

Debating wine health-warning labels using Q methodology

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30 **Abstract**

31 In Europe, alcohol-related diseases have an increasingly high impact on healthcare costs every year.
32 Hence, rising consumer consciousness regarding the risks and harms of drinking alcohol is a primary
33 goal of the EU Commission. Recently, the Commission has been discussing the mandatory adoption
34 of health-warning labels (HWLs) on all alcoholic beverages, including wine. This study investigated
35 expert and non-expert perceptions of adopting health-warning labels on wine bottles. The research
36 used Q methodology, a mixed-method approach to explore subjective viewpoints regarding adopting
37 health-warning labels for the wine sector. Respondents were evenly distributed among wine experts
38 and consumers. The results provided four different views based on participants' perceptions of
39 HWLs. Factor 1 (the "Nationalism" view) strongly opposes the proposal, which is considered
40 extremely dangerous for the entire wine market. Factor 2 (the "Market-oriented" view) believes that
41 health warnings will increase transparency in the market and help consumers make informed choices,
42 thereby respecting consumer autonomy. Factor 3 (the "Health-first" view) strongly believes that
43 informing consumers through health labels on all alcoholic beverages is necessary to protect public
44 health. Lastly, Factor 4 (the "Keep Us Alive" view) underestimates warning labels' effectiveness in
45 promoting the right behaviours. The findings highlight different "sides" of this debating topic and
46 provide valuable insight into how policymakers can investigate new strategies, always considering
47 and respecting consumer choice.

48 **Keywords:** health-warning labels, labelling, wine, attitudes, Q methodology.

49
50 **1. Introduction**

51 The European Union is characterised by the most significant production, consumption and export of
52 wine worldwide, with thousands of manufacturing companies [1]. Italy is one of Europe's top wine
53 producers, focusing on quality-labelled food products, including PDO (Protected Designation of
54 Origin) and PGI (Protected Geographical Indication). Regarding consumption, the EU area accounted
55 for 48% of world wine consumption, and Italy is the second largest consumer of wine after France:
56 10.3% and 10.7% in 2021 respectively [1]. Wine consumption has been experiencing a continuous
57 decrease since 2008 [1–3]. Although more conscious consumers have spread the consumption of
58 organic and more natural wine and those with lower alcoholic content, wine consumption is expected
59 to fall by 2031 [1,4,5]. Furthermore, the high rates of alcohol consumption have raised considerable
60 attention [6,7]. Indeed, the harmful use of alcoholic beverages is one of the main causes of mortality
61 as well as many negative short-term effects (i.e., lack of coordination and accidents) and long-term

62 effects (i.e., non-communicable diseases including cancer, brain damage, heart and liver diseases)
63 [5,7,8]. According to recent estimates by the World Health Organisation [6], every year, around 1.7
64 million people worldwide die due to alcohol-related causes. However, many drinkers worldwide have
65 scarce knowledge of the related risks and potential harm [8,9]. Among the most successful policy
66 actions to reduce the harmful consumption of alcohol, initiatives that enhance the consumer
67 perception of risk, such as the use of health-warning labels (HWLs), are considered by some scholars
68 as highly beneficial [5,8,10–12].

69 Currently, wine labelling rules are subjected to CMO Regulation - [13] - which was already amended
70 in 2018 by the CAP Amending Regulation - [14]. European Commission aims to improve wine labels,
71 including more nutrition information and health warnings. In the EU, the adoption of HWLs on
72 alcohol products is still voluntary, and some member states have already adopted optional measures
73 imposing the communication of potential hazards of alcohol consumption in particular conditions
74 (e.g., “alcohol consumption during pregnancy”; “drinking alcohol and driving”) [8]. Ireland first
75 posed the issue regarding the mandatory adoption of detailed health-warning labels on all alcoholic
76 beverages and, in 2023, introduced new regulations with a specific law [15]. The Irish case generated
77 controversial debates, which have also been fuelled by the European Commission’s no objection [1].
78 Most leading wine-producing countries, such as Italy, France, and Spain, strongly oppose this new
79 Irish rule, as they believe that wine must be considered an essential part of their producing national
80 tradition and cultural heritage [16]. In Italy, wine consumption culture has a deep impact on
81 individual’s perspective, as it influences various aspect of every day’s life. These goes from health
82 perspectives to social identity. In Italy, as in other European countries, the inclusion of wine within
83 the context of the Mediterranean diet principles [5,17] reinforces the idea that moderate consumption
84 may be associated with certain health benefits. From a social identity perspective, wine, more than
85 other traditional and regional products, represent a symbol of cultural heritage [18]. Furthermore,
86 wine is an essential part of the culinary culture of many Italian regions, offering numerous
87 opportunities for wine tourism activities [18].

88 In this framework, this study aims to provide insights into the subjective views of consumers and
89 wine experts regarding the potential implementation of health warnings on wine labels. To discover
90 these viewpoints, we used Q methodology, which offers a valuable approach for identifying and
91 comparing the diversity of participants’ views [19,20]. Since the introduction of the method, Q
92 methodology has primarily been used in psychology [20]. In the last decades, Q methodology has
93 gained considerable attention, and its use has rapidly increased in different research topics regarding
94 consumer behaviour, food acceptance, agriculture, environmental science, and others [21–29]. More
95 recently, Q methodology was also applied in the field of the wine business to support the development

96 of sectorial policies [30–32]. The structure of the article is as follows. The following section describes
97 Q methodology, presenting the main steps of this approach and how data were collected and analysed.
98 The “Results” section then shows the four perspectives, describing the similarities and differences.
99 In the next section, the results are discussed in relation to previous research studies. The conclusions
100 focus on the advantages and shortcomings of Q methodology, highlighting the relevance of the
101 finding for the wine sector as well as the limitations of the current study.

102

103 2. Material And Methods

104 Q methodology, first introduced in 1935 by the physicist and psychologist William Stephenson
105 [19,20,33], is a technique designed to explore people’s subjectivity and attitudes. More specifically,
106 the Q method allows us to find groups of people with similar perspectives and attitudes towards a
107 given topic [10,20,34]. The method is advantageous for gaining a well-defined snapshot of a complex
108 and novel debating matter. In a Q study, participants sort a sample of statements with each other and
109 on their viewpoint along a scale. This ranking process provides subjective beliefs (called *Q sorts*)
110 representing participants’ attitudes. In Brown’s words (1980), a Q sort is “*such a picture, being an*
111 *individual’s conception of the way things stand*” [20]. Then, *Q sorts* are correlated and factor-
112 analysed to identify the dominant and shared “*patterns of belief*” [20,35–37]. In other words,
113 common views are defined and statistically modelled as factors, which in a Q study provide clusters
114 of persons who ranked the statements similarly. The emerging factors or perspectives are
115 “*spontaneous*” and obtained from “*a set of acts*” and not from a single response [36,38]. Also, Q
116 method allows for discovering critical areas of divergence and consensus among participants,
117 highlighting the different positions [39,40].

118 Q methodology can be considered a mixed method and combines the advantages of both qualitative
119 and quantitative research approaches [10,41]. First, it offers valid results [10,42], enabling the
120 exploration of the main perspectives more in depth than traditional surveys [43]. Second, a Q study
121 provides more structure than qualitative methods traditionally employed in social science (i.e.,
122 interviews or focus groups) thanks to “*numerical results*” [20,44]. Third, Q methodology takes
123 distances from the conventional rule of numbers, where the validation of results is fortified by the
124 dimension of the participants’ group [45]. For this reason, because of its intensive orientation Q
125 studies usually require a small participant sample (P sample), which is built to encompass and run out
126 the full range of attitudes towards the topic in the study [20,41,42]. In a Q study, a subset of statements
127 defining the “universe of communicability” (called *concourse*) is higher in number than the non-
128 random sample of participants (P sample) [20]. Contrary to classical factor analysis, here, the

129 “variables” are people performing the Q sorts, not the statements [41]. Stephenson first clarified that
130 Q methodology was not developed to substitute R methodology, which concerns the relationship
131 across objective variables using many respondents to make inferences [33,37,45]. Since the aim of
132 the Q analysis is to reveal “*an in-depth portrait of the typologies of perspectives that prevail in a*
133 *given situation*” [37], the statistical generalizability of Q results to a larger population of individuals
134 is not of interest [33,46]. Indeed, factors are themselves generalizations of views which can be
135 expected to exist outside the study's participants. Fourth, the strength of Q method passes through the
136 well-known mathematical method of factor analysis, which is instead applied to the individuals’
137 viewpoints expressed with the Q sorts [35,42]. This “*inverted*” factor analysis simply allows to reveal
138 the structure of factors using the correlation among the participants’ views and not, like in R
139 methodology, among the traits [20,37]. Q factor analysis allows to synthesize straightforwardly and
140 flexibly the divergent opinions of participants into a smaller subset of perspectives (i.e., the “factors”)
141 [20,45]. Finally, Q methodology works well when it is necessary to explore novel topics allowing a
142 public debate “*to take place regarding values*” and without imposing “*meanings a priori*”
143 [24,37,41]. Typically, a Q study comprises of five steps [42]: 1) the collection of the *concourse*; 2)
144 the selection of the *Q sample*; 3) the definition of the *P sample*; 4) *Q sorting* task; and, 5) factor
145 analysis and interpretation of results.

146 2.1. Concourse

147 The set of statements to be ranked is obtained theoretically from a larger group, namely the
148 “concourse”, or “population of statements” [20]. For Stephenson [47], the concourse “*refers to*
149 *conversational and not merely informational possibilities, and is arrived at empirically for every*
150 *concept, every declarative statement, every wish, every object in nature when viewed subjectively*”.
151 The concourse can include verbal statements gathered from interviews, focus groups, participant
152 observation etc. The selection of the population of statements is guided by the research question. In
153 this case, the research question relies with the public debate regarding the adoption of health-warning
154 labelling, and it can be defined as follows: “*What do diverse consumers and wine experts view the*
155 *adoption of health-warning labels for the wine sector to promote healthier behaviours?*”.
156 Consequently, the main goal was to include a wide a range of viewpoints or opinions concerning the
157 topic under investigation. The concourse was obtained by searching inside websites, social networks,
158 and interviews ready-made statements using specific keywords [42]. Another important aspect is that
159 the statements should be self-referent (e.g., “*for me...*”, “*I believe...*”) [20]. The use of statements
160 such as “For me...” or “In my opinion...” are essential for stimulating the self-involvement of the
161 participants’ ranking process (Q sorting). Finally, over 240 subjective and contrasting written
162 statements composed the concourse.

163 2.2. Conditions of instruction

164 Q analysis must be considered *de facto* a behavioural experiment, in which the subject is instructed
165 to operate with the statements under “*conditions of instruction*” guided by the theory and the specific
166 aims of the study [20]. In most studies, like this one, the instruction “*rank the statements to represent*
167 *your own point of view*” is all that is called for to let operantly emerge the principles governing the
168 subject’s behaviour.

169 2.3. Q sample

170 A subset of statements drawn from the concourse forms the Q sample, built to provide a “*miniature*”
171 of the original concourse to guarantee enough variety and representativeness [48]. Regarding the Q
172 sample dimension, the number of statements may vary between 30 to 60 [20,49,50]. Typically, the
173 statements sampling is tied to the Fisher’s experimental design [20,51]. This structured approach
174 provides a theoretical way for selecting the statements. In this study, the structured matrix used for
175 the selection was obtained by adapting one proposed by a previous study [52]. In their four-by-four
176 original matrix [52] included four categories relating to different discourse elements and four types
177 of claims extracted from [53]. For this study, we adopted four levels in one variable (*the Toulmin’s*
178 *claims*: definitive, designative, evaluative and advocative) cross-classified with two levels in a second
179 variable (*Attitude*: positive and negative) in a 4x2 factorial arrangement. The 8-cell matrix is reported
180 in Table 1. All statements were first classified in the matrix, and after eliminating the redundant and
181 unclear statements, five different statements were selected for each cell. The final balanced Q sample
182 included 40 self-referent statements for administering the sorting task. Due to the diverse audience,
183 the Q sample was also pre-tested to revise the clarity of each statement.

184 *Table 1 Structured 8-cell matrix [52].*

		Toulmin’s types of claims			
		Definitive “Concerns the meaning of terms”	Designative “Issues of fact”	Evaluative “Expressions of the worth of something”	Advocative “Something that should or should not exist”
Attitude	Positive	5	5	5	5
	Negative	5	5	5	5

185

186 2.4. P set

187 Q methodology works with few participants: “*enough subjects to establish the existence of a factor*
188 *for purpose of comparing one factor with another. What proportion of the population belongs in one*
189 *factor rather than another is a wholly different matter and one about which Q technique as such is*

190 *not concerned*” [20]. In traditional by-item factor analysis (R technique), [54] suggests a minimum
191 of ratio of two participants per variable. In Q technique, the ratio should be reversed. Because the aim
192 of the methodology is to prove the existence of relevant and natural discourses, adding more
193 participants to the study does not add any information “*unless the extra individuals are truly*
194 *different*” [52]. Relevant studies were carried out with few participants, or even with a single
195 participant to whom multiple Q sorts were administered with different condition of instruction – the
196 so-called “intensive” studies [24,25,42,55]. In any case, the main criterion for sampling participants
197 was seeking the maximum variation and emphasis on higher quality [25]. Consequently, the number
198 of participants is less important than the representativeness of their selection [20]. Following the
199 methodology, participants were strategically – not randomly - sampled including those with pivotal
200 view regarding the subject [41]. More specifically, to provide the broadest diversity of opinions, both
201 wine consumers and experts, who are more familiar and involved with the topic, formed the
202 participant sample or P set [22]. We included at least six participants per group [56]. In more detail,
203 the P set included twelve consumers and seven experts. Among the experts were three
204 resellers/distributors, two sommeliers, one agronomist, and one enologist. Contacted wine growers
205 preferred to refer to their own consultant, either enologist or agronomist. Participants were contacted
206 via mail and phone to schedule a convenient time and location. The P set included 19 participants,
207 nine males and ten females with different ages (range 22-66 years), education and occupation.

208 2.5. Q sorting and post-sort interviews

209 The forty statements were provided to participants as printed cards randomly numbered. Participants
210 were asked to rank-order the statements along a continuum from “most agree” (“+4”) to “most
211 disagree” (“-4”) into a forced quasi-normal distribution (Figure 1). The sorting distribution is
212 generally symmetrical about the middle (the “0” represents the neutral area). It is important to note
213 that no effect on the results is produced by the rating and the shape of the distribution [42]. By ranking
214 all statements, participants “operantly” impose their individuality or view on the distribution,
215 producing the self-referent Q sorts [38]. Before starting the Q sorting, each participant was instructed
216 to read all the statements and divide them into three piles: “agree”, “disagree” and “neutral”. Then,
217 the participant was asked to start rating the “agree” pile, moving from the right to the left. Due to the
218 symmetrical distribution, the same procedure is followed for the “disagree” pile, in this case, moving
219 from the left to the right. Finally, the remaining neutral statements are placed into the distribution.
220 Then, open-ended interviews (usually on the highest and lowest ranked statements) were gathered
221 after the Q sorting to facilitate the interpretation of results.

222

223 2.6. Factor analysis

224 The analysis was conducted using the KADE software [57]. All Q sorts are cross-correlated and factor
225 analysed. The calculation of the correlation matrix is necessary to prepare the data for revealing the
226 factor structure [20,48]. Then, the correlation matrix is used as raw material for the factor analysis.
227 Factor analysis in a Q-study is used to reduce the variety of Q sorts into a finite set of “discourses”
228 or “factors”. The initial $n \times n$ correlation matrix is reduced to $n \times m$ matrix, where n is the number of
229 Q sorts and m is the number of factors, with $m < n$ [20]. The factor analysis allows to group Q sorts
230 highly correlated with one other into one “family” and reports how many different families exist
231 [20,45,47]. Here, seven factors were initially extracted automatically using the centroid method
232 [20,35] Table 2. The first output of the factor analysis are the factor loadings which are correlation
233 coefficient indicating the extent to which each Q sort is associated with each factor [20,42]. At this
234 point, it is important to define how many factors should be retained for the interpretation. There is
235 not a unique way to establish how many social factors to extract. For this study, three criteria were
236 followed. First, one method is to accept those factors with at least two significant factor loadings [20].
237 The factor loading of one Q sort can be considered statistically significant or “*defining*” for a given
238 factor if it exceeds $\pm 2.58 \times$ (standard error) (with $p < 0.01$); where the standard error is
239 $1/\sqrt{n \text{ of statements}}$ [20,55]. For this study, a defining Q sort has a loading which exceeds \pm
240 0.4079. Second, the Scree-plot analysis was also followed. According to this method, eigenvalues for
241 each factor, calculated by summing the squared loadings for each factor, are plotted on a line graph
242 and the number of factors to extract are those where the line changes slope [49]. Third, the Kaiser-
243 Guttman criterion guides the selection of those factors with eigenvalue over 1 [20]. In Table 2,
244 the eigenvalues for all unrotated factors are reported. The results of these criteria and theoretical
245 considerations were considered to select four factors [41]. Once extracted, the factors are usually
246 subjected to rotations. The four factors were rotated using a combination of varimax and the
247 judgemental rotation to fit more in focus the connection between similar Q sorts. The solution was
248 also motivated by low correlations between couples of factors, indicating the minor similarities
249 between each perspective. The study variance and the factor score correlations for the four-factor
250 solution are reported in Table 3. Table 4 shows all factor loadings with the ‘defining’ Q sorts [20].
251 Other coefficients, namely the z-scores and the factor-scores, are usually calculated to complete the
252 analysis and facilitate the interpretation of factors. Those scores are typically used to describe factors
253 and to facilitate their interpretation [20,42,47]. The z-scores, indicating the relation between
254 statements and factors, are calculated for each factor as a weighted average of the scores given by the
255 “*flagged*” Q sorts [20]. Then, the z-scores are converted in the form of the original “+4” to “-4”
256 metric to produce rounded factor scores [20,42,44]. The factor scores report the scores for each

257 statement “*computed as ideal Q sorts from the highly loaded sorts*” [42]. In other words, factor scores
 258 are “*empirical generalizations of a subjective viewpoint shared by those whose individual sorts are*
 259 *significantly loaded on the same factor*” [42]. The methodology also allows the calculation of the
 260 distinguishing statements, those that significantly differ from one factor to another [20].
 261

262 *Table 2 Eigenvalues of unrotated factors*

	F1	F2	F3	F4	F5	F6	F7
Eigenvalues	4,9517	2,2941	1,365	1,2402	0,7917	0,4855	0,4978

263

264 *Table 3 Characteristics of the four rotated factors*

	F1	F2	F3	F4
% of explained variance	26	11	6	9
Cumulative % of explained variance	26	37	43	52
Factor score correlations				
F1	1	-0,1619	-0,08	0,1189
F2		1	-0,2981	0,1323
F3			1	0,0758
F4				1

265 *Table 4 Factor loadings (those loadings “flagged” in bold indicate significant Q sorts)*

Q sort	Type	F1	F2	F3	F4
1	Consumer	0,1149	-0,0066	0,0397	0,8224
2	Expert	-0,7443	0,2126	0,0836	0,269
3	Expert	0,7547	0,0468	-0,3076	-0,0232
4	Consumer	0,058	0,5165	0,0197	-0,1122
5	Consumer	0,7239	0,0743	-0,0849	0,0767
6	Consumer	-0,4467	0,4889	-0,1602	0,0645
7	Expert	0,1737	-0,0472	-0,0145	0,7587
8	Consumer	0,5092	0,3606	-0,2473	0,1633
9	Expert	0,7571	-0,2384	0,0027	-0,0773
10	Expert	0,0162	-0,3653	0,1615	0,1693
11	Consumer	0,8326	-0,0183	0,3138	-0,1181
12	Consumer	0,2544	0,5378	0,1113	-0,0345
13	Consumer	0,7332	0,2968	-0,0126	0,0678
14	Expert	0,7522	0,2348	-0,1589	-0,0387
15	Consumer	-0,2831	0,7195	-0,0147	0,3254
16	Consumer	0,0442	0,093	0,4143	-0,0997

17	Consumer	0,1698	-0,1178	0,3495	0,17
18	Consumer	0,0035	-0,4039	0,6675	0,0888
19	Expert	0,5645	0,2284	-0,1112	0,2628

266

267 3. Results

268 From the nineteen Q sorts, nine loaded significantly on Factor 1, four on Factor 2, two on Factor 3,
 269 and two on Factor 4. Two Q sorts were not assigned to any factor. The variance explained for each
 270 factor was respectively: 26% for Factor 1, 11% for Factor 2, 6% for Factor 3 and 9% for Factor 4.
 271 The total variance explained was 52%. The interpretation of factors was based using the most
 272 positively characteristic statements (+4, +3, +2) and most negatively characteristic statements (-4, -
 273 3, -2) and the most distinguishing statements [20,25]. Factor scores for most relevant statements are
 274 reported respectively in The adoption of HWLs was not seen as an attack on the national economy.
 275 Also, the participant strongly disagreed that the adoption of HWLs will damage the Mediterranean
 276 diet and added, “*What does the Mediterranean diet have to do with alcohol?*”.

277 Table 5, Table 6, Table 7 and Table 8. To better identify the divergent views four labels were selected
 278 for each factor.

279

280 3.1. Factor 1: The “Nationalism” view

281 The first factor is bipolar; eight of the nine defining Q sorts have positive loadings, and only one (Q
 282 sort 2) is negative [20,58]. For this reason, the bipolar factor composed of discourses 1A and 1B. The
 283 latter can be considered a ‘mirror image’ Q sort to that of 1A [59]. The most distinguishing and high
 284 ranked statements are reported in The adoption of HWLs was not seen as an attack on the national
 285 economy. Also, the participant strongly disagreed that the adoption of HWLs will damage the
 286 Mediterranean diet and added, “*What does the Mediterranean diet have to do with alcohol?*”.

287 Table 5. The positive loadings of this factor (Factor 1A) perceive the adoption of health warnings on
 288 wine labels with solid hostility. For the ‘pro- Nationalism’ view, the proposal appears dangerous for
 289 the wine market, especially for the Italian one. Participants belonging to Factor 1A believe that these
 290 labels are essentially an attack on the Italian economy. This negative perception is drawn from their
 291 ‘anti-European’ position, which made it strongly different from all other factors. The participants who
 292 shared this attitude felt protection towards national interests against European policies (4, +4**;
 293 +3**;
 294 33, -4*;
 40, +2). According to this viewpoint, wine is an ambassador of Made in Italy and part
 of the national culinary tradition. For this reason, the national government should protect the Italian

295 wine sector by contrasting the use of HWLs (9, -3**). Looking at the post-sort interviews, some
 296 participants stated: “The government should oppose it because it is not the right solution to the
 297 problem of alcoholism” (P3); “It is an attack on Italy, on our economy, which will surely cause
 298 strong repercussions” (P11). Adopting warning labels is also wrong for other reasons. First, if wine
 299 bottles would be treated as cigarettes - adopting HWLs - a precious sector which involves thousands
 300 of companies will be compromised (5, +3**; 21, -3). Second, warning labels are considered “useless”
 301 and an instrument for imposing “psychological terrorism” on consumers (8, +4; 25, -4). Third, this
 302 view supports the moderate consumption of wine in accordance with the Mediterranean diet
 303 principles (38, +3**). Lastly, for participants, the proposal is not supported by scientific basis (31, -
 304 1**). Regarding discourse 1B, factor scores should be reversed, e.g., statements 9, 25, 33 engender a
 305 strong agreement, and statements 4, 5, 27, 38 engender a strong disagreement. It is important to
 306 underline that Factor 1B focuses on the same relevant topics of Factor 1A but with a negative view.
 307 The participant (Q sort 2) provided some comments that might verify his position. For example, it
 308 takes distance from ‘victimhood’, which characterise the ‘pro-Nationalism’ opinions (Factor 1A). In
 309 particular, referring to the statement 27, which disagrees, this participant stated: “How boring is this
 310 sovereignist victimhood?”. The adoption of HWLs was not seen as an attack on the national economy.
 311 Also, the participant strongly disagreed that the adoption of HWLs will damage the Mediterranean
 312 diet and added, “What does the Mediterranean diet have to do with alcohol?”.

313 Table 5 Factor scores for Factor 1 (distinguishing statements with ** indicates a significance of
 314 p<0.01, with * of p<0.05

n	Statement	F1A	F1B	F2	F3	F4
4	For me, the European policies supporting the wine sector have proved incapable of defending quality products again.	+4**	-4**	-1	-1	-2
5	I think Europe cannot treat a bottle of wine like a pack of cigarettes.	+3**	-3**	-1	-4	-2
8	I think that we should not engage in psychological terrorism but use proper communication (e.g., on social media, TV, etc.) to educate citizens about the consumption of wine.	+4	-4	+4	-1	+3
9	In my view, the Italian government should not oppose using health warnings on labels.	-3**	+3**	+1	+2	0
10	I think the labels should also include information to protect the health wine consumers as in other countries (e.g., Ireland).	-2*	+2*	-1	+3	0
21	In my opinion, using warning labels does not risk compromising the role of wine as an ambassador of a system that respects the environment and local traditions.	-3	+3	+2	-2	-3
25	I find it helpful to indicate on the labels that drinking wine is seriously damaging to own health.	-4	+4	-2	+4	+1
27	For me, using these labels is a concrete attack on Italian wine. It is unclear why wanting to tackle this problem and hypocritically hide other issues under the carpet (e.g., fine dust, pollution, etc.).	+3**	-3**	-2	+1	-2
31	For me, using health warnings on the label is supported by a scientific basis.	-1**	+1**	+1	+4	+3

33	I don't think that the introduction of these labels represents an attempt by some northern European countries to demonise sectors that represent a heritage of our food and wine culture and tradition.	-4*	+4*	+3	0	-2
38	For me, these labels risk damaging the Mediterranean diet, a fundamental tool for protecting health. Recent studies have shown how the moderate use of wine could benefit health.	+3**	-3**	-3	0	-4
40	For me, adopting such labels is irresponsible and would create difficulties in a vital supply chain, one of the most relevant to our agri-food sector.	+2	-2	-3*	+3	-1

315

316 3.2. Factor 2: The “Market-oriented” view

317 An optimistic attitude towards the adoption of health warnings mainly characterizes this second factor
318 Table 6. According to this view, health warnings will help to increase transparency in the market
319 and help consumers to make informed choices. The factor has a strong focus on market dynamics and
320 does not perceive that warning labelling adoption would negatively compromise the image of Italian
321 wine worldwide (21, +2**) and the economy of the entire sector, including turnover, employment
322 and total exports (6, -3*; 24, -4**; 40, -3*). Some participants stated: “*I do not think that these labels
323 will do devastating damage to the world of wine, particularly Italian wine, which remains an excellent
324 quality product*” (P15); “*Those who take a healthy and consistent approach to wine will not change
325 the way they consume it, so I don't think exports would be affected*” (P12). Furthermore, for this view,
326 HWLs will not create obstacles to the free circulation of goods nor increase wine costs or prices for
327 the final consumer (17, -2**). One participant stated: “*I believe that adopting health warning labels
328 is useful and low-cost*” (P6). Contrary to perspectives 1 and 4, this view does not perceive these labels
329 with hostility as an attempt by other European countries to penalize Italian wines (33, +3**).
330 Regarding this point one affirmed: “*Good communication is necessary to ensure that people are
331 educated on the correct consumption of wine*” (P6). Also, adopting warning labels with proper
332 communication could add more value to wines produced responsibly (35, +2**), inform consumers,
333 and promote moderate and responsible consumption (26, +4).

334 *Table 6 Factor scores for Factor 2 (distinguishing statements with ** indicates a significance of*
335 *p<0.01, with * of p<0.05*

n	Statement	F1A	F1B	F2	F3	F4
6	In my opinion, with these labels, Europe risks causing enormous damage to the world of wine, which in Italy alone involves millions of employees and produces a significant annual turnover.	+2	-2	-3*	0	-1
8	I think that we should not engage in psychological terrorism but use proper communication (e.g., on social media, TV, etc.) to educate citizens about the consumption of wine.	+4	-4	+4*	-1	+3
17	I believe these labels are a clear obstacle to the free circulation of goods and involve additional costs which will increase the price of wine to final consumers.	+1	-1	-2**	+3	0

18	I think that the use of these labels represents a sort of 'disclaimer' by those who impose them.	+2	-2	-2**	+1	+4
21	In my opinion, using warning labels does not risk compromising the role of wine as an ambassador of a system that respects the environment and local traditions.	-3	+3	+2**	-2	-3
24	I think it is a fact that the adoption of such labels will cause severe setbacks for wine exports.	+1	-1	-4**	+1	-1
26	I think there is nothing wrong with creating labels inviting moderate consumption. It could be a way to encourage responsible alcohol consumption without scaring consumers with too negative information.	-1	+1	+4	+2	+1
32	I believe using these labels will negatively affect the promotion policy of alcoholic beverages, wine included.	+1	-1	-2**	+2	+2
33	I don't think that the introduction of these labels represents an attempt by some northern European countries to demonise sectors that represent a heritage of our food and wine culture and tradition.	-4	+4	+3**	0	-2
35	I think that inserting some important analytical values on the back of the label is not so harmful; on the contrary, it could - together with other precautions - lead to a greater valorisation of wines produced responsibly.	-1	+1	+2**	-2	-2
39	I believe that to reduce the adverse effects that introducing these labels would have on the wine sector, the Italian government should intervene with economic-financial support to all operators in the sector.	-1	+1	-3**	+2	+1
40	For me, adopting such labels is irresponsible and would create difficulties in a vital supply chain, one of the most relevant to our agri-food sector.	+2	-2	-3*	+3	-1

336

337 3.3. Factor 3: The “Health-first” view

338 More than all the other views, this third view shows a strong focus on health aspects and has high
339 expectations towards the ability of HWLs to protect consumers’ health Table 7. One participant
340 affirmed: *“Health is the first element to protect”* (P16). Looking at the most distinguishing
341 statements, adopting health warnings is perceived as necessary to protect public health, which
342 contrasts mainly with the first perspective (10, +3**, 25, +4**). For example, concerning the
343 statement 25, one stated: *“I find these labels useful for highlighting the motivations”* (P18). Overall,
344 this view particularly trusts the use of measures based on labelling to inform consumers about health
345 risks (7, -3*). The overconfidence with HWLs of those belonging to this factor is also supported by
346 a scientific base (31, +4) and by the belief that consumers will pay high for those health-related
347 information (22, -3**). Distinct from all other viewpoints, this third perspective is not worried about
348 the aesthetic impact of warning labels on wine bottles (14, -4**) and retained that this is a low-cost
349 measure (28, -3**). However, this view raises some concerns about the possible price increase (17,
350 +3*). Regarding this last point, one participant confirmed: *“Anything that affects wine damages it; if
351 it doesn't damage it, it causes problems for those who consume it”* (P18).

352 Table 7 Factor scores for Factor 3 (distinguishing statements with ** indicates a significance of
 353 $p < 0.01$, with * of $p < 0.05$)

n	Statement	F1A	F1B	F2	F3	F4
7	For me, using these labels is wrong because the habit of getting drunk should be fought by adopting a different cultural approach to wine, drunk with meals and in limited quantities.	+2	-2	0	-3**	+3
10	I think the labels should also include information to protect the health wine consumers as in other countries (e.g., Ireland).	-2	+2	-1	+3**	0
14	For me, using these labels ruins the aesthetic and valuable sense of wine bottles.	0	0	-1	-4**	0
17	I believe these labels are a clear obstacle to the free circulation of goods and involve additional costs which will increase the price of wine to final consumers.	+1	-1	-2	+3**	0
22	I think that information policies on bottles related to the risks of alcohol abuse cannot be based solely on labels because these warnings receive very minimal attention from consumers	+1	-1	+3	-3**	+2
25	I find it helpful to indicate on the labels that drinking wine is seriously damaging to own health.	-4	+4	-2	+4**	+1
28	I think using warning labels is a low-cost deterrent measure because it does not involve public investment, awareness campaigns or particular commitment by the public administration.	-1	+1	+3	-3**	+1
31	For me, using health warnings on the label is supported by a scientific basis.	-1	+1	+1	+4	+3

354

355 3.4. Factor 4: The “Keep us alive” view

356 This last view is mainly characterised by an evident scepticism regarding adopting health-warning
 357 labels Table 8. Participants from this view are conscious of the risks related to alcohol abuse and
 358 underline how, in the end, there are no safe amounts of alcohol consumption for health. Adopting
 359 HWLs for wine does not make sense for them (12, +4**). On the other hand, this viewpoint
 360 recognises that these labels are supported by scientific basis (+31, +3). However, for participants who
 361 share this view, governments should not impose limits on the consumption of wine (3, -3). This
 362 viewpoint expresses a “fatalistic” approach to health behaviour, supporting the idea that many foods
 363 could negatively affect individuals’ health (36, +3**). In this sense, showing a warning label on wine
 364 bottles that informs on the potential adverse effects of wine consumption is useless (22, +2), with the
 365 only result of ruining the pleasure of drinking a good wine (19, -3**). The strategy to use health-
 366 warning labels is unacceptable also because it represents a sort of disclaimer by politicians (18, +4*
 367 For this perspective, similar to the first perspective, it would be more effective a radical cultural
 368 change (7, +3). Regarding this last point, one participant confirmed: “*Nowadays, practically everyone*
 369 *knows the side effects of many substances, and yet they continue to abuse them. If there is genuine*
 370 *interest, a radical change in lifestyle must be done*” (P1).

371 *Table 8 Factor scores for Factor 4 (distinguishing statements with ** indicates a significance of*
 372 *p<0.01, with * of p<0.05*

n	Statement	F1A	F1B	F2	F3	F4
3	I think nobody wants to ban drinking, but at the same time, the government should limit individual choices if this negatively impacts public health.	-1	+1	+1	+1	-3
7	For me, using these labels is wrong because the habit of getting drunk should be fought by adopting a different cultural approach to wine, drunk with meals and in limited quantities.	+2	-2	0	-3	+3
8	I think that we should not engage in psychological terrorism but use proper communication (e.g., on social media, TV, etc.) to educate citizens about the consumption of wine.	+4	-4	+4	-1	+3
12	For me, there are no safe amounts of alcohol consumption for health.	-2	+2	-4	-2	+4**
18	I think that the use of these labels represents a sort of 'disclaimer' by those who impose them.	+2	-2	-2	+1	+4*
19	In my opinion, using these labels would not change consumption in any way, and it would ruin the pleasure of drinking wine at the table.	0	0	0	0	-3**
22	I think that information policies on bottles related to the risks of alcohol abuse cannot be based solely on labels because these warnings receive very minimal attention from consumers	+1	-1	+3	-3	+2
30	I believe that freedom of choice in our society is a thing of fact. In any case, being free to drink as much as you like is separate from being correctly informed about the possible risks.	0	0	+3	0	+2
31	For me, using health warnings on the label is supported by a scientific basis.	-1	+1	+1	+4	+3
36	I think there are a lot of carcinogenic foods today. From meat to vegetables. You only live once, and it will certainly not be these labels that influence my alcohol consumption. If you don't die of one thing, you die of another.	0	0	0	-1	+3**

373

374 4. Discussion

375 The results identify four key perspectives on adopting HWLs on wine bottles, each offering valuable
 376 insights into consumer and expert opinions within the wine sector. The results generally reveal a
 377 broad awareness of the health impact associated with wine consumption across all factors. However,
 378 the four viewpoints differed substantially in their responses to the mandatory adoption of HWLs.

379 The results showed that, for Factors 2 and 3, mandatory HWLs on all alcoholic beverages, including
 380 wine, could raise awareness of health-related risks and support consumers make better-informed
 381 choices. This suggests a potential positive impact of HWLs on wine bottles, offering hope for a more
 382 informed and healthier consumer base. Nevertheless, significant differences exist between the
 383 viewpoints of Factor 2 and Factor 3 regarding the HWLs on wine bottles. According to the latter (the
 384 “Health-first” view), Italian consumers still have a low level of awareness about the health risks
 385 associated with alcohol consumption. Therefore, HWLs on wine container could be crucial in raising

386 awareness about the dangers of alcohol consumption. Previous studies [9,11], highlighting that only
387 a small percentage of alcohol consumers are aware of the health-related risks associated with alcohol
388 consumption. However, while HWLs may enhance awareness of these risks, their effectiveness
389 ultimately depends on an individual's perception. As found in [60] and [11], risk perception can
390 strongly affect an individual's level of engagement with a risky situation (e.g., beverage alcohol
391 consumption) and, consequently, his acceptance of the related consequences [61]. According to some
392 scholars [11] [62], peoples' perceptions of health-related risks from alcohol consumption do not
393 necessarily increase after being exposed to HWLs. The findings of [63] support this, showing that
394 society tends to have higher acceptability for voluntary risks (e.g., smoking, drinking alcohol)
395 compared to involuntary risks (e.g., flooding; storms; earthquakes). Furthermore, as also raised by
396 [64] research suggests that HWLs alone may not be sufficient to reduce alcohol consumption.
397 According to [61] an individual's perception of risk is strongly influenced by their knowledge of
398 specific hazards, such as alcoholic beverages. The mandatory introduction of HWLs on wine bottles
399 should be part of a broader strategy. This strategy should not only include HWL education campaigns
400 but also support programs targeting at-risk populations, highlighting the complexity of the issue, and
401 pressing the need for multi-faceted solutions.

402 Similarly to the previous viewpoint, Factor 2 (the "Market-oriented" view) is also favourable for
403 adopting of HWLs. People who are part of this factor consider the mandatory adoption of detailed
404 HWLs on wine containers (e.g., bottles and cans) an effective policy tool to regulate the alcohol
405 market and address various externality costs, including those related to public health impact [65].
406 According to this view, mandatory HWLs can be considered both a regulatory instrument and an
407 informational tool used by the government to establish the socially optimal level of alcohol
408 consumption. Moreover, according to this "Market-oriented" viewpoint, the mandatory adoption of
409 HWLs on wine containers does not necessarily cause a decrease in wine consumption. According to
410 a previous study, improving knowledge and understanding of wine health related risks may lead to a
411 general increase in consumption [64]. According to [66], responsible wine consumption should be
412 promoted through national and international programmes to reduce alcohol abuse. At the same time,
413 consumers should be educated to consume alcohol based on cultural norms and healthy lifestyles.
414 Typical examples of other regulatory instruments governments could adopt include licensing
415 restrictions to retailers and bars, setting a minimum legal drinking age, and restricting alcohol
416 advertising addressed to young people and adolescents [67]. Health taxes on alcoholic products,
417 which can also be defined as Pigouvian taxes, are considered one of the main economic instruments
418 implemented in many countries worldwide [65,68,69]. In the UK, where excise duty on alcohol has
419 been in place for many years, the government has recently proposed changing the tax from a product

420 volume tax to an alcohol volume tax [70]. These taxes can be complemented with other economic
421 instruments, such as incentives to alcohol-free beverage productions. According to [71], wine with
422 reduced alcohol content or de-alcoholised wine has proven to be an effective measure in reducing the
423 potential health-related effects of alcohol consumption. Governments must implement economic
424 strategies, including price incentives and subsidies, to promote the production and consumption of
425 No-and Low-Alcohol (No-Lo) beverages. As the production of No-Lo wine is still more expensive
426 than traditional wines, supporting innovations in production techniques through R&D projects is
427 necessary [72].

428 Factor 4 (the “Keep us alive” view) is characterised by a limited interest in adopting HWLs, primarily
429 due to perceptions of limited effectiveness in promoting positive behaviours. The scepticism
430 associated with this factor stems from the belief that individuals who consume wine in moderation
431 will continue to do so, regardless of the presence of HWLs. As reported in the literature, the
432 moderated consumption of wine is considered important for reducing the risk of cardiovascular
433 diseases (CHD). This was first explored by [73], whose findings are often referred to as the “French
434 paradox”. According to this study, despite the relatively high consumption of food rich in saturated
435 fatty acids (e.g., cheese and meat), the mortality rate of the French population due to cardiovascular
436 disease was lower compared to that in other countries with similar diets. This has been partially
437 attributed to the effect of moderate red wine drinking [73]. Regular consumption of red wine is
438 beneficial in many other recent studies conducted in Mediterranean countries [74,75]. The challenge
439 lies in finding effective strategies for those who abuse alcoholic beverages, including wine, and
440 preventing harmful behaviour, especially among younger individuals. According to the Factor 4
441 viewpoint, if decreasing alcohol abuse is the main objective of the EU Commission, this goal cannot
442 be achieved using labelling alone, which could be seen as a way of discharging responsibility from
443 institutions. Achieving meaningful changes in drinking behaviour requires enhancing knowledge and
444 understanding of the potential health-related hazards connected to the consumption of alcoholic
445 beverages. According to the [7,76], the use of HWLs on alcoholic beverages should be only part of a
446 broader campaign to educate people about the health-related risks of alcohol consumption. Public
447 health agencies should implement several other information strategies at the member state level to
448 address misinformation about the alcohol use (and abuse), particularly among the younger generation
449 [68]. These include implementing evidence-based advertising restrictions [77] and school-based
450 preventive alcohol use interventions for adolescents [78,79]. Moreover, a notable feature of the
451 Mediterranean Diet, inscribed in 2013 on the UNESCO list of the Intangible Cultural Heritage of
452 Humanity [80,81] for its cultural significance and health-related benefits, is the moderate
453 consumption of wine.

454 Factor 1 (the “Nationalism” view) strongly criticised HWLs for reasons beyond the health
455 implications of alcohol use. From this perspective, the labelling is seen as a threat to the national wine
456 industry. Consequently, contrasting the adoption of HWLs on wine bottles is essential to protect
457 domestic and international demand for wine, as this product plays a crucial role in the national
458 economy. These findings are consistent with those in [76], which highlight the general resistance of
459 the alcohol industry to include public health information on the label. The wine industry and farmers
460 have a strong interest in protecting their sector. The Italian wine industry plays a significant role in
461 the global wine market [82]. According to [83], in 2023, Italy produced about 49 million hectolitres
462 of wine, 40% of which was exported in EU and non-EU countries. In Italy, winemaking is performed
463 by over 30,000 wineries, most of which are smallholder grape growers, and involves about 690,000
464 hectares of vineyard area [83]. The valorisation and protection of this important sector are also seen
465 as important for the Factor 4 viewpoint. This perspective brings the view that introducing HWLs
466 could be an attempt by northern European countries to undermine a key sector of Italy’s economy
467 and cultural heritage. Among typical products, such as Geographical Indication (GI) products, wine
468 represents a strong connection between geographical, environmental and cultural contexts. Some
469 authors [84,85] define this concept as terroir, which refers to the interaction between environmental
470 factors (i.e., biological and physical) and winemaking practices applied in each context that can
471 provide distinctive characteristics to the final product.

472

Just Accepted

473 5. Conclusions

474 This study provides a preliminary investigation into the perception and acceptance of health warning
475 labels (HWLs) on wine bottles, focusing on experts and non-experts within the Italian context, where
476 wine is deeply rooted in national culinary tradition. Using Q methodology, a systematic approach to
477 studying human subjectivity, the research highlights a lack of consensus on mandatory HWLs for
478 wine in Italy. While Factor 2 (the “Market-oriented” view) and Factor 3 (the “Health-first” view)
479 reflect a more positive stance towards HWLs, accounting for the majority of consumers, Factor 1 (the
480 “Nationalism” view) and Factor 4 (the “Keep us alive” view), mainly represented by wine industry
481 professionals, oppose such measures. Despite these divergent views, there is shared recognition of
482 the need to distinguish between alcohol abuse and moderate consumption. Different countries have
483 varying regulations; in regions with less stringent warnings, companies may leverage this to market
484 their products more aggressively. The Irish regulation on alcoholic products, among the strictest in
485 the EU, has sparked widespread debate, illustrating the complexity of implementing HWLs across
486 diverse cultural and market contexts. Discussions in Italy and other major EU wine-producing
487 countries are intensifying due to the potential implications for the wine industry. As this debate
488 unfolds, a nuanced and multi-faceted approach is essential for evaluating the potential effects of
489 HWLs on both abusive and social wine consumption, particularly among younger generations. Future
490 research should analyse the impact of HWLs in countries where such measures are already enforced,
491 by promoting real-world studies, and comparing the findings with existing experimental research in
492 Italy.

493 In some cases, companies may view HWLs as a competitive disadvantage. Stricter regulations on
494 health warnings may push companies to innovate or differentiate their products in ways that comply
495 without compromising appeal. On the other side, companies might use health warnings strategically
496 to enhance their image by appearing responsible and socially conscious, thus potentially gaining a
497 competitive edge in the marketplace.

498 In this framework, harmonizing HWL designs with international regulatory frameworks, such as the
499 Trans-Pacific Partnership (TPP), could be crucial to minimize disruptions to both domestic and export
500 markets. Careful alignment with existing EU and member state wine legislation is equally important.
501 Health warnings can serve as a competitive measure in the marketplace, nevertheless, the
502 effectiveness of these warnings often depends on various factors, including cultural context,
503 consumer behaviour, and regulatory enforcement.

504 While this study sheds light on critical perspectives, it is limited by its focus on the Italian context
505 and the exclusion of wine growers from the participant set. Replicating the research in other EU

506 countries and incorporating additional stakeholders would provide a broader understanding of the
507 varied responses to HWLs, offering valuable insights for future policy development.

508

509 **Ethical statement**

510 The experimental procedure was approved by Università Politecnica delle Marche ethical committee
511 and conducted in accordance with the principles outlines in the Declaration of Helsinki.

512

513 **Competing Interests:**

514 The Author(s) declare(s) no conflict of interest.

515

516 **CRedit authorship contribution statement:**

517 Conceptualization: Francesco Solfanelli and Serena Mandolesi; Data curation: Francesco Solfanelli,
518 Serena Mandolesi, Simona Naspetti and Ileana Silvestri; Investigation: Francesco Solfanelli, Serena
519 Mandolesi and Ileana Silvestri; Methodology: Serena Mandolesi; Formal analysis: Francesco
520 Solfanelli and Serena Mandolesi; Validation: Raffaele Zanolì; Writing - original draft: Francesco
521 Solfanelli and Serena Mandolesi; Writing - review & editing: Francesco Solfanelli, Serena
522 Mandolesi, Simona Naspetti and Raffaele Zanolì; Supervision: Francesco Solfanelli.

523

524 **Data Availability Statement:** All relevant data are within the paper.

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733

734 **Appendix**

735

Most disagree		Neutral					Most agree	
-4	-3	-2	-1	0	+1	+2	+3	+4

736 Figure 1 The Q sorting distribution