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Wine tasting based on emotional responses: An expedite approach to distinguish between warm and cool climate dry red wine styles

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ABSTRACT

In this study, we improved an empirical tasting sheet including emotional responses and common sensory attributes. An Optimized Descriptive Profile (ODP) was run to characterize different red wines according to sensory descriptors used in the improved sheet. A total of 5 wines were evaluated by a Consumer Panel (CP) of 103 subjects (36 females, 67 males) using the improved sheet and a Check-All-That-Apply (CATA) list of 25 emotions. In the ODP, the panel identified the main discriminating sensory attributes as "Complexity", "Astringency" and "Duration of the wine fragrance". However, this analysis did not allow for differentiating very distinct dry red wine styles originating from warmer or cooler regions. On the contrary, Principal Component Analysis of emotional attributes demonstrated that these two wine styles could be easily distinguished. In particular, wine with a red-brick color, complex smell and aggressive mouthfeel consistent with those from cooler regions was less liked by the CP than a warm climate gold-awarded wine. Although receiving lower scores considering its color and smell, the former wine was regarded as the most "surprising" in the CATA.

1. Introduction

Wine is a fascinating product that has been produced and praised for thousands of years in many parts of the world (This, Lacombe, & Thomas, 2006). One should think that with such history, profound cultural background, and linkage to so many civilizations there would be some common and spontaneous vocabulary on how to talk about wine. Wine sensory analysis has largely been developed to answer this need for describing and evaluating wines. The focus has been put on the ability of tasters to describe sensory attributes elicited by visual, olfactory and taste-mouthfeel sensations (Jackson, 2014). However, wine is not easy to describe, assess, or evaluate, and it is questioned if wine judging requires a particular degree of expertise (Hopfer & Heymann, 2014). In fact, human senses are not accurate measures of these sensations due to physiological or cognitive limitations (Lawless, 1999). Cognitively, the same descriptor can be attached to two different sensory perceptions or the same sensory perception with two different words, while cultural background is decisive for interpreting the semantics related to wine description (Bastian, Bruwer, & Alant, 2005; Paradis & Eeg-Olofsson, 2013; Sáenz-Navajas, Ballester, Pêcher, Peyron, & Valentin, 2013). As a result, conventional sensory analysis seems to create a communication gap between wine experts and consumers, and so new approaches to tackle this drawback are welcome (Francis & Williamson, 2015; Hopfer & Heymann, 2014). Moreover, considering that consumer preferences are not only driven by food intrinsic attributes (De Pelsmaeker, Schouteten, Lagast, Dewettinck, & Gellynck, 2017), these new approaches may be explored outside the field of conventional sensory analysis.

Ubigli (2004) observed "the sensory signal, in the strictest sense, is complemented by a multitude of other information of a hedonistic and emotional type," and perception is not just about a physiological reaction, but an "activity that involves knowledge and reflection". When triggered by food, emotions can have five different sources: sensory properties, experience, anticipated experience, personal or cultural significance, and third-party influence (Desmet & Schifferstein, 2008; Jiang, King, & Prinyawiwatkul, 2014; Meiselman, 2015). Mostly positive emotions have been used to differentiate between and within food categories (Jager et al., 2014; King, Meiselman, & Carr, 2013; Ng, Chaya, & Hort, 2013). In particular, Jiang et al. (2014) listed 78 positive, 55 negative and 23 neutral emotions. However, a balance between negative emotions was recommended by Meiselman (2015) in product development.

Using emotional attributes to describe wines was first reported by Ferrarini et al. (2010) and Rive and Deneulin (2014). In these works, the wine was not tasted and no attempt was made to relate emotions to sensory characteristics of wine. Hopefully, this relation would enable

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wine professionals to anticipate consumer preferences and better predict wine choice, which is a common challenge for food companies in the present competitive business climate (De Pelsmaeker et al., 2017; Kenney & Adhikari, 2016), and has been demonstrated with basic taste solutions (Samant, Chapko, & Seo, 2017) and in chocolate with different sweetness (Lagast, De Steur, Schouteten, & Gellynck, 2017; Thomson, Crocker, & Marketo, 2010). Having this concern in mind, Loureiro, Brasil, and Malfeito-Ferreira (2016) proposed a tasting sheet where the emotional responses were explained by the sensory characteristics of wines, enabling recognition of the so-called classic European wines mostly produced in cooler climate regions.

The present study was an extension of that and intended to explore the emotional reactions induced by dry red wines and see how these reactions can be used to describe and evaluate wine. While Loureiro et al. (2016) used an empirical tasting sheet to train two student tasting panels, our work was first directed to improve that sheet followed by testing it with a large consumer panel without previous training. Therefore, our objectives were: (i) to adapt an empirical wine tasting sheet to include emotional responses and conventional sensory attributes to be used by consumers to describe and evaluate wines; (ii) to evaluate the relevance of emotions in wine appreciation; and (iii) to differentiate between wines with different styles using emotional responses.

2. Materials and methods

The research was divided into three sensorial methodologies: Focus Group (FG), Optimized Descriptive Profile (ODP) and Consumer Panel, which can be visualized in Fig. 1. Participants were not compensated for their work.

2.1. Focus Group (FG)

2.1.1. Wine selection

The approach described by Loureiro et al. (2016) requires the use of two wines with clearly opposite styles. Therefore, Focus Groups tasted two red wines chosen from warm climate and cool climate regions. First, the example of a warm climate wine was a 2013 concentrated dark red wine with a high aromatic intensity (over-matured red fruits and noticeable oak) and a low acidity and short finish, which had been awarded a gold medal in an international challenge originating from Palmela DOC (Portugal). The second wine, typical of cool climates, was a 2004 Pommard Premier Cru (Burgundy), with a light red-orange color, discreet and complex aroma evolving over time, high acidity and long persistence.

2.1.2. Tasting panels

Participants were recruited through a questionnaire distributed among 50 students aiming at selecting those who consumed wine at least once a week. The first tasting panel consisted of two FGs organized among Instituto Superior de Agronomia (ISA) students ranging from 22 to 46 years old, all with different wine tasting knowledge. The first FG gathered 11 subjects (8 males and 3 females) regarded as experts given their background as students in their second year of the Master of Viticulture and Enology with extensive wine tasting training. The second FG gathered 10 non-experienced subjects (3 males and 7 females) in wine tasting, but with previous training in food sensory analysis being recruited from the Master's program in Gastronomical Sciences. Participants filled in a quick questionnaire with basic information on their socioeconomic profile and wine consumption habits.

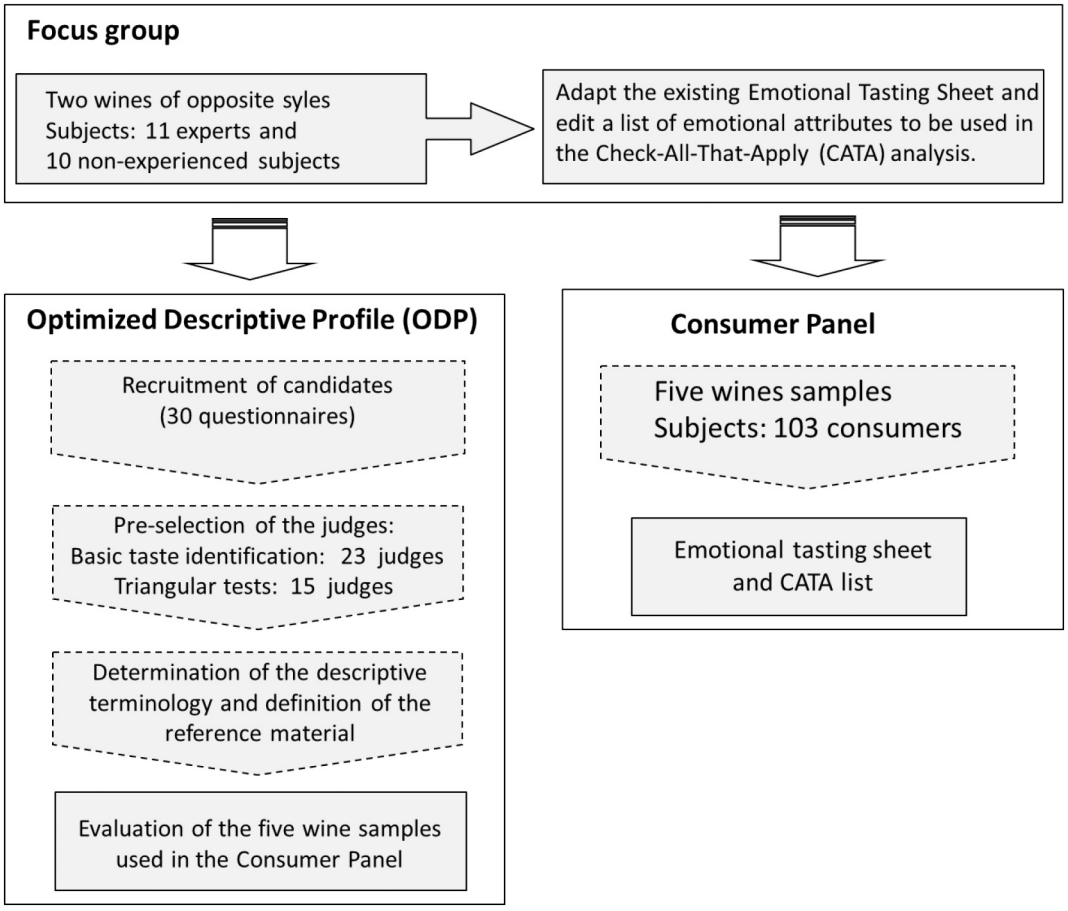

Fig. 1. Sensorial methodologies: Focus Group (FG), Optimized Descriptive Profile (ODP) and Consumer Panel.