

HEADPHONE LISTENING

SPACE, EMBODIMENT, MATERIALITY

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the requirements for the degree of*

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by

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.....

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In loving memory of

PATRICIA ROSE THOMAS
NÉE KINGSBURY

(1931-2020)

*who 'always wanted
a doctor in the family'.*



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ABSTRACT



In this thesis, I adopt an empirically driven phenomenological approach to study the perceptual experiences of contemporary headphone users, analysing data collected through interviews with an array of listeners to crystallize novel conceptual models. While existing headphone-listening research has attended more precisely to sociological concerns, the project of the thesis is to engage in greater depth with the perceptual-phenomenological realities of such practices and their philosophical, cultural, and aesthetic consequences, drawing especially from Maurice Merleau-Ponty's embodied phenomenology of perception to do so. I ask a series of research questions that probe various facets of headphone listening, all of which are constructed in the light of three relationally conceived themes: space, embodiment, and materiality. First (Chapter 2), I investigate the perceived spatial location of headphone sound in relation to the body, interrogating certain issues surrounding the phenomenology of in-head sound localization to theorize the notion of sonic *floodings*. Second (Chapter 3), I account for the intimacy of listening to mediated voices through headphones, examining how the body of the voice is perceived in spatial terms to conceive of the *intercorporeal incorporation* of virtual bodies during headphone listening. Third (Chapter 4), I move to the edges of the body, investigating how the materiality of headphone technologies can enter into a listener's awareness over time as a *fleshly* extension of the listening body. Fourth (Chapter 5), I query the received portrait of headphone listening as an intrinsically anti-social practice by attending to the *interpenetrations* of the 'interior' and 'exterior' lifeworlds of the headphone user. The result is an account of headphone listening that aims to challenge, nuance, and extend prevailing scholarly accounts, one structured as an embodied-spatial trajectory that blossoms outwards from the perceived interior of the lived body through the skin towards the wider intersubjective lifeworld.

DECLARATIONS



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NOTES ON FORMATTING



The thesis is formatted in the style of a booklet to be printed double-sided. It uses Harvard referencing, meaning that citations are in-text and figured in round brackets. Footnotes are used solely to provide relevant information that is deemed ancillary to the thrust of the main prose text.

In-text references include the year in which a source was published wherever possible. The use of ‘n.d.’ (‘no date’) indicates a source whose year of publication could not be ascertained, and the same applies to the use of ‘n.p.’ (‘no page’) in lieu of pagination. Sources without a named author are listed in the main bibliography in alphabetical order according to their title. For any sources that are republications (for example, translations of texts originally published in a different language), the original year of the source’s publication is included in the bibliography in square brackets wherever possible. This original year of publication is not always included in in-text citations.

When reproducing quotations from published materials, I indent passages that exceed forty words in length. However, when citing primary interview data directly, I always indent quotations regardless of length.

During direct quotations from transcribed speech, I occasionally use square brackets to enclose sections of text inserted to improve the reader’s comprehension of a statement. However, I also use square brackets to enclose important nonverbal (such as gestural) and paralinguistic information. In such cases, I indicate the difference between inserted text and transliterated nonverbals by figuring the latter in *italics*.

Ellipses are used in two ways during quoted materials. First, and most commonly, they are used to indicate that certain words or passages have been excluded from direct quotations. In such instances, there are always square brackets around the ellipsis. Second, in quoted interview materials, ellipses are sometimes also used to indicate that a participant trailed off, leaving the sentence unfinished. In these cases, there are never brackets.

When directing the reader to other parts of the thesis, I use a silcrow (§) followed by the section number(s) (e.g. ‘§ 1.1’, ‘§§ 1.1–1.2’). If the passage is in a separate chapter, this is also indicated in the text (e.g. ‘Chapter 1, § 1.1’).

1

INTRODUCTION



‘Sounds go through muscles.
These abstract, wordless movements:
They start off as cells that haven’t been touched before;
These cells are virgins. [...]’
I don’t recognize myself. This is very interesting.’

— **BJÖRK**
(from ‘Headphones’,
in *Post 1995*)¹

1.1 CONNECT

What is it like to experience the world within and through headphones? For seasoned headphone users, asking oneself such a question might feel more than a little artificial. As an everyday practice, headphone listening is often something that happens habitually and unthinkingly as part of routines at work or at play, often with a specific, if implicit, goal in mind: for example, to listen to music while travelling without disturbing others (Heye and Lamont 2010; Sloboda et al. 2009), filling the time between leaving home and arriving at a destination with chosen sounds (Thibaud 2003); or to block out the sounds of coworkers in a shared office environment and to maintain focus on the task at hand (Dibben and Haake 2013). Such functional uses, which are well documented in the psychological and sociological literatures devoted to mobile music listening, enable us to understand headphones and the sounds they relay as providing specific task- and behaviour-oriented solutions to everyday problems. They act as ‘tools’ allowing individuals to ‘regulate’ (DeNora 2000) certain facets of their engagement with the socio-sonic environment, such as through clearing out ‘space’ for themselves in busy public

¹ In a 1995 interview with John Savage, Björk explains the genesis of the track ‘Headphones’: ‘[Y]ou go to bed and take your Walkman and put you headphones on and you fall asleep. [...] I had this idea to do a song that is like a worship of headphones. [...] All the noises in the song are just-for-headphones stereo tricks’ (Björk, reprinted in ‘Big time astrology’ 2011: n.p.).

milieux (Bull 2000, 2007; DeNora 2013: 63–78) through the production of sonic ‘walls’ (Herbert 2011: 96) between ears and wider world. But more than this, existing accounts show that a set of headphones can provide an unobtrusive means to an end. Provided they function properly, they largely go unnoticed, acting more as a *medium* for self-selected audio than as a material *object* of perceptual experience, as with any technology (Heidegger 1962: 98; Latour 1999: 304). On this account, to think too far beyond headphones’ status as a phenomenologically ‘transparent’ medium, one that recedes into the background of experience, might be to think too much.

The received scholarly portrait of headphone listening might lead us to conclude that a function-oriented understanding of the practice is sufficiently cohesive. Reviewing the uses to which headphones are put in day-to-day life enables us to bring technologies to the fore when accounting for sound’s role in everyday practices, highlighting how sound technologies can help to mediate our negotiations of the world. But as with any musical or sonic practice, there is more to our experience of these phenomena than meets the reflective ear. As Ruth Herbert argues, a cohesive study of musical experience must involve close attention to dimensions ‘that the perceiver may or may not be aware of’ during listening (Herbert 2011: 49). This can be a challenge: when asked about their experiences, a listener may be more likely to attend to issues of use, function, and context than to specific characteristics of their (pre-reflective) experiences. From a scholarly perspective, the ready availability of reflective awareness means that it is ‘far easier [...] to chart the *function* of music in everyday life [...] than tap the subjective moment-by-moment “feel” of individual music listening experiences as they unfold’ (Herbert 2011: 8; original emphasis)—a possible reason, argues Herbert, that the literature on music listening has more often than not ‘tended to focus on function (music as resource used to regulate behaviour and mood) rather than a detailed account of experience itself’ (2). In other words, while attention to function must form a central part of any study probing the relations between people, technologies, and the world, it cannot answer every question pertaining to experience.

It could be said that a number of headphone users with whom I spoke during the course of this research project thought in a similar vein to the imagined headphone users introduced above. Such interlocutors were comfortable when discussing the contexts and functions of their normative headphone use, sharing stories about preferred routes to work and noisy office colleagues with limited social etiquette. To offer a brief example, one interviewee, Charles (‘C’),

appeared to find it easier to list the life events alongside which his headphones travelled with him than to describe his experiences of using them to me ('J'):

- J: Would you use the headphones to listen to radio and music while you were doing other tasks? And if so, what sort of things?
- C: Painting the other day, walking the dog, just pottering around the kitchen.
- J: And when you're listening to sound over them, and you're using both of your ears, how close or far away do you hear the sound as being in relation to you?
- C: [pause] Well, close.
- J: Where would you locate it, if you had to?
- C: How do you mean?
- J: In relation to your body. If you had to shut your eyes, and you were listening to Coldplay or whatever through your headphones, where would you hear that sound as being located?
- C: [long pause] Well, in my head? [laughs] [...] Well, I mean, I don't know where else it would be! [laughs] I suppose it's like it's around you, in that respect. Because it's in your head, there's no other sound around you.

Charles seemed a little puzzled by my later questions. While he was able to list situations in which he used his headphones without an issue, he appeared to have more difficulty in responding to my questions about his spatial experience of headphone sound. We might interpret this as an example of how functions of use are easier to chart than the details of experience, both for interviewee and interviewer; or perhaps that the question of perceived location appeared unimportant, trivial, or strange to Charles when compared with more concrete information about contexts of use. An alternative, though related, interpretation of Charles's response could be that his apparent struggle with my question about the location of the perceived sound arose by virtue of how pre-reflectively certain he was of his answer—that he could not conceive of 'where else it would be' other than in his head, and perhaps that he felt it was such an obvious point to make that it seemed broadly inconsequential to mention. On this account, it was perhaps not that he had difficulty explaining or reflecting on his experience, but that the experience was so pre-reflectively clear in its perceptual reality for him that it seemed unnecessary to describe at all.

Yet despite acknowledging the potential difficulty or unwillingness that Charles appeared to exhibit, in drawing our analytical gaze away from the nature of his response closer to the substance of Charles's experience, we encounter some intriguing details. Charles suggested that the sound relayed by his headphones—or, put more simply, the 'headphone sound'—appeared *in his head*. More than this, Charles experienced sound as both 'in' his head *and* 'like it [was] around' him. The headphones in turn produced a sense for him in which there was

‘no other sound around’ him. What consequences do such perceptions have for Charles, and how might we best make sense of them?

What begins to surface through this closer analysis of the phenomenological characteristics of Charles’s experience is a deeper, more complex view of headphone listening than one bent wholly towards function and use. Clearly, in Charles’s account, function plays an important part—but so too do the more specific sonic-perceptual peculiarities that emerge. To an extent, others have accounted for such phenomena in existing work—for example, the agenda-setting work of Michael Bull (e.g. 2000, 2007), in which the notion of a headphone ‘bubble’ is theorized to describe how the listening ‘space’ of headphone presentation is a sealed sonic environment that extricates a listener from (the sounds of) the wider social world. In this way, the suggestion that such sound technologies perform important roles in our experiences of both sonic and non-sonic phenomena is hardly new; as Tom Rice writes, it is well known that listening practices are profoundly ‘shaped by technologies and their interfaces and affordances, which have extended the reach of listening and multiplied its possibilities’ (Rice 2015: 102). However, a phenomenological philosophy of headphone listening—one that, like Bull’s accounts, is empirically driven—is currently lacking in the available literature. In particular, an account that privileges attention to the impacts of headphone listening on listeners’ experiences of embodied space and its phenomenological consequences is as yet absent from the discourse.

Other writers, such as Gascia Ouzounian (2006, 2008, 2013, 2021), Peter Petralia (2010), and Charles Stankieveh (2007) have begun to account for the relationship between the spatial realities of sound and of the body during headphone listening. Focusing on aesthetic objects and practices designed specifically for headphone presentation, these writers explore curious dimensions of listening experiences in which, as my interviewee Charles reported, sound appears *inside the head*. For Ouzounian, sound art works designed specifically for headphones can ‘directly challenge the body’s habits of perceiving itself, its tendencies to imagine itself in static and pre-conceived ways’ (Ouzounian 2006: 77), suggesting that headphone sound can transform a listener’s experiences of their own body: ‘It is difficult to relate to the uninitiated listener how unsettling it can be to perceive your own head as an architectural space that has particular definite dimensions, reflective qualities and resonant properties’ (Ouzounian 2006: 77).

Through engaging with accounts such as Ouzounian’s, I became curious about the peculiarities of headphone listening. I began to think deeply about my own experiences of using headphones, focusing less on the reasons, functions, and

contexts of my listening and more on the minute details of the experiences I was having, asking questions as I listened (*From where does sound appear to emanate for the headphone listener, and what is the relationship between the sound's spatiality and that which is perceived to be inhabited by the listening body?*). When listening to popular music featuring prominent singing voices, I thought more about the ideas of sonic 'intimacy' that have been posited by writers such as Nicola Dibben (e.g. 2009a, 2013) and how these phenomenological qualities might be influenced or exacerbated by headphone presentation (*What is the perceived relationship between a headphone listener and an acousmatic voice, understood as a voice heard without the physical presence of its source-body?*). I also noticed that standard headphone models are necessarily attached to the body, either slotted inside the ear's opening or pushed against the head. I thought more about the idea that humans and technologies are related to each other (*Given the necessary tactile contact between body and technology during headphone listening, what kind of 'relationship' do listeners feel they have with their headphones, and how does this human-sound-technological contact impact individuals' experiences of their own condition as embodied subjects 'bounded' by the skin?*). And as I began to read existing work on the subject of headphone listening, I noticed a common theme: that headphones produce a 'hermetic seal' (Bull 2000, 2007) for listeners, meaning that they are divorced from the wider social and perceptual environment during listening. But as I read Bull's work while wearing my headphones on the London Underground, reading his participants' intriguing accounts of the interplay between the sonic 'world' within their headphones and the wider environment, I noticed that the extremely loud sounds of the Tube train passing through London's underbelly were penetrating through the boundaries I had attempted to set up between my ears and the extraneous noise. In light of my experience, I began to question whether Bull's account was the whole truth. Reading others' accounts of mobile music listening (e.g. Beer 2007; Bickford 2017; Dibben and Haake 2013; Herbert 2011; Heye and Lamont 2010; Prior 2014; Thibaud 2003; Trotta 2020; Watson and Drakeford-Allen 2016), in which researchers find that the wider environment 'enters into' listeners' experiences during headphone use in often quite marked ways, I found that—despite Bull's compelling, expertly conducted research—there was indeed some evidence to the contrary. Was the hermetic seal of headphone listening a totalizing truism, or was there more nuance to be found? Asking more questions than I could answer (*What characterizes a headphone listener's embodied relationship to their wider social and perceptual environment, and is headphone listening really as 'anti-social' a practice as others have suggested?*), I decided that rather than

speculate further, I would seek to find out the answers to these four questions myself. And so this project began.

My focus throughout this thesis is firmly locked onto the granular detail of individuals' mediated perceptual experiences during headphone listening. While a significant amount of research conducted on the subject of headphone use has probed questions pertaining to the cultural significance and wider societal impact of mobile, public, recreational listening practices involving personal audio technologies, far less has been done to document and analyse the phenomenological detail of listening experiences, especially by empirical means. Moreover, where the data is available, there has as yet been no deep, extended engagement with the philosophical consequences of headphone listening, especially in relation to the broader discipline of phenomenology, whose tools for the study of lived experience are rich and extensive. Identifying a number of related lacunae in the literature, I engage with three deeply related phenomenological themes pertaining to headphone listening: space, embodiment, and materiality.

This introductory chapter can be read as a composite of three major sections, respectively (1) a critical review of existing approaches to the study of headphone listening and spatial experience in music and sound studies (§§ 1.2–1.3); (2) the suggestion of an alternative methodology that draws yet diverges from previous studies, together with an introduction to the theoretical basis underpinning such an approach (§§ 1.4–1.5); and (3) an account of the research project's design and scope, both in terms of the empirical work conducted and the structure of the thesis as a whole (§§ 1.6–1.7).

1.2 HEADPHONES

I use the term 'headphones' throughout the thesis to refer to all types of everyday-use, head-mounted sound technologies whose most common function is to relay pre-recorded or broadcast audio directly to the ears and head (see Blauert 1983: 31).² Circum- and supra-aural (over- and on-ear) headphones both comprise two receivers ('cans') connected by a tensile, often adjustable band that usually adheres to the top of a listener's head. For circumaural headphones, the round cushions

² This category does not include technologies such as hearing aids, whose function is more specifically to amplify and enhance external environmental cues for Deaf and hard-of-hearing individuals. That said, some headphones *do* electronically relay sounds from the environment *as well as* pre-recorded or broadcast sound; and, for that matter, so too can some hearing aids relay pre-recorded or broadcast audio via technologies such as Bluetooth (see Mecklenburger and Groth 2016: 141, 146). However, in broader terms, these are less common technological features.

fixed to each receiver surround the ear, while supra-aural headphones press directly against the pinnae ('earflaps'). Intra-aural headphones (in-ear or 'ear-fitting' designs) are more intimately connected with the body, as they are designed to sit in the ears' apertures. Some models, such as the 'earbud' formats sold by Apple, rest at the meatus and require little pressure to sit in place, while others must be propelled into the opening of the canal to sit tightly therein. What is crystallized in the design of all headphones is a desire to keep the technology in place with ease and without manual support while maintaining a consistent level of comfort for listeners. While in common parlance the term 'headphones' is often used to describe on- and over-ear models and 'earphones' or 'earbuds' to refer to in-ear designs, I use 'headphones' as an umbrella term to refer to all of these designs. While I am to some extent interested in how listeners experience the differences between these types (see especially Chapter 4), I am also concerned with foregrounding certain phenomenological commonalities between experiences of these sub-categories of headphone design.

Some headphones also incorporate more advanced technologies to enhance certain functionalities. While a mediating cable traditionally links a set of headphones with an audio-relaying device such as a hi-fi stereo or mobile audio technology, over recent years there has been an increased interest in wireless technologies which use Bluetooth connectivity to link to a central audio device. Also prevalent in contemporary markets are so-called 'noise-cancellation' technologies, which improve the degree to which extraneous, environmental sounds are attenuated for headphone users. As Mack Hagood explains, noise-cancelling headphones function due to the inclusion of 'tiny microphones and signal processing to produce an out-of-phase copy of the aural environment in an attempt to negate its phenomenological existence' (Hagood 2011: 573).

Why headphones? For one, these personal audio technologies are now ubiquitous across the world. A recent report analysing recent and forecasted trends in the global market for headphone technologies valued the current market size at \$25.1 billion (GVR 2020). In addition, existing evidence shows that headphones can have a profound impact on worldly experience, suggesting that they afford rich, complex experiences for listeners. Writing of the multisensory condition of worldly experience, the philosopher and pioneering phenomenologist of sound Don Ihde pauses to consider how headphone technologies represent a curious example of an everyday technology:

Here the auditory dimension, which can be quite dramatic and often with high volume, *does not synthesize or coordinate with our other sensory dimensions*. In terms of a sensory gestalt, earbud listening is more *disjunctive*. It ‘calls attention’ to itself. The listener gets ‘into’ the music. One could say this phenomenon is one whereby the mediation is more an *insulation* (although not a total separation from) [*sic*] our ordinary whole body perception. [...] E]arbud experience can be anything from insulation to distraction, to even greater absorption with the auditory. [...] Technically, earbud technology is not multimedia, but it changes an entire environment and is thus an important variant in this context. (Ihde 2016: 98–99; original emphasis)

Other writers suggest that headphone listening involves a particular perception of sound as an all-compassing spatial experience of being ‘surrounded by sound, embedded in media experience’ (Behrendt 2012: 292). As adduced above, there appear to be a number of interesting dimensions that commingle in headphone listening.

A brief historical gloss will provide context to the current headphone-saturated world in which we live during the twenty-first century. Jonathan Sterne provides a cohesive epistemological and technological history of the cultural ambitions and tropes underpinning the emergence of headphone technologies in the late nineteenth century. Forging a link to the advent of the stereophonic stethoscope in the early nineteenth century (Sterne 2003: 90, 107; see also Stankievecch 2007), Sterne argues that ‘the headset supplements and crystallizes an orientation to listening’ predicated on a century of listening’s coupling with ‘newly emergent notions of science and rationality through its use in doctors’ medical examinations of patients’ (89). For Sterne, ‘[t]echnologies are repeatable social, cultural, and material processes crystallized into mechanisms’ (8) and as such reveal a great deal about the human ambitions underpinning their design. In this way, Sterne’s account asks us to avoid arguments pertaining to a technological ‘determinism’ in which technologies are the agentic drivers of social and cultural change, instead showing that human desires, ideologies, and techniques are at the heart of technological and societal change (92). For Sterne, headphones represent the crystallization of ‘a concrete set of limited and related practices of listening and practical orientations toward listening’ that he terms *audile technique*, an epistemological perspective on listening and audition predicated on the privatization and professionalization of hearing—of hearing as a *rational*, scientific sensory modality (90). Sterne explains that ‘audile technique is oriented toward a faculty of hearing that is separated from the other senses. Once so separated, it can be intensified, focused, and reconstructed’ (93). As Rebecca Tuhus-Dubrow suggests, the appearance of headphones in the late nineteenth century was therefore for work-oriented purposes: they ‘were originally used only

by professionals such as telephone operators and military pilots' (Tuhus-Dubrow 2017: 17). Attention has been paid by other historical researchers working in the field of sound studies to 'proto-headphone' technologies, as Ouzounian (2021: 178n3) has termed them, including the late-nineteenth-century emergence of the théâtrophone (van Drie 2015) and Bell Laboratories' stereophonic 'head receivers' in the 1930s (Ouzounian 2021: 61–82).

As compelling and rich as historical considerations of headphone technologies and their developments are, my focus here is on headphone-listening *experiences*. Sterne argues that while recordings and technologies may afford insight into an *audible* past, 'we can do no more than presume the existence of an *auditory* past' (Sterne 2003: 19; added emphasis). In this way, my approach necessarily prioritizes contemporary accounts of headphone listening.

1.3 EXPERIENCE

The advent of the Sony Walkman in 1979 marked a notable cultural shift. At the time, mobile headphone 'devices were new enough and unusual enough that wearers would acknowledge one another on the street with a smile or a nod or by tipping their headphones at each other' (Tuhus-Dubrow 2017: 44). Since then, a modest but rich collection of studies has surfaced probing the experience of headphone-mediated mobile music listening. Some have focused more on developing critical, historical, and media-theoretical analyses of such cultural phenomena (e.g. du Gay, Hall, Janes, Mackay, and Negus 1997; Everett 2014; Gopinath and Stanyek 2013; Hagood 2011, 2019; Hosokawa 1984; Weber 2010), others on collecting first-person empirical data as a means of understanding more about lived practices (e.g. Bickford 2017; Dibben and Haake 2013; Heye and Lamont 2010; Prior 2014; Schönhammer 1988, 1989; Skånland 2011), and others still on a mixture of both methods, using ethnographic data to draw out broader sociological conclusions (Bull 2000, 2007; Thibaud 1992, 2003). Despite methodological differences, many such studies have argued that individuals experience the 'space' of headphone listening as a kind of 'bubble', suggestive of the ways in which one's personal listening space is 'bounded' during headphone listening.

Within sound studies, the model of the headphone bubble is most closely associated with Bull's (2000, 2007) pioneering work on mobile musical experience, representing a useful theoretical heuristic for those engaging with the phenomenology of headphone listening. Bull analyses listeners' descriptions of using head-

phones to ‘clear’ a ‘predictable and secure’ space (Bull 2007: 31), with sound acting to frame the world as ‘intimate, known and possessed’ (21) and to structure time ‘into a seamless web of controlled sound and space’ (3). In defining the auditory bubble, Bull cites the ‘enveloping acoustics’ of headphone listening as constitutive of such experiences of spatial control (3), using the model to explore how the widespread instrumentalization of headphones’ ‘isolating’ affordances may represent a shift toward the prioritization of privatized experience in shared urban space (see also Hagood 2011, 2019; Jordan 2017). His work therefore reveals much about the complex ways in which individuals perceive both mediated sound and the wider environment when using headphones.

There can be little doubt that Bull’s agenda-setting work on the sociology of personal stereo use represents the most influential corpus of scholarship on urban headphone listening. The result of large-scale interview and survey studies with diverse recreational listeners, Bull’s work sets the agenda for unpacking the social and perceptual rationales underpinning personal-stereo use, especially those pertaining to the practice’s provision of mobile ‘soundtracks’ for Western listeners living in urban contexts and the resulting mediated ‘aestheticization’ of everyday experience. However, there are certain aspects of Bull’s bubble model that may benefit from further nuance in terms of the phenomenology of auditory perception. For example, the exact ‘location’ of the headphone bubble’s boundaries and its interior space is broadly unclear in his analyses, especially in terms of its relation to bodily space. Moreover, as adduced above, Bull regularly describes the bubble as ‘hermetically sealed’ (e.g. Bull 2000: 192; 2007: 15), which appears to suggest that headphones can extricate listeners from the wider environment by eliminating all sonic interpenetration—a suggestion that is at odds with the perceptual permeability of the ‘headphone-space’ reported in other studies (e.g. Heye and Lamont 2010; Prior 2014; Thibaud 2003). Lastly, while Bull’s analyses of urban headphone listening are rich in their consideration of how personal stereos enable listeners to ‘bridge’ the space between the (private) home and the (public) urban milieu by providing ‘aural mnemonics’ that can connect listeners to significant, comforting memories of life at home (e.g. Bull 2000: 24; see also Thibaud 1992, 2003) as well as in their accounting for the ‘enveloping acoustics’ of headphone listening as a means of bracketing off and controlling auditory experience, there is room for further detail regarding how the territorializing affordances of headphones are experienced in complex affective and perceptual terms, especially in relation to ideas of being ‘nested’ (Born 2013;

Smalley 2007) in public space and of headphones providing a means of ‘refurnishing’ (DeNora 2013) a listener’s perceived bodily space.

I engage in depth with many of Bull’s extensive insights throughout the main body of the thesis, including his Adornian analysis of the ‘mediated “w-ness”’ (Bull 2000, 2007) of mobile music listening (see Chapter 3, § 3.2) and the influential model of the auditory bubble that pervades his oeuvre and its interpretations and developments (see Chapter 5, § 5.2, § 5.5). For the purposes of the present introductory chapter, I narrow my focus to the broader methodological decisions underpinning Bull’s work, both as a means of identifying his important contributions to the discourse and as a way of foregrounding certain lacunae left in the wake of his perspective and how the approach I adopt here differs from his in certain notable ways.

Like others (see, e.g. Hagood 2011, 2019; Jordan 2017), Bull interprets the media-saturated culture of mobile headphone listening as a world ‘in which the privatizing impulse in Western culture has come to a state of maturity’ (Bull 2011: 1516). His account is classically dialectical: he holds the ‘positive’ aspects of headphone use—as a mediated practice of cognitive, emotional, and socio-spatial regulation—in tension with the necessarily individuating effects of delimiting a listener’s auditory horizon in shared public spaces (see also Everett 2014: 5–12). Other empirical work supports the dialectical tension apparent in Bull’s accounts (Simun 2009).

Bull’s is a theoretical gaze heavily indebted to the Frankfurt School’s critical-Marxist approach, which enables him to offer striking, often compelling critiques of the technological atomization of millennial British society. He analyses interview data in a characteristic, esoteric manner to arrive at broad sociological conclusions regarding the experiences reported by his interviewees. Take the following example from *Sounding Out the City* (Bull 2000), which I regard as broadly representative of the kind of analysis that Bull favours throughout the book:³

I think it creates a sense of kind of aura. [...] Even though it’s directly in your ears you feel like it’s all around your head [...]. I find it quite weird watching things that you normally associate certain sounds with. [...] W]hen you’ve got a Walkman on you don’t hear any of those. You’ve got your own soundtrack. You see them and it looks like they’re moving differently because you’ve got a rhythm in your head. [...] (Karin: interview number 18)

³ Bull’s primary data from interviewee Karin is included first, with the writer’s analysis beneath. For the sake of space, I truncate the primary data here; Bull includes a longer quotation. However, the cited analysis is the full extent of the writer’s direct engagement with the data.

In this example the users [sic] ‘horizon’ of experience is described auratically whereby representational space is transformed into ‘spectacle’. This aestheticization of experience may well represent a monumentalization of experience in which experiential contingency is negated. (Bull 2000: 22)

Despite a powerful sociological critique being embedded in his mode of analysis, Bull does not attempt to engage with certain illuminating aspects of the interview quotation. For example, what constitutes the ‘sense of kind of aura’ that the listener reports? It appears, at least in part, related to her experience of sound as ‘directly in your ears [yet] you feel like it’s all around your head’—a rich and complex experience in phenomenological terms, one that treads a line between the pre-reflective ‘appearance’ of sound as ‘all around’ and the conscious, reflective awareness that the sound comes ‘directly in your ears’ from the technology. By prioritizing more directly perceptual-phenomenological facets of listeners’ experiential reports, then, there appears to be the potential for a complementary approach to data analysis, one that foregrounds the detail of perceptual experience.

What we see across the corpus of studies probing mobile headphone listening is a mixed reception of the practice. Headphones represent inherently controversial objects in music, sound, and media studies, ‘on the one hand acting as technologies of self’ (Bergh et al. 2014: 317), meaning that—to borrow Marie Skånland’s expression—headphones can act as ‘a positive life resource’ for their self-regulatory affordances (Skånland 2011: 16; see also DeNora 2000, 2013) for many listeners; and, on the other, ‘exacerbating social isolation and disconnection from the real-time social environment’ (Bergh et al. 2014: 317). But while much scholarly work devoted to headphone use has focused on the functions and uses of headphones for self-regulation or the apparent extrication of listeners from their wider auditory environments, far less has considered the nature of sonic ‘interiority’ that may result from their use or its effects on experiences of embodiment, space, and materiality.

One possible route into these issues pertaining to sound and space is a psychological approach. A number of musicologists working from psychological principles (e.g. E.F. Clarke 2005, 2007, 2013, 2017; Dibben 2001, 2013, 2017; Gamble 2019; A.F. Moore et al. 2011) have employed the insights of psychological research into auditory spatial perception to describe, analyse, and—to a lesser extent (e.g. Dibben 2013)—critique musico-spatial practices through a so-called *ecological* perspective. Drawn from the pioneering work of James Gibson (1966,

1979), ecological perceptual theory posits that perceiver and environment are locked into a mutual and reciprocal relationship in which the environment offers certain *affordances* to a perceiver—that is, action possibilities relating directly to a perceiver’s perceptions of environmental phenomena. In this way, ecological theory critically reduces the separation of subject and object (perceiver and environment) that is often associated with cognitivist theories of perception.

Thinking explicitly in terms of auditory space, a number of factors are important in enabling us to access the affordances of a sonic environment (E.F. Clarke 2013; Downs 2016):

- *Direction*: As the ears are set on either side of the head, they broadly correspond to left and right. The auditory system is very finely calibrated and can detect slight differences between the ears: inter-aural variances in a sound’s intensity (loudness) and the time taken to reach the ear are clear indicators of a sound’s directional location, as are—to a lesser extent—differences in its perceived spectral composition (that is, the weighting of upper ‘partials’ that affect the perceived timbre of the sound). Also, the pinnae have intricate structures that reflect or absorb sound as it travels towards the ear canal, thereby specifying—with limited acuity—the ‘up/down’ and ‘front/behind’ locations of sounds.
- *Distance*: Sound intensity plays an important role in distance perception, though this factor alone is not sufficient in all instances. The perceiver must also take into account other aspects of the sound, such as its spectral content: higher frequencies, for example, are absorbed to a greater degree by air and other intermediate obstacles than lower frequencies. In addition, the ratio of signal-to-reflection is demonstrative of distance: if a greater amount of echo or reverberation is heard than the original sound, this often specifies a source that is further away.
- *Capacity*: Echo and reverberation play an important role in determining the volume of a space: a long reverberation tends to imply a larger space, and a dry sound usually specifies a smaller one. Other factors also contribute, such as the material with which the space is constructed and how absorbent it is.
- *Density*: The degree to which a space is auditorily perceived as densely populated depends in part upon the number of different sound sources that can be heard. More precisely, and depending on how absorbent the materials within the space are, this can be judged by perceiving the amount of sound reflected off of other bodies—for example, a space could be very full but only have one active sound source, thus the sound would be audibly absorbed by other objects.

Using these psychological insights in tandem with theories drawn from social psychology to produce analyses of popular music tracks, writers argue that the spatial affordances of virtual sonic environments are experienced in a powerfully embodied way. In some sense, what these approaches achieve is an analytical heuristic based on the principles of ecological perception: they consider specific popular song recordings in terms of their acoustic attributes, identifying how the human auditory system perceives spatial cues in the environment and considering how evolutionary psychology can enable us to interpret an ecological hermeneutics of music.

However, while often cautious to avoid prescriptive accounts, such accounts often fall short of a fully ‘ecological’ account of listening, as they rely on an abstracted auditory gaze that is separate from an actual perceiver, albeit deriving their analyses in part from their own experience. I would suggest that one reason for this ‘abstraction’ from the ecologically valid conditions of listening is a lack of attention to the specific sonic-spatial *form* of certain technologies—with headphones, for example, the interiorizing reterritorialization of sound. The attempt to make a science of music listening is commendable, but despite its best ecological intentions, technology-mediated ‘situations’ of experience are often lacking from such analytical work (but see A.F. Moore et al. 2011: 87–88).

What could a technology-focused perspective on sonic- and musico-spatial experience offer? Consider my research ambition in relation to the ecological approach to music perception adumbrated above. Eric Clarke (E.F. Clarke 2005: 126–155), for example, is keen to argue that the modernist aesthetic model of music as ‘autonomous’—of music as somehow ‘separate’ or on another ‘plane’ to other sounds heard in the environment in terms of both its hermeneutical and ontological status (see also Paddison 2021)—appears logically untenable in light of ecological theories of perception. Instead, we must understand musical sound as *immanent* within the wider environment, its spatiality perceived by us using the same perceptual frameworks that we use to monitor the spatial characteristics of non-musical sounds. To do this, I argue we should consider not only the ‘ecological’ characteristics of sonic *content* but also how the sonic *form* of an audio ‘text’ is perceived when mediated by specific technologies. What, for example, is the specific effect of listening to a spatially ‘intimate singing voice’ (Dibben 2013) over headphones, when the sound might appear to be situated *inside the head* of a listener (see § 1.1 above)? In asking such questions, we may begin to see the potential of what Georgina Born (2013) has termed a *post-formalist* approach to

musico- and sonic-spatial experience, one that considers not only the *content* of musical texts but the *situations* and *mediums* through which it is relayed. To quote from Ola Stockfelt, ‘daily listening is often *more conditioned by the situation in which one meets the music than by the music itself*’ (Stockfelt 2004: 133; original emphasis), and a perspective that draws the insights of ecological approaches to musical perception and meaning together with a closer engagement with the specific affordances of a particular technological medium might therefore provide a more cohesive, ‘ecologically valid’ account of listening experience.

1.4 PHENOMENOLOGY

While psychological approaches to musical and sonic experience are compelling for their ability to bring scientific evidence into more ‘aesthetic’ domains, they are often inherently more concerned with issues of (psychological or neurophysiological) *causation* than with a deep consideration of philosophical issues that arise from such experiences. To fill such a lacuna, this thesis blends insights from music and sound studies with influential philosophical concepts derived from the broad field of phenomenology. From its emergence in the work of Edmund Husserl (e.g. 1982 [1913]) at the turn of the twentieth century, through that of his student Martin Heidegger (e.g. 1962 [1927]), towards its reception and development in the work of those associated with French existentialism including Jean-Paul Sartre (e.g. 2003 [1943]), Maurice Merleau-Ponty (e.g. 2012 [1945]), Simone de Beauvoir (e.g. 1997 [1949]), and Emmanuel Levinas (e.g. 1969 [1961]), the philosophical branch of phenomenology developed rapidly throughout the first half of the twentieth century into a vast conceptual framework probing the structures of experience. Since then, phenomenology has been developed, reshaped, and critiqued by a host of philosophers and interdisciplinary scholars, finding its way into all manner of debates and fields of study.

Phenomenologists study the structures and dimensions of experience and existence through the lens of lived reality as opposed to abstract metaphysics (classical ‘idealism’) or scientific positivism (classical ‘empiricism’). That said, phenomenology often takes influence from work in psychological science, from its earliest forms in Husserl’s transcendental philosophy derived—though markedly different—from Franz Brentano’s (1995 [1874]) descriptive psychology (Husserl 1982; see also Fissette 2018; Moran 2000: 23–59, 68–71) to later incarnations, such as in the work of Merleau-Ponty, that draw from the principles of Gestalt psychology and thereby demonstrate that ‘science and phenomenology are

“continuous” (Romdenh-Romluc 2018: 342), as opposed to necessarily conflicting, approaches (see also Cerbone 2012). However, phenomenology does not share psychology’s need to clutch at causal attribution. When phenomenologists of perception describe studying the ‘structures’ of experience, it is not the science of the causal frameworks underpinning perception that concern them (neurophysiological systems, psychological mechanisms, etc.) but rather the detail of how objects of perception *appear* to us. In other words, phenomenology is concerned more with the *what* than the *how* of experience. It requires critical reflection on the *form* and *content* of experience (on what is ‘given’ to us) without finding itself overwhelmed with concern for the *causes* of such an experience (with how our perceptual systems afford us access to the world, or how the world ‘got here’ to begin with).

To offer a concrete example, David Cerbone asks us to consider the benefits of leaving questions of causation and epistemology aside—‘even while respecting their legitimacy’ (Cerbone 2012: 12)—during reflection on the experience of perceiving a cup:

[S]uppose [...] we ignore all the complexities of the brain, the details of the organism-environment interface, and so on; we exclude worries about justification and knowledge. Instead, we concentrate just on that stretch of experience *in and of itself*. That is, we attend just to the experience of seeing the cup, without attending to any of the questions and worries that might arise about just how that experience is caused or generated by my bodily engagement with a surrounding environment or to any concerns about whether my beliefs pertaining to the real existence of the cup are warranted or well-founded. [...] By imposing these limitations, I would suggest that we are on the way to doing phenomenology [...] by] paying more attention to the way by the cup is *presented* or *given* in my experience. (10–11; original emphasis)

A phenomenological approach, then, can enable us respectfully to circumvent certain questions of cause and epistemological justification to ‘return to the “things themselves” with the demand for legitimation of all cognition by *experience*’ (Husserl 1982: 35; original emphasis). In this way, phenomenologists develop their ontological arguments out of and through lived experience, stressing that without accounting for the appearance of the world, we can never begin to account for issues pertaining to metaphysics.

While a cohesive review of the immense literature devoted to phenomenology is neither appropriate nor feasible here, I provide an introduction to a handful of key concepts that are important to the phenomenological approach I espouse throughout the thesis: the *lived body*, the *lifeworld*, and *being-in-the-world*.

These concepts are expressed here in part through the foundational work of Husserl and Heidegger, though greatest attention is paid to Merleau-Ponty's substantive development of an embodied phenomenology. A theoretical introduction to these concepts is important here for the sake of substantiating certain assumed knowledge that pervades the remainder of the thesis.

The concept of the *lived body*, or *one's own body* (*le corps propre*), is vital both to the development of Merleau-Ponty's embodied phenomenology and to the account I produce in this thesis. At the heart of Merleau-Ponty's philosophical work is a desire to move far beyond the bounds of the classical Cartesian split between mind and body to produce a fully embodied account of being and experience (see also Chapter 2, § 2.9). In short, 'I am never a mere thing and never a bare consciousness' (Merleau-Ponty 2012: 480) because I am always both simultaneously:

Starting from the lived experience of one's own body (*le corps propre*)—the body I live as my own and through which I have a world—[Merleau-Ponty's] phenomenological account [...] offers a third way between the classical schools of empiricism and idealism, arguing that one's own body is neither a mere object among objects, *partes extra partes*, nor an object of thought for an ultimately separable and constituting consciousness. (Landes 2012: xxxi; original emphasis)

The lived body, then, is that which I *live*: it is what I am, that through which I know I exist, and that through which I experience the world. I am wholly indivisible from my body—'the subject that I am, understood concretely, is inseparable from this particular body' (Merleau-Ponty 2012: 431)—as there would be no 'I' without embodiment. However, that does not mean that I am wholly reducible to the physical composition of my body as 'mere object'. It is for this reason that Merleau-Ponty, like Husserl before him, makes an important distinction between the notion of the lived body (akin to Husserl's *Leib*, roughly 'the body that I am') and the physical, object-like status of the body (as with Husserl's *Körper*, roughly 'the body that I have'). Donald Landes suggests that Merleau-Ponty's notion of 'one's own body' refers to "'the body that is necessarily lived as mine", rather than a body that I possess contingently or the body considered from a third person perspective as a simple object in the world' (Landes, in Merleau-Ponty 2012: 512n6; original emphasis). I am necessarily indivisible from my lived body, and only I can perceive the world through it. Framed differently, while you may be able to see my body, just as I can observe much of the object-like appearance of my perceivable body, you cannot access the experience that I have of and through my body as I live it. In other words, as Landes suggests in his reading of Merleau-

Ponty, this body that I am and that I live can be distinguished from the body as ‘mere object’ by virtue of the difference between first- and third-person perspective. My lived body is always lived in the first person, as it is that without which both my experience of the world and my status as an ‘I’ within the world collapse. In terms of experience, this lived body is markedly different from my ‘object body’, which is part of the domain of scientific observation (Mol and Law 2004); the lived body is ‘not out there among things, but on my side’ (Merleau-Ponty 2012: 94). This sets out in stark relief the inadequacies of third-person positivist scientism for the study of subjectivity: my being, entirely founded through my body and its relationship to the world, is not wholly reducible to the physical characteristics of my body that can be observed in the third person.

A distinction between the lived body and the object body reveals the complex reality of the body as that which both ‘experiences worldly things and [...] is experienced as a thing in the world’ (Wehrle 2020: 499). Phenomenology posits that being and experience are—to invoke Heidegger’s (1962) influential phrase—‘always already’ (*immer schon*) relational: it represents one of the ‘inescapable aspects of our condition’ as subjects ‘thrown’ into the world (Polt 2005: 389; see also Heidegger 1962: e.g. 174, 376). Behind this phenomenological concept, then, is a latent ontological contention: that our very experience of existing as subjects is predicated on the existence of a knowable world. This ‘lifeworld’ (*Lebenswelt*) is the world that is *lived* by us and which partly constitutes our being, just as the world can only appear to us through our experience of it. Like the lived body, the lifeworld is understood as rooted entirely in my experience of it; it is phenomenologically distinct from the ‘objective world’ as measured by scientists and geographers, just as the lived body is distinct from the body as observed by third-person scientific means. In this way, my experiences of the lifeworld are always rooted in the body that I live; my perspective on the world is *situated*, *perspectival*, and ‘egocentric’ (see Chapter 2, § 2.5).

Framed differently, we cannot know, perceive, or exist without always already *being-in-the-world* (Merleau-Ponty’s *être au monde*, after Heidegger’s *in-der-Welt-sein*). We are produced in and by the world, ‘simultaneously born of the world and [...] into the world’ (Merleau-Ponty 2012: 480); we experience our existence by virtue of our ‘thrownness’ (*Geworfenheit*) into the ‘there’ of the world (Heidegger 1962: 174); and, to recall Landes’s statement adduced above, there is no ‘ultimately separable and constituting consciousness’ (viz. ‘mind’ or ‘soul’) intrinsic to us beyond our embodiment that can be excised from us enable us to transcend our worldliness, or to ‘precede’ our existence in the world. In Komarine Romdenh-

Romluc's words, the phenomenological axiom of being-in-the-world posits that '[w]e must think of the world and consciousness as mutually dependent parts of one whole' (Romdenh-Romluc 2012: 104). An important point that phenomenologists make regarding our experience of being-in-the-world is that worldly objects and entities *mediate* our experiences. As Matthew Jordan writes, '[w]e do not live in a world of pure unmediated phenomena. Our being-in-the-world effectively means being-in-the-world as conditioned by forms of mediation' (Jordan 2017: 239). It is for this reason that Heidegger calls the state of existence *Dasein*—literally, 'being-there'. We require a world and entities within that world as well as a body to exist; the body is the 'vehicle of being in the world', the means by which I may be 'united with a definite milieu' and 'perpetually engaged therein' (Merleau-Ponty 2012: 84). Being-in-the-world offers a clear concept for understanding Merleau-Ponty's central contention that existence and experience are always already the result of the ineluctable relationship between body and world.

In Landes's words, 'the body, as open to the world, envelops the world with its gaze, and yet, as a body *of* the world, it is simultaneously enveloped' (Landes 2013: 70; original emphasis). In working notes published after his death, Merleau-Ponty uses the reciprocal German adverb *Ineinander* ('in, or into, one another') to describe this mutually contingent relation between body and world, in which every component of the relation (here, subject and world) is 'each enveloping-enveloped' (Merleau-Ponty 1968: 268). Later in the thesis, I extend these ideas to incorporate more complex insights from Merleau-Ponty's oeuvre, namely his concepts of *intercorporeality* (see Chapter 3, § 3.9) and *flesh* (see Chapter 4, § 4.7).

1.5 THEMES

Having now introduced more about the philosophical grounding of my methodological approach, I connect these conceptual frameworks to the three major thematic vertebrae that consistently guide my investigation: *space*, *embodiment*, and *materiality*. After providing a brief overview of how I define each of these terms in relation to existing work within phenomenological philosophy, sound studies, and music studies, I foreground an important meta-thematic that connects the three major themes: *relationality*.

Space. There is a varied history of the relationship between music, sound, and phenomenology (e.g. Akbar 2013; Benson 2003; D. Clarke 2011, 2019, 2021; Clifton 1983; Dufrenne 1973: 249–273; Dura 2006; Herbert 2011; Høffding 2019a,

2019b; Ihde 2007; Lochhead 1980; Montague 2011; Pike 1970; Schutz 1976; Smith 1979; Zuckerkandl 1956; see also reviews in Benson 2011; Høffding 2021; Levitz 2021) including that which examines regarding the role of the body in performance and listening (Kane 2012; Nancy 2007; Siu 2016). In musicology and music philosophy, much phenomenological work probes the elements of music that are more readily approachable in relation to Western art music, especially regarding melody, rhythm, and time consciousness, drawing mostly from the work of Husserl. There is little that engages with space as a musical parameter, and even those that do are often unspecific in their approaches. For example, Alfred Schutz (1976) regards space as unimportant in the study of music perception, considering it only worthy of consideration in the discussion of group music performance (see Siu 2016). Mikel Dufrenne writes of a melody ‘filling a space’ and that it ‘penetrates us through and through’ but ultimately concludes by asking whether ‘such spatialization [is] really anything more than metaphor’ (Dufrenne 1973: 272); and a similar emphasis on the ‘metaphorical’ understanding of musical space is echoed in Viktor Zuckerkandl’s (1956) work (see Born 2013).

The space in which I am interested here is not metaphorical but perceptually real. For the phenomenologist, to speak about space is to describe ‘not the space that would be measured by the surveyor, geometer, or scientist, but perceived space as we experience it before objectifying it’ (Morris 2004: vii). For Merleau-Ponty, spatiality represents one of several existential *dimensions* of lived experience. A dimension can be understood to refer ‘to those aspects that haunt all of experience without thereby reducing experience to them’—so, in terms of space, it is Merleau-Ponty’s contention that ‘every human experience is spatial [...], and yet *no* human experience is purely spatial’ (Landes 2013: 67, 73; original emphasis). Our sense of space, as David Morris contends, ‘is the basis of all social experience and of perceptual experience in general’ (Morris 2004: vii).

The contention that spatiality underpins all human experience but is not wholly reducible to it correlates well with perspectives on sonic-spatial experience in sound studies literatures. Gernot Böhme foregrounds the non-Euclidean behaviours of sound-space, writing that sounds ‘create spaces—self-contained, non-objective ones—as is most impressively illustrated by listening to music with headphones’ (Böhme 2017: 139). On Böhme’s account, the ‘space’ of headphone listening might therefore be understood to appear in excess of traditional models of space as a pre-existing ‘container’ for sounds. Such ideas correlate closely with Henri Lefebvre’s (1991) account of *lived space* (see also Born 2013; Ouzounian 2006): the idea that space is not a pre-given ‘thing’ but a relationally constituted,

emergent phenomenon. I return to the phenomenological qualification of lived space at length throughout the thesis, especially in Chapters 2 and 5.

Embodiment. The body is at the heart of Lefebvre's account of lived space, in which he argues that 'Western philosophy has *betrayed* the body; it has actively participated in the great process of metaphorization that has *abandoned* the body; and it has *denied* the body. The living body, being at once "subject" and "object", cannot tolerate such conceptual division' (Lefebvre 1991: 407; original emphasis). As suggested, a crucial basis for a Merleau-Pontian phenomenology of spatial experience is the assertion that space is a *lived* phenomenon that pervades all human perception. Spatiality is experienced through the body, representing a relational phenomenon. In this way, the body co-constitutes space—and it is itself also a spatially perceived phenomenon. I engage in depth with how headphones impact experiences of embodiment during listening in Chapter 2.

Materiality. Writing of trends in the study of mobile communication media, Simone Pereira de Sá suggests that in addition to the 'spatial turn' in recent media scholarship, we might also identify 'a further "material turn", since attention has also been paid to the materiality of communication devices, as well as to the central role of the body as a means of communication, [...] especially in the case of sonorities' (Pereira de Sá 2011: 3). My interest in the materiality of headphone listening has less to do with the apparently 'material' qualities of sound itself during experience (see, e.g. Bird 2020a; Connor 2004b; Henriques 2003) and more to do with the materiality of headphones as a medium and an object. In this way, I am more concerned with the idea of headphones as a physical technology, one experienced by listeners mainly through the sense of touch.

Interest in materiality has burgeoned over recent decades (see, e.g. Coole 2014; Dant 2005; Luhman and Cunliffe 2013: 100–106; Miller 2005). My approach here is phenomenological, though a swathe of alternative approaches could have been adopted. As suggested above, phenomenological space must be understood in directly relational terms, and the same can be said for how we access the materiality of objects and of our own bodies (see Chapter 4, § 4.2). Milla Tiainen summarizes the relational-material position cogently: 'Relations are where the entities' qualities, capacities, and self-relations (connections to their respective pasts and unfurling toward the future) jointly emerge and modify' (Tiainen 2015: 257). The notion of emergence is key here: relational emergence enables a pluralistic, nuanced, contingent approach to the study of experience that is always already *becoming* through experience. I engage in greater depth with issues of materiality in Chapter 4.

In phenomenological terms, we must understand each of these three central themes—not just materiality, but also space and embodiment—as always already *relational* dimensions of experience. Our experiences of space are contingent upon our anchoring to the world as material bodies.

1.6 DESIGN

To explore these themes in relation to headphone listening, I decided to adopt an empirically driven phenomenological approach. This involved conducting interviews with headphone users to collect reports of previous listening experiences in terms of their embodied, spatial, and material dimensions. Following the examples of Bull's (2000, 2007) and Herbert's (2011) empirical work, interviews were chosen for their affording a space in which to reflect deeply on previous experiences and to facilitate an atmosphere of curious inquiry on the part of participants. The primary aim was to collect and analyse rich primary data about lived experiences of headphone listening with a high degree of rigour and ethical integrity.

There were a number of important decisions involved in the design of the empirical component of the research that I summarize here for methodological clarity.

Interviews were conducted with twenty-seven self-selecting respondents aged between 22 and 56. An online call for participants was circulated across mailing lists and social media platforms with the aim of recruiting a wide range of individuals with experience of headphone listening across both recreational and professional contexts. The rationale for the breadth of the eligibility criteria for the study was in part to widen the predominant focus on mobile, recreational music listening in humanities studies of headphone use and experience—to account for the detail of all headphone users' experiences, not just those of mobile music listeners, as is the case in Bull's (2000, 2007) major empirical undertakings. Those interviewed hailed from across the globe and included commuters, musicians, office workers, television captioners, conference interpreters, diplomats, speech pathologists, military service members, and more. (A full list of participants and their occupations is printed later in this section.)

At the time of recruitment, participants were encouraged, though not required, to keep a diary of noteworthy experiences that they could bring to the interview as a prompt. Interviews took place over the course of two years between April 2018 and May 2020. Where necessary in the later interviews, COVID-19

‘social-distancing’ rules were always closely followed. Where possible, interviews were carried out in person, though a number were conducted via teleconferencing technologies. Before commencing the interview, every participant was given a digital copy of an information sheet stating the ambitions of the project, its ethical clearance, and the intention to publish the results of the research. All participants were then asked to sign a declaration form as a means of giving formal consent to be interviewed as part of the study.

All interviews were audio recorded. No visual materials were collected. All data were stored in line with the University of Sheffield’s research data management policy.

Interviews varied in length, but the overwhelming majority lasted around an hour. Two participants (‘Elliott’ and ‘Tatiana’) consented to being interviewed on another occasion to allow time to cover ground that had been missed in the first interview.

Interviewees were encouraged to refer to specific experiences (or types of experience) in as much detail as possible, drawing directly from the broader ambition of phenomenologies of perception to effect ‘a reordering of what was tacitly known but went unnoticed’ (Critchley 2001: 119). In terms of approach, I took inspiration from theoretical work exploring interview practice and methodology from ethnographic and qualitative psychological perspectives (Atkinson and Silverman 1997; Briggs 2001; Denzin 2001; Ewing 2006; Varela and Shear 1999; Yow 2005). I was interested here in ensuring that the traditional social science setup of the interview was destabilized, meaning that the disparity between interviewer and interviewee was decentred, with the ambition of encouraging a co-generative, ‘shared’ experience more akin to conversation than distant interviewing. Of particular import here was work by Simon Høffding and Kristian Martiny (2016) on the phenomenological interview. As Høffding and Martiny suggest, as an interviewer, ‘you do not come to the interview as neutral. You have some idea about what you want to know, what the interviewee might say, and hence actively participate in the knowledge generation process’ (Høffding and Martiny 2016: 541). In this way, ‘[t]he “you” can never be reduced to a kind of object’ (543); instead:

The interviewer asks a question and gets an answer that leads him to modify his next question. Thus, both subjects contribute to the knowledge generation process through complex dynamics, which are driven by reciprocal interaction. This kind of interaction strongly affects both the discursive and the tacit knowledge generation process. [...] In an interview, one studies another subject, which means that two autonomous subjects, capable of producing accounts of

themselves and their worlds, interact together in an ever-developing conversation. (543, 541)

Understanding the performative, relational nature of the interview format allowed me to create a meaningful, co-generative relationship with each interviewee, encouraging them to feel comfortable with sharing the complex, nuanced details of their experiences.

In terms of content, all participants were asked about the types of headphones they used. The vast majority used multiple types depending on context and function, so it was therefore deemed impractical and unremarkable to include such data here. While participants occasionally spoke about certain variations in their experiences of different headphone models (see Chapter 4), all participants approached the questions in a holistic manner, often suggesting that their reported experiences of, say, the sonic-spatial appearance of headphone sound did not vary noticeably depending on headphone models.

In terms of accessing the detail of headphone-listening experiences, the three overarching themes adumbrated above linked all interviews, and topics of discussion were always gently guided toward the orbit of these central concerns: auditory space, sonic embodiment, and material human–technology relations. In addition, the broader meta-thematic of relationality was included in the remit of each interview, probing experiences pertaining to wider socio-environmental engagement during headphone listening. While interviews were always loosely structured to afford individuals the opportunity to focus on the aspects of their listening experiences that they deemed most noteworthy, I used a list of prompts to guide every interview, each of which corresponded directly to a chapter of the thesis’s main body. These could be summarized as follows: (1) the perceived relationships between sound, space, and the body during headphone listening, with emphasis on the ears and head (cf. Chapter 2); (2) virtual ‘social’ experiences occurring when listening to voices over headphones (cf. Chapter 3); (3) multimodal awareness of headphone technology and its relationship to the body (cf. Chapter 4); and (4) multimodal awareness of the wider environment, of other ‘real’ social actors, and of one’s relationship to these socio-environmental milieux during headphone listening (cf. Chapter 5). This ensured continuity across the corpus of interviews but avoided a strict structure for each interview. The questions I asked most commonly were open to substantial variation in response (e.g. *Could you tell me about the most recent time you used your headphones?*). These open-ended questions would sometimes probe more specific aspects of perceptual experience (e.g. *Where would you say you perceive the sound relayed by your headphones in relation*

to your body?). In all cases, interviewees were asked not only to describe phenomenological appearances but also to reflect deeply on the ‘meanings’ that such experiences had for them. Such freedom in interview structure often resulted in rich, detailed, and complex accounts of previous experiences.

While I often spoke with professionals about the specific uses of headphones in their lines of work—for example, the practice of attending closely to aberrations in vocal production via headphones by speech pathologists—I was less concerned with understanding the specific *functional* uses of these technologies and more about exploring the detail of such users’ sonic-spatial experiences. In the hypothetical case of a speech pathologist, my analysis of her experience would focus less on the *why* of the reported use (for example, headphones causing the ears to prioritize relayed sounds and to establish auditory separation from the wider environment) and more on the *what* and *where* (for example, the location of the patient’s voice in relation to bodily space and its phenomenological and/or quasi-social affordances). Doing so across the whole corpus of interviews therefore enabled me to remain aware of the differences in context but simultaneously to draw out phenomenological themes that connected all manner of headphone users. My intention, then, was to produce a portrait of headphone-listening experiences that could cut across diverse situations, drawing out commonalities in headphone perception while balancing these ambitions with attention to nuance and variation.

After collection, data were coded using thematic analysis (Braun and Clarke 2006), identifying common themes that emerged across interviews. Specific data extracts were later analysed in light of broader phenomenological theories, especially those pertaining to listening (e.g. Herbert 2011; Ihde 2007; LaBelle 2010) and embodied space (e.g. Leder 1990; Merleau-Ponty 2012; Morris 2004) to consider theme-specific details of the evidence in greater depth and to create robust conceptual tools based on resonances with wider theoretical work.

In terms of participant identification in research outputs, each informant chose their own pseudonym, which was not required to correspond with their self-identifying gender. Given the creative freedom, some names are more unconventional than others; but the result is that each individual injects a certain character into their accounts. Some participants had English as a second language but were always able to provide great detail regarding their experiences despite linguistic barriers.

My interviewees’ chosen pseudonyms were:

Alana, 40, UK, PR agent
Albert, 25, USA, graduate student
Bathsheba, 56, UK, property surveyor
Charles, 52, UK, traffic officer
Dana, 25, UK, HE administrator
David, 24, UK, musician
Elliott, 24, UK, graduate student
Florence, 24, UK, artist manager
Hannah, 27, UK, marketing specialist
Henrietta, 22, UK, graduate student
Hillary, 24, UK, theatre director
Julius, 37, Australia, TV captioner
Kevin, 26, China, conference interpreter
Max, 41, UK, former military serviceperson
Miranda, 23, UK, magazine editor
Nell, 22, Australia, speech pathologist
Orestes, 32, UK, SEN teacher
Otto, 25, Belgium, diplomat
Reg, 22, UK, teaching assistant
Sally, 28, Australia, TV captioner
Sinclair, 30, UK, graduate student
Tatiana, 23, Netherlands, project manager
Tom, 28, China, sustainability consultant
Ursula, 23, UK, graduate student
Vincent, 26, China, private tutor
Violet, 23, UK, musician
Vita, 31, UK, Samaritans volunteer

The project received ethical approval from the University of Sheffield's Department of Music (ref. no. 013045). Anonymity was ensured regarding participants' specific employment situations wherever appropriate.

While all data were treated sensitively, certain material was of a more directly complex nature. For example, at a number of points during the thesis, I engage with cases in which headphones have been instrumentalized as tools of violence and torture. It is my firm contention that these cases should not be regarded as examples of *listening*. They represent brutal acts of human maltreatment that cannot be subsumed under the same penumbra as examples of

volitional listening experience. This is both an ethical and a philosophical contention: a phenomenology of listening bends under the weight of violence and torture (Cusick 2013), as the lifeworld is ‘unmade’ (Scarry 1985) and the subject ‘unhinged’ (Guenther 2013) from the world of intersubjective relations. These caveats considered, I also argue that such cases of violence and torture should not be disregarded in a cohesive account of the embodied, spatial, and material experience of headphone use. If my project is to achieve its goal of accounting for a diversity of cases in which the peculiar qualities of headphone sound have an effect on individuals’ embodied subjectivities, then it is unwise to disregard ‘extreme’ cases on the grounds that they do not conform adequately to the broader corpus of data. In some sense, to do so would be to place the researcher in danger of suppressing evidence through the selective apportionment of the data set, or at least of distorting the broader reality of headphone use in a way that leads the research towards overwhelmingly ‘positive’ conclusions. On this account, I stand with writers such as Dibben in the contention that a ‘more critical perspective’ on sonic (including musical) experience must foreground ‘the potentially negative ways in which music [and sound] may be involved in human experience’, including through attention to how music and sound are ‘deliberately deployed in ways which are morally dubious or unethical’ (all Dibben 2017: 385). Only then can an accurate representation of the diverse world of experiences be produced. By extension, then, beyond the issue of contributing adequately to academic knowledge, we might identify a further ethical consideration at play: that it is the *duty* of the academic to report those cases of experience that are at the core of certain human rights abuses, thereby contributing to the rigorous knowledge base that ultimately underpins ongoing activist projects. In the words of Darius Rejali, there is a need, both within academia and beyond, to attend ‘to the actual devices [of violence and torture] or their effects’ through detailed engagement with cases of human maltreatment (Rejali 2007: 379).

Thinking in terms of existing phenomenological work, my occasional focus on cases of human maltreatment and torture represents a decision akin to that of Merleau-Ponty’s attention to ‘extreme’ examples of perceptual experience, such as those observed in pathological cases. As Romdenh-Romluc (2011: 24–28) explains, theorists have offered various interpretations of Merleau-Ponty’s rationale for using extreme cases as part of his work towards establishing an embodied perceptual phenomenology. One such interpretation is that Merleau-Ponty has the ‘aim of making the familiar unfamiliar’ (Romdenh-Romluc 2011: 26), thereby using such cases as ‘a means of gaining distance from the familiar, so that

one is better able to explicate it' (Hammond et al. 1991: 181). Such a rationale makes some sense for the present purposes: as with Critchley's description of phenomenology as the 'reordering of what was tacitly known but went unnoticed' adduced earlier in this chapter, the use of extreme cases can serve to foreground the *differences* between such examples and those of 'familiar' experience. Yet I would argue for two related but distinct phenomenological justifications for my attention to extreme cases that should be considered in parallel with the ethical statements made above. First, I contend that attention to cases of violence and torture involving headphones can serve to demonstrate *in extremis* what is common to headphone use more broadly: an attention to the embodied, material, and relational constitution of headphones, which can act—whether to positive or negative ends—as tools of spatial reterritorialization. In this sense, while the consequences of 'familiar' (non-violent) and 'extreme' (violent) cases for human subjectivity can be wildly antithetical, certain aspects of the experience can be compared: the spatial 'form' of headphone sound-space, the experience of being in corporeal contact with a technology, the variable sense of separation from the wider acoustic environment. Moreover, there is an important interplay to acknowledge between familiar and extreme practices: perpetrators of violence often appear to use their own habit-formed experiences of headphone listening to instrumentalize these technologies to malign ends, including the intimate presentation of sound and the partitioning of perceptual space through the building of sonic 'walls'. Second, as the most extreme example of headphone use considered in the course of the thesis, cases of sonic violence and torture may be said to represent the 'limits' of the world of headphone use—that is, the maximal extent of these technologies' potential effects on human subjectivity. In that sense, we may learn about both extremes of the scale, ranging from the markedly positive to the profoundly negative experiences of headphones as a technology of emotional and perceptual control.

1.7 STRUCTURE

The remainder of the thesis is figured as a spatial trajectory that begins at the interior of the listener's body and extends outwards towards the wider environment, thus interweaving the central themes of space, embodiment, and materiality.

In Chapter 2 ('In'), I begin by focusing on the interior space of the lived body as it emerges during headphone listening. First, I elucidate how philosoph-

ers, engineers, and cultural scholars have identified the common experience of locating headphone sound *inside* the head as a ‘problem’ on account of its complication of ‘distal’ theories of hearing, namely the claim that sounds are heard as occurring at a distance from a listener’s body. I then explore how listeners describe the interior *form* of headphone sound, attending to certain curiosities that emerge in their descriptions: that sound is experienced variously as within the body, as ‘here’, as simultaneously surrounding the head and entering it, and as delineating ‘zones’ within the body’s interior. Engaging with the phenomenology of embodied space, I consider how headphones can appear to *flood* the lived body with sound during listening. As I show, this may have consequences for listeners’ experiences of the ‘space’ of thought and subjectivity, as in cases where the sound-space of headphone listening and an individual’s experience of ‘thought-space’ appear to commingle and interact. I engage throughout with aesthetic examples taken from sound art and theatre.

By Chapter 3 (‘With’), having now worked to establish the *form* of headphone sound reported by listeners, I turn my attention to a specific, prevalent example of listening *content*: the voice. I examine the relational dynamics of headphoned voice-listening through analysis of interviewees’ descriptions of listening to vocal music, podcasts, audiobooks, and the like, as well as the experience of using binaural headphones to make phone calls, hear simultaneous interpretations, and participate in headphone theatre. I draw from the insights garnered in Chapter 2 to prioritize attention to the auditory appearance of mediated voices in terms of embodied space. Analysing the evidence, I suggest that if, on Merleau-Ponty’s (1964, 1968) account, intersubjectivity is always already intercorporeal, and a headphoned listener reports experiencing a sense of another’s mediated vocal sound becoming incorporated into the phenomenological space of their bodily interior, we may suggest that the curious intimacy experienced by such a listener may be figured as a powerful intersubjective relation to another’s ‘voice-body’ (Connor 2000a) that is predicated on a sense of shared corporeal space. In other words, the intercorporeal power of the voice becomes spatially incorporated into the embodied space of the headphoned listener, effecting an *intercorporeal incorporation* of bodies through voice. As I show, this can result in a notable form of mediated acousmatic intimacy, a variously social and ‘parasocial’ (Horton and Wohl 1956) phenomenon that is thrown into stark relief through headphone sound’s apparent incorporation into perceived corporeal space.

In Chapter 4 ('On'), we begin to venture beyond the perceived interior space of the lived body to its spatial horizon, attending especially to the liminal space on and around the edges of the body. Given that headphone listening is a phenomenon predicated on the 'wearing' of—or being in intimate contact with—a technology, attention is paid in this chapter to the phenomenological relationship between listener and headphones through an emphasis on issues pertaining to materiality and touch. I consider how listeners can variously experience a set of headphones as both a *medium for* and an *object of* perception—that is, as a 'transparent' channel for sound and as a perceivable entity in its own right. I attend to a number of materially significant attributes of headphones, ranging from the concomitant sounds that occur through the friction of body and technology to the tethering of wires. The chapter represents the most ontologically concerned section of the thesis, focused on understanding how to characterize the relational ontology that emerges from the material human-technology nexus during headphone listening. Stemming from a question posed by Merleau-Ponty during his theorization of the chiasmic ontology of flesh—'Where are we to put the limit between the body and the world, since the world is flesh?' (Merleau-Ponty 1968: 138)—I interrogate the possibility that there may be a *fleshly* dimension to the experience of headphones' materiality: that the edges of the body may be regarded as *extended* or foregrounded through the incorporation of headphones into the body schema.

Chapter 5 sees the investigation move beyond the spatial edges of the body towards the wider socio-perceptual environment. Here, I provide a critical evaluation of Bull's (2000, 2007) model of the headphone 'bubble', evidencing how listeners not only report headphones as affording an auditory 'wall' between their bodies and the wider environment, but also that these 'walls' are permeable and subject to sonic *interpenetration*. On the one hand, I demonstrate that Bull's idea of the 'hermetic seal' of headphone listening has some phenomenological grounding, exploring how listeners may feel empowered or more confident through headphone use in public space, as well as how individuals use headphones to signal to others that they are unavailable. On the other, I suggest that the hermetic seal model has its flaws, especially when it is invoked uncritically to present headphone listening as a necessarily anti-social or 'zombifying' practice. To illustrate this, I consider how listeners' perceptions of the wider environment may be *heightened* through headphone use, as well as how listeners are consistently aware of social and environmental *contingency* during use—that is, they are aware

that their actions in the world impact others, suggesting that there may in some cases be a powerfully social dimension to headphone listening.

I conclude in Chapter 6 with a consideration of the ‘cross-pollinations’ of individual chapters, emphasizing my contention that headphone listening should be considered a nuanced, multimodal, *plural* set of practices in which context is always an important consideration, but also that there are certain apparent commonalities shared across different headphone-use practices. I also highlight certain limitations and suggest future avenues for research on the subject of headphone listening.

2

IN



‘Global, integral, already abstract hearing, seeking unity, fills volumes [...].

And my whole body, a music or language box,
resonance chamber, resounding gong’

— MICHEL SERRES

(2008: 138)

2.1 CAVITY

In a meditation on his experiences of living with tinnitus, Steven Connor (2011) redirects the typically outward-facing auditory gaze inwards towards the sonic interior of the body. Unlike the distal appearance of other ‘real-world sounds’, Connor’s tinnitus lacks the ‘quality of exteriority, and so cannot easily be referred outwards to the world’ (9). With characteristic transhistorical perspective, he situates his experience of being plagued by apparently intracorporeal sound within a broader history of ‘great purgative obsession’ regarding the human body, namely ‘the idea that all bodily and spiritual ills can be regarded as the result of some kind of alienness inside them that needs somehow to be extracted or extruded’ (15). For Connor, an important locus of such thought is found in the body’s conceptualization *as a space*, one that can be invaded and in which foreign objects—both physical and intangible, lasting and ephemeral—may nest. Historically, ideas surrounding bodily purging tended to focus ‘on one or other of the forms of phantasmal cavity in the body, of which the stomach or chest is one, the mouth another, the anus another and the ear and head another still’—the latter of which, writes Connor, has proven ‘particularly ambivalent and fascinating’ in its straddling of anatomical and imaginative exploration (15). In other words, the spatial status of the head eludes simple description. Thinking in acoustic terms, there is no clear, concrete sense of the head’s sonic spatiality during Connor’s tinnitus: the sound appears ‘at once firmly located and unlocatable, palpable and yet indefinable’ (15); it ‘is by me now, it is in me, on at

me still' (17). There is the appearance of a space, of a resonant cavity, in the process of becoming *through* the tinnitus; the sound that is experienced 'does not so much arise in this space as *give rise to it*' (15; added emphasis).

I take as an impetus for this chapter Connor's consideration of the 'phantasmal cavity' of the head, exploring how sound may appear to be located within the head's interior, in turn 'giving rise' to a phenomenological reality in which the body may appear as a hollow, resonant container for sound. Through analysis of listeners' diverse experiences of sonic interiority, I provide an account that foregrounds the nuanced and complex relationships that may emerge between sound, technology, and embodied space during headphone listening. In essence, it is focused around two questions that flow one from the other, one centred on the phenomenology of auditory spatial perception and the other on the conceptual 'interpretations' of such perceptual realities for listeners. First, in directly spatial terms, where do listeners experience headphone sound as arising in relation to their own bodies? Second, what are the apparent phenomenological consequences of such sonic-spatial experiences, considered especially in terms of ideas pertaining to the corporeal spatialization of subjectivity and thought? As I show, the journey through these intimately, inextricably connected research questions is knotty and requires close attention to the elusive ambiguity of intracorporeal space and its cultural and phenomenological meanings. Bodily space is a phenomenological zone that evades simple explanation—for '[t]he contour of my body is a border that ordinary spatial relations do not cross' (Merleau-Ponty 2012: 100).

I begin with an overview of the 'problem' that headphones have posed to philosophers, psychologists, and others over the past century and a half or so: that they may produce 'undesired', 'illusory', 'unsatisfactory', 'unrealistic', 'odd', or even 'intolerable' spatial experiences for listeners (Blauert 1983; Datta 2000; Emmerson 2007; Evens 2005; Gibson 1966; Kim and Choi 2005; O'Callaghan 2007), forcing a reconceptualization of the received account of audition as a 'distance' sense (§ 2.2). As I show through the work of writers including Gascia Ouzounian (2006, 2008, 2013), artists have taken a different, more optimistic approach to the phenomenon, sometimes producing works specifically designed for the resonant interior of the head that probe important questions pertaining to interiority and subjectivity (§ 2.3). I explore these ideas throughout the chapter, focusing on the spatial 'location' and 'form' of headphone sound in relation to the body, as well as interrogating these experiences in greater depth with reference to themes including the sometimes paradoxical experience of headphone sound-space as something that

both inhabits and is inhabited by the listening body (§§ 2.3–2.6), the idea of the body as composed of multiple experiential ‘zones’ (§ 2.7), and the peculiar phenomenology of head–mind–brain linkages (§§ 2.8–2.9). I later draw together a theoretical agglomeration of the insights gained from the empirical evidence, considering the specific liquescent language that should be used to describe headphone listening (§ 2.10). I posit the notion of plural, sometimes contradictory *floodings* of sound as an apposite conceptual framework for headphone listening, pushing gently against the prevalence of the more vague, catch-all term ‘immersion’ in contemporary parlance. My argument is that headphones represent a paradigmatic example of the phenomenological reality of sonic space as a wholly relational phenomenon, something that is not pre-given but that emerges through the yoking of body, sound, and technology over time during listening. Taken as a whole, the chapter offers a bodily baseline upon which the rest of the thesis is built, beginning within the body’s phenomenological limits to set the stage for a continuing account of the complex embodied, spatial, and material experience of headphone listening.

2.2 PROBLEM

Philosophers engaging with the spatiality of sound most commonly conceive of hearing as a ‘distance’ sense. Gilbert Ryle suggests that, like sight, ‘the things we speak of as [...] “listened to” are things at a distance from us’ (Ryle 2009: 27), which—he argues—is different to experiences of touch, taste, and smell.¹ As Casey O’Callaghan explains, ‘sounds themselves, as we experience them in audition, seem to be located not only in a particular direction, but also at some distance’ (O’Callaghan 2007: 30). Clearly, the location at which a sound is heard as occurring is figured in relation to the location of the perceiving body, making auditory distance perception predicated on ‘a head- or body-centered frame of reference—one that represents the location of the source of a sound relative to the

¹ It is uncontroversial to suggest that touch and taste are ‘contact’ senses in the sense of there being no distance between external stimulus and bodily receptor, but Ryle’s bundling of these together with smell seems less anodyne. In spatial terms, smell is a complex sense, and philosophers offer great insight into its phenomenology (Keller 2016; Mizrahi 2014). While olfactory perception does function as a result of molecular contact between odorous particles and sensory neurons, there is little phenomenological logic to understanding smells as ‘in contact with’ the body; yet smell does not appear to involve distance or direction, but we still experience smells as somehow exteroceptive (Richardson 2013). Comparing these qualities with sound, the latter appears much more clearly to be a ‘distance’ sense; but it could be argued that the tympanic structures (both auricular and otherwise) underpinning audition involve material contact between stimulus and body, something especially notable in the case of extremely loud sound (Bird 2020a; Cusick 2013; Henriques 2003; see also Nancy 2007).

perceiver's head or body' (Nudds 2009: 83). Auditory spatial perception is therefore always perspectival; as with all perceptual experience, it 'is egocentric', meaning that we hear 'from a point of view in space, which is the place where my body is situated' (Romdenh-Romluc 2011: 144; see also § 2.5 below). Similarly, Roberto Casati and Jérôme Dokic (2009: 97) critique what they categorize as *proximal* theories of spatial hearing (suggestions that sounds are located solely 'where the hearer is') and *medial* theories (that a sound's location is 'somewhere in between' the perceiver and the sound's source) on phenomenological grounds, arguing that *distal* theories, which locate sounds 'where their material sources are', are the only theories that carry clear viability.² They conclude that distal theories therefore represent the least controversial explanations of 'untutored' descriptions of sound's spatiality. The same is often posited by phenomenologists of music, as in Viktor Zuckerkandl's contention that music occurs 'outside, outside of myself, not in me. Music that I hear does not arise in me; it encounters me, it comes to me' (Zuckerkandl 1956: 268). In all cases, sounds are perceived as 'external' phenomena—that is, as phenomena that appear to a perceiver as occurring and/or originating *outside* of the space occupied by the body.

When philosophers engage with the phenomenon of headphone listening, arguments predicated on distal theories of auditory spatial perception begin to unravel. O'Callaghan contrasts 'ordinary hearing' with headphone listening 'in that sounds seem to come from somewhere between the subject's ears, [...] and not from the environment' (O'Callaghan 2007: 32). By comparison with most experiences of externally produced sounds, the experience of hearing 'a sound located "in the head" when listening to earphones is another sort of sound location experience, though it is a bit odd' (33–34). O'Callaghan offers no further elaboration on this 'oddness', though his argument appears to be clear enough: that perceiving sounds produced outside of the body as internal as opposed to external events is a strange phenomenon, one that is at odds with the vast majority of other 'distal' auditory perception.

The peculiar location of an externally produced sound event 'in the head', as observed by O'Callaghan during headphone listening, has been the subject of discourse throughout the past century and a half or so of psychoacoustical

² To offer an example of a non-distal theory, Brian O'Shaughnessy claims that 'the perception of sound is never perception at a distance' (O'Shaughnessy 2009: 117), citing the physics of faraway sounds and their temporal lag in reaching the ear. Even O'Shaughnessy himself describes 'the counter-intuitiveness of what I take to be the true account of auditory space perception' (125), suggesting that the claim lacks clear phenomenological grounding and represents a more abstracted metaphysical description of sound's ontology.

research into spatial hearing (see reviews in Blauert 1983: 116–19, 132–37; Ouzounian 2021: 27–28, 34–35; Whitney 2013: 205–12). Nineteenth-century anatomist Jan Evangelista Purkyně appears to have been the first scientist to document the phenomenon in the 1850s (Blauert 1983: 132; Ouzounian 2021: 34; Whitney 2013: 205–9), reporting the apparent in-head location of sound during an experiment using listening tubes to convey identical or similar sounds to both ears at once. Later that century, Sylvanus Thompson reported that the diotic use of two treated tuning forks of identical pitch could produce similar effects, describing a sound ‘most distinctly heard’ that ‘seemed to be taking place within the cerebellum’ (Thompson 1877: 274; see also Ouzounian 2021: 27; Stewart 1918: 34–35).

In a later paper (Thompson 1878), having amended the experimental design to incorporate Alexander Graham Bell’s newly available telephone receiver—described as ‘a new instrument peculiarly adapted for researches of this nature’ (Thompson 1878: 384)—Thompson describes his experience of conveyed sound’s apparent location inside his head in vivid terms. For example, he observes ‘a sensation only to be described as of some one [*sic*] tapping with a hammer *on the back of the skull from the inside*’ (Thompson 1878: 386; original emphasis); that ‘dissonances are excessively disagreeable, and ordinary consonance harsh’ during such binaural audition (391); and, in tandem with systematic amendments to the relayed sound’s compositional characteristics, an ‘acoustic image, which at first occupies a position behind the middle of the top of the cerebellum, [that] gradually moves round the back of the head apparently just within the skull, to the ear in which the sound arrives with full intensity’ (387). These experiences were supported by ‘the concurrent testimony of several independent witnesses’ (384), as well as more broadly:

Almost all persons who have experimented with the Bell telephone, when using a pair of instruments to receive the sounds, one applied to each ear, have at some time or other noticed the apparent localization of sounds of the telephone at the back of the head [...] as if proceeding from the back of the head, or, as I would say, from the top of the cerebellum. So distinctly marked is the apparent localization, that it has been regularly employed, I am informed, by Professor D. E. Hughes to ascertain whether a pair of receiving-telephones are rightly adjusted or not. (385)

Here, we can observe something of the emergence of an empirical discourse surrounding the phenomenological reality of hearing externally produced sounds as internal phenomena, one that, even in the nineteenth century, was being both

described in rich detail and instrumentalized as a symbol and means of ('audile') technical proficiency (Sterne 2003).

Part of the broader epistemic importance of the early in-head localization experiments was their evidencing of auditory spatial perception as a monosensory phenomenon. Historians of sound and audition have shown that the experiments probing intracranial sound perception 'would later be referred to as proving beyond a doubt that the ear possessed a means of perceiving space that was independent of both vision and touch' (Whitney 2013: 210; see also Ouzounian 2021: 17–36). Because sounds heard as though inside the head represented auditory spatial phenomena for which any crosstalk between 'sensory cues provided by vision and touch could be fully excluded' (Whitney 2013: 211), they offered strong empirical evidence that spatial hearing acted as a standalone sensory capability. Given that the source of an in-head localized sound in these experiments 'came instead from the two telephones located on either side of the head', and therefore that 'proof for the existence of an independent acoustic space was provided by precise but inherently subjective localizations of phantom-sounds whose true origins were to be found elsewhere' (Whitney 2013: 212), it is interesting to note the subjective, intracorporeal, even proto-phenomenological leanings of these early researches. As Tyler Whitney argues, the eventual maturation of experimental designs in the study of auditory spatial perception effected a shift in researchers' 'attention to mapping the contours and precise geometries of acoustic space *external* to the listener's body' (Whitney 2013: 212; added emphasis), despite the prevalent focus on the interior space of the body in the earliest work.

After Bell's telephone receivers had been crystallized into the technology of headphones, experiments probing—and debates surrounding—the spatial reality of such mediated listening experiences began to burgeon. To some extent, attention to nuance and detail became more widespread throughout the twentieth century, aiming to encapsulate more about the variability of the phenomenon for different individuals. For example, Don Ihde recounts the findings of the pioneering audiologist Georg von Békésy (e.g. Békésy 1930) following an experiment involving early radio listeners in which some headphone users heard the music 'as if it were in front of them', others as though it came from behind them, and others still 'heard it "in the middle of their heads"' (Ihde 2007: 187). In Jens Blauert's words, Békésy observes that a single auditory event presented over headphones 'could be made to appear by choice at the front or rear depending on the state of mind of the subject, that is, depending on the subject's expectations or

will’, thereby foregrounding ‘the human ability to concentrate at any one time on particular attributes of a signal and to suppress others’ (Blauert 1983: 104–5). Blauert also cites the work of Georg Plenge (e.g. Plenge 1972), who suggested that ‘the judgments “inside” or “outside” the head depended not on the type of presentation but on the individual subject’, entailing certain ‘secondary factors’ pertaining to ‘previous occurrences, including familiarity with the signal, expectations, habit, and specific associations’ (all paraphrased in Blauert 1983: 137). In turn, such observations appear to work towards highlighting the nuanced and conditional reality of perception: that the appearance of sound as inhabiting the interior space of the head is but one of a number of phenomenological possibilities that may appear to a headphone listener in any given moment.³

However, despite the promise of certain nuanced, almost-phenomenological moments in the discursive history of the phenomenon, more recent accounts are often more rigid. Audio engineers and psychoacousticians have portrayed interiorized headphone sound as a major issue to be circumvented. Today, psychoacousticians posit various possible explanations for the phenomenon of in-head localization, citing technical variables ranging from headband clamping strength and cushion compliance to cup resonances and isodynamic design principles as salient factors (Starling 1996: 246–247), as well as the lack of interaural ‘crosstalk’ that results from sounds being presented directed to each ear separately and at very close range, meaning that the manner by which the auditory system locates exterior sounds—for example, by registering interaural time differences—becomes obstructed (Blessner and Salter 2007: 187–88; Datta 2000: 34; see also Chapter 1, § 1.3 on the psychology of auditory spatial perception). As Frances Dyson summarizes, ‘the proximity of the receiving or transmitting apparatus to the ear creates an interior sound’ (Dyson 2009: 81). However, such

³ There is much more detail available about the history of ideas surrounding in-head localization, not least regarding the wealth of empirical literature devoted to the subject. However, given that the focus of the present thesis is neither structural causality nor epistemic history but phenomenal appearance (see Chapter 1), I do not go to any greater lengths here regarding historical debates that surround the psychophysical causes of the phenomenon. Others have attended closely to these discourses in existing work. For example, Blauert cites and paraphrases work in the 1960s conducted by Werner Schirmer, who suggests a number of possible psychoacoustic ‘causes’ of in-head localization, ranging from the ‘invariability of the ear input signals when the head is moved’ (see also § 2.4 below on ‘cemented’ spatiality) through ‘no sound [being] presented to the rest of the body besides the ears’ (see also § 2.7 below on the ‘zonings’ of the head and the rest of the body) to ‘mechanical pressure of the headphone units against the head’ (see Chapter 4) (all Blauert 1983: 133). Schirmer eventually rejected all of these suppositions. Similarly, though referring to earlier psychoacoustical work, Ouzounian acknowledges the ‘debate that would preoccupy a number of psychophysicists in the late nineteenth century’ surrounding the causal ambiguity of in-head localization, citing—among other work—Anton Steinhäuser’s confusion regarding whether such perceptual phenomena were ‘physical, physiological, or psychological’ in nature (Ouzounian 2021: 28).

writers also frame the ‘problem’ of headphones’ spatial presentation of audio as the ‘*greatest single obstacle* to ubiquitous use of headphone systems’ (Starling 1996: 246; added emphasis). Blauert notes that ‘localization of auditory events inside the head often occurs as an *undesired side effect* when headphones are used to present signals’, going on to describe the phenomenon as ‘this *error* in headphone presentation of sound’ (Blauert 1983: 117, 132; added emphasis). Ville Pulkki and Matti Karjalainen argue that headphone reproduction ‘often sounds *very artificial*’ compared with experiences in the ‘real world’ (Pulkki and Karjalainen 2015: 221; added emphasis). Sang-Myeong Kim and Wonjae Choi describe in-head localization as ‘a *critical problem* in headphone reproduction’ that ‘*can seriously harm* the listening comfort and the clarity of a spatial auditory display’ (Kim and Choi 2005: 3657; added emphasis). And Jayant Datta suggests that ‘[h]eadphone listening is *not a natural phenomenon*’ due to the emergence of “inside-the-head” *phantom images*’ that preclude the recreation of ‘a *natural* 360 degree sound stage’ (Datta 2000: 28; added emphasis). In such accounts, then, it is suggested that there is a ghostly, ‘unnatural’ (Datta 2000: 34), even quasi-damaging dimension to the spatiality of headphone sound.

In addition, some humanities and social science scholars have also framed the phenomenon of in-head localization pessimistically as a ‘problem’. Aside from O’Callaghan’s depiction of the spatiality of headphone listening as ‘a bit odd’ adduced above, Barry Blesser and Linda-Ruth Salter consider it a priority to develop technologies that ‘*mitigate* in-head aural localization’ on the grounds that the ‘experience of space’ afforded by headphones is unsatisfactory for a full and realistic presentation of audio (Blesser and Salter 2007: 191; added emphasis; see also, e.g. Wenzel et al. 2018: 28–30). Stronger still is Aden Evens’s use of highly critical language in his description of headphone listening:

Headphones [...] generate a *misleading* experience of a music that is no longer in an acoustic space as such but now within the listener’s head. [...] Personal stereos *foreclose the space that would allow the appreciation of musical subtlety*.

Such *intolerable* listening conditions are tolerated precisely because listeners are not interested in the music as sound but as index. (Evens 2005: 118–19; added emphasis)

Evens’s portrait of headphone listening is drawn from a wider account that bemoans how ‘very little of the actual sound gets heard and none of the subtle content of the music’ through the use of ‘cheap’ listening technologies (118), one that seems to glorify an audiophilic aesthetics and to be embedded in a modernist imagination pertaining to ‘pure’ and ‘unadulterated’ access to high-fidelity

musical sound (see Sterne 2003: 215–286) that has been ‘tarnished’ by more recent trends in musical engagement. Most important for the present purposes is the total lack of clarity regarding what leads Evens to forge a bizarrely direct link between the in-head localizing effects of headphone technologies and a loss of access to ‘musical subtlety’. There appears to be little attempt to substantiate what he means by the ‘misleading experience’ of music afforded by headphones, though we can imagine his rationale in the light of other accounts—that is, that the ‘unnatural’ acoustics of headphone listening somehow obstruct adequate auditory spatial experience.

Perhaps surprisingly, there are certain resonances in Evens’s account with James Gibson’s (1966) portrayal of the spatiality of headphone listening as ‘illusory’:

[A] continuing balance of binaural input [...] should specify a sound within the head. In this situation the sound ought to be heard inside the head. A person who wears a pair of earphones is in just this situation. He is strongly inclined to hear a mysterious invisible speaker inside his head, and it takes some practice to overcome the illusion.

Even a child who first listens to a telephone receiver hears the voice in or at his ear and is puzzled.⁴ The modern world of earphones, telephones, and loudspeakers does some violence to the natural orienting tendency of the auditory system toward sources. [...]

The illusion of perceiving a source within the head when it ‘really’ comes from earphones is a necessary consequence of the perceptual ability to localize correctly the sounds of one’s own voice, of eating, breathing, and the like, which are in fact within the head. The listening system normally provides not only information about the external loci of sounds but also about the locus of ‘here’, to which the others are relative. It is thus capable of proprioception as well as exteroception. (Gibson 1966: 85–86)

Gibson’s account reads more moderately than Evens’s but remains critical or suspicious of technology-mediated perception. For example, an important point raised by Gibson is that sound technologies do ‘some violence to the natural orienting tendency’ of the listening ear. This observation contributes to a wider history of distrust regarding the novel perceptual experiences that may be effected by technologies, namely that culturally (technologically) mediated modes of perception deviate in a negative sense from ‘natural’ perceptual modes. This is in some sense at odds with an earlier remark Gibson makes—that ‘there is no sharp division’ between ‘natural’ and ‘cultural’ ‘environments’ (Gibson 1966: 26)—which is influential on Eric Clarke’s account of ecological perception (see E.F. Clarke

⁴ I engage in depth with voice perception during headphone use in Chapter 3.

2005: 39–41) as well as others’ (see, e.g. DeNora 2014: 120). The tension here is born of the idea proposed by Gibson in the passage cited above that (cultural) technologies can negatively impact our ‘natural’ spatial perceptions. As Clarke does, sound studies scholars such as Jonathan Sterne argue against the assumption ‘that sound-reproduction technologies will have a disorienting effect on the senses that are otherwise oriented or grounded in coherent bodily experience’ (Sterne 2003: 20–21). The idea of embodied *coherence* is notable in Sterne’s argument, revealing an apparent assumption inherent in anti-technological accounts that the ‘natural’, technologically ‘unmediated’ body is a cogent structure—an assumption that Gibson appears to favour.

Moreover, Gibson’s account relies on the idea of in-head localization as an ‘illusion’ to ‘overcome’. My earlier suggestion that Gibson’s invocation of illusion is ‘surprising’ is in part formed through the lens of more recent accounts of listening that develop his characteristic ‘ecological’ approach to perception in the realm of music psychology. I am thinking particularly here of Clarke’s (2005) Gibsonian approach to listening, in which he argues convincingly that ‘virtual’ spatial environments, such as those afforded by recordings, ‘specify *perceptually real* events that happen not to be present’ (E.F. Clarke 2005: 71; added emphasis). In this manner, and interpreting Clarke’s approach through a phenomenological lens, it appears that the musicological application of ecological principles foregrounds how worldly perceptions of this kind—of listening to a virtual sound source, such as a headphone-relayed recording—are always already phenomenologically *real* and not, as Gibson suggests, ‘illusory’ (see also Chapter 3, § 3.6). To offer an alternative example, when I look at a Baroque painting of a landscape, I am not experiencing an *illusion* that a space unfolds through the lines and shades of the picture’s surface; it is instead a phenomenological *reality* for me that the scene has dimensionality, because the spatial cues in the painting, its perspectival composition, provide me with a very *real* image of a three-dimensional space that happens to be physically two-dimensional. I am under no illusion that the space is one that I could access and explore, but that does not make my experience of it any less perceptually ‘real’. As Rudolf Bernet argues, drawing from Husserlian phenomenology, ‘paintings have [...] a reality of their own. They are fictions we can perceive [...], not mere dreams or projections of mental images’ (Bernet 2012: 574; see also Akbar 2013: 81; Merleau-Ponty 1993). To borrow from Tia DeNora, then, we might best understand that all perceptual ‘realities are neither virtual nor real—rather, they are “virtually real”, drawn out of the potentially multiple ways in which things, sensations, experiences and meanings could become mani-

fest' (DeNora 2014: 123). On this account, we may suggest that headphone-space is not an 'illusion' but a perceptual *reality*: it appears spatially real to a listener and is understood in relation to the world of perception. This slight moderation in terms is useful, as it helps to frame experiences of sonic spaces not in terms of 'misperception' (O'Callaghan 2007: 156) but as *real* perceptions with material consequences—of sonic spaces as objects and events that we perceive as occurring in reality, even if such perceptions may elude scientific logic or reflection.

An 'undesired' 'obstacle' that 'does some violence' to 'natural' spatial perception; an 'intolerable' 'error' that 'can seriously harm' listener comfort and clarity; an 'illusory' auditory experience to be 'mitigated'; an 'odd', 'misleading', 'very artificial', and 'phantom'-like phenomenon—clearly, the in-head localized presentation of headphone sound appears to trouble all manner of scholars and engineers, often expressed in dramatic terms. However, the perspective that these multidisciplinary accounts fail to take is a softer, more considered aesthetic or phenomenological one. Instead of posing in-head listening as a problem that thwarts access to an idealized realm of auditory spatial purity, we might instead ask more about how listeners experience the curious, sometimes beguiling sonic-spatial 'worlds' to which headphones can afford access. We might ask how such tropes in scholarly accounts have in fact served to occlude important considerations regarding experience, in turn resulting in a myopic image of headphone listening that overlooks its complex, potentially rich characteristics as a sonic-spatial practice.

2.3 WITHIN

In suspending the view of headphone listening as a deficient mode of sonic-spatial perception and instead approaching it as a curious, intriguing phenomenological reality, we might begin to unpack some of the assumptions underpinning its reception in scholarly accounts and to focus more clearly and impartially on its phenomenological details. In order that we may access what I term the phenomenological 'consequences' of headphone listening—its impacts on broader conceptualizations of one's own embodiment, thought, and spatial experience—we must also ascertain in detail how individuals actually report experiencing headphone sound. By drawing attention to the aesthetic and phenomenological dimensions of headphone listening without recourse to received accounts of headphoned sound-space as 'problem', I contend that we may open up the

scholarly view to the more specific, complex, and interesting consequences of listeners' sonic-spatial experiences.

Not all humanities and social science scholars share a pessimistic view of headphone listening as a spatial inadequacy to overcome. For example, Clarke appears to draw from his experience of interiorized sound-space to describe evocatively 'the "internal choreography" of recumbent headphone listening' (E.F. Clarke 2017: 531), gesturing not only towards a sense of embodied response to music but also to the 'internal' experience of the relayed sound. Earlier than Clarke, R. Murray Schafer offers a rich and detailed interpretative account of headphone listening:

The ultimate private acoustic space is produced with headphone listening, for messages received on earphones are always private property. 'Head-space' is a popular expression with the young, referring to the geography of the mind, which can be reached by no telescope. Drugs and music are the means of invoking entry. In the head-space of earphone listening, the sounds not only circulate around the listener, they literally seem to emanate from points in the cranium itself, as if the archetypes of the unconscious were in conversation. [... W]hen sound is conducted directly through the skull of the headphone listener, he is no longer regarding events on the acoustic horizon; no longer is he surrounded by a sphere of moving elements. He is the sphere. He is the universe.

Headphone listening directs the listener toward a new integrity with himself. (Schafer 1994 [1977]: 118–19; original emphasis)

Schafer's positive description of the sonic-spatial world of headphone listening is notably out of step with much of his technosceptic rhetoric, apparently as a result of headphones making relayed audio a 'private acoustic space' as opposed to something that 'pollutes' the 'natural soundscape' (see Schafer 1994: 15–28, 181–202).⁵ Schafer's reflection on in-headphone experience here is as effusive as it is chaotic: he presents the part-beatnik, part-neoliberal idea that headphone listening is at once (favourably) comparable to drug-taking, quasi-spiritual connection to the 'mind', and the privatizing project of free-market capitalism. Nonetheless, Schafer identifies a phenomenological 'oneness' that emerges between the headphone listener's body and their embodied sense of self, one that induces a sense of becoming 'the universe' of sound for him—a clear 'monumentalization' of his individual, privatized auditory experience (Bull 2000:

⁵ Of course, some headphones *can* pollute sonic environments on a small scale in the form of tinny extravasations, as many public transport users will know well (see Chapter 5, § 5.8 for a discussion of headphone 'leakage' and its social effects). However, writing before the advent of the Walkman (*The Tuning of the World* was first published in 1977, two years before the Walkman was first released), Schafer would likely have been unaware of the conflict-inducing phenomenon of headphone leakage.

e.g. 22). This is a directly sonic-spatial observation, pertaining directly to how sounds ‘literally seem to emanate from points in the cranium itself’. Here, as Dyson notes, ‘Schafer *recommends* augmenting the ears with headphones, as these produce *authentic*, originary sounds, unsevered from their environment, their maker, or their history, since they resound within the head and redeem their original nature as pure vibration’ (Dyson 2009: 81; added emphasis). Noteworthy in the shadow of the previous section are the ideas of sonic authenticity and purity that Dyson identifies in Schafer’s argument—a markedly different interpretation of headphone listening to those adduced above.

Other writers share Schafer’s interest in the consequences of in-head localization for conceptualizations of the body and the self during listening. As we encountered at the beginning of the thesis (Chapter 1, § 1.1), Gascia Ouzounian (2006) writes of the ‘aural architectures’ of the body that emerge during practices such as headphone listening, specifically examining the ways in which architect and sound artist Bernhard Leitner explores the interior spaces of the head in his 2003 sound-sculpture series *KOPFRÄUME (HEADSCAPES)*. Leitner describes the collection as ‘works specifically created for the interior of the head’ that ‘can only be experienced with earphones’. Presenting the head as a ‘globe-like container’, Leitner manipulates the stereo profiles of recorded and synthetic sounds, causing them to appear to move around a bounded area inside the head, aiming for listeners to ‘contemplat[e] the interior, however unfathomable it may be’ (all Leitner, cited in Ouzounian 2006: 70, 77).

For Ouzounian, Leitner’s *KOPFRÄUME* represents a work that exemplifies the post-1960s aesthetic model of the ‘body-as-site’, in which ‘the location of the work [...] shifts to the individual listener herself’ (Ouzounian 2013: 84). As she explains, Leitner’s practices are predicated on empirical ‘experiments’ into the relationship between ‘body-space’ and ‘sound-space’ (Ouzounian 2008: 186). Most important for the present purposes is her detailed autoethnographic account of experiencing the work, in which she writes that *KOPFRÄUME* serves

to directly challenge the body’s habits of perceiving itself, its tendencies to imagine itself in static and pre-conceived ways. Hearing my own head as a finite domain, a mappable space where sounds can exist and disappear, made me face the possibility that my body may, in actuality, *really be* finite; limited; a space like other spaces, with things moving in and out of it, living and dying in it, with or without my permission, extending, or limiting its lifespan. (Ouzounian 2006: 77; original emphasis)

For Ouzounian, *KOPFRÄUME* had a profound effect on her awareness of her lived body as a spatial entity, as a zone through which sounds can not only pass but in which sound can appear to originate and resound. It caused her to question ‘static and pre-conceived’ ideas about her own embodiment, leading to a conceptualization of the body as a dynamic, fluid ‘space’, one that is not somehow a pre-existing spatial ‘container’ but one to which—to recall Connor’s phrase adduced in the opening gambit to this chapter—sounds ‘give rise’. On Ouzounian’s account, then, the complex spatial experience of headphone sound is no mere ‘illusion’ but a rich, multidimensional phenomenological *reality* that leads her to question her habitually and culturally formed experiences of her own body, and even the nature of her existence as alive in a world.⁶

In what remains of this section, I explore how the kinds of phenomenological consequences of headphone listening described by Ouzounian—its effects on her sense of embodiment and status as a ‘spatial’ body—resonate with accounts offered to me by my interviewees. Many informants mentioned the spatiality of headphone listening in terms of embodied space, describing their sense of relation to relayed sound:

To me, it does all feel like it’s here [*gesturing to head*] in headphones. (Reg)

It’s very close. It comes from, like, sort of, not the outer ear, but I think the inner ear. Yeah. [...] Inside my ear. (Kevin)

It’s quite ‘into you’. Sometimes, I think, I even feel it, like, flow through my head [*gesturing across top of head from left to right*]. It’s kind of like it literally flows through my head. Maybe, like, my left ear to my right ear, or vice versa. It’s kind of slow, you know? [...] Yes, the sound is changing in you. (Vincent)

Being ‘inside’. Like, literally in a spot in the middle of my head. [...] Like, literally in the very centre of my head. As if it’s emanating from me, but then it’s also from, like... [*has difficulty gesturing towards the right spot, pointing one finger into mouth and another towards left ear*] (Henrietta)

Reg suggests that he understands the site of headphone sound to be his head, with Kevin echoing the suggestion of interiority—as though, unlike most other sounds

⁶ Beyond Leitner’s work, sound artists, theatre practitioners, and other creators have harnessed the in-head perceptual possibilities of headphones in their works. As Charles Stankieveh writes, through headphone use, artists are able to create ‘worlds that exist not only in their imagination but in the heads of their audience as well’ (Stankieveh 2007: 57). In recent years, scholars have begun surveying these new creative practices, with a range of excellent accounts of headphone use now available in relation, for example, to theatre practice (Bennett 2019; Home-Cook 2015; Kendrick 2017; Klich 2017, 2019; Myers 2011; Thomaidis 2017; Thomaidis and Butcher 2016; Wake 2013, 2014).

he hears, headphone sound ‘comes from’ inside of his ears and head. Moreover, understanding the sound as somehow ‘into you’, Vincent’s description of headphone sound as ‘flowing’ and ‘changing in you’ is evocative of the fluid, emergent character of his sonic-spatial experience, suggesting that sound is experienced in liquescent terms as something that ‘fills’ the perceived interior space of his head. He remarks on the strangeness of his experience (‘it’s crazy’), suggesting that the appearance of the sound within his body seems somehow unusual for him and therefore difficult to understand or verbalize. Henrietta’s account resonates with Vincent’s though is even more specific, describing the spatial reality as one characterized by emanation, as though beginning at a central point in her head and rippling outwards. Henrietta trails off to gesture to the spot but appears to be holding in tension (‘but then’) the idea that the sound appears in the centre of her head but that she is readily aware that the headphones are at her ears. In the space of a few choice interview extracts, a nuanced and complex portrait of the spatial experience of headphone listening begins to emerge: one characterized by interiority, by intracorporeal emanation, and by a sense of flowing through the ‘space’ of the head.

Henrietta was especially keen to find ways to describe the very exact, specific sonic-spatial experiences that she had recently had when using headphones. Apart from her gestural attempts, she had also arrived at the interview with small diagrams to remind her of what she wanted to relate:

[reading from listening diary] So I’m transcribing a Hatsune Miku song—‘Sharing the World’. There are some quite aggressive, pulsating drum beats and bass notes, which I kind of feel are putting pressure on two spots towards the base of my skull whenever there’s a pulse. And I drew a little diagram [...] that was a head and some kind of furry spots inside the head to represent the sound sources. [...] It’s so difficult. You’d have to literally have a sphere. And in 2D, you just can’t. There’s no way. [...] Where are they? It’s quite a daunting thing! (Henrietta)

Henrietta reports an almost material, palpable sensation when listening to Hatsune Miku’s music in which certain spatial features of the music appear to induce a sense of pressure inside her head. The ‘quite aggressive’ sounds of the rhythm and bass sections of the track cause her to conceive of her experience of the sounds in terms of the materiality of her skull, as though the sounds touch and put pressure on parts of her head. Her decision to visualize these ‘spots’ in a diagram of her head also suggests a determination to ‘make sense’ of her experience in terms of her body’s physicality, understanding the ‘container’ of the head as the space within which the sounds arise and act. Yet the two-dimensional

drawing is not enough for her: she wants to represent her experiences in three dimensions, suggesting there is a depth and thickness to her perceptions of the sounds. Especially interesting is her reflection on the idea that the sounds are somehow ‘inside’ her body, as though lodged therein, which she interprets as ‘daunting’ and disconcerting. This further evidences the notion that sounds are experienced as quasi-physical, material ‘objects’ entering her head, echoing Connor’s ideas about the historical view of ‘alienness’ regarding sounds being located inside the body that opened this chapter.

Reg also drew attention to the material dimensions of his experiences of sound, focusing on a phenomenological relationship between his knowledge of sound as vibration and his experience of sound through headphones:

It feels very concentrated, and very much like I can feel it almost resonating in my temples or something—especially lower, heavy bass sounds, like a sine bass or something. You really feel that resonance. But yeah, to me, it’s all here [*gesturing to head*]. [...] It feels like it’s so directly coming through there [*gesturing to temples*] that you almost feel it vibrating through your skull because of that. (Reg)

Reg’s description of his headphone sound as ‘concentrated’ further suggests that listeners can experience sonic interiority in terms of sound’s apparent materiality, here in terms of a sense of acoustic *density*. Like Henrietta, he especially links lower-frequency sounds such as synthesized bass lines with these material dimensions of sonic experience. For Reg, as with Henrietta, there is an almost-resonance, an almost-vibratory sensation, that he feels in relation to his skull and temples during headphone listening, one that he describes in terms of its *directness*—as though the sound is truly emanating from within his body, felt in terms of its near-physicality. Sound’s materiality, then, is ‘felt’ inside his skull—a ‘haptic aurality’ (Bird 2020a) that is spatially experienced in terms of his physical form.

This directness, perhaps characterized as a (markedly mediated) sense of immediacy, led other interviewees to evaluate the suitability of the term ‘space’ as a descriptor of their experiences. Consider this statement, made by Sinclair:

I think this idea of space collapses a bit [with headphones], and it becomes, you know, like, in the head. So instead of having this overarching kind of experience of the sound coming from these different ways... (Sinclair)

There is a richness to Sinclair’s description of spatial *collapsing* during listening, as though his experiences of sonic space in the ‘outside’ world simply cannot

correlate with his experience of in-head localized sounds heard via headphones. One interpretation of his experience would be to consider his account as produced out of a broader reflection on the logical, ‘scientific’ plausibility of the body being a space for sound. Unlike the ‘exterior’ world of air and distances, the body is an enclosed, fluid-filled space entirely unlike the wider environment. Thinking in this way, Sinclair’s idea of spatial ‘collapse’ might pertain to a more literal, physical understanding—that sonic space cannot, in any logical sense, exist or be produced within the body (see also § 2.5). As Blesser and Salter suggest, ‘by using headphones and binaural processing, listeners can experience music *without* a listening space’ (Blesser and Salter 2007: 130; added emphasis); the ‘need’ for a wider environment through which sound can travel is negated.

Yet an alternative reading could posit his experience in terms of the phenomenological ‘depth’ of the lived body—of his first-person, moment-to-moment experience of sound as so clearly ‘within’ the frame of his perceived bodily space that any notion of separation between himself and the sound is ‘collapsed’. This more directly phenomenological reading of Sinclair’s reported experience would align with other accounts of recent and contemporary practices that question received assumptions about the relationship between sound and space. For example, Andrew Eisenberg reflects on Julian Henriques’s (2003) work on sonic-corporeal immersion in high-amplitude speaker-stack sound, such as that associated with Jamaican dancehall culture, to argue that such sonic practices form part of a broader aesthetic drive towards ‘a direct, spaceless connection between a sound and its internal reception’, one that ‘envelops and invades the body, dissolving the subject’ (Eisenberg 2015: 193). For Eisenberg, such ‘despatialized sonic experiences’ actually work to ‘reaffirm sound’s fundamental spatiality’ (Eisenberg 2015: 194), to some degree echoing Henriques’s own identification of the deconstructive power of acoustic space: that ‘with sound it simply does not make sense to think of having an inside and an outside’ (Henriques 2003: 459) and therefore that Euclidean spatial models must necessarily fall short of dancehall sound’s enveloping and pervasive acoustic power (see also Born 2013; Ouzounian 2006). On Eisenberg’s account, we may observe that Sinclair’s headphones appear at once to territorialize *and* despatialize his experiences of embodiment—that is, the listener identifies an almost paradoxical relationship between the headphone sound and his body in which there is a clear, locatable, spatial dimension to the sonic experience (the sound appearing to arise ‘in the head’), but there is also a sense in which ordinary spatial relations—or, in Sinclair’s words, the very ‘idea of space’ in everyday parlance—

must collapse under the peculiar strain of the experience (the sound-space appearing almost indivisible from his own body-space). Here, then, sound enters the body as a mediated yet phenomenologically immediate material force, in turn effecting a sense of spatial ‘collapse’.

2.4 HERE-THERE

In the empirical examples considered so far in this chapter, individuals have reported experiencing headphone sound as something that occurs *within* their bodies—that is, that the sound overlays, inhabits, or gives rise to the interior phenomenological space of the listening body. Beyond the challenge that such experiences present to metaphysical accounts of audition as a distance sense, there are further complex issues pertaining to the spatio-phenomenological distinction between perceiving body and perceived sound. To unpack these issues further, I attend here more acutely to the manner by which individuals reported experiencing the relationship between their listening bodies and the sonic space of their headphones in terms of deixis, namely how individuals used relational terms such as ‘here’ and ‘there’ to describe how they perceived the spatiality of headphone sound and bodily space intertwining.

For some interviewees, the sonic spatiality of headphone listening appeared auditorily all-encompassing. Consider this short yet rich quotation from my interview with Reg:

There’s no sonic environment other than in yourself. (Reg)

For Reg, normative ideas of one’s spatial environment—as something that surrounds and is outside of one’s own body—are destabilized during headphone listening. He conceives of the notion of a sonic environment as something that he embodies—something that is *inside* him, not around him. This was echoed by Sinclair:

When it’s inside of my ear, and there’s a small, little speaker, the sound seems to be condensed into just my head. That’s what it feels like. It’s like that sphere is the only sphere of influence. [...] Because you’re not dealing with the space [outside]. And you’re not dealing with any other kind of ideas. You know, it could be maybe more of a pure kind of experience. There’s no kind of mediation through other ways. It’s just you. It’s like fewer mediations—so it’s you, the headphone, and whatever the input is. (Sinclair)

Sinclair makes sense of his spatial experiences during headphone listening through the analogy of ‘sphere[s] of influence’, suggesting that headphones produce the sense of a singular, overwhelming sensory world ‘condensed into just [his] head’. Like Reg, Sinclair finds that the headphone sound is auditorily all-compassing, and that—akin to Schafer’s description of headphone listening adduced above (§ 2.3)—there is an almost-*purity* to the experience Sinclair has of in-head localized sound, noting that in spite of his conscious awareness of the multiple mediations of sound, the experience appears less ‘mediated’ than other perceptions of sound. This may suggest that Sinclair experiences a *direct* connection between audio, medium, and body that is somehow unfettered by other worldly mediations—an experience of the sound as ‘immediate’ despite its (obvious) mediation. There is an inherent paradox here, one that Jay David Bolter and Richard Grusin acknowledge as ‘the twin logics of immediacy and hypermediacy’, explaining that contemporary culture ‘wants both to multiply its media and to erase all traces of mediation’—to encourage users to engage with media but to feel ‘as if they were “really” there’ (Bolter and Grusin 1998: 5). In Bolter and Grusin’s reckoning, ‘the logic of immediacy dictates that the medium itself should disappear and leave us in the presence of the thing represented’ (5–6); they describe how ‘new digital media oscillate between immediacy and hypermediacy, between transparency and opacity’ (19). I return to the notion of ‘transparency’ in a later chapter (Chapter 4, § 4.4); but for now it suffices to note that Sinclair’s experience of a ‘pure’, almost immediate experience of an all-encompassing auditory space during headphone listening seems to exemplify this contradiction in terms outlined by Bolter and Grusin: that sometimes the more hypermediated the experience—that is, the more dimensions of mediation that constitute it—the more ‘immediate’ it can appear.

A simple interpretation of the idea of an ‘all-encompassing’, hypermediated-yet-phenomenologically-immediate sonified headspace could foreground the impact of external sounds’ obfuscation during listening, meaning that the headphone sound becomes the only major auditory stimulus for a listener (see also Chapter 5, especially § 5.2). But there appears to be more to these reported experiences than a blunt separation between ‘interior’ and ‘exterior’; there is something specific about the spatial *form* of the headphone sound, ‘condensed’ inside the body, that affords this experience. One way to begin to understand the apparent imbrication of body-space and sound-space could be to understand more about how bodily *actions* affect a listener’s sense of space during headphone listening. This is because an important feature of standard headphone technologies is that

the audio that they relay is ‘head-locked’, meaning that—without incorporating adjuvant head-tracking technologies to measure bodily movements and execute algorithmic sequencing to modify the spatial characteristics of audio in real time (see, e.g. BrimiJOIN et al. 2013; Roginska 2018)—the sound that headphones mediate is static and unchanged by bodily motion. As Hannah and Reg explained to me, moving one’s body during standard (non-head-tracked) headphone listening does not change one’s perspective on the sound:

It doesn’t do anything at all. It [the sound-space] very much stays in the same place. (Hannah)

You move around and they move with you because they’re now connected to you, and sound is going directly to you. (Reg)

We might therefore conceive of a listener’s bodily engagement with standard headphone sets to be one characterized by no ‘degrees of freedom’, a term used in relation to virtual-reality technologies to describe a user’s ability to interact with a virtual environment—for example, the possibility to move around or change perspective on a space—by virtue of motion-tracking hardware (see Dibben forthcoming; Heim 1998: 20–21; Schütze with Irwin-Schütze 2018: 8–9). In this regard, everyday-use headphones provide a static auditory perspective on a space in which bodily movements do not affect the spatial composition of the audio, ‘caused by the fact that signals to the ears do not change as a listener moves their head’, which in turn results in ‘some loss of interactivity’ and—in Agnieszka Roginska’s words—a sometimes ‘unnatural listening experience’ compared with real-world, interactive auditory spatial perception (all Roginska 2018: 90–91; see also Ben-Asher 2016: 31; Blesser and Salter 2007: 189; Emmerson 2007: 146–47, 163). The effect might be described as a kind of auditory ‘cementedness’ (Downs 2016: 35–40) in which the form of headphone sound—its spatial location and dimensionality in relation to bodily space—has a degree of phenomenological constancy for a listener. In this manner, as George Home-Cook writes, ‘headphones not only physically envelop the ears, but this envelopment brings about a radical, if not total, cessation of aural motility’ (Home-Cook 2015: 152). The result, then, is a sense of a sonic environment being condensed into the head as a space that moves ‘with’ the body as though *connected* with it or a part of it. On this account, a listener’s body-space appears to merge with the sound-space due to the latter’s apparent quasi-static location *within* the former.

There was a clear sense, then, for a number of the listeners I interviewed that headphone sound possessed an all-encompassing, somehow ‘immediate’ spatiality that could fit inside their bodily space and travel with them. Soliciting further, more specific details about the spatial location of headphone sound was a more complex task for many interviewees. A select number of my interviewees were able to verbalize their in-head spatial experiences to a high degree of specificity—for example, Julius, who explained:

It’s like the sound is emanating from a point within my skull, slightly to the left—like, behind my left eye at the back. (Julius)

While in Julius’s explanation there is a clear degree of exactitude in his localization of the headphone sound, others were less assured:

If I’m listening to a piece of music, and there’s some reverberant, distant entity, maybe it’s, like, to the outer reaches of my skull, and everything is now contained within a half-metre diameter sphere, or something like this. But the kind of proportionality of the distance is the same idea—this grand proportionality of the distance—is such that these relations are similar, but they’re in different domains. [...] It feels like it’s in another, like, universe of presence. [...] That’s what it feels like: where there is some kind of limit on the unlimited within the head, but in the real world it doesn’t exist. (Sinclair)

Sinclair is describing cases in which musical or sonic content is reverberant, making a sound appear far away and distant. In drawing this spatial experience together with its in-head localization during headphone listening, he conceives of the experience as a merging of two distinct spatial domains: that while the *content* of the audio specifies a large, expansive space, the *form* of the space is mapped onto the interior phenomenological space of his head. In this regard, it seems to make little sense to Sinclair to describe his experience of a sound as ‘far away’ because he simultaneously experiences it as inside his head, at ‘the outer reaches of [his] skull’. There is something of a phenomenological paradox—of a ‘faraway’ sound mapped onto his head’s interior—causing him to conceive of his head as a somehow limited yet expansive space, one with horizons that do not correspond readily with his embodied sense of his head’s dimensions. He describes this as a ‘kind of limit on the unlimited’, another ‘universe of presence’, suggesting that the experience is rife with grand, sometimes captivating tensions, perhaps unlike other spatial experiences he has had in the physical environment.

Similarly, Henrietta and Kevin both found it difficult to conceptualize the ‘limits’ of their headspace during headphone listening:

I kind of feel like it's more porous. Like, it's generally a sphere, but it's not enclosed. The boundaries of the sphere are not ultimate. (Henrietta)

The sound is not... I mean, the sound is definitely close to me. But, on the other hand, the sound is not close to me. Do you see what I mean? The sound is not close enough for me to say that the sound is, like... How do you say? I don't know how to describe this. (Kevin)

For Henrietta, the sense of space produced by the headphone sound within her head eludes exact description. It seems at once to have a spherical dimensionality and to be 'porous'—a semi-permeable, flexible space that fits both inside the space of the physical head and stretches its perceived spatiality, as though made of some quasi-elastic material. Kevin's account resonates with Henrietta's in that he finds it difficult to make the idea of spatial 'closeness' fit concretely with his experience: he explains that the sound appears at once 'close' and 'not close' to him, suggesting that—as with Sinclair's account—there are elements of both dimensions to his experience, and that their elision in his headphone-space produces an awkward, ineffable spatial result. The interiority of the sound, then, appears to elude exact description: it is at once contained within bodily space yet has a dimensionality that is not reducible to the head's physical limits.

Finding comparable difficulties during detailed phenomenological recall, other listeners reached for deictic terms such as 'there' and 'here':

It's just *there*. It's just in an orb around my head, rather than being... Well, I never imagine it in a particular configuration, as such. It's just *there*. (Ursula)

Ursula's description suggests a notable, palpable ineffability to the ways in which she perceives the headphone-space—that the space, like that of her own lived body, is simply 'there' for her. She describes the orb-like quality of the bounded sound-space, though she appears unconvinced by her own explanation. Her difficulty in conceiving of the space suggests that the spatiality of headphone listening is something that she never readily considers. In its comparability with the space she inhabits with her own body, Ursula appears to find the idea of reflecting on the space strange, as though it is hard to express in terms of an exact location because to do so involves conscious reflection or 'imagination', as she explains it. Perhaps, then, we can read Ursula's lack of surety regarding the location of the headphone sound in relation to her body because her awareness of the headphone-space appears to be phenomenologically *akin* to her awareness of her own embodiment—as though the headphone-space has formed part of her

embodied space. Viewed in this way, the embodied familiarity of the headphone-space may suggest that Ursula experiences it as a space of habituated habitation (see also Downs 2021a), something that does not concern her or require her conscious attention due to how acclimatized she is to it. Her experience is revealing regarding the ways in which headphones, despite being consciously appended to the body, may conjure a sense of space that latches onto the body and ‘disappears’ into its schematic structure (see also Chapter 4, § 4.4), effecting a sense of spatial immanence for the listener, experienced as a ‘just there’.

The idea of being spatially ‘present’ with or in the sound was also something that Albert raised in his interview:

You know, it’s almost like it just becomes placeless in a way. [...] It just feels like something else is just taking hold, and you’re *with it* now. And it’s *there*, in charge of what your experience is going to be like, you know? (Albert)

Albert suggests that the idea of headphone-space being a locatable, exact ‘field’ feels unconvincing because there is a sense of the sonic space being ‘placeless’—something that he, as a listener, is ‘with’, something that is ‘there’ and which ‘tak[es] hold’ in some sense. The idea of immanence, of the sense of the all-compassing totality of the headphone-space, is clear in Albert’s account: that trying to describe an exact ‘place’ that the sound produces in terms of a specific location is difficult on account of it just being ‘there’ as some ineffable spatial field for him.

Dana also echoed the idea of an immanent ‘just thereness’ of headphone listening when she explained:

I don’t think about it that much. But I guess it is just sort of... It’s just *happening*. It’s not coming out of the headphones. It’s not in my head as such. It just sort of *exists*. (Dana)

Like Ursula and Albert, Dana rarely considers how to conceptualize the spatial constitution of her headphone-space, apparently because the space appears to her to be something that becomes a kind of *world* for her. One interpretation of Dana’s account would be that she experiences the ‘world’ of headphone listening as akin to the wider lifeworld: as always already *there* for her, ‘just sort of exist[ing]’—its very thereness as something that she experiences deeply and tacitly. Yet in its sonic-spatial immanence and immediacy, the existence and occurrence of the headphone-space is something that Dana does not experience spatially in the same way that she would sounds in the external world; she locates it not ‘coming out of the headphones’ nor ‘in my head’ but as a kind of all-encompassing reality

in itself, one experienced on different terms to how she would understand the specific locations of other objects in the world.

2.5 BODY-SPACE

How can we understand these highly complex, sometimes paradoxical experiences of headphone sound in terms of wider accounts of spatial perception? Ihde notes that when listening, one can feel ‘auditorily immersed and penetrated as sound “physically” *invades* [one’s] own body’ (Ihde 2007: 79; original emphasis); and in his classic paper introducing what he calls the ‘Walkman effect’, Shuhei Hosokawa offers a similar, though more poetic, account specific to headphone listening:

The walkman holder [...] listens to the sound come from his own body [...]. [W]hen the walkman intrudes inside the skin, the order of our body is inverted, that is, the surface tension of the skin loses its balancing function through which it activates the interpenetration of Self and world: a *mise en oeuvre* in the body, through the body, of the body [...]. Through the walkman, then, the body is opened (Hosokawa 1984: 176–77).

Ihde’s idea of sound’s *invasion* of the body—of the body as a space into which foreign entities can enter—correlates not only with Connor’s (2011) notion of the ‘great purgative obsession’ of bodily interiority that opened this chapter but also with my interviewees’ headphone-listening experiences considered above, with listeners spatially locating sound inside the body. In addition, Hosokawa’s account describes the body as ‘opening’ onto the world, in turn becoming its own sound-space. The idea, then, is of the body as an environment for sound—an ‘interpenetration’ of body and world through headphone listening. There is a clear sense of the spatiality of headphone sound being something ineffable—something that our vocabulary for describing the spatial arrangement of the wider lifeworld fails to specify. For my interviewees, headphone-space becomes the ‘only sphere of influence’, ‘just there’, and ‘here’—immediate yet highly mediated. What kind of space is this interiorized sonic domain?

Thinking in terms of existing work on the phenomenology of spatial perception, we can begin to understand these complex, elusive experiences by attending to how philosophers have tried to conceptualize the ambiguity of bodily interiority. Offering a cohesive, granular account of the phenomenology of intracorporeal depth has been a consistent challenge for philosophers. Part of the issue here is that one’s experience of embodied space, of the dimensionality of one’s own lived body, is neither reducible to one’s experience of space outside of

the body nor to scientific and geometric notions of objective or absolute space. In his extended phenomenological account of spatial depth, David Morris argues that ‘I perceive things in depth as here or there, near or far, in front or behind, and so on. But I do not perceive myself in this way’ (Morris 2004: 2). Morris suggests that while we are able to understand ourselves as objects possessing spatial ‘depth’ in the same manner as other objects in our world—for example, we can measure ourselves in relation to other objects, such as rulers, door frames, and other bodies—our *experience* of our own bodies’ depth does not readily correlate with our experience of the spatiality of the wider world. In Maurice Merleau-Ponty’s words, the lived body is more than ‘a chunk of space or a bundle of functions’ (Merleau-Ponty 1993: 124); and, as such, ‘we must not say that our [lived] body is *in* space, [...] but that it *inhabits* space’ (Merleau-Ponty 2012: 140; original emphasis), or that it ‘lives’ and ‘co-produces’ space (see also Lefebvre 1991). There is a clear sense in these statements that bodily space does not correlate phenomenologically with our experiences of external space.

Following the rationale of some of my interviewees, one way to begin to explain the phenomenology of the ‘lived space’ of the body is to acknowledge that the most ‘given’ dimension of my body’s spatiality is its status as *here*. We know—following the phenomenological axiom that to exist is necessarily to be in the world—that we, as bodies, are always *somewhere*. This experience of being-in-the-world is always spatial: Merleau-Ponty writes that ‘I understand the world because there is for me a near and a far away, foregrounds and horizons’ (Merleau-Ponty 2012: 430). On this account, the spatiality of the world that I experience in the first person is necessarily relational, as it is rooted in my own perspective as a ‘here’. In Drew Leder’s words, ‘[n]o matter where I physically move, and even in the midst of motion, my body retains the status of an absolute “here” around which all “theres” are arrayed’ (Leder 1990: 13). Philosophers term this type of spatial reasoning *egocentric* because any spatial relations that I perceive are always anchored to my own lived perspective as a body (Gallagher 2006).⁷ Given that it is the necessary origin of spatial experience, Merleau-Ponty suggests that the body might be understood as a ‘zero point of orientation’: that one’s own body is ‘the absolute “here”’ from which all external ‘places of space proceed’ (Merleau-Ponty 2003: 75). The body ‘holds things in a circle around itself;’ ‘it extends toward things, [as] that primary

⁷ The alternative, scientific model of ‘objective’ space, such as that which is edified by cartographical and geo-location technologies, is an *allocentric* framework, in which geographical space is produced positivistically and without a situated, embodied, partial perspective. Given the focus of the present work, there is little benefit to exploring this model here; but see Gallagher (2006) for a critical account.

here from which all the *theres* will come' (Merleau-Ponty 1993: 125, 136; original emphasis). Morris makes a similar point: that the lived body is always *situated*—it 'is the original "here", the origin from which here and there, near and far, exfoliate' for me (Morris 2004: 2). Simply put, we can conclude that the 'somewhere' that I am is always 'here' for me, and that, in my experience, the 'thereness' of other objects is always measured in relation to my own body. Being, for me, is being-here; I exist as a here that is 'thrown' into the 'there' of the world (Heidegger 1962: 174). To use Ihde's expression, my lived body is a 'here-body' (Ihde 2002: 4–7).

Egocentric space provides a useful framework for enabling us to access how we relate to other entities in the world, but it does not take us much further towards an account of intracorporeal space. The egocentric model helps me to reflect upon the status of my body as an object in the world, one that can be measured by scientific or third-person means and that possesses a material depth and thickness 'that joins with the ordinary depth of the world' (Morris 2004: 3); and it also necessitates that I understand my body as a more-than-object, given that it is only through my lived *experience* as a body in a world that the spatial depth of the world unfolds for me. This distinction correlates closely with the phenomenological distinction that we encountered earlier between the body-as-object and the body-as-lived (see Chapter 1, § 1.4). Moreover, it provides a conceptual crystallization of my experience as more than 'a point within a coordinate system already fixed outside me' (Morris 2004: 2) because it posits that space is not pre-given, but *lived* (Lefebvre 1991); it is co-produced in the relation between my body and the world. Yet the egocentric model does little to enable me to understand the *interior* space of my body. In fact, despite its focal role in the production of lived space, the spatiality of the body is broadly 'absent' (Leder 1990) in accounts of egocentric space.

How, then, to understand corporeal spatiality, when our experiences of space are always figured in relation to the 'zero point' of our bodies? As summarized in brief by Morris at the opening of this section, '[b]odily space can be distinguished from external space' (Merleau-Ponty 2012: 103). This is because my body is the baseline of my experience from which all perceived spatial relations subtend; I experience external depth and distance in terms of my body's relationship to the world around me. On this account, I cannot perceive my own bodily space in the same way that I might the dimensions of another person's body because my body is the 'here'-as-origin of my spatial orientations. While I can stand beside another's body, thereby forming a spatial relation with it, 'I neither stand outside of my own body, nor inside of my own body—indeed, whatever

inside and outside mean in this case, they depend on me being my body' (Gallagher 2006: 351). Moreover, I do not perceive my body as a space in the same way that I perceive the room in which I work as a space, or the objects within the room as laid out spatially. Merleau-Ponty explains this fundamental difference in bodily versus external space in terms of the body's schematic unity:

The contour of my body is a border that ordinary spatial relations do not cross. This is because the body's parts relate to each other in a peculiar way: they are not laid out side by side, but rather envelop each other. [...] Likewise, my entire body is not for me an assemblage of organs juxtaposed in space. I hold my body as an indivisible possession and I know the position of each of my limbs through a *body schema* [*un schéma corporel*] that envelops them all. (Merleau-Ponty 2012: 100–1)

I return to the notion of a body schema in greater depth in a later chapter (Chapter 4). For now, it suffices to identify a complex problem inherent in the phenomenological spatiality of one's own body: that 'ordinary spatial relations'—my spatial perceptions of the 'external' lifeworld into which I, as an embodied subject, am 'thrown'—cannot cross the lived body's phenomenological border, yet that I nonetheless experience a dimensionality to my body. Responding to the notion of 'ordinary' spatiality, Morris conceives of the spatiality of one's own body as possessing an 'extra-ordinary' depth. He offers the example of having a fever as a means of unpacking some of the paradoxical qualities of intracorporeal experience:

I feel cold. Not my usual feeling of cold, in which I experience my body as having a warmth and integrity protected by clothing, with the cold being something outside me in ordinary depth. The cold infiltrates me, it has no distance from me, it has seeped into the extra-ordinary depth of my body. (Morris 2004: 17)

Here, Morris identifies that he experiences his body's feverish modulations in temperature as something *internal*, not external, to him. His perception of the cold 'infiltrates' and 'has no distance' from his body—it is something internal, something experienced through *interoception*, as with cases in which one is able to locate the position from which an ache or pain emanates 'inside' the body (Craig 2003; Eccleston 2016; Ritchie and Carruthers 2015). It is perceived as occurring within the body's extra-ordinary depth, in turn being the result of something with 'no distance' from his lived body. The notion of distance therefore collapses in the experience of one's own bodily space—an observation redolent of Sinclair's earlier description of spatial 'collapse' during headphone listening (§ 2.3).

That said, as Morris also suggests, when I have a pain in my foot, I might reach down to inspect whether a foreign object is in contact with it, causing me pain. In doing so, ‘I am in part treating my body as a thing in ordinary depth, as having an interior ordinality of “heres” and “theres”’—an observation, he argues, that confirms how the ‘extra-ordinary depth of the body and the ordinary depth of the world are in exchange’ (Morris 2004: 3). There is a tension here that requires unpacking: that, as suggested by Merleau-Ponty, the lived body is experienced as a (spatially ‘extra-ordinary’) *whole*, but that it is also something ‘in exchange’ with the ‘ordinality’ of the lifeworld. On the one hand, I am my whole body simultaneously in that the ‘entire spread of the body counts as “here”’ (Morris 2004: 3). Beyond the notion of egocentric space, then, we might conceive of the interior spatiality of the body as a *proprioceptive* framework, with proprioception understood as the pre-reflective (though learned) ability to know the position of one’s own body in space (Eccleston 2016: 34–35). Kirk Besmer, drawing both from Merleau-Ponty’s and Shaun Gallagher’s work, notes that ‘insofar as proprioception is a pre-personal bodily self-awareness, we can speak of “proprioceptive spatiality of the body”’, a dimension of experience that he defines as ‘an intracorporeal unity’ (Besmer 2015: 64). While the lived body is the origin or ‘zero point’ of perceptions of external space, the body itself has ‘no center; there is no origin. There is the body as a diversity-in-unity’ (Besmer 2015: 64). On this account, the body is experienced through proprioception as a singular entity whose parts ‘envelop’ one another into an ‘entire spread’ of the lived body.

If, as Merleau-Ponty suggests, we are to understand the lived body as a whole, there would be little sense in stating, say, ‘that my nose is nearer to me than my right big toe’ (Besmer 2015: 64), because I am one embodied unity. Yet, on the other hand, we have seen that there is some sense of ‘ordinality’ to the body as well as an extra-ordinality—that is, that my body is an assemblage of imbricated parts (an ‘indivisible possession’, in Merleau-Ponty’s words), but that I am still in some sense able to understand my body as having distinct sections. I *live* my body as a whole, but I can perceive its parts in some degree of isolation. Such is the logic of *interoception*: perceptions of ‘internal’ stimuli located within the body at specific locations. There will be cause to return to the idea of the ‘zoning’ of the body later in the chapter (§ 2.7).

We might understand the in-head localization of headphone sound as a composite of three related modalities of sensory experience: hearing, because I perceive a sound and its apparent spatiality; proprioception, because I am tacitly, pre-reflectively aware of the location of my head and the spread of my bodily

space; and—to some extent—a form of interoception, because I locate the sound inside of my body as though it emerges therein, as a pain might.⁸ Here, we observe how technologies ‘can radically transform [...] one’s sense of one’s body’ (Ihde 2002: 70): in headphone listening, the object of one’s hearing—generally understood as a distance sense—becomes interiorized into one section of the body, the head, thereby sonifying corporeal space. In other words, recalling Ouzounian’s (2006, 2008) description of how Leitner’s *KOPFRÄUME* caused her to reflect on her own assumptions about her body—its spatiality and its finiteness—adduced above, headphone-mediated sound is experienced as a phenomenon unlike other sounds in that it yokes together with the spatiality of the lived body, nestling *with-in* a listener’s sense of corporeal space.

Going further still, other interviewees described an almost all-encompassing, spaceless experience to their headphone listening—as though the sound appears to them within their heads but that, in its immanence, the very idea of an auditory space ‘collapses’ (to use Sinclair’s term; see § 2.3 above). Gernot Böhme writes with conviction about this complex relationship between experiences of bodily space and sonic space during headphone listening:

Bodily space is neither the place a person’s body takes up nor the volume that it constitutes. A person’s bodily space is the sphere of his or her material presence. The latter continually transcends the limits of the body. [...] There are people who in a physical—more precisely, neurophysiological—way conceive of listening through headphones as music in the head, but that is only because, looking from outside, so to speak, at the person listening as an experimental subject, they have to locate the sounds that they hear somewhere in physical space. [...] This experiment demonstrates that the space of listening is a space of bodily presence that is independent of the existence of concrete things. (Böhme 2017: 180)

Böhme makes an interesting suggestion here: that, by imagining oneself as an observer looking ‘in’, the ‘space of listening’ that is constituted during headphone listening is attributed to the physical head’s interior for the sake of landing upon a feasible location for the sound by virtue of a person’s necessity ‘to locate the sounds that they hear somewhere in physical space’. But, to recall Merleau-Ponty

⁸ As A.D. Craig explains, ‘general bodily feelings’ such as interoception and proprioception were described by early German physiologists as *Gemeingefühl*, or ‘common sensation’, defined in distinction from the five ‘main’ senses because they evade certain commonalities pertaining to exterior stimuli perception that yoke sight, smell, hearing, taste, and touch together (Craig 2002: 655). Writers such as Christopher Eccleston (2016) work from a ‘neurophenomenological’ perspective to decentre the five senses model, arguing that ‘neglected’ proprioceptive and interoceptive ‘senses’ such as movement, temperature, and pain deserve to be more readily included in accounts of sensory perception. See also Mohan Matthen’s (2015) work on the philosophical logic underpinning the five-way division of the sensorium.

and Morris, bodily space is not reducible to the external ‘ordinality’ of the world; the lived body is more than an object—or ‘concrete thing’, in Böhme’s words—in physical space because its ‘extra-ordinary’ spatiality is always experienced, or ‘lived’, in excess of the ordinary dimensions of the world and its perceivable objects. In this manner, then, even the idea of locating a sound inside the physical space of the head becomes a kind of analogy: that because we have to locate the sound somewhere, the physical ‘space’ of the head appears to make the most sense to us, imagining it as a ‘container’ for sound (Katz 2010: 151; Nazemi 2010: 64; Ouzounian 2006; see also Galera-Masegosa and Erviti 2015: 109, 114; Pritzker 2007). But the lived body is always a more-than-object; it does not necessarily conform, in any phenomenological sense, to the spatiality of the body-as-object because it is always lived in *excess* of the body’s physicality.

In this way, and because our lived bodies may be said to be generally ‘absent’ for us during experience (Leder 1990), headphone sound appears to *give rise* to a concrete sense of interior bodily spatiality, overlaying the space of the lived body in terms of pre-reflective proprioception. Explaining the idea of the body fading into the background of our embodied experiences as subjects in the world, Leder undertakes a short phenomenology of the head in terms of visual perspective, stating:

The head is absent insofar as it immediately surrounds and underlies the eyes such that the eyes cannot achieve a perspective upon it. As I approach the center point and origin of vision I lapse into an invisibility no less certain than that which takes hold of objects increasingly distant. (Leder 1990: 12)

In this passage, Leder’s perspective correlates with Merleau-Ponty’s idea of the lived body as a ‘zero point of orientation’—that, as the origin of spatial experiences, it may disappear or ‘lapse’ into imperceptibility when one tries to focus on it because it is the fundament of our spatial experiences. This is what Raymond Tallis has described as ‘being haunted by the proprioceptive ghost of my head’, citing an occasional difficulty in grasping for ‘the sensations telling me that my head is heavy, warm, tingling, and aching, or simply there’ (Tallis 2008: 156). During headphone listening, this proprioceptive ‘ghosting’ is instead transformed into a material experience of the head as a space, because—to use Connor’s (2011) term—the sound, like a pain, *gives rise* to the sense of an interior spatiality that may not have been apparent without the sonic stimulus’s perceptual presence.

2.6 AMNIOTICS

One of the apparent consequences of the perceived spatiality of the lived body not correlating exactly with that of the physical body-as-object is that some listeners found it difficult to determine whether sound appeared for them to be wholly within them or whether they also simultaneously felt somehow *surrounded* by sound. For example, Vincent described the experience in terms of the fluidity of sound:

With the headphones, it's actually just flowing. Yeah, it's crazy. Sometimes it's flowing, like, around your head. Sometimes it goes through. [...] It didn't belong to you before, but now it belongs to you. (Vincent)

Vincent experiences the headphone sound as 'flowing' both around and through his head, like a liquid. He describes a sense of ownership over the space, of the sound as belonging to him, that appears directly related to its intimate relationship with his body. Similar qualities are manifest in the experiences of another interviewee, Hillary, whose description of the spatiality of headphone listening is intricate and sometimes paradoxical:

It's almost womb-like, you know? You're in someone else's body. I mean, it feels like that to me. [...] You've got this kind of, like, sound-life that's not your body, but it feels like it's in your own head. So that sort of makes me think about what it must be like to be *in utero*, with a woman's body around you that's operating and moving and making sounds. It's not your own body, but it's very much your environment. [...] It does feel like a liquid. It feels like going under. (Hillary)

For Hillary, headphones appear to replicate an imagined experience of being inside the womb, of the sound-based security of being entirely protected by the mother's body. She describes her sonic experience in liquescent terms—of 'going under' and feeling submerged.⁹ In addition, she offers a vivid description of headphone-mediated audio as a kind of 'sound-life', as another body that is 'operating and moving and making sounds', suggesting that she conceives of the experience as though she is inhabiting an extraneous, quasi-bodily 'environment'. This appears to be understood as an 'extension' of her own bodily space, forming a 'second body' in which she feels secure and less vulnerable (see also Jacobson 2009: 362, 356). Yet Hillary holds this experience of being ensconced in sound in direct tension with her recognition that 'it feels like it's in your own head', thereby

⁹ I return to the sonic relationship between headphone-space and wider environment in Chapter 5, especially § 5.2 and § 5.7.

suggesting that she is both within something greater than her body as well as entirely enveloping the sound and carrying it within her own body—as though she is both enwrapped by the sound and a vessel for it, suggesting ‘a kind of space you are inside as well as outside and it is inside you as well as you being inside it’ (Henriques 2003: 459). Here, I invoke Henriques’s description of the experiences of Jamaican dancehall participants who feel themselves ‘to be literally inside the sound and the sound to be inside them’ (464). Despite certain obvious differences between the sonic-spatial experiences of dancehall culture and headphone listening (see Downs 2021b), there are certain comparisons that may be drawn between these descriptions in light of Hillary’s reported experience. As Henriques also notes, ‘the conjunction *both/and* rather than the separation *either/or* appears to be particularly appropriate for thinking with and about sound’ (460; original emphasis). There is also resonance here with Jean-Luc Nancy’s broader description of the phenomenology of sonic space:

To listen is to enter that spatiality by which, *at the same time*, I am penetrated, for it opens up in me as well as around me, and from me as well as toward me: it opens me inside me as well as outside [...]. To be listening is to be at the same time outside and inside, to be open from without and from within, hence from one to the other and from one in the other. (Nancy 2007: 14; original emphasis)

Considered in this light, at the centre of Hillary’s account is a complex, evocative illustration of the specific sound-world of headphone listening, in which she describes an almost *amniotic* acoustics: as though the body is figured as both inhabited and inhabiting, as involved in a paradoxical collapsing of interior and exterior space, as filled with liquid-like sound and surrounded by it—in short, as *both* flooded and immersed.

2.7 ZONINGS

What we see in Vincent’s and especially Hillary’s accounts of headphone listening is an apparent difficulty to conceptualize the spatial reality of the sound in terms of the physical body, though their perceptual focus is clearly on and around what they perceive to be the lived space of their heads. I want to continue probing the tensions between the lived body as a ‘diversity-in-unity’ and as an ‘extra-ordinary’ spatial subject within which, through sonic mediation, we may locate particular ‘zones’. Unpacking more of the detail of how the body is experienced during headphone listening will afford greater understanding of the complex effects that

these technologies can have on listeners' experiences of embodiment, particularly regarding how a heightened focus on the head as a sonic space can interfere with other bodily perceptions and embodied processes.

For example, Elliott explained to me that part of his rationale for using headphones was to redirect his attention away from his sense of embodiment when exercising:

I like to go on the treadmill [...] and be able to zone out. And again maybe it's about escaping inside my head so I'm not so aware of my physical body. (Elliott)

Elliott suggests that headphones provide him with a means of 'escaping inside [his] head', which in turn causes him to be less aware of the physical exertions of his body—to 'zone out', as he puts it. Reg also described to me that using headphones enabled him to 'get into the zone' during exercise:

Some of the best workouts I've had are when I've just been totally in that zone. Again, that feeling of being sort of hazy-eyed—just so alert inside but not very alert outside. That helps, because I don't really like going to the gym, but I know I have to do it in order to be healthier and fitter and stronger. And so I'd rather not... Like, if I'm suddenly aware, I'm like: 'Oh, for fuck's sake. This is heavy, and I'm tired, and I can't be arsed.' But if I'm in that zone, it doesn't matter—I'll just keep going until I decide to stop. [...] It just feels nice when you've got that pulsing going on in there [*gesturing to head*] when you can't feel it in here [*gesturing to torso*]. (Reg)

Reg suggests that headphones and the music they relay enable him to reduce focus on how his body interacts with exercise machinery at the gym and enter into a flow state (Csikszentmihalyi 1997; Herbert 2011) in which he finds himself able to dissociate from the physical exertions of exercise (see also Dibben 2017). He describes this as an alertness towards an 'inside', perhaps suggesting that he is focused on the sound-space of his head and the audio content therein, compared with a reduced attention to the 'outside'. Interesting here is that attention to the 'outside' appears in Reg's account to refer to interoceptive perceptions of weight caused by his lifting of heavy objects at the gym. Moreover, Reg notes that he perceives a marked separation between his head and the rest of his body during headphone listening, citing the 'feel' of the sound in his head. One interpretation of this experience would involve foregrounding how Reg maps his experiences of physical exertion onto the objects that cause them, thereby 'externalizing' his sensations of weight and understanding them as occurring in an 'outside' that is

separate from the space of his bodily interior, which—specifically in the case of his head—is also the site of the headphone sound.

Other interviewees explained to me that they used headphones as a way to focus on their heads to ‘zone out’ other parts of their bodies during physical exercise:

Normally I listen to music to help me forget that I’m in pain. *[laughs]* My body wants me to stop! So if I really focus on a song and how I’d choreograph it, or how where else I’d play it, or if it takes me away to a happy place or a good memory... It’s a distraction, and it helps you forget that what you’re doing is quite monotonous and actually not that pleasant. [...] And listening to headphones really helps with that: zoning out part of your body, whilst keeping, you know... Being physically there. (Tatiana)

Tatiana suggests that music can have a quasi-analgesic effect for her during headphone listening by virtue of its capacity to help to distract her from physical exertion. These observations correlate with existing research into the potential pain-relieving effects of music during physical exercise (e.g. Fritz et al. 2017) and elsewhere (e.g. Choi et al. 2018; Garza-Villarreal et al. 2014), perhaps due to the neurological effects of music—its activation of analgesic ‘pathways’ in the central nervous system (Dobek et al. 2014)—and perhaps due to music’s ability to distract a listener from interoceptive perceptions. What I want to suggest Tatiana’s account contributes to our existing knowledge is that the specific use of headphones prioritizes a focus on the head as a spatial zone of the body, meaning that attention to other, more physically exerted areas of the body is reduced during listening. She makes specific reference to using headphones as a means of ‘zoning out part of your body’, suggesting that she conceives of her exercising body as made up of separate zones during headphone listening, with her head understood as a separate, more perceptually prioritized site. Tatiana’s perspective corresponds with D.E. Wittkower’s account of audiobook listening, in which he states that ‘the very purpose of many who listen to audiobooks while at the gym [...] is precisely to move the process of exercise into the background in order to undergo it without so distinctly experiencing it’, in turn using headphone sound ‘to fade embodied experience into background’ (Wittkower 2011: 228, 230). Considering Tatiana’s account in light of the neuroscientific and psychological evidence, then, it appears that headphoned music listening may provide (at least) a triple pain-relieving effect for listeners: its content, like Wittkower’s audiobook, can transport a listener into another narrative or world (Herbert 2011); it can activate analgesic neurological pathways; and, as I argue here, its spatial location inside the head can

direct a listener's interoceptive attention towards the head in lieu of other, more exerted areas of the exercising body.

A similar account was offered by Hillary, who opted to use her noise-cancelling headphones for a number of reasons:

I have used them running a lot in the gym. And I noticed that I think I get less tired if I've got noise-cancelling headphones on. And I think it's because I hate hearing my own breath. And one of the things I hate about running is how each juddering footstep—like, as you strike the earth, and you start to get tired—knocks breath out of you. And you can hear it rasp, and you can feel it rasp. And it's really unpleasant. It's one of my big turn-offs about exercise. [laughs] But in the gym with noise-cancelling headphones on, I definitely can go further on the treadmill. And it's, I think, because I can't hear myself breathe. I can't hear myself rasp. So the pain of rasping, of feeling out of breath, of your muscles aching and stuff—and all of that combining in this desire to stop—is just a bit delayed or a bit anaesthetized. (Hillary)

Part of Hillary's account of using noise-cancelling headphones during exercise suggests that, like Tatiana, she finds that the aching of her muscles becomes 'delayed' or 'anaesthetized' during listening by virtue of her attention being drawn to her head. In addition, and unlike Tatiana, Hillary is more concerned with using headphones to occlude the sounds made by her own body during exercise. She cites both the sound of her breathing and the sound of her feet hitting the ground as reminders that she is exercising, both of which she deems unpleasant. By reducing auditory attention to these sonic cues, Hillary finds she can feel 'less tired' and 'can go further on the treadmill', which suggests that, by enabling her to avoid both auditory and interoceptive perceptions pertaining to her own body's exertion, the spatial affordances of Hillary's headphones can have a palpable effect on her sense of embodiment and therefore enable her to improve endurance.

Contrary to Hillary's account, one interviewee—Sinclair—suggested that using in-ear headphones could sometimes make him *more* aware of his internal bodily sounds:

I can hear the blood in my head sometimes [when I'm wearing in-ears]. I can hear *ba-dum, ba-dum, ba-dum*, especially when I'm running. Occasionally, like, you're just listening to whatever, but you can really feel it and kind of hear it [...]. That really makes you think about your body in a different way. And when exercising during this, it just, like, has this machine quality to it. You know, it's like pumping in fluids that you wouldn't normally be able to hear. But now you can hear that, like, everything's moving. (Sinclair)

Sinclair's account of hearing the sounds of internal biological processes such as his heartbeat during headphone listening 'makes [him] think about [his] body in a

different way', as though there is a 'machine quality' to its functioning. Because he is generally less aware of these interior sounds without the use of his headphones, he finds that the experience causes him to reflect on what it means to be a living body, suggesting in turn that heightened attention to his body's physical processes almost causes him to feel a phenomenological distance between his lived, active, exercising body and his body as a site of biological processes. Not only, then, does Sinclair's account contribute to the discussion of bodily 'zonings' that is presented here, but it also offers empirical evidence supporting the phenomenological separation of the body-as-lived and the body-as-object.

Aside from Sinclair's heightened experience of interior bodily sounds when using headphones, analysis of the majority of the cases examined in this section suggests that a focus on headphone sound can afford listeners the ability to 'zone out' other facets of their own embodiment, be they the pains associated with physical exercise, the sound of their bodies coming into contact with the ground, or the sounds of other bodily functions such as breathing. While there are likely many other mediating factors, as foregrounded in certain neuroscience and psychology literature, my interpretation of the evidence here has foregrounded the *spatial* experience of headphone sound: that its 'all-encompassing' sound-space enables listeners to focus on one aspect of their bodies—the sound-world inside their heads' perceived interior—as a means of distracting them from other bodily zones or functions. In doing so, listeners appear to attempt to circumvent the experience of the body as a 'diversity-in-unity' by focusing on relayed sound as it appears to them in a single area of the body, the head. What we may observe in such cases is a calculated use of headphones and the sounds they relay to enable other bodily tasks to be undertaken, in turn suggesting that listeners' awareness of the spatial reality of headphone listening has practical outcomes relating specifically and directly to experiences of bodily space.

2.8 THOUGHT-SPACE

Later in our interview, Sinclair continued to trace out a similar strand of his experience when describing his ideas about the head as a site of 'self':

Like, my self is kind of my head, and my body is kind of the tool I have, almost. It's not quite that clean-cut. I also wrote down some things [in my experience diary] about 'life in the head'. So most of the time I think, like, I'm living up here somewhere [*gesturing to face*]: behind the eyes, between the ears, behind the mouth. [...] So somewhere between, like, the bottom of the ribs and top of the head. No,

I'm going to say from the eyebrows to the ribcage—that's, like, where senses of self are. And when I talk about the sphere of sound things, it's always in that range somewhere, usually encompassing the head. (Sinclair)

Sinclair makes a close link between the area of his body that is sonified through headphone sound and the location of what he feels to be his sense of 'self'. He describes that he feels as though there is a sense for him of 'life in the head', lingering somewhere behind the eyes and between the ears. Perhaps it is due to many of his major perceptual faculties—eyes, ears, nose, mouth—being located in his head, meaning that he perceives the world through many sensory modalities through the *perspective* of the head. But it may also be a result of the cultural focus on the brain as the site of subjectivity, reflecting the age-old idea popularized by the likes of René Descartes (1991) that the 'mind'—something head-based—is somehow separate from the rest of the body. There will be cause to return to the so-called Cartesian mind-body problem in the next section (§ 2.9). For now, it suffices to acknowledge that, for Sinclair, the head represents an important locus of the self for him, apparently related to the idea of the sonic 'sphere of influence' that he described in a passage cited earlier in the chapter (§ 2.4).

Sinclair's notion of the head as a central locus of self is intriguing in its challenging of certain philosophical considerations encountered above pertaining to the idea of the whole body being experienced as a complete unity. For example, Tallis writes that 'of all the items in the world, my head is the one that seems closest to me' (Tallis 2008: xiii). Writing phenomenologically, Tallis suggests that '[d]welling on our relationships with our heads is a way of getting hold of our relationships with ourselves: what it is to be this self' (4):

[W]hen I reflect on my self, in that artificial state when we do philosophy, and try helplessly to catch ourselves unawares, we locate ourselves just behind our eyes and perhaps above our mouths, in a little virtual space from which we taste the world. This is where we are, we think. But is it where we think? (13)

In addition to being a central locus of 'self', then, Tallis asks whether the head is the site of *thought*. Thought, for Tallis, appears to be something that he deems integral to our experience of self: 'we tend to think of ourselves—and in particular our heads—as a kind of private space in which special—secret, occult, mental—events take place' (276); 'that thoughts are *in* the thinking head' (280; original emphasis).

Linking ideas about the head as the space of thought directly to headphone listening in a manner that aligns closely with Tallis's, Ouzounian

writes that at times during her ‘situated listening’ to *KOPFRÄUME*, she noticed that the sound from the headphones served to sonify ‘the private, secret chambers of the head, previously reserved for the mysterious working of the soul and the all-too-familiar sounds of the inner voice’—evidence, she suggests, that ‘physical and metaphysical spaces, or real and imagined ones, can co-exist at the intersection of sound, space and the body’ (Ouzounian 2006: 77). In other words, as she listened to the works, the sound mediated by Ouzounian’s headphones appeared to tread a fragile phenomenological boundary between the head as a (quasi-physical) space for sounds and the head as a (metaphysical) ‘space’ for thoughts. This interdimensional blurring of the head’s interior was ‘unsettling’ in its realism: ‘As the sound space merged with my interior head space, I would forget that I was listening to a sculpture and not merely the sounds of my own subconscious, amplified by the sparse but complex, stealthy sequences of sound’ (77). In considering how the head might be conceived of as a space in which material and immaterial ‘objects’, such as sound and thought, can commingle, Ouzounian in turn suggests that perceptions of sound-space and thought-space appear to imbricate or merge for her during focused headphone listening.

The account that Ouzounian provides of her headphone-listening experience here shares some characteristics with one of Herbert’s analyses of her informant Imogen’s reported experiences. Imogen had described that she sometimes used music to ‘block out’ thoughts, leading Herbert to suggest that the headphone-mediated music provided Imogen with

the sense of a personal mental space that can become subject to intrusion from unbidden, non-volitional thought. Imogen uses music to ‘protect’ this space, ‘to block out’ such intrusions. Music appears as a thing-like defence, seen to occupy a defined space inside the head, the underlying belief being that, if it occupies sufficient mental territory, there will be no ‘room’ for thought to coexist. ‘Not wanting to think anything’ is a valued goal, music serving to flood or distract the mind (Herbert 2011: 63).

Herbert’s analysis offers a further dimension to our understanding of the potential phenomenological relationship between sonified headspace and thought-space. She suggests that, in terms of Imogen’s experiential account, there appears to be a sense of a finite *amount* of space in the head—that ‘there will be no “room” for thought to coexist’ with sound if Imogen relays music through her headphones into the perceived interior of her head. There are resonances in Herbert’s account with Bull’s (2000, 2007) notion of the ‘management’ of ‘cognitive contingency’ through personal-stereo use, namely the idea that ‘unwanted or uncontrollable

thoughts' can be 'blocked out' (Bull 2000: 24) through the use of the personal stereo; but Herbert's phenomenological analysis takes these ideas to a more acutely spatial-perceptual level, suggesting that thoughts commingle with sounds, with the latter serving to 'protect' the head's interior from unwanted thoughts.

Many interviewees followed Sinclair's, Tallis's, Ouzounian's, and Herbert's rationale of linking the head—and, by extension, headphone sound—with notions of thought and self. David, Albert, and Dana acknowledged a close association between in-head localized sound and the space of cognition:

I hear it in the same space that I hear my own thoughts. Does that make any sense? [...] If I'm listening when I've got the headphones in, it feels like it's in my head. (David)

I definitely associate it with the mental, with the mind. And there's that kind of numb, physical aspect to it. (Albert)

I guess it is in my head. And I think also that if you're not singing along, I think you can still 'think along' sometimes. (Dana)

David makes a clear correspondence between in-head localized sound and the 'space' of thought. He also suggests that he 'hears' his thoughts in an internal voice, akin to Ouzounian's description considered above. For Albert, the immateriality of the 'mind', as he puts it, seems to coexist with a 'numb, physical', more material sensation during headphone listening. And in Dana's case, the imbrication of thought and sound in the lived space of the head enables her to 'think along' to a song's lyrics even when she is unable to use her voice to sing aloud, suggesting that the space in which she 'thinks' is close to or identical with the space in which she hears the sound.

Tatiana's account was particularly rich with regard to the imbrication of sound and thought. She explained to me that, when using headphones,

My thoughts just feel absolutely more contained. So, like [...] a helmet [...], it feels like everything's being kept inside my own head. I feel a bit more private, I think. [...] If you're wearing headphones, it feels really, sort of, secret and private. [...] That chamber feels, like, whole. Do you know what I mean? Like, sacred and personal. (Tatiana)

Using the analogy of wearing a helmet to protect her head and the thoughts within it, Tatiana describes her experience of thinking during headphone use as deeply private, as though the bounded quality of the sound is keeping her thoughts 'inside' her head and 'contain[ing]' them, in turn demarcating the space

as one that is ‘whole’, ‘personal’, and even ‘sacred’. This correlates with Herbert’s reading of her informant Imogen’s experiences adduced above. To probe the experience in greater depth, I asked Tatiana whether the specific sounds she listened to ever impacted on her thoughts. She replied:

I think headphone music and your thoughts can become mixed and intertwined. They may trip over each other. The song becomes part of the thoughts you’re having at the same time. There’s very complex psychology going on. And it’s a very personal thing. (Tatiana)

Like Ouzounian’s experience of the Leitner sound sculpture, Tatiana finds that there is a sense of sound-space and thought-space commingling during headphone listening. She describes their interaction—that they sometimes ‘trip over each other’—as well as their near fusion. Specific types of thought were experienced differently, too:

If they’re, like, negative thoughts, then maybe they feel like they’re coming from within. [...] It’s like a knot in your head that is trying to get out, maybe. [...] Whereas positive thoughts are a lot more fluid and feel like they’re coming in and out. And maybe that’s the same with songs you like and songs you don’t like. (Tatiana)

Here, Tatiana suggests that she experiences positive and negative thoughts differently, the former more ‘fluid’ and mobile, and the latter more fixed and interiorized. She makes a connection between these observations and her experiences of headphone sound, namely the idea that songs she likes are more fluid and perhaps more pleasurable, whereas a song she dislikes might feel like an intrusion. These experiences could be powerful for her, but she viewed them with a degree of caution:

I’m always very conscious of the fact that, like—not to get too weird, but—who I am as a person is contained in this little skull and this mass of flesh within it. And it does feel very vulnerable at times. Like, you may think you’re in control of it, but then you can change how it feels so quickly. You can change how it feels with headphones. You can flip switches. And while that’s great, it’s also a bit weird when you think about it. (Tatiana)

Here, Tatiana engages more directly with the idea of the head being a site of ‘self’ being contained within her head, specifically in the material ‘mass of flesh’ of her brain. Continuing her account of perceiving a deep connection between sound-space and thought-space during headphone listening, Tatiana explains that headphones can dramatically change how her head ‘feels’. This seems to be both

an emotional and a more directly perceptual ‘feeling’: that, as with the helmet analogy she made earlier in our conversations, she feels that her head is somehow protected by headphones, but also that her *thoughts* are impacted by the sounds they relay.

Bathsheba echoed Tatiana’s experience of noticing the effects of headphone use on her thinking when communicating with work colleagues over the phone:

If I don’t have headphones on [during a work phone call], my mind wanders.
(**Bathsheba**)

As with Tatiana’s invocation of the helmet analogy, Bathsheba makes an interesting connection between cognitive focus and headphone listening, suggesting that—like Tatiana—headphones can serve to *contain* her thoughts and in turn allow her to maintain attention. We can interpret a spatial element to this admission: that the headphones not only bracket her audition (see also Chapter 5) and focus her attention on the audio, but they also relay the audio into her head, which she associates with the space of thought and mental concentration:

And it feels like it’s in your brain, yeah? That actually it’s going straight to your brain, for you to be able to concentrate on. That sounds really weird! (**Bathsheba**)

Bathsheba makes sense of her enhanced concentration during headphone listening by drawing from anatomical (as opposed to phenomenological) knowledge about her brain also being inside her head. Extrapolating specifically from the locational link between headphone sound and the brain, she appears to suggest that their coincidence could affect cerebral function—that her ability to focus so acutely on the sound and the feeling that ‘it’s in your brain’ enables her somehow to cognize or mentally process the content of the sound more efficiently.

Bathsheba was one of many who referenced the brain during their discussions of the spatial location of headphone sound:

I feel it’s pretty much always cerebral. (**Reg**)

And another thing is that, for headphones, it’s kind of like [in your] ear and sometimes your head. Maybe, like, your brain or something? It’s kind of like this is the key thing that makes you relate to the sound. (**Vincent**)

[The sound feels] deep. It’s not, like, an external thing—like: ‘Oh, I can feel it.’ It’s like it’s going right into, like, the bottom of your brain. [...] It heightens your brain activity, I think. Surely. (**Tatiana**)

Reg's use of the word 'cerebral' invokes not only the in-head location of the headphone sound but also connects this space with that of the brain and cognition. Vincent similarly posits a potential causal link between the sound's location within the ears and head and the brain as the site of cognition. As with Bathsheba, Vincent exhibits some awareness of the speculative reasoning that underpins his phenomenological report: there is not a sense of surety in his suggestion, but there is a clear anatomical logic to the statement. For Tatiana, the interiorization of the sound is something she can *feel*, as though it is in the base of her brain, which she suggests has a direct effect on her 'brain activity'.

2.9 SKULLSCAPE

In the previous section, a phenomenological connection between the location of headphone sound and the 'space' of thought was noted by many participants. Some individuals chose to reflect more specifically on how the phantasmal space of thought might relate to the physical contents of their skulls, in such cases effecting an elision of thought-space and the location of the brain. In this section, I want to unpack some of the philosophical issues that arise from the notion of locating thought inside the head, and to consider how the intersection of (material) sound and (immaterial) thought within the head speaks to wider ideas pertaining to embodiment.

Writing in a similar vein to Ouzounian (2006), Peter Salvatore Petralia (2010) considers the in-head localization of sound afforded by headphone listening in relation to works of art, specifically those drawn out of theatre practice. Unlike Ouzounian, Petralia focuses more in his analysis on the idea of the head as the site of the *brain*, specifically regarding 'the notion of *sound and physical presence being re-located to within a viewer's brain* through the use of headphones in live performance' (Petralia 2010: 96–97; original emphasis). As Petralia writes, 'I believe advanced headphone [...] technologies offer unique opportunities for artists to create experiences that question notions of physicality, spatial awareness, perception and, indeed, the boundaries of reality' (97). In this way, the evidence provided in the previous section regarding listeners' phenomenological links between headphone sound, thought, and bodily interiority seems to align with Petralia's ideas about the brain as a site of sound—that 'sound is simultaneously spatially relocated into the acoustic shell of the brain and in the imagined space around the listener' (101–2).

Suspending our phenomenological inquiry briefly and thinking as an anatomist might, there is little scientific logic to thinking—as Bathsheba and others did—about sonic energy having a direct, palpable, vibrational effect on the brain; nor that the brain is a form of ‘acoustic shell’, to use Petralia’s term. It goes without saying that the brain plays an important role in hearing, both cochlear and non-cochlear (see Ashmore 2018; Schnupp et al. 2011 for reviews); and there is ample evidence to support the claim that sound, especially musical sound, can have a profound impact on cerebral function (see, e.g. the evidence regarding neurological activation of analgesic pathways in § 2.7 above). Yet the brain deals in *electrical* signals, with the auditory system transducing sound energy at the primary auditory cortex; so, at least in terms of audition, the brain does not function by registering the *vibrational* energy of sound.¹⁰ In neuroscientific terms, then, the notion that the brain is a kind of functioning ear that resonates in sympathy with sound would be deemed risible: ‘We don’t want to look for places in the brain that vibrate like guitar strings, any more than we want to find places in the brain that turn purple when we imagine a purple cow’ (Dennett 1991: 49).

Yet thinking again in terms of phenomenological reality, the notion of headphone sound being spatially linked with the brain, and relatedly with the perceived spatial ‘location’ of thought and cognition, was deemed by some interviewees to be a noteworthy aspect of their experiences. In tandem with the spatial-perceptual experience of hearing sound as though it inhabits the head, interviewees appeared to draw from the cultural notion of the brain as the site of the ‘mind’, consciousness, and thought to explain their bodily connection to headphone sound. As with all culturally mediated tropes, such ideas have been compounded over centuries, with the brain having long occupied a peculiar position in both scholarly and lay philosophies of mind as both the assumed subject of thought and an object of much thought-focused debate. One of the most influential philosophers of the mind–body relationship was Descartes, whose dualistic conceptualization of the mind’s relationship to the body remains an

¹⁰ When administered in specific clinical settings, there is some evidence demonstrating the efficacy of ultrasound as a non-invasive alternative to certain procedures including deep brain stimulation (DBS) and vagus nerve stimulation (VNS), as in treatments such as magnetic resonance-guided focused ultrasound (MRgFUS) thalamotomy (see Giordano et al. 2020 for a review of empirical studies since 1990; see also Harary et al. 2019). In DBS and VNS, electrodes are surgically implanted into the cerebral mass, emitting electric stimulations in response to particular fluctuations in brain activity. Ultrasound circumvents the need for surgery, though there are issues pertaining to the physics of the head, including the resulting refraction of sound as it is passed through the skull (see Tyler 2011: 34). Nonetheless, for the present purposes, it suffices to acknowledge that the brain does not ‘hear’ the sound as the ear might during MRgFUS; and the ear could not hear ultrasound, so named to denote frequencies higher than the normal threshold of human auditory perception (20,000 Hz).

obstinate source of vexation for contemporary theorists of embodiment (see Westphal 2016). In a letter dated 29th January 1640, Descartes offers a hypothesis that the union of the physical and mental components of a human being could be found at a particular point inside the brain, reporting that he has been studying

the function of the little gland called *conarion* [pineal gland]. My view is that this gland is the principal seat of the soul, and the place in which all our thoughts are formed. [...] It is supported and surrounded by the little branches of the carotid arteries which bring the spirits into the brain. (Descartes 1991: 143; original emphasis)

Descartes's curious decision—which was not without historical predicate (see Lokhorst and Kaitaro 2001)—to select the pineal gland, a small component of the central brain, as the hinge between physical corporeality and mental transcendence and the ‘place in which all our thoughts are formed’ is today considered something of a source of amusement for neuroscientists and philosophers alike—a material artefact of historical inaccuracy regarding the ‘nature’ of consciousness and its anatomical basis. Recent developments in cognitive science and its philosophical developments push hard against the potential implications of locating thought and experience within the brain and head. As Daniel Dennett writes: ‘What is wrong with Cartesian dualism [...] is not that Descartes chose the pineal gland—as opposed to the thalamus, say, or the amygdala—as the locus of interaction with the mind, but *the very idea* of such a locus of mind–brain interaction’ (Dennett 1991: 41; original emphasis). For Dennett, we can never be brains in jars; we exist because we are *embodied* subjects; we live because we experience the world; consciousness is a material, embodied phenomenon. As Tallis writes, the idea of locating thoughts in the head ‘has had the unfortunate consequence that many philosophers have identified thoughts with activity in the brain of the thinker. A thought, they say, is simply a cluster of neural activity’ (Tallis 2008: 280; cf. Ryle 2009: 24–28). Tallis disagrees—as does Lisa Blackman, writing more acutely about the relationship between immaterial and material embodiment to suggest that such ‘neuro-reductionism cannot capture or contain experiences which also extend beyond the limits and boundaries of the fixed and static “Cartesian body”’ (Blackman 2014: 303). Such an ‘extended’ experience may be identified in the in-head localization of headphone sound, whose intracorporeal dimensionality destabilizes the idea of a ‘fixed and static’ body. Proponents of the notion of an ‘extended mind’ argue that cognition must be understood as externalized and ‘spread into the world’ (Clark and Chalmers 1998:

18). And such ideas have a basis in the phenomenological philosophies we have encountered here: Merleau-Ponty (2012), for example, works hard to circumvent the Cartesian dualism of mind and body, suggesting that consciousness is always already an embodied phenomenon born of the yoking of body and world (see Hass 1993).

How, then, can we account for the phenomenological reality noted by many interviewees and published writers of the head as a site of thought that is affected by sound when philosophers and scientists today argue so strongly against the idea of brain- or mind-centred cognition? Recall Connor's (2011) opening gambit to this chapter, in which he traces the historical notion of 'phantasmal spaces' in the body that can be invaded. Anatomists would say that such spaces do not exist: that they are at best a perceptual illusion and at worst a cultural delusion.¹¹ Yet in the cases considered here, the phenomenology of in-head localization caused listeners to conceive of such a space as a perceptual *reality*, in many cases compelling them to reflect upon and rethink their understanding of their own sense of embodiment. In Petralia's (2010) case, the idea of the brain as an 'acoustic shell' functions as a rich phenomenological metaphor: that headphone sound's location inside the head can also affect how listeners (perceive that they) process thoughts through this spatial analogy. Following Connor, then, perhaps we ought therefore to identify that these experiential reflections are founded upon both *perceptually* and *culturally* mediated rationales, emerging in the pre-reflective and reflective processes underpinning how individuals attempt to make sense of their experiences—that is, in terms of wider knowledge, ideas, and (real and imagined) perceptions. This is what Ihde (1990) terms the relationship between (sensory) 'microperception' and (cultural) 'macroperception', specifically denoting the importance of culturally mediated factors in our direct perceptions of the lifeworld.

While ideas of separating thought from body are deemed a woeful hangover from Cartesian thought, then, these clearly have a lasting impact on

¹¹ Perhaps counterintuitively, references to internal bodily 'cavities' pervade medical knowledge. The term 'cavity', from the Latin *cavus*, often denotes a sense of hollow space yet is commonly used to describe sections of the body's anatomical interior. Generally speaking, the human body is a mass of tissues and liquids, meaning there is in fact little 'hollow' space therein. 'We speak continually of the cavities' of the body, write two nineteenth-century anatomists, 'when correctly there are none in the animal body; for there is no empty space' (Bell and Bell 1827: 360). Anatomists continue to speak of the many major cavities of the human body, which include the dorsal, ventral, and cranial cavities. In cases of normal, living functionality, these zones are filled with organs, lesser tissues, and liquid. As such, they are only ever cavities in potential: were the organs to be removed, they could—for the sake of argument—become 'hollowed out'; but uneviscerated, the cavities are full of fleshy materials and fluids (see Drake et al. 2020; Mansour et al. 2019: 19–68; Newell 1999; Stockwell 1999; see also Brown and Vahidassr 2018).

individuals' understandings of their experiences. Leder puts the perspective I take here in clear and concise terms:

I am not in sympathy with this dualist portrayal [of mind and body]. Yet I seek a phenomenological account of why Cartesian-style dualism would be so persuasive. Only in such a way can we break its conceptual hegemony, while simultaneously reclaiming its experiential truths. (Leder 1990: 3)

It is certainly not, then, that phenomenologists should be viewed as condoning or subscribing to the axioms of Cartesian metaphysics when addressing experiences that appear to derive from its principles. Instead, the rationale—indeed, my own rationale here—stands upon the argument that a robust phenomenology should account for the cultural dimensions of perception and self-perception, just as a robust cultural analysis should in turn focus on the details of material experience (Connor 1999, 2000b; see also Csordas 1999). We cannot easily disregard such phenomenological correlations when they appear prevalently in the data corpus on the grounds that contemporary scholarly thought dissuades its acceptance—and, I would argue, we should not *wish* to disregard them, as they reveal complex, peculiar dimensions of individuals' experiences of thought, self, and sound.

To illustrate the interesting complexity of these multidimensional listening experiences further, I want to elucidate more of the phenomenology of sonic head–mind–brain linkages and their inherent implications through the lens of the work of writer and playwright Samuel Beckett and its scholarly reception.¹² Scholars have analysed Beckett's theatrical and radio oeuvres in terms of what has been called the *skullscape* model. Introduced through the work of Linda Ben-Zvi (1986), the notion of the skullscape refers to Beckett's setting of some of his works wholly or partially *inside the head*, during which '[t]he skull becomes the circumscribed center from which the fictions emanate, a place from which the speaker attempts the triple task of defining the inner and outer world and of coalescing the two' (Ben-Zvi 1986: 104). Beckett focused heavily on the relationship between sound and the body during his work, with Catherine Laws writing that

Beckett commented more than once that as he grew older the sense of hearing was becoming more important, adding 'There is always something to listen to'. The meaning is unclear though: is it ambient sound to which Beckett refers, or

¹² Almost all Beckett works that are specifically named throughout this section are dramatic works, available in transcript in Beckett (2006). The only exception is the *Trilogy* (Beckett 1997), a series of three novels (*Molloy*, *Malone Dies*, and *The Unnamable*).

sounds in the head? [Charles] Juliet describes Beckett sitting still for hours, listening to his 'inner voice', but even if this is accurate we have no idea what he listened for or heard, and whether actively or passively. (Laws 2010: 188)

Sound technologies enabled Beckett to explore these 'inner voices' more in formats such as radio drama. For example, Kevin Branigan argues that Beckett's radio dramas represent a desire to 'magnify' fictional characters 'using the microphone, presenting intimate portraits, even presenting a character's "skullscape", or internal mind' (Branigan 2008: 30–31). More recent staged performances of his radio plays continue to harness sound technology to advance Beckett's creative desires: the Irish theatre company Pan Pan produced a staged version of the radio play *Embers* in 2013 featuring a specially designed, four-metre-tall plywood skull inside which actors performed their lines into microphones linked to a 600-speaker radial array, producing a sound-sculptural reimagining of the sonic world scripted by Beckett (Crawley 2013).

The body, and specifically the head, therefore represents a central component of Beckett's explorations of sound and subjectivity. Beckett had a peculiar 'fascination with the space inside the skull' (Salisbury 2010: 213), including a strange obsession with the neurosurgical practice of craniotomy and of 'gazing into the synaptic chasm' of the head (Beckett, in Salisbury 2010: 213). Channelling this curiosity into his practice, in some of Beckett's later plays we may observe that 'theatrical bodies are reduced to a hand, a mouth, or a skull' (Zhu 2020: e25). These bodily spaces are often categorized by their sonic qualities: Wenjun Zhu describes, for example, a character in *That Time* who 'listens to his own voices [...] surrounding him as if they are speaking inside his skull' (e26), and 'the buzzing and dull roar in the skull' of the character Mouth in *Not I* (e27). As Sarah West describes, Beckett's skullscapes are 'hollow acoustic arenas in which voices could resound' (West 2010: 31). Moreover, as the 'physical' locations of certain works, skullscapes become spaces to *explore*: Ben-Zvi shows, with reference to *The Unnamable*, that 'all these enclosures are variations of the same skullscape first explored by the Unnamable: "the inside of my distant skull where once I wandered, now am fixed"' (Ben-Zvi 1986: 4). The skullscape therefore engages with many of the ideas of interiority, embodied deixis, zoning, and material–immaterial head–mind linkages explored throughout this chapter.

I want to focus here particularly on Laura Salisbury's (2010) rich development of the notion of skullscape in a book chapter on Beckett and language. For Salisbury, skullscape refers to the 'strangely cranial spaces' described in some of Beckett's texts from the 1960s in which characters' 'bodies

are confined within the space that compulsively imagines them’, one whose ‘walls may in fact be more cranial than architectural’, and from which it can be interpreted that Beckett has an ardent ‘interest in the space inside the skull and its opening on to the world’ (all Salisbury 2010: 216). Salisbury provides a rich and poetic reading of these skullsapes as occurring within ‘[t]his bone that might become a shield’, spatio-aesthetic decisions that seem to reflect a ‘desire for the skull to be a last refuge’ (216). There are clear resonances here with ideas of delimiting the space of the head as a kind of protection for thought and subjectivity adduced in the interview data above.

However, as Salisbury concludes, the possibility of retreating into one’s bodily interior, and especially into one’s sense of ‘mind’—of finding ‘a stable speaking subject [...] in this solid thinking head’—‘is a vain hope’ (216). Salisbury writes that, for Beckett,

it is precisely [...] the penetration of the cranium, of going deeper and further inside, that seems intuitively to get one nearer to a kernel of a graspable and stable subjectivity. But [...] getting inside the head does not open up a smooth empty space, a cavern containing nothing on to whose walls immaterial shadows might be projected, although neither is it solid and substantial; rather, the head is bulging with matter. (217)

What becomes apparent in Salisbury’s reading is the head as—to recall Connor’s (2011) term cited at the opening of this chapter—a ‘phantasmal space’, one that is necessarily beyond simple description. Yet it is this phantasmal idea of bodily space that is revoked in Beckett’s later works:

[B]y the time of the *Trilogy*, the purity of the mind imagined as a monad no longer convinces; instead, mind is, as often as not, replaced and displaced by brain and body. The space inside the head is no longer self-sufficient, a windowless retreat, relieved of all engagement with exteriority. The head is, instead, a perforated container of recalcitrant substance, drinking in impressions and reflexively streaming language in ways that determinedly denude the text of a neatly intending or immaterial mind that could close its own curtains on the world. (217–18)

What we may observe in Beckett’s creative responses to the head is a tension: a desire to ‘find’ the ‘mind’ within the head’s substance as a means of accessing the foundation of thought, language, and experience, but a desire that is never satisfied. The mind, in Beckett, is only ever embodied—something ‘replaced and displaced by brain and body’, and something that is contingent upon its being-in-the-world. There is a wilfulness to reach the ‘essence’ of consciousness in Beckett’s work, but this aim is never achieved. At the core of these aesthetic

practices is an inevitable philosophical failure: an ardent pursuit of an interior bodily space, the head, that acts as a ‘self-sufficient [...] retreat, relieved of all engagement with exteriority’. Such a space is only ever phantasmal.

Applying the insights of the skullscape model to headphone listeners’ experiences, then, we can identify some commonalities. Headphones enable listeners to ‘retreat’ into an apparently ‘self-sufficient’ world of private sound, a phenomenal field that is internalized and controlled. While the technologies mediating the sound are necessarily ‘exterior’ to the body, the ‘all-compassing’ experience of the sound offers a sense of a kind of phantasmal yet phenomenologically real world of seemingly ‘pure vibration’ (to recall Dyson’s terminology) that intersects with the space of thought. In doing so, headphone sound becomes a medium through which to conceive of one’s own body and its interiority as an immaterial and material space—of being both contained within the skull, or even the ‘acoustic shell’ of the brain (Petralia 2010), and necessarily breaching its physical boundaries in its status as a lived body—forming part of a broader attempt to make sense of experiences of thought and of being a body in a world. If the interior spatiality of the body is something that confounds us, the ability of headphone sound to ‘give rise’ to a concrete experience of such an internal world, one that listeners experience as a kind of acoustic *territory* limited to bodily space (Downs 2021a), is noteworthy. In this way, listeners conceive—however ‘unscientifically’—of the interior spatiality of headphone sound as producing a close relationship with notions of ‘interior’ thoughts and ideas about the brain; it is through the medium of sound that they are able to disentangle and make sense of their ideas about the location of thought and its relationship to perceptions of embodied self. Perhaps, then, listeners attempt to conceive of the physical space of the body-as-object in a similar way to Beckett: a desire to untangle the complexities of experiencing and having agency over thought and subjectivity, in a space that is never truly a ‘space’ in the worldly sense of the word, by means of sound.

2.10 FLOODINGS

Throughout this chapter, I have engaged with a diverse range of issues pertaining to the experience of sonic interiority during headphone listening. First (§ 2.2), I identified what many have deemed to be a ‘problem’ about headphones’ presentation of sound: that it creates an ‘unnatural’ sense of sonic interiority during listening that should be ‘mitigated’. Working to nuance this negative view

of in-head localization, I explored how listeners experience auditory space during headphone listening as a material, interiorized phenomenon (§ 2.3), impacting their understanding of the relationality of embodied space, specifically the relationship between notions of inside and outside, here and there. I observed how some listeners experience a sense of spatial ‘collapse’ (§ 2.4): of the very idea of sonic space as unfolding in the in-betweenness of bodies and entities in the world falling in upon itself as sound appears to inhabit the body’s interior, negating such spatial separation and leaving in its wake a sense of an ‘all-compassing’ ‘sphere’ of sonic ‘influence’. Unlike locating a sound in the wider environment, headphone sound appears to some listeners to travel no distance, instead emanating from *within* the body. I suggested that such experiences tread a multimodal sensory path between hearing, proprioception, and interoception (§ 2.5): a sensation that—to recall Tallis’s expression—the ‘proprioceptive ghost’ of the head becomes *sonified*, ‘giving rise’ to some form of interior spatiality through sound.

Moreover, headphone sound’s fluid, spatial-yet-spaceless appearance regularly eluded simple explanation, appearing both within and without, as ensconcing and as filling the head’s interior (§ 2.6). This focus placed on the head as a spatial site of sound perception at times effected a sense of the ‘zoning’ of bodily space (§ 2.7), in which listeners made use of headphones’ territorializing affordances to attend to or distract from certain bodily sensations and undesired consequences of embodiment, such as pain. On this account, the body appears both as a ‘diversity-in-unity’ *and* as something that can be segmented through sound, suggesting that headphone listening can have interesting impacts on normative experiences of embodiment.

Finally, I explored how headphone listeners identify correspondences between the perceived spatial location of sound in the head and ideas of the ‘space’ of thought, of the brain, and of subjectivity (§ 2.8). Here, I discovered multiple spatial rationales underpinning listeners’ experiences pertaining to the spatiality of thought, the relationship between sound-space and thought-space, and the culturally mediated suggestion that the brain may act as a ‘space’ for sound. Engaging with certain scientific and philosophical issues that emerge from such accounts (§ 2.9), I suggested that an adequate phenomenological account of these experiences should be attentive to cultural mediations of ideas linking thought, brain, and head but should not consider them illusions or delusions; instead, they are phenomenologically real experiences, both reflective and pre-reflective, that listeners deem noteworthy. As shown in the case of Beckett’s work,

a cultural phenomenology of the head as a ‘phantasmal space’ for sound has philosophical currency, yoking together complex perceptions of sound, space, the body, and subjectivity and revealing interesting connections made by listeners between these categories.

The evidence presented here therefore suggests that headphone listening can have a meaningful impact on individuals’ experiences of embodiment, variously causing them to rethink ideas about their own corporeality, their sense of bodily interiority, and the role of sound in mediating their experiences of thought and subjectivity. As a means of conclusion, I use this final section to offer a brief reflection on the potential conceptual resonances of my analysis here, as well as considering its implications for understanding certain negative affordances of headphone sound.

In contemporary parlance, sound is regularly described in liquescent terms (see Janus 2013; Rodgers 2016). In the interview data presented here, there were many invocations of fluid language to describe the experience of sound during headphone listening: references to liquids and amniotic fluids (Hillary, § 2.6), to flowing (Vincent, § 2.3, § 2.6), to containment (Tatiana, § 2.8), to porosity (Henrietta, § 2.4), to ‘going under’ (Hillary § 2.6), and to the ‘mixing’ of sounds and thoughts (Tatiana, § 2.8). More broadly in relation to sound, the idea of *immersion*—of sound’s ‘immersive’ qualities—is commonly used to describe ‘omnidirectional, enveloping qualities ascribed to a specifically sonorous experience’, one characterized by ‘a sense of being surrounded or bathed in sound’ (Schrimshaw 2015: 155–56). Immersion as a conceptual figure has garnered some criticism in sound studies over recent years, especially in the work of Will Schrimshaw (2015, 2017), who critiques its reification of a series of arbitrary oppositions between vision and audition: of sound as immersive and vision as perspectival and directional, as posited in Sterne’s influential notion of the ‘audiovisual litany’ (Sterne 2003: 14–19; see also Sterne 2015: 66–67).¹³

¹³ Schrimshaw (2015, 2017) provides some of the most developed, if abstracted, critiques to date of immersion as a conceptual figure dominating many accounts of sound art, so it may at first appear appropriate to engage with it in greater depth here. However, on the whole, Schrimshaw’s approach deviates sharply from my own, and sufficient engagement with his arguments would be impossible—even unproductive—as a result. For example, much of his criticism is directed towards what he deems uncritical, ‘internalist’ phenomenological work that avoids sufficient epistemological engagement with so-called ‘realist’ philosophies (2017: 3). Specifically, he is concerned about ‘the extent to which the enveloping and encircling qualities of the immersive contribute to a predisposition towards interiority that has the capacity to disable critical thought and differentiation in favour of mystical unification through a figure of cosmic vibration’ (2015: 156). For Schrimshaw, philosophers such as Merleau-Ponty contribute to what he terms an ‘immersive phenomenology’ (see 2017: 99–107) that is condemned to its inability to engage in ‘thought of a reality in excess of perception’ (2017: 140). In turn, approaches that argue in favour of the primacy of perception and first-person empirical experience result in ‘a kind of myopia, an

I do not so much want to critique immersion on the grounds proposed by Schrimshaw and Sterne here as to suggest an alternative terminology for engaging with the phenomenology of headphone listening. I want to suggest that immersion has become a go-to descriptor for headphone-listening experiences in part due to the lack of suitable vocabulary available for such a phenomenon. Considering the definition proposed by Schrimshaw of sonic immersion as denoting the listening body being surrounded by or bathed in sound (see also Bird 2020a; Henriques 2003), such a phenomenological rationale generally did not underpin my interviewees' experiences of headphone sound: sound was perceived as something *internal*, as 'filling' bodily space. In this light, I propose a lexical move that deviates partly from the language of immersion but retains the liquescence common to descriptions of sonic experience. If, as many of my interview participants did, we are to conceive of the head as a resonant chamber for sound, we may conceptualize this embodied phenomenological space as a kind of vessel that at once emerges for us *through* sound and is *filled with* sound. On this account, the interior space of the lived body is figured as a form of sonic container, one into which sound is poured. This phenomenological space is not *immersed in* sound, then, but *flooded with* sound: the (lived) body is not an object *in* a (pre-given) sonic space but instead—as it were—*becomes* that space. Important to note here is that this process of sonic-spatial becoming is relational and dynamic—that is, to recall Connor's (2011) careful conceptual distinction adduced at the opening of this chapter, sound should not be conceived of as *arising* within the (pre-given) intracorporeal space of the head but instead as *giving rise* to that space. Lived sonic space therefore *emerges* in the anchoring of body to technology.

It is my contention that we should conceive of the interior spatial reality of

unduly conservative limitation of the scope of humanity's epistemological capabilities' (2015: 156). The argument that results is one characterized by a somewhat paradoxical aim to further human knowledge through an (at least partial) eschewing of the importance of human experience. As such, he discourages approaches to sound that rely on a phenomenological basis. In such a light, his critique of immersion appears more broadly to represent a critique of phenomenology and the work of certain sound theorists who adopt its philosophical methods, especially that of Salomé Voegelin (2010, 2014). To provide a concrete example, while Schrimshaw views the following statement as a *negative* consideration of sonic experience as co-constituted by perceiver and world, I would view it as eminently *positive*: the 'blurring of distinctions between interiority and exteriority, this strange relationality or the extension of affective interiority into a position where it becomes constitutive of perceived exteriority is a characteristic of immersivity and the related notion of acoustic space' (Schrimshaw 2017: 102). Moreover, while I praise Schrimshaw's desire for critical scholarship on sound and agree that all work, including phenomenological work, *can* be uncritical, I regard it as an unimaginative misreading to deem phenomenology inherently opposed to critical thought on methodological grounds (see, for example, Guenther 2020; Marder 2014 on notions of 'critical phenomenology'). There are clearly many fundamental points of divergence between our approaches, and it would be the project of a far different piece of writing to untangle his own.

headphone listening not in terms of one unified type of experience but as a plurality of complex, sometimes ambiguous phenomenological appearances—as multiple ‘floodings’ of sound. Consider, for example, Hillary’s account of the almost amniotic acoustics of sound analysed above (§ 2.6), in which sound appears at once to be within her and around her during headphone listening. Writing on the work of Jean-Luc Nancy, Adrienne Janus—acknowledging that ‘the sense of water, as that which flows and streams, envelopes and penetrates, is most commonly associated with the liquid sonorities (sound waves) of music and poetry’ (Janus 2013: 75)—argues that sound is ‘capable of enveloping and penetrating us, of getting under and pulsing beneath the skin’ as it ‘moves between exteriority and interiority’ (76–77; see also 78). I am particularly taken here with Janus’s description of sonic experience as both an enveloping *and* penetrating embodied phenomenon, as something that collapses any simple distinction between interior and exterior. Perhaps then we can consider these multiple floodings in terms of both containment and overflowing—what David Grubbs, in his experimental book on experiences of studio recording, refers to as the experience in which one’s ‘[h]eadspace fills to overflowing’ during a headphoned session of recording (Grubbs 2020: 50). And as my interviewee Bathsheba suggested, when using headphones,

It [sound] is just taking over your head. (Bathsheba)

In this light, headphone sound, in all of its material and spatial recalcitrance, can be understood to *flood* auditory space, to overwhelm and to overwhelm, in doing so complicating any neat demarcation of the lived body’s interiority and exteriority being defined by the physical limits of the body-as-object.

As one final thought with which to link us into the next chapter, I want to consider the potentially negative effects of in-head localization. Consider this example, again taken from creative sonic practice. In the theatre company Complicité’s play *The Encounter*, conceived by Simon McBurney, every audience member wears a set of headphones for the duration of the performance (Complicité/McBurney 2016: 3). Through the use of binaural ‘dummy head’ microphones (see Schütze with Irwin-Schütze 2018: 228–34) as well as a range of other inputs, a three-dimensional sound-world is mixed and relayed to the audience in real time as they watch McBurney onstage interacting with the dummy head and other technologies as he acts. Petru Popescu, the writer of the original book that underpins Complicité’s show, *Amazon Beaming* (Popescu 2016

[1991]), recounts his first experience of McBurney's binaural head show in a special book released to celebrate the play:

In August 2015, I sat in a theatre at the Edinburgh Festival and along with the whole audience I put on a pair of headphones... A moan of rainforest, enormous, ingenious, stylised and yet so real that I felt I was crawling with the jungle bugs, flowed out of the headphones and conquered my brain. (Popescu, in *Complicité/ McBurney* 2016: n.p.)

The evocative description offered by Popescu of feeling his 'brain' being 'conquered' by *Complicité's* binaural sound-world speaks not only to the sonic head-mind-brain linkages examined during this chapter but also to a potentially negative affordance of in-head localization. Popescu describes how sounds appear as physical, material objects, 'flow[ing] out of the headphones' and into his head. Donna Haraway, in a manner comparable with Connor (2011), draws from the broader cultural notion of 'space invaders' to account for the 'abstract spaces of our interior bodies', noting that 'Western medical discourse in colonizing contexts has been obsessed with the notion of contagion and hostile penetration of the healthy body, as well as of terrorism and mutiny from within' (Haraway 1991: 224, 223). For Haraway, such a drive contributes to a view of the body's interior as a space that can be *invaded*, observing that

in the supposed earthy space of our own interior, we see non-humanoid strangers who are supposed to be the means by which our bodies sustain our integrity and individuality, indeed our humanity in the face of a world of others. We seem invaded not just by the threatening 'non-selves' that the immune system guards against, but more fundamentally by our own strange parts. (222)

Taking Haraway's lead, I begin the following chapter with attention to the potentially *violent* uses of headphones to manipulate phenomenological head-mind-brain linkages to malign ends. I do so through attention to a specific perceptual phenomenon that garners much cultural interest: the voice in the head.

3

WITH



‘We’re connected now.
My breath, a part of yours.
My thoughts, transferred to your mind.
Please return the headset to the building.
Press stop now.’

— **JANET CARDIFF**

(from *Louisiana Walk #14*,
transcribed in Neumark 2010: 114)

3.1 BRAINWASH

In the early years of the Cold War, the Canadian psychologist D. Ewen Cameron published a paper in the journal *Psychiatric Quarterly* (Cameron 1957) describing recent amendments to a new treatment he had designed for psychoneurotic and schizophrenic patients.¹ The system of techniques, which he termed ‘psychic driving’, involved recording a one-on-one psychotherapy session and selecting a short twenty- to thirty-second extract, which he termed the ‘dynamic implant’ (Cameron 1957), during which the patient discussed their most pressing difficulties. Camer-

¹ Cameron’s work is often associated in contemporary accounts with the United States’ Central Intelligence Agency (CIA), namely the so-called ‘mind-control’ research conducted in its name during the 1950s (Klein 2007: 25–48; McCoy 2006: 42–45). The study considered here likely predates his funding by the CIA: some suggest he was funded from 1958 onwards (e.g. Rejali 2007: 370), while others trace the CIA’s involvement in his research back to early 1957 (e.g. McCoy 2006: 43–44). Cameron’s later work was funded through ‘a modest investment’ (Rejali 2007: 141) from the CIA as part of a wider course of research commenced in response to reports that Chinese forces, backed by the Soviets, had successfully driven American soldiers captured in Korea to become sympathetic towards their cause (see McCoy 2006: 21–59). In fear that the communists had managed to ‘crack the code of human consciousness’ (McCoy 2006: 21), the CIA, together with the United Kingdom’s Ministry of Defence and Canada’s Department of National Defence, devised a project codenamed MKULTRA: a covert series of scientific trials aimed at probing the foundations of human psychological command, reportedly commissioned for the sole purpose of training allied soldiers to withstand future ‘brainwashing’ attempts from their military opponents. See, among other works, Alfred McCoy’s (2006) extensive critique of the suggestion that MKULTRA was wholly defence-oriented, especially regarding the research’s crystallization into a manual of recommendations for ‘enhanced interrogation’ techniques in the 1960s; see also Downs (2021b).

on would then play the clip repeatedly to the patient for a designated period of time with the aim of altering cognitive or behavioural tendencies—that is, to change the way its victim would process certain thoughts. A write-up of some of Cameron’s findings in the popular Canadian periodical *Weekend Magazine* heralds the research as revelatory of the ‘beneficial’ applications of ‘brain-washing’ (J. Moore 1955).²

In its earlier stages, a dose of the psychic-driving treatment would be limited to fifteen minutes, not more than once a week, relayed over loudspeakers (Cameron 1957); but, following later revisions, a single instance could last for up to sixteen hours each day over twenty-one days of treatment (McCoy 2006: 43–44; Otterman 2007: 46), often together with the administration of psychoactive drugs (de Young 2015). It was during the preliminary stages that Cameron noticed how his patients would regularly appear resistant to listening attentively to the recordings during treatment, which in turn reduced the impact of the procedure. In light of these observations, he edited the treatment to involve headphones,³ which he regarded as circumventing a number of the shortcomings of his previous approach:

the sound should be conducted to the patient’s ears through headphones. This causes the patient to experience the driving with much greater impact, the more particularly since he frequently describes it as *being like a voice within his head*. For instance, one patient said: ‘I’ve heard enough. It goes right through my head.’ Another reported: ‘It’s too close; it’s horrible; I hear all the stuttering.’ (Cameron 1957: 706; added emphasis)

In amending the psychic-driving treatment to include headphones, Cameron made use of certain sonic-spatial effects afforded by the technology. In partitioning space and relaying sounds at close range, headphones may cause the auditory system to privilege the sounds they present, meaning that they appear more prominent to the user—‘too close’, as one patient reported. In this manner, the patients found it far more challenging, if not impossible, to avoid becoming absorbed by the relayed voice, in turn reporting experiences of sensory overload and extreme discomfort in being subjected to the sound for extended periods of time. Moreover, as Cameron’s patients describe, and as evidenced in the previous

² Incidentally, the verb ‘to brainwash’ is said to have entered the English language from the Mandarin colloquial expression *xi nao* (literally ‘wash brain’) in the 1950s (*OED*). Credit is often directed towards the journalist Edward Hunter, who disseminated the term most influentially in his *Brain-Washing in Red China* (Hunter 1951).

³ McCoy describes the technology used by Cameron as ‘a football helmet’ (McCoy 2006: 44), though Cameron refers specifically to headphones in his report (Cameron 1957: 706).

chapter (Chapter 2), headphone-mediated sounds can appear to be located inside a listener's head, meaning that voices heard through the headphones during the treatment 'became tantamount to voices in the head' (de Young 2015: 276). This facet of the experience appears to have been important to Cameron: in addition to certain patients displaying schizophrenic symptoms which may have included auditory hallucinations of voices, he also termed the recordings used during the treatment 'dynamic implants', which could refer both to the forcible insertion of the clip's message into the 'mind' of the patient and to its apparent sonic-spatial 'implanting' into the interior space of the head via headphones.

In the previous chapter (Chapter 2), I demonstrated how listeners regularly describe the 'location' of headphone-mediated audio as one that gives rise to a perceived interior space of the lived body, most acutely inside the head. As such, the descriptions offered by Cameron's patients of the relayed voice as appearing within the head, of its perceptual motion 'right through' the head, appeal specifically to the issues of sonic phenomenology I have so far been probing. What is apparent in Cameron's methodology is a desire to reify the (assumed) experience of hallucinatory voice-hearing through what might be termed forced 'voice-listening'—that is, the actual presentation of sound manipulated so as to appear as though within the head of the patient.⁴ The private space of the head therefore becomes a flooded site for speech, presented incessantly and inexorably to force its semantic content to be registered by the victim.

Comparable cases of sonic torture have arisen in political milieux in more recent years. For example, in their list of 'common' torture methods reported to be used in the People's Republic of China, the International Society for Human Rights (ISHR) (n.d.) list the following: 'Over a long period of time the bound victim is exposed to extremely loud music or propaganda tapes via headphones.' While no source evidence is provided for its claim, it may be assumed that corresponding testimonies were acquired as part of the ISHR's work as a non-governmental human rights organization with victims of torture, and that any validated sources were anonymized as a result. The available evidence is sparse regarding China's contemporary torture practices: often it is only through Chinese nationals who

⁴ Regarding auditory verbal hallucinations (AVHs), the perceived spatiality of the heard voice varies in location between interior and exterior. Some studies suggest that it is more common to experience an AVH as located outside of the head (e.g. Nayani and David 1996), with others suggesting that interiorized hallucinations are more statistically prevalent (e.g. Copolov et al. 2004; Kent and Wahass 1996). Interestingly, in a review of AVH research, Simon McCarthy-Jones notes that some voice-hearers report their AVHs being experienced 'more like ideas than external sensations' (McCarthy-Jones 2012: 108). Greater detail regarding the experience of AVHs is available in other sources (see especially McCarthy-Jones 2012; see also McCarthy-Jones et al. 2013 on the phenomenological philosophy of AVHs).

have defected from the ruling Communist Party (CCP) to become activists in the West that testimonies are heard. One example arises in a speech given in San Diego, CA, on 30th December 2007, in which Sa Geng, a follower of the state-proscribed religious practice Falun Dafa (or Falun Gong), describes his wife's persecution under the CCP from 1999 until her murder in 2003. Geng explains that, following years of abuse, her death resulted from a torture technique known as 'strapped clothes', in which the victim's limbs are violently contorted and fastened in a modified straitjacket, after which they are hung up for at least twenty-four hours, using the body's weight against itself. In his speech, Geng noted that:

According to witnesses of this torture, the victims are forced to wear these strait jackets, then their arms are tied up by the straps behind their back. Next, their arms are pulled to the front over their shoulders, and then tightly tied together with their legs. To make them suffer even more, *the police will force them to wear headphones broadcasting defamatory programs about Falun Dafa*. With their mouths covered, they are then hung from a widow frame [sic]. (Geng, in 'Imprisoned in China for practicing Falun Gong' 2017: n.p.; added emphasis)

In Geng's example, the use of the headphone-mediated propaganda recordings is clearly ancillary to the horrifying physical treatment of the victims' bodies, but one that Geng notes intensifies their suffering. The propagandistic sound becomes attentionally unavoidable for the victims, invading their broken, incarcerated bodies and removing the possibility to retreat into thought. The resultant state is one in which a victim's ability to imagine themselves out of the situation is demolished, leaving in its wake the persistent noise of the propaganda, trying as it does to enter into the fabric of their consciousness. In the head's interior, the material and the immaterial collide violently through the medium of voice.

3.2 BEING-WITH

The examples of headphone torture considered above demonstrate *in extremis* the phenomenological intersection of body-space and sound-space during headphone use. In the previous chapter (Chapter 2), I established that many headphone users experience relayed sound as becoming 'incorporated'—literally 'brought within the body' (see Leder 1990: 31)—during listening. By focusing on the embodied-spatial appearance of the mediated *voice* during headphone listening, the social and the semantic dimensions of sound enter into our account of the experience of

bodily interiority that can be afforded by headphones. In the cases of acts of violence being committed by sonic means, we may observe that the specific use of headphones appears to confront the notion of ‘brainwashing’ with a certain degree of literality—that is, a perpetrator’s ambition to change the thought processes of their victim through the use of headphones may be interpreted as a manner of doubly ‘getting inside the head’, both sonically and cognitively (cf. Chapter 2, §§ 2.8–2.9). The message of the torturous sonic content, relentlessly repeated, is implanted into the perceived headspace of its victim, intersecting with the space of thought and ‘flooding’ the body’s perceived interior with all-encompassing vocal sound (see Downs 2021b).

The voice represents a complex sonic phenomenon, yoking together issues of intersubjectivity, corporeality, and space. Thinking about the headphone-mediated voice, then, we can extend our account of sonic interiority into the realms of the *social* to ask what impacts the spatial presentation of sound may have on individuals’ experiences of sociality. In what remains of the chapter, I initially consider how sound can mediate live, reciprocal, multilateral communication: firstly, with regard to instances in which headphones are used in non-acousmatic scenarios—that is, in the physical presence of the voice’s original source-body—such as in situations involving headphone-afforded simultaneous interpretation and theatre (§ 3.3); and secondly, in cases involving the acousmatic use of headphones to make telephone calls, in which the (‘live’) voice is heard in the physical absence of its source (§ 3.4). To provide a theoretical lens through which to understand the embodied aspects of interviewees’ listening experiences, I draw from Steven Connor’s (2000a) agenda-setting work on the theory and phenomenology of voice, adopting his model of the *voice-body* as a way to understand experiences of the acousmatic voice (§ 3.5). Developing the voice-body model through a media-theoretical prism, namely the theory of *parasocial interactions* with media personae (Horton and Wohl 1956), I consider instances in which headphones mediate asymmetrical human–human encounters—that is, non-reciprocal, quasi-social experiences in which the listener cannot interact productively with a virtual social actor but in which they may perceive the social affordances of certain vocal cues, including apparent intimacy as mediated through popular music recordings (§ 3.6), radio, and podcasts (§ 3.7). I then interrogate what such mediated intimacy can mean for listeners, considering such reported experiences in relation to theories of mediated *presence* (Lombard and Ditton 1997) (§ 3.8). Arguing that the materiality of the voice-body is intimately ‘felt’ during headphone listening, I consider how listeners react to the amplified

sounds of the mouth as relayed over headphones (§ 3.9). This leads me to suggest that headphone-mediated voice-listening represents an intense example of *intercorporeal* relation in which a listener may report the sense of their body imbricating with another's via the channel of the voice (§ 3.9). I conclude with reference to 'posthuman' voices (§ 3.10), contemplating the human–non-human connections that may be afforded by headphone listening and forming a hinge into the focus of the next chapter (Chapter 4).

The chapter's title refers to the complex reality of feeling in the presence of another person through the medium of the acousmatic voice—of being *with* another's bodily presence, of feeling 'in their company' even in the absence of their physical body. *Being-with* (Heidegger's *Mitsein*) is a central axiom of phenomenological philosophy, understood as the necessary co-constitution of subjects in relation to other subjects. Being is always already being-with, because without the social lifeworld—the with-world (*Mitwelt*)—I would cease to exist (see Heidegger 1962: 153–63). In the account I offer here, the with-world is understood as physically *and* virtually constituted—that is, social relations can occur in the physical environment as well as being felt by virtual, acousmatic means.

There is some resonance in my account with Michael Bull's (2000, 2007) application of the Adornian notion of *we-ness* in his work on mobile music listening. Bull defines 'we-ness' 'as a state of "being with" by which Adorno refers to the substitution of direct experience by technologically mediated forms of experience' (Bull 2000: 28n4, see also 122–5). In Bull's figuration, the mediated *we-ness* of headphone listening is not something that pertains specifically to the voice; rather, according to Bull, *we-ness* can be experienced in relation to any mediated audio. The idea here is that the headphone world can represent 'a world accompanied by mediated messages of culture' (Bull 2000: 33). In this way, a voice need not be present in mediated audio for it to afford a sense of *we-ness*, though they may enhance such experiences (see Bull 2007: 96): 'states of "we-ness" are not only located in the sounds of music but in other forms of mechanized auditory sounds [*sic*]' (Bull 2000: 61). In such circumstances, a listener is understood to be 'with' a familiar soundtrack or the 'noise' of the culture industry; it is not necessarily a directly social experience but rather a feeling of filling the silence of the unmediated world. Nonetheless, as Bull suggests, these experiences of *we-ness* through headphone-mediated audio 'might be seen dialectically as colonizing the user's desire for social attachment, thereby creating new forms of experiential dependency within the emancipatory desires of the user' (Bull 2000: 123). As such, while Bull's account of *we-ness* is influential on my own, my focus is more directly

on how headphone-mediated *voice*-listening is experienced in social terms.

Bull's account of mediated we-ness correlates with some of the music-psychological literature on *social surrogacy*, in which music is understood to fulfil 'social needs' in the absence of direct social contact (see Schäfer and Eerola 2020; Schäfer et al. 2020). However, as with Bull's account, Katharina Schäfer and colleagues do not refer directly to the voice as an important sonic channel affording experiences social surrogacy but to the idea that music 'understands' its listener and acts as a substitute for an 'empathic friend'. In this way, while the idea of music as a tool for social surrogacy has some influence in the account I provide here, I am necessarily both narrowing and extending the remit of such ideas to account for more 'directly' social experiences through the prism of voice.

3.3 ENCOUNTERS

Gareth Fry, who worked with the theatre company *Complicité* as a sound designer to produce *The Encounter* (see Chapter 2, § 2.10), notes that the headphone presentation of the three-dimensional (3D) sound-world produced as part of the play 'allows a more intimate relationship with Simon, who can talk into a mic onstage which can be heard as if he is inside your head' (Fry, in *Complicité/McBurney* 2016: n.p.). During the opening gambit to the play, McBurney speaks directly to the audience, at first without technological mediation, then through microphones linked to the audience's headphones:

It seems empathy and proximity are connected, so I'd like to get closer to you. Can you put your headphones on? [...] So now instead of shouting I can be as close to you as I am to my children. Closer in fact, because now, instead of whispering in your ear, I am in the middle of your head. (*Complicité/McBurney* 2016: 7)

The 'fourth wall' is consistently broken throughout the opening to the play, with McBurney both directing speech towards the audience and having a 'live conversation' with pre-recorded speech extracts in the space of the listener's headphones. Though the heavy degree of 'sonic wizardry' may be heard to push towards the realm of novelty, the overall effect is noteworthy for its multiple mediations of sociality, technology, and embodied space. As Hillary, who had been to see the play, explained to me:

He [McBurney] sort of messed with you in a way that I'm sure is pretty cliché for headphone experts. But he blew in the ear of... Like, the binaural head was in the shape of a human head, and he blew in the ear of the microphone's head—the fake

head. And, like, you felt hot air blow in your ear. So there's lots of that kind of funny sleight-of-hand. People were, like, literally screaming in the room. And then, as he descended into this kind of imaginary world of the Amazon, it was just magic. I mean, you really, really felt like you were there. It's, like, deeply empathic, you know? Like you're not sitting watching something—you're in it. And it's not like immersive theatre in other ways. You don't have to be, like, doused in water to feel wetness, or you don't have to have a cold, artificial, air-conditioned wind blow through the theatre to feel cold. Your body fills in the gaps. So if you hear the wind whistle through you, you feel a chill. Which I think—isn't that what empathy is, you know? Like you're stimulated in one way, and your senses imagine the other ways in which it might affect you. So that's what I thought was most meaningful about that show. [...] You feel special, even though you know everyone's hearing the same thing. [...] It feels] completely personalized. (Hillary)

Hillary's rich account of *The Encounter* speaks volumes to the ideas of mediated sociality that interest me here. Using her embodied memory of feeling as though McBurney had blown directly into her ear as a springboard, Hillary describes feeling present in the virtual world (see also § 3.8 below)—that it 'really, really felt like you were there', that she was 'in it' with McBurney. She describes the felt reality of specific crossmodal sensory correspondences resulting from the sound, explaining how she was sure that she 'felt' the heat of McBurney's breath at her ear. Her idea that the 'body fills in the gaps'—that fanciful theatre technics are not necessary to produce a phenomenologically *real* experience of a multimodal, 'immersive' environment—is particularly interesting, gesturing towards the powerful effects of 3D headphone sound on her body. She understands this 'gap-filling' propensity of the listening body in terms of empathy, echoing McBurney's own statements in the play, suggesting that her senses are able to 'imagine'—if pre-reflectively—the experience simply as a result of audition.

Another interesting component of the reported experience is that Hillary, despite having been sitting in a theatre packed with other spectators, suggests that the headphone presentation of the audience caused her to 'feel special' and to feel as though the experience is 'personalized' for herself alone. In this way, the territorializing 'walls' of Hillary's headphones (see Chapter 5, § 5.2)—that is, her headphones' ability to separate her auditorily from those around her—combine with the all-encompassing 3D audio being relayed into her ears. To use Paul Roquet's (2021) expression, the 'one-person space' of headphone listening is understood by Hillary to be a private, exclusive place—a privileged listening situation from which to experience the world that McBurney is producing *just for her*. Most telling about the phenomenological reality and intensity of her listening experience is the fact that she *knew* others were experiencing the same thing, but that this knowledge did not colour her experience. There will be cause to return to

the idea of feeling ‘special’ and intimately involved with other virtually present actors in later sections (see §§ 3.6–3.10).

In Hillary’s account of *The Encounter*, there is a sense that the mediated voice, heard through the ‘one-person space’ of headphones, can have powerful quasi-social effects. Interesting in this situation is the idea that the person producing the heard voice is in the *physical* space with the headphone listener. Comparably, Otto, who used headphones as part of networked simultaneous translation in his work in multilateral diplomatic fora, described a strange sense of both intimacy with and distance from the voice of the interpreter in his ear:

I listen to their voices all day. And because there are teams of people, they change over. And I hear them when they’re having a good day, and I hear them when they’re having quite a bad day, and they’re getting grumpy, and they’re saying: ‘Microphone, please!’ [laughs] You know, and it’s ten o’clock at night, and we’re still going. And I can see them. You’re not supposed to sit and look at them. [...] My understanding of their professional standard is that they wouldn’t want to be a distraction. They would say that the peak of their career is to just do the function. But you can see them, because they gesture. And they’re on one side of a room, across the middle of a wall, [behind] a slightly tinted window. But you can definitely see. And you might look at [them, and] you might realize that the person who’s ‘envoicing’ *you*—that you have a lot in common with them. [...] And you think: ‘That’s kind of weird!’ (Otto)

We might observe a certain element of intrigue and fascination in Otto’s report regarding the interpreters during the multilateral situation. Claudia Monacelli describes the simultaneous interpreter’s headphone-relayed voice as a phenomenon ‘disembodied [...] yet connected in some mysterious way [...] to what is going on before participants’ eyes’ (Monacelli 2009: xi)—a sense in which the voice, which is in fact being produced in or near to the room in which it is relayed, has a peculiar sense of immanence. A comparable sense of mystery may be interpreted as present in Otto’s account, though it emerges not from the apparent ‘magic’ of the simultaneous interpreter’s ‘disembodied’ voice in his ear but from his curiosity regarding the *person* behind the voice. His account suggests that he does not always think of the interpreter as an actor separated from the working environment or characterized by ‘remoteness and automatism’ (Monacelli 2009: xi); rather, he is very *aware* of the person. He hears in their voices, which he listens to ‘all day’, their emotions and moods. He explains that while he is not ‘supposed to’ look at them but instead to look at the colleague with whom he is negotiating, he occasionally sneaks a glance to understand more about them. And at the end of his quoted statement, Otto reports an implicit sense of the ventriloquial nature of the human–non-human network: a strange feeling in which *he* is being ‘envoiced’

by a person, his voice and words passed over to their body and channelled into the ear of his diplomatic interlocutor ‘on the floor’. The interpreter, then, is not an empty, automated channel for Otto, but a source of intrigue whose voice he knows intimately.

The strange close-yet-distant aspect of the headphone-mediated voice was echoed by David, who found the idea of communicating with someone in physical space via headphones peculiar. During our interview, which took place in person, we spoke at length about his experiences of sonic interiority during headphone listening. Opting to engage in a thought experiment with him, I asked David to consider what might be different about his experience of our interview were it to occur face-to-face via headphones:

Well, obviously [your voice would be] more ‘primary’ than anything else. [...] The only thing I’d be able to focus on—very immediately—would be your voice. And I think that would make me feel a bit uncomfortable, but I’m not sure why. (David)

David played along perceptively with my game, considering how the resulting difference in sonic-spatial appearance of my voice would cause him to interact with me. As we were sat a comfortable distance apart during our interview, we experienced each other’s voices as sounding outside of our bodies; but David considered what it would be like to hear my voice through headphones and suggested that he would ‘feel a bit uncomfortable’, though he could not immediately suggest why. I asked David to consider in more depth why he might feel uncomfortable as a result of the more ‘immediate’ presentation of my voice, as he described it, over headphones. He related the sonic-spatial presentation of the audio to that of his own thoughts:

So, whenever I’m thinking about anything, I hear a voice—well, obviously I don’t hear a voice, because there’s no sound. But my brain emulates the experience of hearing my own voice back to me, in a very similar way that one might listen to a voice on headphones—or at least how *I* listen to voices on headphones and how I process that. It’s probably completely psychological. Maybe it’s the idea of having the sound pointed from somewhere external to my head inwards. Maybe that’s what makes it feel like the voice is entering my mind, my brain. Because that’s where it’s pointing. (David)

As with Gascia Ouzounian’s (2006: 77) account adduced in the previous chapter (Chapter 2, § 2.8), David experiences the sounds of his ‘internal monologue’ as occurring inside his head and, in doing so, forges a spatial link between his private ‘thinking’ voice and the presentation of a relayed voice over headphones.

But unlike Ouzounian, who listened to the non-vocal sounds of Bernhard Leitner's *KOPFRÄUME*, it is the sound of a *voice* that David experiences as 'entering [his] mind, [his] brain'. In this way, we may interpret David's account in terms of a perceived human-human relation: of experiencing the voice as interacting with his private interior—an intense form of mediated intimacy in which the social and material qualities of the voice commingle with the immaterial but felt space of thought.

3.4 TELEPHONE

All of the examples considered in the previous section took place in actual or imagined scenarios in which the mediated voice was not an acousmatic one, as the voice's source was present in the same space as the listener. Such cases are, broadly speaking, rare: the vast majority of voice-listening experiences using headphones involve the acousmatic presentation of the voice—of the voice spatially (and often temporally) distanced from its original, physical source. I wish now to turn to such acousmatic cases to identify commonalities and differences from those considered above.

One common means by which individuals come into contact with acousmatic voices is by means of the telephone. Ever since its invention in the late nineteenth century, users have acknowledged the power of the telephone to truncate physical distance between bodies through the electronic transfer of the voice. Even the writings of the earliest adopters of the telephone 'suggest a different, more fluid interchange of separated spaces, in which the interior of one body is transmitted, almost without mediation, to the inner ear of the listener' (Connor 1997: 206). For Steven Connor, the telephone afforded a radical 'sense that the voice that arrived at the other end of the line had not been transported so much as stretched out' (Connor 2004b: 159), channelling the sound through wires across vast distances. Similarly, for Eduardo Abrantes, a telephone user represents an individual who 'is thoroughly in-between, extended beyond her immediate situation, trans-embodied in the sonic exchange' (Abrantes 2019: 77)—and these qualities have become ever more pronounced in the wake of the mobile revolution in telephonic exchange that has burgeoned over the last half-century.

The first time we spoke, Tatiana spent part of the conversation discussing how she had recently moved away from her native country for work. She spoke about her experiences of calling friends and family back home over the phone.

I really dislike calling my mum on the phone. I feel like I'm even more distant from her. Like... She feels very far away physically if I hold a phone to my ear. [...] I think [the phone] highlights how far away they are, that they're not there with you. It highlights that. It highlights the separation. (Tatiana)

Tatiana's example of calling her mother reveals the importance of perceived distance in her experience of communicating from afar. When using a monaural telephone, though the receiver is close to her ear, she finds that she senses a great separation between her and her mother. Though the telephone enables her to span geographical distance, she does not experience the sounds it presents as bringing her mother 'closer' to her in any meaningful way. Her experience suggests that she is readily aware of the mediacy of the social interaction, noting that the embodied experience of placing the phone to her ear with her hand makes her mother appear to be 'very far away physically' (see also Chapter 4, § 4.4).

There are a number of ways to interpret Tatiana's experience of her mother's voice as it is presented over the monaural telephone. By using phrases such as 'not there with you', she appears to find that the telephone does not bring forth the degree of social presence that she desires. Despite its truncation of physical space and its presentation of her mother's voice close to her ear, it appears that the telephonic medium is unable to afford her a sense of her mother's warmth and social proximity in a way that is comparable with physical interaction. Though the voice she hears is clearly her mother's, and she is tacitly aware of its 'liveness' and the near-simultaneity of their interaction, its technological mediation via the telephone does not conjure a sense of her mother's embodied presence to any degree of satisfaction. On the contrary, its presentation of the sound serves to make her feel the distance between them more acutely.

I was keen to understand what it was about her experience of using the telephone that meant that the acousmatic presentation of her mother's voice did not carry with it any notable sense of her mother's presence. I asked her if she ever used her headphones to communicate with loved ones instead of the monaural telephone.

I called a friend of mine on the train, and I had my headphones on, and I was speaking into the speaker through the headphones, and I felt a lot closer to her. Yeah... Like the distance wasn't an issue anymore. Like her voice was inside my head, not coming into my ears from my phone, you know? Like her voice was 'there'. Like it was a closeness, an empathy thing that was very different [from the phone]. [...] Listening to someone call you through your headphones [...], they

could be sat next to me on the train. But they're even closer than that, you know? [...] It's like 'hyper-empathy'. (Tatiana)

Tatiana's experience of using her headphones to talk with a friend appears to satisfy her social desires to a greater degree than her experience with the monaural telephone, as she notes that 'the distance wasn't an issue anymore' in the same way it had been when speaking with her mother on the phone. She describes the degree of closeness she feels to her friend in spatial terms, noting how she hears her friend's voice as 'inside my head, not coming into my ears from my phone'. She later explains in vivid terms that this experience made her feel 'even closer' to her friend than she would have done if sitting next to her. Moreover, she reflects on the experience as one that elicits a sense of 'hyper-empathy', one that is mutually constituted between her and her interlocutor.

To begin to analyse Tatiana's experience of telecommunicating via headphones, it is useful first to compare it—as she herself does—with what she previously reported regarding her use of a monaural telephone. The sense of her interlocutor's bodily presence that she experienced when hearing a voice presented monaurally over the telephone bears little resemblance to her experiences of listening with headphones, despite the broad similarity of the kind of sound signal being presented. Given this comparison, the most obvious observation to make is that a key difference in terms of technological affordance comes with the binaural presentation of the audio when using headphones, which allows the voice to be received by both ears equally. Resonating with the ideas explored in the previous chapter (Chapter 2), Tatiana's experience is one that speaks to the common in-head localizing effect of headphone-mediated sound, because of which some listeners experience such sound as giving rise to a perceived interior bodily space as opposed to coming from outside of the body, a phenomenon which here appears to carry with it a heightened sense of sonic *intimacy*. In this way, there is an apparent relationship between the perceived closeness of the acousmatic voice in embodied spatial terms and the affective 'closeness' that emerges during Tatiana's interaction with her friend. Here, headphones are seen to afford a deep, meaningful, and embodied connection between the two individuals, correlative with unmediated socio-spatial interaction yet markedly different.

Julius echoed Tatiana's observation regarding the spatial appearance of headphone-mediated telephonic voices, stating that he experienced the voice as being closer to him than would be possible in physical reality. As our interview was conducted using audiovisual telecommunication software, Julius was able to

speak in near-real time about his experience of my speaking voice as it appeared to him over his computer headphones:

The perception—for me, at least—is, like, within my head. Like... My perception isn't that it's like somebody sitting next to me, talking into my ear. It feels different. It's more like the sound is emanating from a point within my skull, slightly to the left—like, behind my left eye at the back. If that's the sort of thing that you are after. [...] That's basically where I hear your voice coming from right now. I've got my headset up. Yeah, it's really quite, like... Maybe behind my left eyebrow, towards the back of the skull. A little bit higher than my eye. (Julius)

Julius is highly specific regarding the spatial location of my voice in relation to his bodily space, locating its sound 'within [his] skull', somewhere behind his left eye. Like Tatiana, he is clear to note that the experience is not analogous to having a conversation with someone in physical space, as his interlocutor's voice appears to emanate from inside of his body, effecting an impossibly close, almost despatialized relationship between heard voice and hearing body.

For Reg, this hyper-close interiority of vocal presentation was a socially and attentionally advantageous affordance of using headphones:

I actually really prefer talking to people on the phone if I've got my headphones on. [...] It's much better to have it in there [*gesturing to forehead*]. And it feels nicer as well, talking to that person, because they are your sole focus at that point. [...] You're talking to someone, and you can't hear anything else—certainly if you're wearing noise-cancelling [headphones]. So it's quite nice dedicating that entire time, or your entire space, to someone's voice. (Reg)

Making functional use of the sonic-spatial affordances of his headphones when communicating via the phone, Reg explains that headphones enable him to focus completely and exclusively on the voice of his interlocutor. He takes pleasure in the technology forcing him to dedicate himself to the conversation, suggesting that he finds that his headphones allow him to become a better interlocutor. Interesting here is his decision to correct himself when he says he is giving his 'entire time' to the person on the end of the phone: he suggests it is not only his time that he is giving, but also his 'entire space'.

3.5 VOICE-BODY

The examples from my interviews with headphone listeners considered so far in this chapter represent cases in which actual, coterminous social interactions are afforded by a technological assemblage involving headphones, with the voices of

conversational partners transmitted directly into the ears of headphone users, and (some degree of) mutual communication afforded by a network of microphones and receivers acting between the interlocutors. These mediated social relations are characterized not only by their perceived simultaneity but also by their opportunities for reciprocal interaction, meaning that they unfold in a manner akin to a dialogue in an immediate environment: I speak, you listen; you respond, I listen; our conversation develops in real time as an ongoing, emergent social event. However, unlike a real-world interaction, the intervening space that separates one body from another is truncated, with the correspondent's voice appearing to overlay, or even to inhabit, the interior space of the head.

How can we begin to understand the phenomenon of listening to voices 'inside' the head during headphone listening? We can first consider how others have conceptualized the embodied reality of the voice. In an article published as part of the journal *Twentieth-Century Music's* special issue on 'voice', Steven Connor reflects on his research into the phenomenology of the 'dissociated voice' over recent decades:

After six years thinking about ventriloquism and voices without assignable sources, I had to decide that there is no disembodied voice. That is, there can be no voice that does not imply and require the possibility of somebody, and more particularly some body, to utter it. (Connor 2016: 5)

For Connor, there can never be a 'disembodied' voice, even when the voice is distanced from its original source: 'some body' is always carried with the voice; there is *always* an embodied condition to the voice. On this account, we might argue—as Connor does elsewhere (e.g. Connor 2000a)—that corporeality of voice can therefore be sensed not only when engaging in reciprocal, physical or virtual social interaction with a conversational partner, as in the examples considered thus far in this chapter, but also when listening to *recorded* or *broadcast* voices—voices with whom reciprocal interaction can never take place by design.

One example of mediated but non-reciprocal vocal transfer comes in the form of commercial radio. Like the telephone, the radio affords the acousmatic presentation of sounds, meaning that the sources of a broadcast's voice(s) are imperceptible to listeners in every sense except audition; yet unlike the telephone, it does not afford reciprocal social interaction. It is crucial to note here that a listener is not required to have any preconceptions of a presenter who speaks on air to understand that there is a body behind the voice that they hear. Despite the invisibility and intangibility of the acousmatic voice's source-body, the listener is

always already aware of *bodily presence in the voice*, even if such presence is unstable or indistinct.

The acousmatic voice, while embodied, may be said to tread a fine threshold between the physical and the immaterial, the identifiable and the mysterious, the present and the absent. The instability of bodily presence in the technologically reproduced voice of radio and other acousmatic sound media has perplexed and intrigued listeners and theorists throughout its history. Theodor Adorno, writing in 1939, recognizes the complexity of vocal presence in his critical examination of the ‘radio voice’, which, ‘like the human voice or face, is “present”. At the same time, it suggests something “behind” it [...], not distinctly separated from, but apparently intimately connected though not identical with it’ (Adorno 2009: 373). Adorno’s method of analysis seems uncharacteristically phenomenological here,⁵ as he examines the acousmatic voice as it appears to him in all of its complexity: as a sound that carries with it the acoustic traces of a voice produced by a fleshy body in a physical space, but one that, in its mediacy, indexes a stream of other possible meanings, bringing with it an unknowable presence that lingers ‘behind’ it, inextricable from some kind of source-body yet presented in said body’s absence. Adorno hears the voice as ‘with’ him as he listens, feeling its presence through the radio medium. The source-body of the acousmatic voice is as much ‘there’ for the listener as it is ‘elsewhere’. In this way, there is a certain spectrality to its phenomenological appearance; Adorno’s identification of a bodily presence ‘behind’ the voice is suggestive of a near-ventriloquial arrangement in the virtual space of radio, in which the sound’s source hides beneath the broadcast’s frame, as immanent as it is distant and unattainable.

That a voice’s source-body is indefinite through mere audition, then, does not preclude its affording an absent-present bodiliness: ‘Evocation: something, flesh, emerges from voice’ (Serres 2008: 132). Connor extends his phenomenology of the embodied voice to define what he terms a *vocalic body*. He argues that such a notion illustrates that, while a voice must be produced by a body, voices ‘can also themselves produce bodies’; that a voice can appear to its recipient to conjure ‘a surrogate or secondary body, a projection of a new way of having or being a body’ that may be distinct from the physicality of the human form (Connor 2000a: 35). The idea of the vocalic body, or *voice-body*, provides a shorthand amalgam of the characteristics of voice discussed above: that even when technologically distanced

⁵ Adorno’s antipathy towards phenomenology is well documented (see, e.g. Adorno 1982). That said, Brian Kane (2016) suggests that Adorno’s research into radio employs a methodology that may be read as a ‘modified phenomenology’, one that blends Husserlian thought with dialectical reasoning.

from its source, a sense of body is always immanent within the voice, however imprecise; that the ‘disembodied voice must be habited in a plausible body’ (Connor 2000a: 35); and that the dissociated voice carries with it a sense of ‘presence’.

Moreover, the notion of a vocalic body denotes attributes of voice pertaining to spatiality and relational interaction:

My voice comes from the inside of a body and radiates through a space which is exterior to and extends beyond that body. In moving from an interior to an exterior, and therefore marking out the relations of interior and exterior, a voice also announces and verifies the co-operation of bodies and the environments in which they have their being. (Connor 2000a: 6)

Connor’s phenomenology of the voice offers a dual definition of space that accounts not only for space as ‘taken up’ by a body, but also for space as an emergent parameter of experience that is constituted by the relational arrangement of bodies in an environment. It is the ‘inalienable association between voice and space’ that concerns Connor here, specifically regarding the ways that a voice, like a physical body, takes up space as well as produces spatial relations; that a voice ‘inhabits and occupies space; and it also actively procures space for itself’ (12). Considering the acousmatic or ‘dissociated’ voice in light of these observations, the image that remains is one of a voice that carries itself as a body, one that both occupies space and circulates through it, engaging other bodies in emergent, relational dynamics. In this way, if we are to accept Connor’s suggestion that the acousmatic voice possesses its own sense of ‘body’, we may conceptualize the relationship between a listener’s body and another’s ‘voice-body’ as imbricated during headphone listening.

3.6 PARASOCIALITY

The curious experience of hearing another person’s voice as though sounding within the head’s interior may therefore be said to transform the perceived relationship between listener and voice in terms of embodied space. Importantly, these experiences are not limited to ‘live’, active, reciprocal social encounters, such as those mediated by telephonic technologies but can also emerge through listening to pre-recorded or broadcast audio. With Adorno’s (2009) description of the radio voice in mind, I now turn to cases in which informants reported voice-listening experiences that did not feature as part of multidirectional social exchange. In what follows, I consider circumstances where headphones are used

to listen to pre-recorded or real-time broadcast audio that involves voices, but in which reciprocal social interaction is impossible by virtue of the unidirectionality of the channel. Such situations arise when individuals listen to media formats such as music, radio, and audiobooks over headphones. As one would expect, such instances were common among those of my informants who used headphones outside of work, with listeners often reflecting in rich detail on the qualities of their experiences. For example, at one point in my conversation with Dana, I asked her to talk about what she liked and disliked about different music-listening scenarios, ranging from attending live concert performances to listening to recordings on her own. She explained that she enjoyed listening to her favourite singers using headphones, partly because the sound appears to circulate

in my head. [...] I sort of like the intimate feeling of just having, like, you and [Lady] Gaga just in one room, but the room is your head. Just with the headphones and no other sounds and stuff. I prefer that, I think. (Dana)

For Dana, listening to Lady Gaga's music over headphones opens an intimate channel between her and the singer by virtue of the spatial presentation of the audio. The intimacy she experiences is characterized not only by the apparent proximity of Gaga's voice but also by the perceived exclusivity of the interaction that the technology affords, meaning that Dana enjoys the feeling of being 'alone' with the singer in an environment devoid of other social actors or sounds. Drawing on real-world experiences of social interaction, she attempts to explain her experience by means of metaphor, imagining her head as a space in which she and the singer can commune. Her description is vivid, but she is clearly under no illusion that Gaga is 'there' with her in any actual sense when she listens to her recordings, let alone that her head could physically house another person's body. Nonetheless, it appears that Dana perceives the voice as, in some meaningful sense, bringing Gaga's body with it into her ears, as she responds affectively to certain embodied social cues when she listens to the singer's voice over headphones:

You know, if you're listening to a song that the singer is finding emotional, and you hear their voice break and stuff like that—that again feels really intimate. [...] 'Intimate' is the only word to describe it, I think. You're hearing that emotion. It's not just that they're getting paid to produce music and stuff. Like, they are bearing all for you. [...] It's all happening here [*gesturing to face*—in your head. There's no one else who gets to listen to this person sing for you. (Dana)

Hearing some evidence of emotional pain in the voice leads Dana to perceive a singer's performance as authentic, as though the artist's and/or the producer's decision to allow imperfections to feature in the commercial recording denotes a somehow honest, even intimate approach (Stras 2006; see also E.F. Clarke 2019), and her headphones appear to enhance or magnify her perceptions of such vocal qualities. The 'intimate' quality of her experience, then, seems to pertain to her perceived proximity to the singer, which in turn enables her to hear *more* of the voice than she would if further away. Moreover, echoing Hillary's account of *The Encounter* considered earlier in the chapter (§ 3.3), Dana feels as though the space is an exclusive one—that 'no one else' can enter it and experience the intimate connection between her and the singer.

Dana's reflections on her 'intimate' experience of Lady Gaga's voice align with Nicola Dibben's (2013) analytical model of the intimate singing voice in popular music production. Borrowing from Philip Tagg, Dibben describes the prevalence of 'monocentric' mixing decisions in popular music, in which a lead singer's voice is foregrounded and centralized in the stereo field. For Dibben, such production techniques are not only practical (ensuring the lead melody and lyrics are clearly audible) but aesthetic: they may be said to encourage a listener to adopt a particular subject-position (E.F. Clarke 2005: 91–125; Dibben 2006) in which the socio-spatial cues of the voice afford the impression that the singer is offering intimate access to inner thoughts and feelings. Such production converges with a music industry logic that is predicated on celebrity, with listeners sold the idea that singers are being 'authentic' in their performances not only through extra-musical marketing and branding but also through the spatial composition of their commercial recordings (see also Dibben 2009a).

Dibben's model provides a useful means by which to understand listeners' experiences of (commodified) vocal intimacy in popular song recordings, one that relies on listener-focused formal analysis of musical texts. I wish to extend Dibben's notion of the intimate singing voice here into a post-formalist domain (Born 2013), in which such observations take into account the sound-reproduction technologies that mediate audition. In doing so, we may come to view Dana's experience as one in which the intimate affordances of the singing voice are heightened by virtue of the voice's apparent location inside her sense of embodied space. If the recordings are designed to afford quasi-intimate (if unidirectional) relations between singer and listener, such affordances may be regarded as intensified on account of headphones' own re-spatializing characteristics.

What Dibben's model also foregrounds is the manner in which listeners are encouraged to experience intimacy with singers as part of a wider strategy of (illusory) 'closeness' between celebrity and consumer. Dana's identification of Lady Gaga's performances as authentically emotional, 'real', and 'not just' the result of 'getting paid to produce music' is clear evidence of the efficacy of such production decisions. Such perceived relationships have been termed *parasocial* by sociologists and media theorists, stemming from a foundational paper by Donald Horton and Richard Wohl (1956). In the paper, Horton and Wohl argue that media formats such as radio and television are designed to emulate the cues associated with 'real-world' social interaction as a means of encouraging consumers to feel that they have a meaningful relationship with media personae. Listeners and viewers are under no illusion that such media personalities are directly engaging with them, but the experience of parasocial interaction nonetheless 'in many ways resembles social interaction in ordinary primary groups' (Horton and Wohl 1956: 228). In some sense, parasocial interactivity represents an intensification of the kinds of empathic response that a theatre-goer may experience when watching a play, responding to certain (often affectively charged) socially meaningful cues such as perceived emotion in the voice. As evidenced in Dana's account, what is different in the case of parasocial interactions with media personae (as opposed to fictional characters) is the more nebulous link between the fictional and the real: it is plausible for Dana that Lady Gaga is being 'authentic' in her performance of emotion because she understands that the singer is also a real person, not a character in a play; Gaga's voice-body is always already perceived as 'real' and authentic (see Dibben 2009b, 2013, 2014). In sum, what appears to be at stake in discussions of parasociality is an emphasis on the unidirectionality of the medium: that consumers are engaged in non-reciprocal interactions with a media persona who, by design, cannot perceive any of the consumers' responses. Nonetheless, as Dibben's work shows, these experiences have clear, even calculated social effects: consumers can 'buy into' a persona by engaging with the apparent intimacy of their published outputs. What I am arguing here is that headphones' 'intimate', intracorporeal presentation of sound may enhance this sense of parasocial connection.

Applying the insights of parasocial theory to Dana's reported experience, then, we can observe clear resonances with the cases that Horton and Wohl describe. Dana regards Lady Gaga not as a fictional character but as a real, authentic person whose singing voice provides a medium through which to engage on a quasi-intimate level, despite the non-reciprocity of the interaction.

That said, and despite perceiving such social cues in Gaga's mediated voice, Dana is implicitly aware that the virtual musical environment does not afford her opportunities for reciprocal social interaction with the singer, and that the song is pre-recorded. It is important to stress that I do not interpret Dana's experience as the result of *delusion*, but instead that it emerges during listening by virtue of the social cues afforded by the sounds presented to her—cues that are experienced as phenomenologically *real*. As Eric Clarke writes of his experiences of listening to a recording of someone eating, such experiences are the result of the sonic medium specifying perceptually real events:

The sounds of that recording specify, among other things, the crackly movements of the crisp packet, the mouth movements of the person eating, and so on. When I hear these events over a pair of loudspeakers or headphones, I am under no illusion that the packet of crisps or the person eating them are concealed somewhere within the loudspeakers or the headphones, just as when I watch a newsreader on television I do not mistakenly believe that she is actually in the set. But neither do I see the newsreader's movements, or hear the crackling and crunching of the crisps, as metaphorical events. I perceive them as perfectly real, but I also perceive that these events are broadcast or recorded, and that the actual events are not happening here and now. [...] These recordings [...] specify perceptually real events that happen not to be present. (E.F. Clarke 2005: 71)

Clarke's account may be read as elucidating the idea that 'virtual reality' is not an oxymoron, or contradiction in terms, but a perceptual phenomenon: that recordings specify 'perfectly real' events without it being necessary for the events to occur in the physical world of a listener. As Katharina Schäfer and Tuomas Eerola argue in relation to music listening, 'so-called parasocial relationships with media characters feel psychologically real and meaningful even though people consciously know that they are not real relationships' (Schäfer and Eerola 2020: 233). We might also speculate that the intimate sound of Lady Gaga's voice likely shared a number of sonic properties of the voice of Tatiana's mother on the phone in the example considered above (§ 3.3), not least in terms of the close, even impossible proximity perceived between the listener's body and the singer's voice. The major difference between the two situations—one social (Tatiana), one parasocial (Dana)—is the reciprocity of the interaction: Tatiana was able to engage and respond to her mother in an ongoing social discourse, but Dana was only able to listen to the voice without the opportunity for dialogue. However, because both instances involved the intimate presentation of the voice, a sonic form that indexes social interaction and communication, it makes sense that Dana should hear Gaga's voice in terms of its social affordances and therefore imagine the

singer as a social actor comparable to those with whom she has interacted in the ‘real world’. In sum, the intense intimacy afforded by each voice’s presentation over headphones is comparable, and the power of each interaction, whether social or parasocial, can be understood in directly perceptual terms.

3.7 CONVERSATION-SPACE

To evidence my application of parasocial theory to headphone listening further, I now engage with cases reported by interviewees in which the sonic-spatial composition of a voice-heavy audio environment heard over headphones caused them to feel *involved in* or *a part of* the social happenings within a virtual space, such as during a radio talkshow or multi-hosted podcast. By virtue of the spatial presentation of the audio and its perceived relationship to their own bodies, many individuals felt at the centre of a discussion and deeply involved in the situation:

When listening [to radio drama] through headphones, you really feel like you’re in the middle of whatever it is. You’re in that room, or wherever it is. (Florence)

There’s one [podcast] I listen to that’s got, like, four people talking, and it feels like I’m in the middle when they’re talking. [...] Yeah, it feels like they’re talking at me, and I imagine it as them around a table, and the microphone is pointing upwards in the middle of the table. (Violet)

[In the radio talk show,] they’re, like, here [*gestures to sides of head*]. It’s like they’re dialoguing across me. [... I imagine it like] a totally black room with two little heads here and here [*gesturing to sides of head again*] and a round coffee table. (Miranda)

Through the headphones, it was like, uh, I can anticipate that I will have a connection—between the host, me, and the other guests—through the headphones. I feel like I’m a very important member in that conversation. (Tom)

Florence, Violet, and Miranda all describe themselves as being in the middle of a conversation-space in which those speaking are distributed around them or talking through them. In Chapter 2 (§ 2.4), we encountered cases in which individuals noted the ‘cemented’, ‘head-locked’ character of their audio environments. In these examples, a similar principle is at play: the listener is ‘locked’ at the centre of a virtual environment, perceiving the ‘space’ from a particular, static vantage point. Based on a combination of Dibben’s ideas and those associated with parasocial theory, we can speculate with relative confidence that the producer of the audio has likely taken great care in choosing the spatial arrangement of the voices

to ensure that the listener feels ‘involved’ in the space and is invested in (figuratively and, perhaps, literally) the mediated conversation.⁶

In addition, both Violet and Miranda use previous experiences of physical spaces to make sense of their sonic-spatial experiences, imagining the virtual ‘room’ as comprising a table with the speakers sitting around it. For Tom, the experience is one of perceived ‘connection’: he has the sense of being ‘a very important’ part of the conversation despite not being able to interact with the virtual others. In these cases, we might suggest that the headphone listener maps previous social experiences onto their in-the-moment perceptions of the virtual space. Employing analogies based on memories of social encounters in ‘real life’, the individuals imagine potential physical scenarios in which their spatial experiences could plausibly occur, using cultural tropes (the coffee table between interviewer and guest on a television talkshow, for example) to colour their imaginations.

Hillary echoed some of the characteristics identified by other interviewees regarding her spatial experience of the virtual conversation-space in her favourite podcast, but she added a more specific observation to her account regarding the appearance of the space in relation to her body:

I sometimes feel like I’ve got one in each ear. Like they’re talking through me. I sometimes feel like they’re talking right in front of my face. Like too close to see, hence why you don’t see them. I know that logic probably sounds a bit crazy. But then the voices are so intimate. (Hillary)

Hillary appears to imagine her body as an almost ghostly entity, with the voices of the podcast’s participants going ‘through’ her. Despite this perceived immateriality of her listening self, she attempts to make sense of the spatial proximity of the voices in direct physical terms, describing the speakers as ‘too close to see’—as though they are speaking so close to her face that they are invisible to her. This is a striking suggestion, most notably for the clear attempt to map her experiences of the physical world onto a sonic-spatial phenomenon that eludes such confident postulations. In this way, Hillary clings to the idea of the voices as embodied, as produced by physical, perceivable bodies in the world, despite those bodies not being *present* with her in actuality.

⁶ In addition, there are likely some practical decisions at play—for example, the mixing engineer would spatialize distinct voices across the stereo profile to ensure that the listener can differentiate clearly between speaking individuals.

A useful conceptual tool with which to understand these experiences of feeling involved in a virtual conversation-space is the notion of *presence*. The term surfaces throughout media theories and histories to refer to the manifold ways in which telecommunication technologies afford their users experiences that appear to blur boundaries between the actual and the virtual, or the mediated and the immediate. It may refer to media users' experiences of (virtual) social actors being 'present' with them in an environment or of their own being 'present' within a said environment, both of which may rely on such features as the perceived transparency of a medium or its ability to convey perceivable stimuli in a manner that coheres with 'real-world' experiences. The affordances of different media technologies can intensify experiences of presence, with accounts often referring to the varying degrees of 'immersivity', 'immediacy', or 'realism' that their mediated experiences afford.

For the present purposes, Matthew Lombard and Theresa Ditton's (1997) model of presence provides the most cogent mapping of explored territories relating to such mediated experiences. Defining presence broadly as the 'illusion that a mediated experience is not mediated' (n.p.), the writers conceptualize six related experiential 'types' pertaining to presence, drawing their data from across a diverse array of literatures, including those relevant to the study of sonic spatiality. They are: (1) *social richness*, or the ability of a medium to afford 'warmth' or 'intimacy'; (2) *perceptual or social realism*, or the perceived plausibility of mediated experiences occurring in the 'real world'; (3) *senses of transportation*, of 'being there' in a virtual world, of or a virtual world 'being here'; (4) *senses of immersion*, denoting perceptual and psychological absorption; (5) *social interaction with other (virtual) 'actors'* that appear to be present within or as a result of the medium, partly involving an individual's ability to 'illogically overlook' the mediatedness of the experience; and (6) *social interaction with the medium itself*.

Certain features of Lombard and Ditton's variegated definition of presence are productive here. First, their invocation of terms such as 'being there' and 'worlds' borders fruitfully on the phenomenological, suggesting an approach to media theory that emphasizes the central role of concrete, lived experience in discussions of technological mediation. Second, their consideration of the relationship between the pre-reflective and the reflective during mediated experience is useful, as it sheds light on the awareness that an individual may have of a technology's mediating role in experiences of presence, and on an individual's willingness to 'suspend disbelief' for the sake of richer experiential possibilities. As such, individuals are seen to have a certain degree of agency over their

experiences as they emerge within technology-mediated milieux. While the writers' use of terms such as 'illogical' and 'illusion' may gesture towards a negative presentation of media users as deluded or misguided by technologies, I instead interpret their overall message as one that highlights how individuals can guide their own encounters with mediated stimuli in certain ways that may enrich their experiences—experiences that are phenomenologically *real*, not illusory.

Third, it is pertinent to observe that many of Lombard and Ditton's categories focus on the social affordances of mediated presence. These range from the phenomenon of appearing to interact with virtual 'others' during mediated experience to the degree to which such presentations of social interactions are deemed 'realistic'. Particularly compelling is the conceptual privileging of what they describe as 'social richness', a term related to ideas of intimacy and felt interactivity during mediated experience. It is to this notion of mediated intimacy that I now turn.

3.8 INTIMACY

In the previous sections, I have explored both reciprocal, social experiences of another's voice-body and certain unidirectional, 'parasocial' experiences reported by my interviewees. The term *intimacy* has surfaced on multiple occasions, both in the accounts of my informants and in my own analysis of them. I want to pause here to think in greater depth about what is at stake in these senses of mediated intimacy and how they are founded upon the sonic-spatial reality of headphone presentation.

Tropes of intimacy pervade accounts of headphone listening.⁷ For Frances Dyson, headphones create a sense of both 'intimacy and interiority' (Dyson 2009:

⁷ The potential sexual affordances of headphoned intimacy have also long been identified. For example, in their classic textbook, Paul du Gay and colleagues examine a 1980 Walkman advertisement in the *Sunday Times* newspaper, displaying a woman listening to her headphones next a pool. Her reflection in the water shows a guitarist standing near her, but there is no one with her in the physical space of the image. As du Gay and colleagues write, such a 'photographic trick is really a metaphor because—of course—the singer is not actually there. He is coming to her, with the hint of romance if not the promise of sex itself, *through her headphones!*' (du Gay et al. 2013: 27; original emphasis). While a purposely horny interpretation of the image, du Gay and colleagues make an interesting point about the sense of another's 'presence' with the listener during headphone listening, gesturing towards the potential intimacy of headphone sound. Moreover, sound artists Janet Cardiff and George Bures Miller write that audience participants who experience their headphone works often described their experiences 'in virtually sexual terms: the mingling of bodies, the feeling of being "in" someone and having someone inside them; a sense of unusually close physical communion with another person' (Cardiff and Miller, quoted in Bennett 2019: 106–7). Due to economies of space, such 'virtually sexual' experiences of headphone intimacy are not considered here.

13). Rebecca Tuhus-Dubrow writes that, at the advent of the Walkman, '[m]ost people had never heard music so intimately before: with virtually no space between the sound waves and their ears' (Tuhus-Dubrow 2017: 36). This is especially notable when considering how the sonic-spatial intimacy of headphone listening interacts with the social intimacy of the mediated voice. As Sherry Turkle observes, in a world of typing and swiping, 'we may discover that we miss the human voice' (Turkle 2017: 285). That said, Turkle also notes—in a sense redolent of Adorno and Bull—the 'blurring of intimacy and solitude' (12) that is bound up in mediated social relations. On this rather bleak account, Turkle opines that we have come to 'expect more from technology and less from each other' (295) (see also Chapter 5, § 5.5). However, we might also interpret the power of technology to bring the intimate human voice to us in moments of social need as a positive phenomenon.

I want to take a moment to consider whether the mediated intimacies afforded by headphones should be considered positive or negative. In my view, my interviewee Florence's experiences of using her headphones as a means of feeling 'accompanied' as she traversed the lonely spaces of urban existence reveal that there is no simple answer to the question:

I think it's definitely a comfort thing, yeah. I think, with city life, you spend a lot of time on your own, don't you? Or I certainly do anyway. I spend a lot of my time on my own. I go home, and my housemates are either in or they're not in. And my work is relatively solitary: we've got an office full of people, but we're all focused on our own things. [...] So you could go the whole morning until lunchtime, and you haven't really connected with anyone else. And obviously, when commuting, you're travelling on your own [...]. So when you spend a lot of time in a solitary environment, it's quite nice to have that broken up with something that's accompanying you. [...] Because you're there on your own, you don't have anyone to help influence your mood. [...] [laughs] Oh, *The Archers* isn't much of a social life. [...] It's really depressing that my best social life is [through headphones]. (Florence)

There is a certain sadness to Florence's account of her listening habits, but one that—for anyone who has lived in the paradoxically socially overwhelming yet potentially deeply isolating spaces of a major city—has a relatable hue. Florence describes her lack of meaningful social interaction with others during the working week as 'depressing', viewing her need to resort to media as a disappointing reality. Nonetheless, she notes that her experiences suggest that she is being 'accompanied' by such media as she travels on her own, which correlates with Bull's (2000, 2007) account of *we-ness* and Schäfer and colleagues' (Schäfer and Eerola 2020; Schäfer et al. 2020) insights regarding social surrogacy adduced

above: that media can positively influence her mood and fulfil certain social needs to a limited degree. That said, Florence appears pessimistic, even a touch embarrassed, about her listening practices.

Later in our interview, Florence was forthcoming about the kinds of media she used, stating that voices were an important component of her preferred ‘accompanied’ experiences:

I’ve moved much more to drama and to listening to people talking. Especially in the last couple of years since moving to London, thinking about it. And starting work. I think it’s especially because they last longer, so you actually have something to fill up your day a little bit more while you’re at work. It’s a bit longer: half an hour or an hour—or twenty-four hours if you listen to the last *Harry Potter* book. And you’ve got that kind of continuity from day to day. And that’s really nice, actually. That’s really lovely. It’s really funny: I find so many people who are [my] age are listening to dramas and podcasts. [...] Everyone has these week-after-week things with the continuity of a story. It’s like you’re meeting the same people. Yeah, you’re meeting the same people—I’m saying it like that. You are. It’s like a relationship. And I have a relationship with Stephen Fry! [laughs] (Florence)

At this point in our interview, Florence appeared to change her mind regarding the ‘depressing’ reality of her listening habits. She begins to consider her ‘relationship’ to familiar voice-bodies as she negotiates her life as an urban commuter, explaining to me that she preferred to listen to serial dramas or audiobooks for the ‘kind of continuity’ they afford her. Seeing the positive aspects of her experience in greater light, Florence describes listening to serial media formats as akin to ‘meeting the same people’ week on week. In doing so, she reflects on her choice of words, checks in with her own perceptions, and softens regarding the ‘depressing’ reality of her practices. These, she suggests, could be considered meaningful, intimate, if unidirectional ‘relationships’ with virtual others, in turn implying that she experiences a degree of social fulfilment from her headphone use. It seems, then, that ‘expecting more from technology and less from each other’, as Turkle suggests, is both a negative and a positive phenomenon: media can offer us support in situations where social interaction is lacking, but it does not provide a sufficient replacement for reciprocal human interaction.

3.9 IN(TER)CORPORATIONS

The intimacy of the voice when presented over headphones is also mediated by the degree to which a listener can hear certain paralinguistic aspects of the voice,

such as mouth sounds (see Connor 2014; LaBelle 2014). Due to the close proximity required between two individuals in physical space in order to hear the sounds of another's mouth, such sonic cues signify intimacy for listeners:

Because I have quite fancy noise-cancelling headphones, you really can hear, you know, the moisture on their lips, the heaviness of their breathing. So it feels incredibly close [...] and intimate. (Hillary)

For Tom, the experience was a pleasurable one:

Because through the headphones, I can clearly listen to the details, the minor details of each singer, and even sometimes I can hear their lips opening and closing... So that is, uh, a kind of sound I prefer to listen to. I mean, it's kind of weird, but I just prefer that—listening to the [mouth] sounds. [...] You can even hear and recognize the lips opening and closing, so that kind of thing. And also you can even sense the singer initialize their mouth, open their mouth, their voice, the tension of the throat. (Tom)

Tom identifies a certain curiosity in his account: that it is 'kind of weird' to enjoy the hyperpresent sounds of another's mouth heard at such close range. This is likely due to the cultural strangeness of experiencing a stranger's voice as though it is produced in very close proximity to the ear. Clear in these examples is that the listener is vividly aware of the materiality of the voice-body—that the voice is produced by a fleshy, living, breathing body and transported to their ears.

In all examples considered throughout this chapter, but especially in relation to the experience of another's intimate bodily sounds through headphones, the embodiedness of the voice is clear to listeners. To engage on a more phenomenological level with how individuals perceive their relationships with other voice-bodies, I now wish to turn to the idea of *intercorporeality*. Intercorporeality (*intercorporéité*) is a term used by Maurice Merleau-Ponty (1964, 1968) to represent his core phenomenological belief that intersubjectivity, our constitution as relational subjects, is firmly rooted in bodily being. As an embodied subject, it is through my body that I may relate to and perceive your body; and, in this process of relational being-with, my body is also an object of perception for you as a subject. We each know that the other exists by virtue of our intercorporeality, and as such any relationship that we have is always already predicated on our mutual embodiment:

When my right hand touches my left, I am aware of it as a 'physical thing'. But at the same moment, if I wish, an extraordinary event takes place: here is my left

hand as well starting to perceive my right [...]. The physical thing becomes animate. [...]

The reason why I have evidence of the other man's being-there when I shake his hand is that his hand is substituted for my left hand, and my body annexes the body of another person in that 'sort of reflection' it is paradoxically the seat of. My two hands 'coexist' or are 'compresent' because they are one single body's hands. The other person appears through an extension of that compresence; he and I are like organs of one single intercorporeality. (Merleau-Ponty 1964: 166, 168)

Merleau-Ponty argues here that, in a similar manner to how he perceives his body as a 'compresent' and integrated unit by virtue of his two hands touching, he perceives the presence of another person through the 'reflection' of their bodies. His logic is predicated on the reversibility of his embodied status as both subject and object in the touching/touched dyad: in one moment, his right hand is the active 'subject' that touches the 'object' of his left hand; and in the next, the arrangement is reversed, as he shifts his attention to what his left hand perceives, thereby noticing that the left hand becomes the subject of the touch, his right hand now the object.⁸ Mapping this reasoning onto an interpersonal situation, when he touches the hand of another person, he acknowledges that while the other is the object of his perception, he too must exist as an object of the other's perception. It follows that by knowing that he is both subject and object within the social scenario, he is able to regard those same characteristics in the other, and in doing so to perceive the subjectivity of the other as he perceives his own subjectivity.

Later proponents of phenomenology echo and extend the ambit of Merleau-Ponty's notion of intercorporeality. Of particular import here is Gail Weiss's claim that 'intercorporeality includes inanimate and even virtual objects and experiences' (Weiss 1999: 168), suggesting that the intercorporeal model can extend beyond real-world situations characterized by human exceptionalism. While the idea of recognizing inanimate entities as phenomenological subjects continues to attract controversy,⁹ I interpret Weiss's argument here in terms of her emphasis on 'virtual' experiences of intercorporeality. This may include the

⁸ I develop my interpretation of Merleau-Ponty's 'chiastic' model of two hands touching to a greater extent during the following chapter, which takes as its focus how tactility forms a fundamental component of the human-technology relation that emerges during headphone listening (Chapter 4, § 4.7).

⁹ Christian Meyer and colleagues, for example, consider the potential for speaking of an 'intercorporeality with things' but resign themselves to the observation that since things, 'for the time being, lack the ability to *feel themselves into* and *continually sustain co-responsivity with* human beings who use them, we prefer speaking of transcorporeality rather than intercorporeality when it comes to the interaction with things' (Meyer et al. 2017: xxxii; emphasis original).

experience of quasi-empathic relationships with virtual bodies (Hayles 1996, 1999), such as avatars in game worlds (Damer and Hinrichs 2014; Heim 2014; Turkle 2017); or, as I wish to show here, a sense of embodied connection with mediated voice-bodies such as those presented in the virtual space of acousmatic recordings. In arguing that intercorporeality emerges even beyond real-world interactions, Weiss brings the phenomenological model explicitly into the domain of technological mediation, in turn demonstrating the continuing value of phenomenology for the study of virtual social and parasocial interactivity.

In the remainder of this chapter, I argue that the social resonances of the intercorporeal model are exemplified in extremis by certain experiences of headphone-mediated voice-listening. Our status as relational sonic beings is typified by the voice, which, as an embodied phenomenon, acts as a ‘hinge’ of intercorporeality (Csordas 2008)—that is, the voice brings bodies together. In Merleau-Ponty’s words, we exist ‘as sonorous beings for others and for ourselves’ (Merleau-Ponty 1968: 155), with sound acting as a vector that crosses between our bodies. If another’s voice is always already a material channel that reaches out towards me, a sonorous limb extended through space towards the body that I am, then the incorporation that I experience of that voice as I listen to it with headphones may be said to intensify the emergent sense of intercorporeal connection that I feel to the body of the voice. In other words, another voice-body enters me in this intimate sonic nexus; it appears to inhabit the interior of my lived body, a private, resonant space in which I know all other vocal sounds to belong to me, to come from within me and to exit me as markers—even extensions—of my corporeality. Yet, during headphone listening, my body becomes the acoustic space in which another’s voice can resound, and as such the voice that I hear through the headphones becomes incorporated into my own embodied space. The question of self–other distinction may therefore be complicated by this experience—not dissolved, but problematized—and intercorporeality can act as a pertinent phenomenological concept when attempting to understand ‘those bodily self–other relations which are [...] closest to a full merging of subject and object in their carnal relation’ (Meyer et al. 2017: xxxvii).

To begin to evidence the relevance of intercorporeality to the study of headphone-mediated voice-listening, consider the following passage from Martin Spinelli and Lance Dann’s recent explication of podcast listening:

Earbuds in particular, placed as they are within the opening of the ear canal, collapse the physical space between a person speaking and the listener; the person speaking is literally inside the head, inside the body, of a listener. [...] We could

say then that earbuds allow for a hyper-intimacy in which the voice you hear is in no way external, but present inside you.

Earbuds push intimacy inside a body—they are, in a very real sense, about re-*embodying* the voice. (Spinelli and Dann 2019: 83–84; original emphasis)

The writers describe a hypothetical situation in which a podcast listener experiences a ‘hyper-intimacy’ with the voice of a presenter while listening over headphones, one that they describe in terms of embodied space. However, Spinelli and Dann go further than conceiving of the resulting relationship as one involving two separate ‘bodies’, instead arguing that such listening represents a form of ‘re-embodiment’—that is, the listener, perceiving the voice as though it enters the interior space of their body, in some meaningful sense comes to embody the voice.

The experience described by Spinelli and Dann corresponds to what I wish here to call *intercorporeal incorporation*, or *in(ter)corporation* for short: the experience of radical intersubjectivity that flourishes through the (intracorporeal) incorporation of sound, namely the sound of another’s voice. The voice-body of the other is experienced so intensely by the listener as to make them feel—based on previous experiences of vocalization—as though there is some sense of correspondence between the location of their own voice and the sound of the other’s voice, and as such to experience some sense of imbrication between their own body and that of the other(s voice). Such a phenomenon was also reported by Cecilia Björkén-Nyberg’s audiobook study participants, who ‘chose earbuds for an intimate and intensified experience and a strong sense of presence’ in which an audiobook narrator’s voice became materialized ‘*through their bodies*’ (Björkén-Nyberg 2016: 82; original emphasis).

To solidify the notion of intercorporeal incorporation by means of the voice, I turn now to examples from my interview corpus in which informants described the uncanny, complex experience of another’s voice. When discussing the experience of listening to recordings of vocal performances through headphones with Vita, she paused for a moment when I asked her to explain her experiences in spatial terms.

I think I do feel vocals more there [*gesturing to upper part of throat*]. I don’t know whether it is that my voice is trying to [*respond*]. I’m so used to singing along, and that’s what I find really hard in headphones—that I can’t sing along. So I sometimes do think that there is perhaps quite a bit of tension going on in there. (Vita)

When she listens to a singing voice through headphones, Vita acknowledges a kind of frisson that resonates in the space reserved for her own vocalizations. She

explains a sense of near-frustration in being unable to sing along as she listens, one that is embodied in a feeling of ‘tension’ in her larynx. While she finds her voice almost autonomically trying to sound, there is no sense in which she feels a blurring of self and other during listening; rather, Vita experiences an intense form of vocal empathy, in which she feels that her voice is trying to sound itself, to materialize the voice that she hears as vibrating in the space of her own vocalization. One way to interpret such an experience is to suggest that Vita’s active listening opens a powerful parasocial channel with the singing voice-body, in which she experiences the voice as sounding within her, in turn moving her own body towards vocalization.¹⁰

In Tatiana’s case, listening to familiar music, for example, had a profound effect on her sense of bodily integrity. I asked Tatiana where she would locate a singing voice in relation to her own embodied space during headphone listening:

I thought about this, and I was really freaked out by my answer. If I’m listening to a song that I know very well, and I know the lyrics, I notice that I hear the sound, like, from the back of my throat. I know that sounds crazy. Like, back into the middle of my head, but nearer my throat. Because if I knew the words it felt like I could almost mouth them myself. But that’s where it felt like the sound was coming from. Especially if it’s a song I love and lyrics I love. It felt so, sort of, part of... I feel so much a part of it that it felt like I could almost be singing it, you know? [...] It comes from here [*gesturing to throat*]. [...] So where your mouth and the back of your neck is—that kind of channel is where the human voice sound comes from. (Tatiana)

For Tatiana, listening to familiar pop music heightens her interiorized experience of another’s voice to such an extent that the voice appears to lodge itself in her own throat. One way to interpret such an experience is to suggest that Tatiana’s active listening opens a powerful quasi-social channel with the singing voice-body, in which she experiences the voice as sounding within her, in turn moving her own body towards vocalization. As evidenced in her account of ‘feel[ing] so much a part of [the music] that it felt [... she] could almost be singing it’, Tatiana appears to experience an intense form of vocal empathy—a ‘hyper-empathy’, to

¹⁰ Research into the role of neural and sensorimotor systems suggests that pre-reflective, autonomic laryngeal responses to sound can enhance empathic responses to the voice. For example, Arnie Cox (2006) theorizes a ‘mimetic hypothesis’, arguing that to make sense of music when listening, we engage in an ‘imagined participation’ which involves ‘covertly and overtly imitating the sounds heard [in music] and imitating the physical actions that produce these sounds’ (Cox 2006: 46). Drawing upon research into the role of motor systems in speech perception, Cox claims that one of our primary means of understanding music is through *subvocalization*: covert, barely perceptible micro-movements of the larynx that are grounded in previous embodied experiences of vocalization. This ‘laryngeal empathy’ occurs when listening to any instrument but is most powerfully triggered by human voices.

recall her earlier term (§ 3.4)—in which her own body’s interior serves to materialize the voice that she hears.

3.10 ‘OFF!’

My focus throughout the chapter has been the human voice, with the purpose of elucidating more about the phenomenological reality of what we might term *mediated social relations*, understood here as human–human connections mediated by headphone technologies. We have seen that such relations can take the form of multidirectional, ‘live’, reciprocal social encounters, such as in certain real-world situations in which headphones are used to mediate communication (§ 3.3) and through the use of real-time voice-relaying technologies such as telephones (§ 3.4). Through engagement with the work of theorists such as Connor (2000a, 2016), I have argued that the voice is always perceived as an embodied phenomenon (§ 3.5), even in those situations where it is heard in the absence of its source-body; and, in this way, that the acousmatic voice can be understood to produce its own ‘voice-body’, whose material presence can be felt during listening. This includes during non-reciprocal, ‘parasocial’ encounters, in which headphone users perceive having an intimate, almost impossibly proximal ‘relationship’ with vocal media personae, responding to social cues in the voices of singers (§ 3.6) and radio and podcast hosts (§ 3.7). I suggested that the phenomenon of mediated, or virtual, intimacy has certain positive and negative connotations and can never truly substitute for actual human encounter (§ 3.8). Nonetheless, I showed that listeners may have intense embodied experiences of the headphone-mediated voice in which they experience a near-materialization of their perceived voice-body in their own body, understood in terms of the imbrication of perceived bodily spaces. At the darkest end of the scale, we saw at the very opening to the chapter the ways in which the sonic-spatial reality of headphone-mediated voice perception has been weaponized in calculated ways (§ 3.1), materialized inside the victim’s body in the immaterial-yet-material interior ‘space’ of thought. In sum, I have argued that the voice, as a powerful ‘hinge’ of intercorporeality, is a necessarily embodied phenomenon that can become ‘re-embodied’ (Besmer 2015) during headphone listening.

I want to end with some consideration of the notion of a non-human or *posthuman* voice. In the case of such voices, it is a technological ‘body’, not a human one, that speaks to a listener. Interest in the aesthetic use of posthuman voices in contemporary popular music has burgeoned over recent decades (e.g.

Auner 2003; Chapman 2008; Weheliye 2002; see also Dibben 2014: 124–28), and ideas about posthuman networked assemblages of voice are burgeoning in the field of sound studies (see Bird 2020b; Prior 2018; Tiainen 2015). Occasionally, such voices are embedded in the fabric of headphones and their related technologies, as Sumanth Gopinath and Jason Stanyek note in their study of ‘athletic capitalism’ and the Nike+ Sport Kit in which feedback based on an athlete’s performance is fed via an iPod’s screen as well as ‘by means of generic voices that periodically provide feedback to the user’ (Gopinath and Stanyek 2013: 131) over the sound of the athlete’s music—a ‘smooth mixing practice, wherein the communicative voice seems to emerge from within the fabric of the playlist songs, which then subsume that voice upon the delivery of its message’ (144).

Interesting here is the notion that such posthuman voices are also voice-bodies, despite having never originated in a fleshy human form. For some listeners, then, hearing the body in the posthuman voice served to make the parasocial connection to their technologies fairly ‘real’:

There’s a lady’s voice, and it says: ‘JBL Everest is ready to pair.’ And then I pair, I turn on Bluetooth on my phone, and it says: ‘Connected.’ [...] ‘Powering off!’ Yeah, she says that, too. ‘Powering off.’ [...] I think the [headphones] voice, the voice definitely makes you feel like the connection is stronger, and it’s not going to fail on you, and that, like... I don’t know. If there’s a voice, it’s more ‘real’, I guess. And you’re about to listen to voices and lyrics and things, so... Yeah, it feels natural. I haven’t really thought about it. But I’d definitely prefer a voice over a beep. [...] It kind of makes you feel like the headphones are a bit animated, and that you’re saying goodbye to someone, and that’s like: ‘OK, see you later!’ (Tatiana)

Tatiana hears the voice of her headphones’ ‘assistant’ voice as contributing to a sense of ‘real’ connection between herself and the technology, suggesting that it is ‘not going to fail’ her. She likes the natural ‘feel’ of voice, which gives her the impression that the headphones are ‘a bit animated’—as though the voice, ‘a lady’s voice’, is experienced in a parasocial sense, vitalizing the technology and motivating her to trust it. Here, we see Tatiana not only perceive her headphones as a medium for sound, but as a sounding object in themselves. It is to ideas about technological materiality and listeners’ material relations with said technologies that I turn in the next chapter.

4

ON



‘It seems that my body literally devours me,
and it is the same with all the other possessions
which are somehow attached or hung upon my body.’

— **GABRIEL MARCEL**
(1949 [1935]: 164)

4.1 SHOCK

On 26th May 1927, the *Manchester Guardian* published a short report announcing the peculiar death of a woman from northwest London (‘Electric shock when “listening”: woman found dead with headphones on; lamp suspected’ 1927). The piece documents the tragic case of Mrs Violet Rainford of Wembley, who was killed by accidental electrocution when a circuit was completed by a small network comprising her body, a reading lamp, her metal spectacles, and the crystal-set headphones she wore. Mrs Rainford became a fleshy conductor for an electrical current that passed from the wires and metal structures of her various devices through her skin, leading her vital organs to fail. A representative from the Edison-Swan Electric Company interviewed as part of the report was quick to brand the incident ‘unique’, occurring due to ‘a remarkable combination of circumstances which is most unlikely to recur’, and at least in part a result of Mrs Rainford’s ‘weak constitution’ (‘Electric shock when “listening”’ 1927: 12). Two days later, the same newspaper printed part of an account of the incident given by the victim’s daughter:

I noticed flashes coming from the headphones which were hanging by my bed. The flashes were accompanied by a terrific thumping noise. I instinctively knew that there must be something wrong and rushed into my mother’s room, which was in darkness. My mother was lying in bed with the headphones on. They were flashing in the same way as my own. Her hand was clasped round the standard lamp. (‘Electrocuted with headphones on: defective standard lamp; current passes to earth through wireless set’ 1927: 13)

There is much that is curious to behold in the newspaper accounts of Mrs Rainford's death. In the earlier report, the headline writer's decision to raise an eyebrow at the notion of 'listening' with scare quotes may reveal a contemporary suspicion towards the novelties of recent technological developments, acting as a hesitant suggestion to the reader that this was not quite 'listening' in the sense that one might normally consider it. Similar, though more diverting in its brevity, is the headline writer's syntactical elevation of the lamp to the level of murder suspect, suggestive of a wider anxiety towards the perceived dangers of technological innovation. In the body of the report, the reader hears the refutations of a sales executive whose bottom line is to mitigate bad press for his business's wares by insisting that another such incident was unlikely to occur, and—adding a contemporaneously characteristic tincture of misogyny to the proceedings—that the victim's 'weak constitution' was to blame. His argument loses credibility when dovetailed with the second report, in which the daughter's fearsome portrait of Mrs Rainford's death amasses to a Gothic tableau, all darkness and electrical flashes. Even the most pragmatic of early twentieth-century readers would likely be left with a strange sense of dread at having witnessed the apparent elision of the fantastical and the everyday.

Yet behind the journalistic rhetoric of the reports is a very real, and equally horrific, incident in which the physical contact of a woman's body with unearthed conductive technologies led to death by electrocution. Touch, not audition, became the central mediator in the human-technology assemblage, producing an electrical circuit formed of tactile connections; Mrs Rainford had elected to place her body in contact with two wearable technologies—her headphones and her spectacles—that were composed of copper wires and metal casings, and she had reached out to touch the faulty lamp. Her headphones, in tandem with other electrical technologies, were therefore involved in her death because of the skin-to-technology attachment that they necessitated during use, producing an intimate, material connection between body and technology that, in this case, would prove fatal.

I wish to argue here that the tragic and unusual case of Mrs Rainford exemplifies *in extremis* the central component of *touch* in headphone use. Headphones, as material technologies, must be attached to the body to afford standard functionality. In this way, an important, though previously underexplored, sensory component of headphone listening is its tactility. As I use this chapter to show, the close study of human-technology contact can elucidate much that is integral

to mediated everyday practices, bringing the perceptual ‘background’ to the fore to consider how material connections between headphone technologies and listeners’ bodies come to affect individuals’ experiences of the felt limits, or ‘edges’ (Casey 2017: 211–32), of the lived body. The central aim of the present chapter is therefore to move away from the central focus of the thesis so far—sound—to shed more light on the *multimodality* of headphone use, with emphasis on the tactile experience of technological materiality and its impact on experiences of embodiment. In turn, we begin to understand how headphones can variously act as both *medium* and *object* of experience.

I begin by outlining how discussions of materiality have entered into certain relevant debates in both the philosophy of human–technology relations and sound studies over recent years (§ 4.2), all as a means of qualifying my own perspective on how materiality as a conceptual category is of great import in the study of headphone listening. Attention is first paid to listeners’ ‘materialistic’ relationships with headphones, namely experiences of ownership of, agency over, and ‘care’ towards commodity technologies (§ 4.3). I then acknowledge an interesting tension in individuals’ perceived relationships to headphones: that when they are not in use, they are understood more readily as *objects*, but while in use they are understood more as *mediums* for sonic experience (§ 4.4). Drawing these empirical insights together with philosophical concepts pertaining to the ‘transparency’ of technologies during use, I consider how we might nuance the stark binarism placed between technology-as-functioning-medium and technology-as-object (Heidegger 1962), highlighting how the so-called ‘postphenomenological’ work of Don Ihde (1990, 1993, 2007, 2009, 2010, 2016) might help us to draw out such nuances. I go on to consider two aspects of headphone use reported by my interviewees which relate closely to this idea of medium-versus-object: the production of concomitant sounds through a technology’s interaction with the physicality of the body (§ 4.5) and certain material issues pertaining to wired versus wireless technologies (§ 4.6). Later in the chapter, through engagement with the foundational work of Maurice Merleau-Ponty (1968, 2012) and later work by Edward Casey (2017) and others, I consider how headphones’ materiality impacts listeners’ senses of bodily integrity, interrogating ideas of the body’s felt limits—its ‘edges’—and the intertwining of human and technology in the listening nexus (§ 4.7–4.8). This section includes attention to the physical secretions of the body, such as earwax and sweat (§ 4.9) and to interviewees’ experiences of the ear as an orifice that can be penetrated (§ 4.10). I conclude with an examination of cases in which headphones become akin to a physical parasite, attached to the body’s

edges and limiting an individual's openness to the (intersubjective) world (§ 4.11). Of all the thesis sections, this chapter ventures the furthest towards ontological considerations, but it does so phenomenologically, always in terms of relational experience—that is, it is not concerned with what the body *becomes*, in strict ontological terms, during headphone use, but how individuals' *experiences* of embodiment are affected by the appendage of technologies to the edges of the body.

4.2 MATERIALITY

Materiality represents a complex and far-reaching conceptual category that, over recent decades, has traversed many disciplinary boundaries. For example, in the introduction to his edited volume on material anthropology, Daniel Miller accounts for how 'things' govern and direct perception, action, and identity. His analysis is tinged with phenomenological influence, describing how the very notion of material culture 'implies that much of what we are exists not through our consciousness or body, but as an exterior environment that habituates and prompts us' (2005: 5), thereby destabilizing any cogent duality between the notions of subject and object, and in turn foregrounding the essential role of the world in the constitution of being and experience (see also § 4.8 below). Miller goes further to highlight the inextricable intertwining of humans and things in his definition of materiality, arguing that 'we need to show how the things that people make, make people' (38)—for example, that 'we are not just clothed; rather, we are constituted by our clothing' (42). The decision to emphasize material relations therefore denotes a privileging of attention to central roles performed by objects in our lives.

Thinking phenomenologically, materiality can be conceived of 'in terms of the manners in which matter presses upon human bodies and senses' (Forman 2020: 449), namely the ways in which material things enter into and partly constitute our perceptual experiences. In other words, we encounter the materiality of things through our sensory engagement with them, or through attention to the ways in which they guide and shape our negotiations of the lifeworld. While materiality necessarily pertains to the (perceivable) properties of an object or body—what James Gibson (1966, 1979) would call an object's 'invariant' properties—it is only through *experience* that we may access it. Moreover, our perceptual interactions with objects reveal not only their materiality but our own. In a close reading of Merleau-Ponty's work on the 'carnal conditions of our being-in-the-world', Aud Sissel Hoel and Annamaria Carusi

refer specifically to the potential relevance of Merleau-Ponty's work to the study of materiality, arguing that his later philosophy 'brings bodies, symbolic systems and technologies into a new constellation that reconfigures agency and materiality' (Hoel and Carusi 2018: 62, 46). In this way, Merleau-Pontian phenomenology can represent an apposite philosophical lens through which to consider issues of materiality.

Proponents of the philosophy of human–technology relations such as Hoel and Carusi who are associated with the recent move towards a 'postphenomenological' account of technological mediation (see Ihde 1993, 2009; Rosenberger and Verbeek 2015) focus closely on material concerns in their work. Ihde, the principal figurehead of the postphenomenology movement, argues that early philosophies of technology, such as those he identifies in the technological-determinist work of writers such as Karl Marx and Ernst Kapp, represent a marked 'shift in *perspective*' in their discernment of the 'focal role for *materiality*' in their philosophies, 'particularly the materiality of technologies or produced tools, machines, and their organization in relation to human cultures' (Ihde 2010: 6; original emphasis). For Ihde, the focus of postphenomenology is more acute regarding technological mediation and materiality than was the case for the 'classical' phenomenologists, such as Husserl and Heidegger: 'the materiality of the technologies, the bodily techniques of use, and the cultural context of the practice are all taken into account' in postphenomenological work (Ihde 2009: 19). However, as Hoel and Carusi (2018) argue, Merleau-Ponty was acutely, if implicitly, aware of the mediating roles performed by technologies, particularly in relation to the constitution of embodiment and bodily experience. There will be cause to return to Merleau-Ponty's perspective on embodied technological mediation in a later section (§ 4.5).

4.3 OWNERSHIP

Commentators exploring materiality regularly acknowledge the colloquial use of 'materialism' to denote the human drive towards material ownership born out of neoliberal economics—that is, 'an economics that sees humanity as a capacity that is developed by its possession of commodities' (Miller 2005: 19). Other writers have taken note of how technologies associated with mobile music listening such as MP3 players come to be experienced as media devices to which individuals become emotionally attached, foregrounding how the objects of material culture feature as important, meaningful artefacts for everyday users (e.g. Beer 2012; Bull

2000, 2007; du Gay et al. 2013; Gopinath and Stanyek 2014b; Tuhus-Dubrow 2017). On the specific subject of headphones, Tyler Bickford (2017) provides a rich ethnographic account of children's often non-normative use of earphones such as through 'earbud sharing'. Bickford observes the ways in which MP3 players and their associated headphones 'have been thoroughly domesticated within an intimate and childish material culture already characterized by playful physical interaction and portable objects' as technologies 'that can be shared, manipulated, and held close, and in a culture of embodied participation that emphasizes touch, physical closeness, and movement' (Bickford 2017: 30). His argument is that children demonstrate a profound interest in the materiality of their headphones, one that appears to extend beyond the normative uses of the technologies by adults. In what he refers to as a form of 'play', children are shown to 'tinker' with and 'tether' their devices, manipulating their materialities through refashioning, including decoration and technological amendment (90–110). As Bickford describes it, children's use of headphones and MP3 players, unlike adults', involves 'reimagining them not in terms of transcendent freedom *from* bodies, spaces, and sociality, but as intimate and tangible anchors *to* their material, embodied, and spatial surroundings, and especially to one another' (94; original emphasis). In this way, Bickford amply demonstrates how headphones, as material objects, can feature as important social tools for children and young people.

Except for Bickford's analysis of children's engagement with the material aspects of earphones in his ethnography, there is no other deep scholarly inquiry into individuals' experience of the materiality of headphones in existing work. Following Miller's account, we can acknowledge that headphones, as technologies, are objects of a capitalist material culture; and my interviewees often described their relationships to their technologies in appropriately 'materialistic' terms. I wish first to engage with cases in which my informants referred to their headphones explicitly as a commodity object. In other words, beyond regarding them solely as a medium for sound, as something that was a means to an end, some interlocutors focused more acutely on the object nature of headphones, particularly as something that could be owned or stockpiled:

I always feel like I'm in that liminal place where headphones break, and then I'm like: 'What headphones do I have, somewhere in a drawer?' Or I find some on the floor somewhere, and I'll use those for a period of time. (Elliott)

I do have a drawer full of old earphones. (David)

I've got like six pairs at home. I keep the old ones even though they're broken! [laughs] I'm like: 'Well, they might come in useful.' I don't know why they'd come in useful. (Florence)

Elliott acknowledges the material limitations of his 'main' headphones—that they sometimes break and need to be replaced—and reports using an old pair, such as an unwanted model he finds 'on the floor' somewhere, in the 'liminal' time between breakage and replacement. David admits that he has a whole drawer of older headphones which he keeps instead of throwing them away, perhaps in case a newer, preferred set breaks, as in Elliott's case. For Florence, she finds that she is unable to throw away old sets, even those that no longer work. Unlike Elliott and David who at least appear to stockpile older models in case of needing a spare pair, Florence acknowledges that there is no specific import to her hoarding.

We might interpret Florence's decision not to throw away any of her broken headphones to be symptomatic of a broader sense of 'care' towards her old, disused technologies, understood here as a feeling of emotional attachment to her devices. Such an interpretation is substantiated through engagement with other parts of her interview:

I had to be without my phone for, like, twenty-four hours just before Christmas. I was having a new battery put in. And it felt like a physical separation from a part of me. And I actually get a little bit [...] like it when my headphones die. Like, I have twelve hours or however long it is until my Amazon parcel arrives, and I genuinely feel quite bereft. And it's like a physical loss. (Florence)

Florence describes certain media technologies such as her phone as a 'part of [her]', suggesting that the loss of such items, even if only temporary, was 'like a physical separation' for her. This is similar in the case of her headphones, the breakage of which she describes as causing her to 'feel quite bereft' as though coping with 'a physical loss'. We may therefore observe in Florence's account a strong sense of attachment to her headphones, something she experiences in a clearly material sense given her descriptions of the 'physical' aspects of her perceptual and emotional relationships to her devices.

Henrietta, who had recently invested in a more upmarket set of headphones than she had previously owned, described a more acutely 'careful' relationship with the technology than Florence had:

It's weird now that I've got these headphones, because they're just so important to me. I literally, like... After I finish listening, I take out the cable and I fold it up nicely and wrap it up, and then I put it in this little bag that they come in. And I

won't... I'm really careful when I put them in my backpack—about what's in the backpack, whether there's some water. Or I get really worried about them. [laughs] Like they're kind of... I think if my room was burning and I had to save, like, five things, it'd be my laptop, my headphones, my phone... You know, like, that'd be the list. And before they [her older headphones] definitely wouldn't have been on the list. [laughs] My crappy Samsung in-ear headphones! (Henrietta)

Henrietta describes her rituals for looking after her headphones, folding up the wires and placing them carefully into her bag to ensure they are not damaged. If she forgets to check to see if there are potentially damage-inducing objects in her bag, she 'get[s] really worried' about her headphones. When I asked her whether it was to do with the amount of money she had spent on this new set, she replied:

No. It's because of the access that they give me to the music. [...] It's all to do with how they allow me to experience music. (Henrietta)

Henrietta's account therefore suggests that she feels strongly attached to one particular pair of headphones because of the kinds of experience she has had with them. In doing so, she treads the line between understanding her headphones as a treasured *object* in themselves and as a favoured *medium* for her music-listening experiences. Because of the history of their use for her—the experiences she has enjoyed with them—she feels a notable sense of care for them.

It appears, then, that individuals can identify more regarding the material value of headphones than their status as commodities, instead understanding the technologies and the sonic experiences they afford as bundled up with senses of self, identity, and care. At the end of our interview, Elliott reflected on what it meant to think deeply about these everyday objects:

I've just unlocked so much of an emotive history—ultimately an emotive history—with these headphones. [...] Every time you unbox a new set of headphones when one breaks... Well, when they die! (Elliott)

In reflecting on his experiences of discussing his relationship to his headphones in depth, Elliott acknowledges that there is a deep connection between his everyday listening habits and what he calls his 'emotive history'. In this way, he binds together his material practices with his own biography, thinking about how these objects mediate important experiences and in turn become imbued with emotional meaning. Especially interesting here is Elliott's decision to correct himself: that instead of saying his headphones 'break', he describes them as 'dying'. In light of comparable evidence from Henrietta's and Florence's accounts,

we might interpret this self-conscious terminological reconsideration as evidence of the almost anthropomorphic manner in which he conceives of a favoured set of headphones—as something that lives, becomes imbued with emotion, and dies.

4.4 TRANSPARENCY

In the examples considered so far, we have seen some ways in which a set of headphones can be experienced as both a medium for sound and an object in its own right. However, as evidenced in Elliott's deeper reflection on the very idea of talking about everyday objects in terms of 'emotive history', the latter notion of headphones-as-object may be due in part to the artificial condition of the interview—of having to think in great detail about technologies and practices that one might usually not. In fact, as some interviewees suggested, the idea of being aware of the materiality of headphones during listening was deemed something to be avoided:

I was thinking that so much of using headphones is about eliminating their presence. It's like trying to forget they're there at all. Or at least that's how I think about it. Because the moment I want to stop using these [headphones] is when I'm most aware of their presence. [...] That then speaks to what I need headphones to do, which is for they themselves to be silent agents. (Elliott)

Elliott forges a direct link between a dislike for using headphones and a heightened awareness of their presence. In this way, he suggests that the optimal experience of headphone listening involves a lack of awareness of their presence—a situation in which perceptions of headphones-as-object disappear into the background of experience, leaving the headphones as an unobtrusive medium for relaying sound. He uses the concept of headphones as 'silent agents' to foreground this 'disappearance' from his perceptual awareness, thereby appearing to make sense of the experience of their vanishing into his experiential background in directly sonic terms—as though they do not 'speak over' his listening experiences by declaring their physical presence for him.

For many interviewees, most experiences of headphone listening involved a near-total dissociation from their physical presence:

No, it never really crosses my mind that they are touching me. (Hannah)

I'm not aware of it. Like, obviously there is—you physically feel them on you. I'm more aware of it with earphones, because... I don't really know why. Maybe because [over-ear] headphones have a cushion, and it's less of a physical awareness? (David)

Here, Hannah acknowledges that the use of headphones necessitates physical contact between her body and the technology, but she implies that there is no overt perceptual consequence of this tangency—that the idea of being in contact with the technology 'never really crosses [her] mind'. We can therefore interpret that Hannah's headphones do not impose themselves in any material sense on her listening experiences; they are instead experienced as an efficient, unobtrusive medium. David diverges slightly from Hannah's account, suggesting that he *can* 'physically feel' his headphones on his body during listening, but only if he reflects deeply on the experience; otherwise, he is 'not aware of it'. Interesting in David's case is the idea that in-ear headphones are more noticeable than over-ear headphones during use, perhaps on account of their 'cushioning'. As I show in later sections (e.g. §§ 4.6–4.7), the various affordances of different headphone designs were sometimes identified as important factors governing individuals' preferences for technologies in certain situations for similar reasons.

David's and Hannah's accounts suggest that the tactile experience of headphones during listening features as an insignificant part of the overall experience for both individuals. Neither denies the felt presence of the headphones, but both suggest that this parameter of their overall experience is broadly inconsequential. For other interviewees, it was the use of headphones in tandem with the completion of another task that led them to become less aware of the technology's presence on their bodies:

If I'm really, really focused on a task [...], I forget they [the headphones] are there. (Tatiana)

Here, we see how headphones can form part of a scheme of multitasking, in which absorption within another task leads the technologies to fade into peripheral attention. This suggests that, as a result of Tatiana's attentional focus being on other aspects of her experience, her headphones disappear into the margins of the experiential frame. In turn, we might conclude that individuals' awareness of a technology's presence is dependent on a number of factors including attentional economy and aspects of material design.

Philosophers refer to the ability of technologies to fade into the background of perceptual experience as the principle of *transparency*. Martin

Heidegger writes of how a functioning tool (*Werkzeug*) may be characterized by its ‘readiness-to-hand’ (*Zuhandenheit*), describing cases in which a tool becomes so intimately involved in undertaking a task—say, a hammer being used to push a nail into a wall, as in his well-known example—that it becomes absorbed into the embodied action of the task. In this way, when a tool is ready-to-hand, it ‘is not grasped theoretically at all’; instead, ‘it must, as it were, *withdraw* [...] in order to be ready-to-hand quite authentically’ (Heidegger 1962: 99; added emphasis). By ‘withdraw’, Heidegger is suggesting that using a well-functioning tool involves the technology becoming an extension of the acting body—a mediating object that vanishes into the perceptual background, forming a pre-reflectively incorporated component of the active task ‘at hand’. In this way, if it is working efficiently, I do not focus on the hammer when I drive a nail into a wall, but instead I concentrate on the nail; in Heidegger’s words, ‘[t]hat with which our everyday dealings proximally dwell is not the tools themselves’ (99). Only when a technology fails and is in turn perceived as ‘unusable’ does it become, in Heidegger’s terms, ‘conspicuous’ (102). Importantly, it is always in the act of using the tool that we discover its ‘un-readiness-to-hand’—‘not by looking at it and establishing its properties, but rather by the circumspection of the dealings in which we use it’ (102–3). As Ihde summarizes, a tool in use ‘becomes the *means*, not the object, of the experience’ (Ihde 1990: 32; original emphasis); and, by extension, it is only when the tool fails to do its unfettered duty as the means of an action that one begins to perceive it as an *object*, not a transparent means. In other words, in affording the successful completion of an active task, technologies fade from our awareness—or, to recall Hannah’s phrase cited above, we might say that they never ‘cross the mind’ of the actor during efficient use. In this way, there are clear resonances between the evidence considered above and Heidegger’s theoretical position: that when headphones seamlessly enable a listener to achieve their desired task (for example, to listen to relayed audio), they disappear into the background of perceptual experience.

Merleau-Ponty (2012) contributes to the phenomenological account of technological transparency by attending more closely to the schematic integrity of the body during mediated experience. Perhaps his most well-known technology-focused example is that of the interaction between a Blind person and a walking stick. In the case study, Merleau-Ponty suggests that the very structure of the perceiving body can be *extended* through material engagement. He argues that when using a walking stick to negotiate the lifeworld, a Blind person finds that the stick ceases to be perceived as an object but is instead experienced as a means of

embodied perception: ‘it is no longer perceived for itself; rather, the cane’s furthest point is transformed into a sensitive zone, it increases the scope and the radius of the act of touching and has become analogous to a gaze’ (Merleau-Ponty 2012: 144). Peter-Paul Verbeek summarizes Merleau-Ponty’s position succinctly as the argument that ‘human beings can not only *extend* the spatiality of their lived bodies with the aid of artifacts but *perceive* with them as well’ (Verbeek 2005: 125). To habituate oneself with a technology, then, is ‘to take up residence in them, or inversely, to make them participate within the voluminosity of one’s own body. Habit expresses the power we have of dilating our being-in-the-world, or of altering our existence through incorporating new instruments’ (Merleau-Ponty 2012: 145). Part of the ‘successful’ incorporation of a technology, then, is heavily dependent on habituation (see also Romdenh-Romluc 2013).

I return in a later section to the idea of corporeal extension and its consequences for individuals’ experiences of the body’s limits (§ 4.8). For now, it is sufficient to understand that technologies, when functioning properly, can form a transparent part of embodied action and perception. Drawing from Heidegger and Merleau-Ponty, Ihde (1990) forges a lexicon for describing the types of technology-mediated experience in which a tool becomes ‘incorporated’ into the body schema. Ihde separates the characteristics of technology-mediated experience into a number of categories in his ‘phenomenology of technics’, in which he taxonomizes the ways ‘in which I-as-body interact with my environment by means of technologies’ (Ihde 1990: 72). The first of Ihde’s categories of human–technology relation, and most relevant here, is that of the *embodiment relation*. For Ihde, as with Merleau-Ponty, an individual’s relationship to a technology may be considered embodied by virtue of its incorporation into the person’s wider body schema. A classic example may be found in the practice of wearing spectacles. Here, the technology ‘is actually *between* the seer and the seen, in a *position of mediation*’ (73; original emphasis). In this instance, the eyeglasses represent an exemplary technology that is normatively used and experienced in a way that fits closely with Ihde’s model of the embodiment relation:

It is, as it were, taken into my own perceptual-bodily self experience thus:

(I—glasses)—world

My glasses become part of the way I ordinarily experience my surroundings; they ‘withdraw’ and are barely noticed, if at all. I have then actively embodied the technics of vision. Technics is the symbiosis of artifact and user within a human action. (73)

Here, the transparency to which Ihde refers denotes the degree to which the technology becomes incorporated into its user's sense of embodiment, and in doing so 'withdraws' into the background of the individual's perceptual awareness. While eyeglasses mediate a user's experiences of the wider environmental lifeworld, headphones can be understood to act in a position of mediation between listener, relayed audio, and lifeworld. To quote from Shuhei Hosokawa, then, a personal stereo and its requisite headphones work not as a prolongation of the body [...] but as a built-in part or, because of its intimacy, as an intrusion-like *prosthesis*' (Hosokawa 1984: 176; original emphasis).¹

In the following sections, I aim to illustrate how headphones can be experienced as transparent, 'opaque', or somewhere between these poles during use. As Elliott suggested in the quotation adduced at the start of this section, headphones are not always efficiently transparent technologies; perceivable cues pertaining to their material presence on the body can cause them to appear more 'conspicuous' during use—or, as I am terming it here, more 'opaque'. While there is a drive towards what Ihde calls 'total transparency'—'total embodiment, for the technology to truly "become me" [...], equivalent to there being no technology' (Ihde 1990: 75)—this is never such a phenomenological reality with a technology such as headphones, whose status as an 'actual, or material, technology always carries with it only a partial or quasi-transparency' (Ihde 1990: 75).² Instead, there are varying *degrees* of technological opacity during use—a notion that relates directly to what Ihde terms technological *multistabilities*. Ihde argues that technologies 'have structured ambiguities that allow what first appears as a "same" technology to be differently situated and have different trajectories' (Ihde 2010: 126). In other words, the multistable possibilities of technology-mediated perceptions show in stark

¹ Hosokawa's use of the term 'prosthesis' to describe the kinds of technological extension to which he refers is a common trope in discourses surrounding human–technology interaction (see, e.g. Wigley 1991; Wilson 1995). However, following the work of Sarah Jain (1999), I avoid the term here. For Jain, prosthesis can be a useful conceptual tool 'with which to account for the ways in which technologies are always and never constituent of the body', but it is also concerning in terms of how it can account for the complexities of the bodies that it addresses: 'Certain bodies—raced, aged, gendered, classed—are often already dubbed as not fully whole' (Jain 1999: 32). In other words, 'the disavowal and simultaneous objectification of the disabled body is at stake in the use of the term "prosthesis"' (Jain 1999: 33).

² 'Total transparency'—effectively a human–technology merging—is considered by others to be a possibility in relation to certain 'permanent' technologies that are installed into the fabric of the body such as pacemakers and cochlear implants. Especially relevant here is the work of Verbeek (2008) and Kirk Besmer (2012) on 'cyborg intentionality', which extends Ihde's ideas about embodiment relations to suggest that humans and technologies can, in certain circumstances, merge to produce a hybrid intentional frame through which the world is experienced. Given the inherent 'removability' of headphone technologies, such theoretical perspectives are not influential on my own approach here.

relief the ‘simultaneously open yet structured’ nature of perceptual reality in which ‘each possibility is one that can actually be experienced in a certain way, but while so experienced the other possibilities equally there to be discovered are not experienced’ (Ihde 2007: 187). Multistable possibilities, then, are analogous to Gibson’s (1966, 1979) ecological theory of affordances, in which an organism perceives meaning and possibilities for action in its environment. Such affordances are always already relationally constituted, predicated not only upon the external information an organism perceives but also upon the organism’s own capacities. Among these capacities are embodied and mechanical concerns, the memory of previous experience, and intent and motive. As Gibson writes, affordance theory asks us to consider what the environment *affords* a perceiver: ‘what it offers the animal, what it provides or furnishes, either for good or ill’ (Gibson 1979: 127). In relation to the present study of headphone listening, then, I want to suggest that the varying degrees of technological opacity reported by interviewees in what follows represent multistable possibilities or affordances, with perceived transparency understood as dependent on a number of factors: the perception of material consequences of the mediating object such as concomitant mechanical sounds (§ 4.5) or tactually perceived components of the technologies such as wires (§ 4.6), cushions, and earbuds (§ 4.7).

4.5 CONCOMITANTS

At the beginning of our interview, Sinclair explained to me that he was troubled by how sonically noticeable the mechanical materiality of his headphones was during listening:

You put these on. [*offering headphones to interviewer*] And then just tap the metal [headband]. It’s extremely loud. [...] Anytime you accidentally rub your glasses up against the metal frame, or you have to fiddle with the port or something, you really notice that there’s something on your head. (Sinclair)

When the headband across the top of his over-ear headphones comes into contact with other objects, it causes Sinclair to hear a loud sound. Clearly, he does not intend to hear this sound when he uses his headphones; it is, for Sinclair, an unfortunate consequence of the heavy metal casing of the headband. In this way, these *concomitant* sounds—the sounds directly caused by the material construction of the headphones as opposed to those that they are intended to relay electronically—enter into Sinclair’s auditory experience. The technology, as it were, makes

itself heard, and in doing so it moves from the status as a transparent *medium* of perception towards becoming an opaque *object* of perception. To recall Elliott's term adduced earlier, the headphones fail to act as 'silent agents' for Sinclair. While Elliott's coinage of the term was more metaphorical, drawing on the idea of headphones being optimally transparent technologies that disappear from perceptual awareness, Sinclair's account suggests there is a more literal side to the idea: that it is partly through the literal sonic consequences of the technology's materiality that Sinclair's experience of the headphones' transparency is affected.

In Sinclair's case, the headband coming into contact with other objects caused the concomitant sounds to be heard during headphone listening. For others, it was the contact caused between the body and the technology that caused disturbance:

The ones we used to have when I was studying in the music IT suite, they were sort of, like... It [the headband] was adjustable, and it had this metal bit that would pull them out. And every time you moved, you heard it all moving. And it was really annoying. Like, you could drown it out after, like, a few seconds, but I just was really aware of it. And it was annoying. It annoyed me greatly. (Dana)

Dana acknowledges that her own bodily motion was a direct causal factor in her awareness of the technology on her head because of the concomitant sounds that were produced as the headphones moved in sympathy with her own movements. She describes the experience of her headphones appearing more opaque to her during use as a source of great irritation. She notes that she was able to 'drown it out' after a while, but also that she 'was really aware of it', in turn suggesting that it was a difficult noise for her to ignore. Over time, then, Dana's attentional focus would be pulled between the audio being intentionally relayed by the headphones and the concomitant sounds they transmitted, suggesting that technological awareness is something that varies over time during mediated listening (see also Herbert 2011).

Similarly, during our interview, Otto raised the issue of hearing unwelcome mechanical sounds caused by the headphone apparatus (wires, ear-cushions, headband, etc.) during listening, especially those resulting from friction between a part of the technology and his body when walking or exercising. Like Dana, it was something that Otto admitted irritated him about headphone use. He associated these unwanted sounds more with wired headphones, as the presence of long, loose cables was more likely to cause such frictional noises through contact with his clothing. He therefore suggested that his preference for wireless headphones

was likely due in part to their lessening of these extraneous sounds. I asked how regularly he noticed such mechanical sounds while using headphones, and whether there were any factors beyond those relating to wires that might heighten or reduce his awareness.

I think it would partly depend on what you were listening to. Or possibly if you were listening to nothing at all, which I also do. [...] I would just leave them in if I didn't happen to be listening to anything at that moment, even with non-noise-cancelling headphones. But there would be this odd tapping [...] just outside your ears [..., as] they jump just slightly on your ears as you walk. And so, with each impact, you get a slight thump of the movement. [...] So it becomes much more noticeable, in a way, that you're doing that [walking in a certain manner]. And you change the way you conduct yourself, because you walk in a different way—you walk more smoothly. (Otto)

Using headphones when travelling by foot, Otto notes that he is prone to altering his manner of walking in an attempt to lessen the sonic effects of interactions between the material of the technology and of his body and clothing. In doing so, he becomes more aware of his body's movements when using headphones, choosing to 'walk in a different way', 'more smoothly', to reduce any unwanted consequences of his footsteps and shifts in posture on his sonic experience. Otto also suggests that his recognition of the concomitant mechanical sounds of the apparatus is in part contingent upon whether sound is being relayed by the technology at all, as well as—in cases where sound is playing—the kinds of audio to which he is listening. Implicit here is the suggestion that certain sonic materials can mask any unwanted technological noises better than others, and that the absence of mediated sound may cause awareness of such mechanical sounds to be heightened, as the perceivable characteristics of the medium itself may appear more prominent in attentional terms due to the removal of any audio masking.

Three pertinent observations may be drawn from Otto's account here. First, Otto's change of gait and tread when walking while using headphones suggests that his reluctance to be troubled by unwelcome mechanical sounds produced by the fabric of the headphones may at times cause him to become more aware of his *own embodiment* than he otherwise might. He demonstrates a heightened awareness of his body's motion in space during headphone use by describing how the very fact that he is walking in a certain way 'becomes much more noticeable' than it might without such technological mediation. In urging him to reconsider 'the way you conduct yourself' in public space, wearing headphones increases how conscious he is of his own movements because they amplify his body's motility through sound. His distaste for the extraneous sounds

may therefore relate not only to the ways in which they interrupt his experience, but also to the ways in which they cause him to become more self-conscious in his bodily movements—to become more aware of his own embodiment as he negotiates the world on foot.

Second, I regard Otto's heightened awareness of his manner of walking as in part contingent upon certain sonic-spatial characteristics of the mechanical sound, as he describes the 'odd tapping' sound as located 'just outside' his ears. His observation here suggests that the description he gives of his gait and tread as being 'much more noticeable' during headphone use pertains in part to the apparent location of the sound: not at his feet, but in the space just beyond his ear. As such, the sound's apparent location close to the ear appears linked to his heightened awareness of and dislike for the experience not only because the sound may garner greater auditory prioritization by virtue of its perceived proximity, but also in part because the sound's appearance at a significant distance from his point of contact with the ground may be at odds with the proprioceptive logic that sounds associated with his footsteps should be located at or close to the feet. The sound of his movements, mediated by the headphones, may therefore effect a degree of multimodal perceptual tension between his senses of touch (of the locative sensation of foot against ground during walking), proprioception (of the distance between feet and ears), and hearing (of the headphones' concomitant mechanical sounds close to the ear), and as such may draw his attention to the auxiliary sounds caused by the headphones by virtue of their appearance as aberrant mediations of body and technology. Moreover, his perceived placement of the sound as occurring beyond the limits of his body ('just outside your ears') suggests that he recognizes a degree of separation between himself and the headphones. Perceiving that the technology is not phenomenologically incorporated into his body schema provides evidence for the suggestion that an individual's awareness of a technology is increased when the medium appears less transparent, here as a result of the material noises they emit when used during walking.

Third, Otto's identification of the relationship between his awareness of the extraneous noises of the headphone apparatus and the degree to which such sounds may be masked by mediated audio resonates with certain insights arising from applications of ecological perceptual theory (Gibson 1966, 1979) to music listening. Of particular relevance here is the argument that one can never listen solely to musical sounds, as the sonic composition of any scenario involving music always results from 'the interpenetration of music and the wider environ-

ment' (E.F. Clarke 2007: 47)—that is, that musical sounds are but one of many kinds of sonic stimuli that make up any single music-listening environment (see also Chapter 5, § 5.7). As such, perceptual attention during music listening may be distributed across a host of environmental stimuli, as Eric Clarke contends:

One of the remarkable characteristics of our perceptual systems, and of the adaptability of human consciousness, is the ability to change the focus, and what might be called the 'scale of focus', of attention—from great breadth and diversity of awareness to the sense of being absorbed in a singularity. At one moment I can be aware of the people, clothing, furniture, coughing, shuffling, air conditioning and lighting of a performance venue, among which are the sounds and sights of a performance of Beethoven's string quartet Op. 132 and all that those sounds specify; and at another moment I am aware of nothing at all beyond a visceral engagement with musical events of absorbing immediacy and compulsion. The transition between these different perceptual worlds, or the interruption of one by another, can be disturbing and disruptive (when the ticking of a neighbor's watch breaks into the environment of Op. 132, for instance). (E.F. Clarke 2005: 188)

Clarke's hypothetical example is insightful, exploring the many 'ways of listening' that may emerge even within the often austere and socially regulated frame of the Western concert hall (Warren 2014; see also Johnson 1995). Clarke explains how a listener's focus can alternate effortlessly and unpredictably between narrow- and wide-lensed, and how radically different sounds, regardless of their aesthetic importance within a particular listening scenario, can feature prominently in terms of perceptual significance. A similar logic may be found in the case of listening to mediated sound through headphones that are producing extraneous mechanical noises. At times, a listener may be engrossed in the content of the relayed sounds, their perceptual attention focused on what is being mediated by the headphone speakers; and, at other points during the listening experience, they may attend more directly to other sounds, such as those caused by the material apparatus itself. Moreover, as would be the case in such contexts as Clarke's example invokes, specific features of the mediated sound may be more productive in masking any additional sounds caused by the medium itself. Where the headphone-relayed sound is insufficient at masking the extraneous mechanical sounds, the listener's attention may be distributed across both simultaneously, perhaps effecting the 'disturbing and disruptive' imbrication of the two auditory 'streams' (Bregman 1990) that Clarke observes, or—if, say, the listener steps in synchrony with the beat of the music to which they listen—overlapping in a productive manner that may be perceived as sonically coherent (see Thibaud 2003).

In addition, and as a means of bringing together each of the three points of interest I drew from Otto's account above, recent developments in the

ecological psychology of music listening may provide a useful theoretical lens with which to elucidate more about the contingent relationship between the masking affordances of mediated sounds, auditory awareness of a technological medium's materiality, and awareness of the body during headphone listening. One such example comes in Ruth Herbert's (2011) model of everyday music listening. Making use of ecological principles as well as drawing influence from phenomenology, Herbert demonstrates by empirical means that music listening is often characterized by variable oscillation between a number of levels or 'states' of consciousness, including absorption (defined as 'effortless engagement' with music) and dissociation (describing senses of 'detachment from self and/or situation' through music listening) (Herbert 2011: 3). She notes that in everyday situations, 'awareness may be equanimous', suggesting that the multiple 'components of experience are not separable, but interact, perceptually affecting each other' (17), and that everyday listening experiences are therefore regularly characterized by 'a distributed and fluctuating attentional sense' (55). Herbert's model exhibits close correspondences with Clarke's, though its focus on states of consciousness adds a particular nuance here in relation to the issue of embodied self-awareness. Take, for example, Herbert's identification of an instance of musical absorption in one informant's experience of Steve Hillage's music as almost 'hypnotic', which he evidences by explaining that he feels 'as if my whole body and mind has shut down for a while' (90); or her description of another interlocutor's experience as 'external dissociation' when he encounters 'some sort of (slight) out of body experience thing' as he 'mentally replays' a track in his head on a train journey (93). Here, the accounts of Herbert's research participants evidence how focused musical engagement can afford absorbing experiences that temporarily extricate an individual from their immanent sense of embodiment. Applying a similar logic to Otto's account, we may interpret that it is in part a result of his distraction by the concomitant 'tapping' sounds of the headphones moving, thus the distribution of his attention to sounds other than those he has chosen to have the headphones relay, that he becomes more aware of his body, not only because the mechanical sounds amplify his bodily movements at the ear, but also because they draw some of his perceptual attention away from the mediated sound of the recording, thereby reducing the degree to which he may feel 'absorbed' in the transmitted sound and lessening any ancillary effects of such absorption, such as bodily dissociation. Framed in such a way, it is likely that the 'tapping' sounds preoccupy Otto because they interrupt his pursuit of an idealized, interiorized listening condition in which he is able to attend to his chosen

mediated sound without distraction from the amplified sounds of his physical body's movement in space, pulling his focus away from the sound-world of the headphones and towards the wider environment.

While the work of both Clarke and Herbert can provide compelling vectors for the analysis of mediated listening, their insights may be less practical when approaching situations in which Otto wore headphones without electing to relay any sound through them. While my interpretations regarding Otto's perception of the sound as indexing his embodied motility remain applicable, the ecological argument based upon his implicit preference for an 'undistracted' listening condition is less sustainable here, as it is unlikely that he would be aiming to focus on an interior sound-world constituted by an absence of mediated sound. Rather, the points raised above regarding audio masking and awareness of technological presence appear more adequate for analysis here. It is precisely because there is no sound available to mask the concomitant 'tapping' sounds that Otto finds his auditory attention drawn entirely to them, and hence to the heightened awareness of the technological object. Instead of interrupting the flow of listening to a mediated stream of audio, the mechanical sounds become the major object of his attention, meaning that he focuses more on what the sounds themselves afford than he does when hearing them as merely an unwelcome tandem with a more 'meaningful' chosen soundtrack. It follows that a greater depth of attention to the affordances of the mechanical sounds may further heighten his bodily awareness and increase his sense of self-consciousness when moving, as he may notice the sounds more by virtue of their isolation.

4.6 WIRES

In analysing listeners' awareness of the materiality of their headphone technologies through sonic transduction and mediation, I have shed some light on specific ways in which the materiality of headphone technologies may preoccupy listeners and impact upon their experiences of embodiment. In Otto's case, like Dana's, it was bodily movement that caused the headphones to produce undesired mechanical sounds. But unlike Sinclair and Dana, it was specifically the contact between the *wires* of Otto's headphones and his body that produced the frictional sounds as he moved. For Hannah, it was not the *sound* of her headphones' wires that brought them to her attention but the *feel* of them hitting against her body:

Sometimes when you're running, they [the wires] knock against your body. You can definitely pick that up. But I think it just gets lost in everything else that you're doing. I think that you just stop paying attention to it. I think your attention isn't 100% on the music anyway—it's split between three different things at once. So I don't really tend to notice it. But it's a thing, for sure. (Hannah)

The tactile experience of her headphones' wires colliding with her body as she runs causes Hannah to become more aware of the technology than she otherwise might. However, she notes that she is not wholly and continuously preoccupied with these experiences; instead, her perceptions of the wires can get 'lost in everything else that you're doing'. This suggests that attentional economy is important, but also that the materiality of headphones can fade in and out of perceptual attention; there can be greater nuance than a harsh delimiting of 'transparent' and 'opaque'.

In other cases, the wires were more of a preoccupation. Reg also reported instances in which aspects of his headphones' wires became a material encumbrance for him during the performance of other tasks:

My gym headphones are wired, and they have a very annoying aspect to them. You know a lot of them have that sort of microphone bit on one of the bits of the cable? It has a weird clicky function in there where, if I touch it, it will stop what I'm playing. And I often wear the wire so it goes from my head, through my shirt, and down to my pocket where my phone is. And if I were sitting at a machine where I have to put my chest on something, often it would stop what I'm playing, and I'm like: 'Oh my God!' That is really frustrating, because it completely pulls me out of the environment that I was intending to set up. So that I hate. (Reg)

Reg makes reference to an ancillary technology embedded in the wire of his 'gym headphones' designed to enable a user to exercise greater control over the sound they hear without the need to engage with the source of the audio, such as a phone. Despite the intended function of the gadget to streamline audio controls, Reg identifies it as a hindrance by virtue of it being susceptible to unintended activation—for example, in cases where it becomes trapped between his body and another object. We can see in this example a case in which the material functionality of the technology is experienced as inefficient, encroaching on the seamless experience of self-selected audio and drawing the technology's functionality to the very forefront of perceptual attention.

For Vita, her headphones' wires produced a sense of being materially tethered to technology:

It [the wire] sort of tethers you in a weird way. And it actually makes me feel a bit claustrophobic. In a way, it's sort of like you're being bound to something. And there have been numerous times where I've gesticulated and whipped it out of my ear. So yeah, it just... It frazzles me in a weird way sometimes. Not being able to make them a bit more part of you, where you can just sort of put them around your neck—with your in-ear ones, anyway. They're the ones I find I whip out quite a bit. I miss the over-ear ones, where you can just sort of put them around your neck.
(Vita)

Vita explains in some detail the embodied relationship she feels to her wired headphones during listening. Describing her headphones as a tether, she notes that the experience can result in feelings of claustrophobia, of being 'bound to something'.³ She also suggests that the tethering wire can cause her to be more likely to 'whip out' an in-ear headphone with her arm by accident, foregrounding another limiting aspect of the technology's materiality. Interesting here is her perception of *separation* from her in-ear headphones by virtue of their tethered relationship to her: she describes wishing that they were 'a bit more part of you', suggesting that she experiences the technology as fairly opaque during use—as not being as seamlessly incorporated into her body schema as she would like. This is compared with her experience of over-ear headphones, which correspond more to the physical shape of her body: she notes that the ability to wrap over-ears 'around your neck' increases her sense of connection to the technology.

Henrietta reported a similar, though more positive, experience of human-technology tethering. When using headphones for work to aid in the production of interview transcripts, she noted how she felt absorbed in the human-technology nexus and connected to the technologies involved by virtue of her headphones' wires:

It makes me think about how the headphones connect me to the computer. The fact that they put pressure on my bones means that it's a kind of... I mean, previously, I wasn't bodily connected to the computer. It's like there's a kind of link between me being embodied and feeling things and the computer being... I feel like me and my laptop are producing the transcription together when we're connected by the headphone cable. [...] I think I probably do feel more like I'm

³ Wires enter into Bickford's (2017) account of how earphone technologies mediate social relationships for children and young people in a school setting. For example, Bickford writes: 'Listening together presented everyday physical challenges. Walking together while sharing earbuds involved careful coordination of two bodies, and friends would spend time practicing especially difficult tasks like walking through doors together. [...] Wires literally tethered kids to one another, and headphone cables suspended from ear to ear traced out the intersecting nodes of social networks [...]. Wires threaded under clothing and tangled across crowded lunchroom tables' (Bickford 2017: 14). Bickford therefore foregrounds physicality and materiality as crucial concerns for the children he observed, especially noting the various entanglements and tetherings of wires in certain listening scenarios.

... tied to the other piece of technology and that I can't get away from it. [...] I wrote the words 'umbilical cord' [in my experience diary]. (Henrietta)

Henrietta's report outlines her experience of feeling part of a technological network that is formed between her body and her computer via the wires of her headphones as she works. She explains that the physical experience of pressure caused by the headphones on her head makes her more aware of 'being embodied and feeling things', with the wire yoking her together with the computer. The result is a feeling of tethered connection, with her headphones acting as an 'umbilical cord' (see also Chapter 2, § 2.6), suggesting a wombic element to Henrietta's experience. Like Vita, Henrietta notes that there is a certain dimension of feeling bound to the technology ('I can't get away from it'), but on the whole her experience of wiredness is characterized more by a sense of positive and fluid connectivity than of the tether as a shackle.

The idea of the wire-tether as a more positive, 'secure', umbilical-like structure was echoed by other interviewees. When asking Ursula and Tatiana about their experiences with more recent wireless headphone technologies, they both suggested that they preferred the material connection afforded by wired models:

It [wireless technology] feels to me like it can't be as reliable if it hasn't got a wire. [...] I like the rooted connectedness of having it plugged in. [...] I think I just feel more secure having it wired in many ways. [...] Especially because I often have the phone in my hand with the wire in, or I'm aware of it being in reach of my hand in my pocket. So you can feel the way everything connects. (Ursula)

I actually tend to use the wires more than I do Bluetooth. I'm not sure why that is. Maybe it is that sense of security. (Tatiana)

Ursula describes a 'rooted' feeling of being tethered to her phone by a wire. Like Henrietta, she finds that the wire helps her to feel that 'everything connects' between her body and her mediating technologies. Tatiana suggests that she prefers the 'security' of a wire, though she finds it difficult to place the exact reasoning: perhaps due to the potential failure of Bluetooth technology, causing sound to become uncontrolled, or perhaps because of the material feeling of connection that the wire affords her.

The idea that wirelessness indexes precariousness was shared by a number of interviewees:

I don't want to go to wireless, because [...] I think I'd be really worried about losing them. (Miranda)

Do you know the Apple [AirPod] earphones, the earbuds that don't have any cords attached to them? I just think they're going to fall out all the time. (Tatiana)

Because I feel that, if you're walking along with headphones on without the cord, then someone's going to grab them off your head. [...] There's something that's on your head, but it doesn't show its connection to anything else. (Ursula)

For Miranda, the fear is that she would lose a pair of wireless headphones by virtue of their being smaller and, in the case of wireless in-ear headphones, not yoked together. Tatiana's concern has more to do with the earbuds not staying put inside the ear, meaning they appear precarious and therefore likely to fall out and become lost. Ursula's experience is slightly more irregular: because of the lack of physical connection between her headphones and her audio player, she feels that her wireless headphones are unsafe when used in public—that 'someone's going to grab them off [her] head' as she walks along.

For others, wirelessness indexed a form of technological emancipation, removing some of the material constraints and annoyances associated with wiredness:

With the wireless ones, you haven't got to worry about the cable, or where it's going, or that it's connected. So they're much easier wireless, definitely. (Charles)

I love the fact I can go to the park now and do some exercise and, you know, you just have your phone or your watch now, and the Bluetooth headphones, and you can do a workout and not be impeded by anything because the music's just *there*. (Alana)

Charles suggests that wirelessness reduces any 'worry' he may have about the materiality of his headphones, specifically regarding where a wire would have to be placed in order not to encumber him when listening, in turn suggesting that the overall wireless experience is an 'easier' one. Alana similarly regards the wireless functionality of her headphones as reducing any encumbrance or impediment in relation to other tasks she undertakes while listening, such as exercise. In this way, and echoing ideas pertaining to the embodied deixis of headphone sound explored earlier (see Chapter 2, § 2.4), the music is 'just *there*', as though experienced without mediation. This suggests that, for Alana, wirelessness increases the transparency of headphone technologies during use.

The focus on the transparency of the medium that may be afforded by wirelessness was echoed by other interviewees:

You notice that you're wearing headphones less if there are no wires. (Tatiana)

I was in the gym, and I used these over-ear headphones in the gym, predominantly because it was a decision about the physicality—I didn't want the wires. You know, I like to go on the treadmill and not have any wires and be able to zone out. (Elliott)

Tatiana confirms that the loss of the 'umbilical' wire causes her awareness of her headphones to be reduced during listening. Elliott's suggestion that the 'physicality' of the medium was a concern for him during exercise echoes Alana's point about the reduced encumbrance of wireless headphones. He suggests that the ability for headphones to afford a 'zoning out' of bodily and environmental awareness (see also Chapter 2, § 2.7; Chapter 5, § 5.2) is only possible when the medium is as inconspicuous as possible—that is, when technological transparency is at an optimal level.

4.7 FLESH

The evidence presented so far in this chapter has shown that individuals' perceived relationships to headphone technologies can be highly variable. When not in use, headphones are understood as commodity *objects* to care for or to stockpile (§ 4.3), but when in use they can recede from a listener's perceptual awareness and become *transparent mediums* for sonic experience (§ 4.4). However, the evidence also suggests that the harsh binarism of medium/object requires deconstruction and nuance in order to foreground the apparent reality that individuals' perceptual awareness of mediating technologies varies a great deal during use. The concomitant sounds of headphones' material form pressing against and moving with the listening body can infiltrate into the headphone-space without profoundly impacting their technological functionality, bothering a listener at some points while not being noticed at others (§ 4.5); and wires, as physical manifestations of a technology's materiality, can be experienced in a number of ways, including (positively) as part of the 'secure' mediation of sound, (negatively) as an encumbrance during listening, or (neutrally) as consistently transparent during experience (§ 4.6). Variations in perceptions of headphones as medium/object and transparent/opaque appear to be caused—at least in part—by fluctuations in attention. The degree to which technologies enter into experiential awareness for listeners during use depends on changes in 'states of consciousness' (Herbert 2011) on a continuous scale from absorption through to dissociation, with

listeners at times more absorbed in the relayed audio than its conditions of reproduction and at other times more concerned with the materiality of the medium-as-object than with the sounds it transmits (see also Romdenh-Romluc 2013). Using Ihde's terminology, then, we have already observed a number of the *multistabilities* of headphones—the differing types of perceptual experience they may afford in a given circumstance.

I want now to pull our focus back from the awareness of headphone technology as material medium or object towards the impacts of headphone listening on an individual's sense of *embodiment*. The cause of the concomitant sounds and the irritations regarding wires were the direct result of headphones coming into tactile contact with the body and in turn bleeding into perceptual attention as an object of experience. In these cases, a listener's awareness of the materiality of the technologies is mediated by physical contact between headphones and body, in turn providing perceptual access to the object's material constitution either through tactility or the sounds produced by the frictions of contact. It is at this meeting point of body and machine, the yoking of the two into the almost-one, that we can therefore locate the origin of such experiences of technological materiality: at the horizon of the object body.

One way to conceptualize the impact of tactile contact on experiences of embodiment during headphone listening is to consider the phenomenological reality of the body's *edges*. The attachment of headphone technologies to the body suggests that they occupy a liminal position between listener and world. This may force a listener to consider the boundaries of their body—the ambiguous 'limits' between interiority and exteriority. We might pose a question: When headphone technologies come into contact with the edges of the *object* body at the level of the skin, do individuals experience these dermal edges as synonymous with the thresholds of their *lived* bodies? With this question guiding my investigation, I want to use what remains of this chapter to interrogate in greater depth the embodied implications of human-technology contact during headphone listening, specifically regarding the impact of mediating technologies on an individual's perceived relationship between the edges of the body-as-lived and those of the body-as-object.

As evidenced in previous sections, then, the tactile contact between body and technology is an important factor in understanding the material relations that emerge between listeners and their headphones. Beyond technological mediation, Filip Mattens, writing from a Husserlian perspective, suggests that touch is fundamental to the way we experience our bodies: 'the tactile experience of body

contact [...] constitutes my body as such: in feeling that something touches me, my body appears to me in a way that it cannot by simply looking at it' (Mattens 2009: 101). On this account, we might consider the tactile contact between headphones and the body as partly 'constituting' the listener's own sense of embodied materiality through its sensory demarcation of the object body's corporeal edges. Thinking in this way, and recalling Raymond Tallis's (2008: 156) expression adduced in an earlier chapter (Chapter 2, § 2.5), the 'proprioceptive ghost of the head' that is 'filled' with sound during headphone listening is *also* delimited by technological attachment to its edges. The spatiality of the head, then, is multimodally perceived during headphone listening: not just experienced through hearing, proprioception, and interoception, as previously argued (Chapter 2, § 2.5), but also through touch—the tactile contact between body and technology. Thinking with Mattens, then, we might hypothesize that a headphone listener's experience of the head as a limited bodily space is buttressed by the attachment of headphones to its edges.

To unpack these ideas further, I want first to consider the phenomenological ontology of touch through a Merleau-Pontian lens. As adduced above (§ 4.4), Merleau-Ponty uses the example of the Blind person and their walking stick to evidence the potential extendability of the lived body, particularly in relation to the ability of the senses to be physically extended out into the world and therefore to mediate actions. Merleau-Ponty offers a further set of examples with which to explain his ideas about the body schema and its potential extension through technological means:

Without any explicit calculation, a woman maintains a safe distance between the feather in her hat and objects that might damage it; she senses where the feather is, just as we sense where our hand is. If I possess the habit of driving a car, then I enter into a lane and see that 'I can pass' without comparing the width of the lane to that of the fender, just as I go through a door without comparing the width of the door to that of my body. The hat and the automobile have ceased to be objects whose size and volume would be determined through a comparison with other objects. They have become voluminous powers and the necessity of a certain free space. (Merleau-Ponty 2012: 144)

Evident in the feather and car examples is the idea that perception and praxis can be mediated through the incorporation of technologies into the body schema. Merleau-Ponty argues that the woman's feather is experienced as an integral part of her bodily space: as akin to the experience of proprioceptively sensing the location of one's own hand or one's own body in relation to a doorframe, the technologies extend and inhabit space as components of one's wider body schema.

As Ihde writes, Merleau-Ponty therefore shows us that the lived body ‘as an experienced bodily spatiality can be “extendible” through artifacts’ (Ihde 1990: 39).

The Merleau-Pontian lived body can therefore be understood as phenomenologically modifiable and porous. In Annemarie Mol and John Law’s words, ‘*this body is not a well defined whole: it is not closed off, but has semi-permeable boundaries*’ (Mol and Law 2004: 51; original emphasis). In combination with technologies, then, we can augment the body schema and its abilities to such an extent that a blunt phenomenological division between body and technology becomes unsustainable, not least in terms of embodied space. Instead, we might conceive of this phenomenological connection as one characterized by a certain intimacy—almost an *intercorporeality* between human and non-human entities so deeply felt that bodily space is spread to the edges of the objects incorporated into the body schema. As Christian Meyer and colleagues have argued, intercorporeality need not always refer to ‘a body-to-body relationship, but rather a relationship between bodies that together inhabit and are constrained by the world at hand’ (Meyer et al. 2017: xxxi). In Ihde’s words, the Merleau-Pontian account maintains that we may conceive of technologies as *bodies* in their own right—‘that perception may be materially extended through the “body” of an artifact’ (Ihde 1990: 40).

To illustrate these theoretical suggestions in relation to headphone listening using a more concrete example, consider this passage taken from my interview with Otto:

I suppose in the same way that if you were naked, you would think of the outside of your existence [...] as your skin. But you could add layers through clothes and shoes and so on. And then you sort of feel like the end of you is actually the tip of your shoe. [...] And, in that same way, rather than the edge of what you’re experiencing being the outside of your earlobes [...], the outside of your experience is the headset. And that’s partly by virtue of how you fix it to yourself. (Otto)

Otto describes how his experience of bodily space during headphone listening is extended to the edges of the technology. The ‘biological skin-bag’ of Otto’s object body, to use Andy Clark’s (2003) evocative and provocative term, does not designate the limits of his embodiment during listening; rather, Otto finds that the ‘outside’ of his experience, as he puts it, can be traced to the edges of his headphones, beyond the dermal wall. Comparing the experience with that of wearing clothes, he explains that the process of attaching the material technology to his body initiates this sense of bodily extension. Thinking phenomenologically, we can understand Otto’s lived body as having been extended due to technological

mediation: technology ‘reconstructs the body, transforming its limits, at once extending and convoluting its borders’ (Wigley 1991: 9).

We might therefore frame headphone listening as an intimate sensory coagulation of the sonic and the tactile, emerging as the flesh of the body meets that of the machine and, in turn, the body is experienced as co-extensive with the limits of the technology. An important word here is *flesh*. In his late philosophical writings, Merleau-Ponty moves from phenomenological insights towards ontological claims as a means of understanding how being-in-the-world is constituted in terms of the body and the world. As we have previously ascertained, the body-as-lived may be experienced in ways that do not correlate entirely with the physical properties of the body-as-object. As Merleau-Ponty writes, ‘as an object [...], the body is not ambiguous. It only becomes ambiguous in the experience we have of it’ (Merleau-Ponty 2012: 171). In Merleau-Ponty’s model of the body in *Phenomenology of Perception*, the body is at once something that is lived during experience and something that is an object within the perceivable world. The physical body is that which others can perceive and which constitutes us as perceivable entities in others’ lifeworlds, just as it is the object of scientific investigation.

To understand the phenomenological reasoning behind Merleau-Ponty’s designation of the lived body, one of the many examples he offers is that of self-touching (see also Chapter 3, § 3.9). Deriving a well-known example from the work of Edmund Husserl to demonstrate the notion, Merleau-Ponty invokes the experience of touching one’s right hand with one’s left in his *The Visible and the Invisible*:

If my left hand is touching my right hand, and if I should suddenly wish to apprehend with my right hand the work of my left hand as it touches, this reflection of the body upon itself always miscarries at the last moment: the moment I feel my left hand with my right hand, I correspondingly cease touching my right hand with my left hand. (Merleau-Ponty 1968: 9)

As Merleau-Ponty shows, perceptual experience is always necessarily relational, requiring not only the perceiver but also the perceived to occur; and, as perception is both necessarily relational and the primary ‘modality of consciousness’ (Merleau-Ponty 1964), it follows that being is always already being-in-the-world: I perceive an object, therefore I exist because I am perceiving the world. In the case of self-touching, the lived body is that which touches (perceives through the modality of touch), and the intentional relation is founded upon my body touching itself. The lived body is therefore understood to be that which is *active* in touch-

ing—here, my right hand touching my left. It follows that my left hand is the *object* of my act of touching: it is touched by my right.

However, as Merleau-Ponty shows in his example, at the very moment that the right hand touches the left, the left hand touches the right in return, which, given the principle of intentionality, makes it the subject of perception and the right hand its object. Here, in the act of one hand touching the other, emerges a phenomenological conundrum, which Merleau-Ponty terms *reversibility*: that, at once, the right hand touches the left and the left hand touches the right, but that these experiences cannot be experienced at one and the same time; ‘the touching is never exactly the touched’ (Merleau-Ponty 1968: 254). If someone else were to observe my body’s mutual touching, they would conclude that *the right hand is touching the left is touching the right*, the coincidence of the two hands assured from the third-person perspective. However, in my experience of my own lived body, I feel ‘the imminent and yet impossible coincidence of the touching and the touched’ (Lefort 2012: xvii); the experience of my right hand touching my left does not entirely coincide with that of my left hand touching my right. The two experiences are seen to relate in an asymptotic manner: they are so close to being identical, but they necessarily differ. When I attempt to focus on the opposite possibility, the experience reverses. Edward Casey refers to ‘a curious asymmetry at the heart of the touched/touching dyad’ (Casey 2017: 221)—that, in self-touching, one is touching and is touched, but that these conditions of being never merge in experience. The lived body is always already a subject in the world, so at the moment of touching oneself, one experiences the immediate reflection of the intentional act, as the object of one’s original touch becomes the subject, and the possibility of a coeval experience of touching oneself and of being touched by oneself is subsumed because of the necessary subjecthood of the lived body.

In the notion of reversibility, Merleau-Ponty is not arguing that there is an ontological separation between lived body and objective body. As he writes, ‘my body is *at once* phenomenal body and objective body’ (Merleau-Ponty 1968: 136; added emphasis). Instead, his suggestion is that the body-as-experienced (the lived body) is never phenomenologically equivalent to the body-as-observed (the object body). What is also notable in Merleau-Ponty’s account is the manner by which the body, in its simultaneous constitution as lived body and object body, is always already both subject and object. If I touch something, I am also touched by that thing, even if those experiences do not coincide for me, ergo it follows that perception and action always already entail that the body is ‘open’ to the world. By touching, I am necessarily affording my being touched by other entities in the

world. As Hoel and Carusi summarize, in the work of Merleau-Ponty, ‘the perceiving body is seen as mutually intertwined or entangled with the phenomena it targets, bodies and environments co-shaping each other in ongoing processes of differentiation’ (Hoel and Carusi 2018: 47). Perception therefore presents itself as an emergent process predicated on the reciprocal co-constitution of perceiver and world.

It follows that, in philosophical terms, Merleau-Ponty’s notion of reversibility leads us not only to phenomenological conclusions but also provides certain ontological frameworks for our understanding of how we relate to the world. In recognizing that perceptual experience is founded upon being embodied within a sensible lifeworld and upon being open to that world in a relationship of mutual co-constitution, phenomenological approaches offer a mode of investigation that pursues the primacy of human experience but which also decentres the human as an ontologically superior or dominant subject within the world. Because we acknowledge that being is always already being-in-the-world, we highlight that human agency is not the sole subject of importance in existence, as the world plays a role without which there would be no being. When touching, I am always *touching something*, discerning through perception what I can about the other entity that I am touching. Moreover, in doing so, I am *being touched*, and I recognize my own embeddedness in and openness to the world in the knowledge that I co-exist as a perceiving subject and perceivable object. While I irrefutably stake claim to subjecthood in my firsthand experience of my lived body, the strict, hierarchical delimitation of the subject/object dyad in perception is destabilized due to my contingency upon the world.

As demonstrated in Merleau-Ponty’s example of the hands touching, the deconstruction of the strict subject/object dyad in the perceiver–environment relation is clear in the constitution of touch. As I touch the keys on my computer to type these words, so too am I touched by them in the very same instance. If, in the act of touching, I am always already touched, and these components of experience are simultaneous and coeval, it follows that I am, in some sense, always already both subject (I touch) and object (I am touched) in the perceptual relationship. In Merleau-Ponty’s terms, both the world and I are made of *flesh*: I touch the world as the world touches me, and in that yoking, both body and world are ontologically constituted. As Elizabeth Grosz summarizes, ‘[f]lesh is being as reversibility, being’s capacity to fold in on itself, being’s dual orientation inward and outward, being’s openness, its reflexivity, the fundamental gap or dehiscence of being’ (Grosz 1993: 44). In this way, the reversibility of flesh extends far beyond

the notion of self-touching: it is inherent in the constitution of the world, of bodies, and of self. The principle of reversibility indexes a *crossing* of body and world, of subject and object—an ontological reciprocity that Merleau-Ponty uses the image of the *chiasmus* (χ) to illustrate.

4.8 EDGES

What does flesh entail for the headphone-listening body? Gail Weiss explains that ‘reversibility describes an ongoing interaction between the flesh of the body, the flesh of others, and the flesh of the world, a process in which corporeal boundaries are simultaneously erected and dismantled’ (Weiss 1999: 119). As we saw in Otto’s example, headphones, like Merleau-Ponty’s feather, can be incorporated into the body schema to such a degree that the edges of the lived body are co-extensive with the edges of the technology. In this way, a headphone listener’s ‘corporeal boundaries’ are shown to be porous: in the flesh of the body meeting the flesh of the technology, a human–technology assemblage is produced, extending the body’s spatiality and questioning its physical limits. Following this logic, Hoel and Carusi argue that Merleau-Ponty’s model of the body is multiply ‘decentred’: it mediates subjecthood and objecthood, it extends into the environment and the environment into it, and—most importantly for the present purposes—‘it has the capacity to alter its own borders, by acquiring new habits and by incorporating symbolisms and tools’ (Hoel and Carusi 2018: 61). There is a deep relationship between perceiving body and mediating technology, then: Weiss refers to ‘technology’s own fleshly existence’, arguing that the notion of flesh ‘allows us to see the intercorporeal possibilities inherent in the chiasmatic relationship between humans and machines’ (Weiss 1999: 128, 125). At the crossing of the body and the world in flesh comes an intercorporeal relationship between human subject and non-human object; and, as the principle of reversibility shows us, the headphone listener can, in different moments, experience this relationship as both subject and object—as touching and as touched. Speaking directly about these issues of tactile contact, Robert Esposito writes that ‘when things are in contact with the body, it is as if they themselves acquired a heart, leading them back to the center of our lives’ (Esposito 2015: 11). In this way, headphone technologies can be said to form part of one’s sense of embodiment during listening.

Merleau-Ponty asks: ‘Where are we to put the limit between the body and the world, since the world is flesh?’ (Merleau-Ponty 1968: 138). We can explore this question through attention to the idea of bodily *edges*. We know that a body’s per-

ceived ‘limits do not coincide with the limits of its material form’ (Zuckerlandl 1956: 304), and in such a sense that ‘strict boundaries are always blurred in human-machine interfaces’ (Jain 1999: 41). Nonetheless, in both perceptual and cultural senses, the skin can be understood as an important ‘surface’ through which we find the limit of the body-as-object. As Steven Connor has suggested, ‘[t]he skin is the vulnerable, unreliable boundary between inner and outer conditions and the proof of their frightening, fascinating intimate contiguity’ (Connor 2004a: 65). In this way, the skin may be said to represent (one of) the most ‘outward-facing’ component(s) of our physical bodies; ‘[i]t is through the bodily surface that I first engage the world’ (Leder 1990: 11). Understanding skin as the primary medium of touch, and as such as ‘a medium of connection or [...] semiotic permeability’ (Connor 2004a: 66), can help us to consider its roles in demarcating the lived edges of the body.

Perhaps the most developed and compelling phenomenological account of the body’s lived edges comes from Casey (2017), whose notion of a *peri-phenomenology* of the body’s lived edges is strongly resonant with the ideas circulating here. For Casey, ‘[e]dges are endemically elusive, quickly disappearing from the very perception that notices them to begin with’ (Casey 2017: xix). In this way, what Casey defines as a ‘peri-phenomenology’ is an approach to understanding how to engage with the peripheral nature of ‘edge phenomena’—in this case, the edges of the lived body. Casey describes skin as the body’s ‘boundary’, with orifices its ‘gaps’ (42). That said, ‘[f]or the most part, I am oblivious of the edges of my own body, which I live from within’ (211). In this way, they are necessarily ambiguous: they are ‘not found in any precise corner or part of space’ (213). Nonetheless, there is a ‘felt immanence’ to the body’s edges (216): ‘they *are there*—there at the periphery of my body’ (214; original emphasis). Casey argues that ‘it is by these very edges’—the edges of the body—‘that we are most fully in touch with the world around us’ (211).

On the whole, the body’s lived edges are ‘proprioceptively experienced’ and may be described as that which ‘I feel or sense to be mine, to belong to my own body’ (Casey 2017: 212). Touching the skin can help to demarcate the physical body’s edges and, in turn, may impact how the edges of the lived body are experienced. As Komarine Romdenh-Romluc suggests, ‘proprioception is an integral part of the sense of touch’ (Romdenh-Romluc 2011: 68): it enables us to understand where our bodies’ edges link with the wider world. In Michel Serres’s words, touch ‘has the virtue of closing and outlining an interior’ (Serres 2008: 56). The linkage of body with technology was something that caused my interviewee

Henrietta to experience her body as spatially finite and contiguous with the world:

The back bit of the headphones [*gesturing to band across head*] was where I was feeling the ‘link’ between the plastic of the headphones and my body. It was there. As opposed to... Maybe if I’d been listening with in-ear headphones it might have been more in here [*gesturing towards head as though suggesting towards interior*], like actually inside, which I wouldn’t have found as nice. [...] I think it’s probably that it [using over-ear headphones] feels more intimate, more immersive in a way, because your bone is there. I mean, I know that there are bones in your ears as well, but it’s not the same kind of surface contact that I get with those [over-ear headphones]. Maybe there’s something to be said about... I don’t know the science... (Henrietta)

For Henrietta, the points of contact between her body and her headphones represent an important ‘link’. She defines this link in terms of intimacy, suggesting that the act of touching—even if only being touched by a non-human entity—causes her to experience her body as something in a close relationship with her headphones, and something whose materiality reaches out to touch the technology and is, in turn, touched reciprocally, co-constituting the one and the other.

For Sinclair, the idea of the body as extended through technological mediation was notable when in contact with headphones:

They feel... There’s an odd gap. I think there’s some kind of idea where your head feels very large when you put them on, as there’s a metal bar [headband]. (Sinclair)

Sinclair experiences his head as enlarged when he uses his headphones, the edges of his lived body perceived as extended due to their contact with the headband. In the fleshly meeting of body and technology, then, the proprioceptive sense of the lived body is questioned; Sinclair’s awareness of his own material embodiment is affected through this contiguity.

A similar experience was also reported by Reg:

A funny one [...] is if you’ve got an itchy ear and you’re wearing headphones. That’s when I sometimes realize that I’ve forgotten that I’m wearing headphones—when I go to scratch my ear and I start scratching a headphone: ‘Oh! That’s not my ear.’ And then you remember that you’re wearing headphones. You forget for a moment. (Reg)

Reg’s account is exemplary for illustrating the effects headphones can have on individuals’ perceptions of their bodies, evidencing more about how headphones enter into, or become subsumed within, wider experiences of proprioception as part of the body schema. Reaching pre-reflectively towards his ear to satisfy an

itch, Reg becomes surprised when he finds the technology sat upon his body, having experienced an embodied connection to the headphones to such a degree that they appear to vanish from his awareness. It is at this point, then, that the headphones flip suddenly from being transparent to opaque. In his attention to the headphones' presence being reduced, Reg returns to the pre-reflective state of knowing his physical body's limits and forgetting that the technology extends them. As he explained in notably phenomenological terms:

In a similar way to how I'm aware that I'm still in the outside world, I am aware that I am attached to the headphones, because they go on you, and you move around and they move with you because they're now connected to you, and sound is going directly to you and not really to anyone else, and it does feel like an extension of your body in a way—an attachment that just fits on and is part of you for that moment. (Reg)

4.9 FLUIDS

We can acknowledge in the cases considered here that listeners' awareness of their own carnal, material embodiment can be affected during headphone use. One consequence of such phenomenological extension and ambiguity was an increased awareness of the material aspects of the body during listening. In particular, a number of interviewees described how they became more aware of their bodies' secretions of fluids, specifically sweat and earwax. For example, attention to the body's materiality was evidenced in Henrietta's explanation of why she preferred using over-ear headphones that cup the earflaps compared with on-ear headphones that press the earflaps when worn:

I don't have [on-ear headphones] on for too long because, firstly, they get sweaty, and then my ears will start to hurt. Which is why I much prefer those [over-ear ones], because even if they get a bit sweaty it's like your ears have space to breathe. (Henrietta)

Here, Henrietta has to make a compromise: that while both headphone types cause her to sweat, and thereby foreground her body's material processes and its discomfort in relation to constraints, it is the over-ear, 'cupping' headphones that are deemed less painful than the on-ears and as such offer some improvement in her experience. Her ears can 'breathe' more, as she says, when cupped as opposed to squashed, as though her attention is drawn to the quasi-claustrophobic experience of the technologies and her resultant connection to the air surrounding her body. As Stacey Irwin notes, '[w]hen earbuds fall out or hurt the

ear, the technology is no longer transparent' (Irwin 2016: 81). Here, we can acknowledge situations in which headphones do *not* become successfully incorporated into one's sense of embodiment, instead acting as opaque, rather than transparent, objects, drawing attention to their adhesion to the body and to the body's own materiality.

Hillary echoed Henrietta's perspective on the relationship between bodily awareness, pain, and sweat:

In the gym, when you're exercising loads, the little microclimate of your ear—with a noise-cancelling, padded Bose headphone over it—does become extremely humid. And especially if you've been running in those, you take them off, and your ear is a completely different temperature to the rest of your face. [...] When you can imagine the kind of humid microclimate of your ear, then that also heightens the sense of this kind of pressurizing, airless thing that noise-cancelling headphones can make happen. (Hillary)

In Hillary's account, there is an unpleasantness to her experiences of over-ear headphones. Unlike Henrietta's experience of giving the ears room to 'breathe' through the use of over-ear cups, Hillary describes the relationship between her body and the technology in terms of moisture and pressure. There is an almost claustrophobic edge to her account: the experience of an 'airless' space between her body and the technology. In this way, the headphones are experienced as something that clings to the body—an opaque object that causes the body to become negatively affected by its presence.

Otto considered the 'microclimate' of his over-ear headphones in both positive and negative terms depending on context:

I find this in cold weather—because it's warm [inside the headphones], you don't necessarily think of your ears as being outside of your experience. It's a closed-off, comfortable, warm box. Of course, there are two sides to that: there's the cold weather, comforting box that is formed. And then there's the hot weather, sweaty box which happens, which can undermine that. (Otto)

For Otto, the use of over-ear headphones can be both 'comfortable' and 'sweaty' depending on the wider environmental climate. In both cases, he describes them as a 'box', but his account seems to suggest that the headphones appear more notably incorporated into his body schema: that they act as a kind of second skin, ensconcing him and leading him to feel as though his ears are not 'outside' in the world but in some sense interiorized—as though his skin is not the 'outside' of his body, but the headphones are. Again, we can interpret from Otto's account an experience of the lived body as extended by technologies.

For other interviewees, there was a concern about the dirtiness of the technologies:

[*laughs*] So these are my daily drivers. Forgive the slight amount of ear wax on them. [...] I always feel like I clean my ears, but it doesn't show—which maybe gets into some neuroticism [...] about] being kind of surrounded or taking your surroundings away from yourself but still having kind of remnants of physicality. (Sinclair)

Sinclair's account here is interesting in that he holds two aspects of his experience in tension: on the one hand, the experience of being somehow removed from his surroundings during headphone listening, suggesting a reduced sense of immanence regarding his material, embodied connection to the wider environment; and on the other, the realization that he is a carnal, fluid-filled being whose materiality is always already present for him. He describes the earwax as 'remnants of physicality'—as reminders of his physical embodiment even in those moments when he feels so enfolded in the headphone-space that he forgets his status as a material body in the world.

4.10 ORIFICE

For Violet, concerns about aural hygiene were intimately linked with the sense of in-ear headphones entering the liminal space of the ear canal:

I feel like... Yeah, perhaps they [in-ear headphones] are a bit more invasive. Because they're going in, it's like being penetrated almost. And then you have to put them in, which feels like it's creating a bit of pressure as well, because they have to suction a bit. You have to put them in, and they might be a bit gross—like there's some dirt or earwax there, and it feels a bit more unhygienic. (Violet)

Violet notes that her experience of wearing in-ear headphones is akin to feeling penetrated. There is also an experience of uncomfortable pressure that accompanies their insertion. Moreover, the body's own materiality, its fluids and waste products, are foregrounded through technological use, reframing Violet's experience in terms of abjection. In this way, the use of in-ear headphones leads Violet to reflect on her ear's status as an orifice—a threshold between interior and exterior that is penetrated by the technology.

A similar sentiment was echoed by Dana:

It sounds a bit Freudian: letting the music enter me. I haven't thought about that. Because then it's sort of making earphones kind of like a masculine thing—that they're sort of entering you through an orifice. [...] It's kind of gross. (Dana)

It is notable that both Violet and Dana used the term 'gross' to describe their experiences of orificial insertion through in-ear headphone use. Dana used gendered terms to conceive of the experience, using terms such as 'entering' and 'orifice' to add to the sexual analogy she makes. Dana is not alone: for Schafer, the ear is an 'erotic orifice' (Schafer 1994: 12). He writes that '[l]istening to beautiful sounds, for instance the sounds of music, is like the tongue of a lover in your ear', tracing the potential intimacy of listening across sexual boundaries. Similarly, Eduardo Abrantes claims in more explicit terms that 'to listen and be heard is literally to be open to consensual mutual penetration' (Abrantes 2019: 71). In the case of in-ear headphone use, then, this idea of 'letting the music enter' the body is exacerbated through material means, with sonic experiences felt as more literally penetrative due to the physical insertion of a technology into a bodily threshold. The abjection that Dana experiences regarding her sexualized interpretation of the experience is telling of the strangeness she feels in conceiving of the ear as an orifice breached by technology.

Henrietta continued this line of thinking but focused more acutely on the 'unnatural' condition of human-technology interaction at the level of the ear's orifice:

I actually hate that feeling of actually having to push it in like an earplug. [...] So even with these, I don't really think I put them in properly because I don't like the sensation of it actually. I really don't like it. It feels really, like, invasive and not... I don't want to say 'unnatural', but it is a bit unnatural. It's like there's something... It puts me on edge when I see other people doing it as well, because it's like: 'You're literally putting the music into your body!' And it's like, urgh... Which is why I much prefer those [over-ear ones], because [...] although there is a really intimate relationship between you and that technology, it's not quite as, like, penetrative. (Henrietta)

Henrietta uses similar vocabulary to Violet and Dana to describe the penetrative qualities of using in-ear headphones. She displays a marked distaste for the tactile aspects of the technology, focusing on the notion of corporeal 'invasion' during headphone listening (cf. Connor's and Haraway's comments in Chapter 2, § 2.1 and § 2.10). While she is comfortable with the 'intimacy' she feels when using her over-ears, the in-ears are too 'penetrative'. Interesting here is the focus on the idea of 'unnatural' relations between humans and non-humans—that the boundary of the body is breached by technology in a way that troubles the felt threshold

between interiority and exteriority. In these cases, we see in clear terms how the material dimensions of headphone technologies can preoccupy listeners to a profound extent, with tactile experience the mediating condition of such strong experiences.

4.11 PARASITE

There can be intimate connections between humans and non-humans. These relations can cause us to reconceptualize our own corporealities through material correspondences with the world. To quote from Elaine Scarry: ‘We continually incorporate, then repudiate, then reincorporate the artifact. [...] We make material artifacts in order to interiorize them: we make things so that they will in turn remake us, revising the interior of embodied consciousness’ (Scarry 1994: 97). Throughout this chapter, I have aimed to provide an account of such material relations that develop between listeners and headphones. Surveying notable themes emerging from my interview data, I explored how individuals variously experience headphones as a medium and as an object, sometimes both simultaneously. I considered how materialistic conceptions of headphones can lead them to be understood as commodity objects that can be hoarded or treasured when not in use (§ 4.3), but that listeners often strive for a ‘total transparency’ of the technology-as-medium during listening (§ 4.4). Examining a number of the ways in which headphones make themselves ‘known’ to listeners during experience, including their production of concomitant mechanical sounds (§ 4.5) and the various (positive and negative) experiences individuals reported with wired and wireless technologies (§ 4.6), I sought to nuance the binarisms of medium/object and transparent/opaque through engagement with lived experiences. Moreover, through attention to developed phenomenological theories of technological mediation, touch, and ontology (§ 4.4, §§ 4.7–4.8), I have suggested that headphones play important roles in listeners’ material experiences of the liminal spatiality of the body (§ 4.8) and their awareness of the body as a carnal, material, *fleshly* entity (§§ 4.9–4.10).

What this chapter contributes to our knowledge of headphone use is a detailed empirical and theoretical account of how the practice is intrinsically multimodal, with the material constitution of headphone technologies not only entering into or disappearing from perceptual attention during use but also sometimes notably impacting how individuals experience their own sense of

embodied materiality, the edges and thresholds of their bodies, and the spatiality of the body schema.

I want to end with an example of how the tactility of the relationship between body and headphone technology can affect individuals in profoundly negative ways. In our interview, Miranda explained:

It [wearing headphones] can reinforce the sense of the boundaries of your self in a way that you don't want. (Miranda)

For some of those tortured through the use of headphones during the so-called 'War on Terror', the experience of feeling separated from the wider lifeworld—of experiencing the boundedness of the self through having headphones or earmuffs clamped to the head—was a lasting, traumatic memory. One such instance can be found in the case of Khalid Sheikh Mohammad. Named in the *9/11 Commission Report* as a 'model of the terrorist entrepreneur' and the 'principal architect of the 9/11 attacks' (National Commission on Terrorist Attacks Upon the United States 2004: 145), Mohammad is one of the highest-profile prisoners at Guantánamo Bay and represents a torture survivor who came to find the experience of wearing headphones again—however far removed the context from the detention camps—to be too traumatic to endure. During a trial held at Guantánamo in May 2012, Sheikh Mohammad was offered a set of headphones through which he could access a simultaneous interpretation of the court proceedings. The trial was delayed when the defendant refused to wear the headphones. After consultation with his lead defence lawyer David Nevin, clarification was requested regarding Sheikh Mohammad's protest against using the technology. Nevin is quoted as stating: 'The reason he is not putting the earphones in his ears has to do with the torture that was imposed on him. It's not a choice' (quoted in Rath 2012: n.p.). After this point, white noise was relayed into the press viewing gallery to obscure further in-court discussions, ostensibly a result of Nevin's invocation of the word 'torture' (Temple-Raston 2012). The nature of the torture that Sheikh Mohammad endured involving headphones remained unclear. I later received confirmation from Nevin that, while Sheikh Mohammad had been submitted to music torture over loudspeakers, the wearing of headphones was—to the best of his lawyer's knowledge—only imposed on him as part of the CIA's sensory deprivation treatment:

Mr. Mohammad objected to wearing the headphones because sensory deprivation was a part of what was imposed on him in his three-and-one-half years of torture in the CIA's Rendition, Detention and Interrogation program. He was also subjected to torture by loud noises [...] at ear-splitting volumes, but not, so far as I have heard, through headphones. (David Nevin, personal communication, 28th December 2017)

Nevin suggests that the accused was refusing to wear the headphones because of the coercive use of sound-isolating earmuffs during periods of sensory deprivation at the hands of the CIA. It was the tactile experience of having the headphones attached to his ears and head that intensely deterred him from wearing them, an experience that would trigger the trauma of his torture. Sound-isolating earmuffs had served to separate him *in extremis* from the wider acoustic environment, even including that of the cell in which he was kept, and to demarcate a boundary between body and world that was heavily pronounced and would have been felt in its tactility. Here, we see a person traumatized by a history of tactile experience, of the parasitic, material relationship of a technology to his body that thwarted his intersubjective flourishing and connection to the wider lifeworld.

Resisting the violent use of technologies to edify the boundaries of the body enables us to foreground the necessary contingency of individuals—as bodies always connected to each other, precarious in the flesh of the world. In this way, Weiss advocates moving ‘toward an understanding of technology as offering new ways of linking bodies up to one another, expanding their interconnections, and, in so doing, increasing their intercorporeal potentialities’ (Weiss 1999: 116). It is to such intersubjective, intercorporeal connections that I turn in the next chapter.

5

THROUGH



‘Every subject spins out,
like the spider’s threads,
its relations to certain qualities of things,
and weaves them into a solid web,
which carries its existence.’

— **JACOB VON UEXKÜLL**
(2010 [1934]: 53)

5.1 ATMOSPHERES

Following the success of her twenty-two-date concert residency at London’s Hammersmith Apollo in late 2014, Kate Bush gave a rare interview on BBC Radio 6 Music in which she reflected on performing in her first series of live shows since the 1970s. When asked whether she enjoyed the experience, Bush replied:

Towards the end, yes—I was just starting to feel relaxed enough to enjoy parts of it. The bit I really enjoyed was the end, because I knew that I wouldn’t have to try and remember the words for much longer. *[laughs]* And also, I had these in-ears in, which I’d never worked with before [...]. So they go into your ears, and it’s fantastic because everybody in the band, including the singers, are using these. And so you’re very much in a sort of, well, pretty hi-fi world. But it’s quite isolating. And you can’t necessarily hear the audience in the way that you would if you were just working off *[wedge]* monitors. So every night I couldn’t wait for the moment when I could actually take my in-ears out and actually hear the audience. And what was great was it wasn’t just sound that came in. It was actually the air in the theatre as well. And so some nights the air would be almost, kind of—I don’t know how to explain it—I mean, sometimes there was a little bit of moisture in the air. Sometimes it was a little bit tingly. But it was interesting that you didn’t just let the sound in. You actually let the room in. Do you know what I mean? [...] The actual, physical atmosphere. (Kate Bush, in *Kate Bush on 6 Music* 2016: c. 16’00”–17’30”)

Having ‘never worked with’ in-ear monitors (IEMs, or just ‘in-ears’) before on account of her decades-long break from touring until the 2014 shows, Bush was

well placed to provide a detailed account of her first public performance experiences as someone not previously acclimatized to the use of onstage in-ear technologies. In her account, she notes that the IEMs afforded her a sense of being in a ‘pretty hi-fi world’ of sound, suggestive of the uninhibited clarity of the relayed sound delivered directly to her ears, as well as indicating that she experienced the ‘space’ produced by her in-ears as a kind of ‘world’ that was somehow separate from the physical space of the performance venue. By virtue of their position in her ear canals, she found that she felt more isolated from her audience than she did when using a traditional stage-monitor setup during previous live performances.¹ Particularly intriguing in her description of the sense of detachment she felt from the audience is the ineffable, multimodal quality of that separation. There is a clear sonic component to the experience, as the IEMs formed a solid barrier between performer and wider acoustic ambience; but there is also the ‘physical atmosphere’ to which Bush refers, gesturing towards the quasi-material sense of the social environment in which she performed—the *feel* of the audience’s presence with her in the large theatre space. She describes this in terms of ‘air’, of noticing an almost tactile sensation of moisture or of a ‘tingly’ quality as soon as she removed the in-ears, an action that served to ‘let the room in’ as well as its sonorities. There is a stagnant, dominant insularity to her experience of the IEMs—of feeling locked into the ‘hi-fi world’ of the headphone-space—that could be instantly alleviated when, towards the end of the show, she would take the chance to remove the technologies and to feel the air of the theatre rush into her ears, as though moving beyond the ‘world’ that her in-ears created into the wider environment of the auditorium. Most interesting here is the notion that the IEMs’ attenuation of the sonic environment of the venue also caused Bush to experience a reduction in awareness of the quasi-tactile, felt atmosphere of the

¹ Performer-directed loudspeaker monitors (‘wedges’) are often used by onstage musicians when some or all of the sound involved in their performance is electronically amplified. Monitors are designed to enable musicians to hear both their own instrument or voice and their co-performers’ when playing over other ambient noise including audience noise. However, wedge monitors in turn create more ‘noise’ onstage, which further complicates the sonic environment, requiring musicians to turn up their monitors to a level higher than the ambient noise to be able to hear what they relay. The efficacy of wedge monitors also depends on room acoustics, which can vary dramatically between performance venues (Burton 2013). As such, IEMs were introduced in the 1980s (Roginska 2018: 114) as a way of circumventing certain issues pertaining to increased onstage noise. IEMs work by blocking the ear canal (often through the use of specially measured ‘moulds’ that are unique to the shape of a performer’s canals) and playing the monitor sound directly into the ears, in turn serving to attenuate ambient sound. This allows performers to hear the relayed sound more clearly as well as to listen at generally lower overall volumes than they would with wedge monitors due to the resultant lessening of onstage signal-to-noise issues (Federman and Ricketts 2008). IEMs are especially useful for performers who move around during a concert, as well as for avoiding feedback issues (Burton 2013).

space—as though the monitors impacted upon both her auditory *and* non-auditory awareness of the world around her, her sense of the air flooding to her ears as she took out the monitors serving to bring her ‘back’ to her physical situation as one among many in a shared socio-sonic space.

I begin here with Bush’s rich account of in-ear monitor use as a bridge from the questions of sonic interiority and technological materiality that have been foregrounded in the previous chapters towards a broader consideration of the impact that headphone technologies may have on listeners’ experiences of the wider environment. Bush’s positive consideration of the ‘hi-fi world’ of the headphone-space is held in tension with her awareness of the IEMs’ status as a necessarily obstacle-making technology, separating her from both the sonic ambience and the ‘physical atmosphere’ of the performance venue. In this way, while the IEMs’ high-quality foregrounding of the relayed sound is regarded as a benefit, they cause their user to experience a disconnect from her social environment by multimodally separating her from the acoustic and felt qualities of the theatre-space. In this example, we begin to move beyond a sole focus on the ‘inner’ spaces of headphone listening or the perceived materiality of the technologies themselves towards the wider socio-sonic environment and its resulting relationship to the headphone user.

In this chapter, I account for the ways in which listeners report experiencing the world *through* their headphones, noting the rich, sometimes peculiar observations that individuals make regarding their socio-environmental experiences during headphone use. In doing so, the chapter nuances the existing scholarly discourse surrounding the social reality of headphone use through consideration of how the perceptual consequences of such listening practices intersect with social and environmental experience. As I show, while there are many cases like Bush’s in which listeners notice a sense of marked separation from their socio-environmental milieu, these experiences are often more complex than a ‘hermetically sealed’ (Bull 2000: 41, 47, 52, 182, 192; 2007: 15, 113, 119, 160; 2014: 107) extrication from the lifeworld. On the contrary, in certain cases, headphones can transform listeners’ social and perceptual experiences in such a way as to cause individuals to become more aware of their environments during listening than they otherwise might (Herbert 2011; Watson and Drakeford-Allen 2016), to perceive multisensory environmental phenomena non-normatively, or to interact with other social actors in novel and intuitive ways.

To foreground how my own research findings build upon yet contribute substantially to existing work on headphone listening, I begin by recalling the

received account of the headphone ‘bubble’ (Bull 2000, 2007) introduced at the beginning of the thesis (Chapter 1, § 1.3), exploring its phenomenological grounding in greater depth through analysis of my own primary data. In line with the bubble model, I show that headphone listening provides some listeners with a sense of phenomenological security via effecting an auditory separation from the wider acoustic environment (§ 5.2), enabling them to experience feelings of spatial agency and control. I then show how this sense of sonically cushioned ‘safety’ can manifest itself in a heightened sense of confidence in social environments (§ 5.3), suggesting that headphone listening acts as a buffer against social fears or discomforts; and that headphones can act as a visual signifier to others that one is not available for interaction (§ 5.4). As I go on to acknowledge, such findings correspond well with—though build upon—existing research: that the auditory ‘boundedness’ of the headphone bubble is what users note as edifying a sense of control over otherwise unruly urban space (Bull 2000, 2007; Hagood 2011, 2019; Jordan 2017), which can have positive effects on individual wellbeing and self-regulation (DeNora 2013; Herbert 2011; Skånland 2011). However, as I pause to consider (§ 5.5), the exact qualities of this ‘boundedness’ have sometimes been under-investigated in favour of producing broader sociocultural critiques (Bull 2000, 2007; Hagood 2011, 2019), meaning that some interpretations of headphone-listening practices appear to have relied too strongly on totalizing phenomenological tropes that are not assured in their empirical accuracy—for example, Michael Bull’s invocation of the ‘hermetic seal’ metaphor in discussions of headphone use. As I suggest, such researchers’ cultural interpretations of headphone listening as a selfish, anti-social pursuit that ‘monumentalizes’ experience (Bull 2000) and radically extricates a user from the wider human and non-human lifeworld may therefore be too strong, as closer phenomenological analysis can show that headphone-related practices are often far more socially and perceptually complex than has previously been posited.

To support my hypothesis, I continue to develop a softer, more nuanced approach to understanding how *exactly* the bubble mediates socio-environmental experience, one whose primary aim is close description of the subtleties of headphone-mediated socio-environmental experiences as opposed to the goal of advancing broader cultural critiques at the potential expense of detail. I go on to examine a number of interesting social and perceptual phenomena that contribute importantly to the existing account of headphone listening: that, as in the Kate Bush example above, headphone bubbles can be understood as colouring listeners’ multimodal (visual, kinaesthetic) engagement with the lifeworld in complex ways

(§ 5.6); that the bubble is not a sonically hermetic seal and instead a permeable membrane that mediates as opposed to negates auditory connection to the environment (§ 5.7); that sound does not only bleed into headphones from the outside world but also leaks *out* of headphones, causing many listeners to become self-conscious and socially aware (§ 5.8); and, following this, that listeners often note a high degree of awareness regarding other human actors in their environments, suggesting that social contingency is an important factor in individuals' experiences and thereby destabilizing the anti-social trope (§ 5.9). I conclude with a phenomenological summary of the relational dynamics of headphone use (§ 5.10), arguing in favour of an image of headphone listening as *situated* in the wider lifeworld, not removed from it. At stake here is a rounded account of headphone listening that places phenomenological detail at its core, in turn avoiding making leaps to demonize the anti-social or 'zombie-like' activities of headphone users without due attention to the real, lived specifics of experience. Put simply, the chapter pursues the central aim of nuancing and softening the influential account of the headphone bubble as an absolute barrier to listeners' social and perceptual connection with the wider lifeworld, instead arguing that headphone listening is a practice based on *mediating* socio-environmental experience as opposed to negating it entirely.

5.2 WALLS

In her work probing the detail of 'altered states of consciousness' during music listening, Ruth Herbert (2011: 96) suggests that some headphone users experience the territorializing effects of the technologies as a form of 'sonic wall' forming an acoustic boundary between themselves and their environments. Herbert's description resonates closely with Michael Bull's (2000, 2007) influential conceptualization of headphone listening as producing an 'auditory bubble', with listeners feeling auditorily separate from the wider environment. Bull analyses listeners' descriptions of using headphones to 'clear' a 'predictable and secure' space (Bull 2007: 31), with sound acting to frame the world as 'intimate, known and possessed' (21) and to structure time 'into a seamless web of controlled sound and space' (3). In defining the auditory bubble, Bull cites the 'enveloping acoustics' of headphone listening as constitutive of such experiences of spatial control (3), using the model to explore how the widespread instrumentalization of headphones' 'isolating' affordances may represent a shift toward the prioritization of privatized experience in shared urban space (see also Hagood 2011, 2019). His work therefore

reveals much about the complex ways in which individuals perceive both mediated sound and the wider environment when using headphones.

As a means of building upon Herbert's and Bull's work and of introducing the socio-spatial themes that run throughout this chapter, I first consider reported experiences that demonstrate how headphones can produce certain sensory-affective 'benefits' for some users, affording a sense of control over their access to the acoustic environment. For example, one of my interviewees, Elliott, described how he used his headphones to carve out a protective space for himself when entering difficult environments:

When I'm going to the gym, I'm having to shut out a lot of things. And it's knowing that I'm then going to enter into a space where I see a lot of bodies that trigger [my anxiety]. (Elliott)

Elliott makes use of the territorializing affordances of his headphones to effect a separation between himself and the potentially threatening social actors in the gym environment. Entering into the mediated audio world of his headphones enables him to set himself apart from anxiety-inducing triggers through a parsing of attentional space, helping him to focus on the sound in lieu of extraneous factors. We might identify a potentially interesting connection between the notion of 'zoning out'—or 'tuning out', to use David Beer's (2007) term—the wider social environment in the context of the gym and the reported experiences of using headphone sound to 'zone out' bodily awareness during exercise that were analysed earlier in the thesis (Chapter 2, § 2.7). In both cases, headphones enable users to become absorbed in the form and content of mediated auditory space and to reduce awareness of 'wider' stimuli (bodily and environmental). These are clear examples of headphones providing a form of sensory self-regulation, 'refurnishing' (DeNora 2013) the interior space of audition with absorbing sound as a means of directing attention away from the external environment.

Elliott is under no illusion that the headphones take him 'out' of his physical environment in any actual sense, but he is intentionally reducing his awareness of it. That said, diminishing awareness through occluding wider environmental phenomena does not preclude a sense of being-in-the-world, as Reg—also describing his experiences in a shared gym—explained to me:

It's an awareness that it [the wider sonic environment]'s there, but an unwillingness to take part in it. [...] You can never be outside of the world. As long as I'm alive, I'm not going to be able to take myself out of the world around me. But being

able to put headphones in allows me to really just focus on what's behind my skin completely, and not have to really pay attention. (Reg)

With a remarkably phenomenological hue to his account, Reg describes that he uses his headphones to focus 'behind [his] skin' as a way of reducing attention to the wider environment. However, he never feels he is removing himself from the world in any meaningful way—to do so, he suggests, would be impossible. Instead, he frames his decision as one characterized by 'an unwillingness to take part' in the possibilities afforded by his environment on account of his wish to focus on his own exercise.

Reg's account suggests that headphone users do not feel wholly separate from the wider world during listening, but instead that they are refocusing their awareness to enable greater sensory comfort or control. Like Elliott above, many headphone users take advantage of the technology's ability to create a sonic buffer against potentially unpleasant aspects of the outside world. For example, Orestes, a teacher at a special educational needs school, told me about how he used headphones as part of calming strategies for children with autism spectrum disorder who were prone to experiencing sensory overload in loud environments:

I noticed that it works better for kids with autism. We had lots of kids that were using noise defenders and headphones. And it was a way of calming them down. So when you saw that they had a difficult time—that they needed to relax, or after a tantrum or something—it was one of the strategies that we were using. As well as *prevent* tantrums and—I don't know—difficult behaviours. So we used it a lot. And it works. (Orestes)

Here, the sonic walls of headphones provide a sensory filter for the children, in turn moderating their moods and behaviours. Orestes would use headphones either as an intervention strategy to calm his students or as a preventative or pre-emptive measure—often, he told me, in combination with a child's preferred music. Such an example shows that there are clear benefits to the sound-isolating effects of headphones for individuals whose sensory needs require greater spatial control. Complex or unpleasant acoustic environments can therefore be 'zoned out' through the use of headphones, in turn—if apparently paradoxically—enabling a child to *engage* more easily with their social and perceptual environments.

In a related way, Alana explained that her headphones help to moderate her experiences of social anxiety in highly crowded areas of her city:

When you're in London in big crowds and things like that [...], by having the headphones on, I'm much better at coping with the crowds. If there are too many people, I sometimes don't like that. But having the music on—the difference it makes if the world's too loud and too present. (Alana)

Alana's dislike for the social experience of negotiating large crowds of people in busy public milieux aligns with existing empirical work linking the experience of living in complex urban environments with heightened sensitivity to social stress (Abbot 2012; Lederbogen et al. 2011; see also Brighenti and Pavoni 2019; Simmel 1950 [1903]).² In moderating her sensory experience, headphones enable Alana to cope better with the reduced interpersonal distance and increased sensory intensity that arises from her city's crowded streets. She notes that the world becomes 'too present' for her when there is an abundance of bodies and noise in her environment, which she remedies by listening to music that masks the outside sounds. This also implies that the boundary-making capacities of headphones reduce her sense of being 'present' within complex social situations, with positive consequences for her affective experiences therein. It therefore appears that Alana uses headphones as a kind of 'defence mechanism against the anxiety-provoking elements of being in close proximity with strangers' (Sloboda et al. 2009: 432), allaying her stresses through the redirection of her attention to her self-selected audio and the masking of extraneous sound. To borrow from Marie Skånland (2011: 16), headphones may be said to provide a 'positive life resource' for Alana as she negotiates the crowded spaces of London by foot.

Alana also reflected on similar experiences of proxemic and sensory distress when travelling on the London Underground. It was here that she spoke more directly of the territorializing affordances of her headphones:

If you're on the Tube or something, and you're not listening to any music, you feel almost too close to everyone, or you're feeling inundated. Whereas if you've got headphones on, you're in your own little space, and you just feel more like you're observing the world go by. (Alana)

Alana describes feeling 'too close' to other passengers when she is without her music, comparing such experiences to those in which she uses her headphones to carve out her 'own little space' within the compromised environment. She also

² Evidence suggests that individuals who grow up in cities tend to process stress and other negative emotions in a different manner to those who grow up in rural areas and later move to the city (Abbott 2012: 163; see also Lederbogen et al. 2011). Such studies also evidence a causal relationship between the stresses of city living and certain psychiatric disorders.

makes use of a liquescent metaphor to describe how it feels to be within the densely populated space of the Tube car, framing the experience as one of inundation, as though drowning.³ Instead, headphones enable Alana to control the phenomenological horizons of her delimited personal space, in turn affording her a sense of being removed from the immediate environment, imagining herself as a detached observer who is unfettered by the social contingency of the space. The mediated spatial environment afforded by her headphones acts as a protective layer against the suffocating space of the Underground, analogous to the manner in which a diver's helmet separates the body from the water surrounding it.⁴

Similarly, Nell explained to me that she found her headphones could provide a sense of increased personal space for her on public transport:

I think, in some ways, it helps you create your own space, even maybe when there isn't physically as much. Listening to music or a podcast on a train that's really, really cramped, and you're squished close to everybody—maybe it's because it's distracting, but it's like creating a space that's not bothering other people, that is for you, I guess. [...] It feels a bit like a bubble at times. (Nell)

Nell's account sketches out her experience of curating a bubble-like space for herself in an otherwise compromised environment, carving out a sense of materially bounded space. Perhaps most interesting is her concern with 'not bothering other people' while establishing and maintaining a sense of spatial ownership, suggesting that her headphones enable her to avoid social conflict with other passengers by affording her a sense of having more personal space than she would without them, despite still remaining 'in' the physical space of the crowded train carriage. This is telling of a desire for spatial ownership in the public forum that is not directly related to the 'physical' environment—that the headphone-space allows her to feel as though she is less 'squished close to everybody' despite actually remaining at the same distance from other bodies in the space. As such, it appears that Nell's headphones forge lived perceptual boundaries for her in the context of an otherwise busy public environment

³ Alana is not alone in her negative social and sensory experiences of the London Underground. One study ($N = 81$) found that too much noise on the Tube was the third-highest anxiety-cuing stressor for travellers, superseded only by fears of anti-social behaviour and overcrowding (Kim and Gustafson-Pearce 2016). Another ($N = 580$) found that over a fifth of people who use technology during their Tube journeys use headphones as part of that technological network (Gamberini et al. 2013: 260).

⁴ My interviewee Charles provided the diving helmet analogy in our interview to describe the feeling of being both 'submerged' and somehow outside of the wider sonic environment. See also Tatiana's description of headphones as a helmet adduced earlier in the thesis (Chapter 2, § 2.8).

without the need to ‘clear’ physical space far beyond the edges of her body (see also § 5.3 below; Dibben and Haake 2013: 160; Tajadura-Jiménez et al. 2011).

Beyond the need to increase the phenomenological dimensions of lived space, other informants reported feelings of safety and security during listening, even in more dangerous environments. Hillary, one of the participants whose description of her experience of headphone sound in terms of an amniotic acoustics was considered in an earlier chapter (Chapter 2, § 2.6), noted how the ‘wombic’ qualities of her headphone-listening experiences also impacted upon the degree to which she felt safe and comforted by the experience:

The headphone does create that womb-like safety that I think a lot of people crave. [...] I think we have, for the first time in my life, a really good reason to be frightened of other people in the street. But I suppose one antidote to that fear is to make your own private space, and to [...] feel like you’re safe in your uterine simulator. (Hillary)

Here, Hillary’s description of being safe in the womb-like space of headphone listening is expressed in terms of how she feels partially removed from the alien ‘outside’. She notes how her fear of walking the streets at night is alleviated by the privatizing affordances of her headphones, which offer her a sense of protection. In actuality, her headphones would do little to keep her secure from threats and may even endanger her further due to a reduction in environmental cues; but Hillary nonetheless experiences the sonic walls of her headphones cushioning her lived space and designating it as a ‘homely’ interior, one co-constituted by its opposition to the ‘alienworld’ of the external environment (see Downs 2021a; Steinbock 1995: 181). This may suggest that the territorializing qualities of headphone-space can positively ‘empower’ individuals (Bull 2007) and reduce experiences of social anxiety.

Albert extended the idea of the wombic ‘walls’ of headphones in terms of his sense of agency, describing how they afford him a sense of feeling secure and at ease:

There’s the wombic thing, which is like: ‘I’m just going to curl up in bed and listen to that familiar album that I like.’ [...] It’s just kind of holding you somewhere. It’s situating you. [...] Because it’s like letting go of the responsibility of being in charge, in a way. It’s super womb-like. And that’s the thing; it’s got that immersive, wombic thing that’s also kind of authoritative. [...] I think that the music is a way of getting to a point where I feel safe enough to relax and let my guard down. (Albert)

Albert's description of the 'immersive' qualities of his experience is expressed in terms of his sense of security, separating himself from the wider environment through the building of sonic walls. Interesting in his case are the multiple 'layers' of sonic-spatial ensconcing that occur in his imagined scene. Choosing to 'curl up in bed' with a familiar record and his headphones, to be enveloped by comforting sound, Albert wraps himself in a sonic space within another sonic space. In doing so, he feels 'safe enough to relax', submitting to the comfort and security of his familiar, curated soundtrack as he immerses himself in the sound. He is 'held' and 'situated' by the sound, which he describes in wombic terms—as though surrendering any need to be concerned with the outside world, nestled inside his home, in his bedroom, in his bed, and within the nourishing space of his headphones.⁵

Later in our conversation, Albert shared a vivid memory of his childhood, explaining how his recollections of using headphones when young were foundational to his listening experiences later in life:

If you asked me what was the safest I'd ever felt as a kid, it would be in the back of the car with headphones on, on the motorway, and my parents are just in charge of where we're going. And I have headphones on, so completely absorbed in my own world, going in and out of sleep. Super relaxed. [...] Like: 'It's raining outside. I'm in the car, nice and warm. I'm in the backseat. Long, long drive. I've got, like, tapes or whatever. And I'm just listening to music that's kind of familiar.' And, when aged five or six, I had such a feeling of happy, relaxed [...] And that's the wombic thing. [...] And I guess it's like, as an adult, I want that, but I also know that most of the time I can't have that, because I am kind of in charge of where I'm going. (Albert)

There is a striking richness to Albert's account, linking his everyday experiences to those that he regards as formative in childhood. His experience of feeling 'the safest I'd ever felt' when in the back of the car, moving at a speed and in a direction set by his parents and being doubly emplaced within a secure environment ('within' his headphones, within the car), represents a powerful example of the comforting affordances of headphone listening. He describes a sense of absorption, of alternating between asleep and awake, in which he is entirely enveloped in the safe, 'warm' familiarity of his self-curated sonic world. Most affecting is his yearning to return to that carefree, protected state of being—

⁵ Similar, though more arresting, examples of sonic-spatial layering can be found in Katherine Wareham's (2017) work on the use of music by young people who are without fixed abode and who live in temporary accommodation. Wareham describes how some individuals use headphones to carve out a more personalized, privatized space than is afforded by their temporary bedrooms, building up additional boundaries so as to edify their senses of embodied space within the precarious environments of supported accommodation and in turn making their uncertain home-spaces more 'homely'.

a pull back to his previous lifeworld that ghosts somewhere behind his every experience of headphone listening.

A useful conceptual tool with which to understand how multiple, co-existing sonic-spatial layers can be produced during certain practices of headphone listening is the notion of spatial *nesting*. Drawing on work by Denis Smalley (2007), Georgina Born (2013: 13) describes the ‘nested’ condition of acoustic space, arguing that sonic ‘horizons’ can co-exist, overlap, and be incorporated into one another to produce spaces ‘within’ spaces. Born argues that ‘music and sound can effect both a zoning and a recursive nesting of publicness and privacy’ (25), with technologies such as ‘headphones engendering mobile, individuated listening enclaves nested within the wider acoustic and social environment’ (26–27). The figure of the nest may also be understood as a safe space, like a home (Bachelard 2014), suggesting that headphones can manipulate spatial horizons to effect a sense of private, personal ‘nesting’ in public environments to produce a number of positive perceptual and affective consequences (see also Downs 2021a).

5.3 CONFIDENCE

In addition to a focus on separating themselves from social and perceptual stressors in the wider world, many participants reported that using headphones could increase their sense of self-confidence when negotiating shared public spaces. Hillary, for example, found that her sense of personal introversion around strangers could regularly be circumvented through headphone use:

The idea of, like, expressing a lot of emotion in public, in a very public space, especially if I’m alone [...]—it doesn’t sound nice to me. But if I’m listening to this funny podcast, I will, like, burst out hysterically laughing without any fear at all. Also if I’m a little bit drunk and listening to music, and I’m on my way to a date or to a party, and I think I look fantastic, I will smile a lot more at other people. I’ll, like, perform a bit more to them—I’ll walk in a really confident way. [...] Whereas I would never do that if I wasn’t able to make that private, intensely vibey musical environment for myself. (Hillary)

Hillary notes that the private, ‘nested’ sonic environment produced by her headphones can enable her to feel more confident in the presence of other social actors in public space. Familiar, ‘vibey’ music enables her to feel ‘empowered’ (Bull 2007) to engage in non-verbal communications with strangers and to ‘perform’ for them by walking confidently, and she feels uninhibited in responding publicly to

comedy podcasts by laughing aloud—all in a manner that would be broadly unthinkable to her were it not for her headphones.⁶ Her description implies that she is bolstered not only by the qualities of the audio that she has chosen but also by the sense in which the mediation of the sound by headphones creates a spatial ‘environment’ for her, as though functioning as a barrier between her and the wider social milieu. Assured by this sonic boundary, she feels more confident when briefly engaging with other social actors.

Similar experiences were reported by Tatiana, who suggested that she often felt less inhibited to express herself visually in public space when wearing headphones:

I think if you’re not wearing headphones you’re obviously more aware of your surroundings. So you’re looking around more—you’re more aware of other people’s awareness. And then you become aware of how you are perceived. As soon as you have headphones... I probably make the same expressions either way, but as soon as I have my headphones on it doesn’t really matter, because I visibly have headphones on, so that’s kind of, like, an excuse for me to be, you know... To have a furrowed brow, or to be listening intently to something, you know. (Tatiana)

For Tatiana, headphone listening can sometimes represent a socially performative practice in which the visible presence of the technology acts as a cue to others in her environment that she is ensconced in a personalized audio world, and that she is therefore in some sense prioritizing the pleasures of her personal listening experience above certain social standards of affective display (see also § 5.4 below). She implies that she feels less ‘aware of other people’s awareness’ when she wears her headphones, meaning that she feels able to lose certain inhibitions regarding her social conduct and to enjoy her listening experience openly without fear of judgment. Assuming that others will draw from their own listening experiences and thereby regard her headphones as a signifier of her attentional focus being ‘elsewhere’, she constructs an image of her situation in which it ‘doesn’t really matter’ that others can see her, in part because she is less aware of them and in part because her headphones provide an ‘excuse’ to others for visibly relishing in her experience. Tatiana’s reflection on her reduced interpersonal awareness during headphone listening implies that the technology enables her to feel less self-conscious when among other social actors, perhaps also because she feels bolstered by her chosen audio, or because she feels removed from the

⁶ In the case of the comedy podcast, Hillary’s experience may also be due in part to her sense of being somehow ‘within’ the podcast’s conversation-space (see also Chapter 3, § 3.7), thus feeling edified by the parasocial experience of hearing intimately proximal voices.

environment due to her headphones forming a sonic barrier between herself and the sounds of the social world.

For others with whom I spoke, headphones had occasionally afforded a sense of assurance and courage within potentially hazardous situations:

I was thinking in the gym the other day [...], like, in America now, one always thinks: 'What if there was a shooting in this public space?' [...] And I thought that I'd probably keep my headphones on. And I'd be convinced that I'd make it out, because I'd just be like: 'Head down. Whoosh.' But I mean, that's ridiculous, obviously. [...] In a sense, I'd be convinced that I'm not really dying, you know? [...] It might be like a placebo effect in that it actually does work. Because it's like an added confidence, really. And an assurance. (Albert)

Albert exhibits a certain anxiety regarding his personal safety in public spaces, one which he mollifies through headphone use. In affording him a sense of 'added confidence' and 'assurance', his headphones act as a modality of 'affective scaffolding' (Krueger 2019), suggesting that his sonic-spatial experience offers some regulatory support for him during stressful situations by redirecting his attention and allaying his anxiety through affectively 'offloading' to the affordances of his self-selected audio environment. Like Hillary's earlier example of using headphones as a wombic 'antidote' to her fears of others when walking in the street, Albert is under no illusion that his headphones would provide physical protection against a potential violent attack. Nonetheless, he describes the phenomenological reality of feeling secure and reassured when using his headphones, which leads him to consider whether he would potentially fare better in a life-threatening situation when wearing headphones. He regards the notion as 'ridiculous', yet his reasoning is not phenomenologically baseless: that he might cope better in a situation of panic if he were bolstered by his self-selected audio, despite a reduced awareness of the immediate sonic-spatial environment. Albert's account develops in a manner reminiscent of the reported experiences of soldiers who use headphone-mediated audio to aestheticize their experiences of battlefield conflict and to invigorate them for fighting (Daughtry 2015; Niklas 2014; Pieslak 2009), in which the sounds of familiar music and the occlusion of distressing sounds in the wider environment may serve to edify individuals in combat. Here, to borrow from Nicola Dibben (2017), Albert hypothesizes that his headphones could function as an 'enabling' technology, affording him the confidence and empowerment to negotiate the complex and perilous situation he imagines, despite clear disadvantages regarding his separation from the wider sonic environment.

Similarly, Vita told me that she felt confident when walking through groups of people while using her headphones:

There was one really particular feeling that I had when I was working in a bar. And I'd be finishing at about five in the morning. [...] I always remember this feeling where—I think I was listening to Jeff Buckley—I was just walking through this sea of [...] almost, like, debauchery and chaos. And I felt like I was Jesus a little bit. [laughs] People would part. And it's just like you're flowing through people. It's like you're on a completely different plane. [...] I think sometimes it just makes you walk forward more confidently. (Vita)

Vita implies that her chosen music enables her not only to feel phenomenologically distinct from the social lifeworld as she walks, but also to enhance her sense of being *centred* by her headphones to the extent that she feels she is able to flow through groups of people unbridled by the concerns of social etiquette. She offers a quasi-messianic narrative to explain her experience of feeling 'on a completely different plane', as though the content of her selected music and the territorializing affordances of her headphones coalesce into an experience of feeling separated from the social environment, and therefore that she becomes uninhibited by worries about social conflict.

Related to her sense of increased self-confidence during public headphone listening was Vita's experience of feeling less inhibited regarding close proximity to other people in public space when using headphones. Continuing her recollection of walking through groups of people in her hometown, she began to focus more on the possible reasons for her sense of dissociation from the social milieu:

I don't know if it's a particular level of confidence and stride or something, but people just seem to move for me more. So rather than me having to sidestep and duck around, there's just a certain feeling where I think: 'No, I'm going to stick to my path.' So it probably is that I become uninhibited by proximity. [...] It seems like it's just something that's happening, just being created around you. And that you're separate from it as well, like you're floating. (Vita)

Noteworthy here is Vita's awareness of a loss of inhibition regarding proximity to others when she uses her headphones, akin to Alana's and Nell's experiences considered earlier in the chapter. Vita notes that it is perhaps not (only) that other individuals appear to move out of her way more readily due to her confident stride, but that she is 'uninhibited by proximity'—that others may perhaps *not* be moving for her, but that she feels confident enough to get closer to them as she walks than she otherwise would without using her headphones. Her statement that the social environment appears to her as 'just something that's happening, just being created

around you' suggests that she feels more comfortable to be outgoing in her movements in relation to others by virtue of experiencing a sense of detachment from the milieu, ensconced as she is in her chosen music.

Vita's reported experience of feeling less inhibited regarding interpersonal distance aligns with the findings of a small selection of existing empirical studies that probe the link between headphone use and social anxiety. Such studies provide some evidence to suggest that using headphones to listen to music while negotiating public spaces can transform how individuals conceive of the boundaries of their 'personal' space in relation to others. Donna Lloyd and colleagues (2009) offer some preliminary evidence that headphone use can alter individuals' perception of space around their bodies. They show that listening to unfamiliar music via headphones can cause individuals to increase the distance between themselves and others, while listening to self-selected music 'may make individuals more comfortable and therefore pay less attention to others in the space around them, thus reducing interpersonal distances' (D.M. Lloyd et al. 2009: 620). Elsewhere, Ana Tajadura-Jiménez and colleagues (2011) found that individuals who listened to experimenter-selected music 'intended to convey happiness' over headphones exhibited greater tolerance for shorter interpersonal distance from strangers than when played negatively valenced music, again suggesting that the size of one's sense of personal space 'shrinks' when one feels more at ease. Similar insights are echoed in Skånland's (2011: 24) qualitative study of headphone use for affective regulation, in which informants noted that MP3 players functioned 'as an alternative coping strategy in settings where increasing one's physical distance is not an option', a result—in Skånland's terms—of headphone-mediated music's creation of 'psychological distance from other people'. Depending on the familiarity and/or perceived 'mood' of the relayed music, then, headphones can afford senses of separation and distraction from the social environment, experiences that may in turn increase social confidence and reduce individuals' negative experiences of compromised interpersonal distance.

5.4 SIGNALLING

In the previous sections (§§ 5.2–5.3), I have provided some evidence to account for how the territorializing affordances of headphone listening enable listeners to feel safe, secure, and phenomenologically invulnerable in social environments. The cases examined have focused on how individuals use headphones feel bolstered and cushioned by sound, causing them to go about their everyday lives in ways

that would be more difficult without the sonic ‘walls’ of their headphones. To understand more about the potential *reciprocal* social effects of headphone use in social environments, I turn now to cases in which interviewees reported using headphones as part of strategies of interpersonal ‘signalling’, in which the technologies acted as visual indicators that their users were otherwise ‘engaged’ and therefore unavailable for social interaction.

What I term ‘signalling’ has been described by Bull (2000: 104, 189; 2007: 112–13) and others such as Nicola Dibben and Anneli Haake (2013: 157) as the visual ‘do not disturb’ sign conveyed by the wearing of headphones in shared spaces, or by Jean-Paul Thibaud (2003: 330) as ‘an involvement shield’. Simply by donning headphones, individuals can non-verbally communicate to others that they are not available for social interaction in the same way that they might if they were visibly in ‘earshot’. There is a wealth of evidence supporting this phenomenon, not least in Bull’s and Dibben and Haake’s work, so it is superfluous to retrace their steps in detail here. However, I intend to nuance the existing account by showing that many headphone users demonstrate a refined social awareness regarding certain specific details about their signalling, including the size and type of the headphones they use in shared spaces—namely that larger, more visible headphones can give off a more aggressive impression than smaller models. In other words, the social rationale behind donning headphones is not always as simple as users wanting to signal to others that they are unavailable: there are layers of more nuanced meaning and social decision-making involved in the practice, amounting to something of a ‘micro-semiotics’ of social deferral mediated by headphone use.

To give an example, Florence told me that she preferred to use smaller, in-ear headphones because they appeared more discreet:

I like to use them at work, but I don’t want to make it obvious. Even though everyone else is listening to music, I don’t want to be the one who’s sat there, really shut off from the world. And I like the option of having one ear ‘in’ and one ear ‘out’.
(Florence)

Florence worries that she will be perceived by her colleagues as rude and self-centred if she appears too ‘shut off from the world’, so she mitigates this by choosing to use a smaller headphone design (in-ear ‘buds’) and occasionally to leave one earphone ‘out’ so that she appears more open—both auditorily and socially—to those around her. As Dibben and Haake note in their study of music listening in open-plan office environments, headphones can affect the social

dynamics of a shared workspace by virtue of ‘cutting the listener off from the social world’ (Dibben and Haake 2013: 161), something that may be perceived as an intentional withdrawal from the contingency of the office space by colleagues, thereby precluding casual interaction and informal learning. By using visibly less obtrusive headphones to listen to audio in the office and using the ‘one-in, one-out’ technique to demonstrate socio-sonic openness, Florence attempts to hold her two desires in balance—that is, being entertained on the one hand and observing social etiquette on the other.

Similarly, a number of other interviewees acknowledged the potentially impolite signalling of using over-ear headphones in the office, including Miranda and Alana:

Those big over-ear ones, they’re so noticeable. [...] I find that they can look a bit anti-social sometimes. [...] I think I’d rather—in the office environment, at least—keep [using smaller in-ear headphones, because] it’s kind of a polite little hint that I’m a bit busy, but I’m not going to be like: ‘I’m really busy with my really big headphones!’ [laughs] (Miranda)

I definitely had a whole series of slight neuroses about: ‘Well, how do I come across when I’ve got these big [headphones on]?’ [laughs] (Alana)

Miranda and Alana share Florence’s concern about the potentially negative signals they might convey to colleagues in shared office spaces were they to elect to use larger, weightier headphones in lieu of smaller ones. This suggests that they have a deep self-awareness when using headphones at work, working to ensure that they—like Florence—find the ideal balance between personal and interpersonal concerns. Their laughter and comical use of hyperbole suggest that reflecting on their socio-sonic choices feels strange or embarrassing to them, which could be interpreted as a slight incredulity regarding their own practices—that is, that it may sound a little bizarre that they would care about such minor details, or that such tiny gestures would carry any meaningful social weight. Yet the fact that Miranda and Alana, together with Florence, were conscious of the material characteristics of different headphone types suggests that this unspoken, microscopic social semiotics of technological use may be more widespread than each individual thinks.

Moving outside of the office, a similar sentiment was shared by Sinclair, who suggested that the relationship between size and perceived openness might pertain to the functional, material possibility of removing a headphone to communicate with someone:

You're more integrated into, like, the regular world and dealing with people when you can just like pop out an ear[bud] thing, instead of seeing somebody with a massive [over-ear] head arrangement on that they need to take off. Yeah, I think part of it feels like, if you have these big Sennheiser studio things on, like: 'Don't bother this guy in the street.' Like, you can't bother him. Whereas if somebody just takes out an earbud or something, it's a bit less... It's more approachable. (Sinclair)

For Sinclair, in-ear 'buds' are not only visibly less obtrusive but also easier to remove quickly than over-ear headphones. This suggests that the functional efficiency of the technology—its ability to be swiftly cast aside to facilitate easier verbal interaction—is an important factor when mediating social concerns. There is also a clear sense that what Sinclair terms over-ear 'studio' headphones might serve to convey a more 'serious' impression of their user to onlookers. Sinclair suggests that it could be something of a conscious decision for certain individuals to select highly visible headphones: such technologies may communicate that an individual takes listening seriously and does not wish to be disturbed. There appears to be a fairly nuanced, multivalent relationship, then, between the materiality of the technology, its visibility to others, and the perception of social signals and meanings surrounding headphone listening beyond the blunt metaphor of the 'do not disturb' sign.

5.5 ZOMBIE

In each of the cases considered so far during this chapter, I have explored accounts of circumstances in which my interviewees intentionally chose to reduce or preclude opportunities for interaction with social actors in their environments as a means of regulating their own sense of personal socio-sonic space. Considered as a whole, we can observe that the social dynamics of headphone use are reciprocal and interactive: that not only do listeners make decisions regarding their own attentional relationship to the wider environment but they also provide nuanced signals to other actors about their openness to social interaction.

Viewed in the light of the evidence presented, many aspects of Bull's auditory bubble model appear to make a good degree of phenomenological sense. There is clear evidence that individuals sometimes choose to distance themselves from others and their environments by producing a sonic barrier between their ears and the wider world. One interviewee (Nell) even used the term 'bubble' to describe her experience. However, other instances have questioned aspects of the model. For example, Sinclair's account of prioritizing headphone models that are easy to remove in moments of social encounter goes against the notion that the

bubble is a ‘hermetic’, impenetrable socio-sonic membrane. This finding correlates closely with work by Andreas Heye and Alexandra Lamont (2010: 112), whose empirical study of mobile music listening revealed that ‘the bubble itself is relatively permeable’ to social encounters, with individuals readily removing their headphones when required in public environments (see also Bull 2007: 56); as well as with Nick Prior’s (2014: 32) own empirical account, in which he concludes that in many cases the headphone bubble ‘is neither sealed nor impermeable’ but instead socially dynamic. The bubble, then, appears to be both permeable *and* impermeable depending on context or evidence set. How might such a tension be resolved?

In my view, conflicting or contradictory evidence is an important part of studying an evolving, dynamic practice such as headphone listening. It enables the production of an account characterized by nuance and an openness to complexity; it eschews the need for totalizing arguments. Unfortunately, applications of the more rigid, ‘hermetically sealed’ idea of the bubble model and its antecedents and consequents in writings about auditory culture have tended to frame it as an absolute obstacle to meaningful social life, sometimes resulting in the production of highly critical statements about cultural practices that appear somewhat removed from lived experience. For example, tropes of the ‘anti-social’, ‘isolated’ headphone listener or the Walkman user-as-zombie have pervaded the reception history of headphone use (see Everett 2014) as rather blunt critiques of such cultural practices. These tropes fit into broader discourses surrounding technology and isolation (see Lawson 2017), in which cultural commentators draw attention to ‘the unsettling isolations of the tethered self’ (Turkle 2017: 154). These discursive tendencies are especially prevalent in journalistic accounts, as exemplified in a 1999 *Washington Post* article by Paul Farhi, who observes:

It is the look and sound of the Walkman dead: the head cocked at a slight angle, the mouth gently lolling. From about the skull comes a tinny low buzzing sound, like metallic bees. The eyes flicker with consciousness, but they don’t see. They’re somewhere else. (Farhi 1999: C01)

Less extreme but equally critical, writers over the past decade in the *New Yorker* (Heffernan 2011), the *Guardian* (Godwin 2019), and the *Atlantic* (Khazan 2019) have offered takes on the growing concerns about the anti-social effects of headphone listening, variously arguing ‘against headphones’, critiquing ‘mute’ culture, and describing the ‘socially alienating’ impact of headphone use on everyday life.

In scholarly writings, headphone culture has represented a useful ‘go-to’ example with which to evidence the gradual death of contingent society around the turn of the millennium. Reactions to the release of the Sony Walkman in 1979 often framed headphone users as zombie-like, with the technology representing a paradigmatic, material symptom of the anti-social condition of contemporary life:

Look at the numbers of people with earphones listening to their own music, oblivious to the world about them. The proliferation of the Sony Walkman and similar sound devices is strikingly symbolic. Look at the faces. They are blank. With earphones on, the individual closes out all outside stimuli. He is his own captive audience. (Hollander 1985: 132)

This ‘blank-faced’ condition also interested Félix Guattari and Suely Rolnik, who describe headphone listening as ‘a relation with music that is not “natural”’ (Guattari and Rolnik 2007: 45). For Mark Fisher, the practice represents ‘a retreat into private “OedIpod” [sic] consumer bliss, a walling up against the social’ (Fisher 2009: 24).

In musicology, some writers have accepted Farhi’s coinage of the ‘Walkman dead’ without criticism or query in their accounts, with Mark Katz arguing that Farhi ‘wonderfully captured that strangeness’ of observing headphone users (Katz 2010: 21), and Nicholas Cook citing the phrase favourably (Cook 2013: 347). On the more extreme end of the musicological scale, Simon Waters brings his cultural critique into the domain of modernist aesthetics, arguing that the ‘point’ of music to challenge listeners intellectually and perceptually is somehow negated during headphone listening: ‘isolated in their personal portable acoustic space, [headphone users] are indicative of a practice which has become primarily non-participative, desocialised, and exists predominantly to placate its audience, rather than to excite, challenge or stimulate them’ (Waters 2000: 60).

In sound studies, such arguments are echoed by writers including Brandon LaBelle, who describes the archetypal iPod user as one ‘whose step occupies the vague threshold between zombism and activism’ (LaBelle 2010: 98), and Martin Spinelli and Lance Dann, who consider headphone listening as ‘inherently a solipsistic experience that draws the listener away from others’ (Spinelli and Dann 2019: 46). Miriam Simun foregrounds the ‘positive’ affordances of headphones to regulate and produce spatial boundaries but ultimately concludes that ‘the power to control individual experience with MP3 players comes at the cost of shared experience of public space—raising troubling questions for the future of

participatory publics and collective agency in urban spaces' (Simun 2009: 940). Similarly, Bull goes as far as to argue that headphones 'respatialize urban experience through a process of solipsistic aestheticization' (Bull 2013: 640), suggesting that the practice of headphone listening necessarily causes individuals to focus solely on themselves and the quality of their own experiences, in turn negating any meaningful social or perceptual connection to—or care for—their physical environments. For Bull, headphones and their related audio technologies cause 'atomization' to be taken to 'a new level' (Bull 2007: 22), involving the 'splitting off of occupants from the outside world' and gesturing towards 'a dystopian aura as the pervasive use of new technologies potentially decreases the capacity of subjects to disconnect from their intoxicated use, tipping subjects into forms of social "toxicity"' (Bull 2007: 23). The dark drama of Bull's cultural critiques is redolent of his major critical-theoretical influences in the Frankfurt School, especially Theodor Adorno and Siegfried Kracauer, in its instrumentalization of everyday experience for the purposes of reaching critical conclusions regarding socio-technological practice. In this way, the result is critically and rhetorically compelling: Bull presents personal-stereo listening as a powerful case study of the neoliberal, individuating drive towards the death of societal contingency under late capitalism.

Bull's arguments are echoed in later accounts that are more specifically focused on noise-cancelling headphones, which appear to some degree to reinforce the bubble model by technological means. Mack Hagood describes neoliberalism—the 'currently prevailing' ideology that prioritizes low-regulation, free-market capitalism—as exacerbating the worldview that 'freedom is an individual matter, and relations with others that do not result from individual choice are seen to impinge on that freedom' (Hagood 2011: 574). For Hagood, noise-cancelling headphone technologies exemplify this drive in consumer culture, with those who use them committing to adopt 'the Western subjectivity that has been built into their technology, one that attempts to construct an on-off interface with the aural environment and the space one shares with others' (586). At the core of Hagood's argument, then, is the claim that the incorporation of noise-cancellation into headphones represents 'a technological way of being in the world that separates us from things—and people—before we have a chance to know whether or not we want them' (587).

Matthew Jordan (2017) closely echoes Hagood's perspective in his own work on noise-cancelling headphones. He argues that because of 'the dispositions that such technologies afford for our sense of being-in-the-world—habits of mind

that maintain neoliberal consumer ideology—we should reject consumer-directed quietism and champion the importance of listening for the unexpected in everyday life’ (Jordan 2017: 237–38). At stake here is the sense that ‘our perception of and sensitivity to the sound of others is being transformed by readily available commodity quietness technologies, which afford a consciousness of space that is less public, intersubjective and shared, and more private, self-centered and solipsistic’ (246). Jordan even suggests that access to original thought may be scuppered by an inattentive disposition towards environmental sounds (246), evocative of the Adornian–Kracauerian critique of popular music in which Bull’s critical method finds its root (Bull 2000, 2007; see also Adorno 1991; Kracauer 1995). Moreover, for Jordan, certain ‘ethical implications of living in this sonic envelope where technology protects us, to echo Levinas, from having to hear the voice of the other [...] are troubling’ (243), and advertising campaigns selling ‘consumer quietism’ as a necessity represented ‘biopolitical discourses’ (Jordan 2017: 246). Both Hagood and Jordan focus on Bose’s QuietComfort headphone series, a technology that—in Jordan’s words—‘affords the neoliberal consumer a market-based “solution” to the socio-sonic problems of people living together’ (Jordan 2017: 244).

Accounts such as Bull’s, Hagood’s, and Jordan’s that foreground more critical, as opposed to reactionary, responses to the cultural resonances of headphone listening are highly important for our understanding of the techniques that are ‘crystallized’ into the fabric of headphones—that is, how the social construction of these technologies may be bound up with apparently atomistic ideologies. In doing so, they enable us to acknowledge critically some of the inherent cultural biases that have come to plague our everyday practices. However, we must also ask whether these critical accounts always wholly succeed in offering an accurate, all-compassing, and unabridged portrait of headphone listening. As Hagood himself writes, he uses sound-occluding ear plugs on flights, and one of the readers of his article—also flying—‘wished for a pair as a baby cried’ while he read (Hagood 2011: 587). As we saw earlier in this chapter, certain sounds can become stressors for those in confined shared environments; and, in this light, it may seem too strong to suggest that occluding the sound of a screaming child on an aeroplane is a cruelly anti-social act. Instead, a nuanced, context-specific account of technological use is key to placing criticism in its most productive position. Thinking in this way, a cynic might suggest that the pursuit of hard-lined cultural criticism can sometimes land on overdone, under-evidenced conclusions.

However, retreating from the macro-lens of cultural critique towards the micro-lens of phenomenological detail, it is nonetheless my contention that the bubble model is an important heuristic tool: it reveals something important regarding the oft-reported spatial experience of headphone listening as ‘bounded’, and its interpretations are often highly fruitful and important contributions to the discourse. But the bubble model has become something of an absolute: its presentation as an airtight, ‘hermetic’ container that negates any social or perceptual interpenetration may have lessened its impact due to certain broad-brush phenomenological assumptions. To invoke more scientific terminology, while an attractive model for evidencing the ‘atomization’ of urban life through techniques of individualized sonic isolation, its overgeneralization as ‘hermetic’ may cause it to fall short of being entirely ecologically valid—that is, its apparent characteristics as a conceptual tool sometimes do not correspond wholly with real, lived experience. I do not wish to present this as a marked shortcoming of the agenda-setting research conducted by Bull and others, because in reality the ambitions of the model in such work were far different to my own. Bull, like Hagood and others, is especially concerned with larger sociological critique, namely with making sense of the cultural explosion of personal listening technologies in light of wider trends pertaining to consumer culture and late capitalism. I consider these vitally important contributions to the discourse on headphone listening; but my approach here has different aims and methodological concerns, as evidenced, for example, in my re-analysis of Karin’s reported experience in the introduction (Chapter 1, § 1.3). From this perspective, lacking in some of the critical-sociological work is a focused, nuanced account of the phenomenology of reported experiences, something which I aim to achieve here.

To be clear, as I have shown, there is undeniable evidence to suggest that listeners *do* use headphones to ‘remove’ themselves from a contingent relationship with aspects of their environments. But to accept uncritically the more abstracted interpretation that headphone listeners are therefore anti-social zombies might be said to detract from a nuanced, considerate, and wholly accurate account of the social and perceptual dimensions of such listening experiences. As I go on to demonstrate, there is also a wealth of evidence to suggest that headphone listening can be a deeply socially situated and contingent practice. To quote from Skånland, ‘MP3 players are used by individuals to create isolation (essentially an ontologically secure space), but its use does not necessarily prescribe isolation’ (Skånland 2011: 28n9). In reality, as Marcel Cobussen writes regarding his experiences of using headphones while commuting on public transport, ‘one is

almost constantly interacting with one's environment: for example, turning the volume down and back up again or taking out at least one earbud when the ticket collector passes by' (Cobussen 2021: 485). Despite many listeners noting a sense of phenomenological 'distance' from the external environment, there is regularly a notable social rationale to headphone listening, suggesting that the framing of headphone use as 'anti-social' results in a reductive and inaccurate portrayal of actual listening practices. In fact, Bull acknowledges this dimension of headphone listening more directly in his later work on the subject, appearing to soften in his approach as he concludes a chapter on the privatizing drive of iPod use by writing:

Even in their privatizing potential, these technologies are *deeply social*, reflecting both the cultural predisposition of users and the cultural values embodied in the technologies themselves. This [chapter's purpose] is not to argue that urban spaces are inevitably privatized through these and other technologies. Collaborative uses of the iPod and the mobile phone are indeed enacted in the street, the café, the automobile, and the home through shared listening and related practices. There is no evidence to suggest that iPod users differ from non-iPod users, for example. In this chapter I have merely analyzed what *the privatizing moment* of iPod use looks like. (Bull 2014: 115; added emphasis)

Akin to my approach, Bull's wording here suggests that the 'hermetic seal' model of the bubble represents just one 'moment' of iPod-related practice, with other 'moments' more socially and perceptually nuanced. It is my ambition in the remainder of this chapter to evidence these alternatives to the hermetic 'moment', highlighting how social and perceptual experience is mediated to *varying* degrees of efficacy. To do so, I analyse more primary data from my own corpus of interviews through engagement with existing work that supports a more nuanced account of the headphone bubble in terms of both perceptual and social interpenetration.

5.6 INTERFERENCE

At the opening of this chapter, my analysis of Kate Bush's experiential account of using IEMs presented an interesting finding regarding the multimodality of in-headphone experience: that headphones can not only cause a listener to feel separated from their wider acoustic phenomena but also that other non-auditory dimensions of experience can be affected. In this section, I document similarly interesting multimodal variations in environmental perception that occur as a

direct result of worldly experience being mediated by headphone technologies.⁷ Of interest here are curious experiences of spatial distortions, particularly regarding visual and kinaesthetic perceptions of motion.

Earlier in the thesis (Chapter 2, § 2.7), we heard from a number of listeners who used headphones to ‘zone out’ aspects of their own bodily perceptions, such as during vigorous exercise (using headphone sound to pull their focus towards the embodied space of the head as opposed to, say, the legs or chest). Here, I continue in a similar vein by asking how listeners’ perceptions of the wider environment beyond the body may be affected by headphone listening. Consider the following account provided by Vincent:

When the outside environment, let’s say, is in motion, let’s say, with other people or cars travelling, it’s kind of... It will a little bit slow them down. Yeah, a little bit—but not, like, actual... It’s not [actually] slowing down, but you can feel they’re not that fast, not that kind of extreme motion, but it’s just... Kind of like when you watch some movie or something. It’s not so *related* to you, actually. A little bit slowed down. (Vincent)

During headphone listening, Vincent experiences a certain degree of reduced involvement in his environment, comparing the qualities of the experience to that of watching a film—of feeling somehow distinct from the space of the ‘action’ by virtue of not feeling ‘present’ within the perceived environment. He understands these perceptual effects in relational terms, noting that the ‘outside environment’ can feel as though it is ‘not so *related*’ to him when he is using headphones. This is partly manifested in an ineffable change in his perception of motion in the environment—a feeling that things almost appear to slow down around him as he listens. Similar to but building upon Bush’s experience of feeling curiously detached from her environment, Vincent’s reported experience may therefore reveal something more about the phenomenology of mediated crossmodal perception during headphone listening: that *visual* experiences of environmental motion can also be affected, causing listeners to perceive things as though they move somehow differently—here, more slowly.

⁷ Audiovisual ‘correspondences’ between audio content and environmental experiences during headphone listening (for example, the process of imagining that one is in a film or music video when listening to particular music when travelling through a certain landscape) have already been well documented in the existing literature across diverse environments, including urban spaces (Bull 2000, 2007; Herbert 2011; Niklas 2014) and wartime contexts (Daughtry 2015; Niklas 2014: 249–259; Pieslak 2009). As such, I do not concern myself here with ideas pertaining to the ‘cinematization’ or ‘aestheticization’ of experience (Bull 2000, 2007).

Tatiana also explained to me that she often experienced disturbances in her normative visual perception while using headphones when exercising in a shared space:

At the gym, I felt that, when I had these big, over-ear headphones on, I felt that people were moving slower around me. I put on the headphones, and the world—it doesn't matter what kind of music I'm listening to—people running in the distance move slowly, and even if they're running very fast, they just appear in kind of, like, slow motion. Not sure why that might be. [...] It heightens your brain activity, I think. Surely. But it might make everything else feel quite lethargic. And there's a discord in that, isn't there? (**Tatiana**)

Tatiana was remarkably adept at identifying phenomenological tensions in her own experiences, which served to enrich her own interpretative accounts. Her experience of perceiving environmental motion in a non-normative way corresponds closely with Vincent's in that she noticed a sense of others moving in a kind of 'slow motion' when using her headphones. In her account, she holds this phenomenon in tension with her 'heightened' experience of an interior sound-world, which she suggests could be linked to an almost reduced sense of visual perception—as though when one mode of sensory experience (listening) is heightened or privileged, another (seeing) becomes somehow diminished. Moreover, it is important to note that Tatiana does not regard specific musical content to be a mediating factor in her perceptual changes, stating that 'it doesn't matter' what music is being played. This suggests that there is something about her experience of the 'form' of headphone listening, of its overall spatial character as opposed to the content of particular audio, that affects her visual experiences. On this account, it appears—at least in Tatiana's case—that this phenomenon may be specific to headphone listening more broadly and not to the formal characteristics of a musical work.

Clear correspondences can also be made between those adduced above and an account provided by Hillary of her experiences of using headphones in shared spaces:

If I'm just listening to them [headphones] when I'm shopping or something, I find everything else except my aural sense quite fuzzy and imprecise. So if I'm shopping in a big supermarket, and I've got a list in my hand, and I'm listening to something, I can't find anything in the shop. And I can't recognize faces. So the other day I was going into rehearsal—our first rehearsal in a new venue, and I was finding my way around—and I couldn't find my colleague, and I was just looking for her everywhere. And I eventually took my headphones off and rang her, and

she was like: 'I'm literally standing behind you. I'm in the same room as you.' I just had no idea. I couldn't see her. So it's weird. (Hillary)

Hillary's visual experience during headphone listening appears to involve greater sensory disturbance than Vincent's and Tatiana's. She notes that she finds it difficult not only to see clearly but to recognize faces or to find her way around a particular environment. In tandem with reduced access to the acoustic environment of the room, Hillary suggests that she fails to notice her colleague by virtue of her visual faculty being made 'imprecise' through headphone use. Interesting here is that Hillary is actively attempting to focus on aspects of her environment (searching for items in a supermarket or for colleagues at work) instead of on the sounds relayed through her headphones; she is not aiming to 'zone out' of the environment but instead to be present within it. This might imply that even when she does not want it to do so for practical reasons, the headphone-space 'absorbs' her to such a degree that her attempts to focus on other tasks and phenomena are affected. In turn, Hillary's account suggests that the use of headphones can profoundly interfere with other sensory domains.

To interpret Hillary's experience, we might turn to one of the richer theoretical frameworks for understanding how headphone listening changes individuals' awareness of the wider environment during walking: Thibaud's (2003) phenomenological model of urban sound and Walkman listening (see also Hosokawa 1984). Among many other tendencies of personal-stereo users, Thibaud (2003: 339) describes what he terms the 'detour' in which a headphone listener becomes so 'lost' in the music that they have to 'backtrack', having unthinkingly taken an incorrect route due to their absorption in the sound.⁸ Thinking in these terms, we might therefore interpret Hillary's visual disturbances and loss of bearings as a form of 'detour', her experience of her spatial situation decentred by her absorption in her headphone listening.

Not all interviewees found their visual abilities to be negatively affected during headphone listening. Otto, for example, explained to me that he sometimes found it easier to see things in his environment while using headphones, or that headphone listening made him notice things differently:

⁸ Phenomenologists regularly acknowledge the relationship between entrenched habits and dissociated 'actions'. See, for example, Komarine Romdenh-Romluc's (2013) nuanced phenomenological account of the roles of habit and attention in action.

You do then find that your visual acuity arguably improves. I'm someone who sees things as a sort of jumble. But with the noise-cancelling headphones on, I find my attention focuses often in strange ways on things which I wouldn't ordinarily look at or be aware of [...]. So rather than looking at—I don't know—their [other people's] feet [...], you look at other things, like faces. You focus in ways that you might not [ordinarily]. (Otto)

Otto's experience is of interest here for two reasons. First, his experience of visual perception is different from others' accounts considered here in that he describes how his vision sometimes sharpens during headphone listening. This suggests that there is not one singular way in which headphones can affect multimodal perception and therefore that our understanding of headphones' effects on perception should foreground nuance and variation among individuals. Second, Otto states that he sometimes finds that he focuses on things that he would not do without his headphones, such as other people's faces. This might be seen to correlate with the evidence surrounding social confidence adduced above (§ 5.3) as well as with Bull's idea of 'non-reciprocal gazing'—what Bull defines as a personal-stereo user's 'transformed modes of "looking" in which their "look" becomes impervious, thus putting them into an imaginary position of social control' (Bull 2000: 25). However, Otto does not report any greater sense of confidence in his account, and he makes no suggestion that he feels socially 'powerful' in the situation. Instead, he finds that his focus wanders and sometimes dissociates from the object of his gaze, perhaps because he attends more closely to sounds than sights during headphone listening. I would favour this softer interpretation of Otto's gazing compared with Bull's more critical option, as there is no suggestion in Otto's account that he is consciously attempting to exert control over his situation; the only clear evidence is that he notices a (pre-reflective) change in his visuospatial acuity as a result of his headphone listening.

Vita's account was similar to Otto's in that she reported greater visual awareness during headphone listening. For Vita, using headphones can sometimes make her

notice seagulls just sort of catching the air a bit more. Although it's giving me my own soundtrack, [...] it does make me see things differently as well. [...] I might be focusing more, so it might bring something more into relief than it just being part of the whole scenery. So like the way a branch suddenly might move and drop—I would probably focus on that more than if I were just walking along [without headphones]. It would just be blowing in the breeze as part of a whole scenario. [...] I think it makes me much more visually aware, basically. (Vita)

As with Otto's case, Vita notes that using headphones sometimes causes her to become *more* visually aware, especially regarding the specific details of phenomena in her environment. Her experience therefore suggests that she is not 'tuning out' the environment (Beer 2007; Tuhus-Dubrow 2017: 5) as much as 'tuning in'—as Allan Watson and Dominiqua Drakeford-Allen (2016) have suggested (see also Herbert 2011; Prior 2014)—to aspects of it. Unlike Otto, and more akin to Vincent's and Tatiana's experiences mentioned above, it is her visual perceptions of motion that appear most affected during headphone listening. Her heightened focus on small details of movement—a bird flying, a tree swaying—could be regarded as a form of 'zooming into' minor aspects of her locale instead of viewing the world as she normally would as 'a whole scenario'. There is no particular function to these perceptions, but they seem to occur for Vita without any thought involved, as though something about the experience of wearing headphones, or perhaps something in the audio to which she listens, causes her to shift her gaze and to become more absorbed in minute visual details.

Unlike others who only reported disturbances to their visual perception, Vita also provided a rich description of her kinaesthetic experiences of self-motion when walking in tandem with headphone listening:

But if I'm walking along at a certain pace, I feel like the ground is moving beneath my feet. So maybe it does connect you to things like touching. It's almost like I can imagine I'm on [...] a travelator, particularly on a hill or something like that [...], or at the very least that I'm moving slowly, and it's helping the world sort of move along past a lot quicker. [...] I think because I'm using my muscles and exerting myself if I'm walking—I'm quite a fast walker—then I am quite aware that I'm still moving. But then I could very well just be on a travelator. [...] That's the sort of visual I see along the road. (Vita)

In describing her complex experience, Vita uses the analogy of a travelator, or 'moving walkway', to verbalize how she sometimes perceives her own self-motion during listening. She finds that the sounds relayed by her headphones appear to help the world 'move along past a lot quicker', suggesting her perceptions of space and time are affected by listening. This correlates with Thibaud's notion of the phenomenological 'short cut' that headphone listening can afford, in which listeners dissociate from their journey due to their focus being pulled to the relayed audio and in turn 'forget' or 'zone out' of a section of their voyage, 'subjectively reduc[ing] the duration of the trip' (Thibaud 2003: 339). There is a sense for Vita that she is being 'pulled along' or assisted by her headphone-listening experience. Perhaps this is due to the 'cemented' presentation of the

audio by virtue of the ‘head-locked’ nature of headphones (see Chapter 2, § 2.4), meaning that her perspective on the relayed sound does not change as she moves in the way that it would when walking through a sonorous environment. Vita, then, is situated in the mediated audio world, which affects her perceptions of her wider lifeworld.

Vita’s experience of moving through her environment is reminiscent of Jody Berland’s description of spatial perception during driving, in which she notes that ‘it seems to be me that remains still, and everything around the car that rushes past me, into the past’ (Berland 1998: 129). The image is a powerful one, bringing to attention the relational nature of spatial perception—that, at least in terms of the phenomenology of visual perception, it could be either way: that she is moving through an environment or that the environment is moving past her. Interestingly, reflecting on the allocentric, ‘objective’ spatial reality that the car—not the road—is actually the entity that is moving does not affect her experience: ‘factual observation doesn’t account for the conceptualization of movement that comes with driving’ (Berland 1998: 129–30). Spatial experience is relational, then, and Berland’s experience of being statically ‘situated’ in the car with the world rushing past her causes her to surmise that her car-body might be a stationary object in a moving world. In both Vita’s and Berland’s descriptions, we can acknowledge the effects that being in a broadly ‘static’ sonic environment (a car or a pair of headphones), one that retains a certain privacy in a wider public milieu, can have on wider perceptual experience (see also Bull 2007: 99–100; Bijsterveld et al. 2014: 170). Different in Vita’s case is that she is tacitly ‘quite aware’ of her muscular exertion during walking—but this does not appear to destabilize the travelator analogy for her, stating as she does that she feels she ‘could very well’ be stationary in an otherwise moving environment regardless. There is a rich complexity to Vita’s account, holding subjective and objective knowledges in tension as she reflects on her experiences.

One interpretation might frame Vita’s (and, indeed, Berland’s) experience as wholly self-concerned—what Bull (2000) might describe negatively as a process of experiential ‘monumentalization’, or the placing of oneself selfishly at the centre of the world with everything else happening around or because of one. But I read Vita’s account differently: that she instead experiences a deep, meaningful connection between her body and the world during listening, feeling situated and present in the world. For example, there is something in Vita’s experience that brings to mind Gaston Bachelard’s evocative description of his embodied memories of walking near to his house: ‘How precise the familiar hill paths remain

for our muscular consciousness! [...] When I relive dynamically the road that ‘climbed’ the hill, I am quite sure that the road itself had muscles, or rather, counter-muscles’ (Bachelard 2014: 33). Here, Bachelard experiences a near-materialization of his reminiscences as he writes, as though his memories of walking up the road are so vivid as to carry his body with them. The hill is conceived directly in terms of his embodiment, its ‘counter-muscles’ constituting his experience as much as his own ‘muscular consciousness’. There is a certain correspondence with Vita’s experience here: a full, embodied connection to her environment as she walks, in which she appears to feel so ‘immanent’ within her lifeworld that she notices a co-constitutive, almost ‘reversible’ quality to her encounter with the world (*is she touching the ground, or the ground touching her? is she moving through the environment, or the environment past her?*). This interpretation links well with Merleau-Ponty’s phenomenological notion of the flesh of the world, adduced earlier (Chapter 4, § 4.7): that because of the effects of her listening experiences, Vita’s mediated perception of her movement through the world causes her to consider that the world may be moving *with* her, shifting around her. Her being-in-the-world is something relationally constituted, a complex co-constitution in which the world is experienced as being together with her, facilitated by the ‘head-locked’ sound technology that situates her as a body in the world. In other words, there is a ‘crossing’ of her body and the world, mediated through her experience of headphone listening; there is a sense that ‘perceiver and perceived cross and infiltrate each other, and this crossing already constitutes a field of perception in which the perceived already has a meaning for the perceiver’ (Morris 2004: 23). In this regard, there is no ‘denial of the physicality of the city’ (Bull 2007: 9) in Vita’s example, but instead an immanent, material awareness of it. As Thibaud suggests, ‘[l]istening to headphones creates powerful and complex links with the characteristics of the urban milieu’ (Thibaud 2003: 335); and as Tuhus-Dubrow writes in her historical account of the Walkman, headphone listening ‘made some people engage with the world around them in a different way. They didn’t necessarily withdraw from it; they just saw it differently’ (Tuhus-Dubrow 2017: 46). Vita’s case therefore demonstrates the potential for headphones to afford perplexing and richly peculiar experiences of spatial reality beyond discourses of isolation and necessary separation.

5.7 INTERPENETRATION

Evident in Vita's example and those of the other interviewees is that headphone listening does not wholly *remove* one from the world but in some cases can effect a deeper sense of *presence* and perceptual engagement with the wider environment. Moving now from the multimodality of headphone-listening experiences to a more direct focus on sound, I want to highlight in more detail this *interpenetration* of the interior 'world' of headphone listening and experiences of the wider environment. As I argue, a focus on the notion of sonic-spatial interpenetration—especially regarding sound's recalcitrance to complete spatial control—enables us to understand more about the deeply relational constitution of the internal and external 'worlds' of headphone listening, in turn encouraging a more nuanced, co-extensive spatial conceptualization of the practice.

I draw the term *interpenetration* from its use by Eric Clarke (2007) in his work on the ecological psychology of music listening. For Clarke, one of the axioms of an ecological aesthetics of music pertains to 'the interpenetration of music and the environment' (E.F. Clarke 2007: 48), decentring the traditional aesthetic claim—upheld most obviously by the 'socially enforced silence' of Western classical concert halls (E.F. Clarke 2005: 20)—that musical sound is necessarily 'autonomous' from the wider acoustic environment (see also E.F. Clarke 2005: 126–155). Beyond aesthetics, ecological accounts of auditory perception offer important insights into how we perceive sonic space as a continuum in which the boundary-making (nesting) affordances of some environments and technologies are necessarily unstable and prone to 'leaking'. In this sense, music is always heard as part of the environment in which it sounds, meaning that, in terms of perceptual space, there can be no logical argument that music is wholly 'separate' from the wider acoustic world.

Applying this logic to headphone listening, we can begin to 'situate' such listening practices within the wider environment, opposing the view that headphone listeners are wholly excised from their wider acoustic environments. Such a claim is upheld by existing empirical work in the fields of music psychology and sociology (Beer 2007; Bickford 2017; Dibben and Haake 2013; Herbert 2011; Heye and Lamont 2010; Prior 2014; Thibaud 2003; Trotta 2020; Watson and Drakeford-Allen 2016). As an example, consider this passage from Thibaud's account of personal-stereo listening:

We mustn't be mistaken—the Walkman listener is not entirely cut off from the urban environment. [...] Intense urban noises—road noise, sirens, warning signals—punctuate the flow of the musical audition and conditions [sic] the degree of autonomy of listening with headphones. [...] The Walkman user is situated within two simultaneous sonic worlds. We are referring in this case to an *interphonic knot*—in other words, the point of convergence between two sonic spaces of a different nature—that of the walking listener and that of the street. (Thibaud 2003: 330, 335; original emphasis)

Thibaud highlights the co-extensive relationship between headphone sound and environmental sound, suggesting that it would be 'mistaken' to conceive of the two as wholly distinct. The 'interphonic knot' of headphone-space and the wider world is therefore characterized by the interpenetration of 'actual' and 'virtual' sonic spaces, with environmental sounds infiltrating the headphone boundary to merge in the listener's perceptual reality as a hybrid space. In Stefan Niklas's words, there is a process by which 'the "inner" and "outer" sensory happenings' of headphone sound and wider environment correspond and 'mesh' together during listening (Niklas 2014: 158; my translation). The nesting of acoustic spaces, then, always involves some interspatial crosstalk: sonic spaces are inherently 'leaky'.

Thibaud's work suggests that the headphone bubble is a perforable, permeable sonic membrane, pointing towards a more nuanced account of the lived reality of headphone use that foregrounds the interpenetration of interior and exterior (socio-)spatial experiences. My interviewees' reported experiences may be seen to correlate closely with Thibaud's account:

I think it minimizes the noise to some extent, but it doesn't entirely reduce or get rid of the noise. (Kevin)

I can still hear the cars, or I know I'm on a busy street. But my focus is the music. (Alana)

Maybe it's not so much of a bubble, then. How would I describe it? I don't know... Maybe a filter? Like a sensory filter. So it still lets things in, but I guess it changes depending on where I am. (David)

Here, Kevin notes that his headphones afford him some separation from the wider sonic environment but that they do not entirely preclude his auditory awareness of it. This, as Alana suggests, may pertain not only to headphones' ability to dampen external sounds but also to one's focus on certain aspects of the auditory environment—here, her focus on the music that she relays through her headphones. Such an experience causes David to conceive of his headphone-space not as a bubble but as a *filter*, suggesting that he experiences something more nuanced and com-

plex than a total divorce from his environment. In each of these examples, we can find evidence that the sonic boundary of a pair of headphones is not auditory absolute but instead acts as a permeable membrane through which extraneous sounds can travel.

Vita offered greater detail in her account, describing her experience of the ‘filtered’ appearance of extraneous sound by means of analogy. Having previously reported feeling ‘submerged’ in her headphone sound, Vita continued her liquescent analogy to describe how clearly she heard exterior sounds when wearing them:

I think it’s that same sort of... It’s not silent underwater. But there’s definitely a sense of isolation and being blocked off when you’re underwater. You can still hear certain things, but it’s not [as clear]. (Vita)

There is a phenomenological depth to Vita’s explanation here: that her experience of the interpenetration of headphone sound and wider environmental sound is akin to the feeling of being underwater. She explains that she can still hear extraneous sounds when listening but that they appear filtered—as though through a dense medium such as water—which causes her to be unable to register the exact characteristics of outside sounds but to remain able to experience their presence around her.

A similar description was offered by Miranda, who spoke to me about using headphones to lessen the onslaught of harsh environmental sounds:

Something about sounds from the real world becoming muffled is quite a comforting thing. It’s like a deadening. Things can be quite sharp and spiky sometimes, can’t they? (Miranda)

Miranda uses her headphones to construct a secure sense of personal space, one reportedly rooted in the technology’s ability to dampen wider environmental sounds and thereby to separate her markedly from an alien ‘outside’. Here, Miranda identifies a ‘comforting’ aspect of headphone listening in the technology’s dulling of certain environmental sounds. She explains how she experiences some extraneous sounds as though they are like physical objects, jagged or barbed, against which her headphones shield her. This vivid description of sounds in material, tangible terms suggests that, like a physical home, headphones serve to ‘protect’ Miranda against sonic aggressions from the wider world and in turn to increase her experience of comfort as she negotiates public space. Implicit here is her awareness that the headphones by no means produce a

hermetic seal (she describes the extraneous sounds as ‘muffled’, not imperceptible), which suggests that the bubble model should be characterized, like a traditional home-space (see Downs 2021a), both by its boundary-making and the permeability of those boundaries.

As in Miranda’s case, there was also a more acutely affective dimension to some listeners’ experiences of sonic interpenetration—though these were not always so positive. For example, the bleed of external sound into a headphone-space could become an aggravating factor, causing them to perceive their listening experiences as somewhat unfulfilling and incomplete:

If you’re using in-ear headphones on a train and the train is noisy, you can’t hear the bass. So it won’t allow me to latch on to the [harmonic] progression. And I find that really annoying. (Henrietta)

And I’ve often found, living on the [London Underground] Northern line—the Northern line is particularly noisy—that if I’m listening to something [like a podcast] and it’s just conversation, I just can’t hear it for, like, five stops, which is really, really annoying. Really fucking annoying. [laughs] (Hillary)

The outside leaking in can be quite an irritating factor. It’s a bit like going to sleep—like, a repetitive noise that I just can’t block out would really start to agitate me. And that would be the same when you’re trying to keep yourself immersed in your own sense of self. (Vita)

Here, Henrietta and Hillary explain that the sounds of public transport that interfere with their perceptions of sonic space during headphone listening can in turn cause them to have difficulty hearing the content of their chosen audio, meaning that they feel agitated and less involved in the sounds to which they try to listen. Vita explains her own irritation in terms of metaphor, comparing the experience of having environmental noise infiltrate the ‘sense of self’ conveyed to her by her headphone-space with the feeling of being unable to get to sleep on account of an irksome, recursive noise that demands her auditory attention. In these cases, we can observe how the permeable barrier of headphone listening conflicts with an ideal, separated listening situation for some listeners, in turn suggesting that it is the interpenetration of these sonic ‘worlds’ that causes such difficulties.

In light of these examples, I contend that the concept of *nesting* provides the study of headphone listening with a greater openness to the sonic interpenetration of environmental acoustic phenomena and relayed audio. It affords an understanding of acoustic space as both segmented and necessarily relational, with both categories of auditory phenomena interweaving into a multivalent experience

of sound. While headphones represent powerful tools for the territorializing of acoustic space, given the necessarily imperfect efficacy of the sonic boundary that they produce between ear and world, there is necessary interpenetration between ‘interior’ and ‘exterior’ sonic worlds. In this light, it becomes phenomenologically inaccurate to refer to the headphone bubble as a hermetic seal. Instead, we might understand the simple binary division between inner and outer to be destabilized or decentred when viewed through the lens of spatial nesting, as the sonic walls edified by headphone technologies become blurred through the bleeding of wider worldly sounds into the headphone space. In Georgina Born’s words, ‘music and sound can produce not only temporal but spatial horizons and boundaries—boundaries the physical, aesthetic and moral obduracy of which are attested to as much by the leakage of sound across them as by its containment within them’ (Born 2013: 26).

5.8 LEAKAGE

Sonic bleeding is not a unidirectional phenomenon during headphone listening: sound can also bleed out of the headphones into the wider environment. As Sumanth Gopinath and Jason Stanyek write, ‘it’s a two-way street, and seals are only ever partially effective at maintaining separation between the worlds inside and outside headphones. There are leaks between domains, and these leaks often reveal the social contours of material culture’ (Gopinath and Stanyek 2019: 102). A similar sentiment is pre-echoed in earlier writing by Gopinath and Stanyek, who suggest that ‘the “leakage” that sometimes emerges from too-loud headphone listening, especially in tight public spaces such as buses and subway cars, can be the source of strife’ (Gopinath and Stanyek 2014a: 18). Given sound’s spatial recalcitrance, it regularly spills over its intended limits, effecting an acoustical blurring of assumed boundaries. And, as Gopinath and Stanyek suggest, these leaky by-products, here in the case of public headphone use, can have certain social consequences.

Other writers have attended to the ‘leakage effects’ (Stanyek and Piekut 2010) of headphones, often focusing on issues of social irritation. Simon Emmerson explores the phenomenon from the perspective of acoustical physics, writing that

The ideal ‘isolation’ of the sound from neighbours is limited by design, as for acoustic reasons there needs to be some ‘leakage’ of sound. This is because in-ear devices need to limit low frequency response through acoustic resistances ‘leak-

ing' back to the outside world [...]. Thus the notoriously unpopular leakage of personal stereo sound is inevitable; with the proximity effect working in reverse, low frequency sounds progressively 'roll off' leaving only the 'high hat' sounds for close neighbours to enjoy. (Emmerson 2007: 162)

Emmerson's reference to the 'enjoyment' of a headphone user's neighbours has a distinct tinge of sarcasm; often the opposite is the case. Felipe Trotta, for example, offers a case study evidencing how the 'annoying', tinny sounds of another public transport passenger's earbuds can be bothersome to some individuals, writing that 'we cannot take for granted that the sound of personal stereos is always kept inside the earphones' (Trotta 2020: 32). Trotta notes that one of his participants, Janet, foregrounds 'her nuisance and the negative feeling towards the situation' of being in proximity to someone who is listening to music loudly over headphones (Trotta 2020: 23). His example shows in miniature the potential social aggressions that can be born out of headphone leakage (see also Gopinath and Stanyek 2019: 102–3; C. Lloyd 2016: 31; Marshall 2014: 46, 70n13; Tuhus-Dubrow 2017: 54–55).

What is not so clear in Emmerson's and Trotta's accounts is the perspective of headphone listeners. While those irritated by sonic leakage in public spaces might assume that those perpetrating acoustic nuisances in shared environments are doing so either intentionally or without due concern for their fellow passengers, a number of my headphone-listening informants provided a different account of their awareness of headphone leakage. All of the accounts provided involved the use of headphones in relatively small shared spaces such as train carriages and open-plan offices. Hannah, for example, noted that she was conscious not to play music over her headphones too loudly on public transport to ensure that others were not bothered by her listening decisions:

It's partly just a social [consideration], of not being a dick. Because there's nothing more annoying than when you've got a tinny little beat coming from somebody else's headphones. [...] It's not very polite. But whatever: if that's what they want to do, then fine... No, I'm being too kind. It is kind of a dick thing to do. [...] It's a choice thing, and it's a control thing [...]. When other people choose to force something on you that you're not necessarily interested in taking part in, I think that's kind of inappropriate or rude. (Hannah)

Bothersome for Hannah here is the lack of consent involved in situations where others are playing music loudly and she is made to 'overhear' these sounds. Aware of the need for social consideration, she makes active attempts not to cause her headphone sound to bleed into shared social spaces, so the lack of reciprocation she observes in others causes some discomfort for her. We might observe that

Hannah's self-awareness regarding her own listening practices and her irritation at others' inability to monitor their own are related: that each feeds the other.

For Florence, the interpenetration of the sonic space of a London Underground 'Tube car' and her headphone-space made her more acutely aware of the presence of others in her environment, causing her to become self-conscious regarding her own headphones' potential disturbances for others:

Because I can hear the noises around me, I feel like other people can hear the music coming out of my headphones. And I've never asked anyone if they can hear the music that's coming out of my headphones, which might be a sensible thing to do to put my mind at ease. Instead, I'm constantly putting the volume up and down, depending on if we're stopped at a station or if we're moving. (Florence)

Being able to hear external sounds bleeding through her headphones while on public transport causes Florence to worry about the potential leakage of sound from her headphones into the wider environment. This offers a clear insight into how social space is mediated through sound even when an individual is using headphones, especially regarding Florence's concerns about irritating her fellow passengers. She becomes not only aware of the presence of other social actors but also of the leaky condition of sound—that if sounds of the Tube car can bleed into her 'interior' space, so too might her headphones' tinny sounds overflow out into the shared space. In fact, she is so concerned that she finds herself continually monitoring the volume depending on how much exterior sound she can hear (louder when moving, quieter when paused at a station).

Interested to find out more about her reasoning for being so aware of her own potential sonic leakage, I asked Florence whether it irritated her when others played their music loudly through headphones in shared spaces:

Yeah. Like, I enjoy listening [with headphones], but it's very much my experience. No one else should have to have that encroached upon them. It's my experience. It's for my benefit. It's not for anyone else's benefit. [laughs] It does bother me. (Florence)

Here, Florence provides more detail about her worries, foregrounding not only an anxious desire to avoid social conflict in public spaces but also something of the sense of private ownership she feels over the headphone sound. She notes that she is irritated by others' leaky headphones because they 'encroach' upon her sense of personal space, all the while suggesting that she is irritated on account of her own self-awareness not being reciprocated by other social actors. In light of both Hannah's and Florence's admissions, we might begin to hypothesize a link

between these two categories of experience: that because they are consistently conscious to monitor the sound of their headphones in shared spaces, both become irritated when others appear not to show the same courtesy; or vice versa—that they become so annoyed by others leaking their headphone sound into communal environments that they make it a priority to take the moral high ground in attending to their own acoustic emissions in public.

Hannah and Florence were not alone in their concern for headphone leakage. Vita explained to me that she had a ritual when using the ‘quiet carriage’ of a train:

I put them [the headphones] to the level I feel comfortable with, and then I always take them out [*gesturing as if holding headphones at a distance from ears*], and I see if I can hear them. And then I put them back in. [...] Because I don’t want to be that person. You know when you’re just hearing, like, *tss-tss-tss-tss*? So it’s just to see if it’s going to be irritating to other people. I feel like I’m quite self-conscious about that kind of thing sometimes. (Vita)

Vita’s common practice of monitoring her headphones by removing them and holding them at a short distance from her ears reveals her consistent awareness of the auditory experiences of her fellow passengers when using public transport. She imagines herself as part of a collective of travellers having to listen to the sonic bleed of someone’s headphones and, in doing so, is keen to avoid being ‘that person’ causing annoyance for others in their environment. Describing herself as sometimes ‘self-conscious’ about such occurrences, Vita demonstrates a highly socially aware dimension to her headphone-listening habits.

I asked Vita to offer some more details of her thoughts about why others might find the sound of leaky headphones irritating. She said:

Because they can’t get the full experience of the music. They’re just getting that tinny, little background. Also, if, say, there’s a particularly whining guitar bit or a falsetto or something, I feel like that could be quite a weird... I don’t want people to be like: ‘What on earth is she listening to?’ [*laughs*] So yeah. Obviously it doesn’t quite block me off from the world completely. I’m very aware that other people will be in receipt of the leakage. (Vita)

In greater detail, Vita reveals not only that the ‘tinny’ timbre of headphone leakage is an irritating component of the sound but also that it is in part due to another person’s inability to experience the richness of the music to the same degree as the listener. This admission corresponds closely with Rainer Schönhammer’s idiosyncratic observation in his earlier phenomenology of Walkman use that a potential reason for people’s irritation regarding emissions from others’ headphones

pertains to a form of experiential jealousy: ‘I assume that this reaction is not triggered by the mere acoustic effect of the perceived sound, but by the fact that one hears only the “garbage” of someone else’s private acoustic world’ (Schönhammer 1989: 135). Vita’s perspective on the ‘fullness’ of listening experiences offers empirical justification for Schönhammer’s assumption, demonstrating that sonic leakage might best be conceptualized as a far less enriching acoustic ‘waste-product’ of headphone listening, and one that therefore has the potential to create social dissonance.

More interesting still, and again related to the idea of acoustic ‘garbage’, is Vita’s admission that her self-consciousness is in part related to her desire to maintain privacy regarding her music choices. Related to but distinct from her concern for irritating her fellow passengers, Vita suggests that she wants to avoid the *judgment* of others regarding music that she has selected for her own private enjoyment. This reveals not only an empathic awareness of her fellow passengers’ travel experiences but also a potentially negative consequence of the ‘privacy in public’ afforded by her headphones. Following Born’s (2013) contention that music and sound represent paradigmatic phenomena through which the distinction between notions of privacy and publicness becomes blurred, we can observe in Vita’s account a correspondence between the wider propagation of headphone sound and the condition of experiential privacy: that as the sound leaks from her headphones, blurring the territorial boundaries she had intended to create through her listening practice, so too is Vita’s privacy as a listener destabilized, suggesting that her sense of ‘ownership’ over her personal music choices begins to unravel due to sonic bleeding. Given her experiences of shame and anxiety, there is something of what Tom Rice has termed a ‘sonic incontinence’ about Vita’s concerns regarding the ‘leakage or seepage of [...] sounds into spaces occupied by other people’ (Rice 2013: 175), mainly due to her worries about being judged by fellow passengers.

This idea of sonic leakage as a shameful effect on the social lifeworld was also shared by Albert, who suggested to me that being ‘caught’ by fellow passengers when listening to music too loudly was akin to being discovered in a compromising position:

When someone taps you on the shoulder on the plane and is like: ‘Can you turn that down a bit?’—it’s like you’ve been caught masturbating! [*laughs*] (Albert)

Albert compares his experience of sonic incontinence in directly bodily terms, as though he has been caught in a sexual act by a stranger. As in Vita’s case, his ex-

perience suggests that his sense of privacy is overthrown by the sound's leakage, as though it has betrayed him and negatively impacted his experience of personal security in a social environment. His analogy is extreme, suggesting that the social conflict resulting from his listening practices causes him to experience a strong sense of discomfort, as though his sonic emissions have revealed too much about him in a shared space.

The interpenetration of acoustical privacy and publicness evident in the urban examples considered here may be seen to provide evidence that headphone listeners can have complex, contingent socio-environmental experiences. The 'reconfiguration of space' involved in such headphone use involves 'not simply the replacement of public space within private, individualised space, but the overlaying of the one by the other in a way that respond[s] to the contingencies of the situational context' (Dibben and Haake 2013: 162). In other words, while each individual to some extent prioritizes their own experience by electing to use headphones in shared environments, each also demonstrates a conscious and consistent awareness of the impact of their sonic decisions on the experiences of others.

In addition, common to the accounts of many of my interviewees who mentioned their worries about irritating others due to sound bleeding out of their headphones was a certain irritability of character regarding their own experiences of other people's leaky headphones. Partly there was a general desire to avoid confrontation in the socio-spatially uneasy environments of public transport, but there was also a clear dislike for hearing other people's chosen soundtracks leaking into shared social space.

5.9 CONTINGENCY

I have presented many examples of the complex social reality of headphone listening with the central aim of problematizing and nuancing accounts of the practice as anti-social and divorced from interpersonal contingency. In this last section involving empirical data, I analyse one example, taken from an account reported by Florence, to demonstrate how the sense of self, location, space, and sociality can commingle in complex ways during public headphone listening.

Florence described how her awareness of other people was *heightened* during headphone listening on account of her fears regarding the attenuation of some environmental sound:

Unless I can see them [other people], even with my rubbish headphones, I still do find it difficult sometimes. It makes me kind of hyper-aware because I'm so worried about encroaching on someone, or being rude or anti-social, that I end up really looking around me all the time, even changing direction to the way I'm walking on the street, because I have my headphones in. If I didn't have my headphones in, I wouldn't be bothered as much, because—I hope—I'd be more aware of the people beside or behind me. But, with headphones, I don't have that luxury, so sometimes it makes me really hyper-aware. I'm sure a lot of other people aren't as neurotic, so... (Florence)

Florence exhibits a multivalent sense of concern regarding her social conduct during headphone listening. She worries so acutely that she will not notice someone else in proximity to her that she spends much of her time absorbed not in her headphone-space but in the happenings of her environment. Turning to look behind her as she walks to check whether anyone is passing her, Florence refers to a sense of 'hyper-awareness' in which she feels sufficiently auditorily separated from her lifeworld that she attends excessively to her other senses to ensure that she is not creating social conflict with other actors in her vicinity. Instead of the headphoned zombie that pervades many critical accounts of headphone listening, Florence's experience suggests that she becomes *more* aware of her social environment during headphone listening than she otherwise might.

Florence's cautious awareness of interpersonal contingency resonates with Dibben and Haake's (2013) account of office-based headphone use, in which—to quote from Born's paraphrasing of their work—they

argue that individuated listening is not used simply to create 'aural cocoons' or 'auditory bubbles' in the workplace, but engaged more subtly and variably to respond to situational contingencies in their subjects' working lives. [...] The result of these countervailing forces is a complex and shifting soundscape in which music is employed to achieve a sonic-spatial nesting and zoning, listeners carving out their sonic territory within the office while also remaining aware of and acknowledging the territories of others. (Born 2013: 57)

Drawing from Dibben and Haake's insights, then, we can observe in Florence's case a far more nuanced relationship between a headphone listener and their social environment than existing accounts have suggested. Hers is a case in which headphones do not preclude engagement with the environment but instead cause her to become more conscious of it, compensating for any reductions in auditory awareness through a *heightened* consideration for others by other means.

Nonetheless, Florence worried occasionally that her headphones *were* making her anti-social because they stopped her from talking to people as readily in

the public spaces of London. But reflecting on her concerns for a moment during our interview, she had a brief moment of realization and began to laugh:

I guess the only thing I really still think is anti-social is that I have no... Well, I don't think I'd have verbal interactions with people anyway! I keep saying it, like: 'It's really bad: I never talk to anyone.' But when would I talk to people on the Tube anyway? [laughs] (Florence)

5.10 PERFORATIONS

Throughout this chapter, I have worked to show that influential accounts of the impenetrable 'boundedness' of the headphone bubble require greater refinement and phenomenological subtlety than has so far been offered. While many headphone listeners do experience some sense of distinction from their wider environments, this is never a total 'removal' from the lifeworld. Instead, individuals report experiences of social and perceptual engagement with their environments to a variety of degrees, sometimes leading them to become *more* conscious of their social etiquette than they otherwise might.

One interesting insight from this chapter is that headphone listening can have profound, curious effects on individuals' multimodal experiences of the wider environment. As with Kate Bush's example that opened the chapter, listeners report variations in both their auditory and non-auditory experiences of the world, drawing upon accounts of visual and kinaesthetic experience as well as those pertaining to sound.

Another important contribution of this chapter has been to conceive of headphone listening is always already a highly socially nuanced practice, not as a bluntly 'anti-social' phenomenon. As illustrated, interviewees often demonstrated acute awareness of social contingency during headphone use, sometimes prioritizing their own socio-environmental wellbeing above others but more often considering the impacts of their listening practices on other social actors with whom they shared public space. I have argued that failing to attend to these often complex social decisions can result in an incomplete or inaccurate portrait of the practice. My argument has therefore been complementary to Bull's contention that the various modalities 'of urban reciprocity, of urban recognition, are denied within the very structure' of headphone use (Bull 2007: 49) in that I have found that social awareness is often a *priority* for headphone users, manifesting itself in a number of interesting ways during listening. In other words, instead of viewing headphone listening as wholly and solely symptomatic of the denial or death of

interpersonal contingency, I have shown it to be a complex, socially constituted practice. To quote from work by Arild Bergh and Tia DeNora (2009: 102), ‘listening needs to be theorised as a form of social practice, even when it takes place in solitude’.

Both contributions—providing more detailed evidence pertaining to multimodal perceptual consequences and to mediated social contingency during headphone listening—might then be conflated to form a single overarching modulation of the wider theoretical discourse: the nuancing of the bubble model to show that headphone listening can and does involve complex experiences of mediated connection to the wider human and non-human environment, highlighting the bubble’s social and perceptual permeability and prioritizing the granular detail of mediated experiences in the process. While there can be no doubt that many listeners use headphones as a social and perceptual buffer against the wider environment across diverse contexts and that such uses are intimately linked with experiences of the ‘boundedness’ of headphone-space, I have amply evidenced the need to soften notions of headphone listening as an anti-social practice predicated on absolute, unwavering acoustic barriers being upheld between listener and world. Bull’s bubble model and its relatives are important, useful, and widely applicable conceptual heuristics that can aid our broader understanding of the social and perceptual dimensions of headphone-listening experiences, but these bubbles require greater phenomenological nuance to be considered accurate in terms of real, lived experience. Listeners can and do experience a sense of separation from the external environment during headphone listening, but this does not wholly negate their situatedness and connection to others and to the environment.

As a deviation from the approaches of many cultural critics, perhaps we might regard the question of whether auditory removal—to whatever degree of efficacy—from the shared spaces of everyday life is inherently ‘bad’ or ‘good’ as best approached through a composite lens comprising all of the nuances explored here, avoiding strong arguments in either direction in favour of a more considered, ‘situated’ account that surveys all of the tensions that surface throughout the evidence with a balanced degree of criticality. There might also be an air of pragmatism: that the arguments regarding how the privileged can essentially pay to ‘remove’ unwanted people from their auditory spheres (Hagood 2011, 2019) are compelling and vital to the development of a strong critical account of late-capitalist culture in the West, but that this same token might not apply to every situation (as in his own screaming baby example, adduced in § 5.5).

In addition, while these critical accounts are rich and compelling, they may sometimes rely too heavily on the *idea* of headphones-as-anti-social without sufficient engagement with the evidence: that headphones can easily be removed, and that they are not ‘hermetically sealed’ to any absolutely effective degree.

As an axiom of Merleau-Pontian phenomenology, we know that ‘to be situated entails that the knower is always *embodied*, located, *is a body*’ in a world (Ihde 2002: 68; original emphasis). To refer back to Reg’s account adduced above: ‘You can never be outside of the world. As long as I’m alive, I’m not going to be able to take myself out of the world around me.’



CONCLUSION



‘Genius to fall asleep to your tape last night. [...] My headphones: they saved my life. Your tape: it lulled me to sleep. [...] I like this resonance. It elevates me.’

— **BJÖRK**
(from ‘Headphones’,
in *Post* 1995)

6.1 PLURALITY

In the months preceding the submission of this thesis, a period of extreme violence erupted between Israel and Palestine. An exemplar case of structurally ‘asymmetric’ warfare (Cordesman 2006; Gallo and Marzano 2009; Pillar 2014) in terms of political, economic, and technological resource, the 2021 crisis claimed hundreds of human lives, the overwhelming majority of them Palestinian (Holmes et al. 2021). On 19th May 2021, the *Washington Post* published an article detailing the lived experiences of Palestinian and Israeli parents and their children during the midst of the brutality (Balousha and Hendrix 2021). The article documents how ‘war means inventing ways to protect children and ease their trauma’ in intuitive ways (Balousha and Hendrix 2021: n.p.). Included in the report is a photograph taken by Loay Ayyoub showing seven-year-old Joury Mghames hidden beneath a kitchen counter in her home in Gaza, Palestine, wearing a pair of headphones wired into a handheld device. According to Joury’s father, she had been extremely distressed by the sounds of Israeli airstrikes at night, which led him to try using noise-cancelling headphones to ease her fears. She responded well, laughing when she became less able to hear her father’s voice through the ‘wall’ of her headphones (Herbert 2011: 96), enjoying familiar YouTube videos, and even going to sleep wearing them. As the report’s writers explain, Joury’s father ‘knows well that headphones won’t protect his children from the bombs that have already

killed more than 200 Gazans in the past 10 days. [...] But like countless parents, [...] he is doing anything he can to shield them from the trauma of being under fire' (Balousha and Hendrix 2021: n.p.). Joury's photograph is striking, presenting a child in a conflict zone nested inside her house, finding shelter under a counter, and enfolded in a protective sonic space.

The horrific scenes of violence in Gaza are a far cry from the vast majority of cases explored throughout this thesis. Yet drawing on the insights gained in the previous chapters, there are certain commonalities one could identify: that Joury—like Hillary (Chapter 5, § 5.2), Miranda (Chapter 5, § 5.7), or Orestes's students with autism spectrum disorder (Chapter 5, § 5.2)—uses her headphones to produce a comforting, lived spatial boundary between her body and the wider world of sonic aggressions; or that Joury ensconces herself in a familiar soundtrack, like Albert (Chapter 5, § 5.2), thereby nesting herself (Born 2013; Smalley 2007) inside multiple spaces within spaces through sonic-technological mediation. While in Joury's case the threat of brutal physical violence is far more pressing than for Hillary and Miranda, these examples are connected through the intuitive use of headphones to provide psycho-affective support, helping to block out the traumatic external sound-world and to wrap the listener in an assuaging sonic space. We might also imagine that the 'amniotic' qualities of the headphone sound (Chapter 2, § 2.6) might have served to comfort Joury, making the space occupied by her listening body more 'homely' as she contends with a complex, traumatic environment (Downs 2021a; see also Daughtry 2015). Her headphones might also be said to bound the edges of her listening body, creating a protective, material barrier that she feels on her skin (Chapter 4); and the familiar voices of her favourite YouTube videos might provide her with a sense of social surrogacy (Chapter 3, especially § 3.8; see also Schäfer and Eerola 2020; Schäfer et al. 2020), taking her outside of her physical environment for a select period of time and into the comfort of a virtual world.

My tentative analysis of the arresting account of Joury's experience is necessarily predicated on assumption-based extrapolations from the available evidence: we do not know to the same degree as we did of my interview participants how Joury experienced the space of her headphones and the comfort it afforded her. That said, her father's observations of her change in mood and improved ability to cope with the traumatic aspects of her immediate environment may be seen to speak to the power of these technologies in such contexts. In such a light, using the insights drawn from the material analysed earlier in the thesis, we can offer a possible interpretation of Joury's experience based on multiple

‘dimensions’ of headphone listening—for example, in its multimodality, its comforting affordances, and its multiple sonic-spatial mediations.

Joury’s is an overwhelmingly ‘positive’ example of headphone listening as a technique of self-regulation (DeNora 2000, 2013) and socio-environmental control (Bull 2000, 2007). Yet, clearly, Joury’s story does not invalidate the trenchant cultural critiques of headphone listening and auditory ‘atomization’ in the urban West that have provided the vertebrae of some of the most important studies considered in this thesis (e.g. Bull 2000, 2007; Hagood 2011, 2019; Jordan 2017). Joury’s is a markedly different context, though the headphones she uses would share many capacities with those donned by the commuters in Bull’s, Hagood’s, and Jordan’s studies—and indeed the participants in my own. It is clear, then, that *context* plays a key role in these accounts, and our interpretations of headphone use should be highly responsive to the specific conditions of situations of use.

Throughout the thesis, I have aimed to show that headphone listening is never one monolithic sensory practice but a nuanced, varied phenomenon that can afford for some what it may never for others. That said, I have argued that there appear to be certain fundamental ‘commonalities’ among the corpus of experiences considered—that headphones regularly effect a sense of embodied sonic interiority and intimacy for listeners (Chapters 2 and 3), that their placement at the edges of the body may variously blur the distinction between listener and technology and foreground it (Chapter 4), and that they may create interesting and sometimes productive barriers between ‘interior’ and ‘exterior’ socio-environmental experience that venture far beyond blunt ‘excision’ (Chapter 5). Yet I have also attended closely to variations in experience, highlighting how certain individuals’ accounts of headphone listening can counteract or even contradict others in their claims and context. Overall, then, I have provided an account of headphone listening that foregrounds both commonalities and tensions across a spectrum of experiences, aiming to show that there is ample space for nuance and attention to the specific situational and phenomenological characteristics of different experiences.

In what remains of this concluding chapter, I summarize the major insights and contributions to knowledge that can be drawn from the thesis (§ 6.2) before attending to certain ‘cross-pollinations’ that can be identified as linking together these various thematic vectors (§ 6.3). I then acknowledge certain limitations of the chosen method (§ 6.4).

6.2 SUMMARIES

In Chapter 2, I took as my springboard Steven Connor's (2011) attention to the 'phantasmal cavities' of the ears and head that emerge through interiorized sonic experience (§ 2.1). I noted how headphones have regularly been said to 'give rise' to an in-head-localized sound-space during use, reviewing how many scholars from across disciplinary perspectives have considered intracranial sound localization as a 'problem' to be circumvented, one that does violence to the idea of sound as a 'distance' sense and thereby to the notion of sonic 'realism' in sound reproduction (§ 2.2). Considering the work of Gascia Ouzounian (2006) and others, I suggested that suspending the drive towards the pathologization of in-head localization can afford us access to the curious phenomenological reality of perceiving sound as an interiorized phenomenon (§ 2.3). Drawing from interview data detailing how the sound relayed by headphones is perceived as located inside the body (§ 2.3), I considered the *immediacy* and deictic logics (the *hereness* and *thereness* of sound) underpinning listeners' accounts of the relationship between bodily space and acoustic space during headphone listening (§ 2.4). I drew from phenomenological philosophy to unpack certain complications intrinsic to such accounts, highlighting the egocentricity of spatial perception as well as the manner by which headphone sound appears to be perceived as a composite sensory phenomenon straddling hearing, proprioception, and interoception (§ 2.5). I also showed how the Merleau-Pontian notion of the lived body can aid us in accounting for sonic-spatial experiences of headphone listening that frame sound as simultaneously *within* and *beyond* the body. This is because such apparent contradictions in spatial experience may be explained by virtue of the lived body's dimensionality being distinct from that of the body-as-object, namely that headphone sound often does not fit neatly 'within' the head on account of the lived, non-Euclidean character of sonic space (§ 2.6). Analysis of listeners' accounts also showed that headphone sound can effect a *zoning* of bodily space in which attention to other areas of the body is diminished through headphones' prioritization of focus on and around the head (§ 2.7). In addition, I considered listeners' reports of experiencing an interference between the interiorized sound-space of headphone listening and their localization of thoughts 'within the head', highlighting certain complex physical-metaphysical relations that emerged as a result (§ 2.8). I unpacked these ideas further through engagement with the Beckettian notion of the *skullscape*, drawing from literary criticism and philosophy to deduce how we might understand the idea that interiorized sound can affect the private space of thought (§ 2.9). I concluded with a conceptualization of

headphone listening as an emergent process of sonic *flooding*, one in which sound flows through and overflows beyond the perceived dimensions of the lived body (§ 2.10).

Continuing my focus on bodily interiority, I turned in Chapter 3 to a specific type of sonic content to which listeners regularly reported listening over headphones: the voice. My rationale here was to apply and extend the insights of the previous chapter, which had ascertained the *form* of headphone listening, in order to understand how the interiorized spatial profile of headphone sound could impact experiences of the *content* of particular sounds. I was concerned here especially with *mediated social (and parasocial) relations*, foregrounding how hearing another's voice as sharing the same location as one's perceived bodily interior can impact social-phenomenological experience. I began by attending to cases of sonic violence and torture involving headphones in which attempts to change cognitive behaviours have been made by relaying a repeated clip of speech to a victim over long periods of time (§ 3.1). I argued that such instances may be viewed as examples of a rather literal mode of 'brainwashing'—that is, that the interior space of the head is flooded with the sound of the voice (see also Downs 2021b). While such examples demonstrate *in extremis* the potential radical power of the headphone-mediated voice, I acknowledged that these cases were marked aberrations, and I began investigating other examples in which listeners' described their experiences of listening to mediated voices using headphones. Using concepts from phenomenological philosophy, music psychology, and sound studies to introduce the issues of *being-with*, *we-ness*, and *social surrogacy* that then pervaded the chapter (§ 3.2), I began my empirical analysis through consideration of certain real-world social encounters in which headphones perform an important role, such as in 'headphone theatre' and during multilateral simultaneous conference interpreting (§ 3.3) as well as during headphone-mediated telephone use (§ 3.4). I interpreted the evidence through the lens of Connor's (2000a) *voice-body* concept, arguing that the interiorized appearance of the mediated voice was an embodied phenomenon and in turn suggesting that the space of one's own listening body and that of the heard voice-body could be understood as imbricated during headphone listening (§ 3.5). To explore the implications of such a suggestion further, I turned to the notion of *parasociality* (Horton and Wohl 1956) and its relationship to the experience of the mediated singing voice and the voice-body of a pop persona (§ 3.6). I continued this focus in my consideration of cases in which listeners reported feeling part of a virtual *conversation-space* inside their headphones, such as during radio and podcast

talkshows (§ 3.7). I suggested throughout that the sense of being-with another's voice body is heightened by its spatial interiorization during headphone listening, arguing that we might best understand such phenomena in terms of *intimacy* (§ 3.8). This led me to consider how Maurice Merleau-Ponty's (1964, 1968) notion of *intercorporeality* might be extended to the phenomenon of headphone listening, demonstrating that the overlapping of bodily spaces can lead some listeners to experience an almost-merging with the voice-body of another (§ 3.9). I concluded with some attention to the *posthuman* voice, especially those embedded in more elaborate headphone technologies, arguing that listeners can experience such voices as possessing a 'body' in their own right (§ 3.10).

Chapter 4 began where the previous chapter had left off: considering the relationships that listeners reported experiencing between their bodies and their listening technologies. Beginning with the historical case of Mrs Violet Rainford, I introduced the central focus of the chapter on touch and materiality in headphone listening, moving away from the sound-focused impetus of the previous chapter towards a more explicitly multimodal account of headphone use (§ 4.1). Following an introduction to the notion of materiality (§ 4.2), I considered certain 'materialistic' considerations of headphone technologies reported by listeners, showing that listeners variously stockpile old headphones and quasi-ritualistically cherish them (§ 4.3). Moving towards a more focused account of touch and human-technological contact during headphone listening, I introduced the notion of technological *transparency* (§ 4.4), exploring the various degrees to which headphones disappear into the perceptual background when in use. I traced this *opacity* of technology through a range of material concerns for headphone users including the concomitant sounds caused by human-technological friction (§ 4.5) and the material impacts of both wires and wirelessness on listening experiences (§ 4.6). Drawing more directly from phenomenological philosophy, I considered the idea that the human-technology relation in headphone listening can be understood through Merleau-Ponty's notion of *flesh*, namely that contact with other objects reveals not only the materiality of the object but that of the body's own materiality, evincing the ontological reversibility of the body and the world (§ 4.7). This led me to consider the phenomenological reality of the body's *edges*, specifically exploring how listeners reported the schematic structure of their lived bodies expanding to the edges of their headphones during use (§ 4.8), of their heightened attention to the material constitution of the body through headphones' foregrounding of bodily fluids such as sweat and earwax (§ 4.9), and of increased awareness of the ears as bodily orifices—thresholds that may be

crossed by technological means (§ 4.10). I concluded with attention to the use of headphones as parasitic technologies of violence and torture, evidencing the extreme ends to which headphones' materiality can be felt (§ 4.11).

By Chapter 5, I moved beyond the dermal exterior of the body towards the wider social and perceptual environment. Opening with the example of Kate Bush's early experiences with in-ear monitors (§ 5.1), I introduced the issues arising at the junction of 'interior' and 'exterior' worlds of sound and socio-environmental experience during headphone use. In the earlier parts of the chapter, I followed the rationale behind Michael Bull's (2000, 2007) influential 'bubble' model of headphone listening, showing how listeners use headphones to build material sonic 'walls' between ears and environment (§ 5.2), to enhance their experiences of self-confidence in public social milieux (§ 5.3), and to signal to others that they are attentionally and sensorily unavailable via an intuitive cultural semiotics of headphone size (§ 5.4). However, I also critiqued the bubble model's potentially negative consequences, in which headphone listening is branded as an intrinsically anti-social, 'zombifying' practice (§ 5.5). While not denying the powerful potential for sociological critique afforded by such models, I suggested an alternative approach that prioritized phenomenological nuance and attended more acutely to the spectrum of experiences of wider socio-environmental relations. To substantiate my contentions, I focused next on the intriguing ways in which experiences of the wider world are affected by headphone listening, exploring certain *interferences* reported by individuals in which perceptions of motion—including self-motion—were inflected by the sonic-spatial experience of headphone use (§ 5.6). This led to an examination of the sonic *interpenetration* of interior and exterior sound-worlds during headphone listening, first with an emphasis on the inward leakage of extraneous sound into the headphone-space (§ 5.7) and second with attention to the outward leakage of sound into the wider environment, with particular interest in listeners' awareness of the impacts of their listening on others in their vicinity (§ 5.8). I found, for example, that listeners were often highly aware of others when they used their headphones, monitoring the mediated sound levels to ensure they were being socially considerate. In this light, I also evidenced how individuals can be highly aware of interpersonal *contingency* during listening (§ 5.9). All of these sections in the second half of the chapter (§§ 5.6–5.9) served to provide some counter-evidence to Bull's claim that headphones form a hermetic seal between listener and world by drawing attention to the intermingling of interior and exterior worlds during listening. I concluded with the contention that we should foreground the perforability of the headphone bubble (§ 5.10).

6.3 CROSS-POLLINATIONS

A number of ‘cross-pollinations’ between the themes encountered in individual chapters can be elucidated to clarify further the original contributions of the research. While this list is by no means exhaustive, it provides a sense of the benefits of considering the thesis as a whole.

The clearest cross-pollination between the thesis chapters is between Chapters 2 and 3, as I mapped the insights from Chapter 2’s focus on the ‘form’ of headphone sound (its perceived location in relation to corporeal space) onto Chapter 3’s engagement with a specific form of headphone-mediated ‘content’ (the voice). Here, we were able to explore how the commonly apparent location of headphone sound ‘within’ the lived body could have implications for mediated social relations with other social or parasocial actors, focusing on the ‘impossible’ intimacy of sharing one’s embodied space with the voice of another, in turn potentially leading to curious experiences of intercorporeal incorporation or mutual re-embodiment.

A further cross-pollination may be identified in the relationship between virtual and actual social encounters, both mediated by headphones in different ways. In the thesis structure, I broadly distinguished between ‘virtual’ social (and parasocial) cues and their vocal mediation via headphone sound (Chapter 3) and ‘real-world’ social interactions beyond vocal sound (Chapter 5). There may be cause to bring these multivalent potential social dimensions into dialogue. For example, in Chapter 5, § 5.3, I explored how Hillary’s use of headphones to listen to familiar, ‘chat show’-style podcasts reduced her inhibitions in publicly displaying emotions via facial or paralinguistic expressions. There is a certain degree to which the auditory separation that her headphones afforded her was foundational to this experience—that is, that she felt ‘distanced’ from the potential conflicts of her social environment because of the boundaries constructed through sound. Yet we might also consider Hillary’s admission in light of the insights surrounding voice listening: that the social cues afforded by the headphone-mediated conversation-space such as laughter, interactive conversation, and the like (see Chapter 3, § 3.7) might have caused her to react more readily to the sounds and to feel more at ease socially as a result. This suggests not only that the content of mediated audio is important beyond the ‘form’ of the headphone presentation but also that the two interact closely (i.e., Hillary’s ‘virtual’ connection to the voices in the podcast impacting her ‘physical’ connection to other, real-world social actors).

Remaining on the subject of perceived ‘comfort’ (see also Downs 2021a), we might consider it appropriate to produce a multimodal model of headphone-

mediated ‘homeliness’ via a composite of the chapters’ insights. For example, not only are there the ‘amniotic’ acoustics of headphone sound (Chapter 2, § 2.6) that produce a sense of a fluid, comforting interiority for some listeners, but there are also the more ‘positive’ aspects of headphones’ materiality in their attachment to the edges of the body (Chapter 4) as well as their edification of meaningful boundaries between body and world (Chapter 5, especially § 5.2). Considering these facets of headphone listening together, we can begin to present a more cohesive account of the multimodality of the practice—that it is not simply the content of the sound that can improve individuals’ experiences of their environments but also its spatial form, the presence of the technology on the body, and the potential it affords for spatial segmentation.

Headphone listening is by no means a solely auditory practice, instead drawing together many sensory modalities into a multimodal, full-body practice of sonic engagement. In some sense, then, the focus on the multimodal correspondences and interactions throughout this thesis, spanning audition through proprioception, interoception, and touch towards vision and kinaesthesia, has provided evidence for Marcel Cobussen’s claim that ‘experiencing music is, can, or should be multisensorial’ (Cobussen 2021: 484)—or at least that scholarly attention to its sensory multidimensionality should be a priority. To cite Don Ihde on the idea of headphones as a monosensory technology, ‘[w]hile it is the case that media may be “mono-sensed” whole body experience cannot. [...] Only with great effort can we bring a “single sense” into focus and even then there is no phenomenological full success’ (Ihde 2016: 95–96). Headphone listening has been presented as something that exists far beyond ‘just listening’, instead representing a multivalent, complex practice involving more than just the ears.

6.4 LIMITATIONS

The necessity to include a section here on the potential cross-pollinations of the thematic chapters may in turn be read as a limitation of the methodology, namely that the separation of the key themes into separate streams forces arbitrary boundaries between dimensions of experience. Despite my attempts to synthesize some of the cross-talk between these channels, there were a number of potential avenues for thematizing the research: focusing on specific contexts, specific audio content, or particular headphone designs. My justification for the approach adopted here is that a more conceptual, constellatory, theme-focused structure has enabled me to cut across the corpus of interview data to elucidate connections and

divergences between a range of participants. Moreover, it is hoped that the thesis's structure as an unfurling spatial trajectory from bodily interior to environmental exterior has provided an intuitive framework for understanding the multiple sonic-spatial mediations of headphone listening.

Thinking more acutely in terms of method, my decision to adopt an empirically driven phenomenological approach to the study of headphone listening has been predicated on an ambition to attend closely to the detail of listening experiences and to provide a novel philosophical lens through which to consider such listening practices. At the surface level, one critique of my approach would be my decision to attend less to issues of function and use in favour of a more detailed account of phenomenal experience. An alternative future project could, for example, work instead to document in more detail the specific professional practices involving headphones and to survey a far greater number of participants in less depth to ensure generalizability. However, the purpose of this thesis has been to foreground the phenomenological detail of headphone listening, and in this light function and use were necessarily secondary concerns.

Interview methods are limited for a number of reasons, most particularly with regard to the present research in that they commonly necessitate retrospective recall, which can in turn blur participants' memories of exact experiences and the reports that they offer. Alternative methods, such as the experience sampling method (ESM; see, e.g., Heye and Lamont 2010) which requests small amounts of data regarding everyday experience at random intervals for participants, could provide more accurate information regarding the moment-by-moment experience of sound. That said, ESM is in turn flawed for its inadequacy in affording sufficient detail to be procured from participants, given that it is predicated on the need to interrupt the passage of everyday life for individuals so is often time- and space-sensitive. In addition, participants' own *reflections* on experience have provided an important source of information for my interpretations here, which can be considered a benefit of interviewing: that detailed insights into individuals' own perceptions of sonic-spatial meaning or human-technology relations can be encountered in depth within the interview framework.

Moreover, while the number of participants interviewed was substantial ($N = 27$) and varied, more data from a more diverse range of participants would necessarily ensure greater generalizability and replicability of the insights drawn here. Given the self-selecting nature of participant recruitment, there was no statistical sampling involved in relation to the demographic data, though a diverse

selection of professions and uses were examined. Certain professions involving headphones (e.g. pilots, security personnel) were not encountered in the research, and neither were a number of potentially fecund contexts for headphone use (e.g. headphones' use in museum guides, 'silent discos' and 'subtle mobs', or 'food operas'). Future empirical research could focus on these gaps in the research record presented here to elucidate more of the phenomenological reality of such practices.

Due to constraints on length and focus, the account offered here has prioritized the phenomenology of binaural headphone use, with only fleeting references to monaural experiences of headphones and related technologies—for example, as a non-normative technique to afford greater sonic interpenetration with the wider environment (see, e.g. Chapter 5, § 5.7). However, much more could be said about the experience of 'one in, one out' headphone listening beyond the social reality of the practice, especially regarding the dichotic (monaural) spatial 'incompleteness' of the phenomenon. Tyler Bickford (2017) places a strong emphasis on earbud sharing, but his phenomenological focus is markedly more social than perceptual.

Such a comparative focus on the sonic experience of monaural versus binaural sound presentation could in turn reveal more about the qualities of auditory immersivity afforded by headphone technologies. Apart from my rather literal reappraisal of the term 'immersion' during my conceptualization of sonic flooding (Chapter 2, § 2.13), I have broadly avoided the more complex issues pertaining to sonic immersivity and its wide-ranging definitions (see Dibben forthcoming; Garner 2018; Schrimshaw 2015, 2017). My justification for such conceptual evasion has to do with the degree to which these debates have become distanced from lived experience. Instead, it is hoped that, in future work, the research I have reported here can provide an empirical and phenomenological basis for further discussions of headphones and immersion.

Moreover, the thesis as a whole has focused on the use of 'everyday', standard model headphones which are characterized by a non-interactive spatial 'fixity' in terms of the audio they relay, meaning that bodily movements are not registered by the technologies and therefore do not affect the spatial appearance of a virtual sonic environment (see Chapter 2, § 2.4; Chapter 3, § 3.7; Chapter 5, § 5.6). The decision to focus solely on these technologies during the thesis, and not on more recent headphone designs involving specialized technologies that afford a listener interactive 'freedom' within a virtual environment, is predominantly the result of a desire to account for the most prevalent contemporary practices,

combined with a call for participants that was not specifically aimed at individuals with experience of such ‘post-headphone’ technologies. While, as adduced above, the sample of headphone listeners recruited as part of the empirical component of the project cannot be considered ‘representative’ in terms of robust demographic statistics, only two of the twenty-seven interviewees ever noted using head-tracking headphones, both on a single occasion. This in turn meant that there was insufficient data to probe such ideas in any great depth. However, much research over recent decades has prioritized the development of interactive headphones that react to bodily movements (see Chapter 2, § 2.4 for a brief review), suggesting that this area of inquiry could be fruitful in future research into headphone listening (see also Dibben forthcoming).

In addition, similarly ‘responsive’ technologies have been developed over recent decades using biometric data to measure individual listeners’ ‘head-related transfer functions’ (HRTFs). These technologies involve measuring the depths and distances of certain relevant parts of a listener’s body (head, torso, pinnae) and use algorithmic sequencing to ‘reproduce’ the filtering effects of the physical body on sounds heard through headphones. As every body is different, these measurements differ widely between individuals, meaning that the practice involves a fair amount of effort to enter accurate biometric data into an algorithm to ensure optimal ‘realism’ through ‘superimposing binaural cues on the sound before it reaches the eardrum’ (Roginska 2018: 88). Especially relevant to the insights gained earlier in the thesis regarding tropes of the ‘unnatural’ when describing in-head localization (Chapter 2, § 2.2), such technologies can be used to varying degrees of efficacy to specify auditory spaces that are markedly externalized.

With phenomenological ambitions at heart, the analysis I have provided here should not be considered totalizing, nor should the corpus of data that I have presented be regarded as cohesive in its generalizability. Instead, mine is a perspective that offers just one set of accounts of one broader aspect of sonic experience—though, in its detailed approach to the qualitative data and engagement with broader theoretical literatures, I hope that its prioritization of lived experience has provided an informative and nuanced account of contemporary listening practices and that it may therefore provide an empirical basis for further critical research into headphone use.

REFERENCES



Abbott, A. (2012). 'Stress and the city: urban decay'. *Nature*, 490(7419), 162–164.

Abrantes, E. (2019). 'Interpenetration of vibrating thresholds: eroticism, sound and sensorial intimacy'. *SoundEffects*, 8(1), 69–86.

Adorno, T.W. (1982 [1956]). *Against Epistemology: a Metacritique: Studies in Husserl and the Phenomenological Antinomies* (trans. W. Domingo). Cambridge, MA: MIT Press.

Adorno, T.W. (1991). *The Culture Industry: Selected Essays on Mass Culture* (ed. J.M. Bernstein). London: Routledge.

Adorno, T.W. (2009). *Current of Music: Elements of a Radio Theory* (ed. R. Hullot-Kentor). Cambridge: Polity Press.

Akbar, S.R. (2013). 'Musical understanding: studies in philosophy and phenomenological psychology'. Doctoral thesis. Iowa City, IA: University of Iowa.

Ashmore, J. (2018). 'The neuroscience of hearing or how to do a hard job with soft components'. *Brain and Neuroscience Advances*, 2. doi.org/10.1177/2398212818810687.

Atkinson, P. and Silverman, D. (1997). 'Kundera's *Immortality*: the interview society and the invention of the self'. *Qualitative Inquiry*, 3(3), 304–325.

Auner, J. (2003). "'Sing it for me": posthuman ventriloquism in recent popular music'. *Journal of the Royal Musical Association*, 128(1), 98–122.

Bachelard, G. (2014 [1958]). *The Poetics of Space* (trans. Maria Jolas). New York, NY: Penguin Books.

Balousha, H. and Hendrix, S. (2021). 'Parenting under fire'. *Washington Post*, 19th May. [washingtonpost.com/world/2021/05/19/gaza-israel-children-trauma](https://www.washingtonpost.com/world/2021/05/19/gaza-israel-children-trauma).

Beauvoir, S. de (1997 [1949]). *The Second Sex* (trans. H.M. Parshley). London: Vintage.

Beckett, S. (1997). *Trilogy*. London: Everyman's Library.

Beckett, S. (2006). *The Complete Dramatic Works of Samuel Beckett*. London: Faber.

Beer, D. (2007). 'Tune out: music, soundscapes and the urban mise-en-scène'. *Information, Communication & Society*, 10(6), 846–866.

Beer, D. (2012). 'The comfort of mobile media: uncovering personal attachments with everyday devices'. *Convergence*, 18(4), 361–367.

Behrendt, F. (2012). 'The sound of locative media'. *Convergence*, 18(3), 283–295.

Békésy, G. von (1930). 'Zur Theorie des Hörens: über das Richtungshören bei einer Zeitdifferenz oder Lautstärkeungleichheit der beidseitigen Schalleinwirkungen' ['Towards a theory of hearing: on directional hearing on account of time differences or volume imbalances in binaural sounds']. *Physikalische Zeitschrift*, 31, 824–835, 857–868.

Bell, J. and Bell, C. (1827). *The Anatomy and Physiology of the Human Body, Volume 1*. Fifth American edition. New York, NY: Collins and Company.

Ben-Asher, M. (2016). 'It's all in your head: Waves Nx technology for 3D audio on headphones'. *Pro Sound News*, 38(9), 31.

Ben-Zvi, L. (1986). *Samuel Beckett*. Boston, MA: Twayne Publishers.

Bennett, S. (2019). *Theory for Theatre Studies: Sound*. London: Methuen Drama.

Benson, B.E. (2003). *The Improvisation of Musical Dialogue: a Phenomenology of Music*. Cambridge: Cambridge University Press.

- Benson, B.E.** (2011). 'Phenomenology of music'. In T. Gracyk and A. Kania (eds), *The Routledge Companion to Philosophy and Music*. Abingdon: Routledge, 581–591.
- Bergh, A. and DeNora, T.** (2009). 'From wind-up to iPod: techno-cultures of listening'. In N. Cook, E.F. Clarke, D. Leech-Wilkinson, and J. Rink (eds), *The Cambridge Companion to Recorded Music*. Cambridge: Cambridge University Press, 102–115.
- Bergh, A., DeNora, T., and Bergh, M.** (2014). 'Forever and ever: mobile music in the life of young teens'. In S. Gopinath and J. Stanyek (eds), *The Oxford Handbook of Mobile Music Studies, Volume 1*. Oxford: Oxford University Press, 317–334.
- Berland, J.** (1998). 'Locating listening: technological space, popular music, and Canadian mediations'. In A. Leyshon, D. Matless, and G. Revill (eds), *The Place of Music*. New York, NY: Guilford Press, 129–150.
- Bernet, R.** (2012). 'Phenomenological and aesthetic epoché: painting the invisible things themselves'. In D. Zahavi (ed.), *The Oxford Handbook of Contemporary Phenomenology*. Oxford: Oxford University Press, 564–582.
- Besmer, K.M.** (2012). 'Embodying a translation technology: the cochlear implant and cyborg intentionality'. *Techné*, 16(3), 296–316.
- Besmer, K.M.** (2015). 'What robotic re-embodiment reveals about virtual re-embodiment: a note on the extension thesis'. In R. Rosenberger and P.-P. Verbeek (eds), *Postphenomenological Investigations: Essays on Human–Technology Relations*. Lanham, MD: Lexington Books, 55–71.
- Bickford, T.** (2017). *Schooling New Media: Music, Language, and Technology in Children's Culture*. Oxford: Oxford University Press.
- 'Big time astrology: a classic Björk interview by Jon Savage' (2011). *The Quietus*, 8th March. thequietus.com/articles/05818-bjork-interview-jon-savage.
- Bijsterveld, K., Cleophas, E., Krebs, S., and Mom, G.** (2014). *Sound and Safe: a History of Listening Behind the Wheel*. Oxford: Oxford University Press.

- Bird, J.M.** (2020a). 'Haptic aurality: on touching the voice in drag lip-sync performance'. *Sound Studies*, 6(1), 45–64.
- Bird, J.M.** (2020b). 'The cyborg queen: lip-syncing and posthumanism in ShayShay's "Mutual Core"'. *Contemporary Music Review*, 39(5), 526–543.
- Björk** (1995). *Post*. One Little Indian TPLP51CD.
- Björkén-Nyberg, C.** (2016). 'Vocal Woolf: the audiobook as a technology of health'. *SoundEffects*, 6(1), 69–87.
- Blackman, L.** (2014). 'Embodiment and voice hearing'. *Interdisciplina*, 2(3), 295–313.
- Blauert, J.** (1983 [1974]). *Spatial Hearing: the Psychophysics of Human Sound Localization* (trans. J.S. Allen). Cambridge, MA: MIT Press.
- Blesser, B. and Salter, L.-R.** (2007). *Spaces Speak, Are You Listening? Experiencing Aural Architecture*. Cambridge, MA: MIT Press.
- Böhme, G.** (2017). *The Aesthetics of Atmospheres* (ed. J.-P. Thibaud). Abingdon: Routledge.
- Bolter, J.D. and Grusin, R.** (1998). *Remediation: Understanding New Media*. Cambridge, MA: MIT Press.
- Born, G.** (2013). 'Introduction—music, sound and space: transformations of public and private experience'. In G. Born (ed.), *Music, Sound and Space: Transformations of Public and Private Experience*. Cambridge: Cambridge University Press, 1–69.
- Branigan, K.** (2008). *Radio Beckett: Musicality in the Radio Plays of Samuel Beckett*. Bern: Peter Lang.
- Braun, V. and Clarke, V.** (2006). 'Using thematic analysis in psychology'. *Qualitative Research in Psychology*, 3(2), 77–101.
- Bregman, A.S.** (1990). *Auditory Scene Analysis: the Perceptual Organization of Sound*. Cambridge, MA: MIT Press.

- Brentano, F.** (1995 [1874]). *Psychology from an Empirical Standpoint* (trans. A.C. Rancurello, D.B. Terrell, and L.L. McAlister). Second edition. Abingdon: Routledge.
- Briggs, C.L.** (2001). 'Interviewing, power/knowledge, and social inequality'. In J.F. Gubrium and J.A. Holstein (eds), *Handbook of Interview Research: Context and Method*. London: SAGE, 911–922.
- Brighenti, A.M. and Pavoni, A.** (2019). 'City of unpleasant feelings: stress, comfort and animosity in urban life'. *Social & Cultural Geography*, 20(2), 137–156.
- Brimijoin, W.O., Boyd, A.W., and Akeroyd, M.A.** (2013). 'The contribution of head movement to the externalization and internalization of sounds'. *PLoS ONE*, 8(12), e83068. doi.org/10.1371/journal.pone.0083068.
- Brown, F. and Vahidassr, D.** (2018). 'The man that lost (part of) his mind'. *BMJ Case Reports*, 27th February. doi:10.1136/bcr-2017-222892.
- Bull, M.** (2000). *Sounding Out the City: Personal Stereos and the Management of Everyday Life*. Oxford: Berg.
- Bull, M.** (2007). *Sound Moves: iPod Culture and Urban Experience*. Abingdon: Routledge.
- Bull, M.** (2011). 'Walkmans and iPods'. In D. Southerton (ed.), *Encyclopedia of Consumer Culture, Volume 3*. Thousand Oaks, CA: SAGE, 1515–1517.
- Bull, M.** (2013). 'Remaking the urban: the audiovisual aesthetics of iPod use'. In J. Richardson, C. Gorbman, and C. Vernallis (eds), *The Oxford Handbook of New Audiovisual Aesthetics*. Oxford: Oxford University Press, 628–644.
- Bull, M.** (2014). 'iPod use, mediation, and privatization in the age of mechanical reproduction'. In S. Gopinath and J. Stanyek (eds), *The Oxford Handbook of Mobile Music Studies, Volume 1*. Oxford: Oxford University Press, 103–117.

- Burton, J.** (2013). 'The sound in your head: an introduction to in-ear monitoring'. *Sound on Sound*, February, 94–98.
- Cameron, D.E.** (1957). 'Psychic driving: dynamic implant'. *Psychiatric Quarterly*, 31(4), 703–712.
- Casati, R. and Dokic, J.** (2009). 'Some varieties of spatial hearing'. In M. Nudds and C. O'Callaghan (eds), *Sounds and Perception: New Philosophical Essays*. Oxford: Oxford University Press, 97–110.
- Casey, E.S.** (2017). *The World on Edge*. Bloomington, IN: Indiana University Press.
- Cerbone, D.R.** (2012). 'Phenomenological method: reflection, introspection, and skepticism'. In D. Zahavi (ed.), *The Oxford Handbook of Contemporary Phenomenology*. Oxford: Oxford University Press, 7–24.
- Chapman, D.** (2008). "'That ill, tight sound": telepresence and biopolitics in post-Timbaland rap production'. *Journal of the Society for American Music*, 2(2), 155–175.
- Choi, S., Park, S.-G., and Lee, H.-H.** (2018). 'The analgesic effect of music on cold pressor pain responses: the influence of anxiety and attitude toward pain'. *PLoS ONE*, 13(8), e0201897. doi.org/10.1371/journal.pone.0201897.
- Clark, A.** (2003). *Natural-Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence*. Oxford: Oxford University Press.
- Clark, A. and Chalmers, D.** (1998). 'The extended mind'. *Analysis*, 58(1), 7–19.
- Clarke, D.** (2011). 'Music, phenomenology, time consciousness: meditations after Husserl'. In D. Clarke and E.F. Clarke (eds), *Music and Consciousness: Philosophical, Psychological, and Cultural Perspectives*. Oxford: Oxford University Press, 1–28.
- Clarke, D.** (2019). 'Music, phenomenology, and the "natural attitude": analysing Sibelius, thinking with Husserl, reflecting on Dennett'. In R. Herbert, D. Clarke, and E.F. Clarke (eds), *Music and Consciousness 2: Worlds, Practices, Modalities*. Oxford: Oxford University Press, 143–169.

Clarke, D. (2021). 'Consciousness'. In T. McAuley, N. Nielsen, and J. Levinson with A. Phillips-Hutton (eds), *The Oxford Handbook of Western Music and Philosophy*. Oxford: Oxford University Press, 653–676.

Clarke, E.F. (2005). *Ways of Listening: an Ecological Approach to the Perception of Musical Meaning*. Oxford: Oxford University Press.

Clarke, E.F. (2007). 'The impact of recording on listening'. *Twentieth-Century Music*, 4(1), 47–70.

Clarke, E.F. (2013). 'Music, space and subjectivity'. In G. Born (ed.), *Music, Sound and Space: Transformations of Public and Private Experience*. Cambridge: Cambridge University Press, 90–110.

Clarke, E.F. (2017). 'Music's meanings'. In R. Ashley and R. Timmers (eds), *The Routledge Companion to Music Cognition*. Abingdon: Routledge, 523–533.

Clarke, E.F. (2019). 'Empathy and the ecology of musical consciousness'. In R. Herbert, D. Clarke, and E.F. Clarke (eds), *Music and Consciousness 2: Worlds, Practices, Modalities*. Oxford: Oxford University Press, 71–92.

Clifton, T. (1983). *Music as Heard: a Study in Applied Phenomenology*. New Haven, CT: Yale University Press.

Cobussen, M. (2021). 'Listening'. In T. McAuley, N. Nielsen, and J. Levinson with A. Phillips-Hutton (eds), *The Oxford Handbook of Western Music and Philosophy*. Oxford: Oxford University Press, 483–498.

Complicité/McBurney, S. (2016). *The Encounter*. London: Nick Hern Books.

Connor, S. (1997). 'The modern auditory I'. In R. Porter (ed.), *Rewriting the Self: Histories from the Renaissance to the Present*. London: Routledge, 203–223.

Connor, S. (1999). 'CP: or, a few don'ts by a cultural phenomenologist'. *Parallax*, 5(2), 17–31.

- Connor, S. (2000a). *Dumbstruck: a Cultural History of Ventriloquism*. Oxford: Oxford University Press.
- Connor, S. (2000b). 'Making an issue of cultural phenomenology'. *Critical Inquiry*, 42(1), 2–6.
- Connor, S. (2004a). *The Book of Skin*. London: Reaktion Books.
- Connor, S. (2004b). 'Edison's teeth: touching hearing'. In V. Erlmann (ed.), *Hearing Cultures: Essays on Sound, Listening, and Modernity*. Oxford: Berg, 153–172.
- Connor, S. (2011). 'Auscultations'. *SoundEffects*, 1(1), 5–18.
- Connor, S. (2014). *Beyond Words: Sobs, Hums, Stutters and Other Vocalizations*. London: Reaktion Books.
- Connor, S. (2016). 'Choralities'. *Twentieth-Century Music*, 13(1), 3–23.
- Cook, N. (2013). *Beyond the Score: Music as Performance*. Oxford: Oxford University Press.
- Coole, D. (2014). 'New materialism: the ontology and politics of materialisation'. In S. Witzgall and K. Stakemeier (eds), *Power of Material/Politics of Materiality*. Zurich: Diaphanes, 27–41.
- Copolov, D., Trauer, T., and Mackinnon, A. (2004). 'On the non-significance of internal versus external auditory hallucinations'. *Schizophrenia Research*, 69(1), 1–6.
- Cordesman, A.H. (2006). *Arab–Israeli Military Forces in an Era of Asymmetric Wars*. Westport, CT: Praeger.
- Cox, A. (2006). 'Hearing, feeling, grasping gestures'. In A. Gritten and E. King (eds), *Music and Gesture*. Farnham: Ashgate, 45–57.
- Craig, A.D. (2002). 'How do you feel? Interoception: the sense of the physiological condition of the body'. *Nature Reviews Neuroscience*, 3(8), 655–666.

- Crawley, P. (2013). 'Close to the bone: getting into Beckett's headspace'. *Irish Times*, 14th August. irishtimes.com/culture/close-to-the-bone-getting-into-beckett-s-headspace-1.1493019.
- Critchley, S. (2001). *Continental Philosophy: a Very Short Introduction*. Oxford: Oxford University Press.
- Csikszentmihalyi, M. (1997). *Finding Flow: the Psychology of Engagement with Everyday Life*. New York, NY: Basic Books.
- Csordas, T.J. (1999). 'Embodiment and cultural phenomenology'. In G. Weiss and H.F. Haber (eds), *Perspectives on Embodiment: the Intersections of Nature and Culture*. London: Routledge, 143–162.
- Csordas, T.J. (2008). 'Intersubjectivity and intercorporeality'. *Subjectivity*, 22(1), 110–121.
- Cusick, S.G. (2013). 'Towards an acoustemology of detention in the "global war of terror" '. In G. Born (ed.), *Music, Sound and Space: Transformations of Public and Private Experience*. Cambridge: Cambridge University Press, 275–291.
- Damer, B. and Hinrichs, R. (2014). 'The virtuality and reality of avatar cyberspace'. In M. Grimshaw (ed.), *The Oxford Handbook of Virtuality*. Oxford: Oxford University Press, 17–41.
- Dant, T. (2005). *Materiality and Society*. Maidenhead: Open University Press.
- Datta, J. (2000). 'Enhancing headphone experience'. *Electronic News*, 10th July, 28, 34.
- Daughtry, J.M. (2015). *Listening to War: Sound, Music, Trauma, and Survival in Wartime Iraq*. Oxford: Oxford University Press.
- de Young, M. (2015). *Encyclopedia of Asylum Therapeutics, 1750–1950s*. Jefferson, NC: McFarland & Company.
- Dennett, D.C. (1991). *Consciousness Explained*. New York, NY: Back Bay Books.

DeNora, T. (2000). *Music in Everyday Life*. Cambridge: Cambridge University Press.

DeNora, T. (2013). *Music Asylums: Wellbeing through Music in Everyday Life*. Farnham: Ashgate.

DeNora, T. (2014). *Making Sense of Reality: Culture and Perception in Everyday Life*. London: SAGE.

Denzin, N.K. (2001). 'The reflexive interview and a performative social science'. *Qualitative Research*, 1(1), 23–46.

Descartes, R. (1991). *The Philosophical Writings of Descartes, Vol. 3: The Correspondence* (trans. J. Cottingham, R. Stoothoff, D. Murdoch, and A. Kenny). Cambridge: Cambridge University Press.

Dibben, N. (2001). 'What do we hear, when we hear music? Music perception and musical material'. *Musicæ Scientiæ*, 5(2), 161–194.

Dibben, N. (2006). 'Subjectivity and the construction of emotion in the music of Björk'. *Music Analysis*, 25(1/2), 171–197.

Dibben, N. (2009a). *Björk*. Sheffield: Equinox.

Dibben, N. (2009b). 'Vocal performance and the projection of emotional authenticity'. In D.B. Scott (ed.), *The Ashgate Research Companion to Popular Musicology*. Farnham: Ashgate, 317–333.

Dibben, N. (2013). 'The intimate singing voice: auditory spatial perception and emotion in pop recordings'. In D. Zakharine and N. Meise (eds), *Electrified Voices: Medial, Socio-Historical and Cultural Aspects of Voice Transfer*. Göttingen: V&R unipress, 107–22.

Dibben, N. (2014). 'Understanding performance expression in popular music recordings'. In D. Fabian, R. Timmers, and E. Schubert (eds), *Expressiveness in Music Performance: Empirical Approaches Across Styles and Cultures*. 117–132.

Dibben, N. (2017). 'Music as enabling: enhancing sport, work, and other pursuits'. In R. Ashley and R. Timmers (eds), *The Routledge Companion to Music Cognition*. Abingdon: Routledge, 377–388.

Dibben, N. (forthcoming). *Musical New Media: Björk's 'Biophilia' and Music in Extended Reality*. London: Bloomsbury Academic.

Dibben, N. and Haake, A.B. (2013). 'Music and the construction of space in office-based work settings'. In G. Born (ed.), *Music, Sound and Space: Transformations of Public and Private Experience*. Cambridge: Cambridge University Press, 151–168.

Dobek, C.E., Beynon, M.E., Bosma, R.L., and Stroman, P.W. (2014). 'Music modulation of pain perception and pain-related activity in the brain, brain stem, and spinal cord: a functional magnetic resonance imaging study'. *Journal of Pain*, 15(10), 1057–1068.

Downs, J.K. (2016). 'Spatial imbrication, multitrack recording, and the problem of (hyper)reality'. Master's thesis. Oxford: University of Oxford.

Downs, J.K. (2021a). 'Acoustic territories of the body: headphone listening, embodied space, and the phenomenology of sonic homeliness'. *Journal of Sonic Studies*, 21. researchcatalogue.net/view/1260374/1260437.

Downs, J.K. (2021b). 'Headphones, auditory violence and the sonic flooding of corporeal space'. *Body & Society*, 27(3), 58–86.

Drake, R.L., Vogl, A.W., and Mitchell, A.W.M. (2020). *Gray's Anatomy for Students*. Fourth edition. Philadelphia, PA: Elsevier.

du Gay, P., Hall, S., Janes, L., Madsen, A.K., Mackay, H., and Negus, K. (2013). *Doing Cultural Studies: the Story of the Sony Walkman*. Second edition. London: SAGE.

Dufrenne, M. (1973 [1953]). *The Phenomenology of Aesthetic Experience* (trans. E.S. Casey, A.A. Anderson, W. Domingo, and L. Jacobson). Evanston, IL: Northwestern University Press.

- Dura, M.T.** (2006). 'The phenomenology of the music-listening experience'. *Arts Education Policy Review*, 107(3), 25–32.
- Dyson, F.** (2009). *Sounding New Media: Immersion and Embodiment in the Arts and Culture*. Berkeley, CA: University of California Press.
- Eccleston, C.** (2016). *Embodied: the Psychology of Physical Sensation*. Oxford: Oxford University Press.
- Eisenberg, A.J.** (2015). 'Space'. In D. Novak and M. Sakakeeny (eds), *Keywords in Sound*. Durham, NC: Duke University Press, 193–207.
- 'Electric shock when "listening": woman found dead with headphones on; lamp suspected' (1927). *Manchester Guardian*, 26th May, 12.
- 'Electrocuted with headphones on: defective standard lamp; current passes to earth through wireless set' (1927). *Manchester Guardian*, 28th May, 13.
- Emmerson, S.** (2007). *Living Electronic Music*. Aldershot: Ashgate.
- Esposito, R.** (2015). *Persons and Things: from the Body's Point of View* (trans. Z. Hanafi). Cambridge: Polity Press.
- Evans, A.** (2005). *Sound Ideas: Music, Machines, and Experience*. Minneapolis, MN: University of Minnesota Press.
- Everett, T.** (2014). 'Ears wide shut: headphones and moral design'. Doctoral thesis. Ottawa: Carleton University.
- Ewing, K.P.** (2006). 'Revealing and concealing: interpersonal dynamics and the negotiation of identity in the interview'. *Ethos*, 34(1), 89–122.
- Farhi, P.** (1999). 'Appreciation: Akio Morita, a man of great import'. *Washington Post*, 5th October, C01. [washingtonpost.com/wp-srv/WPcap/1999-10/05/002r-100599-idx.html](http://www.washingtonpost.com/wp-srv/WPcap/1999-10/05/002r-100599-idx.html).

- Federman, J. and Ricketts, T.** (2008). 'Preferred and minimum acceptable listening levels for musicians while using floor and in-ear monitors'. *Journal of Speech, Language, and Hearing Research*, 51(1), 147–159.
- Fisette, D.** (2018). 'Phenomenology and descriptive psychology: Brentano, Stumpf, Husserl'. In D. Zahavi (ed.), *The Oxford Handbook of the History of Phenomenology*. Oxford: Oxford University Press, 88–104.
- Fisher, M.** (2009). *Capitalist Realism: Is There No Alternative?* Ropley: Zero Books.
- Forman, P.J.** (2020). 'Materiality; New Materialism'. In A. Kobayashi (ed.), *Encyclopedia of Human Geography*. Second edition. Amsterdam: Elsevier, 8:449–455.
- Fritz, T.H., Bowling, D.L., Contier, O., Grant, J., Schneider, L., Lederer, A., Höer, F., Busch, E., and Villringer, A.** (2018). 'Musical agency during physical exercise decreases pain'. *Frontiers in Psychology*, 8(2312). [dx.doi.org/10.3389/fpsyg.2017.02312](https://doi.org/10.3389/fpsyg.2017.02312).
- Gallagher, S.** (2006). 'The intrinsic spatial frame of reference'. In H.L. Dreyfus and M.A. Wrathall (eds), *A Companion to Phenomenology and Existentialism*. Oxford: Blackwell, 346–355.
- Galera-Masegosa, A. and Erviti, A.I.** (2015). 'Conceptual complexity in metaphorical resemblance operations revisited'. *Revista Española de Lingüística Aplicada*, 28(1), 97–117.
- Gallo, G. and Marzano, A.** (2009). 'The dynamics of asymmetric conflicts: the Israeli–Palestinian case'. *Journal of Conflict Studies*, 29, 33–49.
- Gamberini, L., Spagnoli, A., Miotto, A., Ferrari, E., Corradi, N., and Furlan, S.** (2013). 'Passengers' activities during short trips on the London Underground'. *Transportation*, 40(2), 251–268.
- Gamble, S.** (2019). 'Listening to virtual space in recorded popular music'. In J.-O. Gullö (ed.), *Proceedings of the 12th Art of Record Production Conference Mono: Stereo: Multi*. Stockholm: Royal College of Music (KMH)/Art of Record Production, 105–118.

Garner, T.A. (2018). *Echoes of Other Worlds: Sound in Virtual Reality*. London: Palgrave Macmillan.

Garza-Villarreal, E.A., Wilson, A.D., Vase, L., Brattico, E., Barrios, F.A., Jensen, T.S., Romero-Romo, J.I., and Vuust, P. (2014). 'Music reduces pain and increases functional mobility in fibromyalgia'. *Frontiers in Psychology*, 5(90). doi.org/10.3389/fpsyg.2014.00090.

Gibson, J.J. (1966). *The Senses Considered as Perceptual Systems*. London: George Allen & Unwin.

Gibson, J.J. (1979). *The Ecological Approach to Visual Perception*. Boston, MA: Houghton Mifflin.

Giordano, M., Caccavella, V.M., Zaed, I., Manzillo, L.F., Montano, N., Olivi, A., and Polli, F.M. (2020). 'Comparison between deep brain stimulation and magnetic resonance-guided focused ultrasound in the treatment of essential tremor: a systematic review and pooled analysis of functional outcomes'. *Journal of Neurology, Neurosurgery and Psychiatry*, 91(12), 1270–1278.

Godwin, R. (2019). 'Hit the mute button: why everyone is trying to silence the outside world'. *Guardian*, 12th June. theguardian.com/society/2019/jun/12/hit-mute-button-why-everyone-trying-to-silence-outside-world-uber.

Gopinath, S. and Stanyek, J. (2013). 'Tuning the human race: athletic capitalism and the Nike+ Sport Kit'. In G. Born (ed.), *Music, Sound and Space: Transformations of Public and Private Experience*. Cambridge: Cambridge University Press, 128–48.

Gopinath, S. and Stanyek, J. (2014a). 'Anytime, anywhere? An introduction to the devices, markets, and theories of mobile music'. In S. Gopinath and J. Stanyek (eds), *The Oxford Handbook of Mobile Music Studies, Volume 1*. Oxford: Oxford University Press, 1–34.

Gopinath, S. and Stanyek, J. (2014b). 'The mobilization of performance: an introduction to the aesthetics of mobile music'. In S. Gopinath and J. Stanyek (eds), *The Oxford Handbook of Mobile Music Studies, Volume 2*. Oxford: Oxford University Press, 1–39.

- Gopinath, S. and Stanyek, J.** (2019). 'Technologies of the musical selfie'. In N. Cook, M.M. Ingalls, and D. Trippett (eds), *The Cambridge Companion to Music in Digital Culture*. Cambridge: Cambridge University Press, 89–118.
- Grosz, E.** (1993). 'Merleau-Ponty and Irigaray in the flesh'. *Thesis Eleven*, 36(1), 37–59.
- Grubbs, D.** (2020). *The Voice in the Headphones*. Durham, NC: Duke University Press.
- Guattari, F. and Rolnik, S.** (2007 [1986]). *Molecular Revolution in Brazil* (trans. K. Claphow and B. Holmes). Los Angeles, CA: Semiotext(e).
- Guenther, L.** (2013). *Solitary Confinement: Social Death and Its Afterlives*. Minneapolis, MN: University of Minnesota Press.
- Guenther, L.** (2020). 'Critical phenomenology'. In G. Weiss, A.V. Murphy, and G. Salamon (eds), *50 Concepts for a Critical Phenomenology*. Evanston, IL: Northwestern University Press, 11–16.
- GVR** (2020). 'Earphones and headphones market size, share and trends analysis report by product (earphones, headphones), by price, by technology, by application, by region, and segment forecasts, 2020–2027: report summary'. Grand View Research report 978-1-68038-473-4. [grandviewresearch.com/industry-analysis/earphone-and-headphone-market](https://www.grandviewresearch.com/industry-analysis/earphone-and-headphone-market).
- Hagood, M.** (2011). 'Quiet comfort: noise, otherness, and the mobile production of personal space'. *American Quarterly*, 63(3), 573–89.
- Hagood, M.** (2019). *Hush: Media and Sonic Self-Control*. Durham, NC: Duke University Press.
- Hammond, M., Howarth, J., and Keat, R.** (1991). *Understanding Phenomenology*. Oxford: Blackwell.

Harary, M., Segar, D.J., Hayes, M.T., and Cosgrove, G.R. (2019). 'Unilateral thalamic deep brain stimulation versus focused ultrasound thalamotomy for essential tremor'. *World Neurosurgery*, 126, e144–e152.

Haraway, D.J. (1991). *Simians, Cyborgs, and Women: the Reinvention of Nature*. New York, NY: Routledge.

Hass, L. (1993). 'Merleau-Ponty and Cartesian skepticism: exorcising the demon'. *Man and World*, 26(2), 131–145.

Hayles, N.K. (1996). 'Embodied virtuality: or how to put bodies back into the picture'. In M.A. Moser with D. MacLeod (eds), *Immersed in Technology: Art and Virtual Environments*. Cambridge, MA: MIT Press, 1–28.

Hayles, N.K. (1999). *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago, IL: University of Chicago Press.

Heffernan, V. (2011). 'Against headphones'. *New York Times Magazine*, 7th January. nytimes.com/2011/01/09/magazine/09FOB-medium-t.html.

Heidegger, M. (1962 [1927]). *Being and Time* (trans. J. Macquarrie and E. Robinson). Oxford: Blackwell.

Heim, M.R. (1998). *Virtual Realism*. Oxford: Oxford University Press.

Heim, M.R. (2014). 'The paradox of virtuality'. In M. Grimshaw (ed.), *The Oxford Handbook of Virtuality*. Oxford: Oxford University Press, 111–125.

Henriques, J. (2003). 'Sonic dominance and the reggae sound system session'. In M. Bull and L. Back (eds), *The Auditory Culture Reader*. Oxford: Berg, 451–480.

Herbert, R. (2011). *Everyday Music Listening: Absorption, Dissociation and Trancing*. Farnham: Ashgate.

Heye, A. and Lamont, A. (2010). 'Mobile listening situations in everyday life: the use of MP3 players while travelling'. *Musicæ Scientiæ*, 14(1), 95–120.

Hoel, A.S. and Carusi, A. (2018). 'Merleau-Ponty and the measuring body'. *Theory, Culture & Society*, 35(1), 45–70.

Høffding, S. (2019a). *A Phenomenology of Musical Experience*. London: Palgrave Macmillan.

Høffding, S. (2019b). 'Performative passivity: lessons on phenomenology and the extended musical mind with the Danish String Quartet'. In R. Herbert, D. Clarke, and E.F. Clarke (eds), *Music and Consciousness 2: Worlds, Practices, Modalities*. Oxford: Oxford University Press, 127–142.

Høffding, S. (2021). 'Phenomenology'. In T. McAuley, N. Nielsen, and J. Levinson with A. Phillips-Hutton (eds), *The Oxford Handbook of Western Music and Philosophy*. Oxford: Oxford University Press, 307–324.

Høffding, S. and Martiny, K. (2016). 'Framing a phenomenological interview: what, why and how'. *Phenomenology and the Cognitive Sciences*, 15(4), 539–564.

Hollander, R.S. (1985). *Video Democracy: the Vote-from-Home Revolution*. Mt. Airy, MD: Lomond Publications.

Holmes, O., Morresi, E., and Chulani, N. (2021). 'Israel–Palestine crisis explained: why has the violence escalated again?'. *Guardian*, 19th May. [theguardian.com/world/video/2021/may/19/israel-palestine-crisis-explained-why-has-the-violence-escalated-again-video](https://www.theguardian.com/world/video/2021/may/19/israel-palestine-crisis-explained-why-has-the-violence-escalated-again-video).

Home-Cook, G. (2015). *Theatre and Aural Attention: Stretching Ourselves*. London: Palgrave Macmillan.

Horton, D. and Wohl, R.R. (1956). 'Mass communication and para-social interaction: observation on intimacy at a distance'. *Psychiatry*, 19(3), 215–229.

Hosokawa, S. (1984). 'The Walkman effect'. *Popular Music*, 4, 165–80.

Hunter, E. (1951). *Brain-Washing in Red China: The Calculated Destruction of Men's Minds*. New York, NY: Vanguard Press.

- Husserl, E. (1982 [1913]). *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy—First Book: General Introduction to a Pure Phenomenology* (trans. F. Kersten). The Hague: Martinus Nijhoff.
- Ihde, D. (1990). *Technology and the Lifeworld: from Garden to Earth*. Bloomington, IN: Indiana University Press.
- Ihde, D. (1993). *Postphenomenology: Essays in the Postmodern Context*. Evanston, IL: Northwestern University Press.
- Ihde, D. (2002). *Bodies in Technology*. Minneapolis, MN: University of Minnesota Press.
- Ihde, D. (2007). *Listening and Voice: Phenomenologies of Sound*. Second edition. Albany, NY: State University of New York Press.
- Ihde, D. (2009). *Postphenomenology and Technoscience: the Peking University Lectures*. Albany, NY: State University of New York Press.
- Ihde, D. (2010). *Heidegger's Technologies: Postphenomenological Perspectives*. New York, NY: Fordham University Press.
- Ihde, D. (2016). *Acoustic Technics*. Lanham, MD: Lexington Books.
- 'Imprisoned in China for practicing Falun Gong, wife tortured to death in labor camp' (2017). *Falun Dafa Info Center*, 12th May. faluninfo.net/imprisoned-in-china-for-practicing-falun-gong-wife-tortured-to-death-in-labor-camp.
- International Society for Human Rights (n.d.). 'Common methods of torture and abuse in the People's Republic of China'. ishr.org/countries/peoples-republic-of-china/methods-of-torture-in-the-peoples-republic-of-china.
- Irwin, S.O. (2016). *Digital Media: Human–Technology Connection*. Lanham, MD: Lexington Books.
- Jacobson, K. (2009). 'A developed nature: a phenomenological account of the experience of home'. *Continental Philosophy Review*, 42(3), 355–73.

- Jain, S.S. (1999). 'The prosthetic imagination: enabling and disabling the prosthesis trope'. *Science, Technology, & Human Values*, 24(1), 31–54.
- Janus, A. (2013). 'Soundings: the secret of water and the resonance of the image'. *Senses & Society*, 8(1), 72–84.
- Johnson, J.H. (1995). *Listening in Paris: a Cultural History*. Berkeley, CA: University of California Press.
- Jordan, M.F. (2017). 'Becoming quiet: on mediation, noise cancellation, and commodity quietness'. In T. Markham and S. Rodgers (eds), *Conditions of Mediation: Phenomenological Perspectives on Media*. New York, NY: Peter Lang, 237–247.
- Kane, B. (2012). 'Jean-Luc Nancy and the listening subject'. *Contemporary Music Review*, 31(5–6), 439–447.
- Kane, B. (2016). 'Phenomenology, physiognomy, and the “radio voice”'. *New German Critique*, 43(3 129), 91–112.
- Kate Bush on 6 Music* (2016). BBC Radio 6 Music, 20th November.
- Katz, M. (2010). *Capturing Sound: How Technology has Changed Music*. Revised edition. Berkeley, CA: University of California Press.
- Keller, A. (2016). *Philosophy of Olfactory Perception*. London: Palgrave Macmillan.
- Kendrick, L. (2017). *Theatre Aurality*. London: Palgrave Macmillan.
- Kent, G. and Wahass, S. (1996). 'The content and characteristics of auditory hallucinations in Saudi Arabia and the UK: a cross-cultural comparison'. *Acta Psychiatrica Scandinavica*, 94(6), 433–437.
- Khazan, O. (2019). 'What happens when you always wear headphones'. *Atlantic*, 15th May. theatlantic.com/health/archive/2019/05/what-happens-if-you-always-wear-headphones/589474.

Kim, J. and Gustafson-Pearce, O. (2016). 'Passengers' anxiety about using the London Underground'. *Proceedings of 2016 IEEE International Conference on Intelligent Rail Transportation*, 165–169.

Kim, S.-M. and Choi, W. (2005). 'On the externalization of virtual sound images in headphone reproduction: a Wiener filter approach'. *Journal of the Acoustic Society of America*, 117(6), 3657–3665.

Klein, N. (2007). *The Shock Doctrine: the Rise of Disaster Capitalism*. New York, NY: Metropolitan Books.

Klich, R.N. (2017). 'Amplifying sensory spaces: the in- and out-puts of headphone theatre'. *Contemporary Theatre Review*, 27(3), 366–378.

Klich, R.N. (2019). 'Of unsound mind and body: immersive experience in headphone theater'. In M. Borowski, M. Chaberski, and M. Sugiera (eds), *Emerging Affinities: Possible Futures of Performative Arts*. Bielefeld: transcript, 107–126.

Kracauer, S. (1995 [1963]). *The Mass Ornament: Weimar Essays* (trans. T.Y. Levin). Cambridge, MA: Harvard University Press.

Krueger, J. (2019). 'Music as affective scaffolding'. In R. Herbert, D. Clarke, and E.F. Clarke (eds), *Music and Consciousness 2: Worlds, Practices, Modalities*. Oxford: Oxford University Press, 55–70.

LaBelle, B. (2010). *Acoustic Territories: Sound Culture and Everyday Life*. London: Continuum.

LaBelle, B. (2014). *Lexicon of the Mouth: Poetics and Politics of Voice and the Oral Imaginary*. London: Bloomsbury Academic.

Landes, D.A. (2012). 'Translator's introduction'. In M. Merleau-Ponty, *Phenomenology of Perception* (trans. D.A. Landes). Abingdon: Routledge, xxx–li.

Landes, D.A. (2013). *The Merleau-Ponty Dictionary*. London: Bloomsbury Academic.

Latour, B. (1999). *Pandora's Hope: Essays on the Reality of Science Studies*. Cambridge, MA: Harvard University Press.

Laws, C. (2010). 'Beckett and unheard sound'. In D. Caselli (ed.), *Beckett and Nothing: Trying to Understand Beckett*. Manchester: Manchester University Press, 176–191.

Lawson, C. (2017). *Technology and Isolation*. Cambridge: Cambridge University Press.

Leder, D. (1990). *The Absent Body*. Chicago, IL: University of Chicago Press.

Lederbogen, F., Kirsch, P., Haddad, L., Streit, F., Tost, H., Schuch, P., Wüst, S., Pruessner, J.C., Rietschel, M., Deuschle, M., and Meyer-Lindenberg, A. (2011). 'City living and urban upbringing affect neural social stress processing in humans'. *Nature*, 474(7352), 498–501.

Lefebvre, H. (1991 [1974]). *The Production of Space* (trans. Donald Nicholson-Smith). Oxford: Blackwell.

Lefort, C. (2012 [1974]). 'Maurice Merleau-Ponty'. In M. Merleau-Ponty, *Phenomenology of Perception* (trans. D.A. Landes). Abingdon: Routledge, xvii–xxix.

Levinas, E. (1969 [1961]). *Totality and Infinity: an Essay on Exteriority* (trans. A. Lingis). Pittsburgh, PA: Duquesne University Press.

Levitz, T. (2021). 'The twentieth century'. In T. McAuley, N. Nielsen, and J. Levinson with A. Phillips-Hutton (eds), *The Oxford Handbook of Western Music and Philosophy*. Oxford: Oxford University Press, 225–262.

Lloyd, C. (2016). "'Seventeenth heaven": virtual listening and its discontents'. In S. Whiteley and S. Rambarran (eds), *The Oxford Handbook of Music and Virtuality*. Oxford: Oxford University Press, 17–34.

Lloyd, D.M., Coates, A., Knopp, J., Oram, S., and Rowbotham, S. (2009). 'Don't stand so close to me: the effect of auditory input on interpersonal space'. *Perception*, 38(4), 617–620.

Lochhead, J. (1980). 'Some musical applications of phenomenology'. *Indiana Theory Review*, 3(3), 18–27.

Lokhorst, G.-J.C. and Kaitaro, T.T. (2001). 'The originality of Descartes' theory about the pineal gland'. *Journal of the History of the Neurosciences*, 10(1), 6–18.

Lombard, M. and Ditton, T. (1997). 'At the heart of it all: the concept of presence'. *Journal of Computer-Mediated Communication*, 3(2). doi.org/10.1111/j.1083-6101.1997.tb00072.x.

Luhman, J.T. and Cunliffe, A.L. (2013). *Key Concepts in Organization Theory*. London: SAGE.

Mansour, S., Magnan, J., Ahmad, H.H., Nicolas, K., and Louryan, S. (2019). *Comprehensive and Clinical Anatomy of the Middle Ear*. Second edition. New York, NY: Springer.

Marcel, G. (1949 [1935]). *Being and Having* (trans. K. Farrer). London: Dacre Press.

Marder, M. (2014). *Phenomena—Critique—Logos: the Project of Critical Phenomenology*. Lanham, MD: Rowman and Littlefield International.

Marshall, W. (2014). 'Treble culture'. In S. Gopinath and J. Stanyek (eds), *The Oxford Handbook of Mobile Music Studies, Volume 2*. Oxford: Oxford University Press, 43–76.

Mattens, F. (2009). 'Perception, body, and the sense of touch: phenomenology and philosophy of mind'. *Husserl Studies*, 25(2), 97–120.

Matthen, M. (2015). 'The individuation of the senses'. In M. Matthen (ed.), *The Oxford Handbook of the Philosophy of Perception*. Oxford: Oxford University Press, 567–586.

McCarthy-Jones, S. (2012). *Hearing Voices: the Histories, Causes and Meanings of Auditory Verbal Hallucinations*. Cambridge: Cambridge University Press.

- McCarthy-Jones, S., Krueger, J., Larøi, F., Broome, M., and Fernyhough, C. (2013). 'Stop, look, listen: the need for philosophical phenomenological perspectives on auditory verbal hallucinations'. *Frontiers in Human Neuroscience*, 7(127). doi.org/10.3389/fnhum.2013.00127
- McCoy, A.W. (2006). *A Question of Torture: CIA Interrogation, from the Cold War to the War on Terror*. New York, NY: Metropolitan/Henry Holt.
- Mecklenburger, J. and Groth, T. (2016). 'Wireless technologies and hearing aid connectivity'. In G.R. Popelka, B.C.J. Moore, R.R. Fay, and A.N. Popper (eds), *Hearing Aids*. Cham: Springer, 131–149.
- Merleau-Ponty, M. (1964 [1948]). *Sense and Non-Sense* (trans. H.L. Dreyfus and P.A. Dreyfus). Evanston, IL: Northwestern University Press.
- Merleau-Ponty, M. (1968 [1964]). *The Visible and the Invisible* (trans. A. Lingis). Evanston, IL: Northwestern University Press.
- Merleau-Ponty, M. (1993 [1960]). 'Eye and mind'. In Johnson, G.A. (Ed.), *The Merleau-Ponty Aesthetics Reader: Philosophy and Painting* (trans. M. Smith). Evanston, IL: Northwestern University Press, 121–149.
- Merleau-Ponty, M. (2003 [1995]). *Nature: Course Notes from the Collège de France* (ed. D. Ségald; trans. R. Vallier). Evanston, IL: Northwestern University Press.
- Merleau-Ponty, M. (2012 [1945]). *Phenomenology of Perception* (trans. D.A. Landes). Abingdon: Routledge.
- Meyer, C., Streeck, J., and Jordan, J.S. (2017). 'Introduction'. In C. Meyer, J. Streeck, and J.S. Jordan (eds), *Intercorporeality: Emerging Socialities in Interaction*. Oxford: Oxford University Press, xv–xlix.
- Miller, D. (2005). 'Materiality: an introduction'. In D. Miller (ed.), *Materiality*. Durham, NC: Duke University Press, 1–50.
- Mizrahi, V. (2014). 'Sniff, smell, and stuff'. *Philosophical Studies*, 171(2), 233–250.

- Mol, A. and Law, J. (2004). 'Embodied action, enacted bodies: the example of hypoglycaemia'. *Body & Society*, 10(2–3), 43–62.
- Monacelli, C. (2009). *Self-Preservation in Simultaneous Interpreting: Surviving the Role*. Amsterdam: John Benjamins.
- Montague, E. (2011). 'Phenomenology and the "hard problem" of consciousness and music'. In D. Clarke and E.F. Clarke (eds), *Music and Consciousness: Philosophical, Psychological, and Cultural Perspectives*. Oxford: Oxford University Press, 29–46.
- Moore, A.F., Schmidt, P., and Dockwray, R. (2011). 'A hermeneutics of spatialization for recorded song'. *Twentieth-Century Music*, 6(1), 83–114.
- Moore, J. (1955). 'Canadian psychiatrists develop beneficial brain-washing'. *Weekend Magazine*, 5(40), 6–8.
- Moran, D. (2000). *Introduction to Phenomenology*. Abingdon: Routledge.
- Morris, D. (2004). *The Sense of Space*. Albany, NY: State University of New York Press.
- Myers, M. (2011). 'Vocal landscaping: the theatre of sound in audiowalks'. In L. Kendrick and D. Rosener (eds), *Theatre Noise: the Sound of Performance*. Newcastle upon Tyne: Cambridge Scholars, 70–81.
- Nancy, J.-L. (2007 [2002]). *Listening* (trans. C. Mandell). New York, NY: Fordham University Press.
- National Commission on Terrorist Attacks Upon the United States (2004). *The 9/11 Commission Report*. New York, NY: W.W. Norton & Company. govinfo.library.unt.edu/911/report/911Report.pdf.
- Nayani, T.H. and David, A.S. (1996). 'The auditory hallucination: a phenomenological survey'. *Psychological Medicine*, 26(1), 177–189.

Nazemi, M.M. (2017). 'Soundscapes as therapy: an innovative approach to chronic pain and anxiety management'. Doctoral thesis. Burnaby: Simon Fraser University.

Neumark, N. (2010). 'Doing things with voices: performativity and voice'. In N. Neumark, R. Gibson, and T. van Leeuwen (eds), *VOICE: Vocal Aesthetics in Digital Arts and Media*. Cambridge, MA: MIT Press, 95–118.

Newell, R.L.M. (1999). 'Anatomical spaces: a review'. *Clinical Anatomy*, 12(1), 66–69.

Niklas, S. (2014). *Die Kopfhörerin: Mobiles Musikhören als ästhetische Erfahrung [The Headphonist: Mobile Music Listening as Aesthetic Experience]*. Paderborn: Wilhelm Fink.

Nudds, M. (2009). 'Sounds and space'. In M. Nudds and C. O'Callaghan (eds), *Sounds and Perception: New Philosophical Essays*. Oxford: Oxford University Press, 69–96.

O'Callaghan, C. (2007). *Sounds: a Philosophical Theory*. Oxford: Oxford University Press.

O'Shaughnessy, B. (2009). 'The location of a perceived sound'. In M. Nudds and C. O'Callaghan (eds), *Sounds and Perception: New Philosophical Essays*. Oxford: Oxford University Press, 111–125.

Otterman, M. (2007). *American Torture: From the Cold War to Abu Ghraib and Beyond*. Carlton: Melbourne University Press.

Ouzounian, G. (2006). 'Embodied sound: aural architectures and the body'. *Contemporary Music Review*, 25(1–2), 69–79.

Ouzounian, G. (2008). 'Sound art and spatial practices: situating sound installation art since 1958'. Doctoral thesis. San Diego, CA: University of California, San Diego.

Ouzounian, G. (2013). 'Sound installation art: from spatial poetics to politics, aesthetics to ethics'. In G. Born (ed.), *Music, Sound and Space: Transformations of Public and Private Experience*. Cambridge: Cambridge University Press, 73–89.

Ouzounian, G. (2021). *Stereophonica: Sound and Space in Science, Technology, and the Arts*. Cambridge, MA: MIT Press.

Paddison, M. (2021). 'Meaning and autonomy'. In T. McAuley, N. Nielsen, and J. Levinson with A. Phillips-Hutton (eds), *The Oxford Handbook of Western Music and Philosophy*. Oxford: Oxford University Press, 763–783.

Pereira de Sá, S. (2011). 'Mobility and sound mediation in the urban space'. *Revista E-Compós*, 14(2). e-compos.org.br/e-compos/article/view/666/535.

Petralia, P.S. (2010). 'Headspace: architectural space in the brain'. *Contemporary Theatre Review*, 20(1), 96–108.

Pieslak, J. (2009). *Sound Targets: American Soldiers and Music in the Iraq War*. Bloomington, IN: Indiana University Press.

Pike, A. (1970). *A Phenomenological Analysis of Musical Experience and Other Related Essays*. New York, NY: St. John's University Press.

Pillar, P.R. (2014). 'Asymmetric warfare in Gaza'. *National Interest*, 12th July. nationalinterest.org/blog/paul-pillar/asymmetric-warfare-gaza-10869.

Plenge, G. (1972). 'Über das Problem der Im-Kopf-Localisation' ['On the problem of in-head localization']. *Acustica*, 26(5), 241–252.

Polt, R. (2005). 'Ereignis'. In H.L. Dreyfus and M.A. Wrathall (eds), *A Companion to Heidegger*. Oxford: Blackwell, 375–391.

Popescu, P. (2016 [1991]). *The Encounter: Amazon Beaming*. London: Pushkin Press.

Prior, N. (2014). 'The plural iPod: a study of technology in action'. *Poetics*, 42(1), 22–39.

Prior, N. (2018). 'On vocal assemblages: from Edison to Miku'. *Contemporary Music Review*, 37(5–6), 488–506.

Pritzker, S. (2007). 'Thinking hearts, feeling brains: metaphor, culture, and the self in Chinese narratives of depression'. *Metaphor and Symbol*, 22(3), 251–274.

Pulkki, V. and Karjalainen, M. (2015). *Communication Acoustics: an Introduction to Speech, Audio and Psychoacoustics*. Chichester: Wiley.

Rath, A. (2012). 'In 9/11 trial, a struggle for control'. *PBS Frontline*, 7th May. pbs.org/wgbh/frontline/article/in-911-trial-a-struggle-for-control.

Rejali, D. (2007). *Torture and Democracy*. Princeton, NJ: Princeton University Press.

Rice, T. (2013). 'Broadcasting the body: the "private" made "public" in hospital soundscapes. In G. Born (ed.), *Music, Sound and Space: Transformations of Public and Private Experience*. Cambridge: Cambridge University Press, 169–185.

Rice, T. (2015). 'Listening'. In D. Novak and M. Sakakeeny (eds), *Keywords in Sound*. Durham, NC: Duke University Press, 99–111.

Richardson, L. (2013). 'Sniffing and smelling'. *Philosophical Studies*, 162(2), 401–419.

Ritchie, J.B. and Carruthers, P. (2015). 'The bodily senses'. In M. Matthen (ed.), *The Oxford Handbook of the Philosophy of Perception*. Oxford: Oxford University Press, 353–370.

Rodgers, T. (2016). 'Toward a feminist epistemology of sound: refiguring waves in audio-technical discourse'. In M.C. Rawlinson (ed.), *Engaging the World: Thinking after Irigaray*. Albany, NY: State University of New York Press, 195–213.

Roginska, A. (2018). 'Binaural audio through headphones'. In A. Roginska and P. Geluso (eds), *Immersive Sound: the Art and Science of Binaural and Multi-Channel Audio*. Abingdon: Routledge, 88–123.

Romdenh-Romluc, K. (2011). *Routledge Philosophy Guidebook to Merleau-Ponty and 'Phenomenology of Perception'*. Abingdon: Routledge.

Romdenh-Romluc, K. (2012). 'Maurice Merleau-Ponty'. In S. Luft and S. Overgaard (eds), *The Routledge Companion to Phenomenology*. Abingdon: Routledge, 103–112.

Romdenh-Romluc, K. (2013). 'Habit and attention'. In R.T. Jensen and D. Moran (eds), *The Phenomenology of Embodied Subjectivity*. Cham: Springer, 3–19.

Romdenh-Romluc, K. (2018). 'Science in Merleau-Ponty's phenomenology: from the early work to the later philosophy'. In D. Zahavi (ed.), *The Oxford Handbook of the History of Phenomenology*. Oxford: Oxford University Press, 340–359.

Roquet, P. (2021). 'Acoustics of the one person space: headphone listening, detachable ambience, and the binaural history of VR'. *Sound Studies*, 7(1), 42–63.

Rosenberger, R. and Verbeek, P.-P. (2015). 'A field guide to postphenomenology'. In R. Rosenberger and P.-P. Verbeek (eds), *Postphenomenological Investigations: Essays on Human–Technology Relations*. Lanham, MD: Lexington Books, 9–41.

Ryle, G. (2009 [1949]). *The Concept of Mind*. Abingdon: Routledge.

Salisbury, L. (2010). "“Something or nothing”: Beckett and the matter of language'. In D. Caselli (ed.), *Beckett and Nothing: Trying to Understand Beckett*. Manchester: Manchester University Press, 213–236.

Sartre, J.-P. (2003 [1943]). *Being and Nothingness: an Essay in Phenomenological Ontology* (trans. H.E. Barnes). Abingdon: Routledge.

Scarry, E. (1985). *The Body in Pain: the Making and Unmaking of the World*. Oxford: Oxford University Press.

Scarry, E. (1994). 'The merging of bodies and artifacts in the social contract'. In G. Bender and T. Druckrey (eds), *Culture on the Brink: Ideologies of Technology*. Seattle, WA: Bay Press, 85–97.

Schäfer, K. and Eerola, T. (2020). 'How listening to music and engagement with other media provide a sense of belonging: an exploratory study of social surrogacy'. *Psychology of Music*, 48(2), 232–251.

- Schäfer, K., Saarikallio, S. and Eerola, T. (2020). 'Music may reduce loneliness and act as social surrogate for a friend: evidence from an experimental listening study'. *Music & Science*, 3. doi.org/10.1177/2059204320935709.
- Schafer, R.M. (1994 [1977]). *The Soundscape: Our Sonic Environment and the Tuning of the World*. Rochester, VT: Destiny Books.
- Schnupp, J., Nelken, I., and King, A. (2011). *Auditory Neuroscience: Making Sense of Sound*. Cambridge, MA: MIT Press.
- Schönhammer, R. (1988). *Der ›Walkman‹: Eine phänomenologische Untersuchung [The 'Walkman': a Phenomenological Investigation]*. Munich: P. Kirchheim.
- Schönhammer, R. (1989). 'The Walkman and the primary world of the senses'. *Phenomenology + Pedagogy*, 7, 127–44.
- Schrimshaw, W. (2015). 'Exit immersion'. *Sound Studies*, 1(1), 155–170.
- Schrimshaw, W. (2017). *Immanence and Immersion: on the Acoustic Condition in Contemporary Art*. London: Bloomsbury Academic.
- Schutz, A. (1976). 'Fragments on the phenomenology of music'. *Music and Man*, 2(1-2), 5–71.
- Schütze, S. with Irwin-Schütze, A. (2018). *New Realities in Audio: a Practical Guide for VR, AR, MR, and 360 Video*. Boca Raton, FL: CRC Press.
- Serres, M. (2008 [1985]). *The Five Senses: a Philosophy of Mingled Bodies (I)* (trans. M. Sankey and P. Cowley). London: Continuum.
- Simmel, G. (1950 [1903]). 'The metropolis and mental life'. In K.H. Wolff (ed.), *The Sociology of Georg Simmel*. Glencoe, IL: The Free Press, 409–424.
- Simun, M. (2009). 'My music, my world: using the MP3 player to shape experience in London'. *New Media & Society*, 11(6), 921–941.

- Siu, R.C. (2016). 'Rethinking the body and space in Alfred Schutz's phenomenology of music'. *Human Studies*, 39, 533–546.
- Skånland, M.S. (2011). 'Use of MP3 players as a coping resource'. *Music & Arts in Action*, 3(2), 15–33.
- Sloboda, J., Lamont, A., and Greasley, A. (2009). 'Choosing to hear music: motivation, process, and effect'. In S. Hallam, I. Cross, and M. Thaut (eds), *The Oxford Handbook of Music Psychology*. Oxford: Oxford University Press, 431–440.
- Smalley, D. (2007). 'Space-form and the acousmatic image'. *Organised Sound*, 12(1), 35–58.
- Smith, F.J. (1979). *The Experiencing of Musical Sound: Prelude to a Phenomenology of Music*. New York, NY: Gordon and Breach.
- Spinelli, M. and Dann, L. (2019). *Podcasting: the Audio Media Revolution*. London: Bloomsbury Academic.
- Stankievecch, C. (2007). 'From stethoscopes to headphones: an acoustic spatialization of subjectivity'. *Leonardo Music Journal*, 17, 55–59.
- Stanyek, J. and Piekut, B. (2010). 'Deadness: technologies of the intermundane'. *The Drama Review*, 54(1), 14–38.
- Starling, M. (1996). 'Aural reproduction devices'. In Whitaker, J.C. (Ed.), *The Electronics Handbook*. Boca Raton, FL: CRC Press, 230–247.
- Steinbock, A.J. (1995). *Home and Beyond: Generative Phenomenology after Husserl*. Evanston, IL: Northwestern University Press.
- Sterne, J. (2003). *The Audible Past: Cultural Origins of Sound Reproduction*. Durham, NC: Duke University Press.
- Sterne, J. (2015). 'Hearing'. In D. Novak and M. Sakakeeny (eds), *Keywords in Sound*. Durham, NC: Duke University Press, 65–77.

- Stewart, G.W. (1918). 'Binaural beats'. *Psychological Monographs*, 25(2), 31–46.
- Stockfelt, O. (2004). 'Adequate modes of listening' (trans. A. Kassabian and L.G. Svendsen). In D. Schwarz, A. Kassabian, and L. Siegel (eds), *Keeping Score: Music, Disciplinarity, Culture*. Charlottesville, VA: University Press of Virginia, 129–146.
- Stockwell, R.A. (1999). "“Macavity’s not there!”: reflections on R.L.M. Newell: anatomical spaces'. *Clinical Anatomy*, 12(1), 70–71.
- Stras, L. (2006). 'The organ of the soul: voice, damage, and affect'. In N. Lerner and J.N. Straus (eds), *Sounding Off: Theorizing Disability in Music*. Abingdon: Routledge, 173–184.
- Tajadura-Jiménez, A., Pantelidou, G., Rebacz, P., Västfjäll, D., and Tsakiris, M. (2011). 'I-space: the effects of emotional valence and source of music on interpersonal distance'. *PLoS ONE*, 6(10). doi.org/10.1371/journal.pone.0026083.
- Tallis, R. (2008). *The Kingdom of Infinite Space: a Fantastical Journey around Your Head*. London: Atlantic Books.
- Temple-Raston, D. (2012). '9/11 hearing disrupted, delayed and finally deferred'. Radio broadcast on WBUR News, 5th May. Transcript online: wbur.org/npr/152100912/delays-and-disarray-at-9-11-case-arraignment.
- Thibaud, J.-P. (1992). 'Le baladeur dans l'espace public urbain: essai sur l'instrumentation sensorielle de l'interaction sociale' ['The Walkman in urban public space: an essay on the sensory instrumentation of social interaction']. Doctoral thesis. Grenoble: Université Pierre Mendès-France.
- Thibaud, J.-P. (2003). 'The sonic composition of the city'. In M. Bull and L. Back (eds), *The Auditory Culture Reader*. Oxford: Berg, 329–341.
- Thomaidis, K. (2017). *Theatre & Voice*. London: Palgrave Macmillan.
- Thomaidis, K. and Butcher, S. (2016). "“The voice is the guide to the experience as well as the experience itself”: an interview with non zero one'. *Journal of Interdisciplinary Voice Studies*, 1(1), 71–84.

Thompson, S.P. (1877). 'On binaural audition'. *London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science* (Series 5), 4(25), 274–276.

Thompson, S.P. (1878). 'Phenomena of binaural audition—part II'. *London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science* (Series 5), 6(38), 383–391.

Tiainen, M. (2015). 'Revisiting the voice in media and as medium: new materialist propositions'. In B. Herzogenrath (ed.), *Media Matter: the Materiality of Media, Matter as Medium*. London: Bloomsbury Academic, 251–275.

Trotta, F. (2020). *Annoying Music in Everyday Life*. London: Bloomsbury Academic.

Tuhus-Dubrow, R. (2017). *Personal Stereo*. London: Bloomsbury Academic.

Turkle, S. (2017). *Alone Together: Why We Expect More from Technology and Less from Each Other*. Third edition. New York, NY: Basic Books.

Tyler, W.J. (2011). 'Noninvasive neuromodulation with ultrasound? A continuum mechanics hypothesis'. *Neuroscientist*, 17(1), 25–36.

Uexküll, J. von (2010 [1934/1940]). *A Foray into the Worlds of Animals and Humans, with A Theory of Meaning* (trans. J.D. O'Neil). Minneapolis, MN: University of Minnesota Press.

van Drie, M. (2015). 'Hearing through the théâtrophone: socially constructed spaces and embodied listening in late nineteenth-century French theatre'. *SoundEffects*, 5(1), 74–90.

Varela, F.J. and Shear, J. (1999). 'First-person methodologies: what, why, how?'. *Journal of Consciousness Studies*, 6(2–3), 1–14.

Verbeek, P.-P. (2005). *What Things Do: Philosophical Reflections on Technology, Agency, and Design*. University Park, PA: Pennsylvania State University Press.

- Verbeek, P.-P. (2008). 'Cyborg intentionality: rethinking the phenomenology of human–technology relations'. *Phenomenology and the Cognitive Sciences*, 7(3), 387–395.
- Wake, C. (2013). 'Headphone verbatim theatre: methods, histories, genres, theories'. *New Theatre Quarterly*, 29(4), 321–335.
- Wake, C. (2014). 'The politics and poetics of listening: attending headphone verbatim theatre in post-Cronulla Australia'. *Theatre Research International*, 39(2), 82–100.
- Wareham, K.H. (2017). 'Personal music consumption by young people facing homelessness'. Master's thesis. Sheffield: University of Sheffield.
- Warren, J.R. (2014). *Music and Ethical Responsibility*. Oxford: Oxford University Press.
- Waters, S. (2000). 'Beyond the acousmatic: hybrid tendencies in electroacoustic music'. In S. Emmerson (ed.), *Music, Electronic Media and Culture*. Aldershot: Ashgate, 56–83.
- Watson, A. and Drakeford-Allen, D. (2016). "'Tuning out" or "tuning in"? Mobile music listening and intensified encounters with the city'. *International Journal of Urban and Regional Research*, 40(5), 1036–1043.
- Weber, H. (2010). 'Head cocoons: a sensori-social history of earphone use in West Germany, 1950–2010'. *Senses & Society*, 5(3), 339–63.
- Weheliye, A.G. (2002). "'Feenin": posthuman voices in contemporary black popular music'. *Social Text*, 20(2), 21–47.
- Wehrle, M. (2020). 'Being a body and having a body: the twofold temporality of embodied intentionality'. *Phenomenology and the Cognitive Sciences*, 19(3), 499–521.
- Weiss, G. (1999). *Body Images: Embodiment as Intercorporeality*. New York, NY: Routledge.

- Wenzel, E.M., Begault, D.R., and Godfroy-Cooper, M. (2018). 'Perception of spatial sound'. In A. Roginska and P. Geluso (eds), *Immersive Sound: the Art and Science of Binaural and Multi-Channel Audio*. Abingdon: Routledge, 5–39.
- West, S. (2010). *Say It: the Performative Voice in the Dramatic Works of Samuel Beckett*. Amsterdam: Rodopi.
- Westphal, J. (2016). *The Mind–Body Problem*. Cambridge, MA: MIT Press.
- Whitney, T. (2013). 'Spaces of the ear: literature, media, and the science of sound 1870–1930'. Doctoral thesis. New York, NY: Columbia University.
- Wigley, M. (1991). 'Prosthetic theory: the disciplining of architecture'. *Assemblage*, 15, 6–29.
- Wilson, R.R. (1995). 'Cyber(body)parts: prosthetic consciousness'. *Body & Society*, 1(3–4), 239–259.
- Wittkower, D.E. (2011). 'A preliminary phenomenology of the audiobook'. In M. Rubery (ed.), *Audiobooks, Literature, and Sound Studies*. Abingdon: Routledge, 216–231.
- Yow, V.R. (2005). *Recording Oral History: a Guide for the Humanities and Social Sciences*. Second edition. Walnut Creek, CA: AltaMira Press.
- Zhu, W. (2020). 'Bodies in Samuel Beckett's theatre from the perspective of Alberto Giacometti's sculptures'. *Journal for Literary and Intermedial Crossings*, 5(1), e1–e31.
- Zuckerandl, V. (1956). *Sound and Symbol: Music and the External World* (trans. W.R. Trask). Princeton, NJ: Princeton University Press.