

## **The Use of Sensory Descriptive Analysis to Gain a Better Understanding of Consumer Wine Language.**

Isabelle Lesschaeve, Director, Cool Climate Oenology and Viticulture Institute (CCOVI) at Brock University, St. Catharines, Ontario Canada L2S 3A1. Ph. 1+905 688 5550, Fax. 1+905 688 3104, Email: [ilesschaeve@brocku.ca](mailto:ilesschaeve@brocku.ca)

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### **Abstract:**

Descriptions of wine sensory attributes, generally generated by wine experts, are widely used to guide consumer purchases. They are either displayed on the bottle back label or published in wine magazines or wine guides. Several studies have shown that consumers, when tasting in blind conditions, seldom matched a wine with expert description. This study proposed using sensory descriptive analysis to “translate” consumer descriptors into well-defined sensory attributes to improve communication of wine sensory benefits. Eleven wine connoisseurs, trained in traditional wine tasting, provided a description of the appearances, aromas, and flavours of five Washington State Merlot wines. Forty-one red wine consumers from the great Toronto area participated in two consecutive central location test sessions and tasted each wine sample in blind conditions according to a complete block balanced design. They rated on a 100-point hedonic linear scale how much they liked each wine and provided a short free description about what they liked or disliked. Data analysis showed that connoisseur descriptions failed to explain consumer expressions of likes and dislikes. A descriptive analysis was conducted by a trained sensory panel to determine the sensory attributes perceived as being significantly different between wines. Eight trained panelists, experienced in wine descriptive analysis, participated in six hours of training; sensory measurements were duplicated. A correlation study between sensory descriptive data and consumer free description permitted to interpret consumer multidimensional attribute into actionable mono-dimensional attributes. Results emphasized the high value of sensory data versus connoisseur words to interpret consumer wine language.

### **Introduction**

Wine consumers have rarely the opportunity to taste the wine they are about to purchase in a liquor store or a grocery store. They have to rely on either written comments on the bottle back label, written reviews from renowned wine critics or verbal comments from the store wine expert, if any. Indeed, Thomas and Pickering (2003) surveyed New Zealander wine consumers to explore the importance of several information displayed on wine bottle labels. Their data showed that wine experts opinion, awards and medals were the third most important information (out of 14) consumers looked on a wine label to determine their purchase decision, the first information looked at being the wine company and the brand name. This communication mode assumes that the language written or said by a 3<sup>rd</sup> party will be fully understood by every prospect consumer. Recent studies have shown, however, that experienced wine consumers could not match a wine with its flavour description written by other experts on the back label (Charters, Lochkin, & Unwin, 2000; d’Hauteville, 2003). Needless to comment on inexperienced wine consumers.

Several studies have looked whether this unsuccessful communication between consumers and experts on wine sensory benefits was due to the higher perceptive skills of the wine experts or their higher cognitive abilities. It has been shown by Parr et al. (2004) that wine experts have superior odor recognition memory than novices. Valentin et al. (2003) showed also that wine experts were able to use more accurate descriptions than novices which facilitated their ability to match the appropriate description with the corresponding wine. These data suggest that wine experts have indeed superior ability than novices to discriminate between, recognize and describe different wines, as stated by Hughson et al. (2002). Wine experts tend to use more consistently wine attributes than novices, probably because of a superior olfactory memory performance (Parr et al. 2004); however, superior description abilities of wine experts seem to be

linked to greater wine knowledge rather than superior sensory acuities (Parr et al. 2004; Hughson et al. 2002; Gawel 1997; Lawless 1984) ; wine experts would rely on prototypic description of wine - “I smell gooseberry therefore it is a sauvignon blanc and I *should* also smell grapefruit and boxwood” - instead of relying on their sensory perceptions at the time of the tasting.

This paper investigates the nature of the language used by both experts and consumers. When reading a back label wine description, the consumer may understand all the words used, but may interpret them along his/her personal sensory framework. Our hypothesis is that consumers and experts can use the same words to describe a wine but the sensory perceptions associated to these words are different. In other words, the consumers and the experts may assign the same label to different sensory perceptions or different labels for the same sensory perception.

To address this question, we propose to use a sensory evaluation technique called Descriptive Analysis (DA). DA has been successfully used to characterize wine variatal characters or determine the effects of viticultural or winemaking practices on wine sensory profiles (e.g. Heymann & Noble, 1987; Lesschaeve, 2001). Combined to consumer liking tests, DA contributes to the mapping of consumer preferences and the determination of preference drivers (I. Lesschaeve, Norris, & Lee, 2002).

Descriptive analysis is a two-step procedure: (1) training on the test samples and (2) replicated measurements of sensory attributes. The measurement tool is a trained sensory panel. Panellists would have been recruited based on their sensory acuity, their verbal skills and ability to work within a group (Issanchou et al., 1997). Training enables the panel to get familiarized with the sensory variability among the test samples; they develop an appropriate list of attributes to describe the similarities and differences between the test samples. Training also is used to align the vocabulary among panellists to make sure that when they use one attribute name, it applies to one single perception. Indeed, the properties of each attribute should be mono-dimensional, relevant and descriptive, indeed no hedonic terms are used (Lawless and Heymann, 1998). Measurements of sensory attributes are usually done in triplicates; panelists rate the intensity of the attributes they perceive when smelling or tasting each test sample on a measurement scale (structured or unstructured scale). In both training and measurement steps, samples are presented and tested according to good sensory practices, i.e. blind, in a different order among panelists, and in a control environment. For more information, the reader can refer to Lawless and Heymann (1998)

One can wonder what is the difference between a wine expert and a trained sensory panellist? According to the ASTM(2005), an expert is “a person with extensive experience in a product category who performs perceptual evaluations to draw conclusions about the effects of variations in raw materials, processing, storage, aging, etc. Experts often operate alone.” A trained panellist or an expert assessor is described as “an assessor with a high degree of sensory acuity who has experience in the test procedure and established ability to make consistent and repeatable sensory assessments. An expert assessor functions as a member of a sensory panel.”

The case study presented in this paper was designed to demonstrate how DA could help to a better understanding of wine consumer language and expert language. Implications for product development and marketing strategies are further discussed.

## **Materials and Methods**

### **Wines**

Wine sponsors generously donated five Merlot wines from Washington State. Samples are described in Table 1; they are identified by a code to respect proprietary information that may pertain to each sponsor. Two vintages were included, 1999 and 2000. Retail price per bottle ranged from \$15US to \$ 50 US.

Table 1: Description of the 5 Merlot wine samples from Washington State

Code	Location	Vintage	Price range \$US	Wine spectator score
A	Columbia Valley	1999	25-30	91
B	Columbia Valley, Canoe Ridge	1999	20-25	91
C	Mixed	1999	15-20	88
D	Columbia Valley	1999	15-20	84
E	Walla Walla Valley	2000	40-50	89

In all tasting sessions, 30 ml of wine sample were poured in an ISO tasting glass, coded with 3-digit labels. Serving temperature varied between 20 and 21C. Samples were presented in different order to panelists, to minimize first position bias and carry over effects (Schlich, 1993).

### **Tasting panels:**

#### Consumer Panel:

Forty-one red wine consumers from the great Toronto area (Ontario, Canada) participated in two sessions, organized 3 consecutive days. Demographic information is presented in Table 2. This consumer sample was recruited among relatives of Compusense personnel. It did not intend to represent a specific market segment and was only used to illustrate the proposed methodology to better understand consumer wine language.

For each 1-hour session, consumers were invited to sit at a booth in a sensory evaluation laboratory equipped according to ASTM standards. They were presented wine samples one by one and were asked:

- To rate their overall liking on a linear scale (0: I do not like it at all; 100: I like it very much)
- To describe what characteristics they liked or disliked in the wine. When the score was higher than 70, consumer was prompted by the sensory software to indicate what s/he liked about the wine; when the score was lower than 30, s/he was prompted to indicate what s/he disliked about the wine; when the score was between 30 and 70, consumers were asked to describe both likes and dislikes.

Table 2: Demographic information about the consumer panel.

Gender	
	N (%)
Male	20 (48.8)
Female	21 (51.2)
Age group	
19-20 y.o.	1 (2.4)
21-24 y.o.	2 (4.9)
25-34 y.o.	18 (43.9)
35-44 y.o.	17 (41.5)
45-54 y.o.	1 (2.4)
55-64 y.o.	0
65 +	2 (4.9)
Red wine consumption frequency	
Once a day	3 (7.3)
Several times a week	14 (34.15)
Once a week	14 (34.15)
Several times a month	2 (4.9)
Once a month	8 (19.5)
Several times a year	-
Once a year	-

Data were collected automatically using the sensory software Compusense *five*, version 4.6 (Compusense Inc. Guelph, Ontario, Canada).

#### Wine connoisseurs:

Twelve members of the *Amicale des Sommeliers du Québec (ASQ)*, a Montreal based wine club, participated in the tasting event. They all successfully attended the three wine appreciation courses (24 hours each) offered by the club; moreover, they all received the prestigious title of *Chevaliers* to distinct their commitment to wine evaluation and wine education, which acknowledge their wine expertise.

Chevaliers examined each wine independently. They were informed that the wines were imported from Washington State and that they were all Merlot wines.

Chevaliers evaluated the visual, aroma and flavor attributes of the wines. They described each wine according to the wine appreciation techniques taught at the ASQ and reported their descriptors on a paper questionnaire.

#### Sensory panel:

Eight panelists (7 females; 1 male) from the Compusense trained descriptive panel participated in the study. Panellists are used as a measurement tool and not as a sample representing a specific consumer population. The gender unbalance in that case reflects the fact that more women were selected and trained based on their superior sensory skills.

Panellists had a previous experience in wine sensory evaluation under the supervision of the author. The panel took part in 3 training sessions (2 hours each). The goal was to expose the panel to the array of sensory attributes present in the 5 samples. Panelists were calibrated to use the same descriptor to describe a given sensory perception and to rate the perceived intensity in

accordance. The sensory panel described the wines using a pre-established list of red wine descriptors (Findlay, Castura, Schlich, & Lesschaeve, 2006). Each descriptor was defined by either a definition or a physical standard. Panelists used a list of 88 red wine attributes to describe the aroma and the flavor of the wines. They rated the intensity of the attributes perceived in each wine on a scale (0: not perceived; 100: very intense). Measurements were duplicated.

### **Data analysis**

Only flavour descriptors (taste, retronasal aromas, mouthfeel, and after-taste) were considered in this study.

#### Free description (Consumers and Connoisseurs):

Data were analysed as follow:

- Occurrence of each word was tabulated;
- Similar words were grouped in one same category, e.g.: sour, acidic, tangy, crisp categorized as acidic taste.

#### Sensory panel quantitative description:

An Analysis of Variance (ANOVA) testing wine, panellist, wine x panellist using a mixed model was conducted to determine which descriptors differentiated the wines.

A Principal Component Analysis (PCA) was performed on the means scores of each attribute found significantly between wines (column) and for each wine (row). PCA was calculated on the correlation matrix.

#### Correlation analysis between different descriptor sets

For consumer sets, frequencies of each term were calculated. These data were included as supplementary variables in the PCA run on the mean scores of sensory descriptors found significantly different between wines. Contributions of these variables to the principal components were used to interpret the relationships between consumer descriptors and sensory descriptors. A similar analysis was performed on one hand between connoisseurs and sensory sets.

To highlight any relationships between connoisseurs' attributes and consumers' language, a correspondence analysis (McEwan and Schlich, 1991/2) was conducted, using connoisseurs as active lines and consumers' attributes as supplementary data. All statistical analyses were performed using XLStat 2006 (Addinsoft, France)

## **Results**

### **Wine description by connoisseurs**

Since the Chevaliers followed the same training, we assumed they were using the same vocabulary to describe wine attributes. The frequencies of attributes used are reported on Table 3. It is interesting to note the use of some multidimensional terms such as woody, spicy, or balanced. For 4 attributes, connoisseurs affected a degree of intensity that we coded by a + in the table, from+ to +++.

Wine A was described as moderately acid, low in tannin, and balanced. Connoisseurs tended to disagree on the degree of smoothness of the wine. Wine B was alcoholic, somewhat acid, tannic, and not balanced. Wine C was described as acid, somewhat tannic and smooth; the panel disagreed on the balance of the wine. Wine D was alcoholic, had some notes of red fruits, and was medium acid, low-medium tannic, low-medium smooth; the panel disagreed on the balance

of the wine. Wine E had some torrefaction notes, was high in acid somewhat low in tannins and was qualified balanced.

The interpretation of such data does not rely on statistics and could be misinterpreted when there seems to be disagreement between the panellists.

Table 3: Occurrences of descriptor used by the wine connoisseur panel

Wine	A	B	C	D	E
alcohol	0	4	0	7	0
bitter	0	2	0	0	3
woody	0	3	0	0	0
spicy	2	0	0	3	0
fruity	2	0	0	3	0
red fruits	0	0	0	4	0
thick	0	2	0	0	0
earthy/mushroom	0	0	2	0	2
torrefaction	2	0	3	3	4
acid+	2	4	0	2	1
acid++	6	3	8	8	4
acid+++	3	3	5	2	6
tannin+	8	5	7	6	7
tannin++	3	4	3	3	3
tannin+++	0	3	2	3	2
smooth+	4	5	3	4	4
smooth++	2	3	2	6	3
smooth+++	5	2	6	2	4
balanced +	2	6	5	4	3
balanced ++	0	4	0	0	0
balanced +++	7	1	5	5	8

+: indicates the degree of intensity of the perception, the more +, the more intense

#### **Consumer words associated with consumer high liking scores**

Table 4 reports the occurrence of the descriptors used by consumers to describe what they liked about each wine.

On 18 items, 9 terms (flavourful, woody, not overpowering, smooth, full body, tannin, harsh, drinkable, after-taste) were multidimensional i.e. referred to multiple perceptions. For the purpose of this case study, we assumed that all terms referred to same perceptions, as it is common practice in market research paradigms, although literature supports idiosyncrasies in flavour descriptions by naïve consumers (Cain, 1979).

Consumers, who liked wine A, described it as flavourful, woody, vanilla and peppery note and some noticed it was not bitter or astringent. Wine C was also flavourful and woody, but also fruity and dry. Wine D was flavourful and had an after-taste; it was also woody and fruity. Wine B was smooth, not overpowering. Wine E was smooth and flavourful.

#### **Consumer words associated with consumer low liking scores**

Table 5 reports the occurrence of the descriptors used by consumers to describe what they did not like about each wine (Liking score  $\leq 30$ ).

The most frequently used descriptors were acidic and bitter. Consumers, who did not like wine A, described it as sour and bitter. Wine B has a bad note, strong taste, and strong tannins. Wine C is sour and has a bad note. Wine D is acidic, astringent, and flavourful. Wine E has an after-taste, is heavy, woody was flavourful and had an after-taste; it was also woody and fruity. Wine B was smooth, not overpowering. Wine E was smooth as well.

Table 4: Descriptor occurrences when consumers gave a score higher than 70 on the 100 point hedonic scale, i.e. they liked the wine sample

	A	B	C	D	E
N	12	13	11	9	11
flavourful	4	2	2	3	3
vanilla	1	0	0	0	0
fruity	1	0	1	2	0
woody, oak	2	2	2	3	2
earthy	0	0	0	0	1
peppery	1	0	0	0	0
bitter	1	0	0	0	0
sour, acidic	0	0	0	0	1
taste	0	0	0	0	1
sweet	0	1	0	0	1
not overpowering	0	1	0	0	0
smooth, mellow	3	6	0	0	4
not astringent	1	0	0	0	0
full body	1	2	0	1	2
dry	1	2	1	2	0
less, good tannin/strong	0	2	0	1	0
tannin	0	2	0	1	0
not harsh	0	1	0	0	1
drinkable	0	0	0	0	1
After-taste	0	0	0	5	2

N: number of consumers who gave a score higher than 70 for the corresponding wine.

#### Understanding consumers' language with connoisseurs attributes

Figure 1 displays the first two components of the correspondence analysis conducted on the matrix made of 5 columns (wines) and 39 lines (21 active connoisseurs' attributes, 18 inactive consumers' words to describe liking).

The majority of the consumer words are concentrated in the centre of the map, showing weak correlations with connoisseur words. Only the term "not overpowering" seems linked to the expert "balanced; woody; thick" word. It is interesting to note that consumer "After-taste" (Ataste) tends to be associated with the connoisseurs attributes "Alcohol, red fruits; fruity; and spicy". It is negatively correlated with consumer "smooth; mellow; sweet; not harsh".

A similar correspondence analysis was conducted with the consumer words associated to dislikes (data not shown). As for attributes related to consumer likes, attributes related to consumer dislikes were concentrated in the middle of the map, hardly related to any of the connoisseur words. The term “Bad note” seemed related to the connoisseur words “bitter, woody; earthy and was opposed to “red fruits, alcohol”. The term “Strong taste” seemed related to the connoisseur words “medium balanced; woody; thick”.

Table 5: Descriptors occurrence when consumers gave a score lower than 30 on the 100 pt hedonic scale, i.e. they did not like the wine sample

	A	B	C	D	E
N	4	10	6	7	13
flavourful	0	0	1	1	0
woody, oak	0	0	0	0	1
green, grassy	0	0	0	1	0
bitter	1	2	0	1	2
sour, acidic taste	1	3	3	3	4
not overpowering	0	0	1	0	0
strong taste	0	1	0	0	0
vinegar, fermented	0	1	1	0	0
bad note	0	5	2	0	1
alcohol	0	2	0	0	0
too sharp	0	0	0	1	0
astringent	0	1	0	3	2
thin	0	1	0	0	1
dry	0	3	0	1	1
less, good tannin/strong					
tannin	0	1	0	0	0
heavy	0	0	0	0	1
After-taste	0	0	1	0	3

N: number of consumers who gave a score lower than 30 for the corresponding wine.

In these instances, connoisseur free description of wine attributes failed to explain the likes and dislikes expressed by consumers. Like consumers, connoisseurs tended to use multidimensional words to describe sensory perceptions; moreover, connoisseurs disagreed on some attributes when they assigned rough degrees on intensity. Although connoisseurs went through similar training, they tended to disagree on oenological basic terms such as acid or tannin.

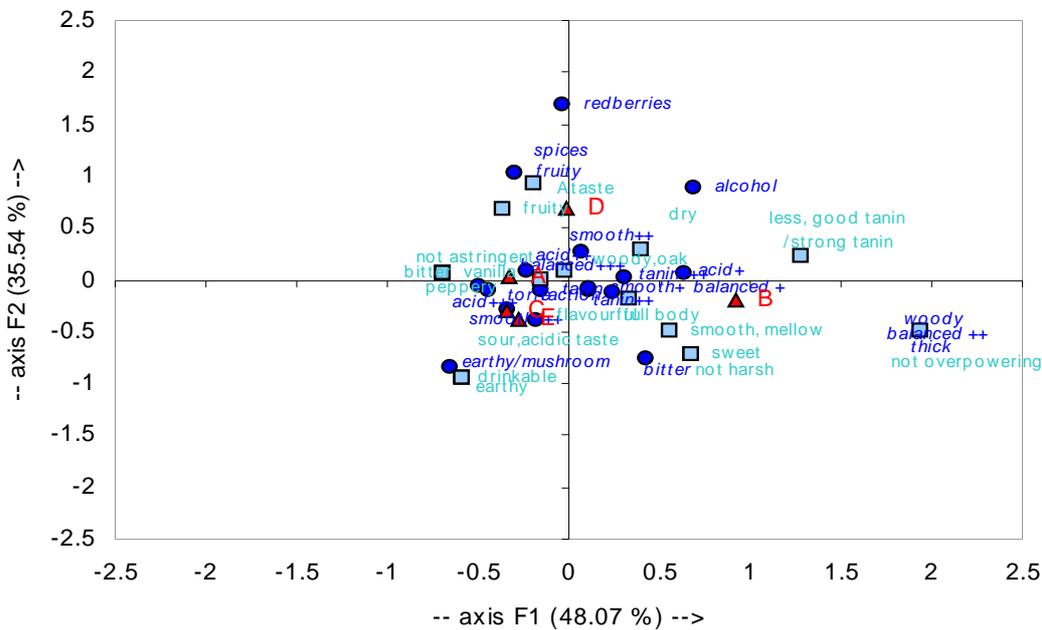


Figure 1: Correspondence analysis plot of the first 2 dimensions showing relationships between all the variables: 21 active connoisseurs' attributes (dark blue, italic font) and 18 consumers attributes associated with liking (light blue, normal font). Wines are displayed with red triangles.

### Description of wine sensory differences by the sensory panel

Contrarily to the other 2 panels, sensory panellists went through training sessions, where they established a descriptive vocabulary for red wines. They refined this vocabulary so that it became relevant to the set of wines studied. Since the descriptive measurements were performed in duplicate, it was possible to determine the level of significance of each attribute to describe the perceptual differences between wines. The descriptors found significantly different between the 5 Merlots by the trained sensory panel were the following:

- Earthy-musty, Vanilla, Sulphur-rubber, Sour/acid ( $p < 0.05$ )
- Astringent, Rose, Sawdust, Light/watery ( $p < 0.10$ )
- Oak barrel, Smoky Burnt, Butterscotch, Pungent, and Grassy ( $p < 0.15$ )

The first plan of the PCA is reported on Figure 2. Sample A is characterized by a butterscotch and vanilla flavour. It has a low intensity in sourness and astringency. Sample D has a similar profile but its mouthfeel was judged lighter. Samples B and C are more sour and astringent than the 3 other wines. Sample E has intense notes of Earthy-musty, sulphur smoky/oak, and burnt.

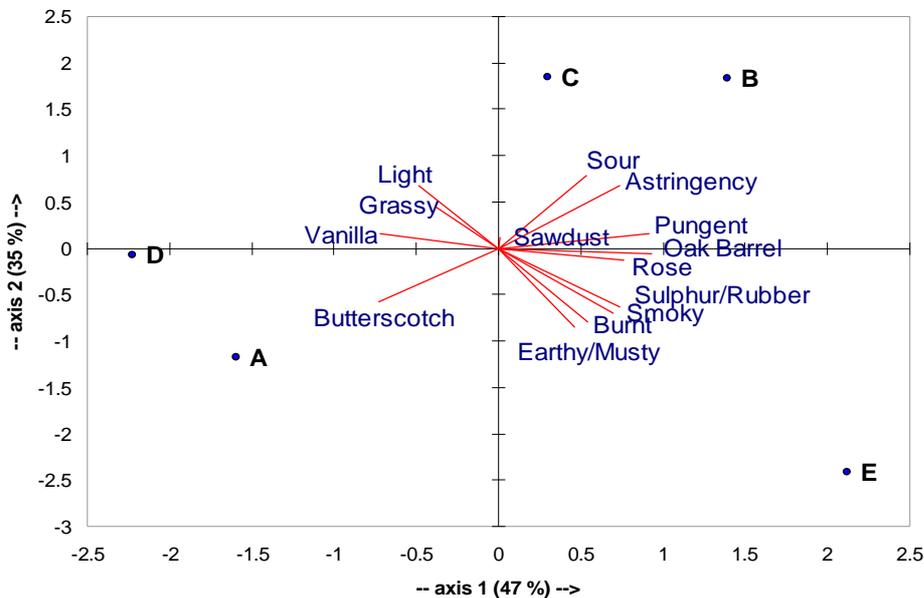


Figure 2: Sensory map: bi-plot representation of the first 2 principal components from the PCA conducted on 5 wines and mean scores of significant sensory attributes. A letter identifies each wine. Each vector points towards the highest perceived intensity of a given descriptor.

**Use of descriptive analysis to translate connoisseurs' and consumers' languages**

To better understand consumer language associated with liking, consumer attributes associated with liking were projected as supplementary variables onto the PCA sensory map.

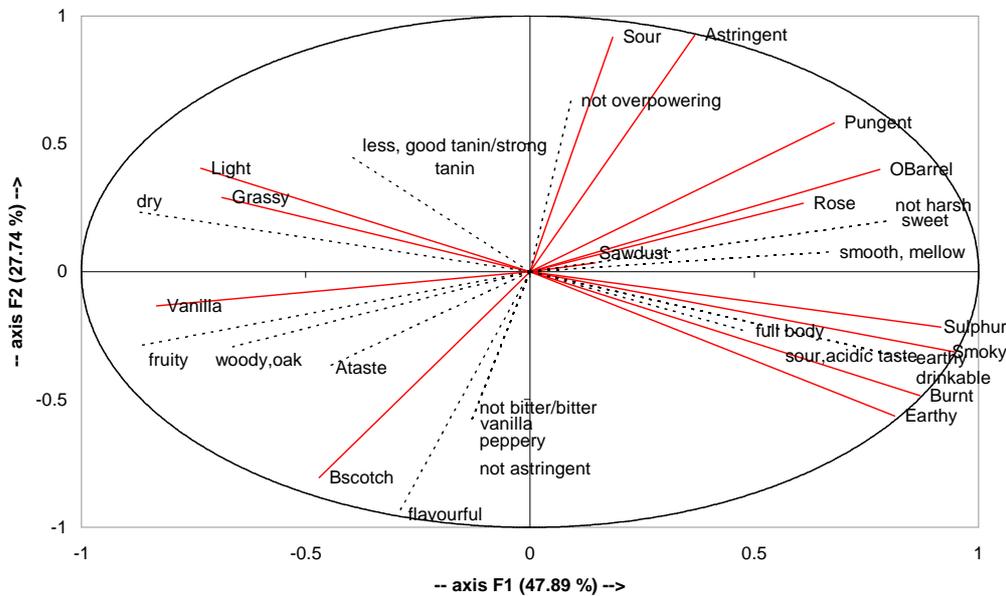


Figure 3: Correlations between the sensory attributes (active variables, red vectors) and consumer descriptors used to describe what they liked about the wines (supplementary variables, discontinued vectors) and the first 2 principal components.

The correlation circle was analysed especially to determine the possible relations between consumer and sensory descriptors. The results are displayed on figure 3.

It is interesting to note several points:

- The sensory attribute Oak barrel (OBarrel) in the upper right quadrant points toward the opposite direction of the consumer descriptor Woody, Oak (bottom left quadrant). This means that the 2 panels used similar terms to describe in fact 2 different sensory perceptions. In this example consumer Woody, Oak is closer to the sensory attribute Vanilla.
- The consumer word “sour, acidic” (bottom right quadrant) is not related to the sour sensory attribute (upper right quadrant). From these data, it is difficult to understand what this consumer descriptor means.

Similarly, in a subsequent analysis, descriptors associated with consumer dislikes, were projected onto the PCA sensory map (data not shown). We observed the following correlations:

- The “Bad note” used by consumers is related to the sour sensory attribute.
- The “sour” consumer descriptor is not equivalent to the sour sensory attribute. On the present data, it is difficult to explain further this term.
- “Thin” mouthfeel for the consumers is different from the “Light/watery” mouthfeel of the sensory panel (upper left quadrant). It seems to be negatively correlated with brown notes such as “Vanilla and Butterscotch”.
- The “Woody, Oak” descriptor used by consumers to express their dislikes is synonym of the “Smoky oak” character used by the sensory panel, but is still not equivalent to the “Oak Barrel” sensory attribute. Previously “Woody” was synonym to Vanilla to express consumer likes.

## **Discussion**

This study highlighted the multidimensional nature of consumer words when they freely describe what they like or dislike about a wine sample, in a blind condition. Although this has been noted in several studies (e.g. Valentin, Chollet, & Abdi, 2003), this type of questioning is still heavily practiced in wine market research studies. Surprisingly, it was also found that connoisseurs were also using multidimensional and somewhat vague terms to describe wine attributes, although other studies highlighted that wine experts were using more precise and accurate descriptors to describe their perceptions (Sauvageot, Urdapilleta, & Peyron., in press; Valentin, Chollet, & Abdi, 2003). The connoisseurs in this study were assimilated to experts as they were all wine enthusiasts, trained in traditional wine tasting and tasted wine regularly. However, the degree of expertise may have been lower than the one considered in other studies, although it was not tested as proposed by Frøst & Noble, 2002.

The multivariate analysis aimed at investigating correlation between sensory descriptors and other lexicons indicated that similar words may refer to different perceptions for connoisseurs and consumers. When consumers indicated they did not like the oak flavour, it meant they didn't like the smoky character of the wine. Contrarily, when consumers liked the oak flavour in a wine, it is likely they liked its vanilla character. This result is in accordance to previous studies showing that consumers poorly matched expert descriptions with corresponding wines (Solomon, 1990; Lawless, 1984). This study showed that using consumer or wine connoisseur comments to operate stylistic change could be misleading, due to their multidimensional nature.

By combining traditional tasting notes and sensory descriptive measurements, it is therefore possible to clarify some multidimensional words used by consumers and wine connoisseurs. The technique described in this study is rather rudimentary and offered only little guidance to interpret consumer language for making strategic decisions. The interest of commercial wineries would be to develop a longitudinal approach to systematically collect consumer words and translate them into actionable sensory attributes. In this paradigm, connoisseurs or consumers would not only describe their perceptions but they would also quantify their intensities. In other commodities, such approach has been successfully implemented to understand consumer lexicon in order to enhance communication about sensory benefits to the same consumer target (Carr, Craig-Petsinger, & Hadlich, 2001; McEwan & Thomson, 1989).

Sensory descriptive data are conventionally used to describe and quantify accurately the sensory attributes of a set of wines. This study showed that descriptive analysis is a powerful technique that could assist in better understanding both connoisseur and consumer languages. It moreover supports the fact that sensory descriptive analysis is complementary to other traditional wine tasting information, as discussed elsewhere (Lesschaeve, 2001; Lesschaeve, 2006). In particular, sensory descriptive data can be used to link technical and marketing descriptions collected from the same set of wines. Such approach referred to as Preference mapping enable to interpret preference dimensions with unidimensional sensory attributes (Greenhoff & MacFie, 1994) or to predict consumer preference based on wine sensory attributes (Greenhoff & MacFie, 1994; McEwan, 1996). An extension is to build a common descriptive language to improve internal communication within an organization among wine experts and other wine professionals. A better knowledge of consumer language will also facilitate the communication of wine sensory benefits to the targeted consumers.

### **Conclusion**

This case study aimed at demonstrating the value of using sensory descriptive analysis as a tool to translate accurately consumer or expert language. The results confirmed our initial hypothesis that a same word used by consumers or experts could describe different sensory perceptions, and conversely different words used by consumers or experts could describe one single sensory perception.

#### **Implications for product development:**

When tasting a new product, market researchers often set up central location tests where they invite consumers to taste several formulations of the new product or one formulation versus the competitor. Traditionally they would ask consumers to rate their overall liking followed by diagnostic questions, such as “is this product not sweet enough, just right, or too sweet.?”

The present study showed how misleading consumer language can be, even with simple words such as fruity or sweet. For instance in the current study consumers expressed dislikes for a wine by describing it as “too woody”. The winemakers (acting as a wine expert) would understand that they’d need to reduce the use of oak barrels in winemaking. However the sensory translation of consumer word “Woody” was “Smoky oak”, which would translate in technical terms to reduce the smokiness in the wood character by for example using light toasted barrels versus heavy toast barrels.

The integration of sensory techniques in market research practices would be beneficial for guiding product developers or winemakers in the correct direction for stylistic change. Although there is a trend to do so using preference mapping techniques, more integration is still needed.

### Implications for wine marketing and business:

Although consumers hardly matched wines with corresponding expert description as stated in the introduction of this paper, they still heavily rely on third party written or verbal advice to purchase wine. The attributes generated and measured as important for a given wine by descriptive analysis could serve as a basis to write wine description on a back label or on the wine technical sheet. Knowing the consumer language correspondence through longitudinal studies would certainly help experts and marketers to communicate efficiently wine sensory benefits to consumers.

For the past decades, in both Old and New World, wine has been marketed as an aesthetic product that required specific education to be appreciated. The current globalization of the wine market shows a strong interest for wines that are not particularly aesthetic but are mass products with a particular defined style (fruit driven shiraz, grassy sauvignon blanc, etc.). This trend shift may mean that it is about time to educate wine experts and marketers on what consumers likes and dislikes about wine, and more importantly how they express these likes and dislikes rather than pursuing the route of consumer high education on wine.

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