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Designations and consumer perceptions

An experimental study and implications for agricultural policy

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Abstract

Purpose – The purpose of this paper is to analyze the labeling and denominations of olive oils and to examine to what extent these factors confuse consumers. Specifically, the authors analyze the extent to which the different denominations of olive oil prevent consumers from distinguishing among the types of olive oil. Furthermore, the authors analyze whether the current generic names of olive oil affect consumer perceptions regarding the product's various qualities and characteristics.

Design/methodology/approach – The authors performed an experiment with 128 participants divided into two groups (experimental $n = 64$ and control $n = 64$). In the pretest, participants completed a survey with 12 terms related to olive oil. The experimental group was then trained in the meaning of each term, after which the group returned to complete the same survey.

Findings – The authors can confirm *H1* and *H2*. Results show that there is no clear knowledge regarding some of these terms.

Social implications – This study provides positive implications to both consumers, providing them a clear information, and producers and marketers, helping distinguish in the market olive oils of more quality.

Originality/value – This paper is pioneer in the literature. The authors provide a number of proposals and amendments regarding olive oil names to improve the knowledge and clarity of olive oil with direct implications for agricultural policy.

Keywords Consumer behaviour, Food policy, Generic names, Olive oil

Paper type Research paper

1. Introduction

In recent years, the consumption of healthy and quality food has increased. Several previous studies demonstrate growing consumer concern regarding these two characteristics in making decisions about food consumption (Fotopoulos and Krystallis, 2003; Mili, 2005; Grunert, 2005; Röhr *et al.*, 2005; Trienekens and Zuurbier, 2007). Consumers choose food based on its perceived value, which includes health and quality features (Shih-Tse Wang, 2010). These features even outrank price in the decision-making process of whether to purchase a food product (Feng *et al.*, 2012). Furthermore, previous research has shown that consumers consider the factors to be closely related (Rijswijk and Frewer, 2008). The increase in demand for higher quality products has also meant an increase in the variety of food that can be found on sale; in turn, marketing strategies are developed toward a greater diffusion of the distinctive attributes of these new categories (Caswell and Mojduszka, 1996).

Continuous changes in the varieties and characteristics of products make it difficult for consumers to become fully informed about food quality (Hellofs and Jacobson, 1999),

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causing market information asymmetry (Akerlof, 1970). Thus, the clarity and simplicity of information transmitted is very important. Within a self-purchase context, such information is reflected in food labeling, which acts as a silent seller. Government policies and regulations regarding labeling are intended to facilitate the marketing of food, ensuring that food products meet the guidelines for consumer rights protection and food security. In this regard, Regulation (EU) No. 1169/2011 of the European Parliament and the Council of October 25, 2011, which addresses the provision of food information to consumers[1], makes clear in its preamble that this task is still pending. Food labeling is increasingly using terms that are referred to as quality labeling in the literature to increase the perception of quality that consumers demand. This quality labeling encompasses protected origin denominations (PDO), protected geographical indications (PGI), eco-labeling and quality certified private or generic quality, among others. Several previous studies have examined labeling and its effects on food consumption (Espejel *et al.*, 2009; Robles *et al.*, 2011; Fandos and Flavián, 2011; Aprile *et al.*, 2012; Chrysochou *et al.*, 2012). However, although the inclusion of these parameters in labeling is designed to ensure the quality of food, in practice consumers still have little knowledge regarding the differences in food products, causing buying confusion. Robles *et al.*'s (2011) study on meat quality strategies suggested that nearly 60 percent of consumers surveyed would pay a higher price (premium) if the product had a label guaranteeing its quality. However, the researchers detected a significant lack of such labeling. Aprile *et al.* (2012) conducted an experiment to measure consumer preferences and willingness to pay for products with PDO, PGI, eco-labeling and other quality indications printed on the label (product description such as extra virgin olive oil). The experiment's results indicated the subjects' very poor knowledge of these quality indicators, with the worst score obtained with regard to PGI labeling.

The findings of this study contribute to the debate that emerged in the Green Book of the European Union (EU) on the adequacy of existing certification policies for agricultural products. Specifically, the European Commission proposed in 2009 to clarify and simplify labels by merging the PDO and PGI systems. This proposal, which has not been included in the current Regulation (EU) No. 1151/2012 of the European Parliament and of the Council of November 21, 2012 on the quality guidelines for agricultural and food products, indicates a need to simplify the regulations on agricultural product quality and to provide clear information on products with specific geographical characteristics to enable consumers to make more informed purchasing choices. In sum, both normative and empirical studies show that an increased effort is needed to improve the information provided to consumers and to clarify the food market.

In this study, we analyze the associations individuals make about the terms used to label a food product: olive oil. The main purpose of this study is to analyze the possible confusion that the terminology creates on the individuals and to make proposals to reduce this misunderstanding.

Spain produces two high-quality food products: olive oil, which is the focus of our study, and products from the Iberian pig. In both cases, problems exist in the marketing stage of these products. Specifically, the generic names of the categories that serve to classify and differentiate the products in quality often lead to confusing or unclear information for consumers. In the case of Iberian pig products, after years of demands to clarify and organize the sector, the Ministry of Agriculture, Food and Environment (MAGRAMA) in 2013 proposed a project for a Royal Decree approving the quality standard for meat, ham, shoulder and the Iberian loin. This decree acknowledged that

there are difficulties with consumers' acceptance and knowledge of the products because of an excessive variety of names on the labeling that may mislead the consumer. Therefore, the Ministry proposed new product names and labeling. The product names must be designated as follows: by product type, by feeding and management and by breed type, which allows the words "100% Iberian" in the case of products with 100 percent pure Iberian genetics[2]; however, it is forbidden in the labeling and advertising of these products to use the term "pure Iberian."

We highlight this prohibition of the use of the term pure because this term has also been misused in the field of olive oil and has caused confusion among consumers. In fact, for many years, the olive oil derived from a mixture of virgin olive oil and refined olive oil has been called pure olive oil (see Reglamento 136/66/EEC of 22 September, establishing a common organization of the market in oils and fats). The use of the term pure to speak about olive oil mixtures demonstrates the mismanagement of olive oil policies regarding designations. It is also true that over the years these policies have attempted to include improvements; in fact, so-called "pure olive oil" is presently called "olive oil-contains only refined olive oils and virgin olive oils." This amendment was made in 2001 by Regulation (EC) No. 1513/2001 (2001)[3]. However, these efforts are insufficient because many consumers are still unaware of the qualitative differences (chemical and sensory) between olive oil and extra virgin olive oil (a blend of refined and virgin). The previous studies indicate this lack of knowledge about olive oils among Spanish consumers (Parras and Torres, 1996; Langreo, 2000; Ministerio de Agricultura, Alimentación y Medio Ambiente-MAGRAMA – 2001, 2005; Calatrava and González (2002); Consejería de agricultura y pesca de la Junta de Andalucía (2010); Navarro *et al.*, 2010; Torres *et al.*, 2012). Furthermore, there is an absence of tradition in Spain for promoting extra virgin oils. For many years, institutional promotions, essentially funded by the EU, have used the generic name "olive oil" to guide consumers and the overall cooking sector with regard to the different qualities and attributes of each type of olive oil (Ruiz *et al.*, 2007). Thus, consumers identify the generic term "olive oil" without clearly distinguishing among the different ranges of olive oil. However, this ignorance does not prevent olive oil from being viewed as a quality product and a base of the Mediterranean diet (Calatrava, 1998a, b; Matsatsinis *et al.*, 2007; Díaz-Méndez and Gómez-Benito, 2010; Chaniotakis *et al.*, 2010; Dios-Palomares and Martínez-Paz, 2011). This finding leads to the following important implication: Although Spanish consumers' lack of knowledge regarding the types of olive oil is not limiting overall consumption, which is secured by the general appreciation of the high quality of this food product, this consumer ignorance is limiting the segmentation of consumption strategy by qualities.

The research of Parras and Torres (1996) and Parras (2000) on the denominations and the market orientation of olive oil discuss several aspects of edible vegetable oil consumers' buying behavior. The researchers analyzed 1,000 respondents in Spain to examine the confusion caused for consumers by designations of olive oil. Although the study indicated the need to introduce changes in the denominations, the researchers neither specify proposals nor analyze the concrete association made by consumers about the words used in the names.

In this work, we make some proposals for changing the terms printed on the labeling of the olive oils, basing on the association, previously measured, that the consumer gives to such terms. The literature review shows that food labeling itself is accessed by the consumer (Vandenberg, 1981), which considers it a very useful source of information, increasing their confidence in the product (Dimara and Skuras, 2005; Storcksdieck

et al., 2010; Norberg *et al.*, 2011; Hodgkins *et al.*, 2012; Morrow, 2013), even modifying final purchase choice (Themistoklis *et al.*, 2012; Swahn *et al.*, 2012). However, there is a problem when this information is incomprehensible or confusing, making the label to lose its value and usefulness (Shannon, 1994; Abbott, 1997).

In fact in the literature review, several studies advocate a change in the labeling to make it more attractive for the consumer (van Herpen and van Trijp, 2011; Graham *et al.*, 2012). Thus, our main aim is to propose terms that are associated as possible to the consumption product and not to confuse or deceive the consumer.

2. Objectives and hypothesis

Our revision of the previous research shows that the level of consumer ignorance about the categories of olive oil is high. This ignorance may create confusion in the consumer that relies on their association of olive oil as a quality product, and do not differentiate among different kind of olive oils. Terms used to refer to different varieties of olive oils have different linguistic connotations (e.g. higher quality vs lower quality). However, if consumers do not associate the terms with the proper variety of olive oil, they may consider an olive oil as a less quality one and vice versa, creating confusion in their perceptions and affecting their consumption decisions. Thus, our study goes one step further by analyzing the association grade that some terms have in relation to olive oils. Our goal is to create proposals based on the perceptions of consumers, which could be used to support agricultural policy, to clarify the sector and to improve the marketing of olive oil. We conduct an experiment in which we test how consumers perceive olive oil terms and other terms that have been proposed in the literature along with additional terms that we include testing consumer perception.

To address this goal we propose the following hypotheses.

As shown in the previous literature, olive oil is perceived as a healthy, quality product. We expect that the terms most commonly associated with this product will be those with a meaning expressing excellence or high quality, linguistically speaking, such as pure, refined, natural and virgin[4]. For this reason, terms such as blended (olive oils that are mixed) or rectified, which are not negative linguistically speaking but different to natural or pure, indicating less excellence or quality would not be highly associated with perceived olive oils. Also, we hypothesize that "regular" will not be a term usually related to olive oils, mainly due to the low use nowadays of this term. We believe that the term "eco-friendly" will be associated with olive oil because of the strength of this type of farming and the increase in organic olive oils on the market. Conversely, we believe that "biologic" and "organic" would not be associated specifically with olive oils; that is, although these terms can be used interchangeably, ecological is the term most frequently used.

Finally, we believe that the production methods of cold extraction and first cold pressure, which can voluntarily appear on the labeling of olive oil, are not well understood by the consumer and can create confusion by not being perceived as related to olive oil. Thus, we expect the following:

H1. Participants will more strongly relate terms such as virgin, natural, pure, refined and organic with olive oil than terms such as blended, rectified, regular, biological, organic, cold-pressed and first cold pressure.

In our experiment, we presented participants with accurate information about the meaning of terms involving olive oils. Because of the effect of this intervention we expect a number of changes in perceptions regarding the terms in relation to their

initial perceptions. We believe the terms that are listed positively in the intervention, including natural, virgin, cold extraction, regular, eco-friendly, biological and organic, are also associated with olive oil in the posttest. Conversely, terms such as refining, rectified, pure, blended and first cold pressure, which are not viewed as high quality, will be seen as less associated with olive oil after the intervention. We therefore expect the following to occur after the intervention:

H2. Participants will more strongly relate terms such as natural, virgin, cold extraction, regular, eco-friendly, biological and organic to olive oils than terms such as refined, rectified, pure, blended and first cold pressure.

3. Experiment

In this section, we detail the sample, the instruments and the experimental procedure.

3.1 Sample

In total, 128 participants comprised two groups, with 64 in the experimental group and 64 in the control group. According to Malhotra's (1993) classification of experimental designs, we followed a pre-experimental design because random procedures are not used to control extraneous variables. In detail, our design consists of a pretest and a posttest experimental group to which we added a control group. According to Luque (1997) one way to mitigate the effect of selection bias, which can occur when a sample is not evenly distributed, consists in measuring, along with the experimental group to which the intervention is applied, a similar control group with similar relevant characteristics to the experimental group to compare both measures. Thus, our sample was composed of two groups of college students, whose ages ranged from 18 to 28 years ($M = 20.37$; SD = 2.03). The percentage of men and women was 39.4 and 60.6 percent, respectively.

We attempted to approximate the maximum values of these variables for the two groups so that they were as similar as possible. In fact, the value of Pearson χ^2 (exact Sig. = 0.77 bilateral) confirms that the significance of the gender variable is not different for both groups.

3.2 Instruments

1. Experimental group. For the pretest we used a survey, and for the intervention we used a PowerPoint presentation of the terms. The experiment was divided into the following two sections: pretest and posttest. The surveys were identical in the two phases; the pretest was marked with the letter A and the posttest with the letter B to observe the effect of the intervention. Similarly, to distinguish that the answers given in the pretest and the posttest corresponded to the same participant, respondents were asked to write the number of the computer station[5] at which they were seated.

The survey used in the experiment consisted of a table of the following 12 terms related to olive oils: biological, natural, pure, regular, rectified, mixing, virgin, refined, organic, organic extraction and cold-pressed and first cold-pressed. These 12 terms were chosen following a review of research and specialized terminology related to olive oil denominations by Parras (2000), along with legislation on olive oils.

Using a five-point Likert scale, participants indicated the degree of the relationship of the olive oil terms, where the value 1 corresponded to "not at all associated with olive oil" and the value 5 corresponded to "completely associated with olive oil."

The participants were asked to not assign the same value to more than two adjectives, thereby avoiding the central tendency of response.

The survey also included demographic data such as age, gender and the location of origin.

In sum, our aim was to analyze consumers' perception of these terms in relation to olive oils to determine whether the terms are ideal when used as a designation of olive oil and to what extent the terms are associated with olive oils.

2. Control group. Surveys in the control group were the same as in the experimental group and were administered to students at the University of Jaén (Spain). Students were randomly selected and asked to voluntarily cooperate by completing a questionnaire. Surveys were collected as completed and the students were thanked for their participation

3.3 Experimental procedure

The intervention consisted of offering detailed information about the 12 terms included in the survey (see Table I[6]). Thus, once the students completed Survey A, we collected the survey and then explained that we would make a brief statement regarding the terms seen in the survey that had just completed. The explanation was given by the researcher and supported by a presentation in PowerPoint format that students could watch while listening. Once the students were exposed to the information, the projector was turned off and the participants completed the same survey marked with the letter B, this time taking into account the explanation that they had just received. Thus, we use a posttest measure to analyze whether the information influenced the participants' perceptions.

4. Results

For the sake of clarity and brevity, we present our results in the following two sections: those related to the initial perceptions of the participants and those occurring after the intervention.

4.1 Results from initial perceptions

Our first hypothesis referred to the initial perceptions of the participants, that is, the associations of terms before undergoing intervention. Thus, we first performed an analysis of the observed values for the total sample ($n = 128$), analyzing the degree to which participants associated the terms with olive oils. For each case, we also analyzed whether there were significant differences in the scores given by participants depending on the group (experimental or control) and gender.

Table II shows the descriptive statistics of the terms ordered from one to 12, from the strongest to the least valued terms related to olive oils.

This classification confirms *H1*. As we predicted, "virgin" and "natural" stand out as the terms most strongly related with olive oil. The findings indicate a clear dominance of these terms. In fact, the standard deviation of virgin is the lowest, representing higher homogeneity among perceptions. Surprisingly, the terms pure and refined occupy the third and fourth position, respectively, showing a higher association to olive oils than expected. The terms that are the least associated with olive oil are first cold-pressed and rectified, far from the term refined, although the two terms are intended to express the same concept.

The GLM multivariate procedure allows us to contrast the null hypotheses about the effects of the group (experimental vs control) and gender (male vs female) on the means

Information	Source and justification
Virgin olive oil: oils obtained by physical procedures, and in a temperature conditions that don't alter the oil. It is a natural product that preserves taste, aromas and the fruit vitamins	Proposal of a new name for virgin olive oils (including the word "natural" in the definition)
Virgin≈Natural	
Refined olive oil: oil obtained from refining, by chemical procedure, the virgin olive oil of high acidity (not for consumption). These oils have lost their organoleptic and natural properties	Proposal to change the term "refined" by "rectified" because the latter term denotes more precisely which is the procedure followed. Furthermore, "refined" has confusing connotations for the consumer (Parras, 2000; Montoro and Roldán, 2013)
Rectified: purify liquids	
Refined≈Rectified	
In designations of olive oils, the terms pure equaled to blended. The mixture of virgin olive oil and refined olive oil was called pure olive oil	Designation of pure olive oil contained in Regulation 136/66/EEC of the Council of September 22, on the common organization of the market in oils and fats
Pure ≈ Blended	There is a proposal to change the term "pure" for the term "regular"
Regular olive oil, nor Pure neither Blended	
First cold pressed: virgin or extra virgin olive oil obtained below 27°C from a first mechanical pressing of the olive paste, through a system of traditional extraction with hydro dams. System virtually extinct. The residue remaining on the mats where the olive press makes oil quality is debatable. Cleaning the mats is a high cost	Definitions of "cold-pressed" and "first cold pressing", as they are listed in Commission Regulation (EC) 1019/2002 on marketing standards for olive oil. According to the regulation the display may appear on the labeling on a voluntary basis
Cold extraction: virgin or extra virgin olive oil obtained below 27°C by filtration or centrifugation of the olive paste. It is got high quality oil that retains all its properties	This definition was completed with a clarification obtained by consulting the Dr Manuel Parras Rosa, an expert in the field of olive oils
Eco-friendly olive oil: is produced by ecological cultive without the use of chemical fertilizers or pesticides	Decree 1614/2005 of 30 December, amending Decree 1852/1993, of 22 October, on production of agricultural products and indications referring thereto on agricultural products and foodstuffs
Eco-friendly≈Biological≈Organic	According to Royal Decree these three terms can be used interchangeably. We wanted to analyze whether the consumer has this perception. This is of importance because of the notoriety of this kind of food

Table I.
Information given to participants in the intervention

of the terms. In this case, there is a main effect of gender and a significant interaction of gender × group (p-value < 0.05). Between-subjects effects indicate that gender has a significant effect with regard to the term blended and that there is an interaction effect of gender and group with regard to the natural and regular terms. "Blended" is valued more positively by women ($M_{w.cg} = 3.03$; $M_{w.eg} = 2.77$; $M_{m.eg} = 2.40$; $M_{m.cg} = 1.91$). "Natural" is perceived as more related to olive oil by men in the control group, followed by women in the experimental group, women in the control group and finally by men in the experimental group ($M_{m.g.c} = 4.23$; $M_{w.g.e} = 4.20$; $M_{w.g.c} = 3.88$; $M_{m.g.e} = 3.50$).

When analyzing the effect of the group on the means of the terms, we found no significant effects (p-value greater than 0.05). This result is positive because it indicates that there are no significant differences between the control group and the experimental group. The only significant difference yielded is for the term "regular"

Ranking of terms		Mean	SD
1	Virgin	4.40	0.93
2	Natural	3.99	1.12
3	Pure	3.63	1.01
4	Refined	3.62	1.18
5	Eco-friendly	3.49	1.24
6	Organic	3.12	1.15
7	Biologic	3.03	1.13
8	Regular	2.78	1.22
9	Blended	2.61	1.19
10	Cold extration	2.37	1.18
11	First cold pressed	2.17	1.17
12	Rectified	2.14	1.02

Table II. The classification of terms related to olive oil, ranked by their means

(p-value < 0.05), which was valued higher in the control group than in the experimental group ($M_{cg} = 2.91$; $M_{exg} = 2.44$).

Using a t test for independent samples we compared the mean equal variances of the variables (biological, natural, pure, regular, blended, virgin, refined, eco-friendly, organic, cold-pressed and first cold-pressed) by group (control and experimental group). We found significant differences in biological terms ($t = -2.064$, Sig. (two-sided) $= 0.041$), and regular ($t = -1.994$, Sig. (two-sided) $= 0.048$) for group averages and with confidence intervals for the difference mean that obviously does not contain the value 0. Participants in the control group associated these terms with olive oils. Although no differences should be found, these differences may be because of not randomly assigning subjects to groups.

4.2 Results after the intervention

Our second hypothesis concerned the association of terms with olive oil after the intervention, i.e., the changes in initial perceptions. Therefore, we focus on the experimental group and examine how the experimental subjects analyze the terms' relation with olive oil before undergoing the treatment (pretest) and after the treatment (posttest). We classify terms by the degree of relationship with olive oil, depending on the estimated mean (see Tables III and IV).

As indicated by the results, the intervention has a clear effect. The most notable change is regarding the terms pure and refined. After the intervention participants do not associate these terms with olive oil to the same extent. Another important change is regarding the biological term, which is now much more related to olive oil, as is the production method of cold extraction.

In view of these results, we can assert that the intervention has had a significant impact on participants, supporting *H2*. Comparing the values for each pair of terms, the t test for related samples yields significant differences at 95 percent confidence in the means between the pretest and the posttest for the majority of terms, except for natural and virgin (see Table V). To analyze whether the differences in scores are considered positive or negative, we conduct the frequency procedure. Previously, we computed two new variables. The first variable indicates the difference between the scores given by the participants to each term in the pretest and the posttest. The other variable is calculated and given a value depending on the meaning of the difference.

Table III.
The classification of terms associated with olive oil by means

Ranking		Mean	SD
1	Virgen	4.36	0.93
2	Natural	3.92	1.09
3	Pure	3.58	1.03
4	Refined	3.57	1.17
5	Eco-friendly	3.43	1.26
6	Organic	2.95	1.15
7	Biologic	2.83	1.15
8	Blended	2.67	1.17
9	Regular	2.49	1.30
10	Cold-press	2.28	1.09
11	First cold – press	2.14	1.13
12	Rectified	2.09	0.99

Note: Pretest

Table IV.
The classification of terms associated with olive oil by means

Ranking		Mean	SD	*p*-value
1	Virgin	4.27	1.09	0.639
2	Natural	4.17	1.00	0.117
3	Biologic	4.14	1.08	0.000
4	Ecologic	3.89	1.16	0.013
5	Organic	3.51	1.27	0.005
6	Cold extraction	3.44	1.43	0.000
7	Regular	3.20	1.31	0.014
8	Pure	3.20	1.13	0.042
9	Blended	3.11	1.05	0.039
10	First cold pression	2.74	1.43	0.012
11	Refined	2.55	1.35	0.000
12	Rectified	2.51	1.40	0.025

Note: Posttest

Table V.
The percentage of participants by term and category

Frequency (%)						
	Biologic	Natural	Pure	Regular	Cold-press	First-cold press
1	5 (7.8%)	17 (26.6%)	26 (40.6%)	13 (20.3%)	10 (15.6%)	16 (25%)
2	47 (73.4%)	25 (39.1%)	12 (18.8%)	27 (42.2%)	37 (57.8%)	34 (53.1%)
3	12 (18.8%)	22 (34.4%)	26 (40.6%)	17 (26.6%)	17 (26.6%)	12 (18.8%)
	Rectified	Blended	Virgin	Refined	Eco-Friendly	Organic
1	15 (23.4%)	16 (25%)	17 (26.6%)	35 (54.7%)	12 (18.8%)	15 (23.4%)
2	31 (48.4%)	28 (43.8%)	15 (23.4%)	11 (17.2%)	29 (45.3%)	35 (54.7%)
3	15 (23.4%)	18 (28.1%)	30 (46.9%)	15 (23.4%)	21 (32.8%)	13 (20.3%)

Notes: 1, decrease in the ranking; 2, increase in the ranking; 3, no change in the ranking

The value 1 refers to a difference between the pretest and the posttest of more than 0. This value indicates that in the posttest the term has increased in the ranking. If the difference is negative, the term has been rated with a high score in the posttest and the variable takes the value 2. Finally, if the scores agree in the pretest and posttest, there is no change and the difference in scores is 0. Thus, this variable takes the value 3.

Once this new variable is calculated, we proceed to calculate the frequencies to identify the percentage of variation in the posttest.

Analyzing these frequencies (Table V) we see that in the majority of cases the terms increase positions in the post-test. Thus, this result implies that participants did not have a clear idea of the meaning of terms related to olive oils. Only "pure" and "refined" decrease, making us believe that there is perception of less association/relation regarding these terms in the olive oil sector. In fact, we think individuals associated these terms with olive oils in the pretest for being linguistically synonym of excellence, provoking confusion in the consumer. Thus, food policies should take into account the necessity of avoiding terms that are not clear, confound the consumer and are less associated to the consumption product. The same is true for the terms "biological" and "cold extraction," which demonstrated clear changes in the posttest. The turnaround followed by the latter term does not occur in the same way as with first cold-pressure, a term that appeared to be unconvincing to participants. The same trend is viewed for "rectified," which increases slightly in the ranking but is still a term that is less associated with olive oil than other terms.

The term "regular" remains in middle positions. We should highlight the 10.9 percent of cases missed in the observations, which can be explained as a term in disuse in the sector and therefore difficult for participants to associate with. In addition, "blended" occupies middle positions. Although this term's change in the posttest is toward higher scores, it still does not position clearly. In the case of "eco-friendly," "biological" and "organic," terms considered synonymous in this context, we observed a greater confusion in the last two terms. This result is explained because "eco-friendly" does not change the trend in a pronounced manner; in fact, 32.8 percent of the subjects do not change their scores. However, this is not the case for "biological" and "organic," which are related to eco-friendly and increase their scores. Overall, the terms that create less confusion and appear to be fairly clear are "virgin" and "natural," which are only minimally affected by the intervention. We may assert that in the minds of consumers, these two terms are highly associated with olive oil. We understand this degree of association with the term virgin because this term is commonly used in the industry; although "natural" is an obsolete term, we consider that consumers perceive olive oil as a "natural product."

5. Conclusions

Based on our results, we reach the following conclusions.

First, "virgin" and "natural" are the terms with the strongest relation to olive oils. Individuals perceive that these terms are very clear and highly associated to olive oil.

Second, "rectified" is a term with negative linguistic connotations in Spanish, which scarcely changes after the intervention. However, significant changes are identified in the posttest. As expected, these changes in scores are in a negative sense; in other words, participants do not initially associate the term with olive oils and therefore change their score after receiving information about its meaning in the context of olive oils. We believe that rectified is associated with low quality or excellence. Conversely, the connotations associated with "refined" are very different, receiving better valuations than those of "rectified." However, both terms are similar in the production process and imply a lower quality of these olive oils than, i.e. virgin or natural. Refined is positively perceived as linguistically referring to "outstanding, gorgeous in a good condition" and thus, related to olive oils which are consider as high quality product. However, when referring to olive oils, refined refers to a chemical process that

transforms a virgin olive oil with high acidity, and unfit for consumption, into an edible olive oil. Thus, a refined olive oil is not as natural product, and its quality is below, as virgin olive oils. Thus, we consider that the term rectified is more appropriated to refer to olive oil than refined.

Third, the term "pure" receives very high ratings because subjects largely associate the term with olive oil. After the explanation, the perception of this term in the context of olive oil decreases considerably.

Fourth, the valuation of "blended" in the degree of association with olive oil turns out to be intermediate. The effect of the intervention is not significant although the resulting changes in participants' scores are, in general, in a positive sense. Thus, our hypothesis about this term is not fulfilled because our expectation was that the term would decrease in rank after the intervention. One possible explanation is that relating this term to olive oil has a beneficial effect and may decrease any negative connotations.

Fifth, "regular" is a term of central tendency that does not produce positive or negative connotations. However, the effect of the intervention is positive, increasing participants' scores on the posttest.

The means for the first cold-press and cold extraction production methods are very similar in the pretest; however, in the posttest these terms are separated with significantly higher scores for "cold extraction." Whereas our expectation was that "first cold-press" would be scored lower after the intervention, we obtained the opposite effect. This result may imply that participants were initially unaware of this term but changed their scores after the intervention to reflect a stronger relationship between the term and olive oil. The central tendency and the marked effect suggest that these terms are unclear for participants.

Because there is a greater awareness of "eco-friendly" than "biological" or "organic," the latter two terms increase their scores considerably in the posttest. Although "biological" initially scored lower than "eco-friendly" in the pretest, "biological" was one place higher than "eco-friendly" in the posttest, indicating that it is a well-accepted term.

The following chart summarizes the perceptions of the terms and how these perceptions change in the posttest (Figure 1).

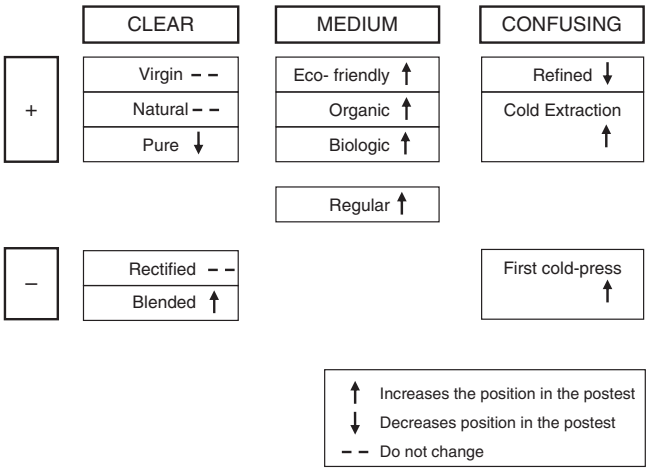

Figure 1.
Summary of the perception of terms in the experiment

6. Proposals and recommendations

In this paper we show our disagreement with the oleic policies regarding the designations of olive oils because we believe these policies do not facilitate consumer decision making. For this reason, we present a series of proposals and recommendations endorsed by our results. These are merely indicative and for the sole purpose of calling attention to the need for change. Parras (2000) introduced several proposals intended to change existing names to new ones, e.g., the name "olive oil" to "regular olive oil." Based on a recent change in legislation, "olive oil" has been renamed "olive oil-contains only refined olive oils and virgin olive oils." Although we understand that this name change was made with positive intentions, the result was not expected. Confusingly within this designation occurs the term "refined." As we analyze in our study, this term generates consumer connotations that are modified when the real meaning is explained in the context of olive oil. We therefore believe that the proper term should be "rectified," which has connotations that are more approximate to the term's actual meaning.

We further believe that the present term used for olive oil is too long and therefore eventually will end up colloquially referred to by the abbreviated name "olive oil," which effectively would produce no change. In any case the addition of an explanation is successful, so that consumers can read on label, clarifying that the label should use the term "rectified" instead of "refined" and also the term "regular" to distinguish the "olive oil" variety, the same generic term used to discuss all olive oil. It is really important that consumers know that there are different categories of olive oils. It is proven that consumers associates olive oils with high quality but does not distinguish its varieties. It should be clear that there are high quality or excellent olive oils and also other olive that, although all of them are healthy and good, they are of a lower quality than the previous. Indeed, to mitigate this confusion, we claim the use of the generic term in the plural "olive oils." The use of the term "regular" is justified in that it is an intermediate term that has no negative connotations; therefore, this term will help to differentiate this variety of oil without damaging it. The name would read "regular olive oil" and we would leave the addition of "contains only rectified olive oils and virgin olive oils" as the compulsory indication on the labeling that should be included but separate from the name so that the name is not as long.

Another change proposed by Parras was to name "virgin olive oil or natural" for virgin oils because in the researcher's study the term "natural" earned higher scores than the term "virgin" in relation to health. However, our results show that the term "virgin" is always the best positioned, followed closely by "natural." Therefore, we believe that the most effective idea would be to keep the name "virgin" that is very well positioned in the consumer's mind, adding the term "natural" in the mandatory statement on the label as follows: "virgin olive oil: natural olive oil obtained directly from olives and solely by mechanical means." Of course, we would use the term "natural" for all virgin olive oil as is the case of "extra virgin olive oil"[7]. The inclusion of the term "natural" provide a means to further differentiate virgin oils from "regular olive oil" and also serves to answer a growing trend in this century: the increased demand for natural products (Senauer, 2001).

This trend also favors the demand for eco-friendly olive oil. In our results this term appears well-positioned; however, we believe that its position should be better because natural and pure have higher positions. Communication campaigns are necessary to teach consumers about the health benefits of this crop.

In a similar vein, we believe it is necessary to reposition the term "pure". In our study this term has proved to have positive connotations in the minds of consumers.

Although in the past this term was not used in the proper way, referring to blended oil, the present term could be effectively used. Consumers have little memory of this term in association with olive oil, as indicated by the MAGRAMA (2001) study on the designation of olive oils in which only 6.3 percent of purchasing managers knew the previous name, "pure olive oil." Thus, this term could be repositioned in consumers' mind but associated with olive oils of higher quality, such as virgin, extra virgin or eco-friendly farming.

Other recommendations relate to proposed voluntary guidelines that can be included in the labeling of olive oils. This is the case for the label "cold-pressed"[8], which the producer may mention on the label. However, based on our results, we believe that this approach would produce no change because consumers neither know nor associate the term. These recommendations should be taken into account before including terms in the labeling to avoid excessive information that the consumer does not understand. In addition, labels should contain information explaining the beneficial properties of this method, which provides a higher quality product and therefore differentiates the product.

In Table VI, we provide a resume of our proposals and recommendations.

Our research has several limitations, including one limitation related to the empirical study conducted. As we discussed, there is a selection bias in the experiment because the experimental units were not assigned randomly. Future research should overcome this limitation through randomization. In addition, there was no follow-up with participants to determine whether the information provided endures beyond participants' short-term memory. In addition, future research could conduct qualitative studies (e.g. group dynamics and focus groups) for an in-depth study of consumers' perceptions regarding the various denominations, for example, whether participants care to read the label or understand its contents. Future research also could examine whether knowledge about the varieties of olive oil could be improved through improvements in designations and labeling. Based on our proposals of denominations, a future study also could assess related items such as valuation and price. Despite these limitations, this study contributes scientific knowledge about designations and perceptions of terms used in relation to olive oils and further makes food policy proposals that helps both the consumer (by avoiding confusion) and the producers and marketers of olive oils (positively discriminating those higher quality oils), giving them a fair position in the market and a fair price according to their quality. In this study we focus on olive oils, but could be applied to any food product that has various categories.

Table VI. Proposals and recommendations

Modifications in the denominations and definitions of olive oils			
Current denomination	Proposal		Labeling definitions
Olive oil-contains only refined olive oils and virgin olive oils	Regular olive oil		Contains only rectified olive oils and virgin olive oils
Virgin olive oils	Maintain names	Virgin Extra virgin	Add the term "natural" within the compulsory mention
Other proposals and recommendations			
Further information about the term "eco-friendly"			
Repositioning of the term "pure": possible use for olive oils of higher quality			
Further information about the "cold-press" method			
Use of the generic term "olive oils" in plural			

Notes

1. Modifing Reglamento (CE) No. 1924/2006 and (CE) No. 1925/2006 of the European Parliament and the Council. This derogates Directive 87/250/CEE from the Commission, Directive 90/496/CEE from the Council, Directive 1999/10/CEE from the Commission, Directive 2000/13/CE from the European Parliament and the Council, Directives 2002/67/CE, and 2008/5/CE from the Commission, and Regulation (CE) No. 608/2004 from the Commission.
2. Whose parents are 100 percent pure Iberian as enrolled in the appropriate studbook.
3. Amending Regulation No. 136/66/EEC and Regulation (EC) No. 1638/98, regarding the prolongation of the aid policy and the quality strategy for olive oil
4. The definitions for these terms that appear in the Spanish Language Dictionary of the Spanish Real Academy justify our assertion:virgin: without artifice in its cultivation;refined: outstanding, gorgeous in a good condition;pure: free and free from any mixture of something else; andnatural: made with truth, without artifice or any composition mixture.
5. Each computer had an assigned number.
6. This information was obtained from the same sources for the terms and from consultation with experts.
7. We have not proposed any change for the term "extra" because this term expresses quality and any change will only further confuse consumers.
8. We refer only to this indication because it is the most frequently used process, compared to the method of "first cold-pressing".

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