Title
Demystifying wine expertise through the lens of imagination: Descriptions and imagery vividness across sensory modalities

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Conference Presentation

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Keywords
Multimodal sensory perception; wine expertise; language; mental imagery vividness

Research Question
How does expertise influence the way wine is imagined and described, and how does this differ across sensory modalities?

Methods
We compared how novices (N=75) and experts (N=45) imagined six wine scenarios both in terms of imagery vividness and written descriptions. Responses were separated by appearance, smell, taste, and mouthfeel.

Results
Compared with novices, experts had more vivid imagery and wrote longer descriptions in all sensory modalities but appearance. Experts also use more concrete and source-based descriptors.

Abstract
Aims
For most untrained novices, talking about wine or imagining the smells and flavours of wine is difficult. Wine experts, on the other hand, have been found to have better imagery for wine, and are also more proficient in describing wine. Some scholars have suggested that imagery and language are based on similar underlying processes, but no conclusive evidence has been found regarding mental imagery and language production. This study examined the relationship between imagery and language use in both novices and experts.

Background
Sensory representations, created by the brain in response to sensory experiences, help us comprehend, react to, and remember sensory input, influencing memory and imagination. They encompass neural encoding of sensory information, which is multimodal and hierarchical, and are subjective, influenced by past experiences, context, and emotions. Sensory and motor brain areas play a significant role in these representations, which are activated during language comprehension and allow for cognitive computation and mental manipulation. Grounded cognition theory posits that concepts are sensory modality-specific and shaped by experience, suggesting that sensory and motor regions support semantic representations. Mental simulation, a key element of grounded cognition, involves recreating experiences in the mind, engaging neural and bodily systems. This notion is supported by gene-environment interactions, such as musical ability or taste for specific flavours, illustrating that cognition is shaped by sensory infrastructure and individual sensory differences, reflected in our thoughts and language. Expertise further impacts cognition, with experts exhibiting specialized skills and knowledge gained through extensive training, influencing memory, attention, and conceptual knowledge.

In the present study, we aimed to compare imagery vividness and language usage to describe evoked wine-tasting experiences among experts and novices across different sensory modalities. We hypothesize that there would be differences between the modalities in how wine is imagined and described, depending on expertise. Specifically, we expect experts to use more precise language and have more vivid imagery than novices in the modalities of smell, taste, and mouthfeel - but not vision - where experts have more training than novices. In addition, as in other types of creative writing, we expect wine imagery vividness could be related to the ability to write about wine, where the underlying mental representations become more detailed with expertise.

Design
Both experts (N = 45, 20 women) and novices (N = 75, 39 women) were recruited to complete an online questionnaire constructed on Qualtrics. Experts were defined as those having achieved WSET level 3 or equivalent. To measure imagery vividness, the revised version of the Vividness of Wine Imagery Questionnaire (VWIQ-II) was used, measuring vividness of imagery in appearance, smell, taste, and mouthfeel. The questionnaire is composed of 6 wine-relevant scenarios that participants have to imagine, and subsequently rate the vividness of their mental image of the colour, smell, taste and mouthfeel of the wine in the scenario on a 5-point scale ranging “1—No image at all (only ‘knowing’ that you are thinking of the object)” to “5—Perfectly clear and as vivid as the real situation.”. To elicit wine descriptions (VWIQ-Language), we used the same six scenarios and questions as to elicit imagery, but instead of rating imagery, participants were asked to describe their imagined appearance, smell, taste and mouthfeel for the wine in the scenario. Participants typed in their responses in a free text field in the online survey. Text data was tokenised, stemmed, and lemmatized. Text-based metrics for analysis included the number of lemmas, adjective-noun ratio, concreteness, and categorization (into source, abstract or evaluative terms).

The survey was organized as follows: After giving informed consent, participants first were presented with VWIQ-II and VWIQ-Language blocks, shown in random order, followed by the Subjective Wine Knowledge Questionnaire (SWKQ), and Demographic variables including age, gender, education level, language proficiency background, smoking, and whether they worked in the wine or food industry.

Results
1. Expertise and modality differences in the vividness of imagined wines
Results revealed that, compared to novices, experts have more vivid imagery for smell, taste and mouthfeel, but visual imagery is comparable. Generalized linear mixed effect model showed a significant interaction between Expertise and Modality, F (3, 2753.48) = 6.09, p < .001, η2p = .007. In addition, there was a main effect of Expertise, F (1, 120.13) = 23.07, p < .001, η2p = .16. The main effect of modality was significant, F (3, 2753.48) = 9.48, p < .001, η2p = .01. Post-hoc pairwise comparisons showed wine experts reported more vivid imagery for wines across all modalities (ps < 0.001) except colour (p = 0.310). For experts, there were no differences between the modalities, ps > .05, whereas for novices, colour was more vividly imagined than smell, taste, and mouthfeel (ps < .01).
2. Expertise and modality differences in written descriptions of imagined wines.
We found that experts on average write longer descriptions, operationalised by the number of lemmas, compared to novices ($\chi^2 (3) = 60.76, p < .001$), in the modalities of smell, taste, and mouthfeel. Overall, participants wrote the longest descriptions for taste compared to colour ($\chi^2 (3) = 125.34, p < .001$).
The category use analysis revealed that experts are more likely to use source-based descriptions across all modalities compared to novices ($\chi^2 (1) = 38.65, p < .001$), in line with their formal training in the use of source descriptors. Moreover, source terms are significantly more likely to be used to describe smell and taste modalities compared to colour and mouthfeel across both experts and novices ($\chi^2 (3) = 1071.20, p < .001$). Similarly, when it comes to the concreteness of descriptions, experts tend to use more concrete words than novices but only for smell and taste modalities ($F(3, 10879.2) = 42.77, p < .001, \eta^2_p = .01$).

3. Predicting imagery vividness from language variables per expertise level across modalities
We found limited evidence for a relationship between the vividness of imagery and language used to describe imagined wines. Using two regression models for expert and novice descriptions with several proxies for language (the total amount of lemmas, average concreteness, relative word type use, adjective to noun ratio, and modality, with the random factors scenario and participant), expert language predicted vividness imagery better than novice language as was indicated by better model fit measures. This is the first time that a link has been found between imagery vividness and language production when it comes to wine-related imagery (or any kind of imagery at all), although the exact mechanism is yet to be uncovered.

Conclusion
This study sheds novel light on the distinct cognitive mechanisms underlying wine imagery across different levels of expertise, emphasising the role of imagery vividness and vocabulary usage in shaping the qualitative aspects of wine descriptions. Experts, armed with an enriched cognitive prototype, steer towards a more specific and source-based description across chemosensory modalities whereas novices tend towards more abstract and evaluative language. Moreover, we observed a closer connection between imagery vividness and language usage in experts compared to novices. The limited yet promising relationship between perceptual representation and linguistic articulation showcases a fertile ground for further explorative studies, bearing in mind the need for broader participant samples and a need to focus on the developmental trajectory of imagery and language skills.

Consent
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