

WHAT DOES TASTE REPRESENT?

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Trick question.

1. Philosophers of perception often ask: what is characteristically represented by this or that sense modality?—e.g., vision (Siegel, 2006, 2010), hearing (O’Callaghan, 2007), smell (Batty, 2010), touch (Fulkerson, 2014).

The question always needs first to be disambiguated. Does “vision” mean, (i) visual *experience* as some writers put the issue, (ii) *seeing*, whether “experienced” (i.e., consciously) or not, or (iii) subpersonally, the visual *system* as investigated by cognitive and neuroscientists? According to me (Lycan, 2014b), those three items represent different things. And I maintain that for vision in particular, the (i) and (ii) versions of our question are very hard to answer. In my own work on vision and on smell (op. cit. and 2014a) I have concentrated on (ii).

In this paper I shall argue that the case of taste is even harder—and categorically so, not just in degree. The disambiguation itself is vexed, and does not fit neatly, if at all, over psychophysical reality. Retaining my earlier italics, what are, respectively, “taste *experience*,” “*tasting*,” and “the gustatory *system*”?

2. There is a traditional answer, based on a simple view of the “gustatory system”: the system consists of four types of receptor on or near the tongue: salt, sweet, sour, and bitter, which project to the brain and thereby constitute a 4-space. The taste, *strictly speaking*, of a substance in the mouth would be its location in that space. Of course, what we commonsensically think of as the taste of food is much richer, as it incorporates smell.¹ We might think of the food’s *flavor* as the overall effect, incorporating taste proper. So, *tasting* would be the deliverance specifically of the taste buds; taste experience would be the subject’s awareness of that tasting; and the gustatory system would be just the taste buds and how they project to and within the brain. (In the rest of this paper, I shall use “gustatory” to pertain to tasting proper.)

Recent work on smell and taste has corrected that simple view. First, on a few elementary points: (1) There is now a fifth recognized receptor, umami, specific to glutamate and associated with “savoriness” in connection with other tastes.² (2) Taste buds are not localized on or around the tongue, but are fairly widely distributed, at least as far as the upper esophagus, the epiglottis and the cheek.³ (3) There are two varieties of smell, orthonasal (through the nose, perceiving the ambient air) and retronasal (up the nasopharynx from the back of the mouth, perceiving a substance there, normally a chewed one). They have quite different effects on flavor, and they comprise, as Rozin (1982) put it, a “dual modality.”⁴ (4) The trigeminal nerve, more recently the trigeminal “system,” plays a role independent of smell in contributing components to flavor (Lawless, 1989; Green, 1996; Viana, 2011).

3. Let us grant, then, that there are five “basic tastes,” salt, sweet, sour, bitter, and umami or savory. They are proper components of flavor. But in fact, they are heavily outweighed by orthonasal odor, trigeminal effects, and especially retronasal odor, which

contribute an estimated 80% to flavor. (This and most of the other empirical claims that follow are reproduced from the excellent survey of recent research provided by Spence, Auvray and Smith (2015).⁵ But those authors' dialectical concern is to clear up confusions regarding the relation of taste to flavor, especially those which have affected experimental design; they do not talk about representation.) Still other factors modulate flavor as well: Oral-somatosensory, such as the feel of chewing, that contributes to texture perception such as the sense of creaminess and/or fattiness (Bult, de Wijk and Hummel, 2007);⁶ physical temperature (Crocker, 1950, Bartoshuk et al., 1982, and Bult et al., op. cit.); very brief passage of time (Piggott, 1994).

There no known pure tastants in nature, i.e. substances that can be directly detected only by taste buds and whose perception is not influenced by smell. Experimenters who are trying to isolate tastes sometimes block their subjects' noses, but that simply ignores retronasal odor and the other nongustatory factors.

4. No conceptual problem has *yet* manifested itself; you will have noticed that the spirit of the traditional answer is intact. There are the five basic tastes, that collectively make a small but determinate contribution to flavor. Though that contribution is swamped by smell and other factors, it is the specifically gustatory sense-component and is rightly though very strictly to be called "taste," and since each receptor responds to a particular type of substance, we may suppose its representational function is determinate too; the rest is detail that can be thrashed out in the usual ways.

There are three questions that may seem troublesome, but which here need not detain us for long. First, do the individual receptor outputs actually represent, in the first place? That they respond selectively to their respective substances does not prove that, and in any case, how are we to determine exactly which substances those are? Let us waive this. Similar questions have arisen for (ortho-)smell, and have been answered subject to only the mildest controversy (Lycan, 2014a). But, much more to the point, my contention in this paper is that *even if* the same is done for taste, the problems for our title question go deeper.

Second, if a taste-strictly-speaking is a point in a 5-space, is *its* representatum simply a function of the individual receptors' referent substances and their intensities, say a straightforward sum of those, such that it is a quinary conjunction? We may suppose so, but I shall not investigate that here.

Third, what does a subject come to know about a substance by tasting it? Quite a lot. (Recall Paul Gross' detective character, Constable Benton Fraser, on "Due South.") It does not follow that taste represents, as the knowledge might be merely a causal product,⁷ and even if we assume taste does represent, it might or might not afford knowledge (a bit more on this below).

5. Now the complications ensue. I see two dilemmas.

The first dilemma concerns the perception of intensity in basic tastes. A number of nongustatory influences can change perceived intensity. Temperature is the leading example; cooling a liquid reduces its sweetness and accentuates its bitterness. Odors can figure in a "sweetness enhancement" effect (Auvray and Spence, 2008), and they can affect saltiness and sourness as well (Stevenson, Prescott and Boakes, 1995). And these effects do not seem to be cognitively penetrable (Stevenson, 2001). Now, question: If a basic taste sensation does represent and is thus altered, does it go either from being correct to being incorrect or vice versa? If not, then are the taste buds not after all representing the intensities of their

respective substance types? (I assume that a representation must be correct or incorrect.) If so, what determines which represented intensity is the actual one? We could start by abstracting entirely away from the odor influence, but how to determine the correct-making temperature for a liquid or a solid food? It would be hard to motivate an answer.

6. My second dilemma is much more pressing. There are several things about taste that subjects are entirely unable to discern. (1) Unsurprisingly, people are not able to isolate the relevant point in 5-space—under any verbal description *or* nonverbal identifying marker, even if they are given the concept. So they are not capable of isolating “taste proper.” (2) When subjects are presented with stimuli at close to threshold, they cannot easily tell which sense modality is in play (Nagata et al., 2005). (3) Even experts are hardly ever able to report selectively on sweetness or another basic taste, entirely ignoring olfactory cues (Stevenson, 2001). In general, when so many components of flavor are in play, “the origins of an individual’s perceptual experience may be quite unknown, or hidden, to them” (Spence, Auvray and Smith, 2015, p. 264). And in experiments designed to provide subjects with *as* pure tastants as possible, the subjects found the resulting experiences “rather strange” (p. 267), and they were unable to classify the tastants according to the basic categories. Whatever are “the building blocks that feature in multisensory [flavor,] ...they may be very remote from conscious perceptual experience and so not the sorts of things that can be thought of as the senses we rely on in perceptual experience” (p. 268).⁸

Taste *experience* is of flavor and not specifically of tastes proper. Perhaps all that means is that *introspection* is not much good at discriminating components of flavor, and that is no big news; introspection is a very blunt instrument. What does taste experience represent? Many things, that it does not distinguish with any degree of refinement. Some of those things will be molecular structures detected by smell. But we could not easily say what a *mélange* of ortho-smell, retro-smell, taste proper and trigeminal irritation represents overall. Smith (2013) argues persuasively also that not everything that *affects* or influences the flavor experience is a constitutive part of flavor; examples include environmental lighting and sound, the perceived weight of the food in the hand, and hedonic values (liking or disliking). “The overall [tasting] experience that we have when eating may overflow the experience or perception of flavor” (p. 308).

Very well. What, then, of our other two explananda, tasting *per se* (conscious or not) and the subpersonal gustatory system? When the subject-matter is as severely restricted as we have seen each of these two phenomena to be, there may be a reasonably straightforward answer. But, now, the dilemma question: Is tasting *per se* *person-level* as opposed to subpersonal?

The latter distinction is not entirely well-drawn,⁹ but there are uncontroversial cases of representation internal to the brain’s perceptual and other psychological systems that are not (except perhaps derivatively by courteous fiat) intentional states of whole persons. To take an obvious example, an English speaker’s language module represents technical syntactic properties of structures that the speaker her-/himself knows nothing of. Visual subagencies represent very small light gradients and the like that their employers cannot properly be said to see. My question, then, means: When the gustatory system represents a glutamate or a bitter substance or the like, does its owner thereby taste a glutamate or something bitter? (I hope it

is clear that I mean in the representational sense of an intentional object, not just what the owner in fact has in her/his mouth.)

First horn: If the whole person does taste such detailed things, in virtue of their being represented by the gustatory system, that tasting is quite *inaccessible to introspection*, a very unusual feature for a person-level mental state to have. Smith (2013) concedes that occasionally we can introspectively separate flavor components and focus our attention on one of them rather than another (p. 302; his example is the flavor of menthol, which involves at least a minty aroma, a slightly bitter taste-proper, and a cool sensation in the mouth). But with most familiar flavors we cannot do that. If we as whole persons are tasting-proper, we just cannot tell exactly what it is we are tasting-proper. Often we are ignorant, and sometimes we are actually in error.¹⁰

Second horn of the dilemma: If the whole person does taste few if any of the detailed things represented by her/his gustatory system, and virtually all there is is the operation of the gustatory system itself, then the only person-level phenomenon we have been talking about is conscious flavor experience, and that is a very complex and demanding phenomenon. It requires internal attention; it involves a difficult distinction between the general flavor experience and the proper part of it that is the perception of flavor itself, *and* it absolutely refuses to reveal its primaries.

7. So be it. I am not aiming to reduce any philosophical view to absurdity. But taste is then very unlike any of the other main sense modalities, even smell. Though we may continue to pair smell and taste by calling them “the chemical senses,” the pairing is asymmetrical and, to say the least, lopsided.

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Notes

¹ Louise Richardson (2013) argues that this familiar idea is not a deliverance of science, but neither should it be taken as plain common sense. For some detail on the integration of smell and taste, see Prescott and Stevenson (2015).

² Some say there may be a sixth, metallic, but that is disputed and there is no clear evidence for it; see, e.g., Lawless et al. (2004).

³ Citing Trivedi (2012), Spence, Auvray and Smith (2015) add the stomach, the intestines, and the pancreas, “and even in sperm” (p. 255n).

⁴ Richardson (2013) calls our attention to apparent evidence that ortho- and retronasal outputs lead to respectively different brain activations; see Small et al. (2005).

⁵ And I am grateful to Barry Smith for his very informative talk on this material, presented at the Conference on Olfaction, Centre for Philosophical Psychology, University of Antwerp (December, 2013), which got me thinking about taste.

⁶ And perhaps, separately, the *sound* of one’s own chewing (Yeomans et al., 2008); but see sec. 6 below..

⁷ But Perkins (1983) asks the same question of smell, and bases on it a substantive argument for his “indirect realist” analysis. (He does not speak in terms of representation.)

⁸ *Is the perceiving of flavor multisensory or “multimodal”?* It seems obviously so, and some take that to be hardly worth mentioning; but Fulkerson (2014, Ch. 2) points out that care is needed here. (His concern is with touch, which has also been called multisensory; he contends that it is not, or more precisely not by any standard that would not also classify the other major senses as multisensory.) “Multisensory” could be judged by (i) double functional dissociation; (ii) same content delivered via multiple information channels; (iii) coördination between different kinds of stimuli; or (iv) lack of feature binding. Fulkerson writes off the first two of those as uselessly liberal, points out that by the third both smell and taste count as multisensory but for a trivial reason, and then argues that touch does accomplish feature binding.

Interestingly, Fulkerson simply assumes throughout that the perceiving of flavor is *unisensory* in the general sense that concerns him. But he specifically argues that smell passes the feature-binding test, and a parallel argument would work for taste.

⁹ It began with Dennett (1978) and Stich (1978). For a critical discussion, see Drayson (2012); she argues that “subpersonal” has been confused as between the explanatory and the metaphysical, and that we should instead focus on Stich’s notion of the “subdoxastic.” Since my topic is representation, I suppose I should take her advice. I shall stop using “subpersonal,” though I think “person-level” is still all right.

¹⁰ Assuming for the sake of argument that we are doing such tasting, Smith goes on to draw a skeptical conclusion that he puts in each of several dramatic ways: “[A]n appearance-reality distinction operates within experience itself. ... How things appear to us *within* experience is not always how they are [within experience]” (p. 294). “Philosophers...assume that the character of experience is transparently available to subjects of experience, using misleading talk of ‘what it is like’ to undergo such experiences. Whereas, it [is] much more accurate to think that what I bring into focus as a result of directing my attention to how things are with me, because of this current phenomenological state, is what I take it to be like” (pp. 299-300). For independent reasons, I am very much in sympathy with this complaint (Lycan, 1996, pp.).