Theoretical Backgrounds toward Text Mining for a Phenomenological Model of Taste Perception

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Abstract

The experience of taste is constituted by the multilayered intersection of time aspects, such as the preceding eating experience, and the post-eating experience of looking back and re-sensemaking the tasting in a holistic way.This presentation will outline the key concepts in approaching the problem of how machines or humans perceive, recognize, and construct internal narratives of taste from the aspect of time.The experience of taste does not only unfold on a physical time axis in the mouth.

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1. Introduction

There are two genres of art: spatial art (e.g. painting) and art that develops over time (e.g. music). Leaving aside the classical argument that taste or odor are not an aesthetic subject, the appreciation of taste seems to have both a temporal aspect (referred to as "top notes" or "after-flavors") and a spatial aspect (think of the spread of whiskey when it is watered).In this article, I will discuss the temporal aspect of the act of tasting, including physiological time, cognitive time, and other concepts that may be relevant to understanding taste as a phenomenon.

2. Physiological and cognitive aspects of tasting time

2.1. *Food aversion learning and food preference learning*

When animals, including humans, are given drugs or radiation therapy that cause visceral discomfort, they learn to avoid eating the food they ate before the treatment, which is called taste (food) aversion learning (Garcia et al., 1955). Taste aversion is a type of learning in which a temporally preceding eating experience influences subsequent eating and preference patterns.

2.2. *Ortho-nasal / Retro-nasal*

There are two pathways for perceiving the aroma of food and drink: the ortho-nasal path is the air pathway through the nasal passages to the olfactory epithelium. On the other hand, the path of air from the oral cavity through the nasal cavity to the nostrils is called the retro-nasal path. The retro-nasal path is critical in the perception of flavors. In the case of sake, the aroma of the sake in the glass is ortho-nasal, while the aroma in the mouth and after swallowing is retro-nasal.

2.3. *Temporal changes in the mouth*

What changes occur in the mouth between the time food enters the mouth and when it is swallowed? When we look at a picture, we hardly see any changes in the picture itself. Still, there are significant physical and scientific changes taking place in the mouth during taste appreciation. The following is an overview of the changes that food undergoes in the mouth over time in four areas: retention, mastication, stirring, and the effects of saliva (dissolution and chemical changes).

2.4. *Temperature change due to retention*

The oral cavity is usually maintained at around 37 degrees Celsius. This is due to the high concentration of capillaries in the oral cavity, especially in the tongue.

After licking ice, the surface temperature returns to its original temperature within 10 to 20 seconds, waiting for the next food to arrive. The food we eat varies in temperature from below freezing to nearly 100 degrees Celsius. These foods undergo dramatic thermal changes during the few to ten seconds when they pass through the mouth. For example, cold ice cream is melted by the body heat of the oral cavity and changes its shape, while hot coffee is sipped and stays in the mouth, lowering its temperature to a level that is not harmful to the body. Because of this trust relationship, there are few temperature sensors in the esophagus and stomach. The function of this temperature change due to retention is to bring food closer to body temperature and render it harmless. Another critical role is to change the taste of the food by changing the temperature.

2.5. *Shape changes due to mastication (chewing)*

Just as chewing grapes dramatically change the sense of taste, shape changes caused by chewing have a significant effect on taste. There are some foods and hedonic items such as chewing gum and chewing tobacco that are flavored only by chewing.

Mastication is a semi-voluntary movement, and it is known that there are large individual differences in mastication patterns (Chen and Stokes, 2012). Mastication changes the volume of the oral cavity. This change in volume causes air to be pumped into the throat like an accordion or bellows, which then passes into the nose, creating a retro-nasal flavor.

2.6. *Dissolution by saliva*

Foods change their shape when they are chewed, and at the same time they are dissolved by saliva and transformed into different substances by chemical reactions. The most common example is the breakdown of glucose by saliva (glycolysis). Therefore, the taste in the mouth and the taste when swallowed are different in quality. This is partly due to cognitive factors, but it is also due to scientific changes in food.

2.7. *Stirring by the tongue*

Stirring by the tongue takes place in the oral cavity in synchronization with mastication. By taking enough time to chew and stir properly, a complete picture of the food in the mouth can be revealed.

Other physiological issues related to time include the following topics:

- Taste masking effect (tequila with a bit of lemon)
- Flavor enhancing effect (*zenzai* with *shio-konbu*, salty-kelp snack)
- Synchronization of flavors (the spice flavor of curry synchronizes with the savory flavor of aged sake)
- Acclimatization (adaptation to the smell)

When animals, including humans, are given drugs or radiation therapy that cause visceral discomfort, they learn to avoid eating the food they ate before the treatment, which is called food aversion learning (Garcia et al., 1955). This is called taste aversion learning, and food aversion learning is called food aversion learning. This is a type of learning in which a temporally preceding eating experience influences subsequent eating and preference patterns.

3. Time as Phenomenon

In this section, we will deal with time as a phenomenon. Time as phenomenon means considering the aspect of time that differs from so-called objective time (physical time, natural time, world time, etc.). It is an attempt to discuss the flavor of time as it is told in the personal, first-person narrative, rather than objective or measurable time.

Phenomenology is not the only discipline that deals with first-person phenomena, but it is certainly the one that should be given maximum consideration.

In phenomenological terms, first-person time means "reducing physical time to phenomenal time as it is experienced," and this reduction leads to Consciousness of Internal Time (Husserl, 1928).

In this study, I emphasize the active aspect of the appreciation of taste, and time in the attitude of subjectively constructing the taste. The theory of time that goes well with such a theory is the argument of Derrida, Ricoeur, and Merleau-Ponty, and in Eastern philosophy (especially as interpreted by Toshihiko Izutsu), the theory of time in *Kegon* and Islam. In "*Time and Narrative* (*Temps et Récit*)," Ricoeur criticizes Husserl's monotonous and unidirectional "flow" of time, and proposes "narrated time" as a different structure of time. In "Phenomenology of Perception," Merleau-Ponty argues for the significance of time as a subjective construct, as follows:

> It is of the essence of time to be in process of self-production, and not to be; never, that is, to be completely constituted. Constituted time, the series of possible relations in terms of before and after, is not time itself, but the ultimate recording of time, the result of its *passage*,

> which objective thinking always presupposes yet never manages to fasten on to.
>
> (Merleau-Ponty, 1962, p.482)

In this way, I believe that we should not have an attitude of sensing sake that exists as a third person, but an attitude of how sake – that has appeared as a first person – is interpreted, and composed (generated) a narrative.

3.1. *The emergence of Sake*

I have been proposing a new approach to define sake taste by focusing on adjectivals, as an alternative to a dominantly used method that focuses on nouns (see also, Fxyma, 2022). I will call this latter way of verbalization an "object-motivated event construction", where the experiencer primarily uses nouns to describe the event of tasting. This can be commonly found in an English tasting comment by a wine sommelier as in: "I feel a note of black cherry, cassis, and the rich flavor of the oak." where the sommelier detects the elements of the flavor, verbalizing them, perhaps selecting the terms from his or her list of tasting words.

This is analogous to an "audio" or a "visual event construction", where an event is reported objectively. For instance, if someone witnesses a traffic accident, the witness might construct the event as follows:

(1) "there are two cars" "two cars collide"

(1) is illustrative of an "object-motivated event construction" where the focus is placed on identifying the event participants (i.e., cars), just like the sommelier identifies the flavors.

There is an alternative way of reporting the same scene, as in (2), which I tentatively call an "emergence-motivated event construction."

(2) something happened! something crashed! Oh, two cars crashed.

This sequence might be thought of as merely a play of things being flipped around. However, the portrayal of the scenes in (1) and (2) are epistemologically distinct. The object-motivated event construction (1) and the emergence-motivated event construction (2) show the opposite approaches. If language interacts with cognition, or if language forms our thoughts, then to have the correct cognition theory is indispensable in the performance of proper language analysis.

I proposed to adopt the approach by the emergence-motivated event construction to define sake taste. Modeling (2), the sequence of cognizing tasting experience can be presented as in (3):

(3) taste emerges what is this taste? I feel the taste of X and Y.

The proposed analysis of event construction of tasting is not the same as that of the visual event construction. When we taste something—that is, when we have an event construction of tasting or when we conceptualize what we taste in our mouth—what we feel first is not the element of taste, such as sweetness, acidity, apple flavor, or other flavors in sake (as expressed by nouns), but the emergence of the tasting event itself.

Supporting emergence-motivated event construction means that adjectives, adjectival nouns, and verbs (but not nouns) take the leading role in the tasting description. The recognition of the emergence of an event is primarily expressed by adjectives and adjectival nouns. They are no longer merely modifiers but play a critical role, enabling us to encode the inceptive stage of our tasting experience.

3.2. *Generating Flavor*

After its emergence, sake is not brought to our consciousness in a constant and homogeneous manner. If we take the tongue as the subject, the tongue does not swim in a pool of homogeneous water quality, but swims in a river as a dynamic environment with currents and stagnation. If you think that sake in a glass is homogeneous, please look back at the previous section. Sake undergoes many actions in the mouth, including retention, stirring, and reaction to saliva. The information brought to the tongue is always changing and dynamic.Here, sake appears with shades of information (what Gibson calls "texture"). We find the gradation, intensity and singular points of the information through the interaction with the environment colored by the texture, and compose the figure and the ground.

4. Future Themes

There are many issues that could not be dealt with in this paper. One of them is the lack of discussion on the separation of the concepts of time and memory, although we have dealt with cognitive time. The senses also have short-term and long-term memories, but there is not enough discussion on whether the discussion of time can be integrated into the discussion of memory, or whether a different explanatory principle is needed than that of memory. We also missed the issue of how to compromise

the phenomenological theory of time with the representations in cognitive science. This is an issue that cannot be avoided when considering appreciation through linguistic expression, and will be an issue for future study.

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Authors Introduction

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Hiroki Fxyma (also spelled Hiroki Fukushima, or 福島宙輝) holds a Ph.D. in Philosophy from Keio University (2018). His main research interests are semiotics, cognitive linguistics, representation of taste. He worked as an Assistant Professor of Keio University (2015-2018) and Senior Lecturer in Kyushu Women's University. He is now an Assistant Professor of Tainan University of Technology.