Wine Economics and Policy

Firenze University Press
www.fupress.com/wep

OPEN ACCESS

Citation: Mikael Oliveira Linder, Katia Laura Sidali, Christian Fischer, Valerie Bossi Fedrigotti, Diego Begalli, Gesa Busch (2022) Assessing preferences for mountain wine and viticulture by using a best-worst scaling approach: do mountains really matter for Italians? *Wine Economics and Policy* 11(1): 15-29. doi: 10.36253/wep-10342

Data Availability Statement: All relevant data are within the paper and its Supporting Information files.

Competing Interests: The Author(s) declare(s) no conflict of interest.

Assessing preferences for mountain wine and viticulture by using a best-worst scaling approach: do mountains really matter for Italians?

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Abstract. European Commission has recently published the rules on the use of the quality term "mountain product". The new regulation aims to promote the sustainable development of mountain areas and to facilitate the identification of mountain products by consumers. Despite the importance of viticulture for several European mountain communities and the growing interest of European consumers in quality certified foods, the regulation did not encompass wines. The literature addresses many issues regarding wines and consumer preferences, but so far mountain wines are not specifically researched. With this study, we seek to fill this gap by analysing Italian consumers' preferences for mountain wines as well as their opinion on the inclusion of this product in the mountain labelling scheme. To do so, this study applies a best-worst scaling model and subsequent latent class analysis. Data was collected through an online questionnaire applied to a consumer panel. The results indicate that most of respondents are in favour of applying the mountain label to wines. The three most preferred attributes are related to human health, ecological sustainability and product typicity. Most of participants gave less importance to the attributes that characterize mountain agriculture. Only one consumer segment valued some of these. Findings suggest that the inclusion of mountain wines in the labelling scheme may convey a better image of wine regarding its impact on human health, environmental sustainability and terroir-based typicity.

Keywords: mountain, wine, viticulture, Italian preferences, best-worst scaling, latent class.

1. INTRODUCTION

"Mountains matter". According to the international alliance Mountain Partnership there are countless reasons to agree with this slogan. All over the world, mountains cover around 22% of the Earth's land surface. Mountains are hotspots of biodiversity, provide 60 to 80% of freshwater and shelter a rich cultural heritage [1, 2, 3, 4, 5].

In Europe, mountain areas cover approximately 18.5% of the total land surface [6]. In Italy, they comprise 43.7% of the municipalities and 58.2% of the national territory [7]. Approximately, two-thirds of the economic activities in European mountain areas rely on the primary sector, including mountain farming [6]. Agriculture in mountain areas is characterized mainly by family and small-scale agriculture [8, 9]. This type of farming plays an important role in supporting sustainability and promoting food security and economic development [10].

Their importance from an ecological and socio-economic point of view does not exempt mountain areas from facing challenges. The hard-living conditions and the economic dynamics can induce farming exit, contributing to the ageing of the farm population and agricultural abandonment [11, 12, 13, 14]. Moreover, due to the isolation of mountain areas, the topography, the climate and short growing seasons, mountain farming faces higher production costs compared to lowlands [6, 15].

Since the 1970s, the European Commission has designed policies to address the challenges faced by mountain communities – as well as other communities located in the "areas facing natural or other specific constraints" [16, 17]. In the last three decades, the approaches adopted by some of such policies have favoured the valorisation of local resources to stimulate "conservation through consumption" [18, 19]. In this context and as a result of the efforts headed by the Euromontana association, the European Commission published rules to regulate the use of the term "mountain product" (Regulation EU n. 1151/2012 and Delegated Act EU n. 665/2014). Accordingly, the term – and the label created by each Member State – can only be applied to food products intended for human consumption whose raw materials and animal feedstuffs come essentially from mountain areas. Besides, the processing plants must be located within these areas.

Although representing a relevant step towards the institutionalisation of a market for mountain food products in Europe, the European legislation does not contemplate the application of the term "mountain product" to wines produced in mountain areas. The inclusion of wine among the products suitable to use the term "mountain product" could benefit several mountain regions – in Italy, Romania, Portugal, Greece, Slovenia, Cyprus, Spain and France – in which wines and grapes are relevant agricultural products [6]. For example, in 2018, in South Tyrol, a mountain area located in the Italian Alps, the

Figure 1. Wine labels from Italy appealing to the mountainous origin. Source: (a) [22], (b) [23].

wine sector employed about 10,000 people, and around 5,000 farms were involved in viticulture operations cultivating on average one hectare each [20, 21].

Besides benefiting producers in mountain areas, the possibility of applying the term "mountain product" to wines would be in line with a practice already adopted by winemakers across Europe: using the mountain origin as an appeal for consumers. Figure 1 displays some examples of this practice.

Some studies point out that consumers have a positive image of food produced in mountain areas. For them, mountain food products evoke purity, health, authenticity and simplicity [24, 25]. From the market side, the Global Consumer Trends report [26] stated that there has been an increasing interest of some consumers in wines that are sustainably produced. In Italy, the market for this type of wines increased by 34% from 2015 to 2016 [27]. Furthermore, a review of 34 studies on consumers' perceptions, preferences and willingness-to-pay for wine with sustainability characteristics confirmed these trends and showed that implementing sustainability-oriented marketing actions may be a promising strategy for quality differentiation of wines [28].

Product differentiation through quality certification schemes may also contribute to preventing free-rider problems and information asymmetry in the market [29]. Considering that consumers cannot easily identify mountain products in the market [9, 24], the application of the mountain labelling scheme to wines may facilitate the identification of the "authentic" mountain wine. In addition, it can contribute to avoiding the misuse of mountain imagery and wording by producers that are not producing in mountain areas [6]. Previous studies have already shown how mountain cheese producers, within the same consortium, use the European label "mountain product" to avoid free-riding on product quality by producers from the lowlands [30]. Due to the exclusion of wines from the mountain labelling scheme, this possibility is not given for wine producers from mountain areas.

Despite these pieces of evidence in favour of including wines in the mountain labelling scheme, little is known from the consumer side. The literature on consumers opinion, preferences and willingness to pay for wines and sustainable wines is extensive (e.g., 31, 32, 28, 33, 34, 35, 36, 37, 38, 39). Concerning wines produced in mountain areas, little is known. The majority of the studies focused on the production side - for instance, Michael et al. [40], Zottelle et al. [41], Verdenal et al. [42], Stanchi et al. [43], Caffarra and Eccel (2013), Guimarães and Magalhães [45]. A study with German consumers and producers indicated potential in obtaining a price premium for wine produced in steep slope [46]. Being part of a broader research project, the current study builds upon the findings of a previous exploratory study [47]. The latter employed a qualitative design and confirmed the interest of Italian consumers in wines produced in mountain areas. Furthermore, the authors identified eight main attributes by which Italian consumers associated wines and viticulture in mountain areas (see Table 1). Remarkably, only a few are directly connected to the mountain environment. However, the mentioned study does not analyse the importance of each attribute for consumers letting open the question on how mountain attributes scores in relation to all attributes tested.

A better understanding of consumers preferences and opinions regarding wines produced in mountain areas is of utmost importance for the debate on the inclusion of wines in the mountain labelling scheme as well as to help farmers and managers in the design of marketing strategies. Against this background, the objectives of this study are twofold: (1) to assess the preferences of Italian wine consumers concerning the attributes associated with wine from and viticulture in mountain areas thus comparing the mountain attributes among the other attributes afore mentioned; (2) to segment the market based on their preferences to identify customer groups for mountain wines. To do so, an online survey with Italian participants was undertaken using a (a) best-worst scaling method to rank preferences for the mountain wine attributes mentioned before, and a (b) latent class analysis to segment participants according to their preferences. Segments are further described using consumption behaviour and sociodemographic data.

2. RESEARCH DESIGN AND METHOD

2.1. Best-Worst Scaling Model

The best-worst scaling model (BWS) is a stated preference method and was designed by Louviere and Woodworth [48] based on the method of paired comparisons introduced by Thurstone [49, 50] and the McFadden's studies on economic choice theory, use of psychometric data and conjoint experiments [51]. Also called maximum difference scaling [52], some authors classify best-worst scaling as a variant of discrete choice experiments [53].

The best-worst scaling model is designed to measure individual's relative preferences in relation to a set of items. Individuals are asked to choose the best (or most important) and the worst (or least important) item among a set of items. The main idea is that the individ-

ual's decision is the result of a comparison of differential utilities in a set of items.

Like in the theory of random utility [54], in BWS an individual's utility is a latent dimension composed of an observable component (V) and an unobservable or random component (ε) (1) [55]:

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad (1)$$

U_{ij} is the utility an individual i is assumed to obtain from alternative j in a specific set of items. V_{ij} is the observable component of utility, held by individual i for item j, while ε_{ij} is the random component utility. In BWS, each component V (2) and ε (3) is a result of the difference between the best and the worst items:

$$V_{bw} = V_b - V_w \quad (2)$$

$$\varepsilon_{bw} = \varepsilon_b - \varepsilon_w \quad (3)$$

The observable components (V) in this study are the wine attributes shown to the participants in a task (choose the most and least important attribute in a set of items). The BWS model assumes that the probability of an individual selecting a pair of attributes (best and worst) is proportional to their distance on the latent dimension (in this case, the latent dimension is the utility) [55]. So, the utility (4) and the probability (5) equations can be written like the following:

$$D_{bw} = V_{bw} - \varepsilon_{bw} \quad (4)$$

$$P(bw|C) = P(V_{bw} - \varepsilon_{bw} > V_{ij} - \varepsilon_{ij})\ (ij) \neq (bw) \quad (5)$$

In equation (4), D_{bw} is the distance between the best and the worst items, which cannot be observed directly. In equation (5), P is the probability, and C is the subset of items (task). As observed by Krucien [55], it is impossible to determine if the difference in the observable component is greater than the random component because the latter is not observable. Louvière et al. [56], suggest a multinomial logit model to explain the probability that an individual n chooses item j as best and j'as worst among a set of items (J):

$$P = \frac{exp\left(\beta_n X'_{nj} - \beta_n X'_{nj'}\right)}{\Sigma_{j \neq j'}^{j,j' \in J} exp\left(\beta_n X'_{nj} - \beta_n X'_{nj'}\right)} \quad (6)$$

In equation (6), the item selected as best is coded as 1. The item not selected by the individual is coded as 0. And the item marked as worst is coded as -1. X'_{nj} is the observable explaining variable. The parameter β_n is the individual-specific preference of an individual n.

The results of the BWS model provide an importance score which represents the utility of each item for each individual – thus revealing the most important mountain wine attributes according to consumers preferences. It allows to further analyse preference heterogeneity using latent class analysis. This method helps to detect consumer segments according to their preferences [57].

2.2. Best-Worst Experiment and Questionnaire Design

The questionnaire was divided into four main parts: (part 1) individual food consumption behaviour; (part 2) eight attributes of mountain wine based on the afore mentioned study [47] (see Table 1); (part 3) general attitudes towards labelling and mountain food; and (part 4) participants' socio-demographics. The survey was set up using Sawtooth Lighthouse Studio software.

The individual food consumption behaviour encompasses questions on consumption habits and individual motivations. 23 questions from an adapted version of the Food Choice Questionnaire developed by Pieniak and colleagues [58] were used. Answers could be given on 5-point Likert scales.

The BWS experiment followed a balanced incomplete block design [59]. It consisted of the sequential presentation of eight sets of four attributes. The attributes tested in this research were taken from a previous qualitative study [47] whose objective was to identify the main characteristics associated by Italian consumers to wines produced in mountain areas. Table 1 shows the attributes extracted from the mentioned study and used in the BWS experiment:

The eight attributes were transformed into sentences to make the experiment easier for the respondents. At each task, participants were asked to select the most and the least important attribute. Figure 1 below contains an example of a task.

To assure attribute frequency balance (i.e., each pair of attributes appears within the same set across the experiment) and attribute positional balance (i.e., the attributes appear approximately an equal number of times in each position), the attributes were randomized by the software algorithm [60].

The section on *general attitudes towards labelling and mountains* included questions on the definition of mountain areas and whether the participants read labels when buying food. Besides, participants were also asked to define to what extent they consider themselves to be mountain food consumers and how much they agree

Table 1. Attributes Italian consumers relate to wines and viticulture in mountain areas.

Wines produced with grapes from small farms[1]
Wines with delicate aromas and flavours[2]
Vineyards located in high altitudes or terraces[3]
Wine produced with less additive[4]
Limited production volume[5]
Less mechanization/more manual labour[6]
Wines produced only with autochthonous grapes[7]
Viticulture and wine production contribute to preserve the mountain environment[8]

Source: Author et al. [47].
For ease of reading, we use shorter formats of these attributes throughout the text as follows: [1]small farms, [2]delicate aromas and flavours, [3]high altitudes or terraces, [4]less additive, [5]limited production, [6]manual labour intensive, [7]autochthonous grapes, [8]sustainable viticulture.

with the inclusion of wines in the mountain labelling scheme.

The *demographics* section encompassed questions regarding income, age, gender, household size, education, and city of residence – including whether respondents live in a mountain or non-mountain area, in an urban or rural area.

The questionnaire was designed in English and it was translated into Italian using back-translation [61]. The questionnaire was pre-tested with 81 participants from the Autonomous Province of Bolzano, Italy. Considering that no participant reported problems in understanding and completing the questionnaire, no changes to the questionnaire were made after the pre-test.

2.3. Data Collection and Pre-Treatment

Data were collected through a self-administered online survey from an Italian consumer panel. The questionnaire was designed using Sawtooth Lighthouse Studio (version 9.8.1) and sent to the respondents across Italy by the consumer panel provider. The data collection took place between January and May 2020.

For a research topic that is still in its infancy an exploratory design is suggested. Therefore, we opted for a quota sample which was representative of the Italian population in consideration of age and gender. The author(s) established the quota, whereas the sample was delivered by a professional panel company. It is important to highlight that the sample includes only wine consumers. To improve data validity, speeders as well as those who did not fulfil the requirements such as participants under 18 years of age and/or people that do not consume wine were filtered out [62].

To define the final sample, the respondents who completed the questionnaire underwent a second control based on the Root Likelihood (RLH). The RLH is a probability expression of the goodness of fit of the data (in this case, the utility scores) in predicting which items respondents choose [60]. The highest value for the RHL is 1. The lowest is obtained by dividing the total number of items per task by the maximum value (1). In this study, the minimum RHL value is 0.25. We obtained it by dividing the maximum RHL possible (1) by the number of items per task (4) [60]. We then excluded 111 respondents whose RHL was below the minimum value. The final sample size is 973 respondents.

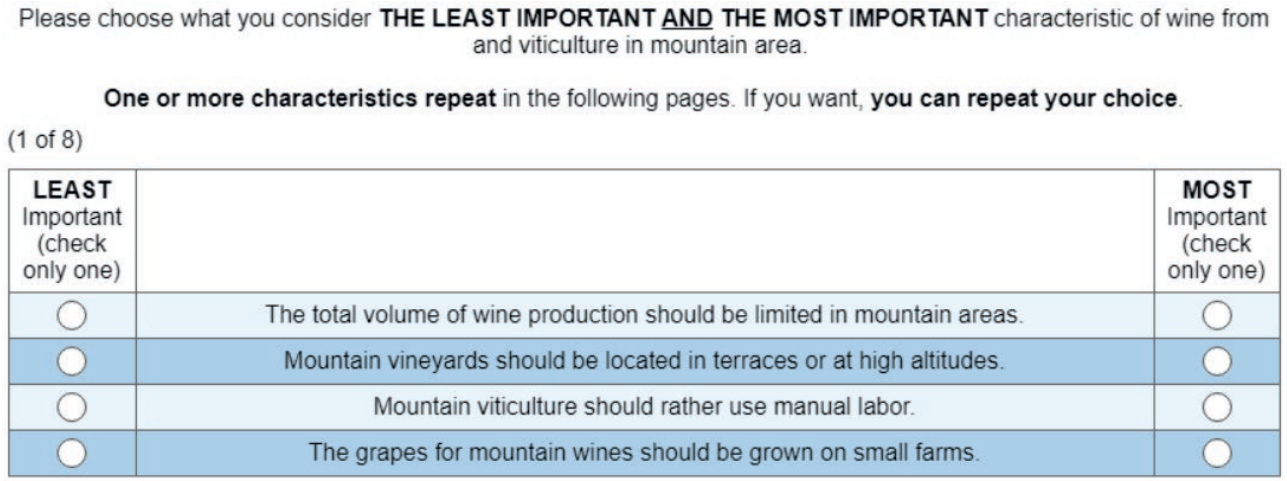

Figure 2. Example of Best-Worst Scaling Task used in the study. Source: own elaboration.

2.4. Best-Worst Scaling Analysis

The best-worst scaling model generates discrete data that can be analysed trough different methods [63]. Hierarchical Bayesian Multinomial Logit (HB MNL) was used for analysing data in this study because it provides a more accurate estimate compared to the standard Count Analysis and MNL. According to Orme [63], HB MNL offers a better solution, as it can generate estimates combining information at the individual level and data from other respondents in the sample.

The analyses generate a utility score which can be reported in three different ways: (a) raw utility scores that are the average utility value of each attribute; (b) probability scales, also known as rescaled importance scores (0 to 100 scaling), are ratio-scaling, meaning that a score of 10 is twice important as a score of 5; and (c) zero-anchored interval scales that represent the normalized raw utility score in which the scores have a mean of zero and a range of 100 [60]. To facilitate data interpretation, we report the results using the probability scale.

2.5. Latent Class Analysis and Characterization of the Classes

The latent class analysis is performed using Sawtooth Lighthouse Studio software (version 9.8.1). The latent class analysis identifies clusters (or segments) with differing preferences and estimates part worths (utilities) for each segment [64]. Each class is composed by respondents with similar preferences regarding the attributes of the best-worst scaling model. In other words, instead of calculating the utilities for each participant, latent class looks for respondents with similar preferences and then calculates the average utilities within the clusters [64]. We use the probability scale/rescaled score (0 to 100) for the formation of the clusters. In this regard, it is important to highlight that there is no respondent who fully belongs to a single cluster. Each respondent is assigned a probability of belonging to different groups according to their preferences.

To characterize the segments and test for differences among them, one-way Analysis of Variance (ANOVA) with post-hoc tests (Tukey and Tamhane) and cross tabulation with chi-square and standardized residuals were carried out. The analyses were performed using IBM SPSS Statistics 25.

3. RESULTS

3.1. Descriptive Demographic Statistics

Table 2 shows the description of the sample concerning the socio-demographic characteristics.

The sample is representative concerning the Italian population in terms of gender and age, and includes only wine consumers. The higher level of education of the sample can be explained by the skewed characteristics of the panel participants – because internet users do not necessarily represent the population [67]. Moreover, in Italy, internet access is greater among people with higher education [68].

The household size at the sample level is slightly smaller compared to the Italian population. Compara-

Table 2. Sample description.

Gender	Sample n = 973 (%)	Italian Population (%)
Male	50.70	48.43
Female	49.30	51.57
Age		
18-29	15.00	14.61
30-44	22.60	23.22
45-59	27.70	27.78
60+	34.60	34.37
Education		
Primary School	6.00	19.51
Middle School	10.80	30.03
High School	56.00	30.71 [c]
University Degree or Higher	32.60	10.78
Residence Location		
Rural Area [a]	28.0	24.00
Urban Area [b]	72.00	76.00
Mountain	10.00	23.54 [d]
Non-Mountain	90.00	76.46
Household Members		
1	10.30	12.97
2	33.40	22.55
3	26.10	24.82
4 or more	30.20	39.67

[a] Municipalities with low degree of urbanization according to Eurostat [65] (Istat, 2019).
[b] Municipalities with medium or high degree of urbanization according to Eurostat [65].
[c] Includes non-university tertiary diplomas of the old system and A.F.A.M.
[d] Based on the data from 2015 [66].
Source: own elaboration based on Istat [65] and Fondazione Montagna Italia [66].

Table 3. Ranking of attributes at sample level.

Item (Attribute)	Rank	Importance Score (0 to 100 scaling)
Less additive	1	24.45
Sustainable viticulture	2	21.69
Autochthonous grape	3	20.96
Delicate flavours and aromas	4	8.17
Small farms	5	7.30
Manual labour intensive	6	6.70
High altitudes and terraces	7	5.62
Limited production	8	5.11

Source: own elaboration.

tively, while at the sample level there is a greater number of respondents living with one person more, at the population level households with four or more people are more numerous.

Table 2 shows that only one-ninth of the interviewees live in a mountain area in contrast with almost a quarter at the population level.

3.2. General Ranking of Attributes

The aggregate average importance scores are displayed in Table 3 (Importance Score, 0 to 100 scaling):

The results indicate a prevalence of three attributes that are associated with health ("less additive"), sustainability ("sustainable viticulture") and typicity/terroir ("autochthonous grape"). Together they add up to more than 60% of the total importance score. Some characteristics related to mountain viticulture and mountain areas such as the mountain landscape ("high altitudes and terraces"), the intensive need of manual labor, limited production and production in smalls farms are less relevant at the sample level.

3.3. Results of the Latent Class Analysis

In the latent class analysis, a three-class solution was chosen by observing the most used information criteria (Percent Certainty, AIC, BIC, Log-likelihood and relative Chi-Square) (Table 4). The most important attributes for each segment coincide with the three most important attributes at the sample level. Segments 1 and 2 have at least one attribute with a very high score whereas segment 3 displays preferences more evenly distributed among all attributes

3.4. Description of Clusters

By looking at the importance scores (Table 4) and the segment describing variables (Tables 5 and 6), in the next section the three segments are described. For ease of readiness, only statistically significant findings from the food choice questionnaire are displayed.

Segment 1 (Naturalists): this group constitutes the most numerous segment containing approximately 37% of the respondents. It is also the group with the highest percentage of older people – closely followed by segment 2. Its members place a high value on healthy eating and natural foods [69], that is, foods without additives and artificial ingredients, and with natural ingredients (Table 5). This importance given to natural foods seems to be extended to wines as well. Respondents falling into this segment show a high preference for mountain wines with fewer additives. Although to a lesser extent, their members are also concerned with sustainability of viticulture that is in second place in their preferences. This group gives the greatest relative importance (among all groups) to the item delicate flavours and aromas. This difference is particularly marked in relation to group 2.

Table 4. Characterization of the segments based on the clustering variables - 0 to 100 rescaled importance score.

Variables	Segment 1 n = 359 (36.9%)	Segment 2 n = 329 (33.8%)	Segment 3 n = 285 (29.3%)	Total n = 973
Less additive	31.91	24.92	12.72	24.45
Sustainable viticulture	20.91	26.10	14.52	21.69
Autochthonous grape	19.20	23.53	17.03	20.96
Delicate flavours and aromas	13.18	2.05	12.53	8.17
High altitudes and terraces	4.05	4.23	10.17	5.62
Small farms	3.91	7.62	12.79	7.30
Manual labour intensive	3.71	6.16	11.00	6.70
Limited production	3.08	5.36	9.21	5.11

Fit criteria of the 3-class solution: Log-likelihood = -17334.5, Percent Certainty = 19.7, AIC = 34715.0, BIC = 34891.1 Chi-Square= 8494.6.
Source: own calculations.

Table 5. Food consumption behaviour, attitudes towards labelling, mountain area definition, and mountain food - mean responses by segment and total sample.

Variables	Segment 1 n=359 (36.9%)	Segment 2 n=329 (33.8%)	Segment 3 n=285 (29.3%)	Total n=973
Food consumption behaviour				
It's important to me that the food I eat on a normal weekday:[1]				
Is good valuer for money* [4]	4.23 [c]	4.19	4.07 [a]	4.17
Is easy to plan, buy and prepare* [4]	4.04 [b]	3.88 [a, c]	4.01 [a]	3.98
Contains natural ingredients*** [4]	4.29 [c]	4.27 [c]	4.11 [a, b]	4.23
Contains no artificial ingredients** [3]	4.21 [c]	4.18 [c]	4.01 [a, c]	4.14
Contains no additives*** [4]	4.27 [c]	4.18	4.04 [a]	4.18
Keeps me healthy* [4]	4.38 [b]	4.26 [a]	4.27	4.31
Tastes well* [4]	4.57 [c]	4.51	4.45 [a]	4.52
Is familiar*** [3]	3.66 [b, c]	3.51 [a, c]	3.90 [a, b]	3.68
Is what I usually eat*** [3]	3.32 [c]	3.20 [c]	3.64 [a, b]	3.37
Attitudes towards labelling, mountain area definition, and mountain food (segment means)				
In favour of the inclusion of mountain labels for wine***[2, 4]	4.21 [c]	4.19 [c]	3.96 [a, b]	4.13
Consumption of mountain food products*** [1, 3, 5]	3.10 [b, c]	3.25 [a]	3.36 [a]	3.23
Agreement with the current mountain definition*[1, 3]	3.65 [c]	3.66	3.81 [a]	3.70

[1] = 5-point Likert scale from (1) strongly disagree to (5) strongly agree.
[2] Item: In your opinion, should the European Commission include wine in the list of agri-food products authorized to use the term "mountain product" and the "mountain label", if they have been produced in a mountain area? = 5-point Likert-type scale from (5) definitely yes to (1) absolutely not.
[3] = Tukey post-hoc test was used because of no differences in variances in segments.
[4] = Tamhane post-hoc test was used because of differences in variances in segments.
[5] Item: Considering a scale from 1 (not at all) to 5 (very much), to what extent do you consider yourself a consumer of mountain food products?
[a,b,c] = Letters indicate significant differences ($p<0.05$) between segments according to post-hoc tests. For instance. [a] indicates that this segment differs from segment 1 in this variable with $p<0.05$.
***=$p<0.001$, **=$p<0.01$, *=$p<0.05$ [k]= $p<0.1$
x^2 = chi-square. n.s. = non-significant
Note: the F values are in the appendix.
Source: own calculations.

Although the segment 1 members do not see themselves as consumers of mountain food products, they are the ones most leaned to support the inclusion of wines in the mountain labelling scheme.

Segment 2 (Sustainability-driven): members of this segment represent about one-third of the sample. It is the group with the highest proportion of female respondents. Like segment 1, this group also has a high proportion of elderly people and value food naturalness. Nevertheless, they seem to give less importance to the relation between food and health than segment 1 members. Regarding the preferences of group 2, viticulture that plays an active role in the preservation of the mountain environment is of importance for its members as they placed sustainable viticulture first. The other attributes valued by members of this segment are wines produced with 'less additive' and the use of 'autochthonous grapes' by mountain winemakers. Sensory characteristics and the mountain setting seem to be relatively less important recalling the traditional aspects of mountain agriculture (e.g., higher altitudes, terraces, limited production). However, they tend to support the protection of wines by the regulation on mountain food products.

Segment 3 (Terroir-driven): the smallest of the segments, with 29.3% of the sample, is also the group with the highest percentage of younger respondents (18-44 years old) and highest proportion of males. Natural food tends to be valued by the members of this segment, but to a lower degree if compared to the other two segments. In their daily meals, they tend to repeat their food choices ("is what I usually eat") and eat food that is familiar to them. About the consumption of mountain products and the current definition of mountain areas, respondents from this group scored higher than the oth-

Table 6. Socio-demographics profile of the respondents by segment and total.

Variables	Segment 1 n=359 (36.9%)	Segment 2 n=329 (33.8%)	Segment 3 n=285 (29.3%)	Total n=973
Socio-demographic variables				
Gender**(%)				
Female	50.8	56.9	43.4	50.7
Male	49.2	43.1	56.6	49.3
x^2 = 10.964. p<0.05				
Residence Location (n.s.) (%)				
Rural Area	27.9	28.0	27.0	28.00
Urban Area	72.1	72.0	73.0	72.00
Mountain Area	9.1	11.4	9.3	10.00
Non-Mountain Area	90.9	88.6	90.7	90.00
Age classes (n.s.) (%)				
18-29	13.2	14.1	18.5	15.0
30-44	20.3	22.0	26.3	22.6
45-59	29.0	28.7	24.9	27.7
60 & over	37.5	35.2	30.2	34.6
Income (net per year) (n.s.) (%)				
≤ 24.000€	35.1	30.9	31.3	32.6
24.000€ - 60.000€	46.8	50.8	49.8	49.0
≥ 60.000€	5.2	3.7	5.3	4.7
Preferred not to answer	12.9	14.7	13.5	13.7

**=p<0.01. x^2 = chi-square. n.s. = non-significant.
Source: own calculations.

er groups, especially in relation to segment 1. However, the members of segment 3 are the least leaned to accept the inclusion of wines in the mountain labelling scheme.

The most preferred item concerning mountain wines and viticulture in mountain areas is the use of autochthonous grapes. It is followed by sustainable viticulture, production of grapes on small farms and wines produced with less additive. Like in group 1, the attribute "delicate flavours and aromas" is also positioned with some relevance for the members of segment 3. Except for "small farms", the characteristics related to the mountain viticulture (higher altitudes, terraces, limited production) are slightly less relevant for the members of segment 3. Nevertheless, they value these characteristics more than the other two groups.

The difference between the most important and least important attributes is relatively small, especially when compared to the other two segments. In other words, there is not a single and very strong preference, but rather a subset of attributes with a certain degree of importance for the members of group 3. In this vein, taking the first five attributes, it is possible to link the preferences of segment 3 with the concept of "terroir" [70, 71, 72, 73].

4. DISCUSSION

Do the mountains matter to consumers? When it comes to wine and viticulture, the results indicate that Italians attach less importance to characteristics related to mountain farming. Aspects such as landscape ("high altitude and terraces"), small-scale agriculture ("small farms", "limited production") and intensive manual labour received less attention in the survey. On the other hand, participants showed a higher preference for naturalness, sustainability, and tradition/typicity. These results confirm previous study findings [28, 69, 74].

Looking at the segment level, some more heterogeneity can be observed. Segments 1 and 2 ("naturalists" and "sustainability-driven") showed a greater preference for more naturally-produced wines and sustainable viticulture. In the case of the "naturalists", the high importance of health and natural food (Table 5, food consumption behaviour variables) may be linked to their preferences for more attributes associated with "natural wines". A similar relationship was found in the study of Galati et al. [75], whose results indicated that a higher willingness to pay for natural wines depended on consumer attitudes towards healthy products with-

out additives or additional ingredients. As for segment 2, a higher interest in sustainable wines may be (at least partially) explained by the higher proportion of female respondents, confirming the findings in the review study of Schäufele and Hamm [28].

Concerning the segment "terroir-driven", the balanced distribution of preferences points to a probable valorisation of a subset of attributes – even though they tend to have tradition/typicity ("autochthonous grapes") as the main consumption driver. The use of indigenous grapes, the sustainable viticulture, the small-scale production ("small farms"), the organoleptic qualities ("delicate flavours and aromas"), and the purity ("less additive") are parts of the same whole that is attached to a territory and drives their consumption. Similar conclusions arose in a cross-country study on European consumers perception concerning traditional food products [76] – which can also be called "terroir products", "typical food", "regional food", "local food" [77]. In this study, Italians consumers associated traditional/typical food products with many quality dimensions to a rather similar extent. In other words, Italians perceive traditional food products as a very comprehensive definition, without strongly emphasizing one specific element. The preference for attributes associated with the notion of "terroir" may also be explained by the higher importance attached to familiarity, which is a common trait in consumers who are more likely to opt for traditional food products [58].

Going back to the initial question ("Do mountains matter?"), the results reveal that the importance of the mountain setting is not homogeneous among the segments. "Naturalists" and "sustainability-driven" showed low interest in the attributes related to mountain viticulture ("small farms", "limited production", "high altitude and terraces", manual labour intensive"). For the "terroir-driven", except for "small farms", the attributes related to mountain viticulture and mountain areas are also among the least preferred. Nevertheless, the importance scores of such attributes are higher for segment 3 when compared with the results of the other two groups. In short, mountains are of some importance only for the "terroir-driven".

Concerning the mountain food label, there are at least four reasons to believe that a considerable number of wine consumers would be attracted by certified wines produced in mountain areas. Firstly, most participants of this study are in favour of the inclusion of wines in the mountain labelling scheme. Secondly, the most important attributes in the case of wines and viticulture in mountain areas may evoke characteristics consumers associate with mountain food products, such as simplicity, purity, healthiness and authenticity [24, 25]. In this way, from one hand, wines produced with "less additive" and "sustainable viticulture" may relate to simplicity, purity and health. On the other hand, autochthonous grapes may represent authenticity. And finally, the markets for sustainable wines and qualified food products are increasing [28, 78]. Given the reputation of mountain wines and viticulture, certifying their quality and origin with the mountain labelling scheme could provide mountain winemakers with an excellent opportunity in these growing markets. From these perspectives, it is plausible to think that the application of the mountain food label to wines may increase consumer purchase interest.

Based on our findings, both marketing and production strategies should be tailored according to three types of wine consumers: the naturalists, the consumers of sustainable wines, and the "terroir" wine consumers (consumers of traditional and typical products). For the first group, mountain winemakers should focus on the production and marketing of wines with less additive (e.g., less or no added sulphites) as well as other types of winemaking process based on the principles of natural winemaking [75].

For the "sustainability-driven", the graphical and textual information should highlight mountain viticulture practices that contributes to the restoration and/or conservation of the mountain environment. For instance, the use of local grape varieties and its effects in terms of agrobiodiversity enrichment, the reduction of pesticide and fungicide usage and the positive effects for the water resources. Using other certification schemes, such as organic and biodynamic may also contribute to market mountain wines for this segment.

For the "terroir-driven" segment, mountain wines must be accompanied by graphic and textual information showing the direct connection between the product and the mountain territory. In this respect, it would be advisable to highlight the sensory characteristics and uniqueness of production that derive from the peculiar environment conditions, the use of local grape varieties and small-scale production.

5. CONCLUSIONS

Prior work on wine has focused on sustainability aspects of wine but neglecting consumers preferences for wine produced in mountain areas. In this work, the authors have conducted a quantitative study using the best-worst scaling model and latent class analysis. Further, they have derived a ranking of eight attributes which the relative importance of attributes associated

to ecological sustainability ("sustainable viticulture"), natural wine processing ("less additive") and typicity/ terroir ("autochthonous grape"). Their findings also provide a basis for marketing strategies that emphasize the origins of products and can help policy makers to develop national wine policies.

Results of this study contribute to enrich the knowledge of the research community on consumer preferences for wines produced in mountain areas. In addition, findings can be useful for policy-makers who may want designing sustainable development strategies in mountain areas in line with consumer expectations on mountain farming and viticulture.

All in all, a mountain certification scheme appears to be useful to capture the positive reputation of mountains. If it is not feasible to extend the mountain labelling-scheme to wines, mountain wine producers should market their wines in combination with those food products that are allowed to use the EU label "mountain product" in their packaging.

The challenge to wine producers from mountain areas is threefold:

- Lobbying actions to include wines in the mountain labelling scheme;
- Catching consumers' attention without generating information overload; and
- Improving viticulture and wine production by adopting more sustainable practices.

As an avenue for further research, it would be interesting to employ a quantitative approach to measure revealed preferences regarding wines produced in mountain areas. For instance, calculating the WTP for wines produced in mountain areas by using hypothetical or non-hypothetical designs such as experimental auction.

This study has some limitations. Although the eight attributes of the BWS experiment were retrieved from a previous qualitative study, some more attributes could have been tested such as taste, price, alcohol level, use of wild yeasts, organic viticulture, territorial brands etc. Moreover, during the development of this study, the Italian government approved a new labelling scheme for wines produced in harsh environments (small islands, mountains and steep slopes). Testing the attributes established by this new regulation would be useful to the development of a European mountain labelling scheme for wines. Given that the participants of this research are exclusively from Italy, it is advisable to be cautious in generalising some of the results to other contexts. For the same reason, we suggest carrying out a similar study in other European countries to analyse consumer interest in mountain wines and their opinion concerning the inclusion of this product in the quality scheme for mountain food products".

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APPENDIX

F Values – Variables from Table 5.

F = "is good value for money" =3.97, F = "Is easy to plan, buy and prepare" =4.57, F = F = "contain natural ingredients" =7.02, F = "contain no artificial ingredients" =5.35, F = "contain no additives" =7.00, F = "keep me healthy" =3.36, F = "tastes well"=3.20, F = "is familiar" =18.13, F = "is what I usually eat"=20.72, F =" In favour of the inclusion of mountain labels for wine"= 9.71, F = "Consumption of mountain food products" = 2.86, F = "Agreement with the current mountain definition" = 3.14

Source: own calculations.