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## The mereological theory of odors

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### The mereological theory of odors

**Abstract:** We propose the mereological theory of odors, according to which odors are proper parts of concrete objects. We distinguish between object solid core and gaseous periphery; the odor is the periphery and plays a role in olfactory perception similar to the role played by surfaces in visual and tactile perception. Some epistemological and metaphysical consequences of the theory are explored, in particular the fact that objects are larger than they visually appear, and that smell turns out to be more accurate than both vision and touch. In the context of dealing with infectious diseases transmitted by airborne particles, a reconceptualization of odors could be leveraged for inducing better mental representations and protective measures.

**Keywords:** odors, smell, mereology, perception, primary and secondary qualities, objects, large object theory.

### 1. Introduction

Odors are traditionally enlisted in the class of secondary qualities, along with colors, sounds, and tastes. Secondary qualities traditionally enjoyed lesser epistemological privileges—whereby one of the meanings of the label 'secondary'—say because they are response-dependent, mind-dependent, or accessible through one sense only. But consider.

Odors have a simple physical signature. They are chemicals that are released in gaseous form by an odorous object by processes such as sublimation or evaporation; once they come into contact with the olfactory system, they are detected, i.e. smelled. This granted, we claim that their metaphysics is even simpler than their physics: odors are just *volatile portions of an object*, or of the matter the odorous object is composed of.

## **2. The Large Object Theory**

Consider a piece of cheese sitting on a dish in a cupboard. The odor of the cheese permeates the cupboard. This means that at each location in the cupboard your olfactive cells are likely to come into contact with volatile portions of the cheese – at very low concentration. Now this description can be developed a bit. Many chunky parts of the cheesy matter hang together in a compact form on the dish. Some tiny parts, though, fly around in the cupboard. If you open the cupboard, some parts will end up in the rest of the room as well, and will be smelled here and there. This amounts to saying that the cheese in your room occupies the room in a gradient that takes extreme values at the dish and fades out with distance. It is mostly a cloud-like entity, with a pretty solid core and a pretty loose periphery. Cheese is sort of exemplarily odorous, but it is not an isolated case. All pieces of matter undergo evaporation and/or sublimation, in appropriate conditions. This means that the matter they are composed of is expected to be found not only where the core is but at its periphery too.

Now, at least two quite different conclusions can be drawn from this. One conclusion is somehow negative and states that odors being too loosely connected to their source(s), they cannot count as reliable epistemic guides. Why would that be? Notably, because of the possibility to mis-track or spatially mis-locate the source of olfactory perception (see notably Batty, 2011:167, for a recent negative stance, and Young, 2011, chapter 2 for a criticism thereof). The negative stance does not seem to be well supported by experimental works. In a behavioral study, published in 1964, Georg Von Békésy has shown that people are able to locate traditionally construed odor sources within 7°-10° of their actual location (thanks to input comparison across nostrils; more recently, Porter et al. (2005) have highlighted the brain mechanisms that are involved in such comparisons). That calls for another, more positive conclusion, according to which the perceptual concrete objects themselves shall be considered to be much *larger* than they visually appear. Here, we propose that *both* the core *and* the periphery are legitimate (proper) parts of any concrete object, and claim that objects are larger than traditionally thought. This Large Object Conception (LOC) has a number of interesting consequences, both epistemological and metaphysical.

### **3. Some epistemological and metaphysical consequences**

*Direct perception.* LOC has it that you do not smell the scent of a strawberry, or of an animal's corpse, as a separate entity or quality. It's the strawberry (the strawberry's matter) *itself*, or the corpse (the corpse's matter) *itself*, that enters your nose. You inhale strawberry, cheese and rotten food. Possibly the idea that scents are mediators, perceptual deputies, is a way to defuse the emotional perils associated with acknowledging such close encounters. Traditional accounts of visual and tactile perception have it that we see (touch) objects by seeing (touching) some proper part of them. We see (touch) objects' surfaces. LOC aligns with this wisdom: we smell objects by smelling a part of them; not the traditional surface,

but what we called the periphery.

*Accuracy of smell:* The traditional poorer epistemic reputation of the sense of smell relative to vision is a consequence of non-LOC accounts of smell. Actually, according to LOC the sense of smell represents the location of objects more accurately than vision does. This is not to say that vision does not represent periphery. In fact, in some circumstances, vision can access the periphery, or part of it—e.g. when one sees the sublimation of a piece of dry ice (solid CO<sub>2</sub>), or evaporation of water. In most circumstances, though, vision only accesses the core, or so it seems. Smell *systematically* represents both core and periphery. According to LOC, the periphery is the odor.

*Systematic visual illusions.* It further follows from LOC that vision systematically delivers an *illusion of location*, by situating objects in places smaller than the ones they are actually located at. Vision correctly registers only invidious or exclusive location, i.e. occupation of a region of space that excludes other objects from being (co-)located at that region. Smell, on the other hand, has it all right about the presence of object's parts at places.

*Partial co-location:* A piece of cheese and a strawberry can co-penetrate each other outside their core. We would notice their joint presence precisely by noticing two different smells at one and the same place.

*Odor as a primary quality.* Another interesting consequence is that if the odor is a *part* of the perceived object, then it is a good candidate for being a primary quality. Arguably, the part-whole structure of an object or of a piece of matter is mind-independent.

*Mereology.* As an aside, part-whole structures are not usually described as primary (qualities), for no particular reason we surmise—this is just an instance of philosophical neglect. And yet they should be considered primary on all accounts of primariness (mind-independence, measurability.) Odor points our attention towards this neglected objective side of reality. We shall now address some objections to LOC.

#### **4. Addressing some objections to LOC**

*Part vs. quality.* An objection to LOC is that we ordinarily keep conceptually separate the odor as a material part and the odor as a quality. “For instance, we can accommodate odorless gases, and therefore we should have no problem in accommodating odorless objects that, by sublimating, give off those gases.” The answer to this is that the odorlessness of a gas is akin to the desaturation of a color. Black and white surfaces are colorless, in a sense, but they still have color, in another. It is the later sense that interests us here.

*Losing stuff.* Another objection would invite re-descriptions of the core/periphery articulation endorsed by LOC: “You should rather say that objects lose stuff, and that the lost stuff is no longer part of them. If a person loses his hand, the hand is no longer a part of the person. Thus odor is not part of the object that gives it *off*.” This can be resisted on grounds of systematicity. Sublimation/evaporation are systematic, whereas loss of a hand is accidental. As an intermediate case, consider a puppet's hand, that can be detached and attached at will; even when detached, it counts as a part. We have the conceptual resources for extending or re-contextualizing the notion of parthood.

*Is the core itself an odor?* A third objection requires defenders of the LOC to accept that apart from the difference in state (gaseous vs. solid) there is no principled distinction

between the core and the periphery of the object: “Thus if you claim that the gaseous periphery is the odor, as odor is only a (proper) part of the Large Object, then you should accept that the core is odor too.” We do not have strong intuitions either way. If the objector thinks that she can live with the idea of the core, chunky portion of the Large Object being an odor, so be it. If she thinks she cannot live with it, that's fine too. *Some* counterintuitive consequences are to be expected for every account.

*Touch and the Large Object.* Other counterintuitive consequences concern touch. Defenders of LOC should accept that as the object is large, we would touch its gaseous periphery much earlier than its solid core – thus we would “touch” the object itself even when our hand is at some distance from its solid core. Touch and sight only pay attention to the core—and justifiably so, given that the core is easy to manipulate, and that vision assists action. But, once more, the counterintuitive costs of LOC should be balanced against their advantages, in our case a neater theory of olfactory object perception.

## **5. Conclusion**

To end, a general note and a potential application. First, the traditional list of secondary qualities was supposed to be a list of *qualities*. On some accounts, sounds have been reconceptualized as events (Casati and Dokic 1994) and according to the present proposal odors are to be reconceptualized as parts of objects (or of the matter objects are composed of). Which means that “quality” in “secondary quality” is used in a loose sense.

Second, in the context of dealing with infectious diseases transmitted by airborne particles, a reconceptualization of odors could be leveraged for inducing better mental representations and protective measures.

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