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Title

Is complexity worth paying for? Investigating the perception of wine complexity in consumers and experts

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Conference Presentation

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Keywords

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Research Question

Which attributes in wine are most linked to complexity, and are consumers or experts willing to pay more for it?

Methods

Two groups - wine novices and experts - are given six single varietal wines and six 50-50 blends to evaluate their complexity, quality, number of flavours, and willingness to pay.

Results

TBD. We hope to find whether blends are perceived as more complex, and differences between novices and experts when it comes to perceptions of complexity and willingness to pay.

Abstract

1. Motivation

The belief that complexity is a positive quality has driven some wine producers to explicitly try to develop a more complex product offering to appeal to consumers. For instance, Wendy Parr (2015) describes one such commercial winemaking project that was deliberately aimed at increasing complexity in New Zealand Sauvignon Blanc wines via innovative grape-growing and winemaking practices. However, what exactly what does 'complexity' mean when it comes to wine? In this proposal, I aim to uncover which attributes in wine are most linked to complexity, and whether it is true that the casual wine consumer (or the expert) is willing to pay more for more complex wines.

2. Background

What kind of complexity are we talking about?

Intuitively, complexity in perception must come from multiple elements. However, we could be talking about physical/chemical complexity, where complexity arises from the structural arrangement of molecules or sheer

number of different molecules, or perceived/inferred complexity, where the focus lies in what the taster takes away from the wine. In terms of physical complexity, there is some evidence that perceived complexity seems to correlate weakly with the physical complexity of monomolecular odorants (Kermen et al., 2011). However, given that wine is made up of many hundreds of different volatile compounds, this level of complexity does not seem like the appropriate one at which to address wine complexity. In addition, there is no simple linear mapping from physical/chemical complexity to perceived complexity, since what smells “simply like a rose” consists of a complex array of compounds, and what smells complex may consist of a single molecule (Yeshurun & Sobel, 2010). Therefore, in practical terms and according to literature, what people are concerned with when speaking of complexity in wine (or other flavour experiences) is perceived or inferred complexity.

That said, perceived complexity can be thought of in multiple ways – for instance, in terms of the number of components perceived, in terms of the evolution of flavours in the mouth (or in the bottle), or in terms of a holistic integrated percept whose elements may not be individuatable. For instance, a heady Gewürztraminer or Viognier has many flavours perceivable at once, whereas a Chablis might give the sensation of seamless minerality rather than any specific range of flavours. Different still, an aged claret might unveil its flavours slowly in the mouth, with bright acidity and blackcurrants slowly giving way to leather and cigar box flavours later on. Might all these different ways of perception give the same resulting perception or inference of complexity in the taster?

The role of blending in increasing complexity

Intuitively, blending different single-varietal wines should result in a wine with more perceivable complexity as the blend will be, at least, more chemically diverse. A study demonstrating just the value of such blending was conducted by Singleton and Ough (1962). These researchers selected 34 pairs of similar commercially available single varietal Californian wines from the 1960 vintage that were rated similarly in terms of quality but presented somewhat different flavours. From each pair, they also prepared a 50-50 mix of the wines. Participants were presented with the individual wines and also with the blend, though they were blind as to the condition (i.e., individual wine or blend) with the order of presentation randomised. The wines were rated on a 20-point quality scale by the 10 experienced sensory panellists. Notably, the quality scores given to the blends were significantly higher than the mean score of the two wines when evaluated separately. Furthermore, in 7 out of the 34 cases, the blend was rated as having higher quality than the best of the two individual component wines. Singleton and Ough hypothesised that, in at least some cases, an increase in complexity might have been a major factor in enhanced quality ratings, although it remains a hypothesis since the panellists did not rate the complexity of the wines.

Role of domain-specific expertise on complexity

Parr and al. (2011) has developed a model for how people with different levels of expertise think about complexity. Compiling interviews with both wine consumers and professionals from New Zealand and Australia, they concluded that, in general, the casual consumer is driven by the image/brand (D’Alessandro & Pecotich, 2013; see Plassman et al., 2011, for evidence of perceptual influences of marketing actions) and hedonic qualities of the wine, whereas the wine professional tends to give more weight to inferred methods of viticulture and wine production.

In terms of the actual tasting experience, Schlich and colleagues (2015) addressed the role of domain-specific expertise in ratings of the perceived complexity of Sauvignon Blanc wines. 13 New Zealand Sauvignon Blanc wines (including 10 from the aforementioned complexity innovation winemaking program) were evaluated by experts (oenologists in this case), connoisseurs (non-professionals with a lot of experience in wine tasting), and consumers via a free-sorting task and a complexity questionnaire. The authors found that while experts associated complexity with the number of flavours, with harmony, with balance, with the length of finish (duration of aftertaste remaining in the mouth) and with familiarity; the connoisseurs and consumers correlated complexity with flavour intensity instead. Additionally, there is evidence that experts had closer agreement amongst themselves in their evaluation of complexity as compared to either connoisseurs or consumers. One drawback of this study, however, is that the wines were not perceived as particularly complex to begin with by the French participants who took part in the study.

Possible correlation between complexity and willingness to pay

As stated in introduction, it is a widely held belief that complexity is a desirable factor in the quality of wine (Kramer, 2012; Shogren, 2012; Singleton & Ough, 1962). If the New Zealand producers who are experimenting with novel production techniques are correct, more complex wines should result in greater purchase intent and willingness to pay from consumers. However, there have been no studies to date looking specifically at the impact of wine complexity on willingness to pay. If we view quality as a substitute for complexity, then higher perceived quality has been shown to result in higher willingness to pay by both consumers and experts (Corduas et al., 2013; D’Alessandro & Pecotich, 2013; Mueller & Szolnoki, 2010; Rao & Monroe, 1989; Tellis & Wernerfelt, 1987), although objectively better quality wines are not necessarily preferred by the casual consumer (D’Alessandro & Pecotich,

2013; Goldstein et al., 2008).

3. Aims and contributions

The goal of the proposed study is to assess how complexity in wine is perceived by social drinkers and experts, especially which attributes are most linked to their assessment of complexity in a wine. In addition, in order to ensure that the wines used in the study have different levels of complexity (see Schlich et al, 2015), I will be partially replicating Singleton and Ough's (1962) study by using single varietal wines and 50-50 blends of those wines. By gathering participants' ratings of complexity as well as liking and perceived quality, I will be able to test whether complexity accounts for the increased quality ratings of blended wines as observed by Singleton and Ough.

Notably, unlike previous studies on wine complexity, the proposed study aims to get a sense of the temporal component of complexity by acquiring information from participants at the various stages of smelling, tasting, and aftertaste. Furthermore, the study will use natural language processing techniques to analyse participants' flavour descriptors, in order to assess their semantic associations with complexity.

The proposed study aims to advance our understanding of wine complexity. It will address the question of whether blending can increase complexity, and, from a commercial prospective, whether increased complexity translates to the consumers' willingness to pay. In addition, the study will assess how differences in wine expertise can influence the way people infer complexity in the glass.

4. Methods

Participants

50 novice participants and 50 expert participants will be recruited for the experiment. Novices will be recruited from the University of Oxford Experimental Psychology participant pool. Experts will be those with WSET level 3 or equivalent training, who either work in the wine trade or have at least one year of active participation in wine tasting societies. Participants will be roughly age matched to control for the effect of age on taste preferences and sensitivity.

Wine samples

A total of 12 samples will be prepared. Three base single-varietal white wines will be used, and three 50-50 white blends will be produced from unique pairings of the base wines. Similarly, three base single-varietal red wines and three 50-50 red blends will be produced. The base wines will be sourced from the same vintage and region (Alsace for white wines, California for red wines).

Experiment Design:

Each experiment consists of a mixed design with wine variety and blend as within-participant factors and wine expertise as between-participant factor. For each wine, I will measure wine liking, familiarity, perceived quality, perceived complexity, willingness to pay, and purchase intentions. Participants will also be asked to write down perceived flavours and place them on a timeline starting from the moment of drinking to after swallowing.

Procedure

The study will be conducted at the Department of Experimental Psychology at the University of Oxford. Each session lasts approximate 1 hour and will be held at common wine-consumption times (either around noon or in the evening). In each session, the wines will be served at room temperature in 25 mL samples, in standard 215 mL ISO glasses. The glasses will be coded with randomised 3-digit identifiers, and all wine samples will be presented in a different order using a Williams Design Latin square arrangement.

Each session involves tasting two flights of wines, 6 white wines and 6 red wines. Each participant will be giving their flight in a unique order and will be asked to taste each wine in the order they are given. Before starting, participants will be briefed in wine tasting methodology (~ 5 minutes, for the novices group) and the task will be explained fully before tasting begins. The experimental design is within subject, such that each participant will taste all 12 wines. After each wine, participants will be asked to rate their liking (on a 9 point hedonic scale) for the wine, perceived quality, complexity, familiarity (all on 9 point visual analogue scales), willingness to pay (in terms of £ for a full 750 mL bottle of the wine), certainty of purchase (0-100 visual analogue scale), and to complete the flavour timeline shown in the figure above. Water and table crackers will be available throughout the session and participants will be asked to cleanse their palates between each wine.

Data Analysis

First, we will analyse overall correlations between perceived complexity and liking, familiarity, quality, willingness to pay, and numbers of perceived flavours for each group of participants. This will answer, amongst others, the motivating question of whether people are willing to pay more for perceived complexity in wines. A multivariate analysis of variance test will be performed with wine colour and blend (single varietal or blended) as within-subject

factor and participant expertise as between-subject factor to determine whether the blended wines are indeed perceived as more complex and of higher quality. Furthermore, based on the timeline, we will be able to test whether mid-palate or post-wallow flavours contribute to complexity, and more specifically, whether complexity is perceived as greater when flavours are perceived close to each other in time, or whether flavours are more spread out.

Finally, we will use machine learning methodology to train a Naïve Bayes classifier on the corpus of participants' flavour descriptors. We will then be able to analyse which flavour descriptors (for instance, those associated with winemaking such as smoke, or those associated with ageing such as leather) might be most informative in terms of distinguishing more complex from less complex wines. We will also be able to analyse differences in language usage patterns for novices versus experts (see Gawel, 1997; Langlois et al., 2011).