.939		0.697	
	*** 15.00 €	-1.974		-0.249		0.917		-1.044	
PGI	*** No	-0.090	10.105	-0.281	11.605	-0.449	16.210	-0.385	14.724
	*** Yes	0.090		0.281		0.449		0.385	
Production method	*** Conventional	-0.167	12.938	-1.778	49.966	-0.259	17.833	-0.562	19.055
	*** Organic	0.167		1.778		0.259		0.562	
Place of purchase	*** Large retail	0.309	17.349	-0.091	15.969	0.044	12.721	-1.181	31.584
	*** Local Producer	-0.309		0.091		-0.044		1.181	
Constant	***	3.958		4.441		4.964		4.413	
Goodness of fit of conjoint analysis		Pearson's R	0.997	Pearson's R	0.995	Pearson's R	0.998	Pearson's R	0.998
		Kendall's tau n (183)	0.929	Kendall's tau n (162)	0.857	Kendall's tau n (113)	1.000	Kendall's tau n (251)	1.000

*p < 0.05; **p < 0.01; ***p < 0.001

Table 7. Socio-demographic characteristics of the clusters

	Category	Cluster 1 %	Cluster 2 %	Cluster 3 %	Cluster 4 %
Regional area	*** Southern Italy	45.36	74.69	35.40	52.19
	*** Northern Italy	54.64	25.31	64.60	47.81
Gender	Male	55.19	58.64	55.75	52.99
	Female	44.81	41.36	44.25	47.01
Age cohort	* Millennials (19-37)	27.87	38.89	24.78	33.86
	Generation x (38-58)	49.73	45.06	52.21	41.83
	Baby boomers (59-76)	20.22	14.20	20.35	23.11
	Silent generation (Ov.76)	2.19	1.85	2.65	1.20
Monthly household income	*** <1000	37.16	29.63	13.27	23.90
	*** 1001-2000	33.88	58.64	46.02	54.58
	*** 2001-4000	25.14	9.26	29.20	17.93
	** >4000	3.83	2.47	11.50	3.59
Olive oil Monthly consumption	*** Mean liter/month (sd)	2.75 (1.67)	3.58 (1.83)	2.57 (1.82)	3.59 (2.40)

*p < 0.05; **p < 0.01; ***p < 0.001

Table 8. Clusters and their attitudes

CLUSTER OF CONSUMERS	PRICE	UTILITY	INCOME	REGIONAL AREA	Others
Low-cost undifferentiated oil lovers and olive	Low price	Large-Scale Retail	Low income		
Organic olive oil lovers	No interest in price	Attentive to the sustainable production	Medium income	Southern Italy	Millennials
High-end metropolitan consumers	Medium and high price	PGI label	Medium-high income	Northern Italian	
Local Olive oil and Sustainability-oriented consumers	Medium price	Buy from producer	Medium-low income		Slight organic-sensitive