# Sensory Memories: Reflections From an Experimental Workshop on Recalled Sounds and Smells

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## Introduction

Classic architectural writings of senses and place, such as Gaston Bachelard's *The Poetics of Space*, Yifu Tuan's *Experience and Appreciation*, and Juhani Pallasmaa's *The Geometry of Feeling*, stimulate the sensorial imaginations and memories through detailed descriptions of space and how the body reacts to space emotionally, physiologically and physically. Making memorable places is also creating memorable marks and atmospheres that are strongly connected to the senses. Places become meaningful when we associate them with our lived experiences through the senses. Sensory memories of everyday life experiences are gained through implicit and unconscious learning (Köster and Mojet 2017, 89), and can also be expressed implicitly and unconsciously rather than explicitly and consciously (Pillemer 2009, 99). These memories are often emotional, however, not always accurate. Feelings from memories are perhaps more meaningful than recalled accuracies and details of the space or objects in the space. Informed by Henri Bergson's idea of memory as intersections of the mind and matter, and psychogeography cartography, Joan Gibbons (2007a) suggested that art is memory objects and forms of connections that intervene in the mind, the body and reality (15-18). Nevertheless, she reminds us that "memory is never just a straightforward process of recording… and, even in the best equipped of minds, it can be a slippery mechanism" (2007b, 40). The idea of place in this discussion is not limited to actual space, but ephemeral settings, objects and events associated with memories. Sensory stimuli are often triggers of involuntary memories. In the famous example of Proust's madeleine in *Swann's Way* (1918, 51), which begins with the taste of the madeleine, the recalled memories expand into spatial scenarios from the aunt's room in the old grey house to the square and streets the narrator used to visit in the town[1]. In this example, taste and smell trigger spatial memories (where and what) that are primarily verbalized as visual information, but also referencing kinesthetic movement (i.e. running). Do all sensory memories lead to spatial recall?

One common approach to studying sensory environments relies on perceivers' subjective reflections which are semantical through two means: sensory walks might combine protocols with semantic differential scales, amenable to quantitative analysis, and interviews, subjected to qualitative analysis. For example, the soundscape questionnaire in ISO 12913-

[1] The description referred to is the following: "And as soon as I had recognised the taste of the piece of madeleine soaked in her decoction of lime-blossom which my aunt used to give me (although I did not yet know and must long postpone the discovery of why this memory made me so happy) immediately the old grey house upon the street, where her room was, rose up like a stage set to attach itself to the little pavilion opening on to the garden which had been built out behind it for my parents (the isolated segment which until that moment had been all that I could see); and with the house the town, from morning to night and in all weathers, the square where I used to be sent before lunch, the streets along which I used to run errands, the country roads we took when it was fine" (Proust 1918, 51).

2:2018 has three parts including rating-scales for identifying types of sound sources, perceived affective qualities, and a general assessment of the surrounding sonic environment[2]. Participants are asked to rate to what extent they agree with the descriptors given in each section. The indicators in the perceived affective quality part, such as eventful, pleasant, chaotic, are core to detailing the soundscape quality (Mitchell et al. 2020). However, they are not spatially informative and have to be repeated across a spatial grid in order to provide spatial design recommendations, or spark imaginations. Additional methods, such as photographic surveys and observational notes, are often used to provide spatial information. However, the extent to which the spatial information is integrated into the analysis is questionable. This chapter presents results from an experimental workshop conducted in Birmingham, UK, recalling sensory memories by sketching, making objects and using a subjective evaluation through a developed soundscape and smellscape protocol. This conceptual framework to spatialize sensory memories uses the body-image concept to understand the interrelationships between spatial recall and sound and smell memories. The discussion delves into how various media utilized in the workshop contribute to the identification of "centre places" simulating spatial imagination and memories associated with sounds and smells.

## Spatialize sound and smell memories

The sounds and smells discussed here are ambient and atmospheric, related to the everyday experience in cities. Memories of poems, music and perfume are equally important in autobiographical memories. However, they are not our focus in the chapter. This section briefly reviews memories of sounds and smells to facilitate the discussion on spatializing the sonic and olfactory experiences recalled in the Birmingham workshop.

### *Sound memories*

Although both sound and smell memories are described as involuntary and episodic, there is much less literature on auditory memories (Harris 2015). Cohen, Horowitz, and Wolfe (2009) found auditory recognition memory is significantly less effective than visual recognition memory from experiments in classrooms comparing participants' abilities to recognize previously encountered auditory versus visual stimuli. This means that the persistence over longer time spans of auditory working memories is potentially shorter than that of visual memories. However, they also recognize that long-term auditory memories might be different from the recognition and working memories since soundmarks (identity-promoting sound sources for a community) were used by participants to recognize sounds in the audio clips. Indeed, in a study about soundscapes, Sheffield, Liu and Kang (2016) found that the mental representation of the sounds of places could reside in long-term memory and be associated with positive and negative experiences or special events and moments. Istvandity (2016) explored the spatial memory associated with music and claimed music related memories are more emotional than ambient sounds. In most of the interviews she conducted, the spatial information was abstract. However, the spatial information was recalled in great detail when the physical surroundings served as platforms for scenarios- causing uncomfortable situations for the interviewees when music was playing in the background (231-244).

[2] For more details, see ISO/TS 12913–2:2018 Acoustics – soundscape – Part 2: data collection and reporting requirements (2018, 14-16).

Connecting to the concept of social remembering and soundwalking, Järviluoma (2016) developed a sensory memory walking method to prompt participants with sensory cues while walking through places they were familiar with to recall sensory memories. The dynamic encounter and situational experiences were argued critically in the process. The descriptions of the past show a clear pathway to the intimacy of one's inner world and emotions (191-204). In the examples shown in the article, the visual encounters of space contribute to the recall of sonic and olfactory memories. However, the descriptions of those memories did not often come with detailed spatial information- whence sounds and smell emanate, what the surroundings were like and where the narrator was in relation to the source. It is also not clear whether sonic memories can be recalled in a more static situation (without walking or a sonic stimulus present in the place).

### *Smell memories*

There is much evidence that smells can trigger episodic memory recall (Herz 2011). Considering a theoretical framework for multi-modal mental imagery, Benjamin Young (2020) posited that non-olfactory stimuli (e.g. images, sounds, text) can trigger smell memories, which are projected as imagined smells. This can be used, for example, in a context of virtual tourism where evidence shows that congruent smell presentations as part of a multimodal VR display act to increase positive behavioral responses (Flavián et al. 2021). Smell-related autobiographical memories with associated emotional encodings are also retrieved with stronger activation of the amygdala, beyond non-emotional memories or emotional memories associated with other modalities (Gottfried and Dolan 2003). Consistently, perceived smells that are not actively attended to are also able to evoke emotional responses in individuals (Haviland-Jones and Wilson 2010). Smells can be incorporated into individuals' schema for places with strong connotations with affective and emotional associations (Tse et al. 2007). On the other hand, Young (2020) points out that imagination is a broader concept than memory recall:

> olfactory imagery seems limited when only considered as the capacity to voluntarily self-generate an experience of olfactory quality in the absence of sensory stimulation. However, a more liberal conception including any experience of olfactory quality in the absence of sensory stimulation widely expands the instances of olfactory imagery by including dream states, hallucinations, autobiographical odour memories, and olfactory memories (3305-6).

This was acknowledged in an experimental study by Lindborg and Liew (2021), where participants were presented with audiovisual stimuli of wet market environments and asked to imagine the smells. Free-form responses were compared with on-site annotations from a sensory walk, revealing an interaction between episodic and semantic memory. Challenges of describing and representing smells make it difficult to communicate feelings and experiences of smells in places. In recalling details in smell-evoked personal stories, references to objects or things are found to play a dominant role (Leret and Visch 2017, 65-77). Obrist and collaborators (2014) adopted a storytelling method to elicit memories of past experiences with smells through a web-based questionnaire to inspire design thinking for creating a human-computer interaction system for smells. Their questionnaire starts with an open question about a personal memorable smell experience which then moves into questions on the emotional characteristics and smell qualities (2843-52). In their study, results from people's responses showed rich information about personal stories whilst giving limited spatial information about

the objects and places involved. However, the staged process is effective for recalling details into memories of smells that have personal meanings attached to them.

The act of returning to a familiar place and its smells activates emotional recollections which can bring people back to a past experience (Pallasmaa 2007, 54). Smellscape constitutes a spatial-emotional medium. Smells act as intermediaries to interlink and trigger emotions that make sense in relation to the physical and social structure of place in everyday living (Xiao, Tait, and Kang 2020). Engen and Rose (1973) discovered that odor memories are long lasting and could maintain 20% accuracy throughout a person's lifetime: odor-evoked memories are often emotional and related to a certain situation (221-7). This is echoed by Beer (2007)[3]who showed that memories of smells are connected to episodic memory (through personal experiences in places) which differ from semantic memory (through memorizing words of places) (189). Beer also argues "yet, in natural settings there is no smell-neutral space. Space is always filled with smells produced by components of the environment, influenced by climate and human actions" (83).

***Representations of spatial-sensory memories***

Representations of spatial-sensory memories, looking at non-visual experiences, triggered by sound, smell, and haptic-tactile contact, that contextualize our everyday experiences, are important to the creation of memorable places. Sound, when understood as emanating from an identifiable source, can be very directional, indicating volume and distance (Mohler 2013, 83; Lindborg 2016). However, with smells in places, the recognition (what is it and where does it come from) could remain very uncertain, even in-situ (Henshaw 2013, 57-78).

The Latin word *ubique* means 'everywhere'. Smell and sound both share this concept. Any background sound such as an urban traffic drone can be perceived as ubiquitous in the very literal sense that the acoustic propagation is highly dispersed and arrives at the listener from numerous if not all directions. Diffuse, unstable, omnidirectional sound presents an intrinsic tendency towards ubiquity, leading to a confusion between the locus of a sound or smell and the locus of a source and impedes upon the perceiver's sense of orientation and location in space (Amphoux 2005, 141-42). However, this aspect of background sound does not suffice to produce the effect. Beyond the mere acoustically produced difficulty or impossibility of locating a sound source, the 'ubiquity effect' suggests a metaphysical dimension of sound perception. For the effect to occur, the sound "questions its location, and disavows, at least momentarily, the listener of its identification" (Amphoux 2005,142). Thus, urban drones or roaring seas might be ubiquitous, but they do not cause the effect since the perceiving subject knows where they are. When the listener cannot locate a ubiquitous sound, it causes stress, especially if loud. It seems that "The uncertainty... establishes a power relationship between an invisible emitter and the worried receptor" (131). For example, music in cafés or shops might produce the ubiquity effect not by being loud but by having neither center nor circumference. "That", Schafer (2005) declared, "is how the mediaeval theologians defined God... the schizophonic voice, invisible but authoritative and omnipresent" (xv). Ubiquity is almost unequivocally negative. For example, reverberant spaces are prone to the ubiquity effect since reverberation reduces the possibility of orienting oneself by listening attentively. Lindborg (2015, 37-39) pointed out that ubiquity describes sound events that are perceived as lacking in spatial precision (cf. *metabole,* for sonic textures lacking in definition over time). It describes not only many of the sounds that are typically found in urban

[3] For more on this, see Lindborg and Liew 2007.

environments but also many, if not most, of the smells. Notwithstanding their imprecision, both sounds and smells contribute to the characteristics of places. At sites where they are ubiquitous, lacking a comprehensible centre, people might sense a feeling of discomfort. While the actual sources of smells and sounds might not be understood, the associated emotion they evoke might linger for a long time in memory. As we could see in the design workshop described further below, ubiquity can sometimes be key to identifying relations between smell, memory, and space.

Memory marks of places might be associated with repeated unconscious encounters or incidental conscious encounters. In *The Image of the City*, Lynch (1964) summarized five elements to describe a memorable urban image- district, landmark, nodes, edge and path, through analyzing people's sketches of cities and interviews about memorable spatial characteristics (47). The five elements are based on imagistic cognitions; it is not clear whether non-visual cues have contributed to the recall process and formation of the space in Lynch's exploration. However, as Pallasmaa (2013) suggests, "It is obvious that our existential space is never a two-dimensional pictorial space, but a lived and multi-sensory space saturated and structured by memories and intentions" (22). It is evident in literature that similar spatial systems are used to describe soundscapes and smellscapes with reference to the landscape concept. In *The Soundscape: Our Sonic Environment and the Tuning of the World*, Schafer (1993, 9-10) defined features of the soundscape such as *keynote* (background sound, often emerging from the natural environment), *signal* (foreground sound, designed to attract attention), and *soundmark* (unique and of special significance to the community). Referring to soundscape studies, Porteous (2006) also suggested that *smellscapes* would involve *smell events* and *smellmarks*; surveys and mapping of smellscapes can be conducted via *smellwalks* with a *nosewitness* (what was detected through the nose and by whom) (89-106). Rather than focusing on details of the physical spatial characteristics, both concepts emphasize the temporary spatial scenarios and relationships between the perceiver and space where memories of sounds and smells play an important role in the perceptual process.

Some pioneering attempts have been made by artists to visualize smells in places. For example, Tolaas (2010) and Mclean (2012) chose scented maps to construct a dialogue between cities, visitors and residents. The spatial scales are presented at the macro level where the physical form of space and the spatial characteristics are abstracted. In fact, abstraction of the physical surrounding is common in memories and often modified by imaginaries. Bloomer and Moore (1977) applied Vischer's explanation of "empathy"[4] in art to explain the relational practice in architecture that "feelings of the inner self might be projected to walls, doorways, and domes of a building" (27). From the perceivers' view, the empathy is inseparable from a series of bodily reactions towards objects in the space such as visually identifying the lines and shape, touch to feel the texture, breath to sense the air, hearing footsteps to tell the material of pavement, and so forth. They presented a body-image concept as "the complete feeling that one individual carries at any one moment in time of his spatial intentions, values and knowledge of a personal, experienced body" (Bloomer and Moore 1977, 37). In the recollections of places, the body-image may generate a series of mental images that contain critical visuospatial information such as shape, color, location, distance and orientation to recognize a space. These imagistic components of space are important in making meaningful personal event memories (Pillemer 2009, 52). In *Figure 1*, we lean on this understanding of *body* to illustrate the conceptual relation between the observing 'I', event-situations, and objects. Bloomer and Moore (1977) indicate that memory of places has a "centre place" where

[4] For more on this, see Vischer, "On the Optical Sense of Form: A Contribution to Aesthetics", 1994/1873, 89-123.

layers of memories are added to the feelings attached to the place (49). The recalled memories of the centre place will call on all sensory stimuli that construct the feeling. The spatial details of such "centre places" in recalled memories would potentially be richer than others (39).

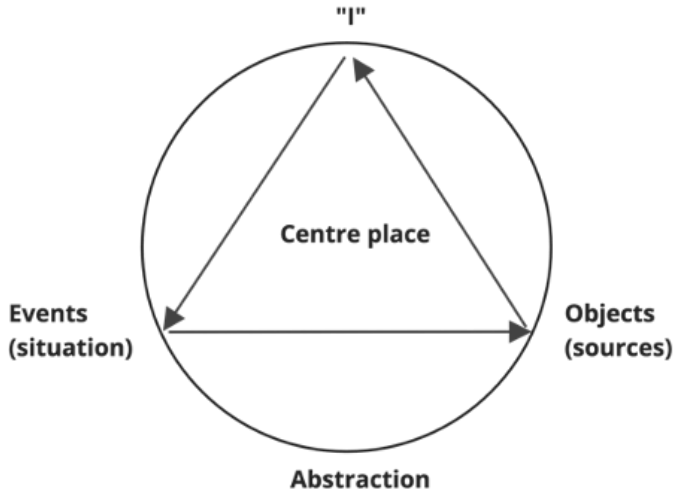


Figure 1- Spatializing recalled sounds and smells using the body-image concept

Spatializing memories of sounds and smells, thus, is to draw out the relationship between the self, objects (as smell or sound sources), and events (as moments or situations that make the sounds or smells memorable). The abstraction of the external world comes in ambiguity of spatial details and constant exchange between present and recalled, real and imagined, feelings and the unfelt. As Treib (2009) suggests, "Memories remain embedded in the form, remain to be unearthed, read, and decoded- however imperfectly or incorrectly. Memories may metamorphose into meaning over time. But to these must be added the memories triggered by the built world that stimulates accumulation or recall" (XI-XII). The transactions between bodily imagination and the environment also extend the inner world into the physical space.

## An experimental workshop integrating sketching and making

Working on the Multimodal Hong Kong (MMHK) project (Lindborg et al. 2024) to document the sounds and smells that are valuable in terms of sensory heritage and meaningful in people's everyday life, the team developed a protocol based on ISO 12913-2:2018 for soundscape annotations, a compacted 'Smell Atlas' (Zarzo 2021, based on Dravnieks et al. 1984), as well as the olfactory heritage framework (Bembibre and Strlič 2017, 7-8) to capture the characteristics of soundscapes and smellscapes of identified everyday heritage sites such as wet markets and temples. Sensory impressions of such places are embedded in people's personal and collective memories and reinforced through everyday encounters with the city's characteristic sites. While reflecting on the experience of using soundscape and smellscape protocols, the authors questioned the documentation of the spatial context to reveal the quality of sounds and smells in the environment. In the meantime, we are curious whether artistic interventions with the protocol could be useful as prompts to recall sound and smell memories with more spatial information. Two questions are explored: How much spatial information and imagination is involved in recollections of sounds and smells using protocols developed for in-situ subjective evaluations? In what ways does sketching and object making contribute to the spatialization of sound and smell memories?

### *Design*

To test the theory and findings discussed above, we organized a workshop to experiment a structured narrative approach to recalling the spatial information associated with auditory and olfactory memories. As Pillemer (2009) suggests, "perceptual representations may or may not reach consciousness, depending upon whether they are actively attended to, thought about, or talked about" (103). A structured narrative approach with cues could potentially help to elicit the imagistic memories of experiences of sounds and smells in places. Successful recall is an active and constructive process that involves a dynamic interaction between the specific attributes or features of the stored memory trace and the corresponding characteristics of the retrieval cue (Lockhart 2001, 9613-9618). In this process, the quality and effectiveness of the retrieval cue play a crucial role in accessing and retrieving the targeted information from the memory trace. From abstraction of feelings and emotions to the body-centered image, we designed the workshop to be phased to lead to a recollection of participants' spatial relationships in a memorable moment with the sounds, smells and objects in a marketplace.

The workshop, "Market Things", was held on April 5th, 2023 and focused on the Bullring open markets (including the Rag market) and Indoor market in Birmingham, UK. Nine participants were recruited from amongst students and staff at Birmingham City University, with diverse ethnic backgrounds. At the start of the workshop, all participants confirmed they had been to the identified markets. A five-minute YouTube tour video of the market[5] was shown at the start of the workshop. The video has no narration nor background music. It only captures the views and ambient sounds in the environment as the person who holds the camera moves along. The workshop was about two hours long in a three-step structure. There was a thirty-minute interval between each step to have a roundtable discussion:

Step1: Recalling the sensory memories of the markets using a designed protocol drawn from the Multimodal Hong Kong project (see above). The protocol included three parts: general memories of the market, memories of sounds and memories of smells. Participants were given ten minutes to fill in the protocol silently. Stories were shared after the 'silent' recalling exercise.
Step 2: Situating in the market that related to the sensorial moments recalled. Participants sketch out the moment associated with the most memorable sounds or smells discussed in ten mins. A sharing of the sketches was conducted right afterwards.
Step 3: Making the sensory probes associated with the sound or smell memory recalled in the sketched situation in the market from Step 2. This process lasted twenty mins. The material provided was clay to bring a tactile correspondence to the other sensorial experiences, without the color influence. The made objects were talked through by each participant afterwards.

### *Participant reaction and outputs*

Limited spatial information was retrieved from the first step with text prompts in the protocol. An example of the protocol filled out is shown in *Figure 2*. Three out of nine participants left spaces unfilled in the protocol, as they struggled to use some of the parameters for descriptions. The memories recalled ranged from a few days ago to months ago; the longest was three years ago. The protocol is useful to elicit the memory landmarks of sounds and smells in the market

[5] The video was made by the TRAVEL OWL and posted on Youtube September 15th 2019. It starts at the Bullring Market and goes to the Rag Market, to then finish at the Indoor Market. https://www.youtube.com/watch?v=6tAfKHC9V_k&t=20s (Accessed on 20th July 2024 ).

spaces and their characteristics using the descriptors. For example, the protocol below shows that sound marks are mainly from people either selling products or talking in the market, being chaotic and noisy, whilst the smell marks are dominated by the fishy smells mixed with sniffs of vegetables and nuts, being strong and unpleasant sometimes. However, there is limited spatial information revealed in the comment box to further describe related experiences of associated sounds and smells (where they are from in the market).

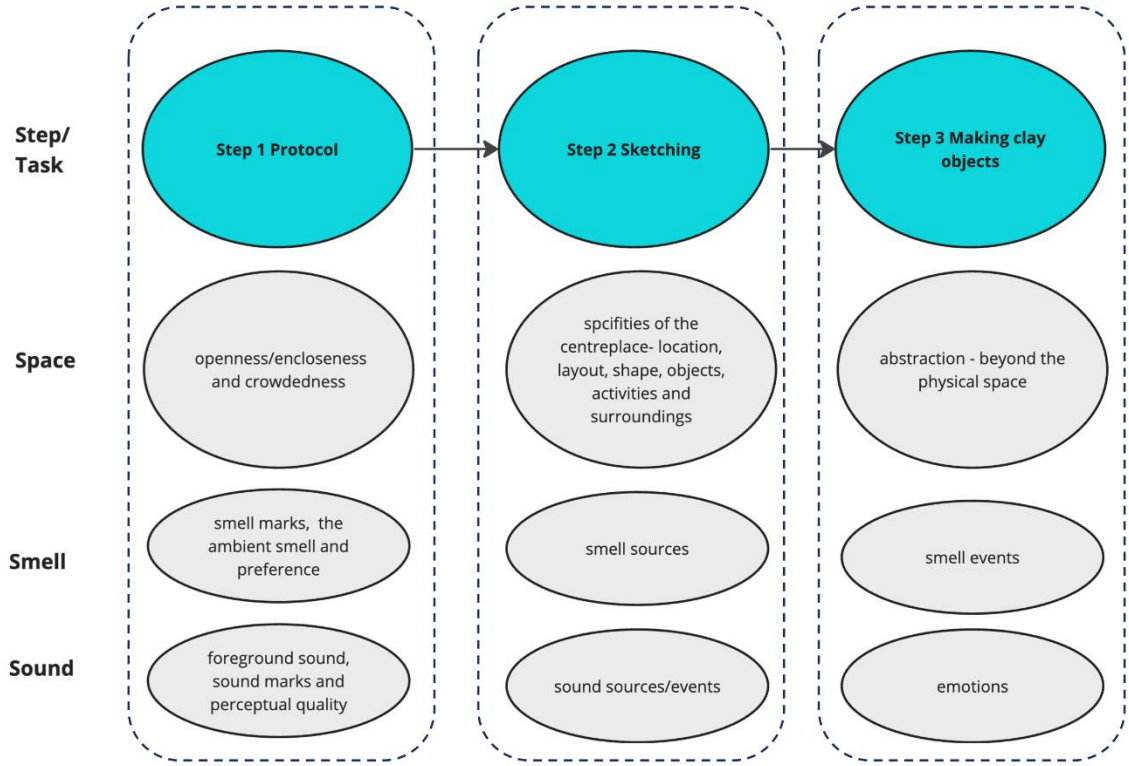


Figure 2- Figure 2.2 The spatial, sonic and olfactory features recalled from each step in the workshop (Xiao, et al., 2024)

The sketching task revealed some essential spatial information related to sound or smell marks recalled from the protocol. *Figure 3* shows all the sketches from participants. Four of the nine sketches are associated with smell marks and the rest have to do with sound. Most of the sketches show a stall (shape and layout) and retail activities with limited details on material and texture. For example, the fourth sketch is associated with foreground sound and soundmarks in the protocol (see above), showing the experience of the participant walking through the popular fruits selling area in an open-air food market. The conversational exchange intertwined with the drawing task played a pivotal role in eliciting personal associations with the market milieu and elucidating the interconnectedness between the auditory and olfactory stimuli and the visual representations and artefacts crafted. However, it is noteworthy that the inquiry posed during the dialogue phase remained notably open-ended, merely prompting participants to expound upon their drawings in response to the task at hand. A more structured approach to questioning could potentially enhance the delineation of spatial relationships and contextual surroundings within the depicted scenes.

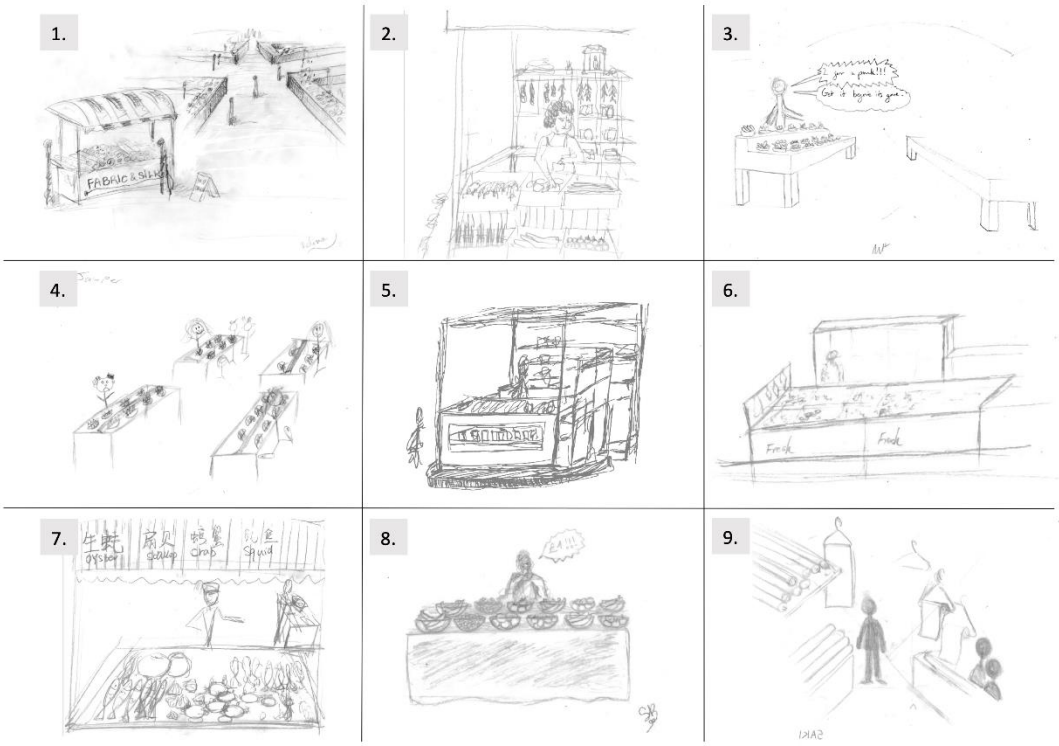


Figure 3- Sketches from all participants that relate to the sensorial moments recalled.

In Step 3, the participants made twenty-six sculptural objects. As can be seen in *Figure 4*, most are things for sale in the market, such as fruits, vegetables, fish, scissors and fabric, though interestingly, there are a few peculiar forms that were revealed to be related to feelings. Although participants did not recall more spatial details, the making process sparked conversations that transcended into other spaces associated with the objects made. For example, one talked about baking potatoes where the objects become the overlap of memories of touching potatoes in the market and the smell of the baked potations at home; however, the shared stories are not necessarily the same sensory stimuli identified from the protocol (e.g.

from auditory and haptic to olfactory). The cross-modal stimulation from the haptic experience of making the objects seems to unlock memories in unexpected ways.

## Reflections from the workshop

The reflections are drawn from identifying ways participants in the workshop refer to spatial elements to make links between the self, objects (as smell or sound sources), events (as moments or situations that make the sounds or smells memorable) as discussed earlier. The discussion also examines in what ways sketching and making objects contributed to recall process and storytelling.

### *Locating the "centre place"*

Most of the sketches have a visual focus on a specific stall in the market as the "centre place" of sounds or smells the participant is deeply engaged with. For example, Sketch 9 in *Figure 3* shows the participant in the middle of the rag market surrounded by the overhanging fabrics and people calling her into their shops. The overwhelming experience was described in the protocol, and again, expressed in the objects made: an apple on top of a human body showing

Figure 4- Objects made on the day and exhibited at the Inclusive Design with Multi-sense Symposium on 14th 2023 as part of the MMHK project

the stress of the noise felt by the body, with a patch of wires showing the distraction and confusion in the space. The smell of fish and people in the market were highlighted in her protocol as "offensive, funky and foreign", evidencing a feeling of being unpleasantly overwhelmed:

> Loud noises. Crowded. About three years ago, I went through the market to access the fabric side. All the colours stood out to me. I easily got distracted by various objects…. A lot of shouting and chanting, objects smashing and fiddling. In certain areas, it is quiet. Not the same to Spanish markets which are mostly outdoors and a lot nicer feel. There are too many people in the indoor market, overwhelming. I am very sensitive to bad smells; I often avoid going to the market here. (S, Female)

In the example above, the absurd experience of sounds and smells marked the memorable spatial conditions in the market. Beer (2007) suggests that "the perception of smells becomes more conscious if they are: very unfamiliar; unexpected; their context deviates from everyday experience; they are culturally marked; or, questions about smells are raised" (188). Perhaps, these conscious sonic and olfactory encounters also encourage one's attention to memorize the spatial conditions that could then be recalled more easily. The affective experience involved in the moment reinforces the sensoriality of space, connecting the body and all agencies that constitute the atmosphere (Hamilakis 2017, 173).

The position of the body in the sketches indicates movements and orientations towards the sounds and smells in the recalled moment. For example, sketches 3, 4 and 8 are all showing the fruit-selling stalls as the centre place associated with chanting from the seller; sketch 3 shows an angled position of the body towards the seller; sketch 4 shows the body in the middle walking towards the seller at the end; sketch 8 shows the body standing in front of the seller. Embodied cognition through movements or walking to facilitate recall could effectively activate the emplaced memories in a place (Stevenson 2014, 335-49). The act of sketching in the workshop, as movement on paper, serves a way of embodying, remembering and interpreting the memories recalled. Lynch (1964) suggests "locations normally identifiedby many objects in context may be recognizable only by virtue of some distinctive, separate symbol" (125). The representation of the stall in these sketches show distinctions of stalls in the open market and indoor market through the way sellers lay out products (in bowels or not), physical structure of the stall (with or without a cubic frame) and types of products (fruits, fish or fabric). However, not all representations are true reflections of reality or reliable for accuracy. For example, the fabric stall in sketch 1 in real-life is located inside the open market at the other end where all stalls are under a large overarching roof.

Self-referral is seen in the discussion of memory making moments of smells and sounds recalled. For example, participant R drew a Jamaican stall in the middle of the page and herself outside the stall (sketch 5 in *fig.3*) and talked about the colors and authentic smells of the spices sold in the stall as well as how they are arranged on the shelf. This relates to her Jamaican background and culinary knowledge passed on from her mother and grandmother. When recalling specific information of smell-evoked stories, people often draw from associations of inanimate objects or things and social-cultural beliefs to get into the details such as locations of places and associated situations (Leret and Visch 2017, 65-77). The example underlies a bodily presence that is perceptibly embedded within the imagery, indicative of the participant's intimate familiarity with the Jamaican spice stall and the cultural resonances forged through olfactory stimuli. The objects she made, a few potatoes and a cabbage, are also ingredients in her cooking. As Pallasmaa (2013) suggests, "remembering is not only a mental event, it is also an act of embodiment and projection" (27). The projection of an individual's identity into the sketches and objects extends the sonic and olfactory engagement with the marketplace into a cultural manifest of the marketplace.

### *Imageability and tangibility*

Memory marks of sounds and smells could spark imageability of spatial elements. Lynch uses imageability to discuss "that quality in a physical object which gives it a high probability of evoking a strong image in any given observer" (9). He suggests that highly imaginable cities would invite a full dimension of sensory experience where the spaces are well formed, distinct and remarkable. However, the theme of "imageability" that emerged from the workshop focuses on how much the recalled sounds and smells can lead to the recollection of spatial experiences. For example, participant J talked about the chanting of the fruit seller as being distinct from the local market near his home, where his family would go together weekly as a family activity. This led to a continued conversation about the different fruits sold and the freshness of the fruits sensed through their smells. The details of sitting positions at the dinner table were also described. This constant changing of places and associated smell and sound markers turned the memory into a flux, where the chanting sounds were crucial in stimulating full imagination. The recollections consist of layers of memories beyond what was initially asked, generating a series of sound and smell markers. This trans-spatial quality of sonic and olfactory memories enhances the imageability of space, however, it also echoes the 'ubiquitous effect' discussed in the earlier section.

Both sketching and making bring a degree of tangibility to the recalled memory. The intangible nature of sounds and smells bring challenges to the recall tasks, particularly without the presence of sonic and olfactory stimuli. Pillemer (2009) suggests, "a person recounting a memory must translate the initial perceptual and sensory registration of a momentous event into a shared, narrative representation" (00). Mediation through sketching and making extends beyond the mere existence of the moment, getting into the memories of sounds and smells. Mediated memories through tangible artefacts, technologies and practiced rituals could construct the past and materialize memories in tangible forms (Stevenson 2014, 339). The journey of materializing the space in the recalling process mirrors one's endeavor to communicate the mental image. The tangibility given through sketching consolidates participants' understanding of the spatial relationship through location, orientation and sources.

The haptic experience in making the smell or sound objects brings tangibility through the weight, the shape and texture. Objects are important in the processes of remembering, expanding the realm of memories and our sense of self in the situation recalled (Pallasmaa 2013, 25). This cross-modal learning as stimulation might find some links to the experiments of a haptic-visual observation drawing method by Shapiro and colleagues (2020, 488-503). In their findings, the inclusion of haptic observations has stimulated three-dimensional learning of forms and enhanced the spatial ability which also do not need high levels of intrinsic visuospatial ability to engage with. Interestingly, five out of nine sketches are more related to sounds rather than smells in the market (sketch 3, 4, 7, 8, 9 in *Figure 3*); only five of the twenty-six objects made are related to sounds (a sound wave, a shouting man, an apple on a human body, scissors and a piece of plastic). Further research into the haptic qualities of sound is needed to have a deeper understanding of this result.

### *Absence of sonic and olfactory stimuli*

Studies prove the benefits and power of presenting sonic or olfactory cues to recall memories connecting the mind, the body and immediate space with the past. For example, Chu and Downes (2002) found "odor-cued memories tend to be more emotional, more detailed, and of a greater age" (517). However, there are also downsides to this approach, particularly with

olfactory cues: first, one might get answers related to the cues presented, neglecting information which might also be important; environmental smells cannot be fully replicated; the same molecule could be found in various things that may have very different associations of smells (e.g. Methyl Mercaptan is in both smells from marijuana and human feces (Leret and Visch 2017, 70); participants may have very strong personal emotional associations which could lead to unpleasant experiences and withdrawal from participation (Leret and Visch 2017, 76). Thus, we intentionally did not provide any sound or smell samples as prompts in the recall process to see how much information can be recalled naturally about the smellscapes and soundscapes in the market using the protocol with the drawing and making task, with a focus on the spatial characteristics.

In our workshop, the absence of the sonic and olfactory cues showed challenges inquiring into memories at the beginning using words. A more conscious information filtering process was observed in sketching out the memorable sound or smell situations in the markets since all participants presented a rationale in the discussion of what they drew. Echoing findings from Hwang et al. (2023), sketching helps to break the language barrier, making the memories and associated feelings more communicable. However, we are uncertain whether the same level of detail and embodiment is achieved through sketching compared to a fully stimulated approach, such as in-situ walking and immersive environments with designed olfactory and sonic cues. This "non-stimulated" approach could potentially be useful for spatial cognition training for sensorially vulnerable groups or for recalling specific spatial contexts where the presence of sonic or olfactory cues is considered unethical.

## Concluding remarks

We examined the approach and spatial recall through an experimental workshop focused on remembering sonic and olfactory memories in a market through protocols, sketching, and object-making. The exploration in this experimental workshop is not aimed at the accuracy of spatial details nor the neuroprocessing of sensory recall, but rather at demonstrating the potential of combining protocols and artistic methods to better understand the spatial relationships in the soundscape and smellscape concepts. Spatializing memories in this chapter is conceptualized as relationships between the self, objects, and events mediated by sounds and smells.

The workshop revealed challenges of using soundscape perceptual factors to describe memories of sounds, while the characteristics of smells were useful in highlighting qualities of smells as memory markers. The results suggest that a structured process to recall sensory memories without the presence of actual sound and smell stimuli is possible. The act of sketching serves the necessity of embodiment and representing orientations of the body towards sounds and smells in the space, through a visual medium. Vision, to many people, is at the heart of configuring spaces and locating non-visual stimuli in the environment such as where these stimuli come from (direction), what they are (type), how far they are from ourselves (distance), and whether anything in the surrounding influences our perception (relation to other objects in the space) (Mohler, Di Luca, and Bülthoff 2013, 84). In human history, we develop a system to describe locations with orientations (left, right, up and down, front and back) and distances (82-3). The visual cues provide accuracy whilst non-visual cues add information of the place characteristics. For example, when describing the spatial planning of the Wollaton Hall in Nottingham, UK, Hawkes (2012) wrote the visitors' journey as "progressively sheltered from the raw cold of the outside as the route turns first right, then

ascends a flight of steps, turns to the left and finally reaches the entrance to the double-height great hall, lit from high clerestories and warmed by two fireplaces set in its long side walls" (36). This detailed account exemplifies how vision and other sensory information work in synergy to shape our understanding and navigation of spatial environments. Introducing a visual method such as sketching and model making, individuals can create a vivid mental map of a space, enhancing both visual and non-visual memories.

The discussion highlights the trans-spatial quality of sonic and olfactory memories for imaginability. The recalled memories of sounds and smells could spatialize the "centre place." Self-referral is a critical pathway for projection, presenting an individualized spatiality to the recalled smells and sounds. A more important question to ask is how these recalled memories can be transformed into the (re)creation of memorable place for its sensory quality or spatial strategies to keep the meaningful sensorial encounters. Perhaps, it is useful to note that "the capacity to replicate a sensorial culture resides in a dynamic interaction between perception, memory and a landscape of artifacts, organic and inorganic" (Seremetakis 1996, 8). The creation of sculptural objects provides tangibility and cross-modal stimulation for memory retrieval. Sensory memory is material; artefacts mediating the sensorial perceptions are passageways into the "autonomous entanglements of everyday material experience" (12). Developing a material practice beyond the protocols, and recordings in the context of sounds, perhaps could enrich the soundscape and smellscape research. Driver and Spence (1998) find sounds could direct visual attentions correctly with respect to the external space; also suggest that two modalities can be modulated by a third modality. In another study, Spence (1998) finds that touch could evidently generate shifts in attention. The cross-modal interactions between touch, smell and vision in our workshop have made a difference in generating conversations. However, we are not clear whether the cross-modal interactions have modified the sounds and smells recalled in the workshop.

The ethical sensitivity of collecting perceptual data in sensory studies is multifaced whilst underexplored (Harris 2015). For example, it is questionable whether it is appropriate to collect recalled sensory experiences that are personal and reveal intense conversations. It is also questionable whether it is appropriate, for example, to collect recordings from participates that reveal their private life and living environments. Although olfactory arts provoke conversations in creative and unexpected encounters in museums and galleries for an immersive experience, Hsu (2020) suggests that associated risks need to be assessed together with a full spectrum of visitors to these locations. The approach in our workshop, without using sounds or smells to elicit memories, could potentially address some of these ethical issues. However, a wider conversation is needed, perhaps, on ethically appropriate methods to conduct sensory studies and practices.

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