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Beyond intersubjectivity in olfactory psychophysics II: Troubles with the Object

Morana Alač
Department of Communication, University of California San Diego, USA

Abstract

This article takes advantage of the sense of smell's peculiar spatiality to reflect on how we may render our engagement with the world other than through manipulating well-defined objects. The lived spatiality associated with olfaction is not reducible to the known parameters of 'distant observation' and 'reaching toward', familiar from the visual and tactile modalities. Instead, olfactory spatiality is one of immersion: Odors ask us to give up our dominance while we continue to be involved. The article attends to this immersive quality of the sense of smell by tracing multimodal, embodied qualities of mundane events in a laboratory of olfactory psychophysics, also considering the spatial organization of laboratory chambers, and how researchers fashion their bodies while they recognize the frailty of their enterprise. To engage these complexities, the article illustrates an exercise in experimenting with re-production, re-enactment and re-experiencing. While the exercise functions as a reflection on how to orient a laboratory study to non-ocular dimensions of science, the article, in parallel, enquires into semiotic articulations of smell experiences. By pointing out how smell language, rather than being 'mute', speaks the spatial quality of our olfactory experiences, it concludes the argument against the olfactory ineffability, initiated in the sister essay on 'troubles with the Subject'.

Keywords

environment, ethnomethodology, materiality, olfaction, sensory ethnography

Dealing with our sense of smell means engaging a world that is not reducible to manipulable objects of which the intentional subject is in charge. The present text does so by turning to 'the language of the mute sense' (Ackerman, 1990: 6) and letting it function as a mode of noticing our lived world. In their orientation toward ontology, *new materialists*

Correspondence to:
Morana Alač, Department of Communication, University of California San Diego, 9500 Gilman Drive, La Jolla, CA 92093-0021, USA.
Email: alac@ucsd.edu

(e.g., Bennett, 2010), together with the proponents of *object-oriented ontology* and *speculative realism* (e.g., Harman, 2002, Meillassoux, 2006; see also Lemke, 2017), have paid less attention to language, probably because of their distrustful attitude toward the *linguistic turn* (e.g., Alaimo and Hekman, 2008; Barad, 2007: 801; Kohn, 2015). But the language associated with olfaction allows us to attend to more than its representational character, as it is importantly involved in olfactory sensing. Thus, rather than obfuscating and taking over the world, olfactory language asks us to direct another look at its very makeup, going beyond objects and things as well-defined features of the world one can *handle*. To get at this language in its bond with sensations, though, one has to tackle events in the density of their singular dynamics, where details and nuances matter. This text does so by considering moments of everyday life in olfactory psychophysics. Aligning with scientists (what they point out and what they do), but also broadening the attention they exhibit toward language, we follow semiotic instantiations across laboratory occasions. There, olfactory sensations are not only a matter of internal and private states (properties of subjects), but – as discussed in the sister paper 'Beyond intersubjectivity in olfactory psychophysics I: Troubles with the Subject' (Alač, 2020) – they are always already mingled with the world.

In Part I, we followed an experimenter as she provided instructions for a smell test, ran the test, and informed the experimental participant of the test results, who replied with his account of the test experience. Those moments made available the centrality of the world-bond in olfactory sensing and its associated language, which I called 'first person plural'. The term comes from a sensory scientist who pointed out that studying sensations in psychophysics is not only about internal states, but also concerns linkages between the felt quality of one's sensing body and experimental practice (Wackermann, 2010). In following the actual smell test, we witnessed how olfactory scientists, in their pursuit of 'objectivity', pay attention to aspects of the world that participate in their attempts to measure sensations as phenomena that are lived in the body, and how they, at the same time, avoid letting those sensations be subsumed under an absolute control of a 'subject'. Committing our discussion to those moments I adopted the expression 'first person plural' to question the subjective/objective dichotomy as the reference point for sensory STS, as my worry is that relying on this dichotomy may not make us sensitive enough to complexities of phenomena at stake. To further sharpen the proposal, I 'radicalized' the idea, as reflected in the expression 'radical first person plural'. This is to accentuate that 'first person' embraces the pre-subjective realm and nonrepresentational features of *a life* and that the 'plural' in question is not only about the human sphere with its associated concepts, such as the one of 'intersubjectivity', commonly evoked in sensory STS. In the present article, my aim is to further push this line of argument by bringing forth the immersive materiality through which olfactory spatiality manifests.

In attending to smell language in Part I, we heard specialized vocabulary (with words such as 'butanol'), but also encountered the vernacular of the 'rotten egg gassy type of odors'. While the specialized vocabulary concerns the semiotic format desired by proponents of the smell's ineffability (namely, the *symbolic* form of the linguistic sign), the mundane language clings onto the world. In taking into itself pieces of the world (e.g., Alač, 2017) – rotten eggs, for example – the language affiliates with it. This affiliation became even more evident in how the language shapes our acts of smelling. The example

of how the test participant smelled through experimenter's words (smelling rotten eggs when only a 'smell of sharpies' was expected, for example) highlighted, once again, the reliance of olfactory sensing on the world, here instantiated in smell language that generates effects that are *analogous* to how one would be affected by sensations it articulates (Eco, 1997/2000: e.g., 100, 310; Peirce, 1894: §7).

The relationship with the world was further at play when laboratory practices manifested a language whose semiotic dimensions are importantly multimodal. Rather than specifying qualities of odorants (as in 'smell of sharpies', for example), the language composed of semiotic features such as gestures, grimacing, shrugs and other body movements renders *how* one is smelling. While not treating that production as a consciously directed phenomenon, experimenters are able to use it as a cue to spot whether the experimental participant was 'just guessing'. Its recurrence and display of uncertainty, encountered in Part I, suggest that the experimental participant may have been dealing with smell-stuff that goes beyond stable and manipulable objects assumed by the experimental instructions and the design of the experimental apparatus.

Certainly, there are odors that appear to be just sitting there, seeming to be permanently embedded in objects. We strive to engage these in our quests to identify sources of odors, and our culturally available descriptors often incorporate them in their functioning ('smell of sharpies' is an example). But there are also odorants that are encountered as dynamic – experienced as intruding, circulating, and contaminating. These *immersive non-objects* are features of living the sensory world that our thinking on intentionality and intersubjectivity cannot fully contain. Yet, as this article will indicate, they animate the language that speaks them, while also showing up in how researchers make sense of their experimental results, how they organize their working spaces, groom and dress their bodies. We will follow them to argue that, in the age of visual dominance and preponderant allergies, but also of the times when the destruction of our planet becomes more salient, these features of everyday life amplify not only the peculiarity of our relationship with the olfactory environment but also our rootedness in the world.

After the section that follows deals with the smell test in its data analysis stage, we join a scene from a training session, and take a walk through the laboratory. There, we consider features of laboratory life, such as body grooming and dressing, and how laboratory spaces and equipment are organized for research on human olfaction.[1] To reflect on the olfactory world that these aspects point to, I briefly talk about an installation meant as a methodological inquiry into sensory ethnography, and conclude with an example of olfactory language whose multimodal descriptors render the peculiar experience of olfactory spatiality. The example rounds up my effort to illustrate how sensory STS, when freed from the visual rule and its ontological commitments toward Subjects and Objects, can engage the world that is irreducible to human dominance.

A whiff of something else

To attend to this unsteady olfactory material – overlooked in our fixation on well-defined objects – we start where we left, rejoining the lab events right when the experimental subject (S1), whom the junior researcher (JR) tested, leaves the lab. To do so, we follow the events as recorded in digital video that I collected when doing ethnographic work in

the olfactory psychophysics laboratory. By staying close to that record, my intention is to produce, to the extent possible, a *multivoiced* (Bakhtin, 1975/1981) text.

In Part I, we discussed an instance of smell test (i.e., the *threshold detection test*) run in the lab. With this test lab members aim to assess a participant's olfactory sensitivity by querying the level of odorous concentration at which somebody is able to detect the presence of an odor. In other words, lab members ask their experimental participants to report whether something smells, so that they can identify the lowest possible concentration of odorant the participants can reliably report detecting. To do so, they use what they call 'Sniffin' Sticks', a kit with three rows of sixteen sticks each, where each stick, in comparison to the one that follows (marked by a higher number), is filled with twice as potent concentration of odorants (see Alač, 2020). During the test, experimenters use three sticks at each trial, one of which is expected to be filled with *n-butanol*, as the target odorant, and two of which are not. In other words, the test is organized around well-defined odoriferous objects experimental participants are to identify.

Immediately after the test run, the experimenters – JR and the postdoctoral researcher (PD) who assisted the test – interpret the S1's test score as reflecting his 'average' olfactory capacity (which would make S1 not eligible to participate in the rest of the study), and express their agreement that he was 'guessing'.[2] Because the two are new to this test, they decide to check their interpretation with the senior member of the lab, the lab manager (LM), who trained them on the procedure.[3] In the LM's office, where we join them now, the JR and PD involve their colleague in reading what the JR wrote into the chart. The JR's chart is reproduced in Figure 1, on which 'X' signs indicate incorrect answers, and '0' signs indicate correct ones.[4] The chart is shaded in two tones of gray to highlight the last four columns as those to be used in calculating the average score on the test.

The JR informs the LM that she believes the experimental participant was 'just guessing'. The LM looks at the chart, and confirms:

> It could very well be just good guessing. That happens a lot. In the same sense that yesterday, when I said halfway through it, don't be surprised if some people just get it, and they'll be able to nail it, like all of a sudden their criteria are super clear to them. For other people, you'll realize how good of a guesser they have been up until that point, because then they'll just start bombing. So that seems to be what has happened here. So maybe he was making great guesses.

The LM wants his colleagues to know about two groups of experimental participants: those that 'just get it' and will be 'able to nail it'; and those that 'guess'. To discuss the first group, the LM orients to what that group does on the trials reported in the chart's last four 'reversals' ('halfway through it'), when 'like … all of the sudden their criteria are super clear to them'. When he evokes 'getting it', 'nailing it', and 'acquiring clear criteria', the experimenter does not discuss 'good smellers' *in their own right*, but talks about the sense of smell that concerns a bodily *achievement*, whose appearance builds up progressively, while participants are doing the test. This happens once participants have gone through the first part of the test, which the chart marks as the training session. The LM indicates that the distribution is to show that participants managed to coordinate their bodies with the world, producing, at a certain point, consistent results.

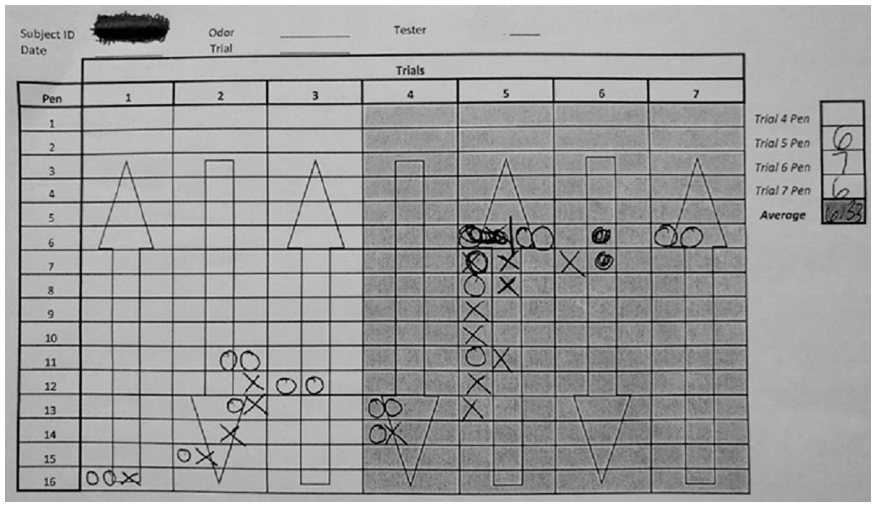

Figure 1. The filled-out chart of S1's threshold detection test (reproduced as Figure 4 in Alaç, 2020).

Considering the LM's downward-moving gesture (mirroring where the answers on the low concentration targets are written on the chart), and, in contrast to what he will next say about the 'guessers', he appears to indicate that the group 'getting it' will produce correct answers to low concentration targets; their results, written in the second part of the chart, will be correct on low concentration trials, in addition to being consistent. He delivers these 'two' aspects of the performance in one breath (combining his talk with gesture, while handling the chart), indicating that a high olfactory sensitivity has to do with that interlocking of the body with the world – it is about being able to align with the lab apparatus and what the experimenter says and does (while leaving behind the rest of the olfactory world). The group of guessers, on the other hand, may produce some apparently correct answers on low concentration trials 'up to that point' (when the experimenter writes the results in the first three columns), but those results will not show consistency, since 'guessing' on the test has to do with not generating that linkage between the body and the laboratory world. That such a reading is correct will be confirmed 'then' (when the experimenter writes the results in the last four columns), as this group starts to 'bomb'.

After this assessment, the LM continues to stare at the chart for about ten seconds, and, while displaying attentiveness, he nods, produces 'uhm' confirmations, and traces his hand over the chart. The LM then says, 'I would just take the last three', while he circles with his finger over the columns numbered five to seven (see Figure 1). By this, he implies that, for calculating the final score, the JR should not consider column *four*, despite the chart's indication to include all shaded areas. To argue for the proposal to override the chart's instructions, the LM gestures toward the fourth column, and explains,

'because this is such an outlier', pointing also out that the results in the last three columns are closely related, 'And this is so consistent. I mean, you locked it in. Two right, one wrong, two right, right within two pens.' The LM then suggests how to derive the final score, 'I'll say, this is six and a half. That's what I would chalk it up as.' As reproduced in Figure 1, the fully compiled chart has the number '6.138' written in its 'Average' cell. That number, as the LM proposes, is calculated from three numbers, while the top cell, representing the fourth reversal, is left blank.

While the manner in which the LM arrives at that result veers away from what the chart dictates,[5] this apparently aberrant reading does not indicate that the LM is somehow falsifying the data in selectively deleting some parts of it. On the contrary, how the senior experimenter handles what is reported in the chart highlights his skills in running experiments, bringing to mind Holton's (1978) discussion of the Millikan-Ehrenhaft dispute (see also Barnes et al., 1996), where Millikan's laboratory notebooks reveal that he was selective toward his data, counting only some of the runs and discarding others (Holton, 1978: 70), while Ehrenhaft included all the results obtained during experimentation into his account:

> The experimenters appear to have used all their assiduously collected readings, good, bad, and indifferent. The kind of discrimination we saw at work in Millikan's private data analysis was lacking. On the contrary, the bias now was in the opposite direction. The 'window' opened, and all 'measurements' were admitted. Ehrenhaft's method was not altogether different from what students do to this day when they repeat a well-established experiment. (Holton, 1978: 73–4).

Holton points out that Ehrenhaft dealt with his experimental material as a novice would (see also Barnes et al., 1996: 36–37), while Millikan, on the contrary, 'evaluated his data and assigned qualitative indications on their prospective use, guided by both a theory about the nature of the electric charge and a sense of the quality or weight of the particular run' (Holton, 1978: 70).[6]

The LM, as he wants his threshold calculus to render how things are, discards those answers he considers as not standing for the actual state of affairs, and treats as reliable only those that reflect the phenomenon being studied – the acuity of S1's sense of smell. The 'sense of the quality' is not only about *externalizing* a sensory capacity that the body somehow possesses by itself, as the ineffability argument would want. Instead, the results need to show a sensation that is experienced in the body as it is realized in its interlocking with the world – it is about an achievement of the first person plural. The consistency of the chart's last three columns indicates the concentrations at which S1 could link his body to that plural, which concerns well-defined objects in the laboratory (such as Sniffin' Sticks that emanate odorants in their specific concentrations), and is also not independent from the JR's explanations, her positioning of her body at a specific distance for optimal inhaling during the experiment, and the movements of her hands handling the threshold apparatus (which the LM acknowledges when he says that she 'locked it in'). The LM concludes by commenting on the impact this manner of calculating the average score for S1's threshold will have on the subsequent lab work:

'which may very well make him not sensitive enough'. The JR – who throughout the LM's assessment continued to show her agreement – cheerfully responds with, 'Ok, cool!' (as this means that she'll be able to schedule S1 for his participation in the rest of the study).

The scene indicates how, when olfactory scientists read threshold detection results, they want to know whether what they recorded stands for participants' sensing of target objects, or whether it may be about *something else*. We encountered an example in Part I, when S1 reported smelling rotten eggs that experimenter mentioned, even if she directed him only to the odor of sharpies. But something else may have to do with the peculiar spatiality of our sense of smell as well. When the JR considers the participant's multimodal language during the test and comments about the participant's 'guessing', and when the LM talks about 'getting it' and 'having super clear criteria', they may be referring to it. *That* something else cannot be simply dismissed as an *artifact* in the laboratory work (Lynch, 1985) because it concerns how we experience the world via the sense of smell. We turn to it next.

Shifting and changing but there

In Part I, we witnessed how, in the practice of olfactory psychophysics, contours of sensing bodies relax – what the experimental participant sensed had to do with what the experimenter said; what the participant indicated through his gestures was not under a control of his Ego; and what these gestures suggested was not overridden by his post-hoc account. Turning to olfactory spatiality makes noticeable the tapering of odors' boundaries as well. As contours of the sensing bodies dissipate, so do those of odoriferous phenomena.

To spot these, we may stay a little bit more with what the LM said while evaluating S1's test chart. For instance, the LM explained, 'In the same sense that yesterday when I said half-way through it, don't be surprised if some people just get it and they'll be able to nail it like all of a sudden their criteria are super clear to them.' What does it mean to 'get it' and 'have super clear criteria' when we are talking about non-intentional responses? As already discussed, the LM indicates something about the body getting attuned to the procedure, becoming gradually sensitive to the experimental apparatus through its exploration of the laboratory encounter (e.g., Deleuze 1972/2000; Latour, 2004). But one wonders what exactly is at stake, why this presents difficulties, and whether there is something peculiar to the sense of smell that makes the LM's statement difficult to decipher. Since the LM's utterance opens with an evocation of a previous moment: 'yesterday when I said', which references the training session, to get a sense of what he evokes with his 'getting it' and 'nailing it', let's return, for a moment, to that session.

We join the training session as the LM, in the role of the experimenter, presents olfactory stimuli to the PD, who, on that occasion, plays the role of the experimental participant. The JR, the senior researcher (SR) and I are in the audience, just next to them. When, in an early part of the testing, the PD delivers her answer, the LM follows by commenting on her performance:

> Again, we are looking for her to get one wrong. She's nailing it! Her criteria, she may be, (.)[7] her criteria may have shifted, she may be more keenly aware of what she is looking for; or it's just a variance of being a human being.

The comment is to direct the LM's colleagues to what an experimenter should be paying attention to, namely, when to start marking responses in a new column on the chart (as specified by, 'we are looking for her to get one wrong'). When the LM suggests that the PD's improved performance may have to do with her being 'more keenly aware of what she is looking for', I seize the floor, and, to inquire how one gets more keenly aware, what it is that one is looking for, and in respect to what else, I ask, 'But do the other two smell a little bit, or not' (in reference to the non-target pens the experimenter uses). The LM immediately negates, 'Not at all. They are not even filled with anything. They are not even filled with a diluent, they have no fragrance whatsoever.'[8] I, then, unsuccessfully try to insert myself with, 'So, in what, in', but the LM continues, 'Unless you can detect the smell of the felt?' He accompanies his utterance with a facial expression of disbelief, while looking toward his colleagues as if inviting their consensus. Motivated by my remembered experience of participating in another lab's experiment (a test that employed a new olfactometer), I insist, specifying my question further, 'Ok. So when you are saying we are tuning in, in respect to a kind of the room we are in, or?' As I ask this, the video camera is frequently moving, rendering in its choppy recording my concentration on the question. To this, the LM responds as follows:

> Of course. Any background odor so long as it's constant, could potentially influence or confound the results that you are looking for. So: I mean, this isn't an odor-free room ((looks around, and toward the lab shelves on his left hand side)),[9] but it's a minimal-odor room. And I don't want to introduce any more odor from like I ((gestures by pointing to his body with both hands)), like I don't wear cologne, I don't wear antiperspirant, I don't wear deodorant, I don't wear fragranced lotions, I wear the gloves ((pulls his gloved hands up, in front of his torso)) just to follow protocol cuz everyone ((enacts a sweeping gesture toward his colleagues)) should be wearing gloves. And also having your hands near someone's face, people kind of ((winks)) feel better when you have gloves on instead of doing it barehanded (.) Um, so yeah (.) it is (.) trying to hold as many things as constant as possible so that when they're trying to detect a difference ((points with his right hand toward the three pens he holds in his left hand, one at a time)) it's genuinely the difference between the pens that you're bringing, instead of somebody walking by who wore too much perfume, or being in a room ((points as if indicating a high level)) that prevents you from being as sensitive as you can, (.) because of the background ((while turning toward the PD and resuming to administer the test)).

One reason for which olfaction is so difficult to study is its peculiar spatiality. The testing procedure with the Sniffin' Sticks apparatus – mirroring threshold detection procedure for the other senses – orients toward odorants in terms of their sources, fashioning odors as stable and independent qualities, to be accessed in relationship to those sources. But, as events in the olfactory laboratory suggest, the achievement of such an orientation is not a simple matter. Participants need to realize that orientation by 'getting it', 'nailing it', 'tuning in', and becoming 'more keenly aware of what [they are] looking for'. Signal detection theory posits subjects' 'criteria' in terms of motivation, expectation, and

strategy (Engen, 1982: 53); in what I witness in the concreteness of the laboratory, this importantly regards a spatial concern. When the LM highlights the relevance of the 'background', he points out that odorants are not simply manifested to us in relationship to their sources, but they envelop us as we are engrossed in the air we breathe. When we orient to an odorant in terms of the object that emitted it, we also have to deal with its carrier – 'the air that acts as the medium for carrying the smell, with air temperature playing a role in the volatility of the odorous compounds' (Henshaw, 2013: 77). Odorants proliferate through space and mix with each other, while they immerse us in a smelly atmosphere. As such, they not only *exist* as stable and independent things, but *happen* as dynamic and immersive qualities.

Merleau-Ponty points out that each sensation is spatial (1962: 256), and that each of our senses displays its own spatiality:

> Sensation as it is brought to use by experience is no longer some inert substance or abstract moment, but one of our surfaces of contact with being, a structure of consciousness, and in place of one single space, as the universal condition of all qualities, we have with each one of the latter, a particular manner of being in space and, in a sense, of making space. It is neither contradictory nor impossible that each sense should constitute a small world within the larger one, and it is even in virtue of its peculiarity that it is necessary to the whole and opens upon the whole. (p. 257)

Regarding olfactory spatiality specifically, Merleau-Ponty hints at it when he characterizes it ('the way we smell an odour') by describing, by analogy, an unusual visual experience:[10] '[I]t closes round us, and acts upon us, without however filling a determinate form of a determinate extent. Everything is at first confused and apparently in motion' (p. 259).

What this description suggests is rendered with added accuracy (and possibly less value judgment) by Kurt Koffka (1935). Koffka relates the sense of smell to Gestalt concepts of *figure/ground*, arguing that olfaction, unlike all other senses, is primarily about the ground. This ground, however, is not about 'emptiness', but, on the contrary, in enveloping us, it shapes[11] the way we relate to and live sources that emit odorants:

> Only a few additions, before we return to vision. We had no difficulty in pointing out figures in different sense modalities. But some senses will also provide us with grounds that are more than 'emptiness'. I am thinking particularly of smell, which may envelop us like a soft cloak or the blue walls of a rotunda in the castle of a fairy-king. And the ground of these other senses is often not only, not even chiefly, the ground of the figures of the same senses, but determines *our* relation to these figures and to all figures of things in our given behavioural environment. The 'atmosphere' of a room is as good an example as I can give. Thus these backgrounds are more comprehensive than the purely visual ones so far discussed, since they are grounds for the Ego as well as for the things with which it finds itself confronted. Our conclusion then is that the figure-ground distinction, though it is applicable to all senses, offers new problems when we go beyond vision, problems which are of great significance for the theory of behaviour, but which as yet are in too embryonic a state to deserve further discussion. (1935: 201)[12]

Koffka's ground concerns a mutable, shifting and changing, but ever-present, olfactory material. It, therefore, should not be taken either to indicate a base, something solid or absolute which grounds in its totality, or that references a depth, or to evoke spooky and mysterious forces. Instead, this smelly atmosphere regards our everyday, ordinary world that easily slips from our attention, except in situations such as those encountered in the olfactory laboratory.

As illustrated so far, laboratory members have to pay careful attention to not only odor-producing objects, but also the atmosphere in which they conduct their experiments. When they work on achieving an orientation toward odor sources (as when, for example, they use the Sniffin' Sticks kit), they also need to monitor, even if not ever fully controlling, what takes place in the odoriferous material beyond those sources. We followed how, during the threshold test, the multimodal language exhibits the difficulty of this nose-source relationship, and how the development of the results inscribed across the chart can alert researchers to it (as we noticed during the wrap-up session, and as indicated by the LM's comments on how to read the chart and perform the test). Inspired by Deleuze's (1981/2003) discussion of the 'shallow depth' in bas relief and Bacon's visual experimentation, it may be said that, once researchers acknowledge the immersive qualities of odorants, they place the ground on the same plane with the figure, reducing the distance between the two. There, the ground, rather than bringing forth the figure (as traditionally seen in optical modalities), makes noticeable the impossibility of figures' clarity. That, for the sense of smell, the materiality attributed to the ground mixes with the figure, on the same plane, is different even from auditory perception. For example, Chernigovskaya (2004: 61), after reminding us of Kant's classification of the senses into *sensus vagus* and *sensus fixus*, which places olfaction and hearing in separate sets,[13] follows by grouping them together:

> I would add that taste and vision provide greater freedom than sound and olfaction, which are much more aggressive: An individual is involved in joint perception having no chance to escape when in the relevant space. (p. 62)

Nevertheless, Chernigovskaya also talks about differences between the two senses by pointing out that, '(the) ear is an analytical organ, distinguishing components, composing a complex sound' (p. 64). This is in contrast to olfaction, which 'is holistic (at least in humans) and processes the world in a Gestalt fashion'.

That we ordinarily do not notice the pervasiveness of the smell's immersive and holistic qualities is exhibited by two well-known STS illustrations regarding chemical senses – Latour's (2004) example of perfumers' '*malletes à odeurs*' ('odour kits'), and Shapin's (2012) *Wine Aroma Wheel* used by wine connoisseurs. Latour uses the odor kit as an example that illuminates his ideas on the body, defining the body as 'an interface that becomes more and more desirable as it learns to be affected by more and more elements' (p. 206), and discussing how a nose, by using the kit (the kit stands for artificial settings and instruments, pp. 211–212), is made progressively 'sensitive to differences' or 'contrast' registered in the world. Latour conceives 'the action of knowledge' in terms of 'articulation' (pp. 209, 214), pointing out how by training with the odor kit, one can

acquire the capacity to pick up, as differences, the elements the world is made of. Shapin's example is related, but differently focused on the *intersubjective* aspects of taste. In his call for an STS turn to subjectivity, Shapin talks about the Wine Aroma Wheel to makes his point against a reliance on 'objectivity'. His intention is to indicate that the space in which connoisseurs operate is not 'private':

> The point is not taste objectivity; it is taste intersubjectivity. The Aroma Wheel is a homespun intersubjectivity engine. Taste communities coalesce around practices like that – practices that refer to mutually accessible external properties as the causes of internal states. (p. 178)

Of note is that Shapin and Latour's examples stay with what we know from the 'major senses', and primarily vision: the definite character of entities that constitute our world (what can be articulated*)*, and their reducibility to the social realm (the intersubjective). In focusing on experts and the instruments akin to the Sniffin' Sticks kit, which force olfaction away from its specificity, Latour and Shapin's illustrations miss what Koffka designates by ground in olfaction. Latour does so in his orientation toward the differences and elements to which the body learns to become sensitive, and Shapin in his attention to what is entirely human – the intersubjective aspects of tasting.

When Jiří Wackermann (2010) highlights the importance of what takes place when a researcher introduces an experimental participant to a psychophysics experiment, he brings up instructions, coordinated with the universe of instruments, and points out how those aspects of laboratory practice constitute the agreed-upon, intersubjective world. The Sniffin' Sticks kit and the chart (employed by experimenters during the threshold test) enact, together with the experimental instructions (that may mention the smell of rotten eggs), the intersubjective world of objects that the participant is to orient to. Yet, following laboratory events into the pre-subjective realm, and paying attention to *a life* there, suggests that olfactory sensations go beyond figures highlighted by the chart, pens, and experimental instructions, being also about the inevitable presence of the rest of the world in which we are constantly immersed – they indicate a radical format of the first person plural.

How researchers set up and manage this kind of sensory environment is *inscribed* (e.g., Eco, 1979) across the laboratory space. In addition to its manifestation in how researchers hold and manipulate their instruments, how they monitor what experimental participants say, and how they read their experimental results, this is also discernable in how they fashion their bodies, arrange things around the laboratory space, and in the very architecture of the space they inhabit. There, as sources of odorants are always at the brink of being swallowed into the smell atmosphere, this swallowing is lived not only as something that needs to be corrected, but also recognized and further worked with as a feature of the olfactory sense.

Laboratory as a smellscape

As the LM's explanation during the training session indicates, practicing olfactory psychophysics has consequences for the fashioning of one's own body. In addition to directing his colleagues to attend to how others in the lab environment style themselves,

'someone walking by who wore too much perfume', the LM reports on grooming his body so that the 'background … [does not introduce] influences or confounds' in the participant's orientation toward target odorants, 'the results you are looking for'. Because odors are immersive and dynamic, experimenters have to make their corporeal presence suitable for their daily work by not wearing 'cologne, antiperspirant, deodorant, and fragranced lotions'. In my previous work on cognitive neuroscientists who study vision with fMRI imaging techniques (Alač, 2011), I discussed the importance of paying attention to scientists' bodies in laboratory practice, but here, as I continue to attend to the involvement of bodies in scientific work, something rather different is going on. The LM's comment does not highlight a body that is directly involved in *handling* equipment and *manipulating* experimental material. Rather, this is the body that *lives there*. Turning to olfactory science makes us notice how embodied laboratory presence *as such* can generate effects on scientific results.

When the LM, on that same occasion, instructs his colleagues on wearing nitrile gloves during the threshold detection procedure, he explains that their use may help in controlling the odoriferous atmosphere in the lab:

> Experimenter puts on gloves, just in case you recently washed your hands, you used fragranced lotion, or anything like that, it will help mask it because all those things would confound the sensitivity of the participant that you are testing.

The nitrile gloves were mentioned in Part I, when – rather differently – the JR considers them as a potential source of unwanted odor during the threshold test.[14] In that instance, the experimenter wanted to make sure that, during the test, the participant was not distracted (from detecting the target odorant) by the smell emanating from her lab attire. To achieve the alignment between the participant's nose and the experimental apparatus, the olfactory world needs to be carefully curated, and the JR checks whether the gloves were the part of the 'ground' that blurred the clean-cut edges of the olfactory objects S1 is to orient to (namely, the odorants emanating from the Sniffin' Sticks kit).

While lab members know that nitrile gloves are not scent-free, they do not doubt their obligation to wear them, assuring comfort to their experimental participants. That comfort has much to do with the symbolic character of the gloves. De Cupere (2016) – when describing his artistic practice in relationship to scientific work, what he calls an 'olfactology lab' (p. 29) – points out that a glove, together with a pipette and a funnel, are 'references, symbols to our society':

> The glove refers to the cleanliness and research and experimental aspects in my work. … The moment I put surgical gloves on is the moment I feel one with the work I'm doing. But it's also a way to create distance between me and the object. It is a protection for my skin but also not to make the work to(o) subjective. (pp. 30–31)

That gloves mark distance is highlighted by the LM as well, this distance being, in his case, between lab members and their experimental participants (rather than hands and laboratory chemicals). The LM explains that, by wearing the gloves, lab members respect the normative distance between bodies, avoiding a perceived possibility of a

direct contact, even if that mode of covering their hands presents risks – in that nitrile gloves may have more odor than unscented hands – for the proper functioning of the threshold test itself.

This management of olfactory spatiality is also inscribed in the very physicality of the lab environment. One example is how arrangements of objects across the lab display practitioners' efforts to contain and control odorants that emanate from bodies and things. On one afternoon, in pursuit of my unsatiated curiosity toward the myriad of unusual odorants stored in the lab, I handled a refrigerated bottle that had warning labels on it and was encased in several protective layers of plastic bags. The label on the bottle read 'Who-Me?' When, next morning, I arrived at the lab, the floor manager, the manager in charge of the entire building, and two gas company employers were inspecting the space. The group was unable to identify the source of the odor, which they attributed to a gas leak. After a couple of hours of diligent search – largely reliant on their noses – they were ready to evacuate the entire floor (if not the whole building), when I convinced them to inspect – again, by sniffing – the bottle that I opened on the previous afternoon. Who-Me? is a historical artifact – a 'stink bomb', or a weapon intended to generate psychological states of panic and fear, without creating physical injuries (Trivedi, 2002) – originally developed in WWII to emanate an odor of rotten meat (Schmeisser et al., 2013: 20). In military operations, odorants are typically used in stealth operations or as decoy, deterrent, or masker/obscurant (p. 19). Who-Me?, on the other hand, was designed by the U.S. military to help the French Resistance embarrass German soldiers by having their bodies smell of it (p. 21). Considering its spatial quality – as witnessed in the lab on that day – this odorant has an extreme volatility, which is why Who-Me? did not last on the battleground (Pain, 2001). The writers for the US Army Research Laboratory point out: 'Unfortunately, this substance was so volatile that it could not be confined to specific targets and contaminated everything in the area' (Schmeisser et al., 2013: 21), as if the substance, with its unexpected moves, resisted use as a weapon. But in the lab, on that occasion, the contact with Who-Me? embarrassed me, even if the stink did not stay anywhere close to my body, invading, instead, the entire laboratory space and beyond. Embarrassed by having generated so much distress in my field-site, I learned that lab fridges are not there just to preserve the quality of the chemicals stored in them, but for containment purposes as well.

Practitioners' labors toward containment and control are also inscribed in architectural configurations of the lab space – from the strata of doors and antechambers across the lab, to special rooms for olfactory testing. One of the two main laboratory chambers hosts a series of state-of-the-art olfactometers that allow lab members to test six experimental participants at once. This space follows the same principle that organizes the Sniffin' Sticks kit – it directs the individual being tested toward sources of odors. While Sniffin' Sticks can be said to be a very simple olfactometer, the chamber with modern olfactometers shows a high sophistication in stimulus presentation, allowing scientists to specify with precision not only stimulus quality and concentration, but also its onset and temporal duration, while assuring an airstream flow of consistent temperature and humidity toward participants' noses (Doty and Kobal, 1995: 192–196; Engen, 1982: 36–42).

Nonetheless, it was in the middle of the twentieth century that the principles of containment, isolation, and precision found their strongest expression in the psychophysics effort to build 'a smell-proof and odorless room', an *olfactorium* (Foster et al., 1950). For its authors, the design goal was a chamber that could function 'both as a laboratory for qualitative research and as part of an olfactometer for quantitative investigations', while directing attention in stimulus control toward environmental variables (p. 431). Motivating the project in a lack of an olfactory analogue to 'dark rooms, soundproof rooms, and constant temperature rooms', the authors argued:

> Since the olfactory stimulus lingers after it has been applied, and since the trace not only alters subsequent stimuli but also reduces the observer's sensitivity by way of adaptation, the need for constant environmental conditions is much greater in the study of smell than in the study of any other department of sense. (Foster et al., 1950)

The design of Foster et al.'s olfactorium was unique in its objective to control laboratory odorants together with those of the experimental participant's entire body. As described by Engen (1982: 7):

> This was a well-ventilated but airtight glass chamber in which controlled amounts of odor were presented to a subject. The chamber was large enough to hold observers or subjects and other apparatus and included provisions for deodorizing both the equipment and the experimental subjects with showers, sterilizers, and the like.

While presenting the work of Eleanor Gamble (1898) (to which we will return in the following section) as pioneering in its intentions to eliminate laboratory odors beyond those studied, the authors attribute 'the first real advance' in targeting the issue to K Komuro's 1921's *camera inodorata* – a glass box into which individual experimental participants were to put their heads during experiments. Before participating in experiments with the camera inodorata, an experimental subject 'had his hair close-cropped and his head washed with an odorless soap. As a further precaution, he covered his skin with an odorless vaseline and was exposed to ultra-violet radiation for 5 min' (Foster et al., 1950: 432). Those experiments – to some degree reminiscent of the LM's account regarding his grooming practices – attended to broader bodily regimes as well. For example, in the case of a participant who tested unexpectedly poorly on identifying camphor, '[i]nquiry elicited the statement that camphor lotion had been used for several days on account of chapped lips. After the application of the lotion to the lips was stopped, the olfactory coefficient for camphor returned to normal' (Foster et al., 1950).

In their design, Foster et al. continued with the box-shaped chamber, after they discarded an alternative globe design – *olfactosphere* (p. 433) – for reasons of inadequate air circulation.[15] They, however, expanded the size of the chamber not only to host the participant's entire body but to be 'large enough to permit O's [the participant's] free movement within' (p. 433), while also adding an antechamber, 'the outer compartment serving as an airlock for entrance into the inner one'. In addition to cleaning and grooming the subject's body before examinations, this setup, moreover, included a garment – 'sterilized and dried without handling' (p. 440) – to wear during experiments:

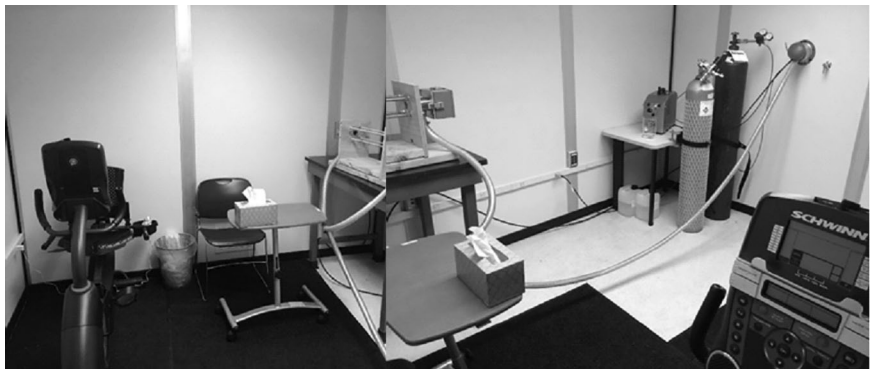

Figure 2. The Exposure Chamber.

> The envelope worn by *O* in the olfactorium … is like an Eskimo's parka. It is made of an odorless plastic and it covers all parts of *O*'s body and head except his face. Closely-cropped hair and Vaseline are rendered unnecessary by this covering – which facilitates the procurement of *O*s.

Today, however, scientists have relaxed their expectations regarding such a tight control of the olfactory environment (Engen, 1982: 7), recognizing that the task may be impossible, given odors' diffusive and ephemeral character.

And this is how we arrive at the PI's 'Exposure' or 'Environmental' Chamber (Figure 2). While aiming at the highest, but practically obtainable, standards in precision and containment, the chamber's primary goal is ecological validity. The apparatus allows practitioners to control odorant diffusion, room temperature and relative humidity, and the frequency at which the room air is purged and exchanged (thanks to a laminar airflow system), in the service of investigating how someone experiences an odorant while moving in an environment where such odorant is present. The idea of movement here is largely equated with workout practices, shared with urban Western dwellers on their visits to exercise rooms and fitness centers (as indicated by the stationary bike in Figure 2, whose role is to enhance the effect of movement in the room). Nevertheless, the chamber inscribes the PI's attention toward the physicality of the sensory body within space. By not being solely about an orientation toward sources of odorants, but also about dynamical and immersive attributes of our olfactory sensations, it acknowledges how we live our sense of smell as a part of our ordinary experiences. Most importantly for the present argument, the chamber points out that the non-object-like character of olfactory matter is not always treated in the laboratory as an artifact that needs to be purged from experiments (as the Sniffin' Sticks kit used during the threshold test may make us think). That the PI designs, assembles, and employs the immersion room points out that she does not consider effects of the olfactory world beyond well-defined objects to be just a disturbance. Instead, her chamber places the olfactory ground on the same plane with smell figures, as the target of investigation.

In my conversation with the PI, she points out a general lack of studies, particularly in psychology, organized around olfactory immersion. The PI contrasts the method where 'some people would just spray something in a room or put a vial of something in a regular room and just expose someone to it' to the studies her laboratory does 'for regulatory purposes for the chemical industry, where it is important to actually know exactly what you are presenting someone with, control the temperature, humidity, the air flow, independently of the odorant you are putting into the room'. After making this utilitarian goal of the project very clear (that this is about capitalist economy and labor conditions), the PI outlines the history of her environmental chamber, discussing a case where regulators wanted to reduce limits of acetone exposure at work:[16]

> We were asked if we could do a study establishing irritation thresholds, and also irritation levels, in like for a group of workers and naïve controls to see if the workers were different than whatever. But I said, why not in addition to getting thresholds why don't we do a chamber study where we actually expose people to what is currently the workplace limit … and we'll see how whether the workers experience it as irritating, whether the naïve controls do or whatever. Well, I've never done anything like that in my life ((laughs)), and I proposed doing it. And then I had about two months of sleepless nights where I would wake up in a panic, because I've never done anything like that before, I was a psychologist for God's sakes, I had no idea! But I figured out how to produce an acetone environment. We built a chamber out of pvc pipes and plastic sheeting, and it even had a little antechamber. And we built it here, and then we disassembled the whole thing, and we flew down to South Carolina, and set it up down there. And I tested I think I can't remember probably close to 30 workers. ((I asked whether it worked)) And it worked. I sparged the acetone in, and I had an on-line PID – photo iodization detector – that told me what the concentration was, and I had to manually keep adjusting it to make sure that the person who was sitting inside at a little desk with a computer and making ratings as the computer prompted them. And then I brought it back to … ((the Institute)), and we set it up here, but it was that that convinced … ((the director of the Institute)) and everyone else at the time that that was the kind of work we should be doing, and that I should have real chambers to do the work, rather than this PVC thing that we did. But it worked, you could generate good data under those circumstances. But I think that is how the evolution of the chamber concept came about, is because I said I would do this study, ((laughs)), and I figured out how to do it on the cheap. But then it became clear that there was a real advantage for having chambers.

The PI talks about her struggles and determination in designing an experimental space that would not erase the particular spatiality of the sense of smell: a chamber where it is the smell of the entire room that lab members and their experimental participants are turning to. Horowitz (2016: 148) refers to search dogs when she points out that '[b]eing olfactory is living in an impermanent space, where seemingly 'objects' – fixed for us, with our visual approach – are fixed only as long as their smell remains'. While Horowitz contrasts these experiences 'from within' (p. 30) to human distraction 'by what we see' (p. 29), in the exposure chamber, humans live their olfactory experiences in ways that come closer to those of dogs. As there, scientists aim at 'the world of smell, (where) the edge is fuzzy' (p. 30), they acknowledge aspects of our living *from within*.

Camera (in)odorata

To engage the problem of rendering ethnographic material focused on olfaction, while generating a *blend* (Fauconnier and Turner, 2002) of the spaces encountered in the olfactory laboratory, I collaborated with sculptor Evelyn Walker on designing a multisensory installation – *camera (in)odorata* (Figure 3). As a reflection on methods in ethnography, camera (in)odorata questions visual dominance, while it provides opportunities for experiences that are to be akin to those of laboratory inhabitants and their visitors. Specifically oriented toward practices in olfactory psychophysics, camera (in)odorata is not only about immersion in a multisensory environment, but also about living the actuality of troubles scientists face when responding to the immersive character of our sense of smell. The platform, thus, articulates olfaction as an importantly spatial domain, and olfactory psychophysics as an endeavor that is oriented toward space, as odors *environ*.

While we originally exhibited it as an installation,[17] I subsequently redesigned camera (in)odorata so that it can be also used in oral presentations, bringing the presenter and audience members closer to the ethnographic material discussed in this paper. As seen in Figure 4, in the presentation format, the 'opening' of the installation (together with the reproduced figures from Foster et al. [1950], see Figure 5) is also to evoke the printed page, as if one opened a giant copy of *The American Journal of Psychology* (where the Foster et al.'s paper was published) or this very issue of *Social Studies of Science*. While in Figure 3, a visitor is in the middle of a room-like space (immersed in its odoriferous atmosphere), in Figure 4, audience members are to notice that (contrary to my efforts to make the experience as immersive as possible) they are *looking* at the installation from a distance, getting at the presented content largely in the modality that erases any olfactory dimension that may have existed in the original material. Finally, camera (in)odorata has a pedagogical aim; it is adaptable for a classroom setting as an experimental space for living, observing, recording, and describing multisensory interaction in a sensory studies class oriented toward olfaction (Alač, forthcoming).

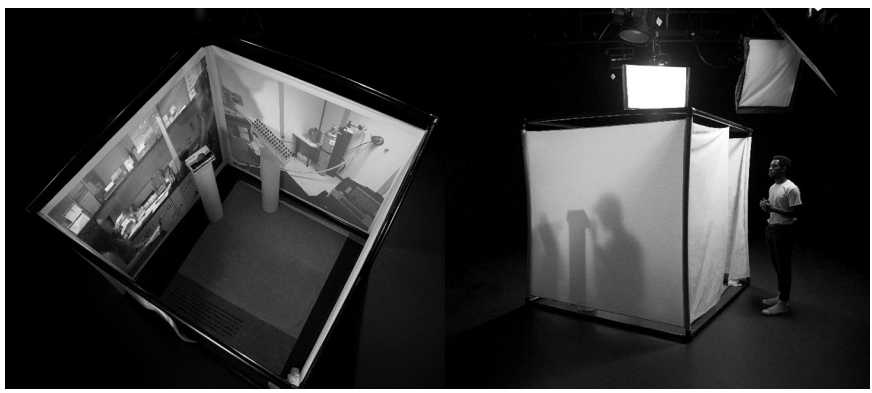

Figure 3. Camera (in)odorata (image by Evelyn Walker).

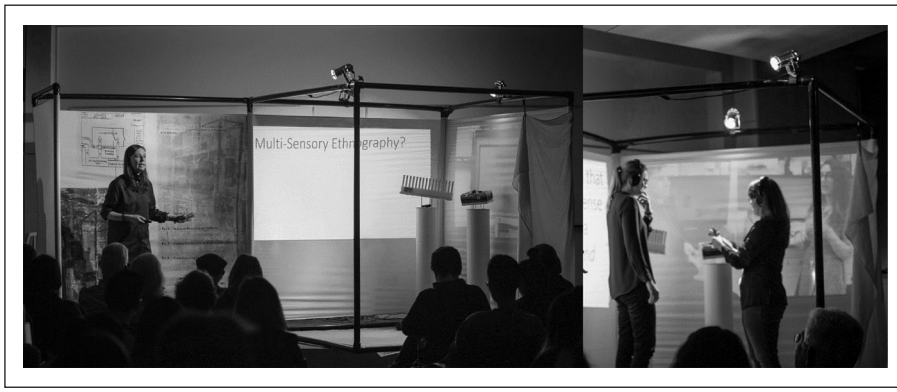

Figure 4. Camera (in)odorata during a presentation (image by The Design Lab).

Figure 5. Camera (in)odorata, reproduction of Foster et al.'s (1950) figures (image by Evelyn Walker).

The name – camera (in)odorata – is a gesture to Barthes' musings on photographic indexicality in his *Camera Lucida* (1980/1981), where he plays, in turn, with the expression 'camera obscura'. While our platform explores olfactory indexicality (as well as

iconicity), literally, however, camera (in)odorata simply means a 'smelly room' and, in that sense, is semantically empty (since any room is inevitably odoriferous). In contrast to Komuro's camera inodorata and Foster et al.'s olfactorium – designed as extraordinary, all-but-impossible spaces – camera (in)odorata evokes an ordinary space (Figures 3 and 4), and, as with any ordinary environment, it is *openly* leaky, with this leakiness also suggested by the openness of its physical setup. Another prominent dissimilarity is that camera (in)odorata – rather than aiming at solutions (for a total containment and erasure of odors) – puts forward scientists' efforts in dealing with the dynamicity and immersive character of our sense of smell. It does so by inquiring into how odors act in space – how they linger, disappear and reappear, occupy certain corners but not others, infuse textiles, complement or clash with each other, move with wafts of air, etc. – and how we encounter them through immersion.

Its temporary inhabitants enter camera (in)odorata as an environment that is large enough to accommodate more than one person, as the platform is meant to be a space for interaction – the space where the language of the mute sense takes place. With its cubic form, it not only references the historical examples from olfactory psychophysics, but it marks the space, gesturing toward the smell's peculiar spatial character. There, inhabitants can view a video record of the smell test described in this project, which, together with photographs of laboratory spaces – taken by laboratory members, and intended to generate trompe l'oeil effects – are projected onto textile partitions from behind. This display mode downplays the power of the visual by giving the video projections softer edges, not unlike those of olfactory non-object-like material. And, while the partitions are employed as projection screens, they are kept next to the interacting bodies (see Alač, 2011), as seen in Figure 3 (and also 4). To further amplify its embodied character, the audiovisual material is incorporated into a multisensory complex, as it is set in a space furnished with the instruments scientists use during a threshold test – Sniffin' Sticks and nitrile gloves – here, perched on pedestals. While those who enter the space can observe how this scientific equipment is employed in the olfactory lab (as the video plays on the space partitions), they can also manipulate it themselves, exploring its tactile and olfactory facets. Through this inclusion of laboratory equipment, now figured in all its physicality, bodies are materialized and made present so that the laboratory study can gain a fuller, multisensory feel – the reader can feel a life in the laboratory in her own body, by smelling the pens, and arranging them in series, while conversing with co-participants. This possibility of identifying as an agent of these scientific practices (*first person*), however, is to provide for that agency, and the things its encounters, to be experienced as distributed through the platform (*the plural*).

While camera (in)odorata leaves those explorations largely unstructured, we intervene by intentionally disturbing them. To specifically elicit attention to the spatial peculiarity of the sense of smell, the platform also contains a diffuser that is to puff a rose scent (in reference to the lab's experiment with asthmatics, discussed in Part I) so that olfactory detection – if performed as indicated by the Sniffin' Sticks apparatus – is more difficult to accomplish. This effect is further enhanced by olfactory features of the space itself, the full upshot of which we realized only when directly working on a historical reconstruction and when exhibiting the installation. To imaginatively combine the

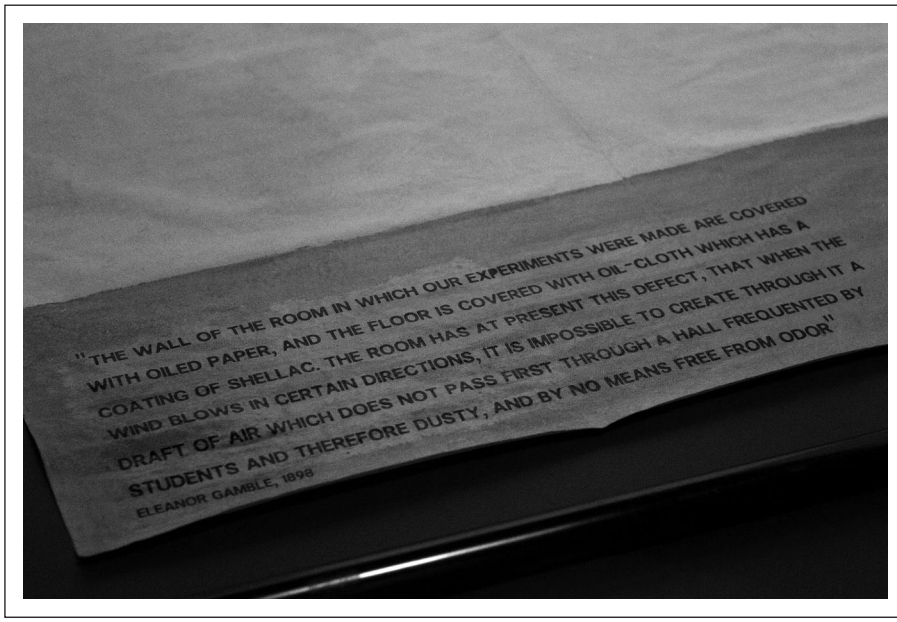

Figure 6. Camera (in)odorata, reconstruction of Gamble's floor covering with a quote from Gamble (1898) (image by Evelyn Walker).

historical record of scientific practice with visual, odorous, tactile, and audio fragments of laboratory life collected during the ethnographic study, we turned to Eleanor Gamble's (1898) pioneering work in olfactory psychophysics. While the contours of our camera (in)odorata evoke the olfactorium of Foster, Scofield and Dallenback, as does our reproduction of their published figures (see Figure 5), we do not reproduce their attitude when they state that Gamble's results 'accomplished little in the way of achieving an experimental environment that was odorless' (Foster et al., 1950: 431). Instead, we feature Gamble's efforts to generate surfaces that are washable and meant to retard odor absorption as central aspects of our installation. Reconstructing Gamble's floor covering (see Figure 6), was generative, as it made us engage – against our original expectations – the unruliness and pervasiveness of olfactory spatiality (in a manner that is not dissimilar from that of olfactory scientists). Gamble (1898: 117) reports covering the laboratory floor with 'oil-cloth which has a coating of shellac'. Our attempts to get at how such floor covering may have been made in 1892 led us to linseed oil, in addition to shellac, both of which we painted over a canvas cloth. When confronted with odors of these substances, which took over the smellscape of our platform, we started to doubt that we actually needed the diffuser we had originally planned for the project. In fact, while the description of the last two paragraphs may portray our design and construction of camera (in)odorata as a directed, linear process, much of it was developed as circumstances presented us with opportunities.

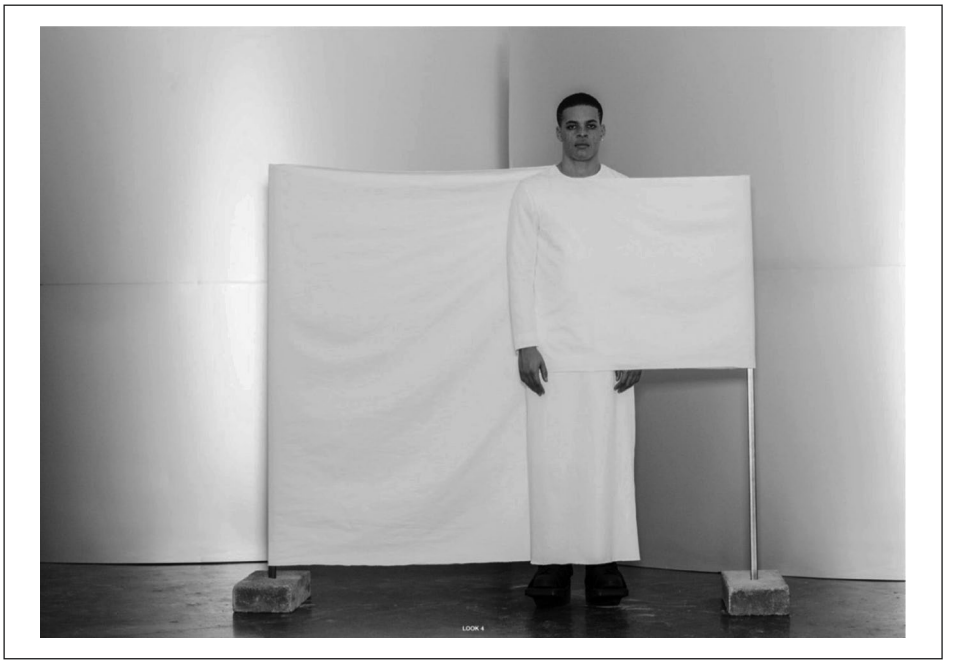

Figure 7. Roni Illan Autumn/Winter 2016 Menswear Collection.

This situated learning from camera (in)odorata also concerns the material we used in constructing the frame of the space. While worried about their questionable sustainability (e.g., Cantrell, 2017), we incorporated pvc pipes to follow the PI's solution for her first immersion chamber, emphasizing, with her, the affordability and mobility of the platform. For the partitions, we could have also matched the PI's choice and used plastic sheeting, or matched Gamble's solution and use oiled paper, either of which would have had a number of advantages for our platform. We, instead, opted for textile – muslin cotton – for two main reasons. On one hand, we appreciate the textile's absorbability; so, when a 4S visitor accidentally spilled a large cup of coffee over our platform, the space retained the odor of coffee for months to come (further upsetting the odor detection task). Secondly, the textile allowed us to bring to the fore the blurring of boundaries between the body and space witnessed in the laboratory (when the LM talks about grooming his body so that its odors do not invade laboratory space, and the JR checks whether she introduced into the test environment the scent of gloves she covers her hands with, for example, the body expands into and is retracted from the space around it). In that sense, the cotton partitions of our camera (in)odorata are to inscribe the laboratory's body in them, further amplifying, through this bond – of the space with its walls, and bodies shielded by clothes – the orientation of practices in olfactory science we highlight: their engagement with the sense that is lived in the radical first person plural. There is an uncanny aptness in how fashion designer Roni Illan literally renders this amalgam in her piece from 2016 Autumn/Winter collection, reproduced in Figure 7.

Smelling something

In a *Science* review article, 'Poor human olfaction is a 19th-century myth', McGann (2017) importantly relies on olfactory psychophysics to make the argument that the human sense of smell is not as insensitive as we often portray. In showing how the neuroscience of the last century was guided by certain ideologies (to define humanness in terms of intelligence and free will, neuroscience focused on the frontal cortex, in turn downplaying our olfactory capacities), McGann indicates how those claims were supported by an inadequate attention to sensory testing. When describing, for instance, how a smaller number of odor receptor genes in humans, in comparison to those in mice, was interpreted in terms of a limited olfactory ability, McGann highlights that 'no actual sensory testing was performed' (p. 2). Furthermore, when McGann displays a comparison of neuronal numbers per olfactory bulb across mammalian species (p. 3), he also showcases results of threshold testing across species and odorants, pointing out that there are detection tasks in which humans outperform mice and monkeys, for example (p. 4).

Through my two articles (Parts I and II), I have focused on everyday practices in psychophysics to expose the *mythic* (Barthes, 1957/1987) character of a claim concerning olfactory ineffability. Our smell experiences – as indicated by mundane events in the laboratory – concern an interrelatedness between bodies and the world. In turn, I have argued that the language of smell needs to be considered in respect to how we practically engage and live our sensory world, which, then, manifests its ability, rather than 'muteness'. I have tackled this mutually affecting relationship (between the language and the world of everyday events) by discussing how smell language links to objects in the world (as in the expression 'rotten egg gassy type of odors'), incorporating pieces of the world into its functioning (Part I). I have also described how smell language indicates the quality of that relationship: how, for example, 'the examinee', in speaking multimodally during the threshold test, allows laboratory members to read the manner in which his nose connects to the olfactory world (Part I and II). As, during the smell test (Part I), the language gave us hints that we shall not rely on a picture of a smell world that is entirely composed of stable and well-defined objects, here, we have explored this direction further, confronting the puzzle by focusing on olfactory spatiality.

In the laboratory, we noticed how, to establish somebody's olfactory threshold, members attend to intricacies of this particular sense, being, for example, aware that a participant's experience may have to do with odors that are accidentally but inevitably co-present in a testing situation. That the smell world cannot be reduced to a collection of stable and well-defined objects available to an effortless detection is also legible in the material set-up of the laboratory, as it is in how experimenters groom and dress their bodies. There are components of scientific apparatus that orient to odorants as self-standing and fixed entities (our principal example was the Sniffin' Sticks kit), but there are also those that engage the peculiar spatiality of olfaction. Some of them are there for purposes of control (for example, throughout the lab space, one encounters multiple layers of doors and antechambers, and experimenters wear gloves to control the odors of their hands); others embrace the inevitability of our olfactory embeddedness (an example is the PI's immersion chamber). We approached those lab features as texts from which we

read the scientific work they inscribe, but also engaged them by listening to lab members' accounts, by following researchers' efforts as they unfolded in singularities of ordinary laboratory practice (their training and data discussion sessions), and by reflecting on ways of rendering the immersive character of this sense by playfully responding to our experiences of the laboratory by way of camera (in)odorata.

Here, I conclude by providing an example that renders exactly that olfactory embeddedness. In articulating the odoriferous atmosphere on which psychophysicists act as they live the ever-changing laboratory environments, their language indicates how the world may be co-opted into multimodal semiotic actions so that it articulates the immersive quality of lived odors. As our olfactory experiences tend to be of the ground that 'closes round us, and acts upon us, without however filling a determinate form of a determinate extent' (Merleau-Ponty, 1962: 259), so does its language, speaking those experiences in their own terms. To get at that final example, we join the senior researcher (SR) and postdoc (PD) just as they finish running a first threshold test for their new study. During the test trial, the SR assumed the role of the experimental participant so that – while generating data for the project and coordinating with her colleague who will help conduct the study – she can experience the test through her own nose.[18] In that way, the researcher may learn whether there are adjustments to the procedure that need to be made before other participants are tested. As the two look at the threshold chart filled out by the PD,[19] the SR comments by accounting for her sensory experiences during the test.

The SR remarks that she was 'smelling something', and accompanies this utterance by a right-hand gesture of repeatedly brushing her fingertips across the thumb, which she performs delicately, as if feeling the texture of an invisible substance in her hand. After the PD follows with an 'Mhm', the SR further specifies by stating her uncertainty toward what she was smelling: 'I was not sure whether it was the odor or something.' When the researcher says 'the odor', she performs a beat gesture, and then re-enacts, while further accentuating, the 'smelling something' gesture (Figure 8), in accordance with her uttering of the corresponding linguistic term. While this multimodal enactment announces a possibility of a disturbance in the experimental procedure (it points out that 'something' that should not be there occurred), its format provides an opening for the PD to intervene. The PD follows with an approval, and elaborates by commenting on a likelihood of a 'contamination'. As the PD proposes the contamination idea verbally, she gestures as if enacting a link between the Sniffin' Sticks pens (which she still holds in her hands), while also performing actions of presenting the pens to an experimental participant. The two continue their engagement by discussing how to modify the procedure to prevent a reappearance of such a 'contamination'. They conclude the sequence by arriving to a decision to present their future participants with one pen at a time, while holding the other two at a distance.

In considering the SR's enactment of 'smelling something', we can imagine that, if the utterance were taken in isolation, one may be, at first, puzzled by the ordinary talk the SR employs – one may ask, why is the olfactory scientist not employing specialized vocabulary (using terms such as 'butanol', for example)? We can also imagine that one would quickly settle into explaining this semiotic occurrence with the 'tip-of-the-nose phenomenon' – the SR is familiar with the odor (recognizes it), though unable to name it

Figure 8. 'Smelling something' gesture (image by Akshita Sivakumar).

(e.g., Engen, 1982: 50); and so she falls back on the vague 'something'. This interpretation would ratify the ineffability of the olfactory language and the muteness of our sense of smell. There is, however, an alternative take – the one suggested by the present text. According to this proposal, the SR's saying 'smelling something' should be coordinated with its co-occurring gesture and considered a part of that test event in the laboratory. If we foreground what the two scientists are doing – namely, dealing with the sensory material that they experience as a dynamic and immersive substance – the SR's multimodal enactment is no longer vague, or marked by any other attribute of semiotic deficiency. Instead, it is an apt, economical and precise mode of articulating just what the two shall act upon – the presence of an unexpected odor they lived in the test situation – and what, at the same time, remains difficult to fully capture or contain as a stable object.

When the SR points out her uncertainty about whether that 'something' was 'the odor or something', she indicates how that 'something' blends with the target object, clouding its edges (she says that she 'was not sure whether it was the odor or something'). Through her gestural performance (Figure 8) – rendered as if feeling a fabric or another pliant material between her fingers – the SR articulates the odor as physically present, even if faint and almost indistinguishable. As the SR's fingertips brush against her thumb, she also enacts this odor as having a materiality that is possibly difficult to catch, while making this gesture – analogous to sensation in response to how one is to deal with the smell's peculiar spatiality – available to the PD in the shared space of the test occasion. While the enactment renders how, in olfaction, the boundaries of objects – their separation from the rest – are less distinct, this is not to say that it exemplifies an

impossible language. On the contrary, the example – as the final piece in my argument against the muteness of the olfactory sense – indicates that smell language is very much possible inasmuch as it renders that very state of affairs of which it is part – the world that goes beyond objects articulated in respect to their difference from each other (the SR points out that the material her multimodal enactment engages is not clearly distinct from the rest of what she smells). The plausibility of this take on 'smelling something' is backed up by what the two researchers do next: rather than wondering about a linguistic term the SR may be searching for, they readily engage in practical dealings with the odor that shows up as that material 'something' by virtue of its peculiar spatiality. As the two continue to deal with the spatial problem – to which the SR provides a concrete remedy (namely, to use one pen at a time) – their language articulates the relationship with the world that goes beyond our dominance. The sense of smell – with its language and a life this language is part of – makes us notice a world which, while in our noses, may not be fully in our hands.

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ORCID iD

Morana Alač https://orcid.org/0000-0002-4980-3993

Notes

1. I have rendered these moments of the lab's data analysis in a paragraph format, rather than in a CA-inspired transcript (as I did in Part I), since the interest here is in what exactly lab members say, rather than in indicating the dynamic of the interaction between participants.
2. The reader of Part I will recall the wrap-up session where S1 displayed his understanding of not being able to participate in the rest of the study, as the JR, after looking at the chart with S1's test results, informed him that he is an average smeller. Just after that, the PD and I move closer to the counter, where the two lab members turn to further discussing S1's test results. The JR (repeating what she has already said to the participant) stresses that she believes S1 'was just guessing really (.) well', which the PD affirms by repeatedly stating that it 'could have been'.

3. At that point, the videotape also preserves my comment where I express curiosity toward learning what the LM will say. After the JR inputs some discussed corrections (specifically concerning the chart's column 5, see Figure 2), we – equipped with that chart (as a vehicle for transposing aspects of the testing event to places and moments beyond it, Turnbull, 2000) – march into the LM's office.
4. While experimenters run the test, they record participants' responses into the chart. During the test, the participant is to utter a number (one to three), and, if that number does not correspond to the position of the target odorant in the presentation sequence, the experimenter is to judge the answer as incorrect. In such a case, the experimenter is to assume that the participant is not able to perceive the odorant at that level of concentration, and, thus, is to follow with a presentation of the stimulus at a higher concentration. On the other hand, if the participant's answer is perceived as correct, the experimenter is first to provide an additional token of the same concentration (to establish with more certainty that the correct answer was not a guess), and, if the participant responds correctly again, to present a decreased concentration of the stimulus on the following trial. When that happens, the experimenter is to switch columns, recording the results now in the blank, adjacent column, on the right-hand side. The experimenter is to continue to record in the same column until the participant fails to detect the stimulus correctly (at which point the experimenter is again to switch to the next blank column on the right-hand side, proceeding the test by using pens with higher concentrations of the odorant). To mark the participant's responses into the chart, lab members use an 'X' sign to indicate an incorrect answer, and a '0' sign' to indicate a correct one. As soon as they write an X into the chart, they are to substitute the current pen for one with a higher concentration of odorant, and then mark the following result into the next row. However, when they receive what they see as a correct answer, they are expected to write a '0' sign but use the same pen again. If the following answer is correct (in other words, if there are two correct answers in a row), they are then to move on to mark into the next column, and continue to use pens with lower odorant concentrations until the participant responds incorrectly.
5. If one were to take into account the JR's misplaced marks in the chart's first column (see Figure 5), one would notice that what is written in the fourth column, should instead be part of the 'training' columns. In that sense, the filled-out chart would be missing one last column, which is to say that the LM's solution would not go against what the chart indicates; it would only deal with its incompleteness. Whether the LM notices that, we do not know. In the video recordings and from my subsequent observations in the lab, there is no evidence for it. What matters, however, is that the LM publicly performs the reading reported here.
6. I am grateful to Michael Lynch for providing the reference.
7. (.) A dot in parentheses indicates a brief interval within talk.
8. The instructions provided with the kit specify that 'blanks' do not contain odorant, just the diluent: 'Since the blanks are not empty, but instead contain a diluent, they have a faint characteristic smell. This is intentional, because the dilutions of the target pens are made with this substance. This way a common background smell exists for target and blanks.' (5) The lab members, nevertheless, use the blank pens in a different manner where they check that there is no smell those pens emanate.
9. (( )) Double parentheses contain transcriber's descriptions.
10. Merleau-Ponty describes how a patient blind from birth who suddenly acquires vision perceives a visual scene.
11. Koffka talks about it in terms of 'determining.'
12. I am grateful to Ben Sheredos for providing this quote, as well as for a discussion on Merleau-Ponty on smell.

13. ‘The senses composing the first group [i.e., *sensus vagus*], are according to Kant, *tactus, visus*, and *auditus*; the second group is *gustus* and *olfactus*. Vision is described by Kant as the most ‘noble’ of all, including the other ‘mechanical’ – tactile and auditory, while taste and olfaction – the chemical sense – as ‘the lowest’. The most ‘unnoble’ according to Kant is olfaction’. (Cheringovskaya, 2004: 61–62)
14. When discussing his test results, the participant (S1) reported on a presence of an unexpected odor during the test. He says that he perceived ‘the smell of rotten eggs’ (the descriptor the JR provided during the instruction session in reference to the larger experiment, not the threshold test). The experimenter, thus, asks whether he might have smelled the gloves she wears (since she expects the participant to detect the smell of sharpies, not the one of rotten eggs). After S1 says that the odor he experienced ‘didn’t smell like a sharpie’ (Line 16, Excerpt 2, Part I), the JR protrudes her gloved hand toward his nose, and asks: ‘Ok, did it smell like my glove?’ (Line 17).
15. ‘A large odor-proof globe (an olfactosphere) was first thought of but this design was given up when air-conditioning engineers pointed out that air in a sphere tends to move around the outside, leaving the center portion undisturbed. The design was therefore made cubical and the apparatus finally devised and described here was called the “olfactorium”’. (Foster et al., 1950: 433)
16. In this case, the lab members had to determine the concentration of acetone that can reliably be associated with causing symptoms of sensory irritation, which is different from odor detection. The two are distinct physiological phenomena that are carried, in the nose, by two cranial nerves: sensory irritation involves stimulation of the trigeminal nerve, while the sensation of smell regards the olfactory nerve.
17. ‘STS Olfactorium’, *Society for Social Studies of Science, Making & Doing Section*, August 30–September 2, 2017, Boston, MA, and ‘Camera In(Odorata): Speaking the Language of the Mute Sense in Olfactory Science’, March 1, 2018, *The Institute for Art and Olfaction*, Los Angeles.
18. This feeling of the test stimuli in one’s own body (first person), while also knowing how to perform the experiment (plural), once again indicates a body that senses by virtue of already being in the world, rather than externalizing its sensations as something that is exclusively and deeply seated in the interior of the individual.
19. This is the PD’s first performance of the threshold test for data collection purposes, after she was trained by the LM a couple of days before, and then practiced with the JR who conducted the test for the gas study, as illustrated in our previous examples.

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Author biography

Morana Alač is an Associate Professor of Communication and Science Studies at the University of California, San Diego. In *Social Studies of Science*, she has previously published on practices in brain imaging and social robotics.