CENTENARY OF THE OIV
45th WORLD CONGRESS OF VINE AND WINE
14-18 OCTOBER 2024 FRANCE-DIJON
OIV

Available on IVES Conference Series vine & wine

DOI : https://doi.org/10.58233/LFxSHO0o

The impact of nutrition label formats on wine consumer preferences

Hioranna Arancibia[1], Maher Georges Elmashhara[2] and Susana C. Silva[1,3]

[1] Católica Porto Business School, Porto, Portugal
[2] Manchester Metropolitan University Business School, Manchester, UK
[3] CEGE – Research Centre in Management and Economics

Abstract. Recent regulations regarding alcoholic beverages have caused producers to alter the labels of their products to include nutritional information. Moreover, for the first time, QR codes containing this information (e-labels) are being used on wine labels. This research aims to investigate consumers' perceptions of wine back labels regarding the different formats in which the nutritional information can be provided. To test the proposed model, an experimental study, a series of independent-sample t-tests, and a Hayes PROCESS Model 7 analysis were conducted. The findings indicate that nutritional information on the back label is preferred by consumers. However, e-labels are perceived as having a superior design. When considering consumer health awareness, the results indicate that the perception of labels on satisfaction via label attractiveness is moderated by health consciousness. Based on our findings, we advocate for the adoption of e-labels containing information within QR codes, particularly when assessing attitudes towards label design.

1. Introduction

Food and beverage labels are the first point of contact with the consumer [1], and influence purchasing decisions at the point of sale [2]. Research carried out on European consumers showed that food labels are one of the most used and trusted sources of information [3]. Wine labelling is even more significant because of the extensive variety of available labels. Selecting a wine is a complex experience compared to choosing other products, because sensory and quality characteristics are typically assessed post-consumption [4-5] and several factors can be considered in the decision-making process.

Recent regulations regarding alcoholic beverages have caused producers to alter the labels of their products to include nutritional information. The goal is to provide information that will help consumers maintain healthy dietary practices [6] and protect consumers' interests [7]. Consumers generally perceive wine as a "healthy" alcoholic beverage [8-10]. However, including nutritional information on labels might change the consumers' perceptions of the product [11] and might have implications for the sector [12], making it important to understand the potential implications.

The European Union (EU) mandatory regulation 2021/2117 established by the European Commission (EC) requires the incorporation of nutritional declarations and a list of ingredients of the product on the back label of alcoholic beverages. In 2021, in response to this legislation, the Comité Européen des Entreprises Vins (CEEV) requested the use of an electronic label (e-labels) [11] with a QR code containing the information required, a proposal that was accepted by the EC. Thus, this content can be provided either on the label or through electronic support [13]. While there is a great deal of research on labels, the information available to predict how consumers would respond to the digital label is limited.

This research aims to investigate consumers' perception of wine labels regarding the different formats in which nutritional information can be provided. It will examine the impact of these new label elements on consumers' perception, especially regarding label attractiveness, brand personality, attitude (cognitive and design clarity), and satisfaction with the label. Moreover, the research will explore any potential moderating effects on consumer health consciousness. To do this, the original label (the one used before the regulation was implemented) with a wine nutritional label (current display format used in food packages), and an e-label (with a QR code), will be contrasted to ascertain which is the consumers' preferred format. The managerial objective of this study is to offer actionable recommendations on effectively designing wine labels.

For this purpose, an experimental study with three different conditions was conducted, involving 221 participants who responded to a survey on consumers' preferences in terms of wine labels. The results confirmed that consumers prefer a nutritional information format, and that health consciousness has a moderating effect when considering the path from wine label to satisfaction via label attractiveness.

2. Literature review and research model

2.1. QR code and consumer perception towards it on wine labels

Product labels represent an important element in communicating attributes that influence consumers [2,14-15]. In this context, wine label designs are one of the first stimuli that consumers encounter when purchasing a bottle, serving as a differentiating element that evokes interest [4, 15-16]. Furthermore, wine label designs influence consumers' choices [4, 16] and elements on it serve as important sources of information [17], which affect consumer responses [14-15]. Thus, visual elements on the wine label [18-19] together with their positioning and fluidity on the label, are critical at the moment of evaluation [1] since these elements evoke sensations in consumers' minds that have an impact on their perceptions [4, 20] and their preferences [1]. However, despite being one of the most profitable and direct sources of communication at the point of sale for producers [5], wine labels are considered an underused area to provide information [4] and for guiding consumers' choices amongst alternatives [21]. Furthermore, the space available for labelling is relatively small and restricted by legal regulations [22]. Therefore, designers must use this space wisely.

From a consumer's perspective, it is stated that [23], generally, the basic product information provided on the label is not adequate for consumers to make a purchasing decision and may be confusing [24]. Thus, some consumers may require more detailed information that is not available on the label, making QR codes an innovative solution [24] for product label communications with consumers. Invented in 1994 in Japan [24-25], this two-dimensional digital image can be easily scanned [26] and it can store a substantial amount of information [25, 27], including URLs to websites for further or relevant information [25, 28-29].

In marketing, QR codes have become a cost-effective communication technology for interacting with consumers [8, 30]. Moreover, QR codes can be particularly convenient for marketing purposes by providing timely product information given their ability to reach consumers when and where they are willing to buy [28]. Furthermore, the application of this smart packaging [31] to wine labels, known as digital labelling (e-label) [11], contributes to the experience of buying a bottle [8]. As previous works have indicated [25, 28, 31], QR codes allow wine producers to provide more detailed information about the product as a natural extension of the label [25]. Thereby, this compact element avoids drastic alterations in the appearance of the label [11] considering the value of the space in wine labels, QR codes increase opportunities for innovation in the design of these labels by increasing the available space [25]. Furthermore, in an international scenario, e-labels offer translation into several different languages [25], allowing consumers to translate the website according to their preferences [29], becoming thus an essential tool for specific market requirements at the international level [25] and in the EU.

Due to consumer trends and new regulations within the industry, more recent studies have also investigated alterations of information on wine labels regarding ingredients and nutritional information, and this label matter is considered to be a key part of the label [4, 32-33]. However, the literature reveals contradictory responses from consumers about this content [5, 9, 11, 34]. Moreover, when taking into account QR codes containing this information instead of having that content visible on the label, which is accepted under the current regulation in the case of wines, consumers behaviour towards the use of these digital labels is uncertain. Research carried out to date offers results that limit the prediction of consumer responses regarding alternatives to wine label design and how the information is provided.

2.2. Outcomes of wine labels

2.2.1. Attractiveness

Consumers are drawn to products they find attractive [35-36]. This attractiveness is based on visual signals that are easy to process from the elements of the object under analysis [37-38]. Additionally, since consumers cannot try the product before purchasing it, the visual appearance of the label assumes a key role in their decision-making by providing elements and information about the product that are aesthetically pleasing [36] and valuable [15, 38], and attract their attention [39] long enough to entice them to prefer and remember this label [40].

Research also has shown that simple and symmetrical (harmonious) designs are easier to evaluate, thus generating higher positive evaluations of attractiveness [38-39]. Regarding wine label design, it was demonstrated that in the case of Bordeaux wines, atypical labels had a positive effect on aesthetics [15]. However, while a wine bottle's design can be a strong predictor of wine choice [21, 40], the role of design and visual elements of wine labels regarding attractiveness have been little considered and are still ambiguous [38].

Following this discussion, and considering the recently implemented labelling regulations, the first research question is:

RQ1. Which brand label type (nutritional label vs. e-label) produces higher levels of perceived attractiveness?

2.2.2. Brand personality

Often Brand Personality is defined as "the set of human characteristics associated with a brand" [41], this implies

consumers will have a response toward the branded product such as product preference [42]. In turn, brand personality evokes emotional associations towards brands from consumers [14, 41], which has relevant implications for consumer behaviour. Brand personality is created from a variety of marketing variables, among which are product packaging [41] and its label's visual elements [14, 22]. Given the great effect that brand personality has in the field of marketing, it is considered a key form of brand differentiation for consumers within product categories [41].

In the case of wine, consumers select those that coincide with their own values [22] and therefore influence how the brand is perceived [14]. It was argued that it is possible to predict successful label design for product extensions using the brand personality that was generated by consumers [14, 41]. However, the label space is relatively small and limited by legislative requirements [22], reducing options for marketers to develop brand personality strategies. For this reason, according to what was been discussed and considering the current context, the second research question is:

RQ2. Which brand label type (nutritional label vs. e-label) produces higher levels of perceived brand personality?

2.2.3. Attitude towards wine labels

Despite the existence of different approaches to the concept of attitude [32], attitude is considered to be an evaluative response [32, 43] to an object, activated by a stimulus that the consumer has a favourable or unfavourable tendency toward [32, 44]. Then, from a marketing perspective, attitudes may reveal consumers' preferences. It can be stated that the attitude of consumers can predict their behaviour when faced with a stimulus related to the product [43-45]. Particularly in wine labels, attitudes toward nutritional information can affect consumer attitudes toward wine [46]. However, attitudes towards the object under evaluation can be altered when there is new information (stimulus) [32] placed on it.

Furthermore, previous research has found that products are evaluated more positively when they contain nutritional symbols [47] or limited information [9-10] on the front of the label with a longer and more objective nutritional panel [48] on the back [49]. Other authors, however, found negative effects when there is an excess of information, when customers are unable to decode [3, 48, 50-51] or interpret the nutritional information [52] which provokes confusion in the consumer [4, 9, 11].

For that reason, the label design, together with the format [1], location [52] and value of its content [35] have become fundamental aspects for understanding consumer attitudes in the area of marketing. Following this discussion, and considering the newly implemented labelling regulations, the third and fourth research questions are as follows:

- RQ3. Which brand label type (nutritional label vs. e-label) produces higher levels of cognitive attitude?
- RQ4. Which brand label type (nutritional label vs. e-label) produces higher levels of design clarity attitude regarding the label?

2.2.4. Satisfaction with wine labels

Satisfaction is a highly studied concept in the field of consumer behaviour [53]. Satisfaction represents an evaluation of the product's ability to meet the consumer's needs and expectations when the consumer analyses a product in the purchase process, producing a pleasurable state [53-54], and stating an opinion about it [55].

When considering product labels, they can generate desires and emotions that satisfy consumers [55]. Thus, the opinion that the consumer has regarding the information available about the product through the label can generate a state of satisfaction in him or her [55-56]. Furthermore, this satisfaction can affect consumer preferences [48].

Regarding this relationship in wine labels, it is also possible to recognize the relevance of consumer satisfaction regarding visual signals on this product packaging. For instance, icons on wine labels had a decisive impact on consumer preferences and a positive relation with aesthetic satisfaction [1]. Thus, given the importance of consumers' satisfaction towards wine labels and considering the current context, the fifth research question is:

RQ5. Which brand label type (nutritional label vs. e-label) produces higher levels of satisfaction?

2.3. The moderating role of health consciousness

The growing awareness among consumers regarding nutrition has led them to evaluate their lifestyles [11,33] and the majority of health-conscious consumers reported reading nutritional labels [9, 46, 50]. Additionally, those who are more interested in health want nutritional content visible on the products they consume [9, 34, 50].

Furthermore, the consumer's awareness of the food-health relationship positively affects the probability that they pay attention to this content [9, 47, 50, 52]. However, while there is a great deal of evidence that nutritional information affects consumer choices, the effects of nutritional information on wine labels are less clear.

Some researchers argue that wine consumers' behaviour is expected to be different regarding wine labelling, as wine is not considered a regular product [10] and it is considered "healthy" among alcoholic beverages [8-9, 11]. Yet, health-conscious people tend to pay more attention to the nutritional information on wine labels [46]. Furthermore, those who are already aware of the nutritional properties and health benefits of wine prefer a more detailed nutritional label [9, 46]. Based on that, it is relevant to investigate whether health consciousness plays any moderating role in the relationships between brand labels and the studied outcomes.

RQ6. Does health consciousness moderate the effect of wine labels on the studied outcomes?

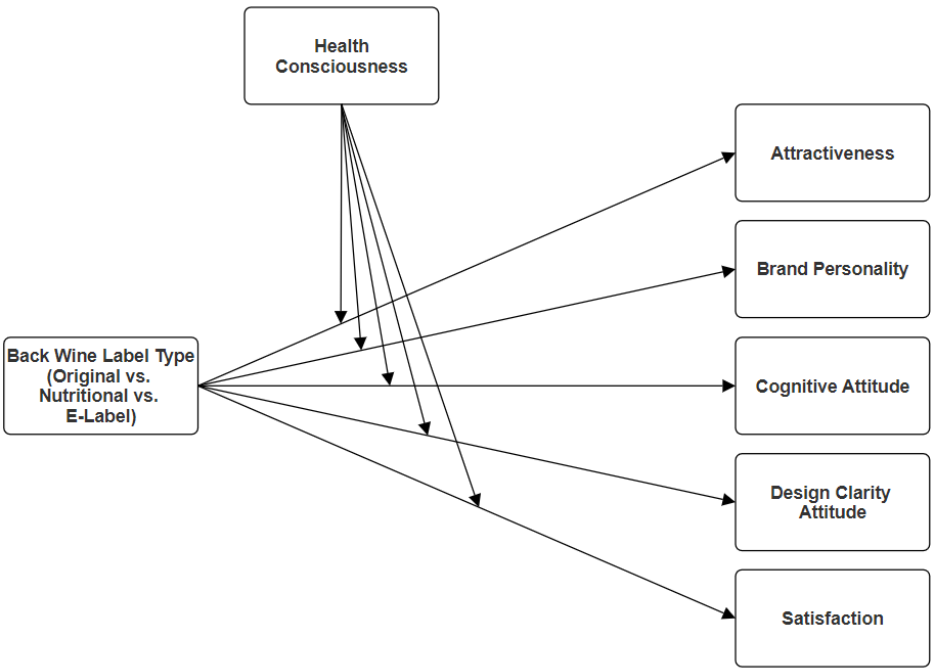

Figure 1. Research Model.

3. Method

3.1. Research design

This study adopts a single-factor experimental design, with the objective of testing the proposed research questions. Considering the different labels being studied three conditions were considered (original label as the control label, nutritional label, e-label). The differences are as follows: the original label is the one used before the regulation was applied (Figure 2), the nutritional label contains the nutritional declaration and product ingredients (Figure 3), and the e-label has the QR code (Figure 4) for accessing the nutritional information stored online.

Figure 2. Condition 1: original label (used as control condition).

Figure 3. Condition 2: nutritional label.

Figure 4. Condition 3: e-label.

3.2. Data collection

Primary data was collected through self-administered questionnaires in English. To gather information from participants, convenience sampling was used. The participants were randomly assigned to one of the three experimental conditions, and a single-blind procedure was used.

Participants were shown a wine back label of Burmester Port Wine, only one of the three labels, and they were asked to answer a series of questions. The questionnaire administered included: first, questions related to the focal constructors (attractiveness, brand personality, cognitive attitude, design clarity attitude, satisfaction), then questions regarding the moderator (health consciousness), and a final section with a few demographic questions, including a minimum age filter question. Because the minimum age for purchasing alcohol in Portugal is 18, responses from people under the minimum age were not considered. To assess the model proposed, SPSS software was used to analyse the data collected.

3.3. Measures

A range of scales from previous literature were adapted to measure the studied variables. Attractiveness was measured using the scale developed by Ohanian (1990) [57], while brand personality was measured with the Venable et al. (2005) [58] scale. Moreover, Stafford et al. (2002) [59] and Bart et al. (2005) [60] were implemented to measure attitude (cognitive and design clarity respectively). The satisfaction scale used was by Crosby and Stephens (1987) [61]. Lastly, health consciousness was measured using the Gould (1990) [62] scale.

The responses for attractiveness and satisfaction were recorded on a seven-point semantic differential scale (for example: 1 = “unlikely”; 7 = “likely”), while the responses for the rest of the constructs were recorded using a seven-point Likert scale (1 = “strongly disagree”; 7 = “strongly agree”).

4. Results

4.1. Sample characteristics

A total of 221 respondents completed the survey, with a mean age of 44.72 years, and the 57.5% were women (127 respondents). Condition 1 (original label) was processed with 73 responses, while conditions 2 (nutritional label) and 3 (e-label) included 74 responses each.

4.2. Assessment of the measurement model

A reliability analysis was conducted on the questionnaire items. Cronbach’s alpha values exceeded the recommended threshold of 0.70 for all the constructs [63], composite reliability scores ranged from 0.889 to 0.963, and composite reliability scores ranged from 0.931 to 0.972 providing evidence for the internal reliability of each scale. Furthermore, convergent validity is also confirmed by the Average Variance Extracted (AVE) of each latent construct exceeding the minimum cut-off of 0.5 [64] (Table 1).

Table 1. Constructs, Measures, Item loading, Cronbach's alpha, AVE, and Composite reliability.

	Factor	Item loading	Cronbach's alpha	AVE	Composite reliability
ATR	***Attractiveness***		0.889	0.819	0.931
	I think this label is:				
ATR 01:	Unattractive - Attractive	0.890			
ATR 02:	Ugly - Beautiful	0.928			
ATR 03:	Plain - Elegant	0.897			
BPR	***Brand Personality***		0.963	0.873	0.972
	I think the brand by using this label is:				
BPR 01:	Honest	0.926			
BPR 02:	Reputable	0.955			
BPR 03:	Reliable	0.952			
BPR 04:	Positive influence	0.938			
BPR 05:	Committed	0.899			
ATC	***Attitude (Cognitive)***		0.932	0.788	0.949
	The label is:				
ATC 01:	Informative	0.795			
ATC 02:	Well-designed	0.925			
ATC 03:	Easy-to-follow	0.932			
ATC 04:	Attention-getting	0.891			
ATC 05:	Clear	0.890			
ATD	***Attitude (Design Clarity)***		0.905	0.844	0.942
	Rate the following:				
ATD 01:	Overall layout of the label is clear	0.943			
ATD 02:	The process for browsing information is clear	0.946			
ATD 03:	The label is visually appealing	0.865			
STF	***Satisfaction***		0.917	0.859	0.948
	If you are checking the label before buying a bottle of wine,				
	please indicate how satisfied you would be with this label design:				
STF 01:	Dissatisfied - Satisfied	0.928			
	please indicate how pleased you would be with this label design:				
STF 02:	Displeased - Pleased	0.957			
	please indicate your level of favourability toward this label design:				
STF 03:	Unfavourable - Favourable	0.895			
HCN	***Health Consciousness***		0.954	0.880	0.967
	Please rate the following statements:				
HCN 01:	I reflect about my health a lot	0.927			
HCN 02:	I am very self-conscious about my health	0.951			
HCN 03:	I am usually aware of my health	0.923			
HCN 04:	I am very involved with my health	0.950			

4.3. Assessment of the proposed research questions

To analyse the research questions, a series of independent-sample t-tests were conducted. Furthermore, this study used specific statistic models, particularly model 7 of the SPSS Hayes PROCESS to evaluate the moderation-mediation effect, developed by Hayes (2018) [65], and it was run using 5000 bootstrap samples.

Regarding RQ1, the results showed that in the case of Label 0 (original label), attractiveness scored significantly lower (M = 3.73, SD = 1.20) than Label 1 (M = 4.13, SD = 1.42), the nutritional label, t (145) = -1.85, $p < 0.05$. Concerning RQ2, brand personality, Label 0 scored significantly lower (M = 4.61, SD = 1.29) than Label 1 (M = 5.02, SD = 1.53), t (145) = -1.74, $p < 0.05$.

When comparing Label 0 with Label 2 (with a QR code) with respect to RQ1, a significant difference in the level of attractiveness was found t (145) = -2.41, $p < 0.05$, where Label 0 scored lower attractiveness (M = 3.73, SD = 1.20) than Label 2 (M = 4.20, SD = 1.16). On the contrary, for RQ2, even though Label 0 scored lower brand personality (M = 4.61, SD = 1.29) than Label 2 (M = 4.81, SD = 1.37) the results were non-significant, at t (145) = -0.93, p = 0.176.

For Label 1 and Label 2 concerning RQ1 and RQ2, differences in terms of attractiveness t (146) = -0.31, p = 0.376, and brand personality t (146) = -0.84, p = 0.199, were not significantly proven. Label 1 showed a lower score (M = 4.13, SD = 1.42) than Label 2 (M = 4.20, SD = 1.16) in terms of attractiveness, and it scored a higher brand personality (M = 5.02, SD = 1.53) than Label 2 (M = 4.81, SD = 1.37).

Hence, regarding RQ1, the results show that the original label is “less attractive” than the nutritional label and the e-label. However, a preference of label attractiveness when the nutritional label and the label with the QR code were compared was not found. Regarding RQ2, the results only revealed that the traditional nutritional format has a “higher brand personality” than the original label. When contrasting the QR-enabled label with the control label and nutritional label, no preference regarding brand personality was found.

Now, in terms of the RQ3 (cognitive attitude), RQ4 (design clarity attitude), and RQ5 (label satisfaction), comparing Label 0 and Label 1, the results showed that Label 0 scored lower satisfaction (M = 4.81, SD = 1.19) than Label 1 (M = 5.32, SD = 1.15) with a significance of t (145) = -2.61, $p < 0.05$. Although, in terms of attitude, cognitive and design clarity were non-significant. Label 0 scored almost equally (M = 4.40, SD = 1.41) to Label 1 (M = 4.40, SD = 1.64), t (145) = 0.0, p = 0.500 and Label 0 scored higher (M = 4.41, SD = 1.43) than Label 1 (M = 4.23, SD = 1.73), t (145) = 0.67, p = 0.25, respectively.

Concerning Label 0 compared with Label 2 regarding RQ5, Label 0 had a significantly lower satisfaction score (M = 4.81, SD = 1.19) than Label 2 (M = 5.14, SD = 1.21), t (145) = -1.64, $p < 0.05$. But, in terms of RQ3 and RQ4, cognitive and design clarity attitude respectively, both results were non-significant. Label 0 scored lower (M = 4.40, SD = 1.41) than Label 2 (M = 4.67, SD = 1.41), t (145) = -1.19, p = 0.118 and Label 0 scored lower (M = 4.41, SD = 1.43) than Label 2 (M = 4.69, SD = 1.39), t (145) = -1.23, p = 0.110.

Then, comparing Label 1 and Label 2 concerning RQ4, a significant difference was found regarding design clarity attitude t (146) = -1.79, $p < 0.05$, where Label 1 scored lower (M = 4.23, SD = 1.73) than Label 2 (M = 4.69, SD = 1.39). However, in respect to RQ3 and RQ5, Label 1 scored lower in cognitive attitude (M = 4.40, SD = 1.64) than Label 2 (M = 4.67, SD = 1.41), but this was non-significant, t (146) = -1.10, p = 0.136, and Label 1 reported a non-significant t (146) = -0.92, p = 0.179 higher score (M = 5.32, SD = 1.15) than Label 2 (M = 5.14, SD = 1.21) regarding satisfaction, respectively.

Thus, regarding RQ3, the findings showed that there is no preference between the labels in terms of cognitive attitude. However, in terms of RQ4, it was supported by the results that the nutritional label is “less clear in terms of design” (attitude design clarity) than the e-label, yet no other influences were found when the control label was compared with the other two labels. Furthermore, concerning RQ5, even though when comparing the traditional nutritional format and the QR-enabled label non-preferences were found in terms of satisfaction, the results showed that these two labels evoke “more satisfaction" than the original label.

Lastly, concerning the final research question (RQ6), the moderating and the moderating-mediating effect of health consciousness was examined using Hayes' PROCESS models 1 and 7 in SPSS, while considering all previously investigated relationships. Among all the results, only one significant moderating role of health consciousness was identified. This factor was found to moderate the impact of labelling on satisfaction through attractiveness b=0.0247, 95%, CI[0.0537,0.1037]. These results specifically indicate that when customers have lower levels of health consciousness (M = 3.5), the studied path is not significant; b=0.0847, 95%, CI[-0.0902,0.2530]. However, when considering customers with higher levels of health consciousness (M = 6.5), the effect of labelling on satisfaction via attractiveness becomes significant; b=0.1587, 95%, CI[0.0156,0.3000]. Therefore, regarding RQ6, as health consciousness is higher, it moderates the effect of wine label satisfaction throughout the attractiveness of the label.

5. Discussion and conclusions

5.1. Discussion

The study found that when comparing the original label and the nutritional label, participants scored the nutritional label higher in terms of attractiveness, brand personality, and satisfaction. When comparing the original label and the e-label, the latter was viewed as more attractive and considered more satisfying in terms of design.

Interestingly, the findings regarding cognitive attitude were not significant.

From this, it can be inferred that consumers have a positive perception of labels when more information is provided [66]. Furthermore, these conclusions contribute to previous studies that found that consumers value ingredient lists and nutritional information on the products they consume [10, 48, 50]. Moreover, the results are in line with the positive relation between the inclusion of information as icons on wine labels and aesthetic satisfaction found in previous research [1].

However, e-labels were preferred when the attitude towards design clarity was evaluated, with consumers finding the label with the QR code to have a clearer design than the nutritional label. These results may be explained thusly, while information provided as a nutritional label is more accessible, without any additional action from the consumer's side [30], the design of the information displayed is not visually appealing [1] or understandable [9, 11]. This suggests that there are problems with the content design on wine back labels, particularly nutrition information, therefore digital labels could be a solution.

When considering consumer health awareness in this study, the results indicate that the perception of labels on satisfaction via attractiveness is moderated by health consciousness. Greater health consciousness correlates with the increased significance of label design. Specifically, high levels of health consciousness led to a significant effect of labelling on satisfaction via attractiveness. Conversely, for individuals with lower levels of health consciousness, this pathway was found to be insignificant. In this sense, a possible consideration for these results is that consumers who are more aware of their health, tend to pay more attention to the information on the label [9]. Therefore, consumers perceive these stimuli present on the label as more attractive which is in line with previous findings [35], and thus provoking more satisfaction when purchasing. One possible reason for this last consumer behaviour could be explained by prior findings that stated that nutritional information on labels helps consumers to choose healthier options [6]. Thus, health-conscious consumers feel that their evaluation of the content on the label better satisfies their needs [53-54].

5.2. Theoretical contributions

The outcomes of the present study make a theoretical contribution to marketing and consumer research literature by examining the impact of wine label design on consumer behavioural responses.

Firstly, the study identifies distinct effects of various presentations of nutritional information in wine labels on four key consumer behaviour outcomes: perceived attractiveness, brand personality, design clarity attitude, and satisfaction. Consequently, it underscores the importance of these behavioural responses in the design of product labels, particularly wine labels. Additionally, the study adds to the body of theory by suggesting that cognitive attitude does not significantly influence consumers' perceptions of additional content on wine back labels. Lastly, the current study highlights the moderating role of health consciousness in the relationship between labelling and satisfaction through attractiveness.

5.3. Managerial implications

This research offers practical insights to wine producers on label design and marketing regarding current labelling challenges and opportunities the new law presents. First, consumers preferred wine labels with nutritional information (both, the e-label, and the nutritional label) over the label that did not include this information (control label). The requirement to redesign wine labels presents an opportunity for marketers to gain a competitive advantage by incorporating this information into more attractive designs, thereby enhancing consumer satisfaction.

When considering health consciousness, wine companies should inform consumers about this content (regardless of format) since consumers prefer more information as they become more aware of their health.

Additionally, this study provides guidance for conveying nutritional information on the back label. The recommendation is to use the e-label since it is preferred by consumers because they pay special attention to aspects of clarity, understanding, and layout of information provided, affecting their attitude positively.

5.4. Limitations and future research

This study is subjected to several limitations that can offer potential avenues for future research. First, additional interpretations of the law were published on November 24, 2023, by the EC, through a Q&A document, which clarifies certain parameters of the law. For example, the use of symbols such as an "i" in the QR code is not sufficient to fulfil the requirements of identification of the content. For this reason, the QR codes must include another reference such as those used for foods (i.e., containing the word 'ingredients'). This was not considered in the study because the surveys were conducted before that date, therefore it is recommended that future research consider the latest clarifications of the law by the EC.

Additionally, although the mandatory content on wine labels is regulated on issues such as size, it differs in the content language between countries. This study only considered the nutritional label content in Portuguese, French, and English. Still, it is recommended to extend the research to other languages in the EU, where the regulation also applies. Furthermore, the label used in the experiment corresponded to a Port Wine, which has different levels of sugar and alcohol than a table wine (such as a Vinho Verde, also Portuguese, or Bordeaux red wine). Thus, it is recommended to investigate this subject with other types of wines.

Moreover, our study does not have segmentation in terms of age or product involvement. For this reason, it is recommended to delve deeper into this topic, to evaluate

whether there are differences in consumer perceptions when such factors are considered.

Finally, the surveys were conducted precisely before the law came into force, hence consumers were not yet accustomed to seeing nutritional information on wine labels. Thus, it would be relevant to confirm these results when consumers are familiar with wine nutritional information.

6. References

1. E. Barbierato, D. Berti, S. Ranfagni, L. Hernández-Álvarez, I. Bernetti, Int. J. Wine Bus. Res., **35**, 365-389 (2023)
2. M. Orlowski, S. Lefebvre, R.M. Back, J. Retail. Consum. Serv., **69** (2022)
3. M.D. Vaz De Almeida, P. Graça, R. Lappalainen, Eur. J. Clin. Nutr., **51**, s3-s7 (1997)
4. N. Barber, B.A. Almanza, J.R. Donovan, Int. J. Wine Mark., **18**, 218–232 (2006)
5. S. Mueller, L. Lockshin, Y. Saltman, J. Blanford, Food Qual. Prefer., **21**, 22-32 (2010)
6. S.K. Balasubramanian, C. Cole, J. Mark., **66**, 112-127 (2002)
7. European Commission, *Report from the Commission to the European Parliament and the Council Regarding the Mandatory Labeling of the List of Ingredients and the Nutrition Declaration of Alcoholic Beverages* **58** (Official J. E.U., 2017)
8. L.M. Higgins, M. McGarry Wolf, M.J. Wolf, Wine Econ. Policy, **3**, 19-27 (2014)
9. T.M. Lease, D. Sommerlad-Rogers, Wine Econ. Policy, **11**, 41-50 (2022)
10. E. Pabst, G. Szolnoki, S. Mueller Loose, Wine Econ. Policy, **8**, 5-15 (2019)
11. D. Popovich, N. Velikova, J. Consum. Mark., **40** (2023)
12. E. Pabst, G. Szolnoki, S. Mueller Loose, Wine Econ. Policy, **8**, 103-113 (2019)
13. E. Pomarici, R. Sardone, Wine Econ. Policy, **11**, 75-82 (2022)
14. C.A. Boudreaux, S.E. Palmer, Int. J. Wine Bus. Res., **19**, 170-186 (2007)
15. R. Lunardo, B. Rickard, Br. Food J., **122**, 2603-2619 (2020)
16. S. Charters, L. Lockshin, T. Unwin, Int. J. Phytoremediat., **21**, 183-195 (1999)
17. P. Combris, S. Lecocq, M. Visser, Econ. J., **107**, 390-402 (1997)
18. E. Lick, B. König, M.R. Kpossa, V. Buller, J. Retail. Consum. Serv., **37**, 146-158 (2017)
19. R. Lunardo, F. Livat, Int. J. Entrep. Small Bus., **29** (2016)
20. J.-É. Pelet, F. Durrieu, E. Lick, J.-E. Pelet, F. Durrieu, J. Retail. Consum. Serv., **55** (2020)
21. A. Thomas, G. Pickering, Int. J. Wine Mark., **15**, 58-74 (2003)
22. S. Elliot, J.E. Barth, J. Prod. Brand Manag., **21**, 183-191 (2012)
23. N.E. Mastorakis, V. Mladenov, WSEAS, Adv. Data Netw. Commun. Comput., *9th WSEAS Int. Conf. Data Netw. Commun. Comput.*114-118 (2010)
24. S. Lau, M. Wiedmann, A. Adalja, J. D. S. Comm. **3**, 393-397 (2014)
25. T. Brabazon, M. Winter, B. Gandy, *Springer Briefs in Business : Digital Wine How QR Codes Facilitate New Markets for Small Wine Industries* (2014).
26. T. Cata, P.S. Patel, T. Sakaguchi, J. Mob. Technol. Knowl. Soc., **2013** (2013)
27. R. Trivedi, T. Teichert, D. Hardeck, Eur. J. Mark., **54**, 145-167 (2020)
28. L. Atkinson, Int. J. Consum. Stud., **37**, 387-393 (2013)
29. E. Ozkaya, H.E. Ozkaya, J. Roxas, F. Bryant, D. Whitson, J. Direct Data Digit. Mark. Pract., **16**, 209-224 (2015)
30. D. Acuti, A. Vocino, V. Mazzoli, R. Donvito, J. Strateg. Mark., **30**, 510-532 (2022)
31. M. Ramšak, *Social Impact of Wine Marketing: The Challenge of Digital Technologies to Regulation* (2022)
32. B. Gawronski, Soc. Cogn., **25**, 573-581 (2007)
33. A. Shine, S. O'Reilly, K. O'Sullivan, Br. Food J., **99**, 283-289 (1997)
34. R. Vecchio, A. Annunziata, A. Mariani, Nutrients, **10** (2018)
35. P. Merdian, P. Piroth, E. Rueger-Muck, G. Raab, Int. J. Wine Bus. Res., **33**, 134-151 (2021)
36. H. Leder, P.P.L. Tinio, I.M. Fuchs, I. Bohrn, Q. J. Exp. Psychol., **63**, 1858-1871 (2010)
37. A. Kirmani, B. Shiv, J. Consum. Psychol., **7**, 25-47 (1998)
38. U.R. Orth, D. Campana, K. Malkewitz, J. Mark. Theory Pract., **18**, 23-40 (2010)
39. R.W. Veryzer, *Psy. Mark.,* **16**, 497-522 (1999)
40. B. Laeng, T. Suegami, S. Aminihajibashi, Int. J. Wine Bus. Res., **28**, 327-348 (2016)
41. J.L. Aaker, J. Mark. Res., **34**, 347-356 (1997)
42. J. Sirgy, *J. Consum. Res.*, **9** (1982)

43. M. Barber, B. Sung, S. Lee, I. Cheah, Int. J. Wine Bus. Res., **33**, 288-311 (2020)
44. M. Fuduric, A. Varga, S. Horvat, V. Skare, *J. Bus. Res.,* **142**, 221-241 (2022)
45. J. Mendelson, J.C. Romano Bergstrom, *LNCS* **8010** (2013)
46. C. Bazzani, R. Capitello, E.C. Ricci, R. Scarpa, D. Begalli, *Nutrients,* **12** (2020)
47. S. Shin, S.H. Park, *J. Consum. Mark.,* **40**, 413-430 (2023)
48. A. Gracia, T. de-Magistris, Food Control, **61**, 39-46 (2016)
49. A. Annunziata, E. Pomarici, R. Vecchio, A. Mariani, *Appetite,* **106**, 58-69 (2016)
50. K.G. Grunert, S. Hieke, H.J. Juhl, *Food Qual. Pref.,* **63**, 107-118 (2018)
51. Z. Pieniak, W. Verbeke, J. Scholderer, K. Brunsø, S.O. Olsen, *Food Qual. Pref.,* **18**, 1050-1063 (2007)
52. A. Annunziata, E. Pomarici, R. Vecchio, A. Mariani, *Nutrients,* **8** (2016)
53. J. Wang, S. Wang, H. Xue, Y. Wang, J. Li, *J. Clean. Prod.*, **181**, 426-436 (2018)
54. R.A. Westbrook, R.L. Oliver, *J. Consum. Res.*, **18**, 84 (1991)
55. A. Dhir, M. Sadiq, S. Talwar, M. Sakashita, P. Kaur, J. Retail. Consum. Serv., **59** (2021)
56. S. Kumar, M. Murphy, S. Talwar, P. Kaur, A. Dhir, J. Retail. Consum. Serv., **60** (2021)
57. R. Ohanian, *J. Adv.*, **19**, 39-52 (1990)
58. B.T. Venable, G.M. Rose, V.D. Bush, F.W. Gilbert, *J. Acad. Mark. Sci.,* **33**, 295-312 (2005)
59. M.R. Stafford, T.F. Stafford, E. Day, *J. Adv.,* **31**, 17-35 (2002)
60. Y. Bart, V. Shankar, F. Sultan, G.L. Urban, *J. Mark.,* **69**, 133-152 (2005)
61. L.A. Crosby, N. Stephens, *J. Mark. Res.*, **24**, 404-411 (1987)
62. S.J. Gould, *Amer. J. Prev. Med.,* **6**, 228-237 (1990)
63. R.G. Netemeyer, W.O. Bearden, S. Sharma, *Scaling procedures: Issues and applications* (Sage publications, 2003)
64. C. Fornell, D.F. Larcker, *J. Mark. Res.*, **18**, 39-50 (1981)
65. A.F. Hayes, *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (Guilford publications, 2018)
66. N. Barber, J. Ismail, D.C. Taylor, J. Wine Res., **18**, 73-85 (2007)