What We Talk about when We Talk about Food Experiences

Yihan Kang†
Department of Computer Science
University College London
United Kingdom
yihan.kang.22@ucl.ac.uk

Shu Zhong
Department of Computer Science
University College London
United Kingdom
shu.zhong.21@ucl.ac.uk

Sriram Subramanian
Department of Computer Science
University College London
United Kingdom
s.subramanian@ucl.ac.uk

Marianna Obrist
Department of Computer Science
University College London
United Kingdom
m.obrist@ucl.ac.uk

Abstract

Verbally expressing taste experiences is challenging for non-experts, whose subjective and semantically inconsistent descriptions often use basic terms (e.g. sweet, nice), unlike trained experts such as chefs. Understanding non-expert taste expressions is crucial for enhancing communication between humans as well as humans and computers for enhanced human-food interaction experiences. This research investigates how non-experts express taste experiences using common foods as taste stimuli. Study participants were asked to verbalise their subjective experiences of five selected foods (i.e., dark chocolate, crisps, mango juice, lemonade, cheese), each representing one of the five basic tastes (i.e., bitter, salty, sweet, sour, umami). These qualitative data was enriched with self-report questionnaires on the liking, familiarity, and perceived intensity of the taste stimuli. We discuss participants verbalisations with regards to five key dimensions: affective, temporal, embodied, associative, and evaluative, illustrating how expressions unfold in time (diachronic structure) and their specific configurations at different moments (synchronic structure). This exploratory is only forming the beginning to understand the complex, multi-faceted nature of how we talk about food experiences.

CCS Concepts

• Human-centered computing • Human computer Interaction (HCI) • Empirical studies in HCI.

† Contact author

MMFood '25, October 27–28, 2025, Dublin, Ireland.

ACM ISBN 979-8-4007-2046-8/2025/10.
https://doi.org/10.1145/3746264.3760492

Keywords

Taste; food experiences; taste language; sensory research; qualitative interviews; human-food interaction

ACM Reference format:

Yihan Kang, Shu Zhong, Sriram Subramanian and Marianna Obrist. 2025. What we talk about when we talk about food experiences. In *Proceedings of the 1st International Workshop on Multi-modal Food Computing (MMFood '25), October 27-31, 2025, Dublin, Ireland.* ACM, New York, NY, USA, 9 pages. https://doi.org/10.1145/3746264.3760492

1 Introduction

Food has served as a mediator of communication medium since the dawn of humankind and the development of human societies [12] such as sharing meals to convey the joy of a hunt or monarchs hosting lavish banquets to display national strength. These communications are primarily non-verbal, with the food speaking for itself. Moreover, effective communication around food – tastes and flavours – is essential for daily social interactions, from seasoning a shared meal to recommending a food, which is also referred to 'taste negotiation' [3]. The verbal expression that underpins this taste negotiation is, however, notoriously complex. Taste perception is inherently subjective, shaped by genetics and experiences [3, 6]. Hence, understanding the relationship between language and perception/cognition [37] remains not well understood, especially when focusing beyond experts, like Chefs, and putting a spotlight on lay people who are however exposed to food every day, likely involving others. Beyond the simple human sharing of meals, there is a growing interest in novel human-food interaction systems, which include innovations like digital foods [1] and conversational supports [33]. A key challenge for these technologies is finding a way to translate our sensory perceptions into communicable data, both verbally and textually. This challenge is exacerbated by a lack of specific vocabulary in common English usage to convey the subtleties of taste experience [2]. To make this communication truly effective, what is presently missing is understanding how people describe their taste experience. A fundamental study by Obrist et al. [26]

demonstrated that basic taste experiences are described using temporal, affective, and embodied dimensions. However, it's still unclear how we move from those basic tastes to common foods, specifically how people describe food experiences in everyday life. Here, we investigated how non-experts (i.e., not professionally working with food) express their experiences with common foods, using a semi-structured interview approach, combined with self-report ratings. We use the taste experience framework established by Obrist et al.'s [26] as a starting point for first selecting food items representing each basic taste and second analysing the participants data with regards to their temporal, affective, and embodied dimensions. Based on our lab-based study, we identified two new themes linked to cognitive processes and personal factors: 'associative cognitions' and 'evaluative judgments', that expand the verbalisations focused on basic taste towards common foods. Our findings add new insights on the subjective taste verbalisations, how they unfold over time (diachronic/temporal structure) and specific configurations (synchronic/experiential structure). We discuss how this exploration of participants expressions around food are linked to basic tastes and can inspire future Human-Food Interaction (HFI) design, offering designers and experience researchers a multi-layered framework to navigate this design space as well as offer more effective communication opportunities.

2 Related work

2.1 Growing importance of human-food interaction (HFI) design

Human-Food Interaction (HFI) has recently become a burgeoning topic within the HCI community, aiming to enrich experiences across culinary preparation, dining, and consumption [4, 9, 23]. Research in this area is diverse: some efforts use food itself as an interactive material for design [10], while others use multisensory technologies to digitally augment a drink [34]. Concurrently, there is a significant push to digitize the sense of taste through technologies like electronic tongues [41] and electrical gustatory stimulation [31], with the ultimate goal of simulating [5] and communicating flavours remotely [32].

Despite these technological advances, a fundamental challenge remains. A food experience is not a single sensation but an integrative, multisensory process where vision, aroma, sound, and touch collectively shape our perception [14, 17, 34]. While HFI research acknowledges this, it often struggles to incorporate personalization, a core tenet of HCI. Individual differences, stemming from both physiological factors (like taste sensitivity) and acquired preferences, are vast [43].

One commonly used measure of individual taste sensitivity in sensory science is taster status, which assesses a person's subjective sensitivity to bitterness. The result from this taste test, helps to classify people into supertasters (approximately 25% of the population), normal tasters (50%), and non-tasters (25%) [8]. Some studies have found correlations between taste preferences and factors such as taster status and genetic variation, these relationships remain insufficiently explained [6, 22]. Beyond these factors, it is crucial for designers to have a language to talk about 'what to design for' and hence understanding how we talk about taste and flavour is key to design taste-based experiences that people can relate to.

2.2 Talking about taste and flavour experiences

In sensory science, taste (gustation) is the basic perception of five qualities (sweet, sour, salty, bitter, umami) on the tongue [20]. Flavour is a complex, multimodal perception created by the brain, integrating taste with aroma from retronasal olfaction and other sensory inputs like texture [19, 34]. Both are attributes of food, the complex physical entity we ultimately consume [18]. This conceptual hierarchy thus provides a framework to investigate the food experience itself: how we build upon basic tastes to perceive complex flavours, and ultimately, what we talk about when we talk about our rich encounters with common foods.

Describing the flavours and tastes we experience through language is an inherently challenging task. Early approaches to traditional flavour characterization, such as "Flavour Profile" method [7], were typically conducted in industrial settings by "experts", who primarily relied on category scales included words or numerical categories to characterize specific sensory attributes of a product. A major challenge lies in the fact that the categorical terms and intensity levels used in these scales may not convey the same meaning to all individuals. This variability is fundamentally rooted in subjective differences among individuals [35].

From a linguistic perspective, taste descriptions often include both descriptive and evaluative elements [21]. For example, in wine tasting, "bland/weak" are typically negative, while "heavy" conveys a positive evaluation. Additionally, people often use metaphor and extend meaning from non-gustatory semantic domains to creatively express taste. For instance, describing a sweet and assertive wine as "a real treasure".

Obrist et al. [26] employed an explicitation interview technique [29] to help people verbalise their subjective taste experiences, examining both diachronic (how an experience unfolds over time) and synchronic (experiential configuration at a specific moment) dimensions of basic taste stimuli. The qualitative descriptions from their interviews provide valuable insights into the initial exploration of subjectivity in taste experiences, highlighting the temporal, affective and embodied responses that differ across the five basic tastes. While this work provided valuable insights into framing taste experiences in the growing field of HFI, its scope is limited to the basic tastes. Here we aim to expand on it towards everyday foods and flavours.

In summary, research particularly in the field like Culinary Linguistics [11] has established structured descriptive lexicons for professionals. However, these studies have predominantly focused on expert populations, leaving a significant gap in understanding how non-experts articulate taste experiences. While foundational work such as by Obrist et al. [26] explored non-expert descriptions of basic taste experiences, inquiries of more complex and holistic experiences of common, everyday foods, is still in its infancy.

Image						
Basic taste	Familiarization	Sweet	Sour	Bitter	Salty	Umami
Stimuli used	Plain cookie	Mango juice	Lemonade	Dark chocolate	Salty crisps	Cheese ball
Amount	1 pc (~15g)	15-20ml	15-20ml	1 pc (~8.8g)	3-4 pcs (~3.6g)	1 pc (~20.5g)

Figure 1: The sensory stimuli used in the experiment to elicit the five basic tastes (sweet, sour, bitter, salty, umami) and for the familiarization phase. The table displays an image of each stimulus, its corresponding taste category, the specific food or beverage item used, and the amount provided to participants.

3 Study aim and method

This study aimed to explore non-expert taste expressions of common foods, employing a mixed-method approach that combined semi-structured interviews with questionnaires. Questionnaires were utilised to gather data on personal factors pertinent to taste expression, such as demographic characteristics and food familiarity, while the semi-structured interviews, drawing inspiration from elicitation interview techniques [26, 29], aimed to elicit verbal expressions of participants' subjective taste experiences.

This mixed-method approach guided the exploration of the diachronic and synchronic dimensions of the taste experiences, thereby enabling a structured investigation of its temporal framework (e.g., identifying distinct experiential phases or transitions). To enrich the verbal reports and record the temporal dynamics even more, we used two generalized Labeled Magnitude Scales (gLMS) [13, 39] (see templates in Figure 2). These quasi-logarithmic scales allowed participants, during the tasting process, to directly depict on the gLMS the perceived intensity, duration, and dynamic evolution of basic tastes, as well as the evolution of their hedonic ratings. Specific-colored markers represented different basic tastes.

A total of twelve participants (6 male, 6 female), with an age range of 23–55 years (M=31.58, SD=10.59), were recruited for the study. Prior to participation, individuals were screened to confirm self-reported normal olfactory and gustatory function and the absence of known food allergies or intolerances relevant to the selected stimuli. The participant cohort comprised seven native English speakers (from the UK and Ireland) and five non-native English speakers (from China, Afghanistan, Cyprus, and India), all of whom demonstrated high proficiency in spoken English. The study was approved by the local University Research Ethics Committee, and all participants provided written informed consent before commencing with the study.

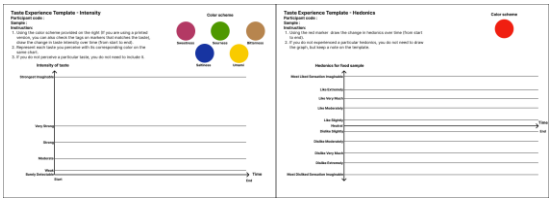

Figure 2: Labeled Magnitude Scales (gLMS) templates [39]. Left shows template for change of perceived taste intensity over time, with different colours corresponding to each basic taste. Right shows template for rating changes in hedonic liking over time, indicated in red.

3.1 Stimuli selection

Sweet, sour, salty, and bitter are widely recognized as basic tastes, while umami [24] is often missed in western cultures. Building on the design framework by Obrist et al. [26], we use the five basic tastes as a foundation to explore the broader experience and communication of food. A selection of five food stimuli was selected (see Figure 1), each representing one of the five basic taste attributes: mango juice (sweet) [16], lemon juice (sour) [42], 100% dark chocolate (bitter) [30], salty crisps (salty) [17], and a cheese ball (umami) [36]. All the specified food materials have been used in prior food-related study and taste perception research and applications. The participants received 15-20ml of each liquid stimulus in a clean shot glass, one piece of solid stimulus (dark chocolate, cheese, and cookie), and 3-4 pieces of salty crisps.

Before starting with the main study, participants went through a familiarization phase. In this phase, a plain cookie was used. Between each stimulus, participants were offered plain unflavoured water to rinse their mouth. All food samples were freshly prepared using commercially available products (purchased in grocery stores), adhering to vendor instructions and health and safety guidelines on storage and use dates. The researcher handled and served each sample using gloves and tweezers to ensure hygiene and consistency across participants.

3.2 Study set-up and procedure

The study was conducted in a dedicated research laboratory (see Figure 3). The participants were instructed and reminded 1 day prior to the study not to eat spicy food 24 hours before the study, not to drink alcohol 6 hours before the study, and not to drink or eat 1 hour before attending the study. Before signing the consent form and commencing with the study, participants were asked again to confirm any food allergies and any other smell/taste related impairments (e.g. cold, flu). Upon singing the consent form, participants were comfortable seated at a table where the respective food stimuli were presented one after another in a randomised order.

Participants were guided through three sequential sessions, initially as part of the familiarization phase with a plain cookie, and then for each of the five food stimuli:

1. *Tasting:* Participants were instructed to taste the food stimulus and to focus on the sensory characteristics.
2. *Drawing task:* Participants were provided with the gLMS templates to graphically represent the perceived intensity of each tasted stimulus and their hedonic liking of the sample over time.
3. *Describing task:* Participants verbally described their taste experience. A semi-structured interview, following the principles of the explicitation technique [29] was used to help participants verbalise their tasting experiences.

Participants were given the option to undertake the Tasting and Drawing sessions sequentially (tasting first, then drawing) or concurrently (simultaneous), according to their preference. This flexibility was designed to reduce the impact of the experimental setting on participants' free expression, thereby collecting data more aligned with their everyday experiences. Regardless of their chosen approach, the Describing task only commenced once both the Tasting and Drawing parts were completed. This procedure was practiced in the initial familiarization phase with a plain cookie and then repeated for each of the five food samples (mango juice, lemonade, dark chocolate, salty crisps, cheese), in a randomized order to avoid bias. Between each sample tasting, participants were asked to take some sips of water to rinse their mouths.

After each tasting sessions the participants were also asked to complete a short questionnaire to rate their confidence of the provided descriptions of their taste experiences, familiarity of the food stimulus and basic tastes, and their preferences of each food stimulus to support the interpretation of the data.

Finally, we offered each participant to take a 'super taster test' (i.e., taster status), which classified them into supertaster, normal taster and non-tasters. This was less important to understand their taste expressions but was considered valuable for two reasons: 1) to provide participants with some insights into their taste capabilities and sensitivity, and 2) offering a distinguishing element for HFI design as the taste design space is emerging and growing within the. HCI field. Overall, the study lasted one hour, was audio recorded with the consent of participants, and participants compensated for their time with a £10 gift voucher.

Figure 3: The study set-up. Food samples were presented sequentially, in a randomised order, to participants. Participants were provided with gLMS templates, a set of color-coded markers corresponding to basic tastes, and a glass of water for rinsing between samples

3.3 Data analysis

Participants verbalisations for the five food samples (excluding the familiarisation phase) were transcribed verbatim, resulting in 12 audio recordings, with individual file ranging from 26 to 52 minutes. This process yielded a dataset of 60 cases (12 participants × 5 food samples), with each case denoted as [Participant, food sample] (e.g., [P01, mango juice]) as part of the data analysis process. All transcripts were imported into NVivo (Version 14), a qualitative data analysis software. A multi-phase qualitative content and thematic analysis was subsequently conducted by the lead author and iteratively discussed with another senior co-author.

The analysis procedure began with an initial content analysis using the coding scheme established in prior research by Obrist et al. [26], i.e. focused on temporal, affective, and embodied expressions as a first top-down analysis. Following this, a thematic analysis was performed to account for any new, emerging themes from the data. These new themes were then synthesized with the original three dimensions, resulting in a refined coding framework to capture taste experiences based on participants verbalisations. This refined coding scheme was applied in a second round of coding by the main author across all 60 cases to verify the findings and systematically organize and summarize the data for each of the 5 identified themes.

4 Study findings

We identified five main themes that help us organize the verbalizations from the participants: **affective, temporal, embodied, associative,** and **evaluative** – each of which will be discussed below. In addition, we captured participants 'taster status' [8]. Out of the 12 participants, 3 were non-tasters (25%), 5 were normal tasters (~42%), and 4 were supertasters (~33%). This distribution aligns well with established population proportions (25% non-tasters, 50% normal tasters, 25% supertasters), although our sample featured a slightly elevated proportion of supertasters, who express stronger aversion to bitter taste [8].

4.1 Temporality

Participants articulate immediate perceptions, such as the intensity, mouthfeel, or psychological sensations at a specific moment, which are often subject to dynamic shifts in intensity, perceived location, or flavour profile, and can possess a sustained presence (e.g., 'lingering', ‘remain’, ‘still there’).

This dynamic process typically involves a sequential unfolding of sensory experiences (taste, mouthfeel, flavour), wherein participants explicitly or implicitly report the order in which different attributes emerge. Such temporality is commonly conveyed through distinct linguistic markers (e.g., 'first,' 'then,' 'finally'). For instance: *“I could taste salty at the beginning. I could taste a bit of sweet at the end and I could only taste the like kind of sour like gassy taste (fizzy feeling) in the middle”* [P07, lemonade].

Individuals perceive the temporal aspects of sensory experiences differently. While they don't use specific timings like seconds, their descriptions of the same food reveal variations in perceived duration (“long” vs. “short”) and rate of change (“fast” vs. “slow”).

Individual sensory experiences are not always perceived as discrete; temporal overlap is common. When narrating such overlaps, the intrinsic relationship between basic tastes can introduce perceptual uncertainty. Some participants struggled to discern the intensity of a specific taste attribute within a complex flavour profile or found it challenging to differentiate between two co-present basic tastes: *“It was a bit confusing because the saltiness kind of like combines with the sour kind of flavour and then it is hard to distinguish like, am I tasting salty or am I tasting sour”* [P07, cheese].

The temporality of cognitive processes also influences taste descriptions, particularly regarding the allocation of attention. This cognitive engagement, whether sustained or minimal, can significantly alter the resulting experience and its articulation. As one participant reflected on their typical consumption versus the study's focused tasting: *” Normally when I eating this kind of snack, I won't have this kind of careful taste when I like, try to feel the taste of it. You know, I just eat it and swallow it and next one. Yeah, that's some extra feeling”* [P12, salty crisps].

Finally, while dynamism is a consistent feature, descriptions of heightened immediacy often correlate with particularly intense experiences or affective responses. During these peak moments, participants may employ vivid metaphorical language or specific temporal adverbs to convey this intensity, using phrases such as ‘like a firework everywhere’, ‘quite powerful punch’, ‘sudden outburst’, or ‘as soon as’.

4.2 Affective reactions

Affective responses within taste experiences encompass emotions such as pleasure or displeasure, and feelings of comfort, discomfort, or surprise linked to familiarity or expectation. During stimulus tasting, many participants articulate psychological expectations or conjectures. These expectations can function as an anticipatory evaluative baseline, often arising from an interplay between current multisensory cues (e.g., appearance, sound, mouthfeel, taste) and pre-existing associations (e.g., past taste experiences, preferences, familiarity), typically formed either prior to or concurrently with tasting.

The subsequent evolution of affective responses is significantly influenced by the comparison between actual sensory experiences and these initial expectations. This was particularly evident with dark chocolate: most participants, drawing from prior experiences with more conventional, sweeter chocolates, anticipated a degree of sweetness. As P02 stated, *“I was expecting a slight sweetness with there.”* When the actual sensory input disconfirmed this expectation, revealing prominent bitterness, participants unfamiliar with or averse to such a profile often reported negative affective responses, sometimes ceasing consumption. For example, *“I haven't found any of the other ones really unpleasant... I'd assume that's non-British cause British chocolate is normally so overloaded with sugar that sweetness would be the major flavour”* [P10, dark chocolate].

Furthermore, these affective responses are not static but can be modulated as experiences or associations evolve. For instance, initial discomfort arising from an unexpected mouthfeel or taste could be mitigated over time. Participants sometimes attempted to reconcile such aversive experiences by forming new associations with familiar foods or through an increased sense of familiarity with the stimulus itself. *“Not a good experience. ... but after you get used to the texture, it will become better. ... I try to link it to something that I used to eat so that it would give me a sense of like more comfortable to expect what's coming up”* [P01, cheese].

4.3 Embodiment

Embodied responses to food stimuli encompass both intra-oral sensations, pertaining to the direct experience of food within the oral cavity, and systemic reactions extending beyond this immediate region. Intra-oral sensations comprise a range of chemical and physical attributes, including texture (e.g., “soft,” “crispy”), temperature (e.g., “cool,” “warm”), viscosity (e.g., “sticky,” “smooth”), moisture content (e.g., “dry,” “wet”), and other chemically-induced sensations like the “fizziness” of carbonation or the “cooling” of mint.”

These physical mouthfeel characteristics were found to elicit affective responses, with tactile and gustatory sensations often being deeply intertwined. For instance, one participant articulated this connection: *“It makes you want to wash your mouth out a bit. Maybe that's more to get rid of the bitterness than your mouth is dry, but I think there is a bit of dryness there as well”* [P05, dark chocolate]. A temporal dimension was also associated with mouthfeel; participants often perceived sensations from liquid samples as more rapid and transient compared to those from solid samples.

Sensations related to the tongue were not limited to gustatory input. Participants described an “activation state” on the tongue using terms such as “excitement,” “shocked,” and “vivid.” Beyond the tongue, other oral structures including teeth, gums, and buccal mucosa contributed to the perception of mouthfeel. As one participant described: *“It gets kind of wet and like soft around your mouth or gums”* [P06, salty crisps].

The perception of food stimuli also demonstrated spatial evolution. Mastication could enhance gustatory intensity, potentially linked to the physical dynamics of swallowing and the distribution of taste receptors. Notably, however, gustatory sensations were reported in locations beyond traditionally recognized taste receptor sites, including the teeth, gums, palate, buccal mucosa (cheeks), and mandible. One participant remarked: *"I don't think the upper jaw… has taste buds. It shouldn't be able to feel the flavour, but it feels like a stronger feeling of saltiness from there rather than my tongue."* [P12, salty crisps]

Furthermore, perceptions extended beyond the oral cavity and gustatory system. Some participants described an awareness of the food's passage through the body post-ingestion, such as P02's experience with dark chocolate: *"…like under my tongue going down from my throat…I can feel it here, like my stomach draining."* Intranasal perception also contributed to the overall flavour experience, as noted: *"It's just the feeling of my chewing it and the smell of oil"* [P12, dark chocolate].

4.4 Association

Our findings indicate that association operates on two levels: as an explicit descriptive strategy and as an underlying psychological activity where the current food is benchmarked against familiar memories to generate an affective reaction. For example, P01 mitigated the unpleasantness of the cheese's mouthfeel by associating it with a familiar rice cake, thereby increasing her sense of familiarity.

In the context of describing food experiences, the descriptive strategy of associations refers to participants establishing and articulating connections between the current food stimulus experience and other entities or past personal experiences. Predominantly, these associative descriptions serve to emphasize or elucidate specific attributes of the ongoing sensory event. This is often achieved by linking the stimulus to analogous food items or autobiographical experiences that are reported to evoke similar sensory characteristics and affective responses. For instance, P02 described an association as: *"like medicines or pills and they taste very kind of bitter and awful"* [P02, dark chocolate].

Furthermore, such associations are employed to compare and relate attributes, not only with external referents but also between different food samples presented within the experiment. For example: *"it's still very fizzy, fizzier than the Rubicon (mango juice)"* [P06, lemonade].

However, associations rooted in similar experiences do not always function to merely highlight the immediate sensory input. At times, they act as a catalyst for broader cognitive elaboration or discussion. In these instances, subsequent descriptions may diverge from direct accounts of the taste experience itself, shifting instead towards an exploration of the association's origins or implications (e.g., discussing the food's cultural history or explaining personal biases).

The use of associations emerged as a prominent and ubiquitous strategy for expressing taste, appearing in the descriptions of all participants. Notably, these associations were predominantly spontaneously. This expressive mechanism enables individuals to convey complex, nuanced experiences without being limited to descriptions of basic tastes.

4.5 Evaluation

Evaluative descriptions are judgments on food's experiential (or perceptual), functional, or value attributes. These descriptions stem from two main bases: subjective hedonic evaluations arising from affective reactions or associations linked to personal preferences (e.g., 'yummy', 'terrible', 'inviting'); or cognitive assessments of objective attributes based on knowledge (e.g., 'healthy', 'artificial', 'fatty').

For instance, of cognitive assessments, included participants judging juices as 'artificial' versus 'natural'. The 'healthy' attribute particularly highlights a complex dissociation between such cognitive assessments and hedonic preference. Participants often cognitively assessed salty crisps as 'unhealthy' yet expressed strong hedonic liking: "Junk foods…No idea why someone don't like it" [P12, salty crisps]. Conversely, dark chocolate, though recognised as 'healthy', could be disliked for its taste, with one participant P02 consuming it for 'health benefits' despite finding it 'bitter and awful'. These examples demonstrate that attribute-based evaluations (like 'healthiness') can diverge from immediate hedonic responses.

We define an 'evaluation' as a description that compares a perceived food attribute against a personal standard, which may be based on preference, knowledge, or focus. A concise illustration is the statement, 'This chocolate is too bitter,' which implicitly compares the food's perceived bitterness to the speaker's internal standard for acceptable bitterness.

This principle extends to evaluations of seemingly objective attributes, which are similarly benchmarked against subjective and non-uniform standards. The concept of 'health,' for instance, is assessed differently: P01 indicated 'a lot of the sodium' as the primary reason of unhealthiness, whereas P12 focused on 'oil', both evaluating the salty crisps. Often, the standard behind such an evaluation is only revealed subsequently, serving as an explanation for the initial judgment (e.g., 'unhealthy because of the taste').

This underscores that evaluative descriptions originate from distinct cognitive and affective pathways and highlights the importance of differentiating attribute-based judgments from personal preferences or standard when analysing overall food responses.

5 Discussion and abstraction

A primary contribution of this research is the identification of five key themes in communication of food experience: Temporal, Affective, Embodied, Associative, and Evaluative. This finding substantially corroborates and extends the seminal work of Obrist et al. [26], laying a foundational basis for future explorations into taste-related communication. These themes demonstrate the multifaceted nature of the food experience as described by non-experts. By describing broader, holistic dimensions such as emotion, context, and multisensory interplay (e.g., between taste

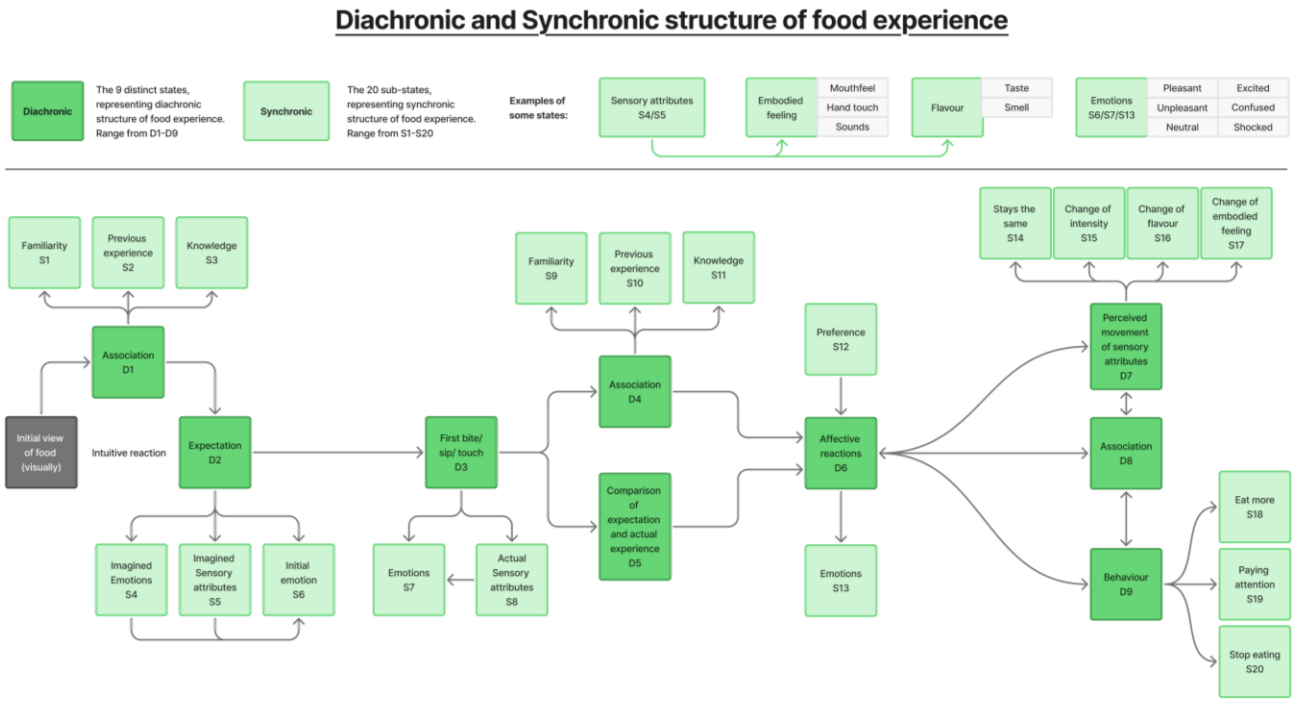

Figure 4: Diachronic and synchronic structure of food experiences, starting from the initial view of the food and unfolding over time. We identified 9 diachronic states (D1-D9), and 20 sub-states(S1-S20) with additional examples in sensory attributes (S4, S5) and emotions (S6, S7, S13).

and texture), non-experts can effectively talk about their food experience. This highlights that discussing 'food' is about far more than just 'taste and flavour.'

5.1 Through the lens of diachronic and synchronic structure of food experiences

A food experience is an integrated phenomenon, including complex cognitive processes and affective responses into the fabric of perception. Here we now like to take a **bird eye view** – abstract from the five identified themes – and offer a reflection on the subjective taste/food experiences through using a micro-phenomenological lens [27, 28], i.e., discussing the findings with regards to their diachronic (temporal unfolding) and synchronic (experiential configuration) structure as well as take existing design thinking models (i.e. from Donald Norman) into consideration. We hope to inspire reflection and discussion on potential avenues for future research for HFI.

To understand how the food experience unfolds over time, we constructed a structural model derived from participant expressions. The key states observed in expressions were synthesized into a hierarchical framework. The resulting model has two parts: a diachronic structure and a synchronic structure. The diachronic part delineates nine key stages of the complete eating episode, as shown in Figure 4. Within those stages, the synchronic structure presents 20 sub-stages that capture the more granular experiences and influencing factors involved. We observe a compelling parallel between the diachronic features of our model and Norman's three levels of design [25]. Norman's first *visceral level*, rooted in immediate, intuitive reactions, corresponds to the initial Expectation (D2) phase in our model, which is informed by fundamental instincts and learned Associations (D1), generating an initial affective state (S6) by forecasting both sensory (S5) and emotional (S4) outcomes from the food. The second, *behavioural level*, relates to the usability of an object, aligns with the actual Sensory Perception (D3) phase during consumption. This sensory experience leads to some intuitive emotional states (S7). The third, *reflective level*, involves conscious thought and reflection and resonates with the Comparison between expectation and actual experience (D5) in our model. This process culminates in an Affective reaction (D6), often manifested as an evaluative description. In instances where participants lack sufficient prior expectation (e.g., encountering a new food item or when time constraints), a different cognitive pathway is engaged. Concurrent with the actual sensory experience, a process of association is initiated. Here, the individual links the sensory attributes to Familiarity (S9), Previous experience (S10) or declarative knowledge (S11).

Regardless of whether the experience is processed through expectation-driven comparison (D5) or the experience-driven association (D4), the pathway culminates in Affective reactions (D6) and an evaluative description may happen (e.g., "This is delicious"), both are shaped by personal Preference (S12). These

resulting emotions (S13), much like the initial emotion derived from expectation (S6), is cognitively mediated. It stands in contrast to the more primal, instinctual affective reaction observed in S7. This dynamic between expectation and association can be explained by the mechanism of mental substitution [15]. We observe that individuals rarely answer the complex "target question" (e.g., "What sensory experience am I expecting for precisely?"). Instead, they unconsciously substitute a series of simpler "heuristic questions [38]." This might manifest as: "Does this resemble a food I know? Perhaps strawberry? If so, it should taste sweet," thereby replacing the difficult task of describing or predicting a taste with the easier one of finding a familiar analogue. Alternatively, the heuristic question might be purely affective: "Will this make me feel comforted?" – substituting an expected emotion for a sensory experience. Additionally, these evaluative processes evolve in complexity over time. The initial affective forecasting [40] and judgement extend beyond immediate sensory attributes (e.g., "Is it sweet?") or hedonic preference (e.g., "Is it tasty?") to encompass more abstract, evaluative judgements with weaker affective ties. These judgements, such as "Is this healthy?" or "Does this align with local culture?", typically emerge in later associative stages (D8) and can directly influence subsequent behavioural decisions (D9). Overall, the lens highlights that the experience is not linear but cyclical; the outcome of one perceptual experience (Initial view of food, D3, D7) informs subsequent expectations (D2) and associations (D1, D4, D7) for future cycles, thereby incorporating subsequent participant affective reactions (D6) and behaviours (D5, D9). Although not fully depicted in the primary diagram, we also identify a post-experience phase, commencing after the cessation of eating (S20). This phase is characterized by residual sensory and affective traces. The current diagram primarily illustrates the process from the initial sight of the food to the cessation of eating. In summary, this model posits that the food experience, while founded on basic flavour perception, is fundamentally structured by more complex cognitive and affective processes.

5.2 Limitations and future works

Our exploratory study offers qualitative insight into how non-experts communicate taste, with a novel structuring of subjective sensory experiences. To build on this foundation, future research should expand the participant pool beyond the current twelve and broaden the range of stimuli to include more complex, composite dishes that better reflect real-world eating experiences. Moving data collection beyond the laboratory into in-situ or field contexts will enhance ecological validity and capture richer, more authentic verbalizations. Methodologically, incorporating inter-rater reliability metrics for qualitative coding, along with complementary quantitative analyses (e.g., ANOVA, regression, correlation), would improve analytical robustness. Additional opportunities lie in integrating technical contributions (e.g., functional prototype and data-driven modelling) to connect these qualitative insights with applied human–food interaction design. Finally, engaging with disciplines like culinary linguistics and sensory science could strengthen the theoretical framework, helping to explain why people verbalize sensory experiences in particular ways and revealing potential patterns of taste expression across and within individuals, with implications for more effective food and flavour communication.

6 Conclusion

This research focused on how non-experts express and verbalise their taste experiences, leading to the representation of our data along five core dimensions: Temporal, Affective, Embodied, Associative, and Evaluative. We integrate these into a model that visualises the progression of the food experience over time (diachronic – synchronic structure), moving beyond simple sensory descriptions and accounting for the complex, multi-faceted structure of taste verbalisation.

Acknowledgements

I would like to express my heartfelt gratitude to my colleagues and friends for their invaluable support throughout this project.

References

[1] Amarasinghe, C. and Ranasinghe, N. 2025. Digital Food Sensing and Ingredient Analysis Techniques to Facilitate Human-Food Interface Designs. *ACM Computing Surveys*. 57, 1 (Jan. 2025), 1–39. https://doi.org/10.1145/3685675

[2] Ankerstein, C.A. and Pereira, G.M. 2013. Talking about taste. 305–316.

[3] Barker, C. 2013. Negotiating Taste. *Inquiry*. 56, 2–3 (Apr. 2013), 240–257. https://doi.org/10.1080/0020174X.2013.784482.

[4] Bertran, F.A., Jhaveri, S., Lutz, R., Isbister, K. and Wilde, D. 2019. Making sense of human-food interaction. *Conference on Human Factors in Computing Systems - Proceedings* (May 2019).

[5] Brooks, J., Amin, N. and Lopes, P. 2023. Taste Retargeting via Chemical Taste Modulators. *Proceedings of the 36th Annual ACM Symposium on User Interface Software and Technology* (New York, NY, USA, Oct. 2023), 1–15.

[6] Campbell, E.T., Franks, A.T. and Joseph, P. V. 2019. Adolescent obesity in the past decade: A systematic review of genetics and determinants of food choice. *Journal of the American Association of Nurse Practitioners*. 31, 6 (Jun. 2019), 344–351. https://doi.org/10.1097/JXX.0000000000000154

[7] Caul, J.F. 1957. The Profile Method of Flavor Analysis. 1–40.

[8] Chen, J. and Engelen, L. eds. 2012. *Food Oral Processing*. Wiley.

[9] Choi Jaz Hee-jeong, Foth Marcus and Hearn Greg 2014. *Eat, cook, grow: Mixing human-computer interactions with human-food interactions*.

[10] Deng, J., Yang, H., Saini, A., Gaudenz, U.D., Yao, L., Olivier, P. and Mueller, F. 'Floyd' 2023. Dancing Delicacies: Designing Computational Food for Dynamic Dining Trajectories. *Proceedings of the 2023 ACM Designing Interactive Systems Conference* (New York, NY, USA, Jul. 2023), 244–262.

[11] Fitrisia, D., Untung Ritonga, M. and Sibarani, R. 2018. TRADITIONAL FOOD IN THE PERSPECTIVE OF CULINARY LINGUISTICS SEE PROFILE Traditional food in the perspective of culinary linguistics. *www.allsubjectjournal.com*. 5, 2 (2018).

[12] Food: A Culinary History: *https://books.google.co.uk/books/about/Food.html?id=sa6pDAAAQBAJ&redir_esc=y*. Accessed: 2024-10-17.

[13] Green, B.G., Dalton, P., Cowart, B., Shaffer, G., Rankin, K. and Higgins, J. 1996. Evaluating the 'Labeled Magnitude Scale' for Measuring Sensations of Taste and Smell. *Chemical Senses*. 21, 3 (1996), 323–334. https://doi.org/10.1093/chemse/21.3.323

[14] Gurbuz, E. and Gokce, A. 2023. Visual processing of food stimuli: The impact of working memory load and color. *Attention, Perception, & Psychophysics*. 85, 5 (Jul. 2023), 1722–1732. https://doi.org/10.3758/s13414-023-02662-z

[15] Kahneman, D. and Frederick, S. 2012. Representativeness Revisited: Attribute Substitution in Intuitive Judgment. *Heuristics and Biases*.

[16] Kaushik, N., Gondi, A.R., Rana, R. and Srinivasa Rao, P. 2015. Application of fuzzy logic technique for sensory evaluation of high pressure processed mango pulp and litchi juice and its comparison to thermal treatment. *Innovative Food Science & Emerging Technologies*. 32, (Dec. 2015), 70–78. https://doi.org/10.1016/j.ifset.2015.08.007

[17] Kleinberger, R., Van Troyer, A.O. and Wang, Q.J. 2023. Auditory Seasoning Filters: Altering Food Perception via Augmented Sonic Feedback of Chewing Sounds. *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (New York, NY, USA, Apr. 2023), 1–15.

[18] Köster, E.P. 2009. Diversity in the determinants of food choice: A psychological perspective. *Food Quality and Preference*. 20, 2 (2009). https://doi.org/10.1016/j.foodqual.2007.11.002

[19] Lahne, J. 2013. Neurogastronomy: How the Brain Creates Flavors and Why it Matters: By Gordon M. Shepherd. *Food, Culture & Society*. 16, 2 (2013). https://doi.org/10.2752/175174413x13589681351575

[20] Lawless, H.T. and Heymann, H. 2010. *Sensory Evaluation of Food: Principles and Practices, 2nd Ed.*

[21] Lehrer, K. and Lehrer, A. 2016. The language of taste. *Inquiry*. 59, 6 (Aug. 2016), 752–765. https://doi.org/10.1080/0020174X.2016.1208925

[22] Li, J., Streletskaya, N.A. and Gómez, M.I. 2019. Does taste sensitivity matter? The effect of coffee sensory tasting information and taste sensitivity on consumer preferences. *Food Quality and Preference*. 71, (Jan. 2019), 447–451. https://doi.org/10.1016/j.foodqual.2018.08.006

[23] Mueller, F. 'Floyd' et al. 2024. Grand challenges in human-food interaction. *International Journal of Human-Computer Studies*. 183, (Mar. 2024), 103197. https://doi.org/10.1016/j.ijhcs.2023.103197

[24] Ninomiya, K. 2002. Umami: A universal taste. *Food Reviews International*.

[25] Norman, D.A. 2004. Three levels of Design: Visceral, Behavioral, and Reflective. *Emotional Design - why we love (or hate) everyday things*. (2004).

[26] Obrist, M., Comber, R., Subramanian, S., Piqueras-Fiszman, B., Velasco, C. and Spence, C. 2014. Temporal, affective, and embodied characteristics of taste experiences. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (New York, NY, USA, Apr. 2014), 2853–2862.

[27] Obrist, M., Seah, S.A. and Subramanian, S. 2013. Talking about tactile experiences. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (New York, NY, USA, Apr. 2013), 1659–1668.

[28] Petitmengin, C. 2006. Describing one's subjective experience in the second person: An interview method for the science of consciousness. *Phenomenology and the Cognitive Sciences*. 5, 3–4 (Dec. 2006), 229–269. https://doi.org/10.1007/s11097-006-9022-2

[29] Pierre Vermersch 1994. *L'entretien d'explicitation [translated as Explicitation interview]*. ESF.

[30] Putri, D.N., De Steur, H., Juvinal, J.G., Gellynck, X. and Schouteten, J.J. 2024. Sensory attributes of fine flavor cocoa beans and chocolate: A systematic literature review. *Journal of Food Science*. 89, 4 (Apr. 2024), 1917–1943. https://doi.org/10.1111/1750-3841.17006.

[31] Ranasinghe, N. and Do, E.Y.-L. 2017. Digital Lollipop. *ACM Transactions on Multimedia Computing, Communications, and Applications*. 13, 1 (Feb. 2017), 1–22. https://doi.org/10.1145/2996462.

[32] Ranasinghe, N., Karunanayaka, K., Cheok, A., Fernando, O., Nii, H. and Gopalakrishnakone, P. 2011. Digital Taste and Smell Communication. *Proceedings of the 6th International ICST Conference on Body Area Networks* (2011).

[33] Silva, L.M., Lu, X., Liang, E.X. and Epstein, D.A. 2025. Foody Talk: Exploring Opportunities for Conversational Food Journaling. *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems* (New York, NY, USA, Apr. 2025), 1–19.

[34] Spence, C. 2020. Multisensory flavor perception. *Multisensory Perception*. Elsevier. 221–237.

[35] Stevens, S.S. and Galanter, E.H. 1957. Ratio scales and category scales for a dozen perceptual continua. *Journal of Experimental Psychology*. 54, 6 (1957), 377–411. https://doi.org/10.1037/h0043680

[36] TALAVERA-BIANCHI, M., CHAMBERS IV, E. and CHAMBERS, D.H. 2010. DESCRIBING FLAVOR USING FEWER AND SIMPLER "HITS" (HIGH IDENTITY TRAITS) PROFILING: AN EXAMPLE WITH CHEESE. *Journal of Sensory Studies*. 25, 4 (Aug. 2010), 481–493. https://doi.org/10.1111/j.1745-459X.2010.00281.x

[37] Trager, G.L., Whorf, B.L. and Carroll, J.B. 1957. Language, Thought, and Reality: Selected Writings of Benjamin Lee Whorf. *Language*. 33, 3 (1957). https://doi.org/10.2307/411163.

[38] Tversky, A. and Kahneman, D. 1973. Availability: A heuristic for judging frequency and probability. *Cognitive Psychology*. 5, 2 (1973). https://doi.org/10.1016/0010-0285(73)90033-9

[39] Westemeyer, R.M. and Dietsch, A.M. 2024. Comparing Taste Perception Across Modalities in Healthy Adults: Liquids Versus Dissolvable Taste Strips. *Dysphagia*. 39, 1 (Feb. 2024), 52–62. https://doi.org/10.1007/s00455-023-10592-z.

[40] Wilson, T.D. and Gilbert, D.T. 2003. Affective Forecasting. *Advances in Experimental Social Psychology*. 35, (2003). https://doi.org/10.1016/S0065-2601(03)01006-2

[41] Winquist, F., Holmin, S., Krantz-Rülcker, C., Wide, P. and Lundström, I. 2000. A hybrid electronic tongue. *Analytica Chimica Acta*. 406, 2 (Feb. 2000), 147–157. https://doi.org/10.1016/S0003-2670(99)00767-9.

[42] Wu, A.Z., Lee, R.W., Calvé, B. Le and Cayeux, I. 2019. Temporal profiling of simplified lemonade using temporal dominance of sensations and temporal check-all-that-apply. *Journal of Sensory Studies*. 34, 6 (Dec. 2019). https://doi.org/10.1111/joss.12531.

[43] Yamamoto, T. 2008. Central mechanisms of taste: Cognition, emotion and taste-elicited behaviors. *Japanese Dental Science Review*. 44, 2 (Oct. 2008), 91–99. https://doi.org/10.1016/j.jdsr.2008.07.003