

## EXPLORING THE NATURE OF WINE EXPERTISE

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The aroma of a wine is not in the bottle; it is in our mind (Brochet, 1999). In other words, the wine in the bottle or glass has no smell, taste, or mouth-feel qualities until we sample it. Yet New World wine research to date is able to tell us virtually nothing about what we are actually doing when we make wine quality assessments based on the information from our senses.

Despite forty years of intense activity in sensory evaluation research, we still know very little about the nature of wine expertise. In the current era, where accountability is emphasised, and where formal wine judgements carry enormous weight in terms of wine-consumer behaviour, we would be unwise to ignore the opportunity that psychological science presents for aiding an understanding of just what the nose and tongue may be doing. Demystifying wine expertise does not need to be at the expense of romance.

### **What underlies a wine connoisseur's ability to identify a favourite vintage?**

Recent gains in knowledge concerning colour, smell, taste, and texture of wine from a physico-chemical perspective have not been accompanied by



an understanding of the sensory and cognitive mechanisms that come into play when a wine is evaluated via our sense organs. The necessary studies are few, are very recent (i.e., in the last decade) and have primarily been undertaken by French researchers (e.g., Morrot, Brochet, & Bubourdiou, 2001). To many readers, the above statement may seem at odds with the proliferation of sensory studies and sensory journals over the last two decades. Unfortunately, few sensory studies concerning wine analysis really tackle the actual content of the topic (see Parr, 2000).

The major reason that we lack an understanding of what the nose and mouth can tell us is that making a 'sensory' evaluation in fact involves two independent aspects of performance. The first, sensitivity, is our ability to detect the smell or taste of interest. Research in this area has flourished (e.g., the proliferation of time-intensity studies). The second component of a 'sensory' assessment has been relatively neglected. This is the cognitive part, and involves how we perceive, conceptualise and classify, remember, judge and communicate about the sensation we experienced. Knowing how our taste buds and olfactory receptors work will be of limited value if we continue to ignore what happens to the information once it enters our head.

Understanding the cognitive component of sensory evaluation lets us have an appreciation of things like: How do our expectations, desires and motives bias perception? What, and how much, can we remember when sampling a wine? What influences our final decision? And how do we communicate wine-judgement decisions to others to ensure a shared appreciation? Although we take these everyday cognitive processes for granted, they are in fact quite complex. It is here that psychological science has much to say that is relevant. Its application to wine evaluation could eventually provide a solid knowledge base from which we could modify our wine-tasting practices accordingly.



### **What can psychology offer?**

Wine evaluations are analogous to other diagnostic problems that are intrinsically probabilistic. A fundamental characteristic of situations such as detecting an off-note in wine (e.g., excess hydrogen sulphide) is that many factors other than our sensitivity to detect the note enter the 'evidence' for a decision. For over half a century, psychological science has employed detection theory to address judgement problems in fields as diverse as medicine (e.g., diagnosing a spot on the lung from an Xray), political decision making, economics, and food science (Swets et al., 2000). Michael O'Mahony and colleagues at the University of California, Davis, have used detection theory to provide an understanding of what people are doing when they sample a range of foods and beverages, including beer. Work currently being undertaken at Lincoln University extends this approach to investigate wine expertise (Parr et al., under review).

### **Background to the current study**

The overall aim of the work is to find out what a "good nose" is by investigating the mind or brain attached to the nose. At present, the work is limited to orthonasal olfaction; that is, to the aromatic characters of a wine that we experience via our nose. This is not only because much of the flavour in wine is aroma, but also because complex interactions between taste and smell would likely serve to confound the issues under investigation (see Dalton et al., 2000) at this early stage of enquiry.

The component of wine aroma that our noses pick up, often referred to as the "bouquet", is experienced when small, volatile molecules interact with olfactory receptors at the top of the nasal fossae. This volatile component provides considerable information about the character of a wine. We can determine much about the type (e.g., cultivar), physical components of



terroir, vintage, condition, and overall quality of the wine from a sniff. This 'judging' occurs even if we are not consciously aware of it. A large body of psychological research shows that smells influence our mental processes and our behaviour without us being aware of their existence, never mind our being conscious of their effect on our behaviour (Epple & Herz, 1999).

Psychological science has quite a bit to say about our sense of smell, and how odours can influence our emotions, our thinking, and our behaviour. The first important point is that it is generally accepted that we have relatively impoverished language skills for describing odours (e.g., Engen, 1982), including smells we encounter every day. That is, naming a smell does not come easy.

As well, studies have shown that odours often spontaneously evoke idiosyncratic, personal memories, rather than their 'correct' name. There is much anecdotal evidence from winemakers in support of this. For example, a particular musty odour note may always give rise to memories of your grandmother's closet. Research shows that memories that are evoked by odours are often those that were learned in childhood (Chu & Downes, 2000), are more often associated with emotion than input from our other senses (Epple & Herz, 1999), and can be hard to forget and relearn (e.g., Lawless & Engen, 1977). Forgetting and relearning are often required in panel work where ensuring consensus (i.e., that panellists agree) is an essential part of most descriptive analysis methodologies (see Parr, 2000). The relative inability of expert perfumers to re-classify smells, shown in a study by Ishii et al. (1997) goes some way to explain why odours are the thorn in the side of consensus-driven, sensory evaluation methods. No amount of training can iron out the differences among panellists (Lawless, 1997).



### **Details of the present study**

The study asked: “Are wine experts more accurate than novices at recognising and identifying wine-relevant smells? If so, what processes give them the edge? Enhanced sensitivity? Perceptual skill (e.g., memory for the *smell* of anise) and/or language-based memories (e.g., remembering the *name* “anise”)?” The theory behind the study concerns the relation between perceptual memory (memory for the smell) and semantic memory (being able to identify and label the smell).

Before tuning out and deciding that this is of academic interest only, consider an important application: Many New World wine professionals and wine-science teaching programmes have adopted the idea that our relatively poor mental dictionary for smells and tastes limits our ability to recognise and identify such smells and tastes. This is exemplified in the widespread use of language tools such as the Wine Aroma Wheel (Noble et al., 1984) that have been developed to provide a standardised language for wine aroma as an aid to effective communication. Such language tools are also often used to help people learn to characterise wine samples. Although this may make intuitive sense, to my knowledge there is no direct evidence that ability to recognise wine components (such as primary characters or wine faults) is best learned by emphasising verbal memory (i.e., labelling the smell with a so-called ‘correct’ name such as “asparagus; “canned peaches”). To the contrary, there is evidence suggesting that some things may be better left unsaid.

Emile Peynaud is reported to have commented that fluency is often a screen for inaccuracy (Brochet, 1999, p. 39). As well as a screen, fluency may also be a stumbling block. There are several sources of psychological evidence that suggest that emphasising words when using our nose or tastebuds may come at a price. This is likely to be especially so when verbal skill is emphasised early in a wine professional’s development (Melcher &



Schooler, 1996). Olfactory perceptual ability (smelling) and language (e.g., naming an odour) may be associated, not in a helpful way, but in an inhibitory way (e.g., Lorig, 1999). More specifically, when we try and remember the smell of a wine sample, verbalisation, rather than enhancing learning, may have an insidious, disruptive effect. In other words, verbal and perceptual processes may interfere with one another, the degree of interference being related to one's expertise in the particular area.

To investigate this, eleven expert and eleven novice wine judges participated in a study that aimed to simulate smelling tasks that occur within typical wine-evaluation situations (e.g., detecting an off-note). The experts and novices were matched for age, gender, dietary and smoking status. Each person was told that the study involved remembering and naming wine-relevant smells. They then took part in tasks that measured odour-detection threshold, odour-identification, odour recognition, and consistent use of the name they gave for an odour. Participants also rated their confidence in their recognition and identification judgements.

Due to the difficulty in assessing what it means to be 'right' when describing the bouquet of a wine, the odorants used were compounds typically found in wine (e.g., Lenoir, 1995; Bende & Nordin, 1997). They were compounds that had well-documented names for the resulting perceived smells (e.g., ASTM Atlas of Odor Character Profiles, 1985). The smells spanned the categories of wine faults (e.g., excess acetic acid), primary characters (those pertaining to the grape such as floral and fruity notes), secondary characters (those pertaining to fermentation and winemaking procedures), and maturation characters (e.g., mushroom; leather).



### **Outcomes of the study**

Sensitivity did not differ between expert and novice wine judges. As well, there was no positive association between detection thresholds (a person's sensitivity) and ability on the cognitive tasks of odour recognition, identification, and naming consistency. This implies that superior sensitivity could not account for any differences between groups on the odour memory and language tasks.

Wine experts however were significantly better at recognising the wine-relevant smells, despite their bias (motivation), sensitivity (detection threshold), and verbal skills (odour identification and naming consistency) being similar to those of the novice judges. This suggests that the source of superior memory for smells by wine experts in this study was perceptual, or sensory-based memory (e.g., imagining the smell), rather than being able to name it.

These findings need to be qualified in relation to the background histories of the experts and novices who participated. The present study involved experts and novices who presumably differed more with respect to actual experience with wine than to knowledge about wine (e.g., wine theory). Many of the novices in the study were current wine-science students whose wine-evaluation experiences to date have a strong linguistic base. That is, students are encouraged to deconstruct a wine into its particular characters (e.g., odours, tastes, and mouth-feel components), identifying each individual character that has been detected. This contrasts with much Old-World wine evaluation where evaluating a wine as a whole or Gestalt is common, and greater emphasis may be accorded perceptual skill rather than linguistic skill.

Certainly, the present data concerning wine olfactory expertise are in keeping with an accumulating body of psychological knowledge that argues



that when people are forced to find words to label complex stimuli (i.e., things that are difficult to capture in words), a form of memory illusion can occur. Known as verbal overshadowing, what is assumed to happen is that a verbal representation of the smell (e.g., the word “aniseed”) is remembered at the expense of the actual smell itself (e.g., the odour of aniseed). When a person has both perceptual and verbal expertise in wine evaluation (as could be expected from the experts in the current study), they are presumed to be less susceptible to the memory illusion because their expertise allows them to shift between reliance on verbal or perceptual expertise without consequence. This notion is supported by studies measuring the electrical activity of the brain (Lorig, 1999), the data from which suggest that when we are called upon to simultaneously process odour and language information, interference can occur.

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## Conclusion

Although language serves us well under many situations, few of us can talk about wine as spontaneously as we can drink it. The present work suggests that in situations for which language is not well suited, such as when remembering smells in wine, verbalising is not only unnecessary to remembering smells (Herz, 2000), but it may even be disruptive. The type and degree of disruption appear dependent on our expertise. In other words, emphasising naming of an odour may interfere with ability to remember the smell in some situations (e.g., in the absence of well-developed perceptual expertise as may occur early in a wine professional's career).

The present research is merely a beginning, and the data should be treated with caution until replicated. They are however in keeping with a large body of psychological literature. Until we know more about wine expertise, a safe take-home message to apply in current training situations is that it may be unwise to place too great an emphasis on naming odour notes without ensuring equal weight is accorded relevant perceptual skill. In short, indulge in the sensory experience of a wine, ignore one's neighbour (unless the context demands communication), and don't feel pressured to name things until ready.

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