

CONSUMER PERCEPTION OF ORGANIC BLUEBERRY LABELING IN ITALY

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ABSTRACT

As the Italian markets are witnessing an increase in consumption of blueberries, which may result in an increase of agricultural land devoted to them, this analysis looks at Italian consumer perceptions of the organic label on fresh blueberries and its potential impact on the market. The analysis included face-to-face interviews and a survey at six points of sales of blueberries belonging to two mass retail chains. Consumer behaviour was evaluated by submitting a self-constructed questionnaire by two sample groups selected in the territories of two metropolitan areas in northwest Italy (Turin and Genoa). The research from the consumer characteristics analysis revealed limited and seasonal consumption of these fruits. The latent class analysis was used to obtain four clusters of consumers for each considered sample. The results underscored a consumer sensitivity to organic labelling in clusters from sample 1, but not from sample 2 respondents. Therefore, the organic quality certification could represent an instrument for the development of the short supply chain, opening up agricultural prospects for subsidiary profit and providing a contribution to the economic survival of producers. However, this certification acceptability must be assessed by studying the consumer perception which, as emerges from our study, varies according to many aspects.

KEYWORDS

Organic label, consumer perception, cluster analysis, blueberries

INTRODUCTION

The "green lifestyle" is a term that resonates with people from many different backgrounds (Gilg *et al.*, 2005). Currently, this green trend is seen in many sectors - from urban construction and engineering to agricultural and food production - putting topics such as environmental sustainability, eco-innovation and economic sustainability at the forefront (Sierra-Pérez *et al.*, 2017; Thøgersen *et al.*, 2017; Tecco *et al.*, 2016; Peano *et al.*, 2015; Olsen *et al.*, 2015; Zanoli & Naspetti, 2002). In the case of food production, aspects such as health, environmental sustainability and locally-sourced products are all associated with the demands of the modern consumer, and in line with the characteristics of certified organic labeling. Food that is organically produced is increasing throughout the world in response to concerns around food safety, human health, and environmental protection (Wier *et al.*, 2008; Bonti-Ankomah and Yiridoe, 2006; Gregory, 2000; Grunert and Juhl, 1995). The production of organic food has increased significantly throughout the world. Italy ranks second place in organic exports; In Italy, in 2016, with a production of 4.93 billion (+15%) in organic products, exports increased by 16% to 1.91 billion (Scarci, 2016). Blueberries (*Vaccinium corymbosum* L.) are recognized by consumers as being beneficial to human health which also reflects the properties identified in organic products. In fact, blueberries are an excellent example of the cultural dynamism that has characterized the evolution of food consumption in Italy in recent years. Among the reasons for this trend, there are the intrinsic characteristics related to the nutritional/health properties of these fruits. Many studies show that one of the main attributes in choosing to buy blueberries is the health benefit associated with them (Hu, Woods, & Bastin, 2009; Lim, 2012; Wang *et al.*, 2012). The consumption of these products is supported also by a "healthy mood", according to their nutritional value. On the other hand, the large investments made by the distribution industry that helps multiply its presence in the various places of choice have contributed to their acceptance by consumers. In addition to the marketing strategies mentioned above, aspects linked to naturalness and hedonistic values are also assigned to this product category. Marketing campaigns are increasingly communicating the characteristics of these products, particularly those related to health and nutritional aspects. The marketing can also be seen directly in stores. The result of these campaigns has been translated, in particular for blueberries, into a widespread market penetration in several sales channels, both for processed products (yogurt, fruit juices, etc.), and for fresh fruit. In addition, the consumption of these fruits is no longer limited to the summer period (June-September), since there is a greater availability of products already in April (produced by North Africa and Spain) and at the end of the season until December (Italian/European production stored in a controlled atmosphere or of southern hemisphere origin, mainly South America) (Di Palma, 2013). Currently, 1.2 billion lbs. of blueberries are produced worldwide, of which 54.2 million lbs. grown in Europe. 11% of the European production is produced in Italy, which has experienced significant growth in the last five years (Peano *et al.*, 2017; Brazelton, 2016). In addition, some typical elements of these crops (high differentiation and profitability, enhancement of marginal areas, agro-economic sustainability and good health) contributes to an exponential growth of their value (Blanc *et al.*, 2018; Girgenti *et al.*, 2013; Cricca, 2008). However, even for the increase in per capita consumption, Italy cannot self-supply itself; in fact, about 70% of the berries consumed in Italy comes from Northern Europe, Spain, the United States and South America. Both the frozen product (about 70%) and the fresh product in modified atmosphere (about 30%) are imported (<http://freshplaza.it/>). Organic farming can offer tools to guarantee a better overall quality of product (Wang *et al.*, 2008; Smith-Spangler *et al.*, 2012), such as taste, flavour,

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and nutritional benefits. This, in turn, ensures differentiation and improvement of the local product. Maintaining this growing market requires an understanding of current consumer demands, agricultural investments, and consumer perception. Given that in Italy the cultivation of blueberries is concentrated in a few regions, especially in the Piedmont area, organic farming could support marginal areas of production, as well as guarantee greater environmental sustainability. Changes in organic farming practices to the detriment of conventional agriculture have contributed to favourable changes for human health in the nutrient composition of fresh fruit and vegetables (Worthington, 2001). In addition, organic certification is recognized in various studies as an attribute that positively influences the choice of the consumer at the point of purchase (Aertsens, 2009; Viganò *et al.*, 2012; Julian *et al.*, 2012; Janssen & Hamm, 2014; Rousseau, 2015). However, consumer preferences are not homogeneous (Wang *et al.*, 2017). Existing literature suggests that various consumer segments may value products differently (Boxall and Adamowicz, 2002; Teratanavat and Hooker, 2006). In a previous study, choice attributes considered by Italian consumers during the purchasing of blueberries and raspberries were identified (Girgenti *et al.*, 2016). Our research dives deeper into the study on blueberry fruit. Evaluating each consumer segment of preferences is an important tool for mass-marketing efficiency. The purpose of this paper is twofold: to shed light on how individual consumers from two metropolitan areas in northwest Italy value the characteristics of blueberries during purchase and to verify the existence of segments of consumers that differently perceive the organic label.

1. MATERIALS AND METHODS

To examine the impact that blueberry organic labels has on consumer interest, an intercept survey was conducted in the territory of two Italian metropolitan areas in northwest Italy (Turin in Piedmont and Genoa in Liguria). For this study, six blueberry points of sale at two mass retail chains were selected, three in each of the chosen territories. An analysis was conducted through a differentiation between the two samples of interviews, one belonging to the territory of the metropolitan area in Piedmont (sample 1), and the second to the metropolitan area in Liguria (sample 2). Interviews were conducted in 2015 between May and August, from Monday to Sunday, during two time slots (9 a.m. to 1 p.m. and 4 p.m. to 8 p.m.). A total of 700 respondents were involved in face-to-face interviews using a structured questionnaire with closed-ended questions. The questionnaire was subdivided into three main sections. The first section included questions related to demographical characteristics: age (under 30 years old, between 31 and 45 years old, between 46 and 55 years old, and over 55 years old) and gender (female or male). Questions about annual consumption habits associated with blueberries were envisaged in the second section (more than 5 times a year, from 2 to 4 times a year, only once a year). Consumer preference about the packaging containers of berry fruits preferred at supermarkets (125 g and 250 g) were also investigated. Moreover, the questionnaire looked into the type of product habitually purchased: the consumer could choose between fresh blueberries, fruit juices, ice cream and jellies. In addition, consumers were asked to indicate the place where the usual purchase of blueberries is made; either at supermarkets, local markets, directly from producers, or greengrocers. Finally, the favourite season for blueberry consumption was investigated in the last part of the main questionnaire section. The final part of the questionnaire was dedicated to the attributes of blueberries. Twelve quality attributes were chosen and presented to interviewees in different sets, each containing a selected number of attributes in a random combination. The selected attributes were: freshness, origin, organic label, beneficial health effects, seasonality, appearance, local product, packaging, brand, quality certifications, price, and brand. For our study we chose the blueberry quality attributes in accordance to those clustered into five categories obtained by adapting the four dimensions of food quality (Table 1). This was adapted from the “Total Quality Food Model” established in Grunert (2005) which is widely considered a model for the study of consumer perception for raspberries and blueberries (Girgenti *et al.*, 2016). The choice attribute of price was not included in this classification (table 1) due to the results of previous studies that revealed that the demand for food is not usually driven by price, but rather it is increasingly driven by more complex and heterogeneous attributes (Girgenti *et al.*, 2016; Lopez -Galan *et al.*, 2013; Grunert, 2011). Therefore, for our study, price was a discriminating factor for clusters definition, although not so important during the choice of the product. For this reason, the price attribute was included in our choice experiment.

Table 1. Categories representing emerging cues in perceived fruit quality and consumer choice (Grunert, 2005; Girgenti *et al.*, 2016)

Sensory	Safety and Health Benefits	Convenience	Sustainability and Processing	Country of Origin
Freshness	Health benefits	Packaging	Organic labelling	Product origin
Appearance	Quality certification	Labelling (producer and/or retailer)	Seasonality	Locally grown
		Brand knowledge		

To implement our experimental design, it was necessary to choose the number of times each of the attributes identified must be presented to respondents, as well as the number of attributes that should be presented in each set of choices. Orme (2012) recommended between three to five attributes per set of choices and that each of these be presented to the respondent between three to five times. According to the indications that arose, we chose to use four attributes per set and to present each attribute three times in the questionnaire (Table 2). The MaxDiff designer v.2.0.2 (Sawtooth Software) was used to assign the 12 attributes to 4 versions of the questionnaire, each comprising nine subsets and with each subset including four attributes. Consumers must indicate which of the four presented attributes were considered the best and the worst during berry fruits purchase. The SSI software can produce different analyses of the collected data. The one used in this work is the IClass analysis. This latter data analysis system was used to compare preferences about blueberry attributes between the two considered sub-samples: respondents from the territory of the metropolitan area in Piedmont (sample 1) and respondents from the metropolitan area in Liguria (sample 2). The samples were divided into clusters according to the weight each individual respondent assigned to the different attributes as per the Latent Class Clustering technique. This allows us to obtain a division in consumption behaviours using the weight of the attributes of

each individual respondent as dependent variables to generate a probability distribution. Each cluster contains two types of information: the relative importance of each attribute among those studied for each segment and the differences between clusters (<http://www.sawtoothsoftware.com/>). The weight of each attribute is described by the raw score: the attributes can have positive or negative weights and have a central value of 0 (the average of the attributes has a weight equal to zero). These weights are on a scale of intervals that do not support relationship operations. In other words, it is not possible to state that an element with a score of 2.0 is twice as important (or preferred) as an element with a score of 1.0. The Sawtooth software by default creates 4 segmentations, each containing the division of the sample from 2 to 5 clusters respectively. To identify the most appropriate segmentation for our case study, some indicators were taken into consideration, such as Log-Likelihood (LL), Consistent Akaike Information Criterion (CAIC) and Bayesian Information Criterion (BIC). The segmentation hypothesis that presents the lowest BIC value among the 4 produced was chosen as the best representation (<http://www.sawtoothsoftware.com/>; Dekhili *et al.*, 2011). The confidence limit applied in the estimation of the attribute scores was set at 95% and the standard deviation was used as a raw indicator of variability present within the sample. Finally, the *p-value* for each attribute was calculated using the homogeneity of the variance test. The software used for the quantitative analysis was SPSS.21.0 for Windows.

Table 2. Example of attributes subset. Respondents had to indicate which of the four presented attributes was considered the best and the worst

MOST INFLUENTIAL	ATTRIBUTES	LEAST INFLUENTIAL
○	Packaging	○
○	Organic label	○
○	Seasonality	○
○	Brand	○

Finally, the classification of the clusters obtained from the analysis of this study relative to the two samples was compared with the consumer segmentation considered as an initial hypothesis model (Table 1).

2. RESULTS

Demographic characteristics of the two sample respondents came from the two considered metropolitan areas reported in Figure 1. The respondents from sample 1 (n=300) represented 43% of the total, while sample 2 (n=400) represented 57%. In both samples, the majority were women, especially in sample 1 respondents. The percentage of consumers belonging to the age group 45 to 55 years old was balanced for respondents belonging to both samples. In the case of sample 2, the majority of respondents were 31-35 years old (37%), while in sample 1 respondents were over 55 years.

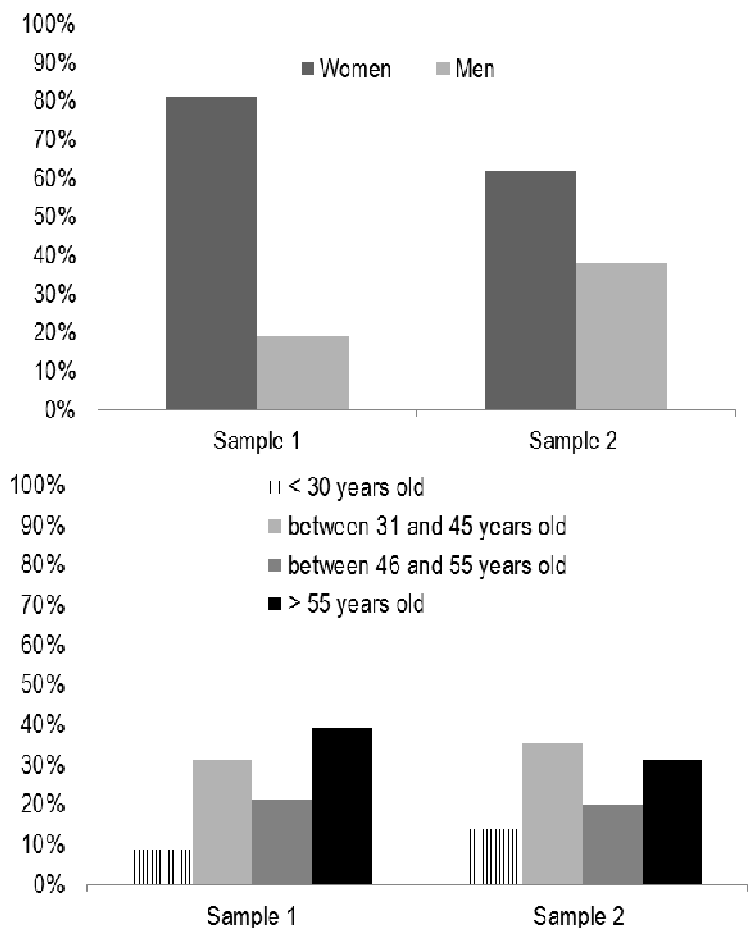


Figure 1. Comparison of demographic characteristics (gender and age groups) between the considered samples 1 and 2

By observing the declared consumption behaviours, a significant share of respondents (36%) consumed blueberries more than 5 times a year, the majority (52%) between 2 and 4 times a year and a small minority (12%) only once a year. The packaged containers preferred by consumers was 125 g as declared by the majority (88%). The remaining of the sample (12%) declared to buy different sizes (250 g). Since the questionnaires focus on the consumption of fresh blueberries, it is interesting to note that a considerable share of the sample (45%) did not only buy the fresh product, but also the transformed products (jellies, juices, etc.). When asked about the usual place of purchase, the majority declared to prefer supermarkets. In addition to retail outlets and local markets, a considerable share claimed to purchase by the producer (15%) or greengrocer (10%). Finally, the favourite season for blueberry consumption was summer, as stated by 87% of respondents.

Latent segments of blueberry cons

The results from both samples illustrate an overall heterogeneity of attributes, which led us to seek out latent cluster samples by applying the IClass analysis function. Individuals with the same latent class are homogeneous with respect to certain criteria, while subjects in different groups have dissimilar attributes (Mueller & Rungie, 2009). Single cluster membership is probabilistic, depending on the importance of the attribute. Models of inactivity for two to five groups were estimated. The segmentation hypothesis that presents the lowest BIC value (Table 3) among the 4 produced was chosen as the best representation of the different consumption behaviours (<http://www.sawtoothsoftware.com/>; Dekhili, et al., 2011). For both groups of respondents (samples 1 and 2), the cluster analysis distinguished four groups of consumers.

Table 3. IClass analysis of individual Best-Worst scores for samples 1 and 2

Segmentation	Sample 1			Sample 2		
	LL	CAIC	BIC	LL	CAIC	BIC
2 groups	-6,668.534	13,556.875	13,533.875	-9,211.824	18,649.691	18,626.691
3 groups	-6,552.035	13,438.558	13,403.558	-9,138.408	18,620.793	18,585.793
4 groups	-6,488.415	13,425.999	13,378.999	-9,070.837	18,603.585	18,556.585
5 groups	-6,458.613	13,481.076	13,422.076	-9,023.748	18,627.343	18,568.343

Considering the cluster analysis from sample 1 (Table 4), significant differences (p -value <0.05) can be observed between the four groups containing 8 of the 12 considered attributes (origin, organic label, beneficial health effects, appearance, packaging, brand, quality certification and price). The four groups were named according to the attributes that characterize them with the classes identified by Grunert (2005) (Table 1). The first group is named "Country of Origin" (22.8%) because the product origin and local attributes were among the most important ones considered by the consumer during blueberry purchase. However, for respondents of sample 1, "organic" emerged as the most influential attribute after "freshness" and product origin. The second group is named "Safety and Health Benefits" (16.5%) because it includes those consumers for whom the health benefits were considered to be the most important attribute after freshness, followed by organic and local. In this case, "quality certification" was not considered important by consumers during the purchasing process. Group 3 is named "Sensory" because it groups together the respondents (21.9%) who attach the most important attributes to freshness and origin at the moment of purchase, while also taking health aspects into account. Also "appearance" was among the quality attributes considered important by respondents of sample 1. Group 4 is named "Convenience" because it encompasses the respondents (38.8%) who say they prefer to buy a product that bears the manufacturer's and retailer's brand name, together with packaging according to information reported in Table 1. On the contrary, from our results, the "origin" was included in this group among the most important attributes considered during blueberry purchase. The results from the cluster analysis of sample 1 has confirmed the assumption concerning the little importance of price during the choice by the consumer, which led to its exclusion in the Grunert (2005) model.

From the division of sample 2 into clusters (Table 5), significant differences (p -value <0.05) may be observed among the four groups in only 4 attributes, which implies that these are the ones that help to determine the differences between the clusters: organic, brand knowledge, price and origin. The first group is named "Sensory" (5.4%) because it consists of the consumers for whom freshness is the most influential attribute, as well as origin and seasonality. "Seasonality" was also included among the attributes considered important during product purchase, but with a low relevance. The second group is named "Convenience" (44.5%) because it represents the respondents who say they prefer to buy a product based on the brand and the producer/retailer manufacturer name (according to table 1), as well as the health benefits. Group 3 (28.6%) is named "Sustainability and Processing" because it groups together consumers who prefer small, seasonal and locally sourced fruit. However, from our results, a discrepancy with the Grunert model (2005) emerged about "organic label" attributes in this latter group. Group 4 is named "Country of Origin" (21.4%) because it includes respondents who regard the product origin as the most important attribute, followed by seasonal and health aspects. Also in this case, our cluster analysis results are in contrast with those reported in Table 1 about the low importance of "local product" for the considered sample (sample 2). When comparing the division into clusters of the two metropolitan areas under consideration (sample 1 and 2), it can be seen that the majority of consumers may be aggregated into the "Convenience" cluster (sample 1 with 38.8% and sample 2 with 44.5%), where the presence of the manufacturer's or retailer's brand is a fundamental factor at the moment of purchase.

Table 4. IClass analysis parameters for the segmentation of sample 1 into 4 groups (the significant p-values are shown in bold)

	CLUSTER 1	CLUSTER 2	CLUSTER 3	CLUSTER 4	PROBABILITY
	Country of Origin	Safety and Health Benefits	Sensory	Convenience	
Size Group	22.8%	16.5%	21.9%	38.8%	
Attributes	raw score	raw score	raw score	raw score	p-value
freshness	1.052	1.333	2.188	0.555	0.539
origin	0.267	-0.094	1.520	0.591	0.003
organic label	0.635	0.665	-0.756	0.464	0.001
beneficial health effects	-0.517	0.782	0.632	-0.030	0.022
seasonality	-0.114	-0.536	0.559	-0.481	0.399
appearance	-0.177	0.493	0.100	-0.608	0.004
local product	0.347	0.647	-1.065	-0.439	0.670
packaging	-0.654	-0.699	-1.428	0.827	0.001
brand	0.080	-1.159	-1.160	0.437	0.002
quality certification	-0.523	-0.332	0.895	-0.895	0.008
price	-0.250	-0.654	-0.724	-0.133	0.005
brand knowledge	-0.145	-0.446	-0.762	-0.288	0.473

Table 5. IClass analysis parameters for the segmentation of sample 2 into 4 groups (the significant p-values are shown in bold)

	CLUSTER 1	CLUSTER 2	CLUSTER 3	CLUSTER 4	PROBABILITY
	Sensory	Convenience	Sustainability and Processing	Country of Origin	
Size Group	5.4%	44.5%	28.6%	21.4%	
Attributes	raw score	raw score	raw score	raw score	p-value
freshness	1.337	0.133	0.984	0.289	0.802
origin	0.873	0.058	-0.559	0.918	0.047
organic label	-0.068	-0.199	-0.062	0.136	0.009
beneficial health effects	0.458	0.208	-0.350	0.920	0.715
seasonality	0.717	-0.074	0.382	0.442	0.784
appearance	0.020	0.019	-0.519	-0.432	0.750
local product	-0.561	-0.304	0.343	-0.209	0.132
packaging	-1.539	-0.068	-0.476	-1.068	0.651
brand	-0.379	0.309	0.070	0.381	0.196
quality certification	0.060	-0.001	0.014	-0.572	0.826
Price	-0.162	0.045	0.029	-0.035	0.041
brand knowledge	-0.755	-0.128	0.144	-0.770	0.032

CONCLUSION

The category of berry fruits has great potential for expansion in Italy. Blueberries, in particular, are one of the products most sought after by the consumer for its beneficial properties to human health. Therefore, the organic quality certification, which emerges from our study as being linked to the origin of the product, could be key to the development of the short supply chain, opening up agricultural prospects for subsidiary profit and providing a contribution to the economic survival of producers (Büchi and Mancuso, 2008). In this research, a study was also carried out on the characteristics of the consumers of blueberries from which a limited and seasonal consumption of these fruits is emitted. The Italian consumer prefers to buy them at the supermarket and prefers the small format (packaged container of 125 g). The choice of the smallest size (125 g) could be associated both with the lower price of this format and with the longer duration and freshness of the product. The specific attributes of packaging (such as transparency, shape, sensation) have been assessed very high in the evaluation during consumption (Giuggioli et al., 2017; Ragaert et al., 2004), although some are not perceived as extremely important during the purchasing process. Also, Koutsimanis et al. (2012) have shown that specific packaging affects the purchasing decisions of consumers of fresh produce, sweet cherries in particular, among the most important characteristics that influence purchasing decisions of the container size.

Differences in preferences emerge between the two samples. Those in Sample 1 prefer the proximity of the typical blueberry production area, and the sample 2 is related to cluster characteristics. When comparing the two samples, the organic label is detected as an important attribute in both cases, especially among the "Country of origin" cluster. However, some differences emerged when comparing between our cluster analysis results and the classification proposed as the first hypothesis of Grunert (2005). Cluster characteristics of sample 1 were more attributable to those of the Grunert model clusters. Also, the little importance attributed to the price has been confirmed in our study by the analysis of sample 1. However, the "sustainability and processing" cluster, which defines attributes as "organic label" and "seasonality" as the most important ones when choosing the product, has not been defined by our sample. The organic label has been a discriminating attribute for the definition of clusters and ranks first in importance for all identified clusters, excluding the group 3 of "sensory". With respect to the classification of sample 2, the "safety and health benefits" cluster does not emerge from our results. Greater discrepancies emerge with respect to the initial hypothesis of the classification shown in Table 1. In particular, within the "sustainability and processing" cluster, the "organic label" attribute is not

among those considered important during the purchase of blueberries. From this analysis, it is possible to state that the differences emerged from the results of this research and the classification deriving from the "total quality food model" (Girgenti *et al.*, 2016; Grunert, 2005) may be due to limitations of the preference study only on blueberries, excluding other fruits, such as raspberries.

The results of this research represent a useful reference for the producers of blueberries in the Italian context, where the production of blueberries is concentrated only in some regions in the Piedmont area. With this aim, the development of the cultivation of berry fruits following a model with low environmental and/or biological impact would allow more development in the marginal areas. In fact, the enhancement of this fruit through organic certification would represent a resource for Italian farmers, particularly in the northwest area where both samples 1 and 2 are located, since it is well-known for being the most suitable region for the production of berries. An interesting strategy would be to improve the value of products, making the production area and its proximity to consumers the focus of a marketing campaign and offering a seasonal, local, and therefore fresh product. This strategy could foster a potential growth in sales in these areas and the possibility of avoiding segmentation of the category, thus keeping the products within the typical dynamics of these specialties. Combining the marketing campaigns for local, organic, and environmentally/economically sustainable products with a strong parallel communication strategy based on the health benefits of these fruits (already widely recognized by consumers and confirmed by numerous scientific research documents), producers could be rewarded with a positive response from the market (Paul and Rana, 2012). Investments in crops could represent an instrument for revaluation and strengthening of local production (Baudino *et al.*, 2017), to which the consumer expresses an increasing interest. However, the organic certification acceptability must be assessed by studying consumer perception that, as emerges from our study, varies according to many aspects including the consumer origin, as well. Our study has some limitations that should be considered in further research. Therefore, we recommend further investigation into the analysis of blueberry consumption, particularly extending research to other Italian territories. For example, more analysis investigating metropolitan areas in southern Italy would be beneficial since this is where blueberry production has increased in the last several years. In addition, considering that our study was limited to a specific country (Italy) within the EU, we recommend research that extends to the international context in order to compare consumers' blueberry habits in different European countries. A broader study could investigate if national differing per capita blueberry consumption volumes have an influence on the importance of the investigated choice attributes.

Author Contributions:

V.M Merlino and S. Massaglia collected and analyzed the data, drafted the paper, and performed the experiments; S. Massaglia, C. Peano and D. Borra conceived and designed the experiments.

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