**"Sonic and tactile bodies: sound, haptic space and accessibility"**

**Introduction**

The sonic ambiance we live within is constantly morphing, echoing the changes of a rapidly changing environment. It is always “on” and, while we may not notice it, we are constantly exposed both to the sound and the vibrations that traverse our bodies, even while asleep (Ingold 2007; Schwartz 2003). This sonic ambiance may not always be pleasant, and for functionally diverse people, the focus of this chapter, it can be perceived with more intensity and as such, have a negative overall impact (Romañách & Lobato 2005). Listening is a fully embodied experience where sound is heard through the ears as well as through the whole body (Drever 2015; Helmreich 2010; Horowitz 2013; Nancy 2002; Rodaway 1994; Smart 2007). In this immersive body experience, we listen to sound while being within sound; that is, we are ‘ensounded’ (Ingold 2007). By this I mean that sound is constantly around us, having a permanent relationship with the body that, in some cases, and as we will explore in this chapter, is not pleasurable, beyond the nuisance that “noise” can cause (Schwartz 2011; Thibaud 2011). For example, a body may tremble from tip to toe if the experience of a power tool is too close. A deafening sound can make us move in a certain direction. Imagine the sudden onset of sound without warning as you move through one of your daily routes, and how you are startled out of your sense of comfort and ease, or you lose—for a moment—a sense of where you are. This full immersion, where your body is constantly submerged in a space of sensory stimuli, is not equally experienced by all; for example, people with diverse visual or aural capacities have a differential ability to pick up or decode this sensory information.

This chapter explores the ways in which sound can be experienced as disorienting and painful, and draws on an ongoing research project, “Ambiances, participative innovation for the urban accessibility for diversely functional individuals (acronym AMBIANCES)” located in Barcelona. The project investigates how, in conjunction with technology, the urban ambiance can be made more accessible for individuals with functional diversity. The project contests the notion of a universal design; instead arguing for alternative design and materials that acknowledge the differing impact of urban sounds on functionally diverse collectives (Bates 2014; Berrens & Cereceda 2017; Callon & Rabeharisoa 2008; Edwards & Harold 2014; Imrie & Hall 2001; Imrie & Luck 2014; Latour 2004; Lid 2014; Liu & Kang 2016; Sánchez-Criado & Cereceda 2016; Sellick 2014; Stengers, 2014).

The project dwells on our various corporeal relationships with urban space. My focus is on the physical perceptions of a sonic ambiance, being mindful that the city’s sonic ambiance includes the dimensions of touch and discomfort or pain (nociception) that are produced in our bodies as we navigate the spaces of the city. I am seeking to explore the city through the sensorial and emotional practices we weave with space, encouraging a way to understand space as constantly intertwined with the corporeal and emotional experience of its dwellers. Hence it is also an argument towards a non-normative approach to space that can encourage a broadening of how and what we conceive of space itself (Bates 2014; Berrens 2015; Imrie 2012; Jiron & Iturra 2014; Johnson 2011; Jones 2009; Jones 2014; Low 2014; Marchand 2010; Paterson 2009; Taylor 2018; Thrift and French 2002; Thrift 2003).

Using an ethnographic approach, I examine the relationship that deaf-blind and blind or partially sighted people establish in their engagement in everyday life and the role a sonic ambiance may play as they navigate through the different spaces of the city. I argue the tactile and pain dimensions of sound are important actors in the making of place for diversely functioning individuals. Tactility and pain intervene on aspects of the spatial orientation of deaf-blind, blind and partially sighted people due to the emotions aroused in and towards the space they navigate and have significant impact on the relationships to the space they inhabit. I conclude by highlighting the importance of rethinking listening as a tactile, emotional and, at times, painful practice.

*The ‘AMBIANCES’ Project: an overview of collaborators*

The main association for blind people in Spain is called ONCE, a very large, powerful and well-funded association that has undertaken pioneering work to improve the quality of life of people that are visually impaired. ONCE strives to ease and give consideration to the everyday life of people with visual impairments.[[1]](#footnote-2) However, as an adult, to be able to benefit from some of their programs ONCE requires you to be designated legally blind.

In the Barcelona case study that provides the empirical material for this chapter, I have worked with two local associations for individuals with a visual impairment B1B2B3—the Catalan Association for Visually Impaired People[[2]](#footnote-3) —and Apsocecat, an association for deaf-blind individuals.[[3]](#footnote-4) As the name indicates (B1, B2 and B3 being the three identifying units of levels of visual diversity),[[4]](#footnote-5) the latter has no restriction on the level of impairment of its members. ONCE requires members to be registered “legally blind” in Spain,[[5]](#footnote-6) which means a group of people with a visual impairment is excluded from ONCE. In comparison, B1B2B3, even if locally based, smaller than ONCE and with fewer resources, provides for many people with varied levels of visual diversity.

The second association (from which data was gathered for this discussion) Apsocecat is an association for deaf-blind people located in the neighborhood of Sants. Apsocecat’s work includes helping individuals that are either completely deaf-blind (in this case, most of them are living in care centers) or people that have some residual sight or hearing and are able to live an independent life with some help from a sensory mediator.[[6]](#footnote-7) It is important to note that people with congenital and total deaf-blindness mostly relate to their surroundings through proprioception and touch, hence they use the haptic sign language to communicate.

During fieldwork, I worked with the sensory mediators at Apsocecat and talked at length about both communication systems and the conceptual elements that could be transmitted through haptic sign language. The key message from those who work at Apsocecat is the concern that deaf-blind individuals have basic road security, that is, to be able to move through a simple and short route independently and safely. For example, one such route is from the door to his/her room to the entrance of the care facility that leads to the street. Apsocecat also provides all sorts of assistance for individuals that have some residual sight or hearing and can move independently. For example, Apsocecat staff can assist residents in learning new routes through spaces by use of touch or step counting, with the use of the stick (the white stick for blind people has red stripes in Catalunya to signal deaf-blindness) and other references the person may use to navigate in space.

**Methods**

The work presented in this chapter is drawn from work I have conducted with B1B2B3 and Apsocecat since 2016. My methods include an ethnographic approach relying on mobile methods (Buscher & Urry 2009), participant observation, and interviews. Semi-structured, in depth interviews were conducted with the association users and mediators. In total there were 15 interviews with group mediators and members of staff, a focus group with four of the mediators that are currently active and working,[[7]](#footnote-8) and follow-up interviews.

At B1B2B3, I conducted interviews and focus groups but also took part in shadowing. Shadowing is a practice that consists of walking a few steps behind the person being shadowed, as if the researcher was that person’s shadow. Understanding and sensing the mere presence of the researcher during the shadowed walks impacts on the overall sensory experience of the walk itself, so the awareness of the shadowed is raised from the moment of engaging in such practice. Shadowing also encourages the participant to engage in a reflexive exercise; from the moment the shadowing is proposed and agreed, until after it has taken place. This technique can help enliven what may otherwise be perceived as the mundane everyday, and so help explore daily interactions in new ways (Jirón 2011; Perec 2003).

In both associations, I also undertook participant observation, analysing the situated and acquired practices undertaken by users as they navigated urban spaces through senses other than that of vision (and for some clients that of hearing), as well as their bodily experiences of sound (Bourdieu 1994; Haraway 1988). In addition, empirical data was collected and recorded of the sensorial experiences and everyday life situations that affect visually diverse and deaf blind individuals’ corporeality. For example, I recorded the shadowed routes and made recordings of areas in the city that were identified as problematic. The participants talked at length about their embodied experiences in interviews, recalling their bodily sensations in the city and how they felt corporeally while navigating them. Their personal reflection on their embodied experiences gave me an insight into the number of obstacles they can face in any urban trajectory.

**Urban design**

Sound is used for accessibility in urban design. The CyberPass signal which is very loud, high-pitched and repetitive and unique sound, easy to identify and heard by the majority of people that have some residual hearing, as well as those inside cars. However, the impact of this sound is very intense and distressing (Berrens & Cereceda 2017). In fact, it is the role of this sonic element to be able to pierce the urban space and be heard above all else, including road works. Compare this to the beeping sound of the underground public transport doors in Barcelona. In the underground, there is also a pulsing sound to indicate the closing of doors that is combined with intermittent lights placed on top of the doors for those who are hard of hearing or deaf. The sound of the doors is quieter and of a lower pitch than used for the traffic lights, as it only needs to be heard within the vicinity of the doors. Nor does this sound need to be heard above the sound of road works or other disrupting sonic elements more likely to be found on the city streets; although perhaps some level of sound is needed to get through to those who use personal stereos (Bull 2007). Therefore, in this sense, underground train doors have far less intrusive sounds.

What these two examples demonstrate is that in the design of an urban ambiance we need to consider not only the function of sound but also its impact on the listener. Sounds may repel the very people that they are meant to keep safe and secure. For those reliant on sound for navigating the city, what is also needed is consideration of the quality of sound, to recognise that what may be required is a more nuanced use of sound. Loud and piercing sounds on their own can be confusing, as they do not adequately help locate a hearing-dependent individual in space. Indeed, some people with hearing loss do not trust these indicators to ensure safe passage across the street and prefer to always ask other pedestrians for help. These sonic indicators do not add any pleasant sonic aesthetic aspect to the city and push the notion of sound towards noise, for the discomfort and disorientation they make evoke. The sonic ambiance of the city is felt differently through bodily difference, for some producing a sense of anxiety and fear. We need to ask then, to what extend does a sonic indicator achieve its purpose when some users feel it as debilitating?

The following section provides examples that illustrate the main findings from the research. Participants have been given pseudonomys.

**Navigating through sound**

Firstly, sound can be understood as a spatial guide when moving through urban spaces. Rhonda has a degenerative disease that has made her sight fade away since the age of 14. She currently has some residual sight but is legally blind and relies on a combination of her sight, some reliance on hearing, as well as the use of touch (with a white stick to feel surfaces) to navigate through the city. This makes it much harder for her to be able to see during the nighttime, hence at night sound takes on a much more prominent role. This reliance on sound is not limited to nighttime but also when it is generally darker, such as very stormy days or particularly cloudy winter days. In very low light conditions, the city’s sonic ambiance takes on a more central role in navigation.

As many visually impaired individuals do, Rhnoda tends to navigate the city through known routes. These routes are learned with the help of a mediator from the association, who then walks through the route with him or her, indicating the reference points that will help with navigation. Reference points may be haptic (like a change in the street layout, or tactile tiles signaling a bus stop, also parking entrances that constitute a hiatus in the wall path can be a reference, or street sign poles) or they can be an obstacle (stairs, a change in the street level) or a sound (for example, a shop, or any other significant, mostly permanent sound, what Schafer (1968) refers to as monolithic sound marks). Once the routes are learned—which usually means memorizing all the reference points, or for some through counting their steps between each reference—then the user integrates it into their everyday life independently.

Similarly, Bettina talks about the tactility of sound. Bettina is a 10-year-old girl with a strong visual impairment. She lives in a town around Barcelona, in an urban environment small enough to let her be mostly independent in her everyday life routes on foot (taking into account her age). Bettina has learned to feel the space through a mix of the residual vision she has, as well as through sound and the tactile aspects of space. She says that she hears a lot better than her school friends because she needs to pay more attention to the sounds around her. In addition, she also attends to how her voice interacts with the surfaces of the spaces she moves through. She uses the echo of her voice and tactility to “find very clean glass doors” that she would otherwise bump into. She uses echolocation without being aware that it is what she is doing, for her it is “listening to a space” and combining it with “having a hand in front of me in case there is a glass door”.[[8]](#footnote-9)

**Disorienting, emotional, painful**

While these two examples illustrate how sound can be used to navigate space, the other side to this experience is disorienting and emotional. For Rhonda, when night falls, the sounds in the street during any route are distressing if she cannot identify them, regardless of how often she has completed the route. As she explained, it makes her feel vulnerable and unsettled, it shakes her. The urban soundscape brings a sensation of discomfort and dissonance with the environment that makes the participant feel fear because of the difficulty she has in deciphering the sounds and understanding their meaning.

For Bettina, the layering of sound impacts on her body to the point of incapacitation and pain. She talks about how she experiences ‘Santes’, a festival of drumming, music and fireworks which takes place in July in a town close to Barcelona. The drumming, street concerts, and exploding fireworks which are characteristic of the festival disorient her. Bettina says “too much noise for me to process and I can’t do it. I just can’t”, in a small geographical area where the sounds from the festival activities are concentrated, the overload overrides her capacity to render the space through her body, the sound becomes “really uncomfortable … it is very unpleasant and kind of irritates me so much I can’t function”.[[9]](#footnote-10) Sound impacts her body with such an intensity and constancy that it induces her body to, via overload, feel an irritation that verges on pain and inhibits her capacity to perceive space physically and emotionally exhausts her to a point of temporary mental incompetence.

Albert also demonstrates how sound and emotion are interlinked. Albert, a middle-aged man is congenitally blind and has been losing his hearing for many years. He has a cochlear implant in one ear and a hearing aid in the other. His hearing is functional and we were able to have conversations without the help of a mediator (though one is present in case he gets tired and prefers other ways of communicating). Albert remembers hearing a lot better than he does now and does not trust sound even though he has enough residual hearing to be able to live a totally independent life. He does not perceive the everyday sonic ambiance he encounters as a useful tool for orientation purposes. He argues that since he has been losing his hearing, he does not trust what he hears in case it is not really what is going on. He is unsure of the directions of cars and wary of how sound may help him calculate distance. Instead, this sonic ambiance enables a general feel for the surrounding space, catching its geist but not at all useful for orienting himself in place. Indeed, he does not even trust the audible sound that the traffic lights emit when activated with the CyberPass system (López and Nieves 2000).[[10]](#footnote-11)

For those I spoke to rainy days were found to be confusing and distressing. While some people may feel that the rain brings a poetic and relaxing touch to the urban sonic ambiance, for people in this study rain muffles other sounds to the point that distances are no longer audible. The repetitive impact of heavy rain on hard surfaces for an extended period of time overwhelms the city’s sonic ambiance, making it extremely difficult to locate other sounds. This means sound as a form of location is much less reliable. Rain disengages the visually impaired and deaf-blind urban dweller from their aural connections to place. Rain sounds overpower all the rest, they muffle the city leaving a sound residue that is not enough to orientate by and makes them feel even more confused.

The results indicate there are elements in sound that, at times, can be perceived as producing noticeable levels of pain, to the point of making hearing itself painful. When this happens, the rendering of space is made uncomfortable or difficult for users with visual diversity or deaf-blindness. Physically, the intensity of sound can render the body unable to function for a few seconds, not able to process information, overwhelmed by the sheer aggressiveness of sound’s tactility, while in turn affecting the user emotionally through a strong sense of irritation and discomfort that permeates through the whole body. What this study demonstrates is that listening is a practice that encompasses the entirety of the body, from flesh to senses to emotion, and sounds experienced as pain can decrease the capacity to make meaningful sense of space and navigate urban places. Understanding sound and listening in this sense can operate as tools to re-frame our conception and implementation of accessibility in the city and its urban planning (Imrie & Hall 2001; Imrie 2012; Imrie & Luck 2014; Bates 2011; Bates 2014).

**Conclusion**

This chapter has explored some ways in which urban sounds are integral to the daily lives of people with visual and/or auditory diversity. The examples presented examine sound and the impact this can have on perception of space. The results identify that the design of sound for accessibility is problematic. The pulsing sound emitted by the CyberPass System in traffic lights can be a source of discomfort and irritation, creating a sense of confusion about the space itself. Therefore, instead of fulfilling the design’s aim of facilitating the crossing of roads, the CyberPass system creates an irritating sonic cacophony that overloads the aural ambiances and the city resident. It brings a sonic chaos that confuses, troubles and diminishes the participants’ capacity to render space aurally, to orient themselves through sound and the tactile dimensions of the city.

Sounds, such as the one used for the CyberPass system, have an impact on the aural composition of space that transcend a functional use and can produce a sonic ambiance that evokes a strong sense of rejection and discomfort. There is a question around the acoustics of such sounds: is their intended design and meaning correctly delivered? (Suchman 2012). In the context of a collective of diversely functional individuals (like accessibility) the meaning of sounds from the designer’s inception may not be understood and received as intended. For example, the meaning of the Cyberpass system’s sounds was never intended to be received as painful or bothersome. Moreover, what also needs to be considered are the approaches taken by technicians and designers when addressing the full spectrum of urban accessibility. We argue beyond the paradigm of universal design and instead propose a design that enables all bodies inclusively (Imrie 1996; Licht and O’Rourke 2007). Thus, eliminating the “us and them” (Depoy & Gilson 2017) approach, and instead prompt a rethinking of the urban design process as a full body experience that does not discriminate amongst body types and diversities.

Visually diverse and deaf-blind individuals rely on sound and tactility (and indeed the tactility of sound) in and with space in order to identify urban objects (whether they be sensory or other types of bodies). We have seen the importance of this link between sound and its tactility in how participants in this project navigate space. It is part of an accessibility practice that produces aural ambiances and spaces,[[11]](#footnote-12) which uncover a perspective on the urban that in turn highlights the materiality of the sounds themselves. Attending to this can unlock a possible dialogue with the city that will help rethink notions of accessibility for diversely functional individuals, situating the corporeal experience of the urban user at its heart.

This gives food for thought on more than representational approaches to space and place. We have observed in this chapter how the tactile and painful dimensions of sound are important actors in the making of place for diversely functional individuals. These sounds intervene on how people orient themselves in space, their connection to their emotions in and towards the space they navigate, and shapes deeply their relationship to the space they inhabit. Listening is a practice that invites the user to (re)configure the meanings of sound (Berrens 2016; Berrens & Calvet-Mir 2016). Sounds have significant impact upon conceptions of space and the city layout as well as a person’s ability to understand and move through that space. As such, there is a latent interest in attending to the tactility of the aural experience by rethinking listening as a bodily, emotional and, at times painful practice that can be key to enhancing the overall urban experience for diversely functional users.

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Notes

1. (<http://www.once.es/new/que-es-la-ONCE>; [http://www.once.es/new/servicios-epecializados-en-discapacidad-visual/educacion](http://www.once.es/new/servicios-especializados-en-discapacidad-visual/educacion); <http://educacion.once.es/>).
2. [www.b1b2b3.org](http://www.b1b2b3.org)
3. [www.apsocecat.org](http://www.apsocecat.org)
4. B1 denotes people having 10% or less vision, B2 denotes people having anything between an 11 and a 99% vision and B3 are individuals with a 100% vision.
5. ONCE statutes, 8th article <http://www.once.es/new/afiliacion>
6. A sensory mediator is a person that will “translate” the sensory stimuli for the deaf-blind person, usually through haptic sign language.
7. With regards to the amount of work that mediators can do, there is currently an ongoing debate with the “Law of Dependency” that is meant to provide help for families to cover costs related to enhancing independent living in individuals with disability, since the allowance either proves too thin to really be a help or it is not granted (<http://www.ara.cat/premium/societat/llei-dependencia-caiguda-lliure_0_1127887276.html>; <http://treballiaferssocials.gencat.cat/ca/ambits_tematics/persones_amb_dependencia/ajuts_i_prestacions_economiques/> -29-08).
8. This is a system implemented in Barcelona and activated by a small Bluetooth remote that ONCE can provide to blind individuals over the age of 12 (Participant 4 interview extracts). The remote can activate a sonic alarm from traffic lights that emits a loud repetitive beeping sound to signal a green crossing light for pedestrians, thus making sure that visually impaired and some hard of hearing (but not totally deaf) people will be able to hear it and cross safely. The remote can also be used to activate recorded information about bus numbers and routes at bus stands.
9. Sonotopias (García 2005)

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1. [↑](#footnote-ref-2)
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