

# Spatial aspects of olfactory experience

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## ABSTRACT

Several theorists argue that one does not experience something as being at or coming from a distance or direction in olfaction. In contrast to this, I suggest that there can be a variety of spatial aspects of both synchronic and diachronic olfactory experiences, including spatial distance and direction. I emphasise, however, that these are not aspects of every olfactory experience. Thus, I suggest renouncing the widespread assumption there is a uniform account of the nature, including the spatial nature, of what is experienced in olfactory experience.

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## 1. Introduction

It has repeatedly been claimed that we humans do not experience something as being at either a distance or direction from us in olfaction, except perhaps in very special circumstances (Porter et al. 2005; Radil and Wysocki 1998).<sup>1</sup> Even among recent contributions that acknowledge other spatial aspects of olfactory experience, this claim is upheld (Batty 2010a, 2010b, 2010c, 2010d, 2011; Lycan 2000; Richardson 2013; Young 2016; Young, Keller, and Rosenthal 2014). I take issue with this claim. One problem is that the reasons offered in its favour are unpersuasive; I target two of them in Section 3. But, more importantly, I think phenomenological and empirical considerations suggest that both spatial distance and direction can be aspects of what one experiences in olfaction. In Section 4, I argue that in *synchronic* olfactory experience one can experience something as extended over a large area and as coming from or being at a distance. In Section 5, I argue that spatial direction can be an aspect of *diachronic* olfactory experience, in the sense that something is experienced as

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having spatial direction. What I do *not* claim, however, is that spatial distance and direction are aspects of every olfactory experience. In Section 6, I suggest we renounce the widespread assumption that there is a uniform account of the nature, including the spatial nature, of what is experienced in olfactory experience.

## 2. Approach

Before we start properly, let me clarify some terms and approaches that will be important throughout. It is useful to adopt a threefold distinction from Batty (2010c) between 'odours', 'sources' and 'smells'. Following her, I use 'odour' as a term for the collection of molecules that objects give off. 'Source' is used as a term for the object that gives off the odour. And 'smell' is used as a term for a property presented in olfactory experience. Simply making this distinction does not indicate whether it is odours, sources or smells – or something else – that is experienced in olfaction. My concern in this paper is not to answer the question as to what the nature of the objects of olfactory experience is. I focus instead on the narrower question as to what their *spatial* nature is. The central approach is to consider the phenomenology of olfactory experience in three examples where, I suggest, there are different spatial aspects to the object of olfactory experience. The phenomenology can be described accurately without specifying what the object of experience is. However, if my suggestions are right, they put constraints on what the object of olfactory experience in these examples might be. So, although my main concern is not the nature of the objects of olfactory experience generally, the investigation will bear on this issue. More specifically, I think the variation in spatial aspects of olfactory experience goes together with a variation in the kind of entity experienced. I discuss this in Section 6. Until then I often remain neutral as to whether what we experience in the examples I discuss are smells, odours, sources, or something else.

By contrast to most other contributors to the debate, I pursue two different approaches to olfactory experience. Theorists like Batty (2010a, 2010b, 2010c, 2010d, 2011, 2014), Richardson (2013) and Lycan (2000) pursue a static approach, which investigates *synchronic* olfactory experience. This approach considers the subject as stationary and as detecting, at a certain moment, a certain odour in a certain concentration. In my view, it seems artificial to focus only on synchronic olfactory experience. Very often when we smell something, we move around – indeed, smelling something often prompts us to move – and the intensity of what we experience varies over time. These are important features of olfactory experiences. Hence, I will also pursue a dynamic approach and consider *diachronic* olfactory experience, where the subject may move around and the concentration of the chemical compounds vary across both time and space during the course of the experience.

In pursuing the dynamic approach, I open for the idea that some olfactory objects may have properties that take both time and space to smell, because they are themselves extended in space. Thus, unlike Mizrahi (2014), I do not claim that all olfactory objects 'can be grasped in one sniff' (248). Instead, I take my lead from the debate about temporal experience, where some think that events and processes take time to experience because they are extended in time and one cannot perceive them by just perceiving a moment's time slice of them.<sup>2</sup> Similarly, I think one can experience other olfactory properties in diachronic than in synchronic olfactory experience. This means that I construe the distinction between synchronic and diachronic experience as concerning what kind of entity is experienced. There can be synchronic experiences that as a matter of happenstance last over time, such as the continued viewing of a building. But the experience remains synchronic in the sense that what is experienced does not by its nature take time to be experienced; one could see the building by giving it a moment's glance.<sup>3</sup>

### 3. Arguments from discrimination

There are many reasons for resistance to the claim that distance and direction can be spatial aspects of olfactory experience. In the present section, I point out why I think two specific reasons for resistance to the claim are unconvincing. The reasons both spring from certain considerations concerning what humans are able to discriminate by using the nose.

One reason is presented by Batty (2010a, 522–525, 2010c, 15–16; 2011, 166–167). She considers a case where someone has been smoking in a room and where lavender air freshener has been used to cover up the smell. Batty claims, plausibly, that we will not be able to distinguish between (i) a scenario where we have missed a spot, so that one location smells only of cigarette smoke and not of lavender, and (ii) a scenario where we have successfully covered the whole room with lavender smell. From this plausible claim, however, she moves to the conclusion that 'each experience [i.e. the experience when I have missed a spot and the experience when I have not] is silent on where before me these properties are instantiated' (Batty 2010a, 525). 'Olfactory experience', Batty claims, 'reports nothing more than "these properties instantiated here"' (525).<sup>4</sup> If this is right, olfactory experience of something as being at a distance or direction from one would be precluded.

We should grant Batty the initial observation about what one is able to discriminate by means of olfaction. One is not able to tell whether the whole room, or only parts of it, is covered with lavender smell. But this observation need not prompt the conclusion that one experiences nothing more than property instantiation at an 'undifferentiated' location, without experiencing the properties as being located before one. For why think that in order to experience something as located before one in the room, one must be able to tell whether

it is located at every location in the room? Richardson's (2013) view addresses part of this question. She claims that the fact that we sniff makes our olfactory experience be one of having 'odours being brought *into the nose from without*' (410). Something is experienced as external to the body in olfaction, although it is 'not represented as being at any distance or direction from you' (410). Thus, Richardson's view provides an example of how we can accept that one is unable to tell whether what is experienced is present at every location in a room, but nevertheless maintain that one experiences it as located before one in the sense of being located externally to one's body.

Accepting, as Richardson does, that one in olfaction experiences something as located externally to one is not yet to accept that one experiences something as located *at a distance or direction* from one; indeed, this is what Richardson denies in the quotation just rendered. However, I think Batty's observation about our olfactory discriminatory powers is compatible also with this latter claim. For instance, it would be thus compatible if, as Young (2016) argues, smells do not have strict determinable boundaries in external space. Given this, he notes, 'olfaction is experienced in a spatial fashion and as having spatial features, but in a less truncated form' (524). This would make it perfectly possible to experience something as being at a distance or direction, despite not being able to tell by means of smell whether it is at every location in the room, since the latter has no determinable answer. Another alternative, which I prefer, is to place the lack of determinacy, not in the nature of the object of olfaction, but in how we experience it. Perhaps one simply experiences smells as being at a distance or direction, without it being part of the experience that they are at any *particular* distance or any *particular* direction. In conclusion, then, I do not think the observation that we are unable to discriminate the two sorts of cases that Batty describes gives reason to resist the claim that something can be experienced as being at a distance or direction from one in olfaction.

A second reason for resistance to the claim that distance and direction can be spatial aspects of olfactory experience is rooted in the observation that smells can *linger* after the source is gone, without one being able to tell whether the source is there or not. For instance, one cannot tell by smelling whether the rotting garbage is there or if simply its smell lingers. This observation is often mentioned as a consideration in favour of the surprisingly widespread idea that, although we often name smells after their sources, sources are not objects of olfactory experience (Batty 2010d 1150; Lycan 2014, 68–69; Richardson 2013, 403–404; Young 2016, 522). The reasoning seems to be that, since one cannot tell the difference between an experience where the source is present and one where it is not, the experiences are the same. As Richardson puts it, 'the comings and goings of, and changes in the particular sources of odours just don't make very much difference to olfactory experience' (Richardson 2013, 404). But then, the reasoning continues, if sources were objects of olfactory experience, one would be having a non-veridical experience when the smell lingers but the

source is absent. And this does not seem plausible. For even though one may be wrong about whether, e.g. the rotting garbage is present, there is nothing deceptive about what one experiences; it smells of rotting garbage.<sup>5</sup> So, according to this line of reasoning, there is at least one way in which one cannot be having olfactory experiences of something at a distance or direction from one; one cannot be smelling sources.

Several assumptions in this line of reasoning are questionable. One is the assumption that the experience of, e.g., the smell of rotting garbage is *the same* when the source is present and when it is not. That the experiences with and without the source respectively are indiscriminable to the subject does not suffice for making the assumption that they are the same, unless we generally treat facts between which the subject cannot discriminate as irrelevant to the nature of an olfactory experience. That is not what contributors who employ the mentioned line of reasoning do. For instance, one of Young's arguments to the effect that sources are not objects of olfactory experience appeal to a fact about the workings of the olfactory system. He writes that 'the whole object is unnecessary for generating an olfactory experience'; only about a dozen of the hundreds of chemical compounds that the average source object is composed of are 'responsible for its smell' (Young 2016, 522).<sup>6</sup> As long as we accept that facts like this, i.e. facts that are indiscriminable to the subject, are sometimes relevant to the nature of olfactory experience, it seems methodologically inconsistent to assume without further argument that one specific such fact, i.e. whether the source is present, is irrelevant.

Another assumption implicit in the above reasoning is that if sources are objects of olfactory experience, they are so in every case. This 'uniformity assumption' motivates the judgement that if sources are objects of olfactory experience, we would be having non-veridical experiences when the source is absent. If, by contrast, we admit that sources are only *sometimes* objects of olfactory experience, there is no *prima facie* reason to conclude that one must be having non-veridical experiences when no source is present. For there would be no reason to deny that, when the source is absent, it is the odour, say, that both seems to be and is the object of experience. In Section 6, I suggest that recognising various spatial aspects of olfactory experience (to be described below) goes hand in hand with renouncing the uniformity assumption.

Thus far, I have said why I think some of the reasons provided in the literature against including distance and direction as spatial aspects of olfactory experience are unconvincing. I have suggested that they rely on some unargued assumptions or overlook certain possibilities. In the next two sections, I reflect on some examples where I believe distance or direction are aspects of our olfactory experience. Section 4 is concerned with synchronic and Section 5 with diachronic olfactory experience.

#### 4. Synchronic olfactory experience

Let me start by outlining two examples of synchronic olfactory experience where, I suggest, one experiences something as extended over a large area, or as coming from or being at a distance. Both examples feature the fairly common phenomenon of *faint smells*, that is, smells that are less intense than what one would usually encounter close to the source.<sup>7</sup>

Example I. Suppose one sits in one's office and detects a faint smell of fire. I think there can be two different spatial aspects of this experience. On the one hand, the phenomenology of this experience may be that one experiences something *as being extended over a large area*. It can be experienced thus because the smell is *faint*. The smell is recognisable as a weaker version of a stronger smell. Insofar as one on past occasions have experienced strong smells, or perhaps specifically strong smells of fire, to become faint as they spread out over large areas, it is at least possible (and perhaps also most likely) that one experiences the faint version as a spread-out version of the stronger smell. This, I take it, will involve experiencing the faint smell as occupying the regions of space over which it is spread out, where this includes not just the region one is in contact with but also regions further away from one. So, while one has only one contact point (the nose), I think one may experience something as extending over a larger area. This is not to say that it is experienced as extended over a precisely determined location. Rather, it is experienced as generally extended, without any details about exactly where or how far.

On the other hand, one may focus on the faintness of the smell as an indicator of the presence of something else *at a distance from one*. By detecting a faint smell here, where one is situated, one may experience something else as being at a distance. Again, I think one may have this experience because the smell is faint and recognisable as a faint version of a stronger smell. It can therefore be taken as an indicator of the stronger version of the smell or of the source. When taken thus, I think the faint smell serves as a means to experiencing this distant thing, since it is this distant thing one reacts to (e.g. by calling the fire brigade). This is not to say that one can determine where the strong version of the smell, or the source, is. Rather, something is experienced as distant, without it being settled precisely *how* distant.

Example II. Suppose one is walking down a road and experiences the faint smell of a spicy dinner. Also here I think the phenomenology of the experience can be that one experiences something at a spatial distance, for the same reasons as in example I. But in addition, one may one experience something as *coming from* a distance. How? Let me first say that I think the example is analogous to how one in audition may experience a sound as coming from a distance. More specifically, when hearing a choir singing from backstage, one may experience the sound as having a different beautiful quality, more 'fragile'

and 'glittering' than when the choir sings on stage.<sup>8</sup> I take it that, because of these qualities, one hears the song as coming from a distance. Analogously, it seems that the quality of the faint smell of a spicy dinner has a peculiar quality; one may perhaps describe it as subtler or more many-faceted than the smell of the dinner up close. Indeed, someone who is not very fond of spicy food may quite enjoy the olfactory experience of the dinner out in the street, but find the experience inside the kitchen rather unpleasant. Thus, one is not just experiencing the same quality more clearly when entering the kitchen; rather, the quality is different. Analogously to the auditory case, then, I think the smell can be recognised on the basis of past experience as having a peculiar quality that smells of spicy foods have had at a distance from the source. This makes it possible to have an olfactory experience of something (the smell or something else) as coming from a distance.

My claims about examples I and II rest on phenomenological reflections. It should be noted that these reflections go against the popular intuition that 'considered only phenomenologically, a smell seems a modification of our own consciousness' (Lycan 2000, 277). This intuition is even acknowledged by Batty, who, although she later argues against it, reports being initially drawn to the idea that 'olfactory experiences are mere smudges on our consciousness' (2010a, 518). It is a mystery to me why this is found intuitive. The way humans – and, more strikingly, many animals – react to olfactory stimulation seems to suggest that they are treating what they experience as occupying their environment, since they frequently start sniffing around. However, in order to settle this battle of intuitions, is there something I can say to support my phenomenological reflections?

At least with regard to example II I think there is; the described phenomenology can be given an empirical explanation. Similarly to how the special tone quality of a song coming from afar can be explained by the fact that some overtones carry better at a distance, the special quality of the smell of a spicy dinner coming from afar can be explained as due to a concentration effect. As Gross-Isseroff and Lancet (1988) were the first to investigate formally, a high versus a low concentration of the same odour is often perceived as differing in quality.<sup>9</sup> A list of such differences was provided in Fenaroli (1975), where for instance hexanal is described as having a characteristic fruity smell when diluted but as smelling strongly of green grass in a high concentration, and indole is described as having an almost floral smell when diluted but as smelling of faeces in a high concentration. What we usually encounter are mixtures of such chemical compounds. Thus, without going into the details, the special quality of the faint smell of a spicy dinner can be explained by fact that low concentrations of one or several of the odours have a rather different quality than high concentrations would.

While this explanation provides some support for my claims about the phenomenology in example II, it also opens for an objection to my claims about both examples. One may wonder why a smell is recognised as the same across the changes in quality; e.g. why does one experience the faint smell of a spicy dinner as a faint smell of precisely that, and not just as an unrelated different smell (as one presumably would for the faecal versus floral smell of indole)? Empirical research provides the answer that, after repeated exposure, one learns to recognise odours as the same across different concentrations.<sup>10</sup> Thus, *past olfactory experience* is required for recognising a smell as the same across changes in quality. Also in example I, past experience with both faint and strong versions of the smell of fire seems required in order to experience the faint smell as, precisely, a smell of fire, and not some unrelated smell. But then, one might object, the spatial properties that we become aware of in examples I and II are not properties of what we experience, but rather *beliefs* about what we experience inferred on the basis of past experience.

This anticipated objection is not a straw man. On the contrary, it is in line with a certain way of thinking about the relationship between past and present olfactory experience that figures in the literature. For instance, this way of thinking underlies Batty's (2010a) reasoning about how one distinguishes two smells when both are present on the same occasion. To do this, she writes, one draws on past experiences where each smell alone has been present. But this means, she claims, that the difference between the two smells is not something one experiences, but something one has a *belief* about, because it is based on something one *knows*:

[O]n the basis of experiences like these [experiences where only one of the odors is present], I have the knowledge that one smell can exist without the other. On the basis of my knowledge of these modal facts, I 'bundle' the properties into two 'packages' and come to believe that I have two odor objects before me. But, unlike the visual case, nothing about the experience itself dictates that I do so. (Batty 2010a, 527)

Here Batty assumes that past olfactory experience constitutes a bit of knowledge, on the basis of which one can form beliefs about what one currently experiences, e.g. that one experiences two 'packages' of properties.<sup>11</sup> This provides a basis for the abovementioned objection to the description of examples I and II, i.e. the objection that one does not experience something to have the spatial properties described, but instead infers it to.

The issue in this objection is what sort of capacities we should think are involved in olfactory experience, and, more specifically, whether there are some capacities, like memory or recognition, that are definitely *not* involved. One might think, quite generally, that if one draws on memory in coming to take things to be thus and so, then one has formed a belief. But that this is mistaken as a general claim is in my view convincingly shown by Smith's (2007) account of



wine tasting. Smith notes that there are discriminations concerning the taste of the wine that only the wine critic is able to make, due to for instance memory of past experiences. Making these finer discriminations, he claims, constitutes an *experience* of the wine's taste, and not a cognitive response. When we describe the taste of a fine wine, he writes, we can 'improve one another's perceptual awareness of the taste of the wine, leading to finer discriminations' (Smith 2007, 45). Thus, he argues that we should reject the view that 'tastes are just what is immediately experienced' (49).

With regard to smell, Wilson and Stevenson (2007) have from the perspectives of neurobiology and psychology argued that smell is strongly tied to memory. Somewhat similarly to how Smith claims that one can learn to taste fine wines, Wilson and Stevenson claim, as is indeed the title of their book, that one *learns* to smell. By pointing to studies of, e.g., how children are poorer at discriminating odours than adults, and where this does not seem due to maturational effects on the receptor system, they argue that 'no match [with stored patterns of activity] or no memory equals no perception' (Wilson and Stevenson 2007, 21). So, rather than taking memory and recognition to be capacities that are definitely not involved in olfaction, they take them to be capacities that are fundamentally involved.<sup>12, 13</sup>

Wilson and Stevenson's view is controversial, and I cannot provide an independent evaluation and defence here. Suffice it to note that *if* their view is accepted, the objection anticipated above is undermined, because the underlying assumption identified in Batty (2010a) is rejected.<sup>14</sup> This is not to say that acceptance of Wilson and Stevenson's view is *required* for rejecting the anticipated objection. Smith's account of wine tasting would suffice for casting doubt on the generality of the assumption that underlies it, i.e. the assumption that drawing on past experience makes one believe something about one's olfactory experience rather than experience it. If there is nothing special about olfaction and reliance on past experience, Smith's point would suffice to reject the anticipated objection.

But perhaps there is something special about olfaction in this regard. Let us again compare smells to sounds. Observe that while past experience with one distant sound will help one recognise also other sounds as distant, the same is not true of smells. For only sounds, and not smells, alter in a *systematic* manner when experienced at a distance. Does this mean that one cannot draw simply on past experience of faint smells in order to recognise a smell as distant, because a belief about the particular smell in question is required? Not necessarily. I think it means only that the past experience required for smell recognition is often very specific. For instance, in order to experience indole as coming from afar, one presumably needs sufficient experience with how the quality of indole in particular goes from fruity to faecal with changes in concentration of the odour (for a similar point, see Batty 2014, 235). Thus, more learning may be required for

olfactory experience of something as coming from afar, compared to auditory experience of the same, but this need not imply that the former involves belief.

In summary, I think the empirical research on concentration effects can be used to support my claim about the change in quality of the smell in example II. However, the central justification for thinking that there can be spatial aspects of synchronic olfactory experience derives from my descriptions of the phenomenology in examples I and II. The same is true of the claims I will make next about a spatial aspect of diachronic olfactory experience.

## 5. Diachronic olfactory experience

For the same reasons as those just provided with regard to synchronic olfactory experience, I think one can also diachronically experience something as extended over a large area or as being at or coming from a distance. But, in addition, one can diachronically experience something as occupying the space across which the nose moves, and this, I suggest, opens for olfactory experiences of something as *having spatial direction*. I will provide one example of this, and then discuss an objection.

Example III. Suppose that a faint smell of newly baked bread has found its way from the kitchen up to the top floor bedroom. A hungry breakfast guest traces the smell, as it goes from being faint to being stronger, and thereby finds the way to the source of the smell, i.e. the newly baked bread in the kitchen. What happens here, I suggest, is that the smell is experienced as pointing the subject to its source; the smell is experienced as having a spatial direction which the subject can track. Why should one think so? Because, I suggest, the subject experiences an *olfactory constancy*. In one sense, the smell changes as one moves from one location to another; the smell goes from being faint to being strong. But in another sense, the smell stays the same as one moves from one location to the other; it is always the smell of newly baked bread. So, the smell appears the same yet also different; one experiences a smell constancy across the space where one moves. This, I think, is what makes one experience the smell as having a spatial direction that is pointing one towards its source. On the one hand, the sameness of smell assures the subject that one and the same smell is being traced. On the other hand, the change makes the subject experience the smell as having a direction at each location, a direction that the subject can follow or fail to follow with his or her movement, and that, if followed, brings the subject to a location where the smell is stronger.

When Batty (2010a, 2010b, 2010c, 2010d, 2011) and Richardson (2013) claim that nothing is ever presented as being at or coming from a direction in olfaction – and when Young (2016, 531 n. 10) claims that it can be presented thus in special circumstances – it is not the described sort of phenomenology they seem to have in mind. They are concerned with synchronic olfactory experience,

where the subject would be having a similar experience to that which the hammerhead shark can have, due to its nostrils being placed so far apart that it can smell in stereo. By contrast, I am describing olfactory experience as having a spatial aspect that is not due to stereo olfaction, but rather that the sense organ is moved around across space and that the intensity of the smell varies across that space. So, even though I think that spatial direction can be an aspect of olfactory experience, which seems to be excluded by Batty's and Richardson's claim, my claim that something may be experienced in olfaction as having spatial direction is not a claim they reject; they simply do not consider it.

Young (2016), by contrast, considers the constancy phenomenon in question briefly, although he does not tie it to any spatial aspect of olfaction. He writes:

The smell of peach can be identified across changes in intensity and concentration (when it is unripe, ripe, and overripe), in different contexts (as a drink, as the filling of a pie, or as the top note of a perfume). Despite these changes, all the various token olfactory experiences can still be recognized under a particular type, that is, peach smell. (Young 2016, 523–524)

While Young does not label it as such, what he here describes seems to be various olfactory constancies; the smell is experienced as the same and yet different across the various changes.<sup>15</sup> However, experiencing olfactory constancies need not amount to an experience of anything spatial. One may sit still on the same chair and experience the smell of a peach as it goes from being ripe to overripe over the duration of a couple of days. Perhaps this could amount to an experience of the smell as having a *temporal* direction, going *from* ripe *to* overripe. This would seem more plausible in a case where the change goes faster, e.g. if one is using one's nose to track the process of popcorn cooking in the microwave, with the aim of stopping the process before the smell of burnt popcorn gets too prominent. Perhaps one then experiences the temporal direction of the smell, as it goes from cooked to burnt. However, in order to experience the smell as having *spatial* direction, the smell must be experienced as changing and yet staying the same across space, not time. This requires that the subject moves across space during the time of the experience, e.g. moving across the space where the smell of newly baked bread is experienced as going from faint to strong. Thus, experience of an olfactory constancy does not suffice for producing the phenomenology described in example III. One must also be aware of the change in the smell as a change that corresponds with the movement of one's nose. This additional requirement gives rise to an objection mentioned by Batty.

Although mainly concerned with synchronic olfactory experience, Batty (2010a) briefly describes the possibility of investigating the environment by means of smell by moving from location to location. She acknowledges that we in this way 'actively engage in figuring out where the smells are located in the space around us' (524). We *figure out* the location of the smell, she claims, but we do not *experience* it.<sup>16</sup> For, according to Batty, we base our investigation, not

only on olfactory experience, but also on 'information gained from movement', and hence, she seems to think, it is not a purely olfactory investigation.<sup>17</sup> With regard to example III, then, I expect Batty would say that, if one is aware of the smell as having a spatial direction as a result of an experience of an olfactory constancy across the space where one moves, this is something one has figured out on the basis of 'information gained from movement', not an aspect of what one experiences in olfaction.

I think this conclusion should be resisted. I grant that the subject would need to move around in order to obtain 'information' about where the smell is located in example III. But I do not think Batty is right that this 'information' is *gained from* movement, i.e. that it is by moving rather than by smelling that the location of the smell is identified. Instead, I think the 'information' is *due to* movement, i.e. that it is because one moves the nose that one experiences the smell as having spatial direction.

As with the objection from the previous section, the issue in the present objection is what sort of capacities one should take to be involved in olfactory experience. Instead of focussing on the capacity for memory and recognition as above, we now focus on the capacity for keeping track of movement. The question is: Should a capacity for keeping track of movement be considered external to olfaction, or can olfactory experiences involve the exercise of such a capacity? In order to argue for the latter, let me use an analogy to vision.

The eyes move about three times per second when we visually perceive the environment (see e.g. Henderson et al. 2014). In order for our visual impressions from different spatial locations to make sense, the movement of the eyes must be taken into account when the brain processes visual stimulation. Or else, we would be presented with a very confusing mash-up of visual impressions from the environment, e.g. visual information from the left-hand side could be processed as visual information from the right-hand side.<sup>18</sup> Now: does this mean that we do not visually experience objects as having spatial location, and that we instead figure this out by drawing on 'information gained from movement'? An affirmative answer would be excluded if one is to maintain the view that both Batty and many other theorists hold about vision, namely that we visually experience objects as spatially located.

For vision, then, the fact that the sense organ moves does *not* prompt the conclusion that the spatial aspects of visual objects one thereby gains information about are figured out rather than experienced. So why think it *does* prompt the analogous conclusion about the objects of olfaction? In my view, there is no good reason for this. However, a certain disanalogy between eye movement and the movement of the nose may seem to constitute a good reason. While we move the nose by moving the head or the body, and where such movement is controlled by the vestibular system, the oculomotor system controls eye movement. Eye movement is largely determined by visual content (Spring

and Carrasco 2015), and it can be used as a guide to different kinds of visual processing in the brain (Marsman et al. 2013). By contrast, even though head and body movement may in part be determined by olfactory content (but, to the best of my knowledge, no studies show this), it seems that it would also inevitably be determined by content from other sensory modalities, as well as many other factors. This may motivate the claim that, while eye movement is part of the visual system, head and body movement is not. This reinforces the objection from Batty.

However, this reinforcement of the objection would, like its original version, have the unwanted upshot that we figure out rather than experience that visual objects are located. For also the movement of the head and the body must be taken into account in processing of visual stimulation if we are to avoid confusing mash-ups. So, once again: Unless this fact should prompt the unwanted conclusion about visual objects, there seems to be no reason why it should prompt the same conclusion about olfactory objects. Moreover, I would argue that if one accepts that eye movement is part of the visual system, it is not clear why movement of the eye as part of head or body movement should not also be. Although the ocular nerve controls eye movement, while head movement is controlled by the vestibular nerve, these nerve systems interact in complex ways as they converge in the brain stem (see e.g. Jarman et al. 2009). So, if one of them is part of the visual system, it seems difficult to exclude that the other is.

In conclusion, I do not think there is any good reason to think that one figures out rather than experiences the spatial direction of the smell in example III. Although one must keep track of the movement of the nose in diachronic olfactory experience, one must do the same for the movement of the eyes in visual experience. There is no good reason why only the former should amount to belief about rather than experience of something as having spatial properties. Hence, there is no obstacle to maintaining that in example III the subject, in being presented with an olfactory constancy, experiences the smell of newly baked bread as having spatial direction.

## 6. Objects of olfactory experience

Thus far, I have concentrated on how things *seem* in olfactory experience. I have argued that in several types of examples one experiences something as having spatial properties. Although I claimed that the *smell* is experienced as having a spatial property in example III (because there is a smell constancy), I have not claimed that the objects of olfactory experience always are smells. Rather, my descriptions of the spatial aspects of olfactory experience in examples I and II are compatible with several suggestions as to what the object of experience might be. Since both smells, odours and perhaps also sources can be experienced as coming from a distance or as located at a distance, they are all possible objects of experience in examples I and II. The point I wish to make in the present section is

that the considerations that tell for or against a certain suggestion as to what the object of experience is seem case-specific. This provides a reason for rejecting what I in section two called the 'uniformity assumption', i.e. the assumption that the same type of entity is experienced in all olfactory experiences.

The uniformity assumption is pervasive in the literature. It is implicit in the reasoning sketched in section two to the effect that we never smell sources. It is also implicit in the search for an account of the nature of olfactory objects, where it for instance has been suggested that all olfactory objects are 'molecular structures of chemical compounds within odor plumes' (Young 2016). Even Lycan (2014), who acknowledges a need for admitting both odours and sources as olfactory objects, maintains the uniformity assumption. He thinks that admitting both these types of olfactory object calls for a reconciliation, and this motivates his 'layered account', according to which we smell sources by smelling odours. Similarly, Mizrahi (2014) describes the acknowledgement of both odours and sources as olfactory objects as an 'apparently ad hoc solution', where the appearance vanishes when we provide the uniform answer that 'smell tracks odour sources by detecting the traces of stuff dispersed in the air' (245).

Something that supports the uniformity assumption is an idea that what type of object one experiences is determined solely by the workings of the relevant sensory modality; the type of object is special to the sensory modality in question and can, for instance, be used to individuate the modality as such (see Macpherson 2011 for discussion). It is unclear why we should accept this idea. Within one and the same sensory modality the type of experienced object may vary with the way one reacts to the sensory stimuli. This point has been made by Gaver (1993) with regard to audition. In what he calls experiences of 'musical listening', one listens to the auditory quality of a sound, detached from what produced it, noticing e.g. its particular timbre. In 'everyday listening', by contrast, one listens to what makes the sound, e.g. a car, noticing that it is approaching from behind.<sup>19</sup> Similarly to how, as Gaver observes, musical listening is often the focus of psychologists confined to the laboratory, there may be a tendency in olfaction research to focus on what we may call 'chemical smelling', where the chemical composition of an odour is what the subject reacts to. But I think there are several other types of objects that subjects can react to in their everyday olfactory experiences, where these reactions are often connected to, or even due to, the subject's interests. Let me provide some rather simple examples of the sorts of considerations I think matter, before returning to examples I–III. For simplicity, I consider only smells, odours and sources as possible candidates for olfactory objects.

First, consider a perfumer who has just distilled a bottle of lily extract and is trying to determine by means of smell whether there is a trace of chlorine in the bottle. The perfumer examines whether a certain type of molecule is among the odours he or she is experiencing. While the perfumer may ultimately be after improving the smell of the lily extract, it is the collection of chemical compounds

coming from the bottle that is of immediate interest. This is a reason for thinking that the perfumer is engaged in 'chemical smelling' and smells the *odour*.

Second, suppose instead that a subject trapped in a space ship smells the bottle of lily extract, and uses it to dream of a field of lilies. In this case, the experienced property is important. This is what the subject uses to engage in an imaginative exercise where the experienced property would be just as it is now, but the source would be different, i.e. it would be a field of lilies. This is a reason for thinking that the subject engages in what we may call 'contemplative smelling' and smells the *smell*.

Thirdly, consider a subject who investigates a strawberry in his or her hand, trying to determine by smell whether it has gone off or is safe to eat. Insofar as the subject's interest is the strawberry directly, and not the strawberry indirectly via its smell, this may qualify as an instance of what we, following Gaver, may call 'everyday smelling', where the *source* is the object of experience.

Note that I am not claiming that, e.g. in every case where one has an olfactory experience of a strawberry, one experiences the source. The claim is just that each of these examples provides a description of the subject's interest and reactions which gives reason to think that the object of experience is, respectively, an odour, a smell and a source. Let us now look at a couple of variations as to how the subject's interest and reactions can play a crucial role in examples I-III.

Suppose that the subject's immediate interest in example I is the potential fire that he or she wishes to escape. Analogously to the strawberry example, the subject's interest is the fire directly. The fire is experienced as being at a distance, but the olfactory experience does not indicate at precisely how far a distance, and this is what the subject worries about. Hence, we have reason for thinking that the subject experiences the source. If, by contrast, we suppose instead that the subject is just annoyed because the faint smell of fire makes it difficult to concentrate, but does not worry about the location of the source, it could be the smell or the odour is the object of experience.

In example II, the odour could be the object of experience, if, say, the subject is an employee from the national food council and is trying to determine by smelling whether there might be any illegal ingredients in the spicy dinner being cooked. Like the abovementioned perfumer, the subject's interest would then be the chemical properties of the odour. If, by contrast, the subject is a chef who is just enjoying the fine play of the spices in the smell, then the smell would plausibly be the object of experience. Like the abovementioned subject in the space ship, the subject's interest would then be the experienced quality. In both cases, the phenomenology of the experience could be that the smell or the odour is experienced as coming from a distance, insofar as the subject recognises the smell as a faint version of a stronger smell.

Finally, in example III, it is built into the example that the subject reacts to the experience by tracing the smell, not the odour, since there is no odour constancy. This gives us reason to think that the *smell* is the object of experience; the smell

is experienced as having spatial direction. By contrast, if we had supposed the subject's reactions to be different, e.g. had the subject's movement not been guided by the increase in intensity of the smell, the object of experience might have been different too, as well as the phenomenology.

It is not necessary that all of these options described for examples I-III be accepted. For instance, one may maintain that sources are never objects of olfactory experience and hence, contrary to what I suggested above, that the source cannot be the olfactory object in example I either. Acknowledging sources as olfactory objects would be significant, for it would mean that olfaction is not purely a proximal sense; there would also be distal objects of olfactory experience. It is compatible with my claims about spatiality in the paper, however, to acknowledge only proximal olfactory objects, like smells and odours. For we do not need to include sources among the olfactory objects in order to acknowledge the spatial aspects I have claimed that olfactory experience can have, i.e. that olfactory objects can be experienced as extending over a large area, as being at or coming from a distance, and as having spatial direction. This is a surprising result, if one thought that proximal senses could not foster experiences of something as being at a distance.

What I do think my discussion of examples I-III shows, however, is that at least some factors relevant to determining the object of experience are case-specific. It would be a bad idea, I think, to consider the various options described for examples I-III as contenders for the title 'the most fundamental kind of olfactory experience'. I do not deny that there are general factors – like the chemistry of the stimulus, the workings of the olfactory system or the discriminatory abilities that this system allows for – that are relevant to determining what the nature of olfactory objects is. But there are other factors that also matter. In some cases, although perhaps not all, I think these factors are the subject's interests and reactions, as indicated in the examples above, and these factors are case-specific. This means that, although there may be general things to say about the nature of what is experienced in olfaction, based for instance on chemical facts about the stimulus, the nature cannot be exhaustively accounted for generally and in abstraction from particular cases. Thus, a uniform account of the nature of what we experience in olfaction does not seem right.

I would like to emphasise that the rejection of a uniform account of the nature of what we experience in olfaction goes hand in hand with acknowledging that the spatial aspects of olfactory experience vary too. As the reader might have noticed, I have only claimed that the subject in examples I-III *may* experience something as, e.g., coming from a distance. Whether something is in fact experienced thus will often depend on one's interests and reactions. If a subject in example I, who detects a faint smell of fire, is mainly struck by the stinging sensation in his or her nose, it would seem plausible that nothing is experienced as extended or as being at a distance. Instead, we could say with Batty (2010a, 2010b, 2010c, 2011) that the subject simply experiences something as being



'here.' Then inference would be needed in order to generate awareness of the distant source. Thus, my claim in this paper is not that *all* olfactory experiences have spatial aspects like those I have described, but only that some do. This moderate position has been overlooked by many other contributors to the debate, as it quite naturally would be if the uniformity assumption is accepted without question.<sup>20</sup>

## 7. Conclusion

Against a pervasive consensus in the literature on olfaction, I have argued that one can have olfactory experiences of something as being at or coming from a distance, or as having spatial direction. Part of why this claim has been resisted, I suggested, is the fact that one cannot tell by smelling at which precise locations a smell or odour is present, or whether the source is present. However, I explained that experiencing something as having spatial properties need not require such discriminatory abilities. What may be required – at least in the particular examples I discussed – is that one has learnt to recognise a smell as the same across changes in quality. In diachronic olfactory experience, one may also need to factor in the movement of the sense organ. The need for this should not make us conclude that the subject simply figures out or believes that he or she experiences something that has certain spatial properties. Rather, something is *experienced* as having various spatial properties, I argued. As I emphasised in the final section, I do not intend this as a general claim about all olfactory experiences. My aim has been to show that the widespread view that distance and direction do not figure as spatial aspects of olfactory experience is mistaken because there are counterexamples to it. Once we renounce the uniformity assumption, this denial does not imply that olfactory experience *always* has such spatial aspects.

## Notes

1. By contrast, there are several spatial aspects of animals' olfactory experiences, as documented by a large scientific literature (see e.g. Gagliardo 2013 for an overview of research on olfactory navigation in birds).
2. See Phillips (2008) for a discussion of why it may be difficult to account for synchronic experience of entities that are extended in time.
3. An alternative way to distinguish between diachronic and synchronic experience would be to define diachronic experiences as those lasting more than, say, 30 m/s. I avoid this way of making the distinction because I think the time at or during which an experience lasts is inessential to its nature. I sympathize with Soteriou's (2007) view that a subject may have several perceptual experiences at a given time or period of time, and that asking for *the* experience had at a given time is misguided.
4. A similar argument can be gleaned from Lycan, who seeks to support the claim that synchronic olfactory experience is aspatial by appealing to the fact that a

blindfolded subject will be unable to tell where a smell is located (2000, 278–279 and 287, n. 13). By contrast to Lycan, Batty does not claim that olfaction is aspatial, but only that a smell's location cannot be differentiated from other locations in allocentric space.

5. Batty (2010d) and Young (2016) appeal to the implausibility of a non-veridical olfactory experience in this argument. Richardson argues slightly differently. She claims that, while sources make no difference to the olfactory experience, odours do. So, she concludes, it is more reasonable to think that odours are the objects of olfaction. (See Richardson 2013, 404)
6. It is unclear to me why this fact should make us conclude that sources are not perceived in olfaction. For it would seem, by analogous reasoning, that material objects are not perceived in vision, since only some of the electromagnetic radiation that the object reflects is responsible for making the object visually appear as it does.
7. For simplicity I speak of 'faint smells' rather than 'low concentrations of an odour'. I do not mean to commit to any particular view of the objects of olfactory experience by speaking thus.
8. This effect is for instance exploited repeatedly in Mascagni's opera *Cavalleria Rusticana*.
9. See Wilson and Stevenson (2007, 71–74) for a brief review of research on concentration effects.
10. As Cleland et al. (2012) show, naïve mice first experience different concentrations of an odour as if they were different smells. They learn to recognise the odour after repeated exposure. *How* they manage this, is difficult to account for. Wilson and Stevenson (2007, 73–74) provide an explanation that appeals to the pattern of glomerular activity.
11. That past olfactory experience constitutes knowledge on the basis of which one forms beliefs about one's current olfactory experiences is also assumed in Lycan (2014, 68). Batty (2014, 241–242) makes a similar assumption.
12. Wilson and Stevenson do not discuss the spatial nature of olfaction much. Without further justification, they write that '[o]bject formation in the olfactory system presumably does not involve an external spatial component' (2007, 23).
13. The influence of training on identification and even hedonistic evaluation of olfactory experience is also emphasised by Barwich (2017), who regards it as a reason for challenging the division between sensation and cognition, as well as acknowledging aesthetic olfactory experiences.
14. Batty (2014) seems more sympathetic to Wilson and Stevenson's view, arguing that their insights are compatible with her view that we perceive properties rather than objects in olfaction. However, she brackets the issue in question here, i.e. whether drawing on past experience makes one believe something about one's olfactory experience rather than experience it.
15. Another kind of olfactory constancy occurs when a smell is recognised as the same despite the fact that some components of the chemical mixture are missing or change over time. See Carvalho (2014) for discussion.
16. Richardson (2013, 408–409) also seems to think one 'finds out' about rather than experiences direction in diachronic olfactory experiences. In a later paper, however, Batty seems to acknowledge a spatial aspect of diachronic olfactory experiences: 'We track odors and, as a result, are able to *experience* them as extended through space' (Batty 2014, 240, my emphasis).
17. In addition, Batty thinks one draws on 'input from the other sensory modalities' (2010a, 523). I bracket this part of her objection here.

18. A different kind of mash-up results when the movements of the two eyes are not coordinated; then subjects experience double vision (Maxwell and Schor 2006).
19. A similar distinction is made by Scruton (1997), who argues that we in music listen to 'pure' sound events in abstraction from what produces them.
20. One contributor who would not accept the uniformity assumption is Barwich (2014). She argues that it is misleading to treat olfactory objects as static units independent of the particular instance of perception, because this fails to capture the variability and the dynamics of the processes involved in perception. For this reason, she resists an analysis of olfaction in terms of the object experienced. I am sympathetic to Barwich's project, especially her call for a variation of measurement techniques that can mirror the important fact that olfactory experience varies with context, person, concentration of the odour, as well as other factors. However, I do not think this prevents us from asking, in a particular case, what the object of experience is. I only think it means we should expect no uniform answer.

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