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European consumers' perception of moderate wine consumption on health

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Abstract

The present study examines the perceptions that French, Italian and Spanish consumers have about the possible health effects of what they consider to be a moderate wine consumption. Furthermore, it identifies whether the following factors positively or negatively influence consumer opinion – wine appreciation, environmental awareness, environmental labels, local legislation and media coverage. Perceptions were identified through an online survey of 1183 respondents. The respondents perceive wine as a rather healthy product if consumed moderately. Wine appreciation positively influences the perception of a healthy effect of moderate wine consumption. French policies advising constraints on wine consumption indirectly influence consumer opinion about the unhealthy effects caused by wine. French and Spanish consumers with high environmental awareness perceive a wine with an eco-label to be healthier than a conventional one.

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Keywords: Wine; Health; Moderate consumption; France; Italy; Spain

1. Introduction

According to the latest data collected by the OIV (International Organisation of Vine and Wine), Italy, France and Spain collectively produced 48% of the world's wine volume in 2015 (OIV, 2015). Wine consumption in Italy and in France has been steadily decreasing: by 11.50% in Italy and by 4.85% in France between 2011 and 2014 (Wine Institute, 2015). In Spain there has been an increase in the on-trade sales of 1.07%, thanks to a recovery from the economy crisis (Euromonitor International, 2015), but it remains lower than in Italian and French because of a sustained decline over the last few decades.

In the context of consumers paying more attention to their diet's influence on health (Todd, 2014; Crédoc, 2010; Eurobarometer, 2006), it is interesting to explore if the perception that wine could be unhealthy is one of the factors explaining behaviour towards wine, and hence consumption.

Several studies have been published that discuss the effects of alcohol consumption on health, and some are specifically focused on wine consumption. Scientists cannot agree on the effects of alcohol consumption on health, because it presents some positive as well as negative health impacts, depending on the variables observed. As background to our research, we briefly summarise the purported health effects and their influence on customer perceptions, with no objective to be exhaustive on the single topic.

(a) Possible positive health effects of moderate wine consumption

Although the Code Against Cancer suggests that the best way to reduce the risks of cancer is to avoid drinking any kind of alcohol (European Code Against Cancer, 2016), some studies demonstrate that a moderate consumption of wine may ensure people a longer life expectancy than those consuming wine in excess, but also than those who do not consume it at all (German and Walzem, 2000; Ruf, 2003; Plunk, 2013).

The term “moderate wine consumption”, referred to

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hereafter as MWC, refers to 2–3 drink units a day for women and men, respectively, and never more than 4 per consumption episode. A standard drink unit contains an average of 10 g of pure alcohol, which equates to around 100 ml of wine - 96 ml of wine at 13% by volume or 104 ml of sparkling wine at 12% by volume (Wine in Moderation, 2017; Mongan and Long, 2015). However, in this article, a MWC is considered from the consumers' point of view. The survey included a question about the personal interpretation of the term "moderate wine consumption", which may differ from the official definition. This should be kept in mind when reading this article.

In contrast to other alcohols, wine contains polyphenols such as anthocyanins, flavonols and stilbenes (resveratrol), which originate mainly from red grapes seeds and skins (Flamini et al., 2013). These polyphenols, and more specifically resveratrol, are the molecules believed to have positive health impacts, thanks to their antioxidant effect and their direct action on cellular lipid homeostasis (Guilford and Pezzuto, 2011). Moderate consumption of wine has been purported to help reduce the risk of cardiovascular diseases (Flesch et al. 2001), neurodegenerative diseases (Letenneur, 2004; Pinder and Sandler, 2004), some cancers (Schafer and Bauersachs, 2002; Bianchini and Vainio, 2003; Kamholz, 2006; Chao, 2007; Kubo et al., 2009), metabolic disturbances (Kar et al., 2009), and may also stimulate an immune response against inflammations (Magrone et al., 2008). The process of maceration, which occurs during the production of red wine, promotes greater extraction of polyphenolic compounds. However white wine may also produce cardio-protective effects (Migliori et al., 2015) and other metabolic benefits (Flechtner-Mors et al., 2004).

(b) Possible negative health effects of moderate wine consumption

Despite of those positive health impacts, wine contains alcohol and can therefore not be considered an "elixir of life". As well as the well-established negative effects of excessive alcohol absorption (alcoholism, liver cirrhosis, physical risks of drunk driving, violence and socialization issues (Tomera, 1999)), various studies have shown that it may also increase the risks of some cancers and embryo's malformation during pregnancy (Wine Information Council, 2016). The Code Against Cancer suggests that the best way to reduce the risks of cancer is to avoid drinking any kind of alcohol (European Code Against Cancer, 2016). However, wine, and most of all red wine, may be considered the healthiest alcoholic beverage (Di Castelnuovo et al., 2002). Other risks specific to wine may be related to the content of sulphites or pesticides (Sutan, 2014), even the majority of pesticides are removed during the winemaking process (Cabras and Angioni, 2000; Dubernet et al., 2014; Cuš et al., 2010).

The above-mentioned studies have been published in scientific papers, and it is difficult to evaluate their impact on consumers' purchase decisions. However, some studies have been made about consumers' perceptions of the health

effects of wine consumption (Chang et al., 2016; Samoggia, 2016; Higgins and Llanos, 2015; Yoo et al., 2013).

(c) Consumers' perception of wine and its supposed health effects

In 2008, the EU led a survey about consumers' perception of alcoholic beverages, finding that 97% of people believe alcohol consumption to increase the risk of liver diseases, and 67%, the risks of cancers (Eurobarometer, 2010). No study of this type focused on wine could be found in the literature.

One study conducted in the United States showed that when choosing between beer and wine consumers do not take positive health benefits as a purchase criterion (Wright et al., 2008). Although according to Barreiro-Hurlé, Spanish consumers are willing to pay more for wine produced with resveratrol-enriched grapes, which infers consumers may buy wine based on health criteria (Barreiro-Hurlé, 2007). This could be an interesting marketing tool, if ever allowed, even though the perceived positive health benefits of wine do not seem to influence consumption patterns in Australia, and therefore does not enhance alcoholism (Saliba and Moran, 2010). Nevertheless, some consumers know by experience that wine also contains unhealthy compounds, like sulphites, as shown in a US study that found they are willing to pay more for non-sulphated wines (Costanigro, 2013). These results do not allow conclusions to be drawn about general perceptions of the health benefits of wines (i.e., those without health claims).

(d) Influence of national legislation and media coverage on consumers' opinion

Consumers have access to much information about products, health and environmental issues through the media and also through food labels. The messages portrayed about the health impacts of wine consumption are diverse, and potentially contradictory, depending on the source. This can lead consumers to be uncertain about the health effects of wine. Legislation and media coverage may play an important role in influencing consumers' opinion on the health effects of wine consumption. Spanish law is relatively flexible concerning wine advertising, whereas French law, specifically the "Loi Evin" is very strict (Legifrance (2016), forbidding any kind of alcoholic beverage advertising on television and requiring other kinds of advertising to be accompanied by a cautionary message about alcohol abuse (Assemblée Nationale, 2004). In contrast Italy has some restrictions on nearly all media, but a lot of TV programs talk about the consumption of wine during meals. In Spain, the Ministry of Agriculture, together with the association Wine in Moderation, launched in 2012 an advertising and educational campaign to promote moderate wine consumption. France is the only country in the EU where the pregnant woman pictogram must appear on the wine container (Farke, 2011).

(e) Environmental implication's impact on consumers' opinion

Recent concerns about environmental matters has led to the creation of numerous environmental labels

(Higgins and Llanos, 2015), such as organic certification and carbon footprint declarations. The objective of eco-labelling is to facilitate purchasing based on environmental criteria (Delmas and Grant, 2014). The European Commission, with its Ecolabel department, reports that in 2015, Italy was the country of Europe with the most eco-labelled products and services (19,593), followed by France (6186) and Spain (2989) (European Commission, 2015). Consumers may associate environmental issues to health issues, for example by consider wine to be bad for their health because of its pesticides residues content. This has been considered in the present study by the examining the relationship between environmental perceptions and health perceptions.

The aim of the present research was to explore European consumers' perception of moderate wine consumption on health, and the factors that influence perceptions. The study was conducted in France, Italy and Spain, as these three major wine-producing countries have different policies on wine and alcohol consumption, and thus provide a useful sample. The messages conveyed by the media and advertisements in these countries are also different, which influences policies. Various aspects were analysed, such as the country of origin and the different policies and ways to diffuse information via the media. Furthermore, as other factors can affect how consumers build their opinions, respondents' appreciation for wine and their environment awareness were also taken into account in each country (Jourjon and Symoneaux, 2016).

2. Material and methods

A quantitative survey was structured based on previous literature about health perceptions and their influencing factors. The questions were separated into three sections, to test the influence of the following factors on consumers' perceptions of the health effects of wine: media and legislation, health appreciation, wine and environmental involvement. The last two have been used to provide consumer segmentation. Socio-demographic information was also collected to define the sample's composition.

The questions were presented to gauge the degree of affirmation, requiring an answer on a 6-point Likert scale (Leung, 2011) (1 = "I completely disagree" and 6 = "I totally agree"). The first section was focused on perceptions about the health effects of wine. These questions followed a precise order so as to not influence responses, starting with general questions and proceeding to more personal questions. The first part investigated the perceived relationship between wine and health. The questions were based both on an American survey of consumers' perception about the health benefits of wine (Higgins and Llanos, 2015) and on the earlier literature review but was modified to also implicate consumers' relatives, and with more questions on general health care. Consumers' point of view about warnings on wine labels were also added by reference to two different Italian works (Annunziata et al., 2016a, 2016b). Based on advice from sociologists, questions about illnesses with no link to wine consumption were also included to differentiate beliefs from founded knowledge. The second section, about the wine involvement was based on the work of Wilson et al. (2010, 2007) regarding consumers' perception of "terroir". Two questions were added, regarding

Table 1
Summary of the questions grouped for each research section.

Section 1	What are, according to you, the effects of a MWC on health? A MWC can prevent some diseases.	Average score for overall opinion on the health effects of MWC (referred to as "overall opinion on wine and health").
General opinion on Wine and Health + Legislation and Media	– Cancers. – Cardiovascular diseases. – Neurodegenerative diseases – Diabetes – Obesity A MWC is healthier than a moderate consumption of other alcoholic beverages. National legislations are favourable to a MWC. Media coverages are generally favourable to a MWC.	Average score for the perception of local policies and media coverage regarding wine (referred to as "perception of local policies and media coverage"). Average score for for "wine involvement".
Section 2	I like to learn about wine. When I find articles about wine, I read them.	
Wine involvement	I am actively interested in the winemaking process and I look for additional information. The wine and the wine world in general are for me a passion.	
Section 3	While shopping, I prefer environment-friendly products. I have a good knowledge of environmental issues.	Average score for the "environment involvement"
Environment involvement	When I find information about the environment, I read them carefully. In my everyday life, I pay attention to reduce my impact on the environment, e.g.: waste segregation, use of renewable energy, water reuse, considered use of transportation mode.	

whether their professional activity is linked to wine and if they are living in a wine region. The third section about “environmental involvement” was based on the previous work of Jourjon and Symoneaux (2012).

The survey was translated from French into Italian and Spanish and was beta-tested in each country before distribution. The survey was distributed in March 2016 via the internet using the Google Form platform to the ESA's alumni, professional networks in France and partner universities in Italy and Spain. In addition, personal and social networks were used to reach a broader range of consumer's profiles in the three countries. The recruitment method may have been biased the final sample towards a larger share of students and young people, and those with wine appreciation.

Average scores were given to consumers to characterize their profiles, according to their level of “wine involvement” and “environmental involvement” and perception of local policies and media coverage regarding wine. An average of all the answers for each section of the survey was calculated (Table 1). Then, to measure the overall opinion about the health effects of wine, the average agreement level was calculated for the following questions: “What are, according to you, the effects of a MWC on health?” (1 = very negative to 6 = very positive); “A MWC can prevent some diseases” (1- I totally disagree to 6- I totally agree), and then the detail of the health conditions that could be prevented through a MWC according to the literature review, and “A MWC is healthier than a moderate consumption of other alcoholic beverages” (same scale).

The data were analysed using the program XLSTAT. To find relations between the variables, the tests chosen were ANOVA (Analysis of Variance), linear regressions and cross-tabulation.

3. Results

3.1. Sample description

The final samples for each country were of different size (France $n=795$, Italy $n=238$ and Spain $n=150$), but quite well balanced in terms of overall socio-demographic characteristics (Table 2). In terms of gender, females represented 48% of the French sample, 42% of the Italian sample and 55% of the Spanish one. In relation to age, the Spanish sample had a higher proportion of individuals over 45 years old (46%) compared to 27% for France and 21% for Italy. In the French sample the 19–24 and 25–34 age groups represented the largest proportion (respectively 29% and 25%). In the Italian sample the 25–34 and 35–44 age group was the largest (34% and 27% correspondently). In the Spanish sample the 45–54 age group was the largest (28%), followed by the 19–24 and 25–34 age groups (both 19%).

In relation to the professional activities represented in the samples, there was a similar proportion of students (between 22% and 25%), non-employed (between 3% and 5%), and retired individuals (between 3% and 7%). There were some differences in the proportion of executives - higher in France

(43%) and Spain (39%) than in Italy (27%); and in the proportions of employees - only 9% in France, compared to 25% in Italy and 19% in Spain. Regarding wine consumption frequency, the samples are quite similar with those consuming every day being between 14% and 18%, those consuming once a week being between 18% and 24%, those consuming once a month being between 7% and 8%, and non-consumers being between 3% and 5%. There were some dissimilarities in the category of respondents consuming wine 2/3 times a week, as the share in the French sample is 30% against 40% in Italy and 35% in Spain.

Finally, we should underline that, due to the snowball sampling technique used for recruiting respondents, our data are not representative of the respective national populations.

3.1.1. Moderation and drinking habits

The sample was not aware of the World Health Organization's (WHO) definition of a MWC: maximum 2 glasses a day for women and 3 for men. As can be seen in the Fig. 1, in all three countries, the majority believe it is one glass a day (58% for France, 52% for Italy and 63% for Spain). Then, France and Spain are a little bit more conservative with 28% and 15% of respondents considering it is less than one glass a day, with no respondents thinking it is 4–5 glasses a day. The Italians seem to be the closest to the MWC definition, with 38% of respondents thinking that a MWC is 2–3 glasses a day. The

Table 2
Samples' description.

	Modalities	France	Italy	Spain
Sample size (N)		795	238	150
Socio-demographic characteristics				
Gender	Male	52%	58%	45%
	Female	48%	42%	55%
Age cohort	15–18	0.5%	2%	0.6%
	19–24	29%	16%	19%
	25–34	25%	34%	19%
	35–44	18%	27%	16%
	45–54	11%	12%	28%
	55–64	7%	6%	14%
Professional activity	+65	9%	3%	4%
	Farmer	7%	2%	1%
	Craftsman, shopkeeper	0.6%	6%	4%
	Company head	4%	10%	3%
	Worker, employee	9%	25%	19%
	Student	25%	22%	24%
	Retired	8%	3%	7%
	Without professional activity	3%	5%	3%
Wine consumption frequency	Executive	43%	27%	39%
	Everyday	14%	18%	17%
	2 or 3 times a week	30%	40%	35%
	Once a week	24%	20%	18%
	2 or 3 times a month	16%	6%	11%
	Once a month	7%	8%	7%
	Less than once a month	5%	3%	9%
	Never	4%	5%	3%

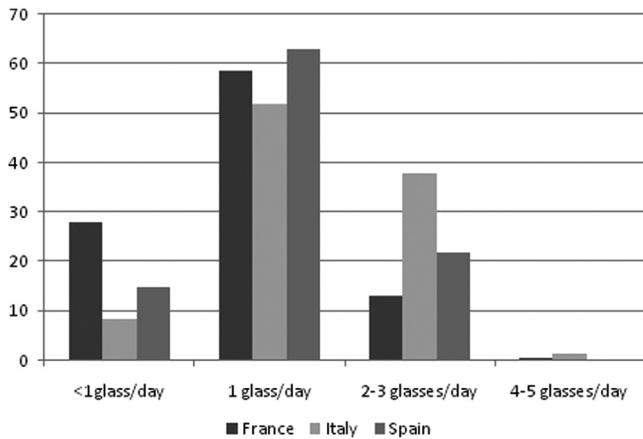


Fig. 1. Respondents' definition of moderate consumption (% of respondents).

Table 3
Respondents' agreement/disagreement on MWC positive role in preventing cardio-vascular diseases (%).

	Disagree	Agree
France	32	68
Italy	30	70
Spain	24	76

consumers' definition of a MWC correlated positively to their drinking habits in all three countries ($p < 0.0001$ for France and Spain and 0.001 for Italy).

3.1.2. General opinion about the relationship between MWC and health

Most respondents appreciated the difference between red and white wine in relation to health benefits. Indeed, 50% were quite aware (marking "5" or "6") that red and white wine do not present the same health benefits. It needs to keep in mind that consumers were probably thinking about red wine rather than white wine when answering the survey.

According to the mark for the overall opinion about the health effects of wine (Table 1), French, Italian and Spanish consumers rather agree that MWC has positive health effects (50%, 52% and 54% have a 4 mark, respectively).

Consumers quite agree with the affirmation "A MWC may prevent some diseases" (France: 68%, Italy: 65%). In Spain, this is more entrenched, with 78% positive responses including 53% "agreeing" or "totally agreeing". It seems that consumers are very aware of the fact that a MWC could help prevent cardiovascular diseases (Table 3), with the biggest share being "rather agree", followed by "agree". Regarding other diseases, most of respondents did not agree that a MWC could prevent them. Nonetheless the Italian and Spanish respondents more than French ones, present a higher percentage of agreement, referred to "sleeping disorders" and "neurodegenerative diseases" Finally 46% of the Spanish respondents also tend to agree on the possibility that wine could prevent cancers.

Both Italians and Spanish disagree with the affirmation "A MWC can causes some diseases", with a percentage of disagreement being 64% for Italy (of which 23% "completely

disagree") and 70% for Spain (of which 30% "disagree"). French respondents consider wine a bit more dangerous for health than other respondents (53% of them disagreeing). As for the Italian and Spanish samples, the diseases caused by wine consumption do not seem to be very clear to them, as they mostly answered negatively, indifferent to the fact that there is documented evidence. The French respondents, more than the Spanish and Italian ones, tended to agree that even a MWC can cause iver cirrhosis (37% "rather agree"). In the three countries, consumers believe that alcoholism can be enhanced by a MWC (more than 50% of the samples having answered between 4 to 6). However, "alcoholism" should have been well defined, because this is a very subjective term. It is also important to remember that the definition of moderation varies quite a lot among the respondents.

3.2. Influence of wine consumption policies and the media on consumers' perception of the health effects of wine

Regarding the main sources of information about the health effects of wine, our results shows that consumers mostly get information from the mass media (70.6% in France, 57.2% in Italy, 65.9% in Spain) from their family and friends (51.5% in France, 39.8% in Italy, 42.5% in Spain), from school (31.8% in France, 26.3% in Italy and 18.6% in Spain) and finally from scientific reviews of oenology and/or health. The statistical treatments have shown that the respondents' perception about local policies and media coverage depends on their nationality (Table 4). Italian and Spanish consumers perceive that the media messages and the local policies about wine consumption are generally favourable towards a MWC.

France was the only country for which there was a statistical relationship between receiving information from the media and the general opinion about wine and health (p -value=0.003; p -value=0.842 and 0.960 in Italy and Spain, respectively). This

Table 4
Respondents' country of origin effect on perceptions.

Variables	Test	Mean	P-value
Opinion of the local policies and the media coverage	ANOVA	3.691	< 0.0001
Opinion about effects of wine on health	ANOVA	3.819	< 0.0001

Table 5
Influence of policies and the media coverage on consumers' perception of the health effects of wine.

Variables	Test	France		Italy		Spain	
		Mean	P-value	Mean	P-value	Mean	P-value
Information through family and friends	ANOVA	3.607	0.560	3.858	0.869	4.059	0.004
Information from the media	ANOVA	3.607	0.003	3.858	0.842	4.059	0.960

Note: In bold statistically significant results.

Table 6
Respondents' degree of wine involvement (%).

	Low Involvement	High Involvement
France	36	64
Italy	37	63
Spain	21	79

suggests that only in France the opinion on wine and health could be influenced by the media (Table 5).

3.3. Influence of wine involvement on consumers' perception about the health effects of wine

Regarding wine involvement, there was a lower proportion of respondents with high wine involvement in the France and Italy samples, compared to the Spanish sample (79%) (Table 6).

The correlation results reveal that the greater a respondent's involvement

for wine, the more she/he tends to have a positive opinion about the health effects of MWC, in all three countries (p -value < 0.001 for France and Italy, p -value = 0.012 for Spain).

The proportion of individuals professionally involved in wine was similar for each of the three samples (33% for France and Italy and 35% for Spain). This high representation can be explained by the channels used for distribution of the survey, which were mainly through oenology universities and professionals and their personal contacts, who tend to work in the wine sector.

The bivariate analysis showed that French and Italian respondents who have a profession link to wine tended to have a positive opinion about the effects of MWC on health (p -values < 0.0001 for France and p -value = 0.014 for Italy); while in Spain there is no link between the two factors (p -value = 0.912).

Concerning whether the respondent lives in a wine region, the French sample is the most balanced, with 47% of the sample living in a wine region, compared to 33% for the Italian sample and 65% for the Spanish sample. No correlation between "living in a wine region" and "general opinion about wine and health" was observed.

In France and in Italy, respondent's perceptions about the health benefits of MWC depended on their links to the wine sector. Indeed, consumers with greater involvement and working in the wine sector perceive mostly positive rather than negative health effects of MWC. These factors do not correlate in the Spanish sample. The sample size and the fact that it does not represent the whole country's population could be an explanation, despite the similar proportions of people working in the wine sector in each sample.

3.4. Influence of environmental awareness and environmental labels on consumers' perception of the health benefits of wine

In terms of environmental awareness, the samples were characterized by a high degree of environmental involvement.

On the 6-points scale, where 6 represents "the most involved", the majority of respondents answered between 5 and 6 (Spain: 57%, France: 63%, Italy: 64%). However, this could be explained by the social desirability bias (Fisher and Katz, 2000). A positive correlation between environmental awareness and perceptions about the health effects of wine was observed only in Italy (p -value = 0.011), whereas in Spain and France environmental awareness does not seem to have an influence (p -values = 0.893 and 0.815, respectively).

The perception of the link between environmental labelling and the health benefits of wine was tested by asking respondents to indicate their degree of agreement to the question: "A wine with an environmental label is better for my health than a wine without any". The three countries had a similar level of agreement (14% for France, 16% for Italy and 13% for Spain answered that they strongly agree). The Italy sample had a higher percentage of respondents who overall considered that an environmental label is a sign of a healthier wine. This may have been influenced by the fact that Italy has the most eco-labelled products and services in Europe (European Commission, 2015). On another hand, those who are more involved into wine do not think that an eco-labelled wine is better for health than a wine without any certification. These two variables are not linked in France and Spain. While highly environmentally aware French and Spanish respondents believe that an eco-labelled wine is healthier than a normal one.

4. Discussion

The present research provides some interesting insight into consumers' perception about the relationship about the health benefits of wine and the factors that influence this perception.

Findings confirm that French, Italian and Spanish consumers tend to have a generally positive perception about the health effects of wine and health, especially for red wine, and believe that drinking wine is healthier than drinking other alcoholic beverages, in which concurs with several previous studies (Chang et al., 2016; Annunziata et al., 2016a; Higgins and Llanos, 2015; Wright et al., 2008; Yoo et al., 2013). It also shows that consumers are not aware of what the rates of MWC are, with the majority of respondents tending to underestimate it, which also concurs with previous results in each country (FranceAgriMer, 2010; Barreiro-Hurlé et al., 2008; Istat, 2010).

Regarding the linkage between MWC and specific diseases, our results show that consumers are rather confused about the link, except for cardio-vascular diseases where the perception is towards positive benefits According with Chang et al. (2016) such views may be attributable to the media reporting on the so-called "French Paradox", which refers to lower incidence of coronary heart disease among the French despite a diet high in saturated fat and cholesterol (Renaud and de Lorgeril, 1992). Our results highlight differences in perceptions between the countries. Italian and Spanish respondents were more confused about the link between MWC and specific diseases, compared with French respondents, who appear to be more aware and informed. This concurs with previous results (Annunziata et al.,

2016b). This could be attributed to social policy on alcohol consumption in France, which has focused on lowering alcohol consumption due to concerns of overindulgence that could lead to behavioral and/or health problems (Moran and Saliba, 2012). French law is quite restrictive on alcohol advertising, and the wine sector is often targeted by the media on environmental and health issues. Our findings confirm the important role of media coverage as the main source of information on the topics of wine consumption and health. Italian and Spanish consumers perceive that the media messages and the local policies are generally favorable towards the promotion of MWC.

This outcome is particularly interesting especially if we consider that in Europe several initiatives promoted by both consumer and public health organizations have called for better information about the health effects of wine consumption. In particular, the introduction of health warnings, and that at the present only in France the health warning for pregnancy woman is mandatory since 2007 (European Alcohol Policy Alliance, 2012). However, the effectiveness of these kind of intervention is still highly debated, and several researches have suggested the need for implementation in conjunction with a variety of other policy tools, such as education and information campaigns especially through social media (Annunziata et al., 2016a, 2016b; 2016c; Wilkinson and Room, 2009).

Regarding the factors affecting consumers' perception of the relationship between wine and health our results show that, for the three countries, the greater the degree of wine involvement, the greater the tendency to have a positive perception about the health benefits of wine health, which concurs with the study of Yoo et al. (2013) who compared Australian and Korean individuals. This might be linked to an access to more positive information on wine's health effects. Indeed, several previous studies have proven consumers' general interest in receiving more information on the relations between wine and health (Annunziata et al., 2016a, 2016b) and even consumers willing to pay premium prices for resveratrol-enriched - wine due to the association between resveratrol and health benefits (Barreiro-Hurlé et al., 2008).

Our results also show that the perception of the health benefits of wine is also influenced by environmental awareness and the presence of environmental labelling. In France and Spain respondents who are more environmentally aware will perceive a wine with an Ecolabel to be better for health, confirming the prominent role of environmental logo in influencing wine quality perception (Pomarici and Vecchio, 2014; Loureiro, 2013). Thus, considering the growing competitive landscape in the wine industry and the increase in consumers' interest in environmental issues, adding an environmental label might be strategic (Jourjon and Symoneaux, 2014). However, in order to be an effective tool, it needs to be adapted to the consumer sector. In fact, the perception of the impact of environmental issues on health varies depending on consumers' segment. In this context, a consumer may choose a wine for its environmental aspects because of its health impact. According to a study on the willingness to pay for a wine produced as environmental friendly farming in France made by the INRA in Paris (INRA, 2008), it could be interesting to see

the evolution from then, the differences between the countries and if it is linked to healthy aspects. (Bazoche et al., 2008; D'Souza et al., 2006).

In every country, multiple labels exist. This study shows that some of them can be seen not just as a product good for the environment but also for health. The relation between those two aspects, the category of environmental labels and the willingness to pay for them are phenomena very related and in constant evolution. These characteristics explain the interest of various studies in order to respond to marketing goals.

Finally, the subdivision of respondents by high/low involvement (with wine and environment) used in this paper allowed to categorize and differentiate consumers. Indeed, this method shows consumers' interest for specific questions such as the impact of the environmental label on the perception of the link between wine and health.

5. Conclusions

To present objectively the results, it is necessary to take into consideration several important limitations of the current research. First, the three samples have quite different size; France (795), Italy (238) and Spain (150). Moreover, the three samples are all non-probability samples and thus are not strictly representative of the respective national populations. In addition, in the Spanish sample there is an overrepresentation of individuals highly involved in wine (79%) that further limits the overall validity of our findings.

Furthermore, the survey collected responses also from non-consumers of wine and the reasons of no consumption. However, in France, this category represented 3.5% of the final sample, in Italy 5% and in Spain 2%. Therefore, these figures do not mimic the real market scenarios of the investigated countries (were a much larger share of population is non-consumer) and leads to conclude that our sample suffers of a self-selection bias (Berk, 1983).

While this study uncovers some insights about consumers' perceptions on the health benefits of wine, future research is needed to understand the complex relationship fully, and qualitative research could be helpful to know if other factors beyond the ones studied here are actually considered by consumers. Further developments of current research would extend data collection in other European countries including non-producing ones. It could also be interesting to focus on different media (internet, TV, radio, etc...) and the level of consumers' awareness of the national laws related to wine consumption. Further developments of the present research should also combine current data with consumers' health status; these outcomes could be extremely valuable in further understanding the relationship between existing health conditions and the perception of wine effects on health.

Conflicts of interest

The authors declare no conflict of interest.

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