

FlavourFrame: Visualizing Tasting Experiences

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ABSTRACT

We present FlavourFrame, a canvas-based app that helps tasters capture and visualize their perceptions during mindful tasting experiences. Taste perceptions are difficult to document because they are subjective, multisensory, and ephemeral; and everyday people have limited dedicated vocabulary to describe such experiences. Our customizable tool is designed to help novice and experienced tasters structure and record tasting experiences. FlavourFrame superimposes visual and text layers to personalize visual and word-based expression of flavor experience. Through autoethnographic reflections, we generated sample data and identified strengths and limitations of the prototype.

CCS CONCEPTS

• **Human-centered computing** → **Visualization; Interaction design.**

KEYWORDS

human-food interaction, taste, perception, design, visualization

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1 INTRODUCTION

In mindful eating and deliberate tasting, tasters focus their awareness of how they sense food and drink [7]. Tasters develop their ability to appreciate and evaluate flavour through reflective practice across repeated tasting experiences, over time. However, taste perception is subjective, ephemeral, and elusive, which makes the sensory experience challenging to represent in a concrete way.

We informed our design of a mindful tasting system by looking to research from food science and human-food-interaction. People need time to develop expertise in flavour discernment and mindfulness around eating [6]. If a taster is tracking their journey, they might record their tasting experiences in words. In such descriptions, tasters use multisensory descriptive words, like “sweet” or “crunchy” [2]; reference foods, like “citrus” or “cinnamon” [11]; and abstract associations with the tasting experience, like colours [10],

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Figure 1: Taster sketching with FlavourFrame to represent mint tea tasting. Credit: Elyse Bouvier, University of Calgary.

shapes [3], or music [13]. Novel, improvised, multisensory comparisons are a powerful way to describe perception when there is a dearth of dedicated vocabulary [12]. Purely linguistic representations offer **flexible, personal, and accessible** ways of expressing taste. However, a sample’s flavour might dissipate long before a taster finds the words to describe it.

Meanwhile, visual tools like tasting wheels or score sheets prompt and structure reflection during tasting sessions [11]. Gayler et al. [5] tested a prototype self-tracking system for tasting experiences. Their design focused on deeply structured quantification of sensations and used a variety of coding schemes and visualisations. This analytic approach to breaking down taste perception can be valuable for novice tasters, but holistic approaches that abstract the experience are more beneficial for practiced tasters [6]. Experimental evaluation of Gayler et al.’s prototype highlighted eaters’ interest in tools that capture the personal aspect of subjective taste and facilitate condensed summaries of past experiences. Tasting wheels and score sheets offer an **efficient, practical, and structured** approach to tasting that works well for an analytical experience. However, these pre-defined reference vocabulary or dimensions may exclude tasters who come from different cultural or graphical backgrounds than the tools’ designers, and may not capture the holistic experience of tasting. Our goal is to create a tool that is **accessible to novices, but flexible and relevant to experts** as they develop their palate over time.

We created FlavorFrame (Figure 1) — a prototype tool for capturing and visualizing subjective tasting experiences. FlavorFrame accommodates concrete and abstract associations from word-based representations, as well as efficient, expressive visual structures. Tasters can continuously use FlavorFrame as they develop tasting expertise, and as their focus evolves from analytic representations to holistic impressions. Our preliminary reflections based on the authors’ use of our prototype highlight its potential, its limitations, and directions for future work.



Figure 2: Representations of tasting experiences generated using FlavourFrame

2 FLAVOURFRAME

In FlavourFrame, each sample of a food or drink is represented on a canvas with three superimposed layers: a background **frame** layer, a **flavour** layer, and an **annotation** layer.

Prior to tasting, tasters create **frames** with a consistent yet personal structure that focuses on individual aspects of flavours. Frames are black-and-white drawings, and can illustrate a various structures, from chart axes to anatomical maps. Frames can be reused for any number of tasting experiences or be blank. Tasters can design and modify frames as a way of customizing the system to their own tasting priorities. Our Frames concept builds on the notion of substrates as background layers to guide and constrain drawn input [4]. After selecting a frame, the taster adds to a **flavour** layer during the tasting experience. Drawn strokes in the flavour layer are wider, semi-opaque, and colourful. Alongside the flavour illustration, the taster can add text **annotations** around the canvas as needed. Figure 2 shows canvases produced using FlavourFrame; the last two flavours were constructed onto the same frame.

We prototyped FlavourFrame [1] as an iOS app in the Swift language. Designed for use on iPad with Apple Pencil, it uses the SwiftUI and PencilKit frameworks to implement the views for drawing frames and flavours. Existing frames and flavours are labelled with a title and displayed in an image grid of thumbnail images, where they can be edited or duplicated.

3 REFLECTIONS

The three co-authors recorded our own tasting sessions using the prototype over a period of several weeks. Our preliminary reflections below offer directions for future development and research.

Quick strokes persist impressions. The free-form, visual nature of the flavour layer helped us manage the ephemeral nature of taste. We found that when taking a bite, we could quickly add a few expressive strokes in the moment, while the taste still lingers in our mouth. While writing text requires translation into a linguistic medium, we found the visual penstrokes allowed us to start depicting flavour almost instantaneously. We improvised using colours and shapes to represent characteristics of each sample, whether concretely or metaphorically. The visual reference helped persist the experience, acting as a form of external memory while we came up with words to describe the experience. Our text annotations included descriptive words (*murky*, *astringent*, *chewy*); reference foods (*berry*, *peppercorns*, *rhubarb*); and other notes on the tasting (*Ethiopia* (coffee country of origin), *marching band* (music that came to mind)). These notes add meaning to improvised abstractions such that the representation is more comprehensible in the future.

Frames reflect personal analogies. We found that the customized frames offered the freedom to structure our perception according to our respective backgrounds, and allowed us to focus on the most personally relevant frameworks and analogies. We each naturally gravitated toward markedly different types of representations — the first author with a background in linguistics and mouth anatomy preferred an anatomical map; the second author with a background in product design preferred to sketch three-dimensional objects; the third author with a background in information visualization preferred abstract, graphical structures. We also used frame designs to go beyond describing perceived flavors; we each found creative ways to use colour, shape, and visual composition to represent the evolution of the flavour over time, the pleasantness of the experience, and/or the textural response to the sample. These three qualities of temporality, affectivity, and embodiment are fundamental dimensions of expression in taste experiences [8]. Frames allowed us to each create tailored substrates that match our distinctive conceptualization preferences, and reflect on how we navigate taste in a personalized way.

Tasters wonder about trends. Although FlavourFrame helped us quickly record and prompt reflection during individual experiences, it still lacks support for long-term self-tracking. Self-trackers want to handle their data and pull insights from it [9]. Similarly, we want to visualize and compare sets of flavours and reflect on trends across our tasting sessions. For comparison, flavours that share a frame can be superimposed and their opacity adjusted to compare and contrast them. Based on our initial selection of several dozen FlavourFrame sketches, we also brainstormed a variety of possible designs for visualizing evolving collections of taste experiences. These included visualizations that clustered thumbnails, annotation keywords, and samples from the sketches to create timelines, canvases, and other layouts that could help tasters synthesize and compare experiences. We plan to prioritize developing visualizations of long-term collections of flavours in our future work.

4 CONCLUSION

FlavourFrame uses a simple multilayer canvas to let tasters represent their personal, efficient, expressive, and creative experiences. It accommodates both analytic and holistic approaches to tasting, and can be customized to individuals' preferred conceptualizations. In the future, we intend to explore visualizations of multiple tasting sessions across longer periods of time, allowing tasters to aggregate and compare their experiences, and develop an appreciation for how their tasting ability evolves over time.

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REFERENCES

- [1] Lauryn Anderson. 2023. FlavourFrame. <https://github.com/lauryn-anderson/FlavourFrame/>.
- [2] Carrie Ankerstein and Gardarine Pereira. 2013. Talking about taste. In *Culinary Linguistics*, Cornelia Gerhardt, Maximiliane Frobenius, and Susanne Ley (Eds.). John Benjamins, Amsterdam, Netherlands, 305–316. <https://doi.org/10.1075/clu.10.13ank>
- [3] Maisa M. M. de Sousa, Fabiana M. Carvalho, and Rosemary G. F. A. Pereira. 2020. Do typefaces of packaging labels influence consumers' perception of specialty coffee? A preliminary study. *Journal of Sensory Studies* 35, 5 (2020), e12599. <https://doi.org/10.1111/joss.12599>
- [4] Jérémie Garcia, Theophanis Tsandilas, Carlos Agon, and Wendy Mackay. 2012. Interactive Paper Substrates to Support Musical Creation. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '12)*. ACM, New York, NY, USA, 1825–1828. <https://doi.org/10.1145/2207676.2208316>
- [5] Tom Gayler, Corina Sas, and Vaiva Kalnikaitė. 2022. FlavorDesigner App: Capturing Multisensory Experiences and Crafting Personalized Flavors for Cueing Their Recall. In *Designing Interactive Systems Conference*. ACM, New York, NY, USA, 1441–1456. <https://doi.org/10.1145/3532106.3533474>
- [6] Kathryn A LaTour and John A Deighton. 2018. Learning to Become a Taste Expert. *Journal of Consumer Research* 46, 1 (2018), 1–19. <https://doi.org/10.1093/jcr/ucy054>
- [7] Michael Mantzios. 2021. (Re)defining mindful eating into mindful eating behaviour to advance scientific enquiry. *Nutrition and Health* 27, 4 (2021), 367–371. <https://doi.org/10.1177/0260106020984091>
- [8] Marianna Obrist, Rob Comber, Sriram Subramanian, Betina Piqueras-Fiszman, Carlos Velasco, and Charles Spence. 2014. Temporal, Affective, and Embodied Characteristics of Taste Experiences: A Framework for Design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '14)*. ACM, New York, NY, USA, 2853–2862. <https://doi.org/10.1145/2556288.2557007>
- [9] Aykut Coşkun and Armağan Karahanoğlu. 2022. Data Sensemaking in Self-Tracking: Towards a New Generation of Self-Tracking Tools. *International Journal of Human-Computer Interaction* 39, 12 (2022), 2339–2360. <https://doi.org/10.1080/10447318.2022.2075637>
- [10] Charles Spence. 2020. Scented Colours: Artistic Interest in the Crossmodal Connection Between Colour and Odour. *Baltic International Yearbook of Cognition, Logic and Communication* 14 (2020), 1–42. <https://doi.org/10.4148/1944-3676.1125>
- [11] Molly Spencer, Emma Sage, Martin Velez, and Jean-Xavier Guinard. 2016. Using Single Free Sorting and Multivariate Exploratory Methods to Design a New Coffee Taster's Flavor Wheel. *Journal of Food Science* 81, 12 (2016), S2997–S3005. <https://doi.org/10.1111/1750-3841.13555>
- [12] Alexandre Surrallés. 2016. On contrastive perception and ineffability: assessing sensory experience without colour terms in an Amazonian society. *Journal of the Royal Anthropological Institute* 22, 4 (2016), 962–979. <https://doi.org/10.1111/1467-9655.12499>
- [13] Jacob Thompson-Bell, Adam Martin, and Caroline Hobkinson. 2021. “Unusual Ingredients”: Developing a cross-domain model for multisensory artistic practice linking food and music. *International Journal of Food Design* 6, 2 (2021), 233–261. https://doi.org/10.1386/ijfd_00032_1