An artist in residence at the AWRI: *exploring synaesthesia and visual harmony with red wine flavour*

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In 2019 the Australian Wine Research Institute hosted Elizabeth Willing as an artist-in-residence as part of an Australian Network for Art and Technology (ANAT) funded program, which aims to bring art and science together in a mutually beneficial collaboration. This article describes some of the work Elizabeth conducted at the boundaries between art and sensory science during her time at the AWRI.

DEVELOPING VISUAL IMAGES TO REPRESENT WINE FLAVOUR

Can a practising artist bring benefits and new insights to wine research? Can the work of the artist be positively influenced by time spent working with professional scientists? In 2019 the AWRI hosted an artist-in-residence for the first time as part of an Australian Network for Art and Technology (ANAT) funded program, which aims to bring art and science together in a mutually beneficial collaboration. The intention is that both parties will benefit, and that the artist will contribute seriously to research and not just be an observer. The residency was supported by both ANAT and the AWRI.

An application process was coordinated by ANAT, and AWRI staff were involved in the selection of the successful artist. Ten strong applications from artists around Australia were received. The successful artist, Brisbane-based Elizabeth Willing, was interested in exploring 'cross-modal' synaesthetic harmony between wine sensory properties and visual forms such as colours or shapes.

Elizabeth has a background in using food and beverages in her art practice.

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She has a Masters of Fine Art and a Fine Arts degree from Queensland University of Technology. She has undertaken a residency in Helsinki, exhibitions and work in New York, London, Berlin, Denmark, Basel, Melbourne and Brisbane, and is represented by the prestigious Tolarno Galleries in Melbourne.

Her residency initially involved discussions with AWRI researchers from a wide range of backgrounds to look for areas that might spark both scientific benefit and creative outcomes in Elizabeth's practice, bringing the two worlds of art and oenology together. She wrote a fascinating blog during her time at the AWRI (https://willing2019.blog.anat.org.au/) where she touched on areas as diverse as the names and origin of yeast and bacteria; cell division; seeds and flowers; the lack of 'hospitality' of wine in barrel to potentially harmful microorganisms; and beneficial insects in the vineyard, amongst many others. Given her interest in wine flavour, it was logical that she spent most time working with AWRI sensory scientists for the residency. During her stay, Elizabeth worked very much hands-on in helping to set up different types of sensory tests, and was involved in regular sensory panel projects.

The main area that Elizabeth and the sensory team were interested in looking into was the translation of wine flavour into the sense of sight through a visual image. Cross-modal interactions between the senses are generally important influences on perception and tasting experience in foods or drinks, with aspects such as the weight of a bottle, plate or utensil, or the colour of a food having large psychological effects on how flavour is comprehended. Synaesthesia is the condition

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of blending of the senses, where one sense, such as sound, can generate in some individuals the perception of another sense, such as colour. There is increasing evidence that this phenomenon is more widespread than previously thought, with many variations. Synaesthesia is known to occur in taste and smell (University of Sussex 2022).

It was decided to work with Shiraz wines and investigate whether there can be firm associations of red wine flavour properties with visual elements. From an industry point of view, the work has potential practical benefit for wine packaging and marketing, with 'sensory branding' having been used in recent years by food and beverage companies to harmonise the overall product experience with a product's sensory properties.

CONFIRMING THE AROMA AND FLAVOUR PROPERTIES OF THE WINES STUDIED

A set of six commercially-produced Shiraz wines sourced from Canberra, Yarra Valley, McLaren Vale, Barossa Valley and Coonawarra were used in the project, with one Shiraz-Grenache blend. The wines were selected as representing a wide range of styles, and several of the wines had been recently included in a multi-region terroir study. The wines were not selected as necessarily being representative of their regions, with the selection criteria only involving the inclusion of wines with diverse sensory characteristics.

The wines were first characterised using the conventional quantitative descriptive analysis sensory method. A trained panel determined the intensity of defined attributes, with the results shown in the form of a Principal Component Analysis plot (Figure 1). In Figure 1 those attributes situated close to a particular wine were rated highly in that wine.

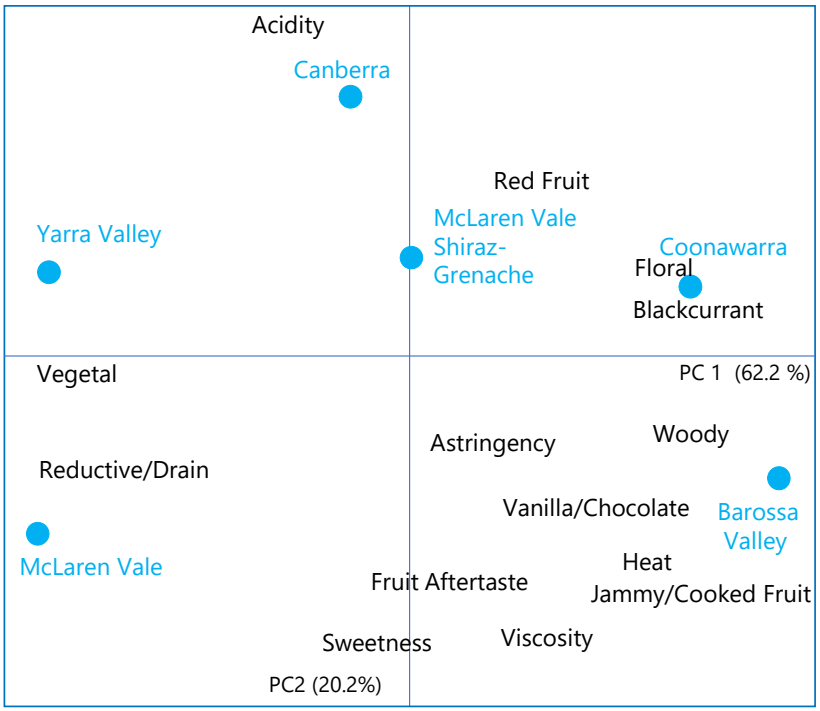

Figure 1. Overview of the sensory properties of the six Shiraz wines studied based one results from a trained sensory descriptive analysis panel. Each wine is represented by a blue dot.

The Yarra Valley wine was rated notably highly in vegetal (green) aroma, while the McLaren Vale Shiraz was also relatively high in vegetal but had a low level reductive aroma as well, while having high viscosity, sweetness and fruit aftertaste. The Barossa Valley wine was viscous, jammy, hot, oaky and slightly sweet, while the Coonawarra wine showed more blackcurrant and floral notes, with some red fruit. The Canberra wine was less viscous, more acidic, and was rated relatively highly in red fruit. The McLaren Vale Shiraz-Grenache blend was intermediate in most attributes, with stronger red fruit and floral aroma. Overall, the six wines were quite distinct and were good candidates for a visual association test.

CAN RED WINE FLAVOUR DIFFERENCES BE TRANSLATED TO VISUAL IMAGES?

Several sorting-type tasks were conducted with the six Shiraz wines to assess associations of wine flavour with colours and shapes. The wines were tasted in black glasses, with 62 assessors asked to taste a wine and place it on a colour grid surface (Figure 2a), and separately on a line with different degrees of angularity/smoothness (Figure 2b). The assessors were AWRI staff, with widely differing wine sensory experience, most of whom were not trained sensory panellists.

While all wines in the study were Shiraz (with one Shiraz/Grenache blend), the colours that the panel associated with the wines when tasted in black glasses were surprisingly distinct. Figure 3 shows that the Canberra District wine, which was relatively acidic, was associated with red colours, while the vegetal/stalky Yarra Valley wine was mapped in the green part of the grid. The high dark-fruit-flavoured McLaren Vale wine was associated with deeper blue/purple colours, and the Shiraz-Grenache blend with floral and red fruit characters was related to yellow shades. There were notable statistically significant differences among the wines, as assessed by 95% confidence ellipses.

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Regarding the scale used for associations with smooth, curving shapes versus angular, spiky shapes, the Coonawarra and Barossa wines with higher astringency (drying, tannic) were indicated as more spiky, while the softer, slightly sweeter wines were associated with the more curved part of the scale.

a) Please taste the wine and think about what colour best represents the flavour of the sample. Closing your eyes while tasting might help distinguish and clarify your decision.
Drag and drop the pin onto the colour grid as closely as possible to your colour association.

b) Please taste the wine and place the pin along the line at the point where you think the flavour of the sample is best represented.

Figure 2. Instructions to the assessors in tasks designed to determine links of wine flavour with a) colours or b) shapes.

Elizabeth considered the results carefully, looking at the spread of responses and the differences in colours and shapes chosen by individuals. She also interpreted the results with the help of a smaller panel who were asked to 'draw wine flavour' using colours within a circular area with subsequent discussion of how they felt about the tasks. After a period of work in her studio, Elizabeth developed artworks for each of the wines that took into account all the information gathered, as well as her own art practice, insight and training. Elizabeth notes that she was frustrated by the data being condensed down to a single point on a graph, whereas the artworks provided a space to acknowledge a range of clustered responses. The six wines were represented as circular images with different shadings and tones painted by Elizabeth in watercolour and pencil. Aromas were featured as background colours while taste formed the foreground details. Figure 4 (page 44) shows the images for three of the wines. The six watercolours were acquired by the AWRI and are now displayed in the AWRI boardroom.

DOES A COMPLEMENTARY IMAGE INCREASE ENJOYMENT OF A WINE?

As a final step in Elizabeth's residency the effect of the images on the wine consumption experience was evaluated using a preference study (n=38 assessors). This relatively small part of the project aimed to assess if viewing the paintings had a measurable effect on wine enjoyment and pleasure. Several wines were tasted blind under three conditions: in a white sensory booth, a booth decorated with the yellow/light red graphic that was developed by Elizabeth to match the McLaren Vale Shiraz-Grenache wine (Figure 4b), and a booth with a purple/pink/light red graphic matching the Coonawarra wine (Figure 4c). The order of the different environments that the panellists tasted in was randomised across the assessors, with a single set of the three wines assessed per tasting session.

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The results suggest that the graphics affected preference for only one of the wines, the McLaren Vale Shiraz, with the results shown in Figure 5 (page 44). There was evidence (P=0.05) that the yellow-dominated artwork that was developed to match the Shiraz-Grenache wine resulted in a lower liking response for the McLaren Vale Shiraz compared to the same wine tasted in the booth decorated with the more purple/pink/light red artwork that matched the Coonawarra Shiraz. It should be noted that this was a small study, completed right at the end of Elizabeth's residency when time was limited, and further work is required to confirm the validity of these results. If confirmed, the results provide the possibility of options for differentially increasing enjoyment through

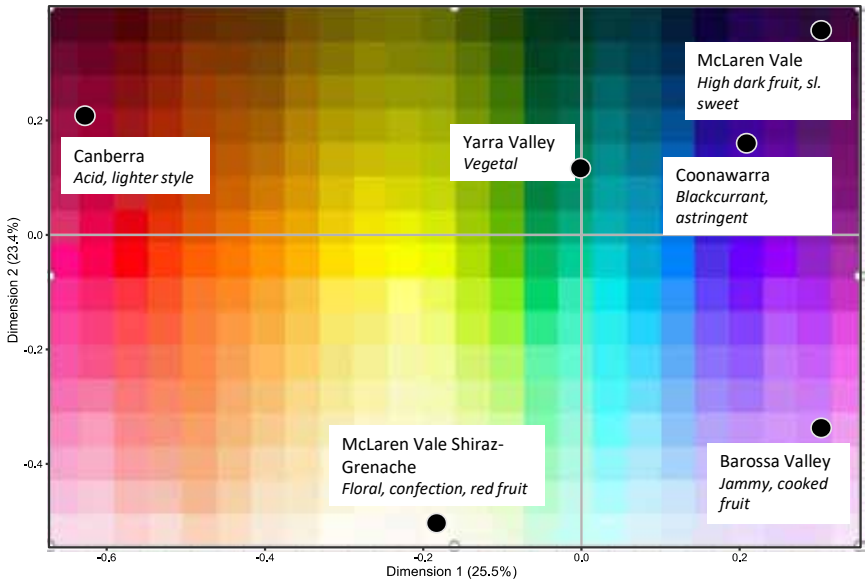

Figure 3. A representation of the colours associated with the flavour of six young commercially produced Shiraz wines (including one blend) by a group of 62 individuals, tasting the wines in black glasses. The set of descriptors associated with each wine are taken from the sensory descriptive analysis study.

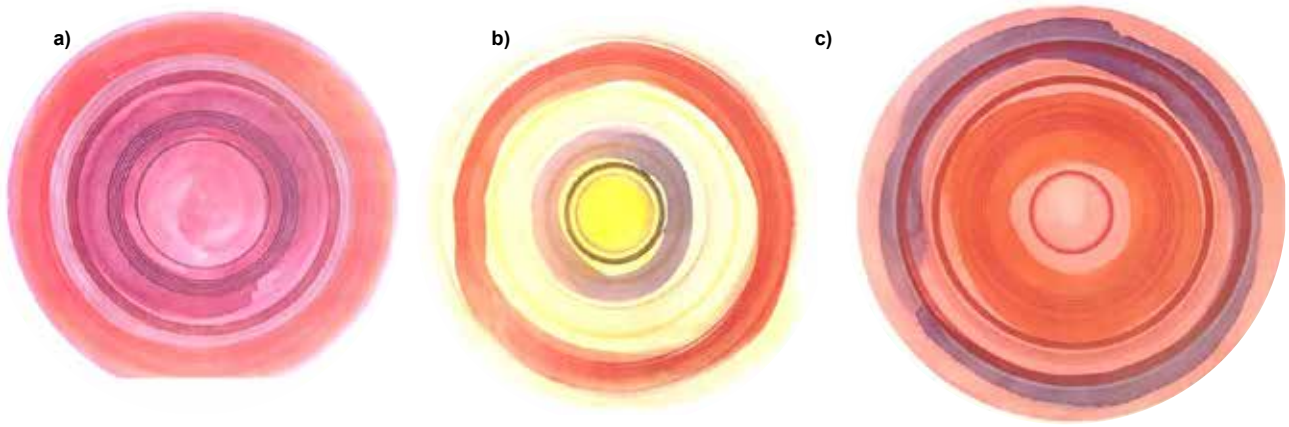

Figure 4. Images of the watercolours produced by Elizabeth Willing that were associated with the flavours of the a) McLaren Vale Shiraz wine b) McLaren Vale Shiraz-Grenache wine and c) Coonawarra Shiraz wine.

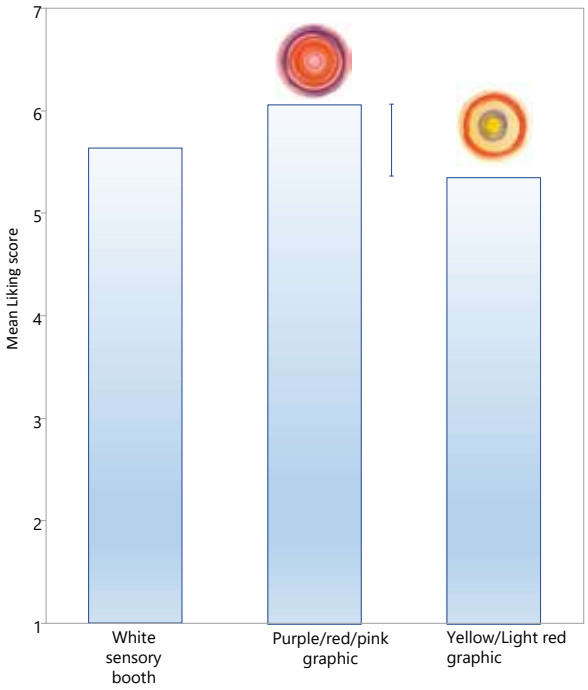

Figure 5. Liking scores for the same McLaren Vale Shiraz wine tasted by 38 assessors under three randomised conditions: in a plain white tasting booth or in a booth decorated with two different artworks developed by Elizabeth Willing (shown in Figure 3).

visual elements for in-store tastings or cellar door settings, or 'experience' type events. In this case, for the selected McLaren Vale Shiraz wine, yellow/pale red visual cues might be avoided in favour of bolder colours in packaging or promotion materials.

CONCLUSION

From a practical viewpoint, the associations of flavour and wine style with visual elements could be used by producers to align packaging and marketing cues to match or complement wine sensory perception, with a view to enhancing the tasting experience. Conversely, careful wine selections may, in turn, further elevate the experience of art. This goes further than relatively simple 'sensory branding' approaches, such as where pink rosé-style wines might be marketed with pink visual elements on a label or promotional material. Given the strong influence the visual sense has on other senses it is logical that images in labels or packaging that are closely related to or harmonious with specific wine aroma and flavour profiles could increase enjoyment and potentially increase the likelihood of consumers repeat purchasing. Further work would be needed to confirm the practical significance of this work, and expanding to other wine styles and varieties would be fascinating.

After her residency, Elizabeth worked with the well-regarded East Brisbane restaurant 'The Wolfe' in a year-long chef collaboration where the Shiraz circle paintings were turned into napkins, and the actual wines were on an Artist Degustation menu. Unfortunately, due to the COVID-19 pandemic, the collaboration was cut short. Elizabeth may develop a larger exhibition stemming from her experiences at the AWRI. While COVID restrictions affected any further developments, artist in residence visitors through ANAT may be supported in the future.

Overall, even though the project was a small component in the overall AWRI sensory research program, it was intriguing to work with an artist with a very different approach to the senses than the highly analytical one practised in our industry. The demonstration of the quite strong associations of the visual sense with wine flavour was unexpected, and it would be fascinating to pursue these links further.

REFERENCES

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