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The epistemological power of taste

It is generally accepted that sight has the power to give us knowledge about things in the environment in a distinctive way. Seeing the goose puts me in a position to know that it's there and that it's, say, brown, large, maybe even that it's angry. And it does this by, when all goes well, presenting us with these worldly features. One might even think that it's part of what it is to be a perceptual capacity that it has this kind of epistemological power, such that a capacity that lacked it could not be perceptual.

My focus here is on the sense of taste—the capacity to taste things or to have taste experiences. It has sometimes been suggested that taste lacks sight-like epistemological power. I will argue that taste has this kind of power, but that as a matter of contingent fact, it often goes unexercised. We *can* know about things by tasting them in the same kind of way as we can know about things by seeing them, but we often don't (section 2). I then consider the significance of this conclusion. I'll argue that in some ways, it matters little, because our contemporary interest in taste is in large part aesthetic rather than epistemic or practical (section 3). However, I'll suggest that we shouldn't be wholly comfortable with the way in which taste's epistemic power is undermined, since this can have ethical import (section 4).

1. The epistemological power of taste

When we see, we can come to know how the world is by taking visual experience at face value. For instance, if I see a brown goose, then I am presented with the goose and some of the features that it has: at least its brownness, location, and shape. Absent defeaters—such as the suspicion that I am hallucinating or that I am in fake-goose country—I can simply take things to be how they seem, and know that there is a brown goose before me, or at least that there is something brown and shaped in a certain way. Some (for example, Travis 2004) would reject this conception of the epistemological power of sight: but I will take it for granted here.

Arguably, it is necessary that a perceptual capacity or sense has this kind of epistemological power. Contrast sight with a capacity to know that there is pollen about because pollen reliably makes you sneeze. This capacity is useful, and it is like a perceptual capacity in that it puts you in a position to know something about your environment. But the way in which it does so is quite different to the way in which a perceptual capacity does. To take the pollen experience at face value lets you know, at best, something about yourself or your body: that you are sneezing or

that your nose is itchy. Furthermore, it's only in the context of knowing that the sneezing or itchiness is likely to be caused by pollen that it allows you to know about it.

That the other senses have this power is consistent with some philosophical views. For example, philosophical accounts of olfactory experience according to which odours represent worldly things (such as (Batty 2010), (Mizrahi 2014), (Roberts 2016)) are consistent with the view that smell has sight-like epistemological power. Philosophical accounts according to which auditory experience represents worldly things (e.g. (Meadows 2018), (O'Callaghan 2007), (Leddington 2019)) are consistent with the view that hearing has sight-like epistemological power. Touch is complicated. On one view (Richardson 2013), it allows us to perceive extra-bodily things indirectly, by perceiving our bodies. Whether this means that touch has sight-like epistemological power only with respect to the perceiver's body is an issue that might be explored elsewhere.

The sense of taste has sometimes been thought of by philosophers as lacking the sight-like epistemological power associated with properly perceptual capacities. On such a view, tastes or flavours—more on that distinction below—can only be thought of as features of sensations or, at best, powers of objects to produce such sensations in us. If that were right then a taste experience would not amount to being presented with a feature of something in the world, as our experience of the goose's brownness does. It would be awareness in the first instance of a feature of a sensation. One route to such a view of taste might be via its spatial phenomenology:

> Tradition holds that taste directs attention 'inward' to the state of one's own body. When one tastes a flavour...that flavour is positioned phenomenologically in one's mouth, nose and throat; the sensation is perceived to be an alteration of the body. (Korsmeyer 1999: 96)

On this 'traditional' sensation view, taste experiences are bodily sensations. But the spatial phenomenology of taste does not merit thinking of taste experiences as bodily sensations. Whilst they do direct attention 'inward', it is to things that whilst *in* one's mouth are distinct from and experienced as distinct from one's body (like a pebble in your hand).

A sensation view is adopted by some for colour too, in which case even sight, at least where colour is concerned, would lack the kind of epistemological power under discussion. Since this paper is premised on the idea that sight does have that power I will take it for granted that the

arguments for thinking otherwise—such as arguments from variation—are not convincing as defences of sensation views of sensory qualities in any modality. Instead, I focus on recent treatments of taste specifically, arguing that taste's epistemological power has been underestimated.

1.1. Construing taste too narrowly

If taste has sight's epistemological power then it presents us with worldly features such that, when one is really tasting, taking one's experience at face value, one can on that basis know that something with a relevant feature is present. William Lycan argues that there are serious obstacles to thinking that taste can do this, or as he sees it, that taste represents. Lycan's argument is premised on thinking of taste narrowly: 'it is the specifically gustatory sense-component [that] is rightly though very strictly to be called 'taste', and a taste, is 'a point in a 5-space'. (Lycan 2018: 30).

On this narrow conception, how something tastes would be a matter only of how sweet, salty, bitter, sour and umami it is or appears. (See also, for example, Spence, Auvray, & Smith 2015). How vanillary or spicy something is or appears would not on this view be a matter of taste at all, since this could not be captured in the '5-space'. On this narrow view of taste, such features are instead aspects of the flavours of things, contributed by other sensory modalities such as olfaction. If taste is construed narrowly then its sight-like epistemological power would be limited to putting us in a position to know about the five 'properly' gustatory properties. But Lycan also identifies a more serious problem.

People cannot, it turns out, introspectively tell how things taste to them: they cannot consistently identify the place in the 5-space occupied by something they are tasting. (Lycan 2018: 32) This leaves one with two options. First, one can say that taste representations are (very unusually for a mental-state type) personal-level states that are, as a type, typically inaccessible to introspection. Or, one can say that the only personal-level state in the vicinity represents flavour, and that taste ('proper') representations are not personal-level.

The first option is to be avoided because it would make taste states a very peculiar kind of mental state. The idea of a mental state type which *as a type* is inaccessible to introspection is not one we should readily accept. Lycan takes the second option—that the personal level state

associated with the sense of taste represents flavour—to be objectionable too, because flavour is such a 'complex and demanding phenomenon' (Lycan 2018: 33), and—and to Lycan, 'worse'—this would mean that the sense of taste was startlingly anomalous amongst the senses. The representations properly proprietary to this sense would be largely inaccessible, and, as corollary, we would hardly ever be able to tell not merely what but even that we are tasting. (Lycan 2018: 34)

It seems to me that Lycan's dilemma is caused by the narrow construal of taste that he, like others, insists on. There is a terminological net that one could easily get caught in here. I do not want to deny that 'taste' can be used in this narrow sense, or more accurately, in narrower senses, associated with the modality (the sense of taste), the object of experience (tastes as properties of things), the experience type (taste experience) and the act of sensing (tasting). Like many terms, 'taste' is polysemous, and amongst its polysemes, some are associated with the narrower construal and some the broader, on which taste and flavour are used interchangeably. The narrower senses which Lycan adopts have their home in those contexts in which we are interested in which sensory system is at work. But outside of those contexts—and we humans are usually outside of those contexts—broader senses of 'taste' and 'tasting' are the norm. When this is the case, we talk of vanilla and lemon no less than sweet and salty as tasted and as tastes, and as the objects of taste experiences. With this in mind, it seems unobjectionable and wholly unsurprising to think of, to use Lycan's terms, the personal level state associated with the sense of taste as representing flavour, which is to say, taste, broadly construed. But then Lycan's second option looks unobjectionable and the dilemma disappears.

Recall though that Lycan was also concerned that flavour's complexity and demandingness made this second option a no-go. One aspect of flavour's complexity is that multiple sensory systems are involved in flavour experience. Flavour is sensed not only by means of the taste buds that are sensitive to sweetness and saltiness and so on, but also by means of other receptors and the sensory systems to which they belong. Without the involvement in flavour perception of the olfactory receptors and the retronasal olfactory system, we would not be able to sense vanillariness and lemoniness, for example. Without the involvement of the trigeminal nerve, we would not be able to sense the 'heat' of mustard or wasabi. For a discussion of the role that orthonasal olfaction and other sensory systems can play in flavour experience see Spence 2015.

Why should that prevent us from thinking that flavour (taste broadly construed) is what the sense of taste (understood broadly) is the capacity to perceive or represent? One reason is metaphysical. On Lycan's view, 'we could not easily say what a melange of ortho-smell, retro-smell, taste proper and trigeminal irritation represents overall'. (Lycan 2018: 32) But it is not clear why we cannot answer: 'it represents flavour'. One option would be to think of flavours as emergent properties, had by substances (often food stuffs), that are made up of component substances—odorants, tastants, trigeminal irritants—that on their own lack this property-type, and which it therefore requires multiple sensory systems to perceive. To the extent that we can attend to, for example, the sweetness of a strawberry or the bitterness of beer, we can say that the contribution of the different sensory systems leaves its mark in experience, in a way that is analogous to that in which our capacity to visually attend to edges involves the contribution of a lower-level edge detection mechanism in the visual system leaving its mark. Perceptual psychologist Richard Stevenson calls flavour a 'preservative emergent property': emergent, in the sense described above, and preservative in that some of the 'components of flavour remain detectable by the subject'. (Stevenson 2009: 109)

The second more specific way in which, according to Lycan, flavour is complex and demanding lies in its failure to 'reveal its primaries'. It is certainly true that no flavour primaries equivalent to red, green, blue and yellow have been identified. These colours are primaries in the sense that they are at the poles of the hue-specific dimensions of the colour space. But without further argument, it is unclear why this should be an obstacle to thinking of flavours as what taste experiences represent. Some accounts of sensory qualities or our experiences of them, such as Rosenthal's Quality Space Theory (2005), or Isaac's Structural Realism (2014) necessitate the existence of sensory spaces analogous to the colour space, for all sensory qualities. If one does not endorse such a theory, one will be unbothered by the absence of a sensory space for flavours. And even if one does endorse such a theory, the creation of a flavour space need not start out from pre-identified primaries. An alternative is to use the method of just noticeable differences to map the experienced relations of similarity and difference between qualities, as some have suggested an odour space could be created. (Young, Keller, & Rosenthal 2014). Multidimensional scaling can then be used to reduce the resultant space's dimensions. It is possible in principle that a flavour space could be created in this way and even that (via multidimensional scaling) flavour primaries, or at least the fundamental flavours, could be identified. (Isaac 2017)

Lycan's concerns about the complexity and demandingness of flavour can then be addressed. It *is* both complex and demanding, but not in ways that preclude it from being the object of taste experience, nor therefore in ways that preclude taste from having sight-like epistemological power.

1.2. Flavour as constructed by the brain

The role of more than one sensory system in taste—broadly construed—has been the source of a second reason for underestimating taste's epistemological power. As Barry Smith notes, it is a view 'prominent among many psychologists and neuroscientists that flavours are not something we perceive: they are just psychological constructs…or items that arise only in the brain' (Smith 2013: 305). The role of multisensory integration in the perception of flavour can seem to support this view, since it evokes the idea of flavour as something that the brain creates by putting together inputs from different sensory streams. If this subjective or 'brain-dependent' view of flavours were correct, then taste could not have the kind of epistemological power that sight has, since it would not be presenting us with features of the world, but only features that our brains have 'made up'.

But as Smith rightly urges, the science of taste experience 'leaves room for objective flavours'. (Smith 2013: 311) We can understand the multisensory processing involved in taste experience as enabling the perception of rather than constructing flavours. Furthermore, Smith argues, we are *better* placed to explain the integrative processes involved in our experience of flavours if we think of them as guided by and towards features which are 'an ecologically valid part of the environment'. (Smith 2013: 310) The integration involved in processing input from multiple sensory streams—in any case of multisensory integration—can be guided by various principles. In the case of flavour perception, one such principle is 'congruence'. If that which the gustatory and olfactory systems detect is 'congruent' then a unified flavour experience is more likely to result. But what determines congruence? One very straightforward answer would be: congruence is determined by what is found in our environments. So, for example, sucrose on the tongue will combine with strawberry odorant at the olfactory receptors, because this is a combination frequently encountered in the world—in strawberries. But sucrose on the tongue will not combine with chicken odorant at the olfactory receptors, because that is not a combination frequently found in the world (or at least not in some parts of the world).

If we don't understand congruence in this world-determined way then, as Smith says, 'all we can fall back on are sensory congruencies'. This means positing a metric of 'congruence' between sensory inputs independent of what is found in our environments, and which would explain cases like the strawberry/chicken example. But the rationale behind such a metric would remain mysterious. And since we have an alternative, on which congruence is a matter of what is found in the world, there is no good reason to 'settle for this unexplanatory stopping point'. (Smith 2013: 310)

So, the role of multisensory integration in flavour perception—or taste perception, broadly construed—does not entail that and in fact is less easy to understand if we think that flavours are constructed by the brain. Thus, it is no obstacle to taste having the same kind of epistemological power as sight does.

In this section I have tried to dislodge some recently-discussed reasons for underestimating taste's epistemic power: a too-narrow construal of 'taste' and a misguided view of the significance of the multisensory nature of flavour experience. There might be better arguments than these for thinking that taste lacks sight's epistemological power. But pending such arguments, we can think of it as having sight-like epistemological power. And, if having such power is necessary for perceptual capacities then taste can remain amongst them.

2. Taste's power unexercised

Though the sense of taste has, inherently, the same kind of epistemological power as our other perceptual capacities, we are frequently prevented from actually coming to know about flavours by tasting. This is contingent: it flows not from the nature of taste itself, but from features of our perceptual and cognitive equipment in interaction with largely human-made features of our contemporary environment.

I'll consider three kinds of effects on taste that influence whether or how much we end up knowing by tasting. The first is associative learning within taste and between taste and smell. The second is the effect of experience of other sensory qualities on how things taste. The third is cognitive penetration, or at least, something like it.

2.1. Associative learning

Taste (and also smell) is subject to associative learning in a distinctive way. This takes two forms: odour-taste learning, and flavour-flavour learning. This is an example of the former: if you eat or drink something that is vanillary and sweet a few times, then vanilla, on its own, will come to taste and smell sweet. (Stevenson, Prescott, & Boakes 1995) An example of the latter occurs when, having tasted something cherry and smoky flavoured a few times, all cherry-flavoured foods come to taste a bit smoky. (Stevenson 2001) There are reasons to believe that these are effects on perceptual experience itself rather than just on our beliefs about it: they are cognitively impenetrable, (Stevenson 2001a) and the learning involved is implicit. (Stevenson & Boakes 2003)

It is plausible that in an untampered-with environment, the associative learning to which taste is subject would facilitate knowing by tasting. In such an environment, the pairings that were learnt would be likely to be mostly ecologically valid. When encountering an odorant evoked experience of a (narrowly construed) taste, such as an experience of sweetness or saltiness, it would be highly likely that the thing you were perceiving was sweet or salty, and likewise for flavour-flavour learning. And, since this learning is perceptual learning, in such an environment, it would facilitate the exercise of taste's sight-like epistemological power. Taking experiences that are the result of this learning at face value, we would mostly be put in a position to know about the flavours that things have.

However, our current gustatory and olfactory environment is *very* tampered with, to the extent that it is quite difficult to say what counts as an ecologically valid pairing. Though it may be difficult to know what to say about any particular case, the frequent presence of non-naturally occurring mixtures of odorants and tastants in our food, drink and in the atmosphere, and the speed with which associations can be created by perceptual learning, likely means that we are subject to a great many taste illusions as a result of this learning mechanism. It is likely the case that frequently, things taste sweet or salty—perceptually appear to have those worldly sensory qualities—when they are not, and in the same way seem to have features like vanillariness or smokiness that they do not have. When this is so, the epistemological power that, as we have seen, taste has, is prevented from being exercised. If we take our taste experiences at face value, we'll end up with false beliefs about the flavours of things, rather than knowledge.

2.2. Crossmodal effects

Experiences of other sensory qualities at the same time or around the same time as tasting can also affect taste experience. For example, the colour or shape, either of food or drink or the receptacles or packaging it is served in can affect how things taste. Charles Spence gives us a plethora of examples of this kind in his book *Gastrophysics*. (Spence 2017) For example, subjects rated a mousse as sweeter when served from a white than from a black plate (Johnson & Clydesdale 1982) and hot chocolate as chocolatier when served from an orange cup. (Spence 2017: 47) Chocolate is reported as being creamier when presented in rounded than in rectangular chunks. (Spence 2017: 45)

Given that we rarely taste with our other senses 'off', it seems likely that taste experience is fairly frequently subject to these kinds of crossmodal effects. And—as I will discuss more in section 4—such effects are increasingly used deliberately to affect our experiences, which makes our exposure to them more frequent still. It may be that some of these cases are best understood as cognitive penetration, in which case they can be dealt with as are the phenomena in section 2.3.

As with associative learning, crossmodal effects may, in the right environment, be conducive to getting things right. If, for example, most of the red things in your environment were ripe fruits, then a tendency to rate red things as sweeter than otherwise would be truth-conducive. But it seems highly likely that in many cases in the present environment, crossmodal effects lead us into error with respect to flavours. In light of the discussion in section 1, we are taking it that taste has sight-like epistemological power, and thus that flavours are worldly features of which we can become aware, and not either features of sensations nor powers of objects to produce them in us. With this view in place, it is reasonable to assume that putting hot chocolate in an orange cup does *not* change its flavour, such that if it appears more chocolately, that appearance is in some sense in error.

It is less clear than for associative learning that these crossmodal effects are perceptual, in the sense of affecting perceptual experience rather than merely reports of or beliefs about perceptual experience. Perhaps the hot chocolate in the orange cup tastes exactly as chocolately as that which arrives in a white cup, and the colour of the cup affects just what the subject thinks and says about how it seems. But whether the effects are perceptual or not, they impact upon the exercise of taste's sight-like epistemological power. If they are perceptual then they produce illusions, so that to take taste experience at face value will be to be led to false belief. And if they are merely effects on belief and report that leave taste experience unchanged, they prevent us

from taking our taste experience at face value in cases when to do so would have led to true belief.

2.3. Cognitive penetration or something like it

Another factor that prevents taste's epistemic power from being exercised is the cognitive penetration of taste experience—or at least something like the cognitive penetration of taste experience. Cognitive penetration happens when the occurrence of a perceptual experience depends on the occurrence of some cognitive state—for example, a belief or a desire or an expectation—so that the content of the perceptual state is affected in a way that is semantically coherent. Whether or not such a thing is possible is controversial. Some think that perception is cognitively impenetrable in that 'it is not possible for two perceivers…to have difference experiences with distinct content or character when one holds fixed the object or event of perception, the perceptual conditions (e.g., lighting), the spatial attention of the subject and the conditions of the sensory organ(s)' (Stokes 2013: 647-8) (Macpherson 2012) We need not take a stance on this issue here as I will explain below.

There are many documented cases of effects on taste that might be considered cognitive penetration. For example, in one study, subjects were given meat samples and told either that they were factory farmed or free range: 'those who were told that the meat was factory farmed rated it as tasting…saltier and greasier'. (Spence 2017: 13) This looks, on the face of it, to be a case in which the content of taste experience was affected by beliefs about the meat's provenance. Consider also the effect that descriptions on menus can have. In 1997, Heston Blumenthal's menu at the *Fat Duck* included a description of an item as 'crab ice cream'. Some diners reported that this item was too salty, amongst other things. When—having worked on a study with Martin Yeomans exploring this effect—Blumenthal renamed it 'frozen crab bisque' ratings of saltiness changed. (Spence 2017: 3-5). Another similar example is the effect of tasting notes—for, for example beer, wine or coffee—on the experience of such products. Aaron Meskin hypothesises that such notes, for example, describing a coffee as tasting of hazelnuts, generate mental imagery that makes the coffee taste more hazelnutty than it otherwise would. (Meskin 2018)

As in 2.1 and 2.2, here we have an effect that, were the circumstances right, could help us to know about the world. As Susanna Siegel writes about a different case of purported cognitive penetration:

> If an x-ray looks different to a radiologist from the way it looks to someone lacking radiological expertise, then the radiologist gets more information about the world from her experience (such as whether there's a tumour) than the non-expert does from looking at the same x-ray. (Siegel 2012: 201)

But clearly this is not always so. Free-range meat is not necessarily less salty than meat that is not free range, and whether a menu item is described as 'ice cream' or 'frozen bisque' does not affect its flavour. Or rather, it does not once we allow that flavour is a worldly property of which experience can make us aware. So the effect of such descriptions is to lead us into error about the meat or ice cream, rather than to give us more information about it. If cognitive penetration is possible, then some cases like this will yield illusions, making things seem to us to have flavours that they do not have. If cognitive penetration is not possible, then as in 2.2, these effects would still have a deleterious impact on the exercise of taste's epistemic power, by making it impossible for us to take experiences had when genuinely perceiving at face value.

In our contemporary environment, our food and drink very often comes to us with descriptions or images, on menus, packaging, advertising and display, that make cognitive penetration or something like it likely. As such, it seems highly likely that this provides another frequently-encountered obstacle to the exercise of taste's epistemic power.

Even though, as we saw in section 1, taste can put us in a position to know about the flavours of things, in our contemporary environment, its epistemological power often goes unexercised, or so I have suggested in this section. The studies referred to use statistical analysis of results acquired from groups of perceivers, and so each effect is one to which we can at best conclude that perceivers are subject *for the most part*. However, that does not undermine this section's conclusion. So far as I know there isn't evidence that there are perceivers who are not subject to these kinds of effects. And, to the extent that we are all subject to a range of such effects, the epistemological power of our capacity to taste is undermined in the way discussed in this section. In the rest of this paper I will explore some consequences of this conclusion.

3. Not significant: taste as an aesthetic sense

It would matter to us a great deal if sight's epistemic power frequently went unexercised. For one, it would matter practically: plausibly, visual experience allows us to do all sorts of things—from picking up cups to reading—because it has the kind of epistemic power we have been discussing here. It would also matter because our interest in sight is frequently epistemic: we are interested in our visual experiences as sources of knowledge. Does it matter if, as I have argued above, taste's epistemic power frequently goes unexercised? In some ways, I don't think it does. On the one hand, that reduces the significance of the preceding: taste's power frequently goes unexercised, but (in these ways) this is insignificant. But on the other hand, this lack of significance draws attention to some interesting features of taste and our current attitude to it.

Firstly, it matters less to us practically if taste's power goes unexercised than if the same were true of sight. This point has two components. First, we modern humans don't *have to* rely on taste to find nutrients and safe food and second, we also *can't* do so (or can do so to a lesser extent). Presumably, things were different for our evolutionary ancestors in both ways. For one, they likely had to rely on taste more than we do to ensure that what they ate was safe and nutritious. We have, and they lacked, other ways of determining that—food labelling, use-by dates, education about healthy eating and safe food preparation. Furthermore, in the untampered-with environment of those ancestors, taste would been an excellent guide to energy and nutrient content. For us, now, things are different. Taste is now a less good guide to nutrient content than it once was. Before the discovery of artificial sweeteners, the vast majority of sweet-tasting things would have been high in calories. But since the discovery of artificial sweeteners over a century ago, and especially since their proliferation in the latter half of that century, we can have 'the sweet taste without the calories' (Chattopadhyay, Raychaudhuri, & Chakraborty 2014: 611), and increasingly, we have exactly that. For example, since the introduction in 2018 of the 'sugar tax' (Soft Drinks Industry Levy) in the UK, sweet-tasting drinks are likely to be sweetened with, for example, aspartame, sucralose or acesulfame K rather than sucrose. (For a comprehensive discussion of alternative sweeteners to sucrose, see O'Brien-Nabors 2016.) Likewise, creaminess and other sensory qualities associated with fat need no longer be indicative of high fat levels. Low-fat versions of foods such as ice creams can be given the taste and 'mouth feel' associated with fat by using various fat-replacing additives. (For a review of fat replacers, see Lucca & Tepper 1994. For more recent discussion of a more specific range of fat replacers see

Peng & Yao 2017. For fat replacement in low-fat ice cream, see Akbari, Eskandari, & Davoudi, 2019.)

These are not themselves examples of taste's epistemic power being undermined: taste experiences could be largely veridical with regards to sensory qualities such as creaminess or sweetness but nevertheless be a poor guide to nutrient content, just as a perfectly veridical experience of a red tomato can be a poor guide to the tomato's ripeness. Nevertheless, the fact that taste is now a less good guide to the presence of nutrients than it was means that the undermining of its epistemic power has less practical import than it might, as does the fact that our need to use it in this way is much reduced.

Secondly, and probably not unrelatedly, our interest in taste as eaters and drinkers is not primarily epistemic—which is to say, we're not usually or mainly interested, when tasting, in finding out what properties the things we are tasting really have. Instead, we're more often interested in how they *seem*, whether or not they *are* that way. This is reflected in the kind of perceptual activity that typically characterises tasting, and in our language about taste and tasting too.

When we look at things or watch them over a period of time, we tend to do so, throughout, in order to know what those things are like and what they are doing—looking and watching are typically epistemic activities. (Crowther 2009) When one tastes something over a period of time, the same is not typically true. There is an initial, as Spence puts it (Spence 2017: 163) quality check (is it off? Is it what I expected?) and then we simply enjoy the experience: we *savour* it, without interest in its epistemic import. It is notable that we use this same originally gustatory terminology ('savouring') to talk about the enjoying of other kinds of experiences too.

Our relative lack of interest in taste's epistemic power is also reflected in the way in which we report taste experience. To see this—and its consistency with taste's inherent epistemic power—it is useful to consider an argument that Murat Aydede applies to pain. According to Aydede, pain reports are importantly different to perceptual reports. I would, typically, withdraw a perceptual report such as 'I see a dark patch on my hand' if it turned out that there was no dark patch there. That's because what is reported in such cases is the presence of something in the world that is seen: such a report is committal about the world. On Aydede's view, pain reports such as 'I feel a jabbing pain in my hand', whilst superficially similar to perceptual reports, do not

function in this way. Such a report does not attribute a quality (such as tissue damage) to an object (my hand), and so would not be inaccurate if the object lacked the quality. Furthermore, he argues, because pain reports are hardly ever committal about the world, we should not even think of the experiences they report as representations of any worldly quality. (Aydede 2009)

For our purposes here, it need not matter whether we accept what Aydede says about pain. What's important is that taste falls between vision and (if Aydede is correct) pain, such that a view he takes to be ruled out for pain remains plausible for taste. Reports of taste experience are frequently but not always committal about the world: 'it tastes sweet' we say, and we would often not withdraw the claim were it to turn out that we are subject to an illusion of sweetness. We are in such cases reporting on the occurrence of an experience rather than attributing a quality to something in the world. However, there are also taste reports that are more like typical reports of visual experiences. One context in which taste reports that are committal about the world occur is the non-culinary: consider tentatively licking some soap that you've been told tastes like honey or (once upon a time) a Doctor tasting urine for the sweetness indicative of diabetes. (See, for example, http://blog.wellcomelibrary.org/2013/11/diagnosing-diabetes-a-wee-taste-of-honey/) More generally, whilst we may agree with Aydede that we strongly resist the suggestion that we are not in pain when we say we are, we are quite willing to accept that in certain circumstances, something is not F when it tastes that way, or vice versa (witness 'miracle fruit' or the effect of a cold on taste experience).

Because there are both taste reports that are committal about the world, and taste reports that are not, this makes it plausible to say about taste what, according to Aydede, it is not plausible to say about pain. Namely, that taste experiences do represent worldly properties but that when we talk about taste we are frequently interested only in reporting the occurrence of those experiences rather than the presence of what they represent.

These factors suggest that rather than being epistemic or practical, our interest in taste is very often aesthetic, where this is understood to mean that our concern is 'with a thing's looking somehow without concern for whether it really is like that'. (Urmson 1957) I do not mean to suggest that this understanding of 'aesthetic' is all there is to having an aesthetic function, or taste's aesthetic function in particular. For further discussion, see, for example Crane 2007; Todd 2010; Matthen Forthcoming. But given that our interest in taste is aesthetic in this restricted

sense, it matters less than it might have—and much less than it would for sight—that taste's sight-like epistemic power frequently goes unexercised.

4. Significant after all: gastrophysical nudging and the ethics of tasting

I have argued that the fact that taste's epistemic power goes unexercised is in some ways insignificant. That lack of significance is itself noteworthy, because it draws our attention to some features of taste and our interest in it: our interest in taste, unlike our interest in sight, is not primarily practical or epistemic but aesthetic. And this might seem to be cause for celebration: lucky are we who can do without the epistemic power of a whole perceptual capacity! But in this final section I will recommend caution. The kinds of effects on taste discussed in section 2 are amongst very many human psychological quirks revealed to us by psychology. Such quirks can (and increasingly are) exploited to affect our beliefs, choices and actions with a variety of aims, benign and otherwise. Behavioural interventions that exploit the effects discussed in section 2 will typically be ones that prevent us from exercising the epistemic power of taste—that is, they prevent us from coming to know how the world is on the basis of taste experience. And, precisely because they function in this way, they fall foul of conditions widely agreed to affect the ethical permissibility of behavioural interventions. So whilst our relative lack of practical and epistemic interest in taste might make us unconcerned about its power being undermined, this undermining nevertheless matters, and specifically, matters ethically. To argue for this claim, I'll first need to briefly explain the concept of nudging, and some conditions that affect its ethical permissibility.

In nudging, someone, the nudger, intentionally changes aspects of 'choice architecture' to influence people's decisions. 'Choice architecture' is the way in which choices are presented to agents. (Thaler & Sunstein 2008) Choice architecture is changed in nudging in a way that exploits 'psychological quirks' that affect human decision making (Wilkinson 2013). Such are quirks are frequently 'patterns of irrationality'. (Bovens 2008) For example, people tend to stick with default options, even when the are more costly. So we can be nudged into paying into a pension or donating our organs after death by making doing so the default: something you have to opt out of rather that into. And because the order in which we are presented with items affects how likely we are to buy them, we can be nudged into buying things if they are placed, for example, at eye level so that they are the first thing we see. We can call the use of the kind of effects discussed in section 2 ('gastrophysical effects') with the aim of affecting decisions in this way 'gastrophysical nudging'.

Nudging has been of great interest because—in utilising scientific knowledge about our psychological quirks—it promises to be effective, and—in eschewing coercion—it is potentially acceptable to those of a wide range of political persuasions. But that's not to say that anyone thinks that nudging is always morally permissible. There are a number of factors that are relevant to assessing the permissibility of a nudge. Two related factors have to do with liberty and transparency. I want to suggest that precisely because gastrophysical nudges (GPNs) involve preventing taste's epistemic power from being exercised they fall foul of these factors. It is helpful to be clear at the outset that this does not mean that GPNs are *impermissible,* since other factors are relevant to the permissibility of nudges too. But holding these other factors steady, we should prefer a transparent intervention that preserves liberty to one that does not.

4.1. Liberty and transparency

A nudge's permissibility is partly determined by the extent to which it does not affect the nudged agent's freedom. In fact, according to Yashar Saghai it is partly constitutive of a nudge—as opposed to some other behavioural manipulation, which he calls a 'behavioural prod'—that a nudge preserves liberty. But there are two ways in which an interference in decision making might affect an agent's liberty. (Saghai 2013) First, and as we have already said, it might restrict an agent's choice set, which nudges do not, by definition. Secondly, it might affect the way an agent reaches a decision in such a way as to be deemed 'substantially controlling' (Saghai, 2013: 488). If that is the case then an interference would prove a threat to the agent's autonomy, despite leaving their choice set intact. An interference will not be substantially controlling if it is easily resistible by a normal agent: one with typical powers of awareness and attention for example. (Saghai 2013: 489-90) According to Saghai, both forms of liberty preservation are determining factors not merely in the ethical permissibility of a nudge, but in whether an interference in choice architecture counts as a nudge at all. I set that taxonomical issue aside here.

The second factor relevant to a nudge's ethical permissibility flows straight from the first: transparency. In order to be easily resistible (and thus substantially non-controlling), it can't be the case that the interference builds in obstacles to the agent discovering that they are being nudged and thus resisting it. As Bovens argues, the transparency that matters is 'in principle token interference transparency' (2008: 216), such that the normal person—without any special

skills or knowledge—should be able to spot the interference in any token instance of nudging, and thus avoid being nudged. Such transparency would be missing from, for example, subliminal messaging or hypnosis, even were an agency that used it completely open about doing so. If an interference isn't transparent then it isn't easily resistible and thus is a threat to autonomy, which as we have seen is relevant to an interference's ethical permissibility.

Where a nudge or other interference falls foul of these factors we can say that it is manipulative. One core conception of manipulation is that of perverting (distorting or corrupting) or subverting (undermining the power of) decision making processes, or rational processes more generally. (Wilkinson 2013) With this explained, I am now in a position to argue that GPNs will fall foul of these ethical permissibility conditions, and thus be manipulative, precisely because they involve undermining the epistemic power of taste.

4.2. GPNs and the permissibility conditions

A GPN would involve exploiting gastrophysical effects in order to affect our decisions about what to eat and drink. One example is the use of flavour-flavour learning to get children to eat more vegetables. (Havermans & Jansen 2007) Researchers exposed children to pureed vegetables paired with a flavouring they liked (sweetness), so that vegetables came to seem to have that flavour. As a result, the children's liking of the vegetable flavours, presented alone, increased significantly. If this result were used in nudging, the desired knock-on result would be increased intake of vegetables, something this study did not explore. Another example would be using odour-taste learning or even crossmodal effects to make something (such as a reduced-sugar cookie or hot chocolate) taste sweeter or more chocolately. See, for example (Crisinel, 2010) for discussion of implicit associations between flavours and sounds that might be exploited to affect how a cookie tastes to a subject, or how they believe or report it to taste. Such effects can be used in 'sonic seasoning', as demonstrated in, for example, 'Why you Should Listen To Your Food', a 2016 episode of the *Sporkful* podcast. (Saini, 2016) If this were successful then we could be nudged into eating more of the reduced-sugar cookies, or choosing them again, or choosing them instead of some alternative.

The psychological quirks exploited in GPNs such as these are in the first instance quirks in perceptual processing, or in the formation of perceptual beliefs. That makes them a bit different to typical nudges or nudge-like interferences, since what the interference will in the first place

target is not a choice but a perceptual experience, such as a taste experience of sweetness, or a belief formed on the basis of (apparently) taking one's taste experience at face value. For example, if odour-taste learning really does change perceptual experience, then exploiting the learned association between vanilla and sweetness, or creating an association between vegetable flavours and sweetness, is to make use of taste illusions. If a GPN exploited, instead, crossmodal effects on taste then arguably (see section 2.3) that might not make use of taste illusion, but merely affect our beliefs about how things taste. For example, a café might nudge us into buying more of a low-quality hot chocolate by serving it in orange mugs, so that we believe it tastes more chocolatey to us than it in fact does.

It seems likely that when they are effective, GPNs will affect perceptual experience or perceptual belief *negatively*: that is, by yielding illusion or false belief. In the first of our examples, the vegetables come to taste (gustatorily appear) to have a flavour to the children that they do not have. In a crossmodal example, perhaps the hot chocolate tastes as chocolatey as it otherwise might, but we believe it to be more chocolatey in an orange mug. In turn, the subject's choices are affected: they eat or buy more of the relevant product than they would have, or choose it over others. In either case, the important point is that the nudge will be effective precisely because it undermines taste's epistemic power: either an illusion is induced, in which case the subject would form a false belief if they took their experience at face value, or they would be prevented from taking their (accurate) experience at face value and end up with a false belief that way.

Because they function by undermining taste's epistemic power, GPNs fall foul of both of the ethically-relevant factors outlined in 4.1. Firstly, GPNs would not be transparent. In functioning by creating illusions or false beliefs about experience they would build in obstacles to the subject being able to spot the interference to which they are subject. For one, the normal person, with normal capacities for awareness and attention will not recognise the illusion or induced false belief, and so will not be in a position to (for example) reject the vegetables as they otherwise would have done. In addition, the subject faces the additional obstacle of it seeming to them that they are merely responding to how the world is revealed to them in perceiving: that is, it seems to them, when they are subject to the GPN, as if they are merely exercising the epistemic power of taste and on that basis choosing.

In that they are non-transparent, GPNs are also difficult to resist: as we saw above, it's transparency that allows for easy resistibility. And that means that these they would fall foul of the first our two factors also: they would be 'substantially controlling' and a threat to liberty. Again, the fact that these nudges function to undermine taste's epistemic power means that they do this in a distinctive way, and that the way in which they are thus manipulative is likewise distinctive. In the case of typical nudges that primarily target choices or decisions, the threat to autonomy, if there is one, comes in the following form: your will is subject to someone else's will. You choose *o* or you choose to φ not because you will it but because someone else wills that you will it. Thus the rational process of decision making is perverted or subverted. In GPNs, the threat is different. Perception and belief are not subject to the will in the way that decisions are. So when your belief or perceptual experience is subject to someone else's will in a GPN, it is not your will that is thus subject. Rather, that which would usually be a manifestation of sensitivity to how things are in the world has become subject to another's will. It is precisely that rational process which is the exercise of taste's epistemic power is undermined.

In the last section, we saw that there is a way in which it doesn't matter to us that taste's epistemic power is frequently undermined, because our contemporary interest in taste is often aesthetic rather that epistemic or practical. We have now seen that GPNs fall foul of conditions relevant to the permissibility of nudging and are manipulative, precisely because they function by undermining taste's epistemic power. That is enough for us to conclude that there is after all a way in which this undermining matters: it is not all good news. That is not, however, to say that GPNs are always ethically *im*permissible: there are other factors that can make even a manipulative interference morally permissible. But that doesn't undermine our conclusion: even when other factors render a GPN all-things-considered permissible, it still matters if it is manipulative, and we should still prefer a non-manipulative intervention, holding all other factors steady. It thus matters that taste's epistemic power is undermined in the context of these behavioural interventions, and the fact that our contemporary interest in taste is frequently aesthetic should not make us wholly comfortable with its undermining. I end by considering an objection.

4.3. Ordinary manipulation?

Sunstein points out that we should not object to a nudge on the grounds of manipulation if it does not 'diverge from the kinds of influence that are common and unobjectionable in everyday

life' (Sunstein 2015: 448). As I said above, I am not claiming that manipulative nudges are impermissible, only that whether they are or are not manipulative is relevant to their permissibility. Still, we might wonder, with Sunstein, whether the level or kind of manipulation in GPNs is of a kind that we generally find acceptable. If it were, then the ethical significance of the undermining of taste's epistemic power that they involve would be vanishingly small at best, and we might wonder whether it matters after all. I offer three responses to this objection.

First, it isn't clear that Sunstein draws the line between acceptable and unacceptable manipulation in the right place. He writes:

> Much of modern advertising is directed at System 1, with attractive people, bold colors, and distinctive aesthetics. (Consider advertisements for Viagra.) Cellphone companies, restaurants, and clothing stores use music and colors in a way that is designed to "frame" products in a distinctive manner. Doctors, friends, and family members (including spouses) often do something quite similar. Is romance an exercise in manipulation? Maybe so. Is medical care? Is the use of social media? A great deal of conduct, however familiar, can be counted as manipulative in some relevant sense, but it would be extreme to condemn it for that reason. (2015: 445)

But I think many of us *are* affronted when we discover the use made by advertisers of—for example—music and colour to persuade us to buy things, especially when, on reflection, we suspect that we have been led to buy that which we otherwise wouldn't have. Sunstein's parenthetical example—pharmaceutical advertising—sounds especially uncomfortable to a reader from the UK, where (as in many other places) direct-to-consumer advertising of prescription pharmaceuticals is not legal.

Second, sometimes, when we take something manipulative to be acceptable, that's because other factors such as benign intent or our having consented to be manipulated make the activity permissible on balance: it's not that the level or kind of manipulation involved is of a kind that we generally find acceptable. Some manipulative GPNs might be on balance permissible if, for example, they are effective and the intent behind them is benign, or if we have consented to them. Also relevant in the cases Sunstein mentions is who is responsible for the manipulation in question: perhaps we are tolerant of some kinds of manipulation from friends, romantic partners and caregivers because our relationships with them are ones of trust. We mind less if we and our

rational capacities are subject to their will because it is partly constitutive of our relationships with them that they take on our interests as their own. We are not in the same relationship with those who are likely to subject us to GPNs: food and drink producers and sellers and public health organisations.

Thirdly and most importantly, it is not clear that the level of manipulation that would be involved in GPNs is 'the kind of influence that is common' in the contexts mentioned. For one, GPN's employ specialist knowledge of quirks in human perceptual processing. There is, intuitively, a difference between presenting an option in an attractive way (getting out the best china, lighting candles, using a friendly tone of voice) and utilising specialist knowledge of human psychology. All else being equal, the latter constitutes a greater loss of liberty, in part because the more specialist the knowledge required to spot an interference, the less likely it is that we'll be in a position to spot it. So, the suggestion that the kind of manipulation involved in GPNs is common and unobjectionable does not stand up to scrutiny.

Conclusion

I have argued that taste has the same kind of epistemological power that sight does: when all goes well, one can take taste experience at face value, and thus know about features of the world. In our contemporary environment, that power often goes unexercised, but because our interest in taste is frequentluy aesthetic rather than epistemic or practical, this matters less than it would in the case of sight. This tells us something interesting about the role that taste has come to have in our lives: it has lost some of its practical usefulness and come to have significantly aesthetic import. But that doesn't mean that undermining taste's epistemic power doesn't matter at all. If gastrophysical effects are put to use in nudging then it matters ethically precisely because that would involve undermining taste's epistemic power.[1]

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