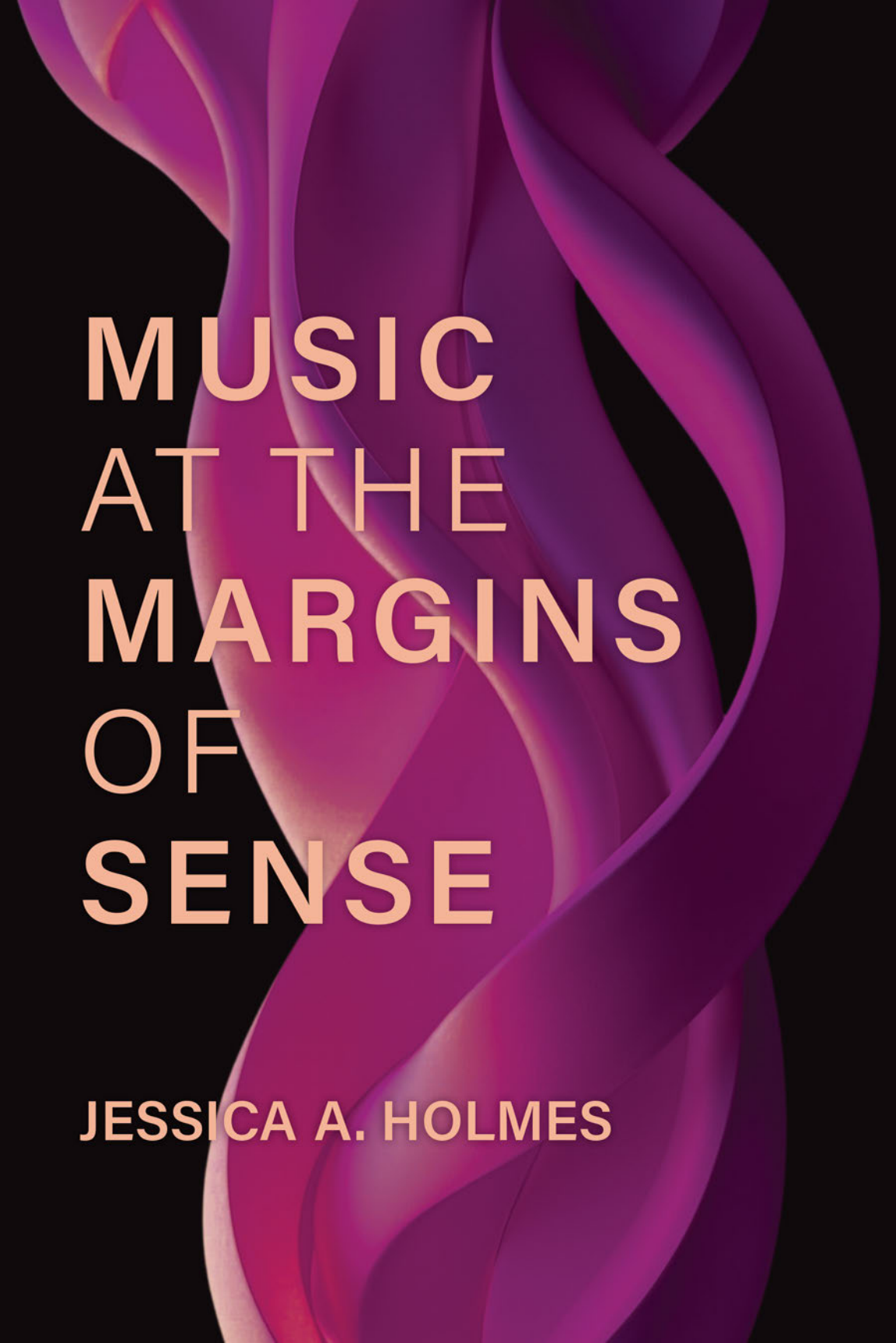

MUSIC
AT THE
MARGINS
OF
SENSE
JESSICA A. HOLMES

Music at the Margins of Sense

MUSIC AND SOCIAL JUSTICE

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Music at the Margins of Sense

Jessica A. Holmes

University of Michigan Press
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This book is dedicated to the memory of Jonathan Sterne (1970–2025), my PhD co-supervisor, my mentor, my role model, my friend.

Jonathan was the absolute best and rarest of our kind, a brilliant, visionary thinker and towering figure of tremendous import, but without any ego or airs about him.

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One

From the Figure of Deafness to Expert Listening

My ear amps whistle like they are singing
to Echo, goddess of noise,
the raveled knot of tongues,
of blaring birds, consonant crumbs
of dull doorbells, sounds swamped
in my misty hearing aid tubes.
Gaudí believed in holy sound
and built a cathedral to contain it,
pulling hearing men from their knees
as though atheism is a kind of deafness.
Who would turn down God?
Even though I have not heard
the golden decibels of angels,
I have been living in a noiseless
palace where the doorbell is pulsating
light and I am able to answer.
—Raymond Antrobus, "I. Echo," from "Echo (a Deaf Sequence)"[1]

Contemporary award-winning British Jamaican poet Raymond Antrobus explains that the five poems in "Echo (a Deaf Sequence)" (2017) were envisioned as individual sonnets "leaning on the idea that sonnets are intimate 'little sounds'" that ought to be sung, and that a poem's ideas are best expressed in noise. He explains that while he couldn't sing the sounds of his sonnets in his voice—that they "felt stiff in my mouth"—he "wrote them out plainly" and in so doing "carved my own shape and rhythm," giving himself permission "to make my own noise" in the process.[2] To that end, "Echo" was inspired by his visit to Antoni Gaudí's iconic basilica La Sagrada Família (the

Church of the Holy Family) in Barcelona, Spain, and his engagement with the space vis-à-vis an audio guide:

> If you listen to the audio guide, you will be led to parts of the church where you are directed to stand under the rather unorthodox shaped roof and shout/sing. You're then instructed to listen to how that sound moves and to identify it as something divine, to experience the sound the way an angel would. The fact I could only experience this sound artificially (with hearing aids) made me wonder if my experience was less divine. I pondered this for a few years before finding a way to write what has become "Echo." I thought about Rilke, whose *Duino Elegies* open on a kind of pleading: "Who, if I cried out would hear me among the hierarchy of angels." I also thought of Philip Larkin's poem "Church Going," where the church is described as a "tense, musty, unignorable silence." Both Rilke and Larkin enter a kind of "serious house on a serious earth" and challenge/question the assumed authority of the space.[3]

"Echo" and Antrobus's account of his inspiration magnify several prevailing misconceptions about deafness while interrogating the "assumed authority" of normative hearing in structuring perceptions of sound and music. Antrobus begins by describing the whistling sound of his hearing aids, high-frequency acoustic feedback resulting from sound entering the microphone, coming back through the speaker, and cycling back into the microphone again, a familiar experience to many hearing aid users and often audible to those standing within earshot. In this instance, the feedback is triggered by the sound of Antrobus's voice as it echoes under the roof of the church nave with its towering columns, mixing with fragments of reverberating ambient noise. The poet tries to make sense of this cacophonous incoherence in light of the promised "holy sound" visitors are meant to experience through activating and engaging with the magnificent acoustics of Gaudí's imposing sanctuary, a space in which Antrobus suggests atheism seems akin "to a kind of deafness" and vice versa. Here the poet alludes to the prevailing characterizations of sensory disability in the Bible, where deafness and blindness symbolize pitiable lack, deficit, loss, ignorance, spiritual un-enlightenment, eternal damnation even. By that same logic, hearing and *seeing* are understood as analogous metaphors for an epiphany, a spiritual awakening, redemption, and wholeness, as in the words of Isaiah, "Then the eyes of the blind will be opened, and the ears of the deaf will be unstopped" (Isaiah 35:5).[4] To *hear* while standing under the roof of Gaudí's basilica, then, is to "experience the

sound the way an angel would," as Antrobus writes, to experience the call of the divine, "pulling hearing men from their knees." Grappling with the question of whether his *deaf* hearing is any less divine by these standards, Antrobus ultimately describes the whistling of his "ear amps" and "misty hearing aid tubes" in musical terms, "like they are *singing* to Echo, goddess of noise," defiantly bestowing his experience with its own kind of musical and sacred significance. At the same time, he dares to "*turn down* God," a line pointing both to the atheist's disbelief in God, and to Antrobus's ability to ultimately turn down (the volume of) his hearing aids at his discretion. The final stanza of the poem makes clear that while he may not hear the "golden decibels of angels" in the precise way Gaudí intended, he also has access to "a noiseless palace" away from Gaudí's cacophonous sanctuary, a place "where the doorbell is *pulsating light*," a sound he perceives through visual, tactile, and rhythmic cues.[5] In the audio recording of the poem read by Antrobus, he emphasizes the "able" in the concluding line: "and I am *able* to answer" when referring to the doorbell's ring.

The poems in "A Deaf Sequence" offer an intimate account of the cultural prestige of sound and the normative terms and conditions of hearing. In the process of confronting the implicit role of sound in different physical spaces and cultural ideologies, Antrobus rejects deficit constructions of deafness and the corresponding false idealization of a kind of "normal," "natural," unmarked hearing to the exclusion of a more multifaceted sense of hearing. Through his words on the page, the poet constructs a dynamic soundscape wherein sound is a multisensory phenomenon that blurs straightforward divisions between "hearing" and "hearing loss," one experienced along an embodied continuum spanning auditory, visual, tactile, spatial, and rhythmic perception simultaneously. He makes clear that sensory perception is materially interdependent with technology, space, and the built environment, calling any "normal," unmediated sense of hearing into question. He challenges hierarchized conceptions of sound and music, such as Gaudí's belief in a *holy* sound and the "golden decibels of angels." In the process, he likens the raveled, blaring, consonant, dull, swamped, misty sound of his hearing aid tubes and the sounds he *voices* in and through his writing to *singing*, casting them as viable forms of musical expression.

Music at the Margins of Sense

By offering an expansive account of sensory experience, deaf subjectivity, and musicianship that resists sensory norms and hierarchies, Antrobus's "Echo" resonates with the fundamental spirit and aims of this book. *Music at the*

Margins of Sense contests the prevailing misconceptions associated with deafness *and with hearing* in the Western musical imaginary through the creative endeavors of musicians from across the diverse audiological and sociocultural spectrum of hearing loss, that is, what Mara Mills aptly terms "deafnesses" *in the plural*.[6] In so doing, the book ultimately imparts a multisensory, multimodal conception of musicianship unbounded by institutionalized conceptions of musical authority and skill, idealized sensory types, and strict ontological definitions of music that I simply call "expert listening." I offer expert listening as an analytical framework and musical value system that embraces diverse articulations of bodily autonomy, multisensory interdependence, perceptual agency, and musical self-determination as the foundation for inclusive musical world-building.

My notion of a shared musical imaginary is rooted in Charles Taylor's concept of a social imaginary typified by the values, ideals, norms, principles, and ideologies within a given society as expressed in the "implicit grasp" and "background understanding" of that social space, and the "common repertory" of images, notions, stories, legends, and expectations underlying the social order.[7] Taylor explains further that a social imaginary is "that largely unstructured and inarticulate understanding of our whole situation, within which particular features of our world show up for us in the sense that they have. It can never be adequately expressed in the form of explicit doctrines because of its unlimited and indefinite nature."[8] Where deafness is concerned, I understand the Western musical imaginary as comprising an unstructured and mostly implicit discourse on deafness that encompasses diverse historic and contemporary musical representations, whether in the music itself, in different forms of writing about music, or in audiovisual media like music video, film, television, and social media. Together, these sources form a common repertory of images, narratives, and notions that implicitly reflect and shape musical and cultural attitudes toward deafness and hearing by extension, and ultimately, the norms, expectations, and ideals governing our shared musical order.

To that end, the book tells of our musical idealization of hearing, our preoccupation with the extreme margins of sensory experience, the tacit, yet heretofore unacknowledged centrality of "deafness" within this imaginary, and the prevailing misconceptions resulting from this discourse. What I call the "figure of deafness" is a recurring trope in the Western musical imaginary through which deafness is mistakenly idealized as an extreme physiological state beneath and beyond the threshold of human audition, the antithetical foil to the musical primacy of hearing. Historically, this has meant mistak-

enly conceptualizing deafness as a state of *absolute auditory silence*, a totalizing form of auditory deprivation precluding musical perception, and an implicit and corresponding mistaken understanding of hearing as perfect, unmediated, and singular. This myth is foundational to the enduring mystique of Beethoven's musical genius. It also undergirds twentieth-century experimental composers John Cage's and R. Murray Schafer's writings on silence, wherein they invoke the figure of deafness to hypothesize about the presumed absence of hearing and sound, a state antithetical to an idealized listening subject newly attuned to the musicality of ambient sound or "silence." The figure of deafness is likewise alive and well in current moral panic around the increasing ubiquity of noise-induced hearing loss. In recent years, the figure of deafness has acquired new cultural potency through popular reporting on cortical plasticity in cases of sensory deprivation, the assumption being that deafness automatically bestows inborn *heightened tactile sensation* in the absence of hearing, what is framed as an innate one-to-one compensatory mechanism of the deaf brain readily attuned to music. Imagined as total auditory silence and heightened tactile sensation, the figure of deafness is likewise central to the fetishization of "deafening" volumes in the live performance of metal, noise, and electronic dance music. It has led to the creation of vibrotactile vests promising to enhance deaf musical perception, just as it informs the sensationalism among hearing viewers around the viral circulation of video recordings of live sign language interpretation at big ticket music events like the Super Bowl and Coachella. I argue that the figure of deafness is invoked in these and other cultural contexts to newly understand the extreme margins of sensory and musical experience in ways that center and affirm hearing, while obscuring the diversity of deaf sensory experience and subjectivity, as well as the heterogeneity of hearing, foreclosing more diverse ways of being and musicking in the process.

By shedding new light on the formative and antithetical role of "deafness" in prevailing conceptions of music perception and listening expertise, *Music at the Margins of Sense* reveals some of the ways Western music discourse participates in the cultural supremacy of hearing over deafness, what deaf studies scholars call *audism*, a term coined by Tom Humphries in 1975. H-Dirksen L. Bauman supplies three "faces" or "sites" of audism: "1. the notion that one is superior based on one's ability to hear," "2. a system of advantage based on hearing ability," and "3. a metaphysical orientation that links human identity with speech," that is, phonocentricism.[9] Accordingly, my book challenges the long-standing associations of deafness with silence and an inability to perceive sound and music, rather emphasizing

the multisensory, multimodal contours of musical perception and creation. In so doing, it rejects an exclusively auditory construction of music and the overdetermined role of the ear in prevailing discourse on musical talent, just as it problematizes overblown narratives about the miraculous ways deaf people *feel* music through a heightened sense of touch automatically born in the absence of hearing.[10]

As part of these efforts, *Music at the Margins of Sense* also challenges any fixed, stable sense of *normal*, *natural* hearing by paying attention to the discontinuous, irregular, evolving, varied, and highly mediated nature of human audition and its creative impact on musical experience. As John Drever and Andrew Hugill observe, musicology is "a field dominated by auraltypical thinking," "underpinned by a set of normative assumptions that ignore differences in hearing," where there is "no discussion of what it means to 'hear'" outside of a normative framework.[11] This is especially staggering given the widely documented prevalence of noise-induced hearing loss and auditory perceptual disorders such as tinnitus and hyperacusis among musicians. As I reveal in chapters 4 and 5, auditory normalcy is built on two overlapping naturalized constructs that are often regarded as one and the same and used synonymously in everyday parlance, despite carrying distinct meanings: The first is the audiometric category of "normal" hearing as it is defined in relationship to decibel levels, frequency thresholds, the perception of human speech, and audiometric zero. The second is the concept of "natural" hearing, loosely understood as both (1) the nonlinear perceptual process by which soundwaves enter and activate the outer, middle, and inner ear (called the cochlea), before being transmitted to the auditory cortex for processing, and (2) the presumed unadulterated acoustic sound quality resulting from that perceptual process, a quality that turns on long-standing questions of *fidelity*. In these ways, auditory normalcy and naturalness are subsumed and consolidated under the encompassing rubric of "normal hearing," where they are treated as a single, stable, unmarked category. The book thus unpacks, disentangles, and denaturalizes these concepts, treating them not as fixed, objective audiometric categories, but as dynamic terms in the larger sociocultural production of auditory normalcy and the presumed baseline for musical understanding, talent, and expertise. In particular, the emphasis on "natural" hearing in the design, manufacturing, branding, and musical programming of digital hearing aids and the sensationalism around their increasingly AI-driven automation lay bare the constructedness of auditory normalcy.

The very question of how to define so-called audiometric zero—that is, zero-decibel sound pressure level (0 dB SPL), the point marking *not* a lack

of sound, but the *threshold of (normal) human audibility* against which hearing loss is measured on an audiometer and plotted on an audiogram—has been widely debated and subject to ongoing revision, harmonization, and universal standardization since the inception of audiometry.[12] Otological normalcy rests on Normal Equal-Loudness Contours, a set of standards defined in ISO 226 (i.e., International Organization for Standardization, 2023), which plot out normal hearing sensitivity (i.e., perceived loudness levels) to pure tones of different frequencies (measured in Hz) at different sound pressure levels (measured in dB SPL).[13] The data for these standards are derived from test subjects aged eighteen to twenty-five, deliberately "selected to exclude the developmental stage of hearing and age-related hearing loss," a relatively narrow age bracket "and small subset to stand in for human auditory perception."[14] Not only are these curves severely demographically constrained, but there exist infinite variations in human ear anatomy—from the size of the external canal to the cochlea—that directly impact the auditory perception of sound that these standards fail to capture, such that "the concept of an immutable standard of 'normal hearing' has substantial flaws," as David M. Baguley explains.[15] Moreover, hearing aids and cochlear implants reroute, reorganize, and reshape the perceptual contours of hearing in diverse ways that contest any objective sense of what "natural," unadulterated, "acoustic" hearing is, both in terms of the processes and pathways of auditory perception and in terms of sound quality, as I discuss at length in chapter 4.

Suffice it to say that the general global increase in human lifespan and the natural processes of hearing deterioration associated with aging, the increasing prevalence of noise-induced hearing loss, and the use of auditory assistive devices, among other factors, arguably make "the boundary between deafness and hearing . . . impossible to pinpoint," as Mills explains.[16] Indeed, I reveal that "hearing" and "deafness" are by no means static, mutually exclusive, or opposing audiometric categories, but highly variable experiences that converge and conflict in unexpected ways that profoundly shape musical experience. One of the book's objects of contestation, then, is what Christopher Krentz calls "the hearing line," an "invisible boundary separating deaf and hearing people" rooted in essentialist notions of difference and normalcy:

> [The hearing line] serves as a recalcitrant reminder of the consequence of corporeal variation to who we are. At the same time, its significance is always socially inflected, varying with historical moment, culture, discourse, and context. As soon as it appears explicit, the hearing line fades; as soon as it appears not to exist, it inevitably reemerges. It must

> perpetually be retested and reimagined. Endlessly elusive, the hearing line reveals a complex and shifting relationship between physical difference, cultural fabrication, and identity.[17]

Riffing off Krentz, this book explores how the hearing line manifests in music discourse, how it is inflected, retested, and reimagined through the figure of deafness, and what it reveals about physical difference, identity, and the cultural production of certain naturalized musical ideals.

Our shared musical imaginary and the implicit role of deafness therein—that is, the figure of deafness—function alongside what Anabel Maler has persuasively argued is a long-standing epistemic exclusion of deaf musical knowledge from dominant music discourse, one that is so normalized and unmarked as to escape notice. This is a tradition that she reveals originated in conflicts between manualist and oralist pedagogies in nineteenth-century America, and one that persists into the twenty-first century. Drawing on Miranda Fricker's and Gaile Pohlhaus Jr.'s typologies, Maler argues that three forms of epistemic injustice have structured musical thought around deafness: *testimonial injustice*, whereby "someone is wronged in their capacity as giver of knowledge," resulting from a social deflation of the speaker's credibility; *hermeneutical injustice*, whereby "someone is wronged in their capacity as a subject of social understanding," resulting from a "gap in our collective epistemic resources" and shared "pool of knowledge" (Fricker); and what Pohlhaus terms *contributory injustice*, whereby dominant knowers practice a "willful hermeneutical ignorance" toward those marginalized knowers who "actively resist epistemic domination."[18] Maler argues that "music scholarship is a social system" with shared epistemic resources wherein "there is no such thing as an isolated 'knower.'"[19] If we fail to expand and develop our shared corpus of musical epistemic resources in order to account for and embrace deaf ways of being and knowing, we risk perpetuating these long-standing injustices, while severely limiting our own understanding of music and all that it entails.

Music at the Margins of Sense ultimately aims to rectify these epistemic exclusions through analyzing the creative endeavors of musicians from audiological backgrounds and sociocultural subject positions historically excluded from dominant systems of musical thought, diversifying musicological conceptions of "deafness" and "hearing," and music and musical expertise in the process. In order of appearance, the musicians featured in the pages of this book are Christine Sun Kim, a Berlin-based, American-born sound artist and composer; Troi Lee MBE (Member of the British Empire), DJ

and founder of the UK electronic dance music collective Deaf Rave; Dame Evelyn Glennie, Scottish-born world-leading solo percussionist; Jon Ehlers, percussionist and keyboardist of the New York City noise rock duo Bangladeafy; Lotte Rømer, Danish rock singer and chairperson of the Copenhagen branch of the Danish Association of the Hard of Hearing; Stephen Harrison, British composer, tinnitus patient advocate, and founder of Tinnitus Works; and Monica Germino, Dutch-based contemporary classical violinist. These musicians were selected because of their relative visibility as artists on the vanguard of contemporary musical practice, combined with their expressly identifying as deaf, as hard of hearing, or as having some firsthand relationship to the general category of "hearing loss" to the extent that these lived experiences shape their creative practice and reception in profound ways.

While much ink has been spilled about many of these musicians, whether in the popular press or among academics—especially Kim and Glennie—they remain conspicuously absent from prevailing musicological accounts of sensory experience. From genres like sound art, to classical percussion, to electronic dance music, to metal and noise music, to musical disciplines like instrument design and composition, the musicians featured in the pages of this book have secured their place in an artistic realm historically suspicious of and inhospitable toward hearing loss. In the process, they combat ingrained misconceptions, stigma, and bias, while pushing musical boundaries and championing fresh creative perspectives. Indeed, as Susan Wendell writes,

> Not only do disabled people have experiences which are not available to the able-bodied, they are in a better position to transcend cultural mythologies about the body. . . . If disabled people were truly heard, an explosion of knowledge about the human body and human psyche would take place.[20]

Indeed, through their multisensory, multimodal engagements with sound, these musicians undermine the primacy of hearing in Western music discourse, while dispelling any notion of audiological normalcy and an idealized listening subject. They likewise challenge a distinctively "deaf" phenomenology of perception, and the presumed innate, compensatory plasticity of the deaf brain. They contest monolithic constructions of the senses, and often in ways that blur strict divisions between hearing and deafness. I show that these musicians ultimately emphasize the musical value of inhabiting "differential sensory configurations," beyond passive constructions of the sensorium and a rigid "compartmentalizing" of the body into finite sensory types, to

draw on concepts developed by Michele Friedner and Annelies Kusters.[21] Through reflecting on sensory experience and musicking in diverse and oftentimes conflicting ways, these musicians expand our musicological sense of what *deafness* is, of what *hearing* is, and of music *is* and *can be*, all the while imparting a multisensory, multimodal conception of musicianship and musical expertise in line with expert listening.

Music at the Margins of Sense thus embeds and centers these marginalized perspectives within the increasingly interdisciplinary field of music studies. In so doing, it champions an understanding of musicianship that is unbounded by sensory hierarchies and ontologically stable definitions of music in ways that reflect the musical implications of what Friedner characterizes as the multisensory, multimodal "unruliness" of deafness and a diverse spectrum of auralities among humans.[22] Expert listening thus eschews normative perceptual frames and static listening typologies by emphasizing diverse creative processes and aesthetic values. In the process, expert listening reframes the usual terms of musical authority and expertise along the lines of the individual artist's lived experience and diverse assertions of bodily autonomy, perceptual agency, multisensory interdependence, and musical self-determination, as I will later describe.

As a point of clarification, this book's title *Music at the Margins of Sense* deliberately appeals to "sense" in general as a multisensory phenomenon, as opposed to aurality, tactility, and visuality specifically, in an effort to move away from hard-and-fast sensory typologies in prevailing conceptions of deafness and music. This overarching appeal to multisensory ways of musicking does not mean, however, that the book's approach to the cultural marginalization of sensory disability is all-encompassing. Rather, I deliberately prioritize deaf and hard of hearing perspectives on account of the "primacy of the ear" in Western music discourse, the corresponding framing of deafness as antithetical to musical experience, and the resulting epistemic exclusion of deaf ways of being and knowing from dominant paradigms of musical thought. To be sure, the representational logics of blindness in Western music follow a complementary legacy, insofar as blindness has been assumed to bestow enhanced hearing and soulfulness (and even divinity in some cases), and a musical genius or prodigiousness that borders on "freakish."[23] To that end, Terry Rowden has revealed the ways blindness and blackness simultaneously shaped the enduring cultural mythology around blind African American pianists.[24] Stephanie Jensen-Moulton has revealed a similar logic at work in the reception of African American pianist Thomas "Blind Tom" Wiggins where appeals to freakishness were enhanced by his young age and knowl-

edge of his cognitive disability.[25] Where deafblindness is concerned, Michael Accinno has revealed how the cultural discourse around American deafblind writer Helen Keller's music lessons and interest in opera is caught between a sensationalism around the tactility of blindness and the assimilationist logics of oralism.[26] Suffice it to say that while considerations of blind and deafblind accounts of music expand musicological conceptions of sensory experience, they are nevertheless beyond the book's admittedly narrower focus on unsettling the musical primacy of the ear through a specific focus on deaf and hard of hearing musicians and listeners. At the same time, insofar as it prizes disability expertise over normative definitions of music and musical skill, as I will later describe, expert listening is a framework and value system that could be instrumentalized in the case of blindness and deafblindness.

As is clear from the foregoing paragraph, the last two decades have seen a profusion of music studies scholarship on disability, of which there is a growing body of work dedicated specifically to deafness. This scholarship instrumentalizes key emancipatory concepts in disability and deaf studies to, among other things, challenge the stereotypes associated with deafness, to highlight the role of music-making in American Deaf culture, and to spotlight previously unknown deaf musicians active in both Western art and popular music traditions, championing non-aural, multisensory listening typologies in the process. Chief among this work is Anabel Maler's pathbreaking 2024 monograph on the musical legacy of song signing in Deaf culture as visual-spatial music; Maler and Robert Komaniecki's and Katelyn Best's respective articles on rhythmic techniques in dip-hop (i.e., signed rap and deaf hip-hop); Joseph Straus's chapter on "deaf listening" and Jeannette Di Bernardo Jones's chapter on "imagined hearing" practiced by deaf listeners; Katherine Meizel's chapter on the politics of voice, identity, and belonging among deaf singer-signers in the "borderlands" between hearing and Deaf cultures; Accinno's aforementioned article on the role of oralism in Keller's engagement with music; Robin Wallace's monograph and Tom Beghin's article on the role of deafness in Beethoven's compositional practice; and George McKay's chapter on 1950s American singer Johnnie Ray's hearing loss and hearing aid use, as well as the romanticization of music-induced hearing loss among hard rock and heavy metal musicians and concertgoers.[27] This scholarship has transformed musicological understanding of deafness as a lived experience and musical sensibility and has significantly expanded ontological definitions of music beyond aurality, with emphasis on the role of vibration and tactility, vision, movement, and visual-spatial perception in deaf engagements with music.

Music at the Margins of Sense builds on this momentum by also paying as much attention to the category of "hearing" as it does to the category of deafness in the ways previously described. In other words, in seeking to diversify musicological conceptions of deafness, my aim is not to denigrate aurality or deny its ongoing significance in music or to promote a distinctly "deaf" theory of musical perception that excludes aurality altogether. Rather, my objective is to challenge its singularity and supremacy in Western music discourse in order to complicate and diversify our musicological sense of what *hearing* is. As Drever explains, not only deafness, but also "its conceptual opposite," "'hearingness,'" the "unmarked, omnipresent norm," is unstable and diverse.[28] What Drever and Hugill term "aural diversity" thus allows us to deconstruct the "tacitly agreed premise" of otological normalcy and the long-standing stigma associated with hearing loss in music in order to recognize the diverse expressions and meanings of hearing. Indeed, they write that, "like 'biodiversity,' or indeed 'neurodiversity,' it [aural diversity] is not so much indicative of an individual divergence from a perceived norm, but rather a description of the reality that any group of people . . . will exhibit a range of hearing characteristics."[29]

To be sure, many readers in music studies may be familiar with the convention of rhetorically distinguishing between an audiological, biomedical, or deficit construction of *deafness* as *hearing loss*, and a cultural-linguistic model of *Deaf identity* through using a lowercase "d" and uppercase "D" respectively, and the compound "d/Deaf" to account for both models simultaneously.[30] Yet, in recent years, "d/Deaf" has fallen out of favor in deaf studies and deaf anthropology on account of what James Woodward, the scholar who originally coined the term in the 1970s, along with Thomas P. Horejes, characterize as its widespread misinterpretation and divisive application as "a rigid classification system," a static "paradigm of identity formation and a cultural/power label" both in "Deaf culture" (where the "D" is historically also capitalized) and among the first wave of deaf studies (i.e., scholarship from roughly the 1970s to the end of the first decade of the twenty-first century).[31] At the same time, there are still individuals who continue to identify as Deaf with a capital D for whom the notion of a Deaf culture remains central to their sense of self; this also includes people who encounter difficulty living in one culture. In many ways, music demands fluidity from definitions of deafness and deaf identity, as we will discover throughout the book. Meizel's work on deaf singer-signers makes this poignantly clear as performers negotiate the musical simultaneity of *signed* and *vocalized* expression and "Deaf" and hearing conceptions of identity by extension relative to the fraught legacy of

oralism.[32] Except in instances where I am referring specifically to historic and present-day articulations of Deaf culture, and/or to authors and musicians who capitalize "Deaf," whether in their written work, as in the preceding paragraphs, or when referring to themselves, I use the term "deaf" (in place of "d/Deaf" and "Deaf") throughout this book to more readily capture the multiplicity and intersectionality of deaf ontology and subjectivity.[33] In these ways, I take my cues from Friedner and Kusters, who write that *deaf* is "more encompassing, less politicized, and less context-dependent than *Deaf*."[34]

In its attention to musicianship and musical expertise, the book thus accounts for diverse audiological expressions of and relationships to the biomedical category of "hearing loss," ranging from so-called mild hearing loss to "profound" deafness, as well as hearing "impairments" and hearing "disorders" (for lack of a better set of terms) like tinnitus and hyperacusis, where temporality of onset varies from person to person. In these ways, the book's central case studies make clear that deafness *does not* entail an absence of hearing per se, but rather "a variety of hearing," to adopt Mills's timely assertion, in that deaf and hard of hearing people have long attested to "the heterogeneity of ear-listening."[35] Crucially, my interlocutors likewise evince diverse relationships to deaf social identity formation and subjecthood, from cultural-linguistic minority articulations of deaf identity and community centering on sign language use (i.e., historically signaled by capitalizing "Deaf"); to those who identify as "hard of hearing," "deafened," "hearing impaired," or even as "tinnitus patient," whether to signal mild to moderate hearing loss relative to profound deafness, to denote acquired hearing loss/impairment in contrast to congenital deafness, or to dissociate from sociocultural identity politics of deafness and/or disability. Accordingly, these musicians deploy different communicative strategies—or "semiotic repertoires," to borrow Kusters et al.'s concept—ranging from speech and lipreading, to sign language, to translingual, multimodal gestures like fingerspelling and mouthing.[36] They also have different politics around medical intervention and the use of auditory assistive technology like hearing aids and cochlear implants. Suffice it to say that some of my case studies take pride in their deafness, while some have a more ambivalent relationship to labels like "deaf," "hard of hearing," and the like, just as others more readily identify as "hearing" and aspire to a kind of auditory normalcy.

To that end, several of the accounts featured in the pages of this book "do not necessarily belong to the bodies with which disability is typically associated, or the identities through which disability has traditionally been reclaimed," to borrow Arseli Dokumaci's words, what she dubs "non-crips"

or "non-paradigmatic people with disabilities."[37] Namely, the book moves beyond any strict identity- and rights-based discourses that assume "there is one teleological way to be deaf"—that is, a *right way* to be deaf—in favor of diverse ontologies and subjectivities, taking my cues from Friedner, Kusters, and Mills, among others.[38] Of these "non-paradigmatic" experiences of disability, Dokumaci asks:

> What kind of a disability story emerges from these experiences that do not fit the normative narratives around disability? What do these stories tell about disability itself? How do they complicate and disorient the category, and multiply its becomings?[39]

Music at the Margins of Sense poses a similar line of questions around the categories of deafness and hearing alike, revealing how diverse sensory ontologies and subjectivities inform and enrich contemporary musical practice.

Accordingly, *Music at the Margins of Sense* does not immediately offer readers a static, finite set of sensorially bound criteria through which to newly and concretely define music and distinguish it from other forms of artistic media and practice. Rather, it interrogates and emphasizes the unique modalities, creative processes, and aesthetic values through which an individual's musical practice, work, style, and repertoire takes shape, that is, emphasizing musicianship as a musical technique, expertise, and skill over the music itself. In other words, I am concerned with methods, manners, and ways of doing, approaching music as active, holistic, and relational in accordance with Christopher Small's notion of *musicking*.[40] The book thus pays attention to the diverse multimodal and multisensory foundations upon which musicianship is formed. Accordingly, my analysis of music encompasses myriad creative disciplines, media, and outputs, from music performances, audio recordings, scores, and music video, to dance, sound art, poetry, and visual art, among other musical pathways spanning the sonorous and non-sonorous.

Indeed, when conceived in ontologically plural terms, music, we will discover, exists and is perceived not only (or if at all) through sound and its many formal parameters (i.e., pitch, melody, harmony, timbre, etc.) but also through words, as in a song; images, as in a music video; gesture, as in a live performance, and so forth, where none of these dimensions is inherently superior or subservient to the other. By way of example, in my previous work on Christine Sun Kim, I contended that sound itself is neither paramount in, nor a fundamental prerequisite for, music. More specifically, I argued that Kim's framing of facial gesture from the American Sign Language lexicon

as a form of non-sonorous singing unsettles "the precondition of vocalized sound in sung vocal production," aesthetic values shaped by Kim's cultural-linguistic minority standpoint. This is an assertion I uphold in this book and revisit in chapter 2.[41] Also of major relevance here are Maler's invaluable contentions in *Seeing Voices*, wherein she challenges the implicit assumption that music is organized sound, redefining music as culturally conceived, formally organized visual-spatial movement. *Music at the Margins of Sense* wholeheartedly supports, celebrates, and instrumentalizes that view, while leaving room for the open-endedness and creative potential of a multisensory and multimodal unruliness that allows for perpetually diverse articulations of music unbounded by ontologically stable definitions. Newly defining music is arguably less feasible in the case of *Music at the Margins of Sense*, since it is focused on a more diverse range of deaf identities and musical genres than *Seeing Voices*, which theorizes about the musical implications of song signing as a distinctly *Deaf* form of musicking through its ties to sign-language and cultural-linguistic articulations of identity and community. Thus, I am privileging *musicianship* as it culminates in musical self-determination to distinguish my interventions from Maler's, while emphasizing the complementary nature of our respective approaches.

To be clear, in pushing for musical ontological pluralism, this book does not suggest that music is somehow universal or inherently accessible by virtue of its underlying multisensory and multimodal substrata or by a presumed compensatory mechanism of an idealized deaf brain. Rather, I contend that musical experience is interdependent with the material limits and creative affordances of the designed world—or *built environment*, to draw on the language of disability studies—which musicians navigate, circumvent, and/or shape at their will. Indeed, music-making is contingent upon the creative interventions of human actors. In these ways, I account for the techniques, skills, and aptitudes individual musicians cultivate in accordance with their own embodied sensibilities, musical interests, and creative priorities. *Music at the Margins of Sense* ultimately champions an active, dynamic conception of musical perception and creation wherein disability engenders "the flourishing of new, different, and intrinsically valuable modes of music-making," to quote musicologist Blake Howe.[42]

With that being said, expert listening does not read the disabled body monolithically as an automatically undisciplined text, intrinsic site of transgression, or inherently liberatory social position. Rather, it contests the cultural mythologies, biological certainties, institutionalized forms of musical knowledge production, idealized listening paradigms, and implicitly bio-

logical constructions of innate musicality that have heretofore foreclosed diverse ways of being and musicking. In its explicit appeal to bodily autonomy, perceptual agency, multisensory interdependence, and creative self-determination, expert listening situates individual musicians and their embodied ways of knowing and creative values as the ultimate locus of musical authority and expertise.

Expert listening ultimately serves as this book's guiding principle. It is the informal, implicit litmus test through which I analyze problematic representations of deafness in the Western musical imaginary; the analytical framework through which I approach, describe, and study the musical endeavors and musicianship of my case studies; and ultimately, a value system through which to acknowledge and approach the humanity and musical expertise of diverse listeners while promoting inclusive forms of musical world-building.

To be sure, I appreciate that in its focus on professional musicians, the book does not attend to more ordinary, everyday accounts of listening. While such a focus is beyond the book's scope, I offer expert listening as an imperfect framework that can be mobilized in connection with diverse accounts of music spanning professional and lay contexts. In many ways, the latter category of experience is embraced through the attention expert listening pays to sites of musical knowledge formation and forms of music-making beyond institutionalized paradigms.

It also bears noting that as a musical epistemology and value system, expert listening is indeed a Western orientation. Its emphasis on subjectivity, bodily autonomy, perceptual agency, and multisensory interdependence might feel at odds with more relational musical ontologies and forms of sense-making, and therefore limited in its scope and applicability. On a very basic level I rationalize this emphasis given that the book's musical purview is decidedly Western, whether in terms of its explicit focus on the Western musical imaginary and the primacy of hearing therein, the representations of the figure of deafness it analyzes, or the individual case studies it discusses, all of whom are musicians based by and large in the West. More importantly, I emphasize these ideals because deaf and disabled people more generally have historically been denied the status of full personhood, and subject to ongoing paternalist control. Deaf and disabled people do indeed teach us much about the significance of relationality and community formation, and thus *interdependence* is also an elemental part of expert listening, where it accounts for the dynamic relationships among musicians, instruments, technologies, and the built environment. I thus submit expert listening as a *possible*, incomplete starting point for diversifying conceptions of musicianship

to be used at the scholar's discretion, and not as a one-size-fits-all approach with universal applicability.

Beethoven, the Primacy of the Ear, and the Figure of Deafness in Western Music

In Western music, understanding of deafness was historically limited to Beethoven's mythology. Anecdotally, I can attest that to this day, he serves as the most widely cited example of a *deaf* musician, the singular frame of reference and litmus test. Deafness is central to his status as one of the foremost composers of the Western art music canon, standing in as the essence of his heroic struggle and ultimate symbol of his transcendent musical genius, a pathos ostensibly inscribed and immortalized in the works of his late period. Romantic portrayals of Beethoven's hearing loss are due in no small part to the composer's own written accounts of his declining hearing contained in his correspondence with family, friends, and patrons, most notably in the 1802 *Heiligenstadt Testament*, a letter to his brothers Kasper Karl and Johann that reads like an anguished confessional. Therein Beethoven recounts having been "attacked by an incurable malady," what he framed as a source of humiliation given his vocation as a composer, a condition that made his social interactions burdensome: "Completely isolated, I only enter society when compelled to do so. I must live like an exile."[43] Beethoven's successors spilled much ink over the composer's deafness, mystified by its seeming incompatibility with his musical prowess and compositional achievements. Carolyn Abbate's 1991 assertion that "deafness is the deepest imaginable antithesis to music, the one thing a deaf person can never possess, a form of discourse unthinkable" gives voice to the extremist thinking around Beethoven's deafness on the part of his musical successors.[44] So potent and perplexing is this paradox that music scholars, historians, and scientists continue to pore over the composer's correspondence, along with surviving anecdotal reports, medical records, and critical reception in the hopes of posthumously diagnosing the cause, type, and severity of Beethoven's hearing loss and its perceptual effects on his music. Often this work exacerbates the sensationalism associated with his deafness and musical genius by framing it as a medical mystery to be solved and a tragedy that Beethoven labored tirelessly to overcome. Indeed, implicit in these familiar representations of Beethoven is the idea that disability can and *should* be overcome through personal triumph—that is, the overcoming narrative—or overcompensated for through inbuilt talent, akin to the trope of the disabled supercrip. Such implicit messaging transfers the

burden of stigma and accommodation onto the disabled individual, while undermining the social and environmental obstacles that inhibit inclusion.[45] As Howe argues, the cultural scripts associated with the performance of disability and the performance of music "shape each other, so that it becomes difficult or even impossible to disentangle them: culturally marked, disability informs the music performance, while music performance in turn informs the disability."[46] This performative entanglement is uniquely charged where deafness is concerned because of its seemingly antithetical relationship to music. Indeed, Beethoven's example reveals how deafness defies ingrained cultural assumptions around the precondition and primacy of otological normalcy in music perception, and expectations around *extraordinary* hearing in composers.

In recent years, however, Beethoven has experienced much-needed scientific and musicological revisionism. For instance, in a 2021 systematic review of prevailing hypotheses regarding the etiology of Beethoven's deafness and their probability from a medical standpoint, Jan P. Thomas and his colleagues contest the mistaken assumption that hearing is a prerequisite for musical creation:

> The hearing impairment of the composer Ludwig van Beethoven is one of the best-known cases of hearing loss among historical artists. It has attracted great interest over centuries as one might speculate that perfect hearing is essential to be able to create musical masterpieces like Beethoven did. Ludwig van Beethoven represents one of the best examples that the creation of ingenious musical masterpieces does not necessarily require an intact auditory feedback loop.[47]

Indeed, scholars like Robin Wallace and Tom Beghin have sought to temper the misconceptions associated with Beethoven's deafness by demystifying its impact on his daily life, while shedding light on the ways it informed and enriched his compositional practice. In his book *Hearing Beethoven: A Story of Musical Loss and Discovery*, Wallace suggests that Beethoven's widely documented "anguish" around his hearing loss had very little to do with any sense of musical estrangement. Rather, it "had to do almost entirely with the way his relationships with others had deteriorated, with the unjust judgments he believed others were making about him personally, and with the tormenting noises in his ears."[48] He observes furthermore that as Beethoven's hearing loss progressed, he resolved to devote himself more fully to his music. Wallace thus sets out to combat stigmatizing narratives rooted in disabled

overcoming through offering an account of Beethoven's creative strategies in rather more mundane, grounded terms, with emphasis on the supplementary role of visual, spatial, and kinesthetic cues in the composer's evolving, though nonetheless enduring, relationship to music.[49] Beghin draws a similar set of conclusions based on his having commissioned a reconstruction of Beethoven's 1817 London Broadwood piano along with a recreation of André Stein's 1820 "hearing machine," a tin cupola Beethoven would fashion over the lid of his Broadwood to amplify the sound. Beghin argues that deafness, combined with the articulatory innovations of the English-action piano design, afforded a deepening of Beethoven's tactile relationship to the keyboard, evident from what Beghin describes as the "accumulating energy of a relentless play of back-and-forth vibration" in the opus 109, 110, and 111 piano sonatas, among other notable musical cues.[50] Important takeaways from Wallace's and Beghin's work that are of relevance to this book include the musically significant fact that hearing loss transpires along different temporalities within the human lifespan; that hearing loss seldom entails or results in complete and totalizing auditory silence; that it is difficult to distinguish between and quantify sensory types; and that musical perception and creation are inextricably tied up with the technologies and constraints of the built musical environment.

The significance of this scientific and musicological revisionism surrounding Beethoven notwithstanding, the automatic association of deafness with absolute silence and musical loss, and the resulting overcoming logic evident in Beethoven's romantic mythology, persists in contemporary musical conceptions of deafness in the Western musical imaginary. To that end, through analyzing recent examples from contemporary music discourse—including music criticism, Hollywood cinema, music videos, interviews, and other cultural artifacts—the book reveals that prevailing accounts of music and deafness invoke the figure of deafness from an implicitly hearing standpoint to indulge in fantasies about the extreme margins of sensory experience as they are imagined to coalesce around total silence and heightened tactility. In so doing, they affirm and center able-bodied norms and perennial fantasies about the universality of music, while obscuring the sensory multiplicity of deaf musical perception and creation.[51] Crucially, these accounts likewise undermine the diversity of hearing itself, what is, in actual fact, an highly variable and unstable perceptual category, an experience that shifts and evolves along different timescales, both moment to moment and across the human lifespan.

The figure of deafness in music is arguably akin to what Georgina Kleege refers to as the "hypothetical blind man" in Western theories of consciousness,

a trope with biblical roots that situates vision loss as totalizing, while framing tactility and auditory cues as perfunctory compensatory mechanisms in ways that promote gratitude for sightedness while belying the far more dynamic phenomenological experiences of blind people.[52] I contend that in Western music, the figure of deafness is not only a hypothetical, but a material condition that musicians and listeners have long sought to simulate, embody, and inhabit, as I will later describe, whether by seeking out the purportedly quietest place on earth, as with John Cage and the anechoic chamber, or through exposure to extreme loudness thresholds at live musical performances where profound inaudibility meets heightened tactility.

To begin with, as a musical construct, the figure of deafness is built on the deeply ingrained musical supremacy of aurality and serves as the antithetical foil to the idealized listening subject implicit in Western music discourse. The "primacy of the ear," or *la primauté de l'oreille*, is a concept attributed to French composer Olivier Messiaen, a member of the Groupe de Recherches de Musique Concrète, that gained widespread traction and crystallized in twentieth-century European avant-garde compositional philosophies and Anglo-American music-theoretical discourse. What Drever characterizes as "this radical foregrounding of the sense of hearing with its various modes of listening, which seems second nature from today's perspective," arose in direct response to the ocularcentricism of Western philosophical discourse.[53] French composer and acoustician Pierre Schaeffer proclaimed "the superior role [of the ear] over the assumed prevailing cultural dominance of the eye and visual perception," a concept that readily encapsulated "the salient tropes of musique concrete—the sound object, reduced listening, acousmatic listening, etc.," as Drever explains.[54] Even as Schaeffer rightfully acknowledged that hearing is enculturated, stating that "each one of us hears with different ears," its naturalized primacy obscured and disavowed the role of the other senses in musical perception, while privileging an idealized listening subject with "scrupulous" hearing.[55] Indeed, Schaeffer, along with many of his musical colleagues, championed the need to "unlearn" one's implicit aural conditioning and biases in order to cultivate clear, scrupulous auditory skills, or "clairaudience," a term used by Canadian composer R. Murray Schafer. Similarly, American electroacoustic composer Milton Babbitt argued that the aesthetic demands of much avant-garde music required a "suitably equipped receptor" compared to what Theodor Adorno termed the "infantile hearing" inscribed in popular music, as Drever explains. Many of these composers and thinkers thus advocated for a "high fidelity auditory perception and cognition" unknown to even the most highly skilled musicians.[56] Drever and Andrew

Hugill also cite a number of taxonomies developed by other mid-century and present-day thinkers and composers for whom finely tuned listening was "demarcated and encouraged and presumed universally obtainable with the right attitude and training," theories that gloss over "any hearing-type that does not accord with the otologically normal."[57]

Drever makes clear that even as composers and music theorists likened their work to an empirical science, the primacy of hearing and the idealized listening subject were not tied to quantifiable, empirical audiometric standards, but ultimately cultural constructs. Indeed, this thinking became institutionalized in the techniques, frameworks, and tools of music theory, and prevailing conceptions of musical expertise by extension.[58] Straus writes that "implicit listeners in traditional music theory" (and musicology and ethnomusicology by extension) "inhabit prodigiously capable bodies" and possess "extensive training and vast knowledge of the musical literature" that enables them to detect sophisticated musical relationships and speak to the formal inner workings of music.[59] For Straus, the "prodigious hearing" encoded in the practices of music scholarship is already extraordinary relative to "the ways in which normally embodied people make sense of music," or "normal hearing." This is what Fred Maus calls "the disciplined subject of musical analysis" evident in mid-twentieth-century writings of music theorist Allen Forte, notably evident in his idealization of early twentieth-century music analyst Heinrich Schenker's "way of hearing."[60] As Maus explains, Forte upheld Schenker as the ideal "model for a normative subjectivity, a way to be a musician. By following the model, you can discipline and transform your existing self to become a specimen of 'the music theorist,'" a thinking that Maus explains likewise pervades music theorist Edward T. Cone's 1972 book *The Composer's Voice*.[61]

As we will discover in chapter 4, the ear also reigns supreme in prevailing discourse on musical talent, where it serves as the implicit baseline for biologically deterministic constructions of innate musicality, the uncontested metric and signifier through which to ascertain the naturalness of one's musical abilities. To have a "natural ear for music" is to evince a seemingly natural inclination toward music independent of prior training, an expression that rests on an overdetermined construction of the ear as the literal organ of hearing and as a metaphor for an elusive sensibility that is believed to reside within the musician. It is an expression that not only subscribes to an understanding of musicality as an implicitly genetically driven trait that is unevenly distributed across the population, but also culminates in the perception of a person's aural aptitudes as manifest in their musicianship. Histori-

cally, discourse on natural musical ability has intersected with ideologies of racial difference and disability, as scholars Lindsay J. Wright and Julia Koza have both revealed.[62] It endures in modern-day empirical scientific discourse on absolute pitch, and the pathologization of its opposite in so-called tone deafness—or *amusia*—as a biologically inherent musical *disorder* or *defect*.

I want to make the case that musical discourse on aurality—from the presumption of otological normalcy, to the primacy of the ear, to the hierarchization of differentiated listening typologies, to the institutionalization of prodigious hearing, to the idealization of musicality as an inborn trait—has depended, in many cases, on the idealization of *silence* as its inevitable opposite, as manifest in the figure of deafness. Ana María Ochoa Gautier explains that silence is a potent, albeit elusive concept in the Western musical imaginary, symbolizing all that is inaudible, unheard, unsung, unknown, and ungraspable, a simultaneous absence and presence and seeming "acoustic impossibility" that provokes tremendous affect.[63] As I make clear in chapter 2, this discourse reached fever pitch in postwar experimental writings on silence, evident from Schafer's (not to be mistaken for the aforementioned French composer Schaeffer) assertion that "silence is the outcome of the rejection of the human personality. Man fears the absence of sound as he fears the absence of life."[64] I make the case that the figure of deafness stands in to denote the phenomenological point at which acoustic silence becomes possible in ways that intensify the musical allure of silence, while relegating *deafness* to the extreme margins of sense, beneath and beyond the threshold of human hearing, where music ceases to exist. In his writings on *musical* silence, Cage invokes the figure of deafness explicitly and repeatedly, weaponizing it as a damning insult for chastising hypothetical naysayers. In his "Experimental Music: Doctrine" from 1955, a text inspired by the Zen Buddhist *Huang Po Doctrine of Universal Mind* (1947), Cage, in his self-appointed role as "uncompromising teacher," asks his fictional "unenlightened student," "Are you *deaf* (by nature, choice, desire) or can you *hear* (externals, tympani, labyrinths in whack)?"[65] Here Cage implores his student to listen anew to ambient sounds as *musical*, lest the student be symbolically "deaf" and therefore bereft of musical understanding. Indeed, Cage frames deafness as a *metaphor* for musical un-enlightenment and a willful indifference to what he insisted was the innate musicality of ambient sound—that is, "silence"—a disposition wholly antithetical to his ethical reconstitution of hearing as an active, open, and expansive endeavor, what Marie Thompson has aptly characterized as "capacious" listening or a sonic "capaciousness."[66] Through an explicit appeal to "nature" and the anatomy of the human ear, Cage situates deafness as

the literal condition of absolute auditory loss, a phenomenologically extreme, pitiable, and remote state of being well beyond anything he ostensibly experienced in the anechoic chamber.

As we will discover throughout the book, a recent number of critically acclaimed Hollywood films dramatize the seemingly fundamental incompatibility of deafness and music, framing deafness, noise-induced hearing loss, or tinnitus as an unthinkable impediment to musical perception and/or source of shame the protagonist must work to overcome, where *silence* stands in for deafness wholesale. Many of these films are crafted by and for what deaf activists pejoratively term the "hearing gaze," offering a largely imagined approximation of what it would *sound like* to be deaf or to go deaf without any forewarning.[67] These films resist developing musical alternatives beyond a strictly auditory framework, rather telling us that deafness is the specter that haunts all musicians, where prolonged exposure to loud sound begets a sudden and ever-growing deafening silence beneath the threshold of human hearing and beyond viable forms of musical perception. Even the 2022 Academy Award–winning film *CODA*—widely celebrated for its unprecedented inclusion of deaf signing actors and spotlight on American deaf culture—perpetuates stereotypes rooted in long-standing and unfounded hearing anxieties about an ostensible inability on the part of deaf people to perceive music.[68] Music is what threatens to tear aspiring hearing singer and "CODA" (i.e., child of deaf adults) Ruby and her deaf parents—who communicate exclusively in sign language—apart. Her parents are framed as inhabiting a world of silence, not only unable to comprehend, but initially unwilling to support their daughter's desire to pursue a career in music. These films are implicitly built upon the figure of deafness where deafness is equivalent to totalizing silence, and hearing remains the most viable and valuable form of musical perception.

In recent years, the figure of deafness has assumed new sensory potency as a second corresponding misconception has begun to take hold in popular culture, namely, the false notion that all deaf brains automatically rewire to compensate for auditory deficit through inborn suprasensory gain, one that supposedly manifests largely through the sense of touch. Popular reporting on cortical plasticity in particular makes inflated, sensationalist claims about the extent and ubiquity of such sensory adaptations, framing them as nothing short of "superpowers" for the deaf, while relying on oversimplified, one-to-one aural analogues that reinforce a logic of disabled overcoming.[69] Best-selling accounts of music perception and cognition have likewise indulged in this fantasy, citing a presumed innate ability among the deaf to perceive

music through an inborn heightened sense of vibration as the ultimate evidence of an ostensible universal evolutionary "propensity to music" encoded in the human genome.[70] Writers frequently cite deaf percussionist Evelyn Glennie's signature technique of "touching the sound" as a prime example of this ostensible phenomenon, and indeed the percussionist's seeming uncanny ability to pass as hearing through her impeccable speech and lipreading skills (combined with the privileges her whiteness affords) intensifies the prospect of this musical overcoming fantasy. In these ways, Glennie's reception is emblematic of what disability activists and scholars pejoratively call "inspiration porn," a by now ubiquitous cultural script and emotional framework that reduces the lived experience of disability to an object for propping up ableist, neoliberalist values, especially perseverance in the face of adversity.[71] Inasmuch as it signals deficit, ignorance, and failure, then, the figure of deafness also symbolizes redemption and virtue through the combined vibrational contours of music and the extraordinary perceptual abilities that deafness bestows. Yet Glennie makes clear that hers is a highly individual, conscious listening practice she has cultivated over many years, one that engages not simply touch but the whole of the sensorium, including her residual hearing.[72] Similarly, among deaf sign language users, tactile and visual acuities belong to a complex sociocultural and physiological convergence of multisensory gains that are collectively nurtured through cultural practice.[73]

As I make clear in chapter 3, in heavy metal, EDM, and other genres of music where loud, percussive sound, deep bass, distortion, and sub-bass frequencies enjoy pride of place, bands, audiences, and critics frequently appeal to "deafness" as a metaphor for describing extreme amplitude levels, *and* as the phenomenological threshold "at the limits of the audible," where hearing and touch, pleasure and pain, sensing and affect, self and other coalesce, a sublime site of *jouissance* and subjective undoing that *hearing* people can temporarily inhabit.[74] The "drop" in EDM is often characterized as a *deafening*, overbearing climactic moment, and indeed Joanna Demers notes that fans of EDM and other maximal genres of music characterize such moments as "trade-offs in which the compensation for agony, imprisonment, or the deprivation of the senses is enhanced appreciation for the other sensory faculties."[75] Accordingly, bands and DJs have long lauded the purportedly *deafening* capacities of their music as a mark of authenticity, a rite of passage, an expression of hypermasculinist ideals, or a catalyst for diverse forms of social belonging beyond heteronormative structures, whether in band names, stage names, album titles, or promotional slogans. Of course, the consequence of prolonged exposure to loud sound in the long term *is* often acquired hear-

ing loss, though it is rather more mundane than such accounts would have us believe, a point to which I will return in chapter 5.[76] Such representations ultimately reinforce what Robert Fink argues is a misguided "celebration of the irrational, the unknowable, and the unstoppable power of deep bass to alter physical reality by vibrating, and thus decolonizing the body politic as a whole."[77]

Increasingly and unequivocally then, deafness symbolizes a set of sensory polarities rooted in overstated notions of sensory deficit and idealized notions of sensory gain that live up neither to the findings of empirical neuroscience research nor to the lived experiences of deaf people. The perpetual quest to inhabit, embody, and effectively colonize the presumed sensory margins of musical experience works to assimilate and *silence* the sensory multiplicity of deafnesses, while subordinating it to a falsely idealized sense of hearing within an implicit musical ideology of sensory difference. This ideology arguably inherits older white Euro-American imperialist engagements with silence, and democratizing, humanist constructions of vibration through affective encounters with non-Western others. Cagean notions of silence are rooted in a mid-century American exoticization of East Asian religious epistemologies, just as Schafer's musings on silence stem from an acoustic ecology built upon what Dylan Robinson has characterized as a settler colonialist perceptual framework.[78] Adrian Curtin writes of the ways modernist avant-garde composer Antonin Artaud and the Zurich Dadaists sought to destabilize the bodies of their listeners through vibrational intensity and catastrophic noise inspired by the Balinese theater in an effort to facilitate a physical encounter with "a notional Other . . . in contradistinction to 'modern man' . . . encumbered by civilising structures and disconnected from his primal roots."[79] Roshanak Kheshti writes of the 1990s world music culture industry's fetishization of what she calls "touching listening," where vibration was thought central to facilitating a sensual encounter between white Western listeners and a racialized, non-Western other, an aural imaginary likewise driven by an erotics of heteronormative, male, penetrative pleasure.[80] Suffice it to say that the figure of deafness assumes these racialized and gendered legacies of sound through its phenomenological rootedness in idealized notions of silence and vibration in ways that bolster the implicit whiteness of the ideology of sensory difference to which it belongs, though exhaustively historicizing and theorizing these connections is beyond the scope of this book.

This book's attention to and analysis of the musical representation and appropriation of deafness is likewise indebted to David Mitchell and Sha-

ron Snyder's notion of disability as "narrative prosthesis" in Western literary traditions:

> To represent disability is to engage oneself in an encounter with that which is believed to be off the map of "recognizable" human experiences. Making comprehensible that which appears to be inherently unknowable situates narrative in the powerful position of mediator between two separate worlds.[81]

Accordingly, *Music at the Margins of Sense* demonstrates that in Western music discourse, persistent appeals to the figure of deafness stage an encounter with what is understood as an extreme, abnormal facet of human experience beneath and beyond the threshold of normative hearing as a means of mediating between normative and nonnormative sensory worlds. It does this both by reinstating a sharp phenomenological, social, and symbolic division between hearing and deafness and by affirming the universal power of music to transcend such divisions. As Mitchell and Snyder argue further, "To prostheticize, in this sense, is to institute a notion of the body within a regime of tolerable deviance" where disability functions as a moralizing *crutch* and representational device, thereby minimizing, erasing, and eradicating difference and the lived experience of disability in the process.[82] I show that this same regulatory logic is at work in customary musical invocations of the figure of deafness, where its representation as a state of total audiological loss and automatic enhanced tactile sensation serves to at once amplify, attenuate, and assimilate difference while marginalizing and obscuring the musical experiences of deaf people and the intrinsic diversity of deafness and hearing alike.

Conceptualizing "Deafnesses" and "Aural Diversity"

There is no typical physiological experience of "deafness" or "hearing loss," and deaf and hard of hearing people do not form a single, homogeneous social group. Rather, people experience and relate to the category of "deafness" in vastly different ways: Deafness encompasses myriad forms of hearing loss and temporalities of onset, linguistic preferences and communicative strategies, and differing politics around medical intervention, auditory assistive technologies, and identity, a set of highly individual variables that shape musical experiences in profound ways.

In audiology and otology, deafness is described through the category of "hearing loss," which exists along an audiometric spectrum ranging from

mild to profound; its type/cause, configuration, magnitude (degree), and age of onset vary from person to person.[83] Hearing loss magnitude is expressed in decibels (dB), the absolute unit for describing the amplitude of a sound (loudness), relative to average hearing sensitivity thresholds—that is, "normal hearing"—which range from 0 to 20 dB, depending on the sound frequency (pitch) measured in hertz (Hz). "Profound deafness" is thus the standard audiometric category and medical term for denoting hearing loss of 91 dB and above; profoundly deaf people cannot generally hear sounds below this volume threshold. Profound deafness is considered the most extreme form of hearing loss compared with "mild" hearing loss, which ranges from 26 to 40 dB.[84] At any degree, hearing loss can differ between right and left ears, and hearing thresholds vary according to frequency: Some people have greater sensitivity at low frequencies, others at high frequencies. Thus, deaf people seldom live in a world of absolute aural silence: Many deaf people, including those who are profoundly deaf, have residual hearing, which amounts to measurable, natural hearing enabling them to hear a certain degree of auditory stimuli. However, the significance and function of residual hearing is necessarily individual. Vision, touch, and kinesthetic stimuli figure prominently in deaf sensory experiences and are informed by a host of materially and socially bound parameters, including specific linguistic preferences, identity politics, technological constraints, and environmental dynamics. And deaf people harness their sensory abilities in both conscious and intuitive ways that often defy straightforward explanation. Hearing loss is thus "a rather poor umbrella term to describe the variety of hearing impairments . . . it is a metaphor," as Sterne indicates.[85]

To that end, the book also analyzes the musical implications of tinnitus and hyperacusis, auditory impairments that fall outside the presumed perceptual bounds of normative audition though not neatly within the audiological category of "hearing loss," rather occupying an ambiguous perceptual middle-ground between hearing and deafness, and cultural constructions of ability and disability in turn. Tinnitus is the perception of persistent internal ringing when no sound is present. The audiological configuration, type of sound, and experience of tinnital sound can manifest as ringing, buzzing, whistling, roaring, clicking, chirping, hissing, humming, and numerous other sounds, whether in one or both ears.[86] Hyperacusis is a disorder of loudness perception that often causes acoustic discomfort, pain, and intolerance triggered by a diverse number of sounds, spanning the full spectrum of frequencies and timbre. While causes vary between people, the onset of both tinnitus and hyperacusis is often triggered through frequent exposure to loud

sounds over the long term or through sudden acoustic shock, and it is often, though not always, a precursor to or co-morbid with hearing loss. In that sense, they are prime examples of what Sterne terms "audile scarification," that is, auditory impairments acquired through what he describes as a process of *large-scale body modification* resulting from industrialized causes, including prolonged exposure to loud sound.[87] Sterne describes audile scarification as reflective of "the cultural tendency to transform people's capacity to hear."[88] Indeed, where tinnitus and hyperacusis are concerned, this auditory transformation is seldom unidirectional. Both conditions reflect the *disabling* impact of music as a loud, sonorous phenomenon that can cause, prolong, and exacerbate auditory problems while paradoxically also *remediating* them, at least in the short term, as I will later describe.

To Sterne's earlier point, the nomenclature around hearing loss is highly ambiguous and charged in ways that speak to the tensions between pathology, temporality of onset, proximity to hearing and speech, and the complexities of disability identity formation. Even as identity- and rights-based discourses have reclaimed what were formerly pathologizing, pejorative labels—"disabled," "crip," "deaf," et cetera—as matters of self-determination, for many people with hearing loss, a term like "deaf" remains reductive and imprecise. To be clear, identifying with and participating in the culturally deaf community are contingent upon neither hearing loss magnitude nor temporality of onset, but rather on a commitment to sign language use over speech. Among people in the overarching category of "oral deaf," there are some with mild to moderate hearing loss who prefer the neutral designation "hard of hearing" as an alternative to the pathologizing term "hearing impaired" as a way of distinguishing themselves from those who are profoundly deaf, and from sign language users, as with my interlocutor Lotte Rømer.[89] However, there is no hard-and-fast consensus on the precise audiological parameters for the designations "deaf," "hard of hearing," or "hearing impaired," and they are often used interchangeably.[90] The term "late-deafened adult" is often used by "people who have lost the ability to understand speech with or without hearing aids after acquiring spoken language," nomenclature that reflects a distinct temporality of onset.[91] Members of the tinnitus community—which began as an online peer-to-peer support network that emerged in the absence of affordable medical treatment, as I will describe in chapter 5, have sought to put the medical term "tinnitus *sufferer*" out of use in favor of the less stigmatizing term "tinnitus *patient*" to emphasize recovery.[92] Ultimately, however, when it comes to such labels, "There is often a gap between the nomenclature and the reality," where preferences vary from person

to person.[93] In the absence of suitable alternatives, then, Mills's notion of "deafnesses" is arguably the most inclusive means of rhetorically capturing the audiological and sociocultural diversity of hearing loss, at least for the purposes of this book.

In North America, deaf identity formation has historically reflected sharp divisions between two distinct approaches to deaf language use, the result of a pedagogical "war" between oralists and manualists that began in the mid to late nineteenth century and persisted until the late twentieth century.[94] Manualism was the practice of educating the deaf using sign language, whereas oralism, by contrast, was a method that taught the exclusive use of speech and lipreading, an ideology that rose to prominence in America in the 1860s, coinciding with the height of the eugenics movement, all but superseding manualism.[95] Proponents of oralism, most notably Alexander Graham Bell, sought to stymie a then emerging subaltern deaf community by suppressing sign language use with the aim of assimilating the deaf into hearing culture, while eradicating hereditary transfer of deafness through banning deaf-deaf marriage.[96] As American deaf historian Rebecca Edwards explains, oralist pedagogy dominated until the 1970s because of its social appeal: "The power of speech would free deaf people from the supposedly narrow constraints of the Deaf community."[97] To promote the exclusive use of the spoken vernacular, oralist educators punished unruly deaf students who signed, often through violent tactics. Sign language users understandably saw the oralist mission as nothing less than "an assault on their way of life."[98] In Britain, the history of deaf pedagogy has been even more strongly oriented toward oralism than in the United States since the inception of British oralist schools in the eighteenth century.[99]

Maler has meticulously uncovered the historically obscure role of music in nineteenth-century American deaf pedagogical discourse, the ways it was disavowed by manualists and promoted among oralists, where both positions were rooted in opposing concerns over conceptions of normality and naturalness. Whereas manualist educators saw music-making among the deaf as inauthentic and unnatural in that it enabled them to pass as hearing, oralists instrumentalized music as a tool and emblem of assimilation, particularly in conjunction with early hearing aid technology. While the two stances were markedly different, Maler makes clear that they were connected through their shared suspicions around the ostensible artifice and mechanical nature of non-aural forms of music-making.[100]

The suppression of manualism under oralism led to the emergence of a distinct cultural movement in the United States among deaf signers—who often

deploy the uppercase *D*, thus writing "Deaf," as previously noted —centering on a consistent use of sign language over oral speech and the framing of deafness as a cultural-linguistic minority identity rather than as a disability. Historically, for many of those subscribing to this cultural value system, "voicing," and the use of auditory assistive technologies like hearing aids and especially cochlear implants, risked affirming oralist ideals and promoting an assimilationist model of deafness that would endanger the survival of sign language.[101] The FDA approval of child and infant cochlear implantation in 1990, and the increasing prevalence of "mainstreaming"—that is, placing deaf children in hearing schools where they did/do not have access to sign language—thereby strengthened the sense of shared identity and community among Deaf signers. As Friedner argues, the biopolitical "individualization, medicalization, and classification [of deafness] have created the conditions of possibility that are conducive to the emergence of the Deaf community," a type of subject and community formation built on unequal power relations in ways that exemplify Paul Rabinow's notion of "biosociality."[102]

It bears noting that the history of the American culturally Deaf community is likewise bound up with the history of American racial segregation to the extent that the presumed cultural edification of the oralist campaign was reserved exclusively for white schools, while manualism remained the primary mode of deaf instruction in Black schools, particularly in the southern United States. This led to the proliferation of Black American Sign Language and the crystallization of a distinctly *Black* American deaf community, one that unexpectedly "flourished due to the historical adversity that white Deaf people had experienced," as Rezenet Tsegay Moges explains.[103]

While sign language proficiency has historically served as the primary means of inclusion in (or exclusion from) culturally Deaf spaces, this formerly hard-and-fast correspondence has begun to evolve as an increasing number of deaf people have started using a combination of signing *and* voicing. This is due in no small part to the impact of mainstreaming and the increasing prevalence of "sign bilingualism" in deaf schools, where sign linguistics and oral speech are taught simultaneously.[104] Guy McIlroy and Claudine Storbeck conceptualize this linguistic fluidity and code-switching as a *bicultural model* of deafness, where identity is conceived not as "a static concept but a complex and ongoing quest for belonging, a quest that is bound up with the acceptance of being deaf while 'finding one's voice' in a hearing-dominant society," rhetorically signaled through capitalization of the letter *F* (thus "DeaF") to emphasize fluidity.[105] Kusters et al.'s aforementioned discussion of semiotic repertoires accounts for the diverse communication modalities

that arise from increasingly diverse deaf socialities as they are practiced by individuals and circulate within larger sociocultural assemblages.[106]

Until recently, the related concepts of Deafhood and Deaf gain have been at the core of Deaf cultural identity formation and are likewise foundational to the first wave of deaf studies. Deafhood refers to a universal experience of biological difference, sign language use, and forms of discrimination uniting self-identifying Deaf people across a diverse manner of social divides, one that arguably culminates in the signed expression "DEAF-WORLD" used to refer to a sense of cultural unity experienced among disparate networks of Deaf signers that is unbounded by geographic location.[107] A rhetorical inverse of the pathologizing term "hearing loss," the term "Deaf gain" supplants a construction of deafness rooted in aural deficit with one rooted in biocultural diversity, explicitly signaling the unique sensory and social *gains* that deafness and deaf culture afford. Deaf gain, write H-Dirksen L. Bauman and Joseph J. Murray, is an "ethical advance" bestowing "a greater appreciation of the deep value of human diversity rather than human monoculture. Freeing ourselves from the shackles of normalcy, we are now more able to see how Deaf Gain can change the ways in which we appreciate the gifts of all humans."[108] A central tenet of Deafhood and Deaf gain is the sense that to be culturally Deaf is to belong to a "visual variety of the human race," to quote deaf studies scholar Benjamin Bahan,[109] an assertion that immediately points to the visual-spatial orientation of sign language and deaf sociality. It also doubles as an explicit rebuke of Bell's 1885 eugenicist manifesto, *Memoir upon the Formation of a Deaf Variety of the Human Race*,[110] and homage to pioneering leader of the National Association of the Deaf George Veditz and his famous 1910 proclamation that deaf people are "first, last and all the time the people of the eye."[111] There has been a profusion of deaf artists who have sought to infuse this liberatory thinking into their work, evident in the music of Christine Sun Kim, the central figure of chapter 2, and in Antrobus's poetry, as in this book's opening. Antrobus clearly invokes the language of Deaf gain when he writes, "My poems are Deaf poems because they are defiant in how they take up space on the page, not searching for loss, but for something gained."[112]

American Deaf culture has always had an ambivalent relationship to disability rights and disability identity, despite a shared liberatory ethos between them. The pathologizing construction of deafness that the cultural-linguistic minority model opposes is reflective of the biological determinism in medical discourse on disability more generally (i.e., the medical model) that disability studies has long sought to counter through a social constructivist view of dis-

ability (i.e., the social model). Accordingly, the cultural model of deafness is not unlike the social model of disability advanced by disability studies that contends that disability is not a biologically inherent defect but rather is culturally bound and tied to the built environment, social norms, and systems of power. Scholars and activists affirmatively claim disability as a valuable minority identity in the same way that Deaf culture frames deafness as a cultural-linguistic minority identity.[113] However, in its persistent and explicit rhetorical disavowal of disability—that is, that deafness is *not* a disability—the cultural model of deafness has come under criticism for reinscribing the stigma associated with disability and its inferiority relative to other positions of marginality.[114] At the same time, many deaf people depend on the legal protection conferred through legal institutions such as the Americans with Disabilities Act (and its international counterparts) for workplace accommodation, communications supports, and medical services despite their insistence that the experience of deafness does not correspond to that of a disability. Inconsistencies exist on both sides of the deaf/disability divide, however. Although the social model of disability embraces a non-pathologizing view of deafness, "disability rights movements and disability studies have been slow to recognize the ways in which hearing and speaking confer privilege" and the role of spoken languages in disability oppression more generally, as Alison Kafer and Susan Burch explain.[115]

In recent years, deaf studies scholars have begun to move away from monolithic concepts like Deaf culture, Deafhood, Deaf community, and Deaf gain to better capture the intrinsic diversity of deaf ontology (i.e., ways of being) and epistemology (i.e., ways of knowing).[116] Friedner and Kusters et al. argue that these founding concepts have been widely adopted as static ideologies that privilege *sameness*, the implicit suggestion being that there is a "right way to be deaf," while overlooking significant differences in deaf worlds.[117] This universalizing discourse is in many ways institutionalized through prominent all-deaf spaces like Gallaudet University and becomes readily apparent for non-white deaf people and for deaf people from outside the global North.[118] S. J. Wright, Gloshanda Lawyer, and E. H. Bart have observed that there exists a legacy of elitism in American all-deaf spaces among whites whose first language is ASL and who are otherwise able-bodied, that is, the "normate" deaf identity, a position closest in proximity to hearingness.[119] This is also reflected in the historical privileging of ASL as the natural parent language over Black ASL and ProTactile ASL, which are often regarded as "dialects" by comparison.[120] Outside the culturally deaf community, BIPOC deaf people have historically "been deprived of equal access" to language, information,

and education, been excluded from outreach and social service programs, and "faced scores of systemic racism in health care access, insurance, health care information, general community information and the like," as Kristie Medeiros, Devonta Thomas, and Andrea Wohl explain.[121] Finally, since the concepts emerged and evolved within deaf spaces in the global North almost exclusively, they tend to obscure important geopolitical and socioeconomic differences in deaf worlds and the role of the nation-state in deaf identity formation.[122] This is abundantly clear from, for example, Karen Nakamura's work on deafness, sign language, and identity in Japan; Friedner's work on deafness and sensory infrastructures in India; Kusters's work on the deaf-inclusive village of Adamorobe, Ghana, and her European Research Council project (2017–22) on international deaf mobilities.[123]

For these reasons, Moges argues that Deaf gain is neither a racially neutral nor an entirely inclusive concept, but rather reflective of the social privileges of a normate deaf identity.[124] Friedner explains furthermore that it promotes a form of deaf exceptionalism articulated through the neoliberal logic of "added value" (and often in ways that can be readily co-opted for corporate ends).[125] M. Remi Yergeau argues that it relies upon an "evolutionary psychology in praise of deafness," using "ableist logics (in particular, that of mental fitness and visual acuity) in order to deflate ableist logics. Ableism cannot cancel out ableism."[126] While many music studies scholars have instrumentalized Deaf gain in their appeals to deaf music-making to great effect, it is of little use to those musicians who experience hearing loss as a legitimate sensory impairment that is insufficiently addressed and accommodated in institutionalized musical spaces.

Ultimately, *there is no one or right way to be deaf*, as the latest work in deaf studies contends. Deaf subjectivity and social belonging are seldom static and often evolve throughout the course of an individual's life as the person is socialized within and moves between different cultural and linguistic spheres and contends with differing social expectations and norms in the process. Medical historian Jaipreet Virdi describes her own evolving struggle for belonging as one of perpetual double alienation:

> Eventually I became an outsider in the same community in which I had once found a sense of belonging, because I had become too "hearing" to be "deaf." I had an audiological impairment, yes, but I was not culturally Deaf: I did not sign, belong to any Deaf organization, or participate in any Deaf events. But my "accent," the result of a speech impediment, gave away the fact that I was not truly "hearing."

> For years, I was stuck in the limbo between two worlds: never quite deaf enough or quite hearing enough to perfectly fit in one side or another.[127]

Virdi's account also alludes to the complexities stemming from what Christopher Krentz describes as the suspicion among hearing people around audiovisual "evasiveness" of deafness relative to more visible disabilities.[128] For these reasons, Virdi suggests further that "deafness is usually a negotiation about normalcy, rooted somewhere between hearing and speech," resulting in what Krentz aptly characterizes as a distinctly deaf form of "double-consciousness."[129] Add to that the fact that the deaf body is also perceived according to its proximity to *whiteness*, as previously mentioned, where the supremacy of speech and hearing "exists at the intersections of ableism, racism, and linguicism," as Wright, Lawyer, and Bart explain.[130] In other words, racially marked and minoritized deaf subjects face added suspicion, scrutiny, and stigma. This sociolinguistic liminality and compounding sense of stigma are a prominent theme in the music of Christine Sun Kim, as I make clear in chapter 2.

This book also includes accounts of hearing loss that complicate the liberatory, identity-based discourses that have so strongly shaped music scholarship on disability and deafness. To quote Dokumaci invoking Kafer, "I am interested in 'making room for those who *do not* or *cannot* recognize themselves in crip,' and crucially, for those who are not even part of such a system of recognition."[131] Indeed, there are many people who regard their hearing loss neither as a social identity nor as a stigmatizing form of deficit, but simply as a physical impairment that requires some form of medical oversight, intervention, accommodation, and ongoing social management. Hearing parents of prelingually deaf children often play a major role in shaping their child's experience of deafness, instilling hearing norms through use of oral speech, infant cochlear implantation (CI), and mainstreaming.[132] Orally deaf and hard of hearing people thus seek to uphold, adapt, and/or assimilate to hearing norms, communicating primarily through oral speech and lipreading, while undertaking an intricate set of invisible labors—maintaining clear sight lines for lipreading, eye contact, body language, et cetera—to compensate for the technological constraints of their auditory assistive devices. Social discretion becomes even more viable as hearing aid and CI design becomes increasingly inconspicuous, enabling users to *pass* as hearing if they so desire.[133] Because the lives of late-deafened adults have been so strongly shaped by hearing prior to the time of onset, they often prioritize the restoration

of hearing when possible, whether through use of hearing aids or through implantation. Those with tinnitus or hyperacusis intently seek rehabilitation, pain management, and remediation in the midst of what can be a physically and psychologically destabilizing experience. In the absence of affordable, reliable medical treatments and a guaranteed "cure," tinnitus patients are inclined to pursue self-directed means of relief, often by soliciting the firsthand expertise of fellow tinnitus patients, as I discuss in chapter 5.

In many cases, these perspectives blur strict divisions between a social and a medical construction of disability, and speak to the life-affirming potential of medical diagnosis and treatment. To that end, I agree with Sterne's assertion that "it is possible to contest the *compulsory* medicalization of people with disabilities, without dismissing the bodily and subjective differences that have physical, physiological, somatic, or perceptual aspects and implications" (emphasis mine).[134] They also give voice to the intermittent and "shifting" nature of auditory experience (to borrow Drever's words) as it exists across diverse timescales, whether over the course of one's life or moment to moment. As one blogger aptly writes, "Being late-deafened, I have the perspective of having had normal hearing, being hard of hearing and now deaf."[135] Marie Thompson observes that tinnitus is "partly constituted by the wider context in which audition takes place," where ringing temporarily ceases in noisy environments while intensifying in quiet spaces.[136]

Thus, as part of its efforts to pluralize our understanding of listening, this book attests to the "heterogeneity of ear-listening" by challenging the implicit assumption that all *hearing* people necessarily possess "a standard, undifferentiated pair of ears," revealing that "normal hearing" and "natural hearing" comprise a falsely unified and innately unstable social and *musical* construct. Once again, this book subscribes to Drever et al.'s notion of aural diversity, a differentiated spectrum spanning "auraltypical" and "auraldiverse" experiences of hearing—that is, "the plurality of senses of hearing"—in ways that blur strict ontological divisions between hearing and deafness.[137] Ultimately, deconstructing, demystifying, and diversifying what hearing and deafness entail enables us to reconceptualize what listening expertise and musicianship entail.

Expert Listening

Admittedly, a framework that explicitly invokes and affirms "expertise" is seemingly at odds with ongoing efforts to democratize music-making by decentering institutionalized and dominant forms of musical knowledge

formation and naturalized forms of musical expertise. The American experimental composer Pauline Oliveros expressly composed for and improvised with "untrained" musicians, a mission that set her apart from her male contemporaries who were ensconced in the elitism of the music conservatory and the ivory tower. Oliveros's legacy of musical outreach and bridge-building is arguably most evident in her *Sonic Meditations* (1971), text-based scores that deliberately require no special musical skill to execute, and the Adaptive Use Musical Instrument (i.e., AUMI), a digital musical interface that enables users with limited mobility to make music using live video motion capture, what Oliveros aptly called "improvising across abilities." As Sherrie Tucker and Ray Mizumura-Pence observe, Oliveros claimed that untrained musicians were "less prejudiced about what they were doing" and that "music should not be imprisoned by expertise." Oliveros framed "expertise" as the "foreclosure of curiosity, openness, and learning that can result from thinking of oneself as an expert. Music, like consciousness, needed room to expand."[138]

While expert listening shares in the spirit of Oliveros's work in that it is unbounded by institutionalized forms of musical authority and proficiency or by ingrained conceptions of musical talent, it does not dismiss or devalue a "formal" musical education per se. Rather, it denaturalizes dominant, singular conceptions of musical expertise by affirming a plurality of musical entry points and creative pathways spanning the conventional and the unorthodox. It accounts for dynamic processes of learning, unlearning, disciplining, and un-disciplining, where musicianship is cultivated in accordance with a musician's individual physical sensibilities, creative priorities, and the multimodal literacies with which their practice is engaged. Above all, expert listening affirms the power that comes "from thinking of oneself as an expert" and *claiming* expertise in music when one's subject position, lived experiences, and creative endeavors have historically been overlooked, undermined, and disavowed. Expert listening shifts the center of musical authority and expertise away from the exclusive purview of prodigious, disciplined listening, toward those who have historically been made to inhabit the cultural margins of musical experience, newly situating them as expert listeners in the process.

To that end, expert listening's conception of "expertise" is rooted in the disability rights movement's universal "demand for control," clear from the slogan "nothing about us without us," which serves as a reminder that disabled people need to be included, consulted, and ideally at the forefront of discussions, decisions, and policymaking about their bodies and rights, in other words, that they are the *experts* on their own lives, bodies, and needs.[139] To that end, I draw on medical anthropologist Cassandra Hartblay's characterization of "disability

expertise" as "the particular knowledge that disabled people develop and enact about unorthodox configurations of agency, cultural norms, and relationships between selves, bodies, and the designed world. It is an acquired virtuosity in negotiating the meaning that emerges when disability appears in social relations."[140] In other words, my interlocutors are *expert listeners* not because of an inborn, heightened, multisensory, and compensatory acuity that is common across all deaf people but because they possess diverse insider knowledge gleaned from inhabiting a world that has so often failed to take them into account. I show that this listening expertise is cultivated both on an individual basis and collectively through cultural practice in ways that expand normative understandings of music and musicianship. Following Hartblay's lead, expert listening also adopts Sara Hendren's notion of the embodied "virtuosities" cultivated, exercised, and perfected by disabled people as they navigate and maneuver otherwise immovable built environments and exclusionary social norms.[141] Expert listening thus situates the individual subject's embodied ways of knowing as a primary site of expert musical knowledge production, what I will later discuss in terms of "bodily autonomy." In so doing, it contests the historical disavowal of corporeality in musicological discourse and the implicit physical biases that have heretofore obscured the full spectrum of human embodiment, the sensory multiplicity of deafness, the heterogeneity of hearing, and the multimodal contours of music.

By attending to the diverse creative means through which my interlocutors—and people more generally—engage with music and express themselves musically, expert listening frames musicianship as a valuable form of human flourishing and musical world-building built upon four interlocking pillars: (1) bodily autonomy, (2) perceptual agency, (3) multisensory interdependence, and (4) musical self-determination. Together they form the core of the value system through which I approach and analyze the musical endeavors of my case studies and interlocutors and the litmus test for analyzing the representation of deafness among the book's other cultural objects of study.

Bodily autonomy in the context of expert listening is understood as the subject's right to bodily sovereignty, authority, and self-determination. It is rooted in the concept of the "bodymind" as it is used in disability studies to acknowledge the connection of physical and mental processes in the lived experience of disability, and in this particular case, to signal the seldom-acknowledged connections between sensory perception and mental well-being.[142] To be sure, bodily autonomy is a widely contested, if complex and ambiguous, concept among scholars in the humanities. Feminist scholars have thoroughly problematized the implicit white masculinist bias of

traditional Western metaphysical conceptions of autonomy and its role in ongoing histories of gendered subjugation and racial oppression that have refused to recognize more diverse forms of personhood.[143] Where disability is concerned, "a biological normality discourse complicates recognition of autonomous competence of the bearers of 'other,' distinct bodies," as Lenka Krhutová writes.[144] As a case in point, the presumed biological normality of speech and hearing (i.e., phonocentrism) in Western constructions of human subjecthood resulted in widespread suppression of sign language use, a paternalist discourse that compromised deaf bodily autonomy in systemic and enduring ways. Lennard J. Davis notes that disability studies thus "demands a shift from the ideology of normalcy, from the rule and hegemony of normates, to a vision of the body as changeable, unperfectable, unruly, and untidy."[145] Disability activists and scholars, by rejecting the cultural "imperative of a self-sufficient body," have thus fought to reclaim, exercise, and diversify conceptions of bodily autonomy within cultural, medical, and legal systems wherein disability and "madness" have signaled incapacity, incompetence, and dependency. Indeed, Eva Feder Kittay argues that dependency and care are inevitable and virtuous parts of life and are neither at odds with autonomy nor to be stigmatized: "When we recognize that dependency is an aspect of what it is to be the sorts of beings we are, we, as a society can begin to confront our fear and loathing of dependency and with it, disability."[146] Hendren speaks of our inescapable interdependence with the built environment, characterizing *all* human interactions with the designed world and the objects and tools that it encompasses as "the ordinary and necessary amplification of the body itself":

> The tools we use, and the environments in which we move, are built to compensate for our bodily limitations or to refine our capacities. . . . The stuff we use between our bodies and the natural or built world—these augmentations are how humans organize and get life done. A body is almost never not-extended . . . you might even say the human animal is co-extensive with its tools.[147]

Expert listening's appeal to bodily autonomy thus challenges the myth of an independent, biologically normate subject with perfect, unmediated hearing akin to what Robert McRuer characterizes as an "inevitable impossibility" of a fully able-bodied subject amid a *compulsory* cultural able-bodiedness. In so doing, it accounts for more diverse forms of embodiment, perception, and musicking.[148]

To that end, bodily autonomy in the context of expert listening is co-constitutive with the built musical environment and the physical norms, aesthetic conventions, and cultural assumptions encoded in musical instruments, technologies, and media.[149] We can think of one's access to and inclusion within a given musical space and tradition in accordance with Bess Williamson's typology where access in the *literal* sense refers to one's "ability to enter, move about within, and operate the facilities of a site," while access in the *figurative* sense suggests "a much broader set of meanings linked to a more inclusive society with greater opportunities for social and political participation."[150] What Howe characterizes as the "constructed normalcy" of music performance encompasses the same literal and figurative realms of access. Howe writes, "Just as architectural features of society have the potential to exclude and stigmatize bodily difference, so too do *the conventions of music performance* frame certain actions, behaviors, and appearances as disabling" (emphasis mine).[151]

Bodily autonomy in the context of expert listening thus accounts for the ways musicians from across the diverse audiological and sociocultural spectrum of deafness and hearingness navigate, circumvent, and, in some cases, *deconstruct* the constructed normalcy of music. In so doing, expert listening shifts the locus of musical deficit and compensation away from the deaf sensorium onto the implicit ideals of the built musical environment, while attending to the subject's virtuosity in navigating and building musical worlds. In other words, bodily autonomy is decidedly *not* about sensorial compensation and "overcoming," but about musical adaptation, optimization, and innovation "enacted through life experience in non-normative bodyminds," to draw on Hartblay.[152] Expert listening frames bodily autonomy as foundational to perceptual agency and creative self-determination.

Perceptual agency emphasizes the subject's right to perceive and think through sound on their own terms in ways that work against "ideologically constructed" sense-making or the ideally sensing person, deaf or otherwise, to draw on Friedner's verbiage. I invoke the term "perceptual agency" here in the manner that musicologist Ingrid Monson describes, as "the conscious focusing of sensory attention that can yield differing experiences of the same [musical] event . . . what people choose to do with musical sounds given the sensory inputs, the manifold cognitive processing possibilities of the brain, and sociocultural contexts in which they listen and perform."[153] Perceptual agency is thus driven by individual sense-making and creative self-determination, not by fixed sensory types, normative perceptual frames, or objective ontological criteria. Monson explains further that the conscious sensory practice and the decision-making that perceptual agency entails

eventually give rise to "embodied knowledge and the freeing of the conscious mind for creative aesthetic discovery and expression . . . there are conscious, formerly conscious, and unconscious aspects involved in these creative processes."[154] In these ways perceptual agency resists oversimplified, overstated, and overgeneralized scientific accounts of sensory perception, and is often irreducible to words. By acknowledging the conscious, formerly conscious, and unconscious dimensions of sensory perception, perceptual agency affirms listeners as the ultimate arbiters of their own sense-making.

Perceptual agency is built on what I call *multisensory interdependence*. Implicit in multisensory interdependence is the concept of "intersensoriality," that is, "the manifold relations among the different senses," as described by David Howes and Constance Classen: "Sensations reinforce each other, play off each other and, at times, contradict each other . . . they are part of an interactive web of experience, rather than each being slotted into a separate sensory box."[155] Intersensoriality is built on what Howes describes elsewhere as the irrefutable cognitive "cross-talk between the senses" combined with the inescapable "cultural mediation of sensation" where "cultural practices and technologies . . . generate different sense ratios across different cultures and historical periods," to which I would add gendered, racial, and class-bound norms as a set of cultural variables with the potential to yield different sensory experiences.[156] Multisensory interdependence also emphasizes the interdependence of the sensorium with the built environment and with human actors, what Rebecca Sanchez aptly characterizes as the "prosthetic" dimension of deaf people's experience with sound insofar as it functions to "extend the sensorium beyond the traditionally understood boundaries of the individual corpus."[157] At the same time, I would emphasize that *all* listening is prosthetic to the degree that musical instruments, media, and tools extend the sensorium beyond its traditionally understood boundaries, amplifying the body in "ordinary and necessary" ways, in line with Hendren's characterization above. For instance, quoting Oliveros, Tucker and Mizumura-Pence describe the ways the composer harnessed technology "to expand her listening," allowing her "to explore sound 'beyond the range of hearing.' It expanded how her body could create and perceive surprising sounds," beginning with reel-to-reel tape machines.[158] Deafness and hearing loss simply make the ordinary, necessary, and inevitable multisensory interdependence and prosthetic dimensions of listening clearer, particularly when the built environment privileges certain sensory modalities over others.

Expert listening culminates in *musical self-determination*, which describes a subject's creative agency, beginning with the freedom to define what con-

stitutes music on their own terms, and in turn, express themselves musically in the ways they see fit. To be clear, musical self-determination does not read musical idiosyncrasies as an inherent condition or outcome of deafness or hearing loss or disability per se, but rather frames musicianship as an expression of a subject's embodied virtuosities, creative sensibilities, and aesthetic values. Musical self-determination thus encompasses diverse *multimodal literacies*, spanning multiple creative disciplines, media, outputs, and entry points to music. To be sure, the related term "music literacy" is oft invoked in the Western art music conservatory tradition, where its "most accepted usage . . . revolves around the reading and writing of [Western] music notation. This includes performing it, dictating it, analyzing it, and anything else that focuses on elements of a music score," as Paul Broomhead writes.[159] Even as music educators and theorists of music pedagogy like Margaret Barrett have sought to account for a more comprehensive range of "musical processes and practices beyond those embedded in music notation,"[160] Broomhead explains that music literacy is nevertheless regarded as crucial for developing the ability to "function *appropriately*" within a particular musical community. Music literacy is in effect "a measure of command of the ways of thinking, knowing, and acting required to belong to the music community; music literacy is fluency in music Discourse," writes Broomhead.[161] I thus use the term "multimodal literacies" *in the plural* to think beyond a singular, authoritative, institutionalized discourse on music and musical skill to account for more diverse, multisensory, multimodal, and *unruly* conceptions of and entry points to music. This perspective aligns with recent work in music studies that conceptualizes music as "multimodal discourse," such that musical meaning is embedded within a diverse relational network of modalities beyond simply musical sound, including "text, still images, moving images, colour, gesture, and other sounds," all of which "communicate discourses of power, agency, and social positioning."[162] Musical self-determination in the context of expert listening works against ontologically stable definitions of music to make room for the plural, heterogeneous nature of musical experience and meaning, allowing for perpetually diverse articulations of musicking over time.

Ultimately, expert listening promotes diverse and inclusive forms of musical *world-building* in both the literal and figurative sense. The concept of world-building is well theorized in disability studies. For instance, Rosemarie Garland-Thomson describes the systemic cultural and medical separation of worthy and unworthy citizens based on physiological traits as a form of "eugenic world building" that aims to cure and eradicate "devalued" physical variation while excluding disabled people from public life with the aim of

building a normate world and citizenry. These logics have a broad material and ideological basis, spanning social, legislative, medical, cultural, and attitudinal orders. In contrast, Garland-Thomson argues for *inclusive* world-building, which "seeks to integrate people with disabilities into the public world by creating an accessible, barrier-free material environment," where disability is embraced as a valuable form of natural human variation and diversity.[163] If Garland-Thomson's notion of inclusive world-building is aimed at overarching biomedical and legal systems, architectural structures, and civic and political institutions, Dokumaci's "activist affordances" accounts for the world-building that operates on a micro, individual level by attending to the ways "disabled people build accessible worlds in and through the unspectacular choreographies of the everyday" when the built environment perpetually fails to accommodate their differences.[164] Drawing on Heidegger's notion of "worlding," Friedner and Kusters likewise account for the "agential action" deaf individuals and communities take in *unmaking* worlds and making new worlds that "exist in relation to (and often within) other kinds of worlds."[165]

Expert listening thus describes the ways individual musicians unmake and make musical worlds through their ordinary, unspectacular choreographies, embodied virtuosities, and creative innovations, transforming the material and ideological contours of music in the process. Musical world-building in the context of expert listening is inclusive world-building not because it offers a blueprint for a universally accessible form of music. Rather, it is inclusive because it engenders a more diverse and inclusive language around sense-making and music around which new creative, social, and intellectual discourses form. Indeed, inclusive musical world-building describes *a paradigm shift* that enables musicians to grow into their "distinctive individuality" beyond normalizing conceptions of musical perception, literacy, skill, and expertise in ways that promote *human flourishing*. It is inclusive because it forges new creative alliances and musical collaborations, leading to novel solutions and ingenious musical breakthroughs. It is inclusive because it promotes community formation among marginalized groups of individuals around a common set of lived experiences and creative interests. In these ways, world-building nurtures and sustains diverse ways of being and musicking while promoting new forms of musical belonging.[166]

Chapter Breakdown

Chapters 2 and 3 are focused primarily on combating the figure of deafness qua silence and deafness qua vibration respectively by illustrating multi-

modal, multisensory forms of sense-making and musicking among different profoundly deaf artists. Chapters 4 and 5 offer a reappraisal of hearing as a diverse facet of sense-making and musicking among deaf and late-deafened digital hearing aid users, and musicians with tinnitus and hyperacusis. Taken as a whole, the chapters unsettle prevailing misconceptions about music, deafness, and sensory experience more generally by accounting for diverse subjectivities, ontologies, and temporalities belonging to the full audiological and sociocultural spectrum of hearing loss.

Chapter 2, "Deafness qua Silence," problematizes the naturalized association of deafness with total auditory silence in the Western musical imaginary—that is, deafness qua silence—as it reflects on the musical fetishization of silence more generally. I frame the postwar experimental music discourse on silence as an exemplary case in this regard: I show that in Cage's and Schafer's writings, deafness is invoked to signal absolute silence, musical absence, ignorance, and death, and made to stand in dialectical opposition to the inherent musicality of ambient environmental sound, or "silence." Even as Cage and Schafer sought to reconstitute listening as a self-consciously active, expansive endeavor, their idealization of silence is built on a false construction of hearing as an all-or-nothing precondition for music, and on a corresponding antithetical construction of deafness as a state of totalizing silence without any middle ground. I reveal that this same polarizing logic is at work in *Sound of Metal*, a film that bears a loose connection to Cage in that its conception of silence and deafness were formed in an anechoic chamber. Indeed, I show that the film's sound design simulates the sudden onset of the protagonist's profound hearing loss through a series of abrupt perceptual contrasts, framing deafness as a near total, irrevocable state of silence, social isolation, and musical loss, while inspiring panic in the hearing viewer around the precarity of their own hearing. Both examples appeal to the figure of deafness to signal the threshold of human audition, musicianship, and subjectivity, affirming and centering hearing with little or no regard for the multisensory, multimodal dynamics of deaf sense-making and musicking.

By contrast, sound artist and composer Christine Sun Kim makes clear that silence is not an intrinsic property of deafness, nor is sound an exclusive property of hearing. I thus trace an ethos of *quiet refusal* in her creative output, one that indexes a disavowal of oralism and audism through a refusal to "voice" and to comply with sound etiquette, and a simultaneous opting out of the intergenerational shame ingrained in the sonic logics of racial assimilation, drawing on the work of Kheshti, Patti Duncan, and Cathy Park Hong in the process. I show that this ethos of quiet refusal finds its voice through

an idiosyncratic integration of visual-spatial cues from ASL, notational symbols from glossing, closed captioning, and Western music notation, a language that speaks to the multimodal unruliness of deafness and its diverse semiotic repertoires. To that end, I approach the expansiveness of quietude in Kim's work as a multisensory, multimodal animating principle that is unbounded by straightforward divisions between sound and silence and audible versus inaudible. To read her scores and witness her performances as a hearing person is to encounter an idiosyncratic musical language that refuses the ingrained structures and syntax of majoritarian systems of signification, one that *others* sound and its attendant norms, making the power sewn into voice, "silence," and music newly *visible* in the process (to draw on and interpolate verbiage from Hong's essay "Bad English").[167]

Chapter 3, "Deafness qua Vibration," examines and contests the increasing construction of deafness as an automatic condition of heightened vibrotactile perception in the face of profound auditory deficit—that is, deafness qua vibration—as it relates to an ongoing cultural vogue of vibration. To illustrate, I begin with an analysis of the music video for electronic DJ and producer Jamie xx's 2014 track "Sleep Sound." Through a sentimental display of deaf children euphorically dancing to the beat of Jamie xx's music, the video readily showcases the core principles of the figure of deafness qua vibration by falsely championing a one-to-one compensatory logic that supplants hearing with tactility wholesale. I show that the video also exemplifies a *polyvalent* conception of tactility (to borrow Luis-Manuel Garcia-Mispireta's characterization) evident in EDM, metal, and other genres of loud music, where the figure of deafness qua vibration is invoked to signal the transcendent, unifying impact of loud, percussive sound and deep bass. In this discourse, "deafness" is implicitly understood as the phenomenological point at which hearing and touch merge, a site of *jouissance* that hearing people can tap into and temporarily inhabit. I show that the links between deafness and vibration also manifest in popular reporting on cortical plasticity touting the prospect of inborn suprasensory gain among the deaf as the ultimate evidence of a human evolutionary propensity for music. These examples appeal to the figure of deafness qua vibration to affirm assimilationist, emancipatory fantasies about the ostensible universal power of music to transcend all manner of difference, including and especially deafness, what is otherwise misconstrued as a totalizing state of auditory loss and music by extension. I also show that such examples are rooted in a passive and idealized one-to-one substitution of hearing for tactility wholesale that

does not correspond to the active and plural nature of deaf sense-making and musicianship.

By contrast, Troi "DJ Chinaman" Lee and percussionist Evelyn Glennie reveal that heightened tactile acuities are not inherent in deaf people, just as vibration and tactility are more banal than they are virtuous. The two musicians rather approach vibration and tactility as a conceptual vehicle for "touching" or "feeling" sound, thereby promoting an active conception of sense-making rooted in strong appeals to bodily autonomy, perceptual agency, and the interdependence of sensory types, as I reveal in an analysis of their respective musical endeavors. In his capacity as founding leader of the UK all deaf musical collective Deaf Rave, Lee underscores the vital role of sound amplification technologies and frequency bands relative to the material constraints of a given event venue in the transduction of vibration and propagation of bass to the extent that they are consistently perceptible and musically functional at their live events. In both Lee's and Glennie's accounts, visual-spatial cues supplement vibrational cues, while serving their own independent musical function, as in the diverse "visual performances" staged at Deaf Rave's live events. Through her signature technique of listening through touch (or *touching the sound*), Glennie champions an active, multisensory approach to listening built on spatial depth, action, inference, imagined hearing, and the prosthetic correspondence between a musician's body and her instruments. In their respective musical practices, then, Lee and Glennie upend idealized, passive constructions of tactile perception implicit in the figure of deafness qua vibration, instead foregrounding the material reciprocity and multisensory interdependence of sense-making, and the role of perceptual agency in their respective expressions of musical self-determination.

Chapter 4, "Hearing Beyond a Natural Ear for Music," offers a musical reappraisal of "natural" hearing. I do this both by deconstructing the concept of a so-called "natural ear for music" and its ties to an inequitable and biologically driven conception of musical talent, and by examining the preeminence of "natural" hearing in the design, (musical) programming, and branding of digital hearing aids. I reveal that as an elusive, albeit enduring figure of speech and fixture of everyday musical parlance, a natural ear for music centers on an overdetermined construction of the ear as the organ of hearing and the "ear" as an innate and sometimes latent sensibility that resides within the individual musician. To that end, not only is it a declaration that privileges an exclusively auditory conception of music, but it is rooted in a biologically deterministic view of musicality as an extraordinary trait that is distributed unequally across the population, evident, in part, in contemporary scientific

discourse and debates around "absolute pitch" and "tone deafness." Historically, the reception of musical talent or a lack thereof has often rested, both implicitly and explicitly, on notions of bodily, intellectual, and/or racial difference, and thus influenced, in some cases, by nineteenth- and twentieth-century eugenicist thinking, as Wright and Koza have made clear.

To further dispel the idealization of a *natural* ear for music and a fixed, stable, singular sense of "natural" hearing more generally, the chapter next examines what I frame as the technological and cultural *production* of natural hearing in the design, branding, and (musical) programming of digital hearing aids. To be clear, understood as the "natural" perceptual process by which analog soundwaves enter and engage the outer, middle, and inner ear, before being transmitted to the auditory cortex for processing, *natural* hearing is distinct from *normal* hearing, which rather describes a set of standardized auditory thresholds measured in sound pressure levels (volume) and frequency (tone/pitch). In audiology, natural hearing is also discussed in terms of overall *sound quality*; that is, digitally processed, amplified, "aided" hearing should sound as "natural" and as authentic to the user's prior hearing experiences as possible, where relevant. In these ways, I argue that the emphasis on naturalness writ large in the design and marketing of digital hearing aid technology indexes cultural anxieties around the disjuncture between a presumed original sound and its amplification through an elusive "aesthetics of auditory realism," to invoke Sterne.[168] Conceptions of naturalness also inform emphasis on creating *a natural hearing experience* for users in the branding of digital hearing aid technology, both in terms of the fit and feel of the hardware and in terms of an increasing number of automated features boasting greater ease and effortlessness and promising fewer manual adjustments on the part of the user. Where music and hearing aids are concerned, the already fraught dynamics around the ambiguous, elusory nature of "natural" hearing become ever more complicated due to the long-standing prioritization of speech perception in the design of auditory assistive technology over other sounds like music, which has a much wider dynamic range than speech. Too often, the overwhelming fixation on both *naturalness* and *automation* in digital hearing aid systems obscures the interdependent relationship between audiologists and users, and the significant agency exercised by users in the creation of their own individual hearing and musical realities or *hearing natures*. I take my cues from scholars like Virdi, Friedner, and Stephanie Lloyd and Chani Bonventre, who implore scholars to think about the acclimatization or habilitation of prosthetic hearing technology beyond the fraught metaphor of the "bionic ear," as "having the potential to replace the functions and outcomes of a 'nor-

mal' hearing system," to better account for user agency in the production of hearing natures.[169]

To that end, the chapter concludes with discussion of Jon Ehlers of the noise rock band Bangladeafy, and Lotte Rømer, Danish musician, composer, advocate, and chairperson of the Copenhagen branch of the Danish Association of the Hard of Hearing. While Ehlers was born with sensorineural hearing loss and has used hearing aids for most of his life, Rømer is a late-deafened adult and began using hearing aids later in life. Together they speak to a more dynamic sense of musical hearingness that transcends straightforward and false divisions between "acoustic," "natural" hearing and its opposites in mediated, amplified, or "artificial" hearing, and exists in relationship to the other senses as a key extension of bodily autonomy, perceptual agency, and multisensory interdependence. I ultimately argue against the notion of a natural ear for music, biological constructions of inborn talent, and any fixed, singular sense of "natural" hearing, reframing hearing as a dynamic, multifaceted phenomenon that encompasses a *plurality of hearing natures*. I so doing, I promote more diverse and inclusive conceptions of musicianship and music in line with expert listening.

Chapter 5, "Auditory Self-Regulation," continues in the vein of diversifying musical conceptions of aurality through accounting for the relationship between music and tinnitus and hyperacusis, auditory conditions that complicate the perceptual divisions between hearing and hearing loss, even as both are often co-morbid with hearing loss. Indeed, hyperacusis is a disorder of loudness perception, whereas tinnitus entails the perception of an internal sound for which there is no external source. In that sense, both are marked by an ostensible misalignment between objective and subjective perception, and an elusive form of auditory gain, provoking an intense yearning for silence and quietude on the part of the listening subject. As a loud sonorous phenomenon, music can cause, prolong, and exacerbate tinnitus and hyperacusis, putting musicians at significant risk, existential repercussions that are dramatized through an ableist, eugenicist logic in the Oscar-winning remake of *A Star Is Born*, as I reveal in my analysis. At the same time, music can serve as a form of tinnitus relief by drowning out the incessant internal ring, a fact that the film *Baby Driver* romanticizes through its sound design.

Turning away from the sensationalism in Hollywood cinema, the remainder of the chapter offers an account of two musicians whose ongoing experiences with tinnitus and hyperacusis reflect on the disabling impact of music *and* its simultaneously remedial potential.[170] Under the moniker Tinnitus Works, composer, musician, self-identifying "tinnitus patient," advocate, and

leader in the tinnitus community Stephen Harrison has created an expansive body of music aimed at relieving and minimizing the sound of tinnitus through application of such techniques as tinnitus masking, acoustical neuromodulation, and amplitude modulation beyond scientific controls at no cost to listeners. Violinist Monica Germino's "whisperviolin" was designed as a low-decibel instrument to help mitigate her hyperacusis and protect her existing hearing thresholds. She debuted the whisperviolin in *MUTED*, a theatrical suite scored for solo violin, voice, whisperviolin, frame violins, mutes, and light design co-composed by Bang on a Can cofounders Michael Gordon, David Lang, and Julia Wolfe, and composer Louis Andriessen with the express purpose of exploring the potential of low-decibel music in connection with Germino's hyperacusis. I reveal that both Harrison and Germino address the failures of diagnostic frameworks and a lack of viable treatments by mitigating the perils of their sonic environments through novel musical interventions and collaborations. When used as a means of what I call "auditory self-regulation," then, music has the potential to remediate and regenerate aurality, whether in the short or long term, ultimately restoring equilibrium within the bodymind in an otherwise noisy world, while nurturing new forms of musicianship and music-making. As expert listeners, Harrison and Germino unsettle the static sensory scripts associated with the figure of deafness and the idealized listening subject, making clear that hearing, like deafness, is far from absolute, but a diverse and fluctuating sensory experience that is foundational to perceptual agency and musical self-determination. They make clear that auditory self-regulation, while rooted in the needs of the individual bodymind, is outward looking and generative: in their search for unorthodox solutions, Harrison and Germino have developed new creative partnerships and strategies that have led to important musical breakthroughs, raising awareness around the perils of noise-induced hearing impairments among musicians, while promoting new forms of musical belonging that will continue to have a transformative impact on musicians and listeners down the line.

Positionality and Methods

As with many disability studies scholars, I approach my scholarly work on disability through my deep and abiding familial ties to disability and deafness. For the twenty-six years that I knew him, my late paternal grandfather used canes and a motorized scooter. While he survived the polio epidemic of the 1940s, his post-polio syndrome progressively weakened his leg muscles over time, necessitating the use of a variety of mobility aids throughout his

life. It was during our weekly outings at the mall while riding in the front of his scooter as a young child that I first came to understand that the built environment often failed to accommodate those on wheels through a basic lack of curb cuts, accessible entrances, and elevators. I remember how he navigated the many obstacles in his path, be they physical or social, with determination and resolve as he exercised his full and equal right to participation in society, maneuvering his wheelchair and his six-foot body with the kind of everyday "virtuosity" and "refusal of pity or charity" Hendren and Hartblay note is characteristic of disability expertise.[171] I also remember my grandma's unwavering emotional and physical support of my grandpa's bodily sovereignty and dignity, even until the final days of his life. In that sense, it was through their loving, faithful union that I came to understand the inevitable interdependence of human bodily autonomy.

My proximity to deafness and interest in its heterogeneous temporalities comes by way of my late maternal grandfather and my paternal uncle. For the near twenty-six years that I knew him, my maternal grandfather had profound noise-induced hearing loss, the result of a lifetime of prolonged exposure to industrial-grade noise as a professional contractor and carpenter. Having inherited his father's commercial construction business, he came of age at a time when discourse on the occupational hazards of noise exposure and the need for hearing safety was nonexistent and wearing protective equipment was deeply stigmatized, even emasculating. The inevitable hardening of his hearing was advantageous in the ways Sterne notes is characteristic of "audile scarification," enabling him to withstand the extreme decibel levels of his workplace, though a fact that made day-to-day social interactions more challenging. I recall many lively family gatherings where his young grandchildren (myself included) were playfully running about his home; my grandfather would promptly retreat to the living room after dinner to spend time alone reading, listening to music, or watching the news, always at full volume. As a child, there were times where I struggled to know how to communicate and meaningfully connect with him. I quickly discovered that if I simply turned to face him as I spoke, and bridged the physical distance between us, I could dramatically improve our communication such that he was able to closely observe a full range of visual cues, from lipreading to body language. Similarly, my paternal uncle, a hearing aid user who has been profoundly deaf since birth, has always navigated the conversational intensity of our notoriously talkative, opinionated, and argumentative family at extended family gatherings by maintaining clear sight lines with the speaker, inferring meaning through subtle visual-spatial cues and physical gestures, sometimes before words are spoken. He and my aunt—a retired opera singer—jokingly

attribute the success of their marriage to her big booming voice and clear diction resulting from years of operatic vocal training, and my uncle's ability to practice "selective hearing" and "tune her out" by simply turning down the volume of his hearing aids or by removing them altogether! Music and dancing were an initial point of connection between them, a creative space where my uncle felt rhythmically inspired and uninhibited by the types of mistaken assumptions that caused him to feel alienated from more institutionalized musical spaces.

It was thus through these familial experiences that I came to appreciate the diverse semiotic repertoires that deafness entails, the types of invisible labors deaf and hard of hearing people undertake to sustain communication with hearing people, and my own responsibility in facilitating and supporting communication. It was through witnessing and learning from what I have come to understand as my grandfather's and uncle's expert listening that I first developed an awareness of the unconscious biases ingrained in my own social conditioning as a hearing person. These experiences prompted me to question the conceptual limits of "normal" hearing, the implicit sensory hierarchies governing my own musical training, and the diverse ontological perspectives on music and musicianship that deafness affords by comparison. I was uniquely motivated by the relatively limited attention to deafness and hearing loss in musicology when I first embarked on this work while writing my dissertation in the 2010s.

I thus approach the intersection of music and deafness as someone who is *once removed from* the lived experience of deafness, to invoke a metaphor with familial connotations. To be sure, my social position as a white, able-bodied person with hearing and speaking privilege, along with my formal musical and academic training, carries potential bias, provoking the question: How can I presume to deconstruct implicit ideologies of sensory difference as someone who has not simply internalized them but arguably benefited from them? In the process of writing this book, I repeatedly questioned whether I was truly qualified to do this work, particularly in instances where my limited fluency in ASL necessitated the use of an interpreter. To that end, I hold fast to Guthrie Ramsey's assertion in his 2001 essay "Who Hears Here?" that we are all "positioned . . . to fashion a cultural politics specific to our own scholarly and personal *productive* biases."[172] Indeed, *Music at the Margins of Sense* invites hearing scholars of music and sound to newly confront the constructed normalcy of music and its implicit biases, and the naturalized terms of musical belonging. I argue that we need to develop a new understanding of deafness and hearingness as diverse ontologies, subjectivities, and relationships to contemporary musical practice, lest we perpetuate a legacy of

exclusion, marginalization, and erasure. Whether our individual relationship to hearing loss is deeply personal, once removed like mine, or perhaps more remote, I maintain that scholars of music and sound have an active role to play in promoting inclusive musical world-building.

When conceived as an analytical and methodological value system in line with Ramsey's "Who Hears Here?," expert listening situates the scholar's "listening" as an active endeavor, that is, being attuned and attentive to the perspectives and ideas of others. Expert listening privileges its subjects' lived experience and accounts of their bodies, perception, and sense-making as the ultimate locus of authority and expertise. Following from that, my methodologies center reciprocity and participatory meaning-making in the ways that scholars like Sara Acevedo, Mel Y. Chen, Alison Kafer, and Elaine J. Lawless describe.[173] This has sometimes meant securing institutional funding for collaborative events organized in partnership with local community stakeholders. This was the case with the "Expert Listening: Music and Deafness" roundtable discussion at the University of Copenhagen in February 2023 that I facilitated, an event cosponsored by the Léonie Sonning Music Prize Foundation and the Danish National Broadcasting Corporation in consultation with Lotte Rømer, Danish rock musician and advocate in the Danish hard of hearing community, as previously mentioned. Rømer and I were joined by a panel of expert listeners including Evelyn Glennie and neuroscientist Peter Keller.[174] My commitment to reciprocity and participatory meaning-making has also meant finding creative strategies for mitigating the hearing/deaf power differentials with my interlocutors on an individual basis. For instance, at sound artist Christine Sun Kim's invitation, I collaborated with her in translating performance notes originally transcribed in an ASL gloss into written English as part of the process of learning about her creative practice and giving back.

To that end, my ethnographic apparatus embraces the diverse semiotic repertoires belonging to the full spectrum of deafness, ranging from speaking, to writing, to lipreading and gesturing, to signing and communicating through an interpreter, and endeavors to listen attentively across them all. Since I myself am not fluent in ASL, in-person interviews with deaf signers were conducted with an interpreter. My initial interview with Evelyn Glennie in 2016 was conducted over the phone through a lipreading interpreter, who stood before Glennie on the other end of the line and repeated what I was saying, so that Glennie could read her lips and respond accordingly.

During the pandemic, Zoom calls and emailing became the customary means of communication between myself and my interlocutors. In the process, I learned that there are certain advantages to conducting interviews

over email. Not only do email interviews more readily capture the practices of community members who organize and mobilize primarily online and through text-based forms of communication, they are also more cost-effective and ecologically sustainable. Furthermore, as an asynchronous electronic research method, email interviews operate along an "extended timeline" that "offers the participant both an opportunity to reflect over questions asked and to give them a better chance of owning their narrative" than with traditional in-person fieldwork, as Emma Dahlin argues.[175] I also benefited from the extended timeframe as a researcher in that it gave me the opportunity to ponder new insights and develop my analytical self-reflexivity, formulating thoughtful, tailored follow-up questions based on the participant's ongoing responses. It also meant that I could more readily engage in selective "cross-fertilization" of different interviews by drawing upon and sometimes describing things I had learned in previous interviews to new interviewees to further test and develop my perspective on a given idea.[176] More generally, I have come to embrace an exploratory style of interview over structured interview formats since it permits the interviewee greater latitude and control in ways that resonate with the values of expert listening, eliciting a much richer and unforeseen set of answers and follow-up questions.[177]

My qualitative audiovisual analyses of different material from Western popular culture and Western music history center on interpreting how the figure of deafness is constructed and invoked in rhetorical, audiovisual, and narrative terms, and the sentiments these representations evoke in audiences through corresponding reception study of YouTube commentary, social media discourse, and reviews in popular media outlets, among other sources. The analytical work of delineating the form and function of the figure of deafness takes place against the implicit backdrop of expert listening such that bodily autonomy, perceptual agency, and musical self-determination serve as a litmus test for evaluating the extent to which these depictions promote or inhibit human flourishing and musical world-building. As a counterpoise to this oftentimes sensationalist or essentializing discourse, I engage in close readings of a range of musical "performances" across diverse outputs by my interlocutors, including sound recordings, video recordings, visual scores, et cetera. Here my interpretive agenda centers on uncovering what these musical examples reveal about the diverse ontological contours of music and the multisensory, multimodal dimensions of music-making and musicianship to more fully illustrate the core tenets of expert listening.

Two

Deafness qua Silence

Are you *deaf* (by nature, choice, desire) or can you *hear* (externals, tympani, labyrinths in whack)?
—John Cage, "Experimental Music: Doctrine" (1955)[1]

Silence is probably one of the loudest and heaviest sounds that you're ever likely to experience. At the end of the day that within everything that we see, there's sound.
—Evelyn Glennie, *Touch the Sound* (2004)[2]

Quit shoving silence down my throat.
—Christine Sun Kim, Twitter (2015)[3]

Side by side, these three statements *speak volumes* about the elusive, yet charged, ontological, aesthetic, and political status of *silence* in Western music discourse, and the implicit antithetical role of "deafness" therein. Cage frames deafness as both the *literal* physiological condition of absolute aural loss (i.e., nature), and the *figurative* condition of musical unconsciousness and un-enlightenment, a metaphor for a willful ignorance of or indifference to (i.e., choice, desire) the musicality of "silence" as ambient sound. If Cage's reference to the outer, middle, and inner anatomical parts of the human ear positions *hearing* as the singular mechanism through which silence is apprehended and musical enlightenment is achieved, Glennie tells us otherwise: She affirms the ontological intangibility of absolute silence, but crucially from her standpoint as a profoundly deaf person, that is, *deaf by nature*, to invoke Cage's verbiage. In Glennie's formulation, ambient sound is perceived across sonorous, tactile, and visual fields simultaneously, *loudly*, *heavily*, and *within everything that we see*. Christine Sun Kim's shrewd tweet eschews the enduring association of deafness with absolute silence, palpably gesturing to the physiological mechanics of oralism and its stifling effects. Here she "speaks back" to an enduring stereotype through a powerful assertion of bodily sovereignty and agential voice.[4]

This chapter further investigates and problematizes the naturalized associations of deafness with totalizing silence—that is, deafness qua silence—in the Western musical imaginary. I approach the musicalization of silence in the postwar avant-garde, particularly as articulated in lectures and writings by Cage and Schafer, as emblematic of this notion.[5] Cage's musical recuperation of ambient silence profoundly shaped mid-century compositional discourse to the extent that "silence became the lynchpin of a new postwar American experimentalism," in the words of David Novak, and continues to serve as a major point of musicological reference.[6] I show that the figure of deafness is foundational to this discourse, carrying major dialectical weight relative to the "positive recovery of silence," to borrow Schafer's words. In Cage's and Schafer's writings, the figure of deafness signals absolute silence and the end of music, thereby serving as an antithetical foil to a reconstituted hearing subject who is newly attuned to the inherent musicality of ambient sound or "silence."

I then proceed to detail how the figure of deafness *comes to life* in the Academy Award–winning film *Sound of Metal*, wherein "deafness" is embodied, visualized, and *sounded* through the performance of its main character Ruben, a metal drummer who is suddenly plunged into the depths of silence when he unexpectedly loses his hearing. The immersive sound design offers the hearing viewer a discomforting simulation of what it would be like to suddenly *go deaf*, modeled after the filmmakers' experiences in the anechoic chamber when they were, like Cage, confronted with the sounds of their own bodily interiority. In so doing, the film falsely frames deafness as an all-consuming state of silence resulting in profound phenomenological insularity and isolation, for which there is no viable escape, musical or otherwise.

I use these two complementary examples to showcase the ways the figure of deafness qua silence is invoked in Western music to indulge in fantasies and anxieties about the threshold of human audition and subjectivity and the extreme margins of musical experience in ways that affirm and center a hearing perspective relative to an auditory construction of music. This typical framing makes musical space for neither the heterogeneity of ear listening that deafness entails nor the multisensory, multimodal nature of deaf sense-making and music more generally, rather framing hearing in absolute terms as an "all-or-nothing" prerequisite for musical perception. As Padden and Humphries write,

> When hearing people identify Deaf people as silent, they are mistakenly assuming that Deaf people have no concept of sound, that sound

> plays no part in their world, or that if it does, their ideas about it are deeply distorted. The truth is that many Deaf people know a great deal about sound, and that sound itself—not just its absence—plays a central role in their lives.[7]

As a point of contrast, I thus offer an in-depth analysis of the musical output of sound artist and composer Christine Sun Kim, who vehemently rejects the notion that silence is an intrinsic property of deafness and that sound is the exclusive possession of the hearing world, as is clear from her tweet quoted at the top of this chapter. In so doing, I locate an ethos of *quiet refusal* in Kim's creative practice, a refusal of the power, privilege, and discipline of phonocentric voice, the sound etiquette of the hearing majority, and the shame ingrained in the sonic logics of racial assimilation and the formation of racial and disabled others. This quiet refusal centers on a close integration of visual-spatial cues from ASL, glossing, closed captioning, and a repurposing of symbols from Western musical notation, as in her hand-drawn scores. Kim's idiosyncratic aesthetic language reflects the multimodal unruliness of deafness and the diverse semiotic repertoires of deaf sense-making, comically reflecting on the disparities between majoritarian and minoritarian conceptions of sound. In *Face Opera II* (2013), Kim and a group of fellow deaf signers *sing* using ASL facial gesture, upending the damning links between deafness, voicelessness, and silence, while framing singing as embodied utterance in line with Maler's definition of the signing singing voice. Through her strong appeals to bodily autonomy, perceptual agency, and musical-self-determination, then, Kim ultimately recasts deaf subjectivity and musicianship beyond dominant systems of signification, refusing the figure of deafness and a Cagean dialectics of silence in favor of the multisensory, multimodal capaciousness of quietude.

Silence and the Figure of Deafness in the Postwar Avant-Garde

As Hagood pithily writes, "Silence spans an incredible amount of babble," an elusive ontological, political, and musical construct begetting tremendous affect.[8] The *Oxford English Dictionary* defines silence as "the state or condition when nothing is audible; complete quietness or stillness; an absence of all sound or noise; complete absence of sound" and as "the fact, state, or habit of abstaining or refraining from speaking (sometimes with reference to a particular matter) or other utterance; the fact of keeping silent; an act or instance of this."[9] Silence also has a range of valences as a verb used (with an

object) to describe the suppression of sound, noise, voice, or expression more broadly, as in the silencing of public opinion, of opposing viewpoints, or even a gene in instances of genetic mutation.[10] In these ways, silence is unbounded by its literal ties to sound and carries a wide range of meanings and applications. Ochoa Gautier explains that across its diverse conceptual senses, silence encompasses "experiential extremes" that are "intensely contrasting," from the plenitude of contemplative quietness leading to an expansion of consciousness in religious epistemologies, to silence's more "sinister dimensions," including a fear of the unknown and the irreversibility of death, political domination, coercion, and nonparticipation, and even the weaponization of silence as a form of torture through isolation and sensory deprivation.[11]

Nineteenth-century oralists weaponized silence in their campaign against sign language and deafness itself, perpetuating the mistaken notion that the deaf were trapped in a silent world not only by virtue of their profound congenital hearing loss, but because of their presumed inability and unwillingness to speak. As a manual, non-sonorous language, sign language was thought a pantomimic, artificial, and primitive form of communication that hindered "normal" human development.[12] The pejorative labels "deaf mute," meaning silent and *without voice*, and "deaf and dumb"[13]—what Nancy Creighton aptly describes as "the granddaddy of all negative labels pinned on deaf and hard of hearing people"—reinforced a false and essentializing link between speech and intellect.[14] Eventually the term "dumb" would come to stand in for "silent" as a totalizing state of being, one rooted in an erroneous conflation of sensory and intellectual disability.[15] Oralists thus sought to liberate the deaf from their presumed social imprisonment by suppressing sign language use and equipping the deaf with speech (often through physically violent tactics), and also thwarting deaf-deaf intermarriage with the ultimate goal of eradicating the genetic propagation of deafness. Through its unrelenting appeals to phonocentric voice and wholesale crusade against "the establishment of a deaf variety of the human race," so-called by oralist and eugenicist Alexander Graham Bell, oralism all but *silenced* deaf ways of being, sense-making, and agential voice.[16] As Meizel writes, "Voice in this history is not an instrument of liberation; instead, it is one of erasure."[17] The overdetermined sense of silence that figured in the oralist crusade against deafness aligns with Ochoa Gautier's more general conclusion, that silence ultimately deploys a dialectical limit or a negative, whether with respect to auditory thresholds, consciousness, or the normative terms and conditions of human subjectivity.[18]

These negative dialectics are strongly present in Cage's written appeals to and musicalizations of silence. When understood as "the state or condition

when nothing is audible; complete quietness or stillness; an absence of all sound and noise,"[19] silence arguably serves as a fundamental precondition for music in that it frames a given musical utterance, while also alternating with sound along a temporal horizon within a piece of music, helping to articulate its structural parameters through pause, stillness, and closure. In this formulation, silence is co-constitutive with music and has a diversity of expressive uses and meanings. Nicky Losseff and Jenny Doctor observe that, among other things,

> silence can stand in as the softest kind of music, and it can also exist as the nothingness represented by rests, which the activity of performance must challenge to be alive. There might be a sense of silence that "is" music unsounded, a kind of ideal condition of music to which a composer's contemplations and compositions might aspire; and there might also be a sense that silence is a sea on which rafts of sounds float.[20]

Nevertheless, the "received aesthetic" of silence that Cage was concerned with was one in which silence "marked an absence," as William Brooks observes, an absence too "easily equated with the passive, the submissive and the void," in the words of Losseff and Doctor. Cage was thus uniquely interested in the "impossibility of silence as physical experience" and its implications for music.[21]

Formative to Cage's stance on silence was his widely cited visit to Harvard University's anechoic chamber in 1951, a sound-insulated room free of reverberation below the threshold of human hearing, purportedly the quietest room in the world. Hagood explains that the anechoic chamber was made "to silence the context that forever remakes sound and meaning . . . by reflecting nothing back."[22] Cage famously writes of having heard a high frequency and a low frequency sound, which the sound engineer declared were his "nervous system in operation" and "blood in circulation."[23] For Cage, *hearing* and being intimately confronted with the presumable sounds of his own bodily interiority was the ultimate empirical evidence in support of his assertion that "until I die there will be sounds." With these words, Cage suggested that silence was possible only in death, where death marked both the end of the body's vital functions and the subject's consciousness.[24] Jael Kraut writes that this experience led him to conclude that "conventionally intended silence indicated by pauses in scores turns out to be an illusion" and that music is rather filled with the sounds of the environment.[25]

Cage thus newly approached a domain otherwise regarded as "silent" and nonmusical as a sonorous space rife with ambient, naturalized, everyday sounds that were *wholly* musical. His vision of an emancipated musical silence thus sought to question "the binary logic of apparent opposites by dissolving them into the other (presence as absence, emptiness as plenitude, quietness as expressivity, silence as the intensity of life)," as Ochoa Gautier explains.[26] Cage's attempt at "composing silence as a featured absence"[27] is immortalized in *4′33″* (1952), wherein he sought to upend the hierarchy between intended "musical" sounds produced by traditional instruments and random, involuntary "nonmusical" sounds produced by people and ordinary, everyday objects in the outside world. With *4′33″*, Cage also articulated a new kind of listening paradigm, what Marcel Cobussen describes as "a susceptibility to the other, passive in its dedication to the sounds that present themselves, and active in its alertness to and preparedness for a diversity of (acoustic) events."[28] In insisting music inhered in "silence," then, Cage demanded an active receptiveness and passive deference on the part of his listeners, a capacious listening ethos (to invoke Thompson) that pervades postwar experimental music discourse more broadly.

To that end, composers like Oliveros and Schafer echoed aspects of Cage's thinking in their respective compositional philosophies and creative output in service of a newly emancipated listening subject. Tracy McMullen notes that, like Cage, Oliveros affirmed the musical "power of silence" and encouraged "the art of listening as productive of new and better ways in the world."[29] (The same could be said of Schafer.) Silence figures as an underlying structural device in Oliveros's celebrated *Sonic Meditations* (1971). These text-based scores aimed to equip performers with a deeper and more embodied sense of ambient, environmental sounds, "heightened states of awareness and expanded consciousness . . . changes that may represent a tuning of the mind and body," ideally leading to "a greater sensitivity towards one another."[30] The meditations privilege simple bodily action in order to reveal the ubiquity and materiality of sound, as in the instructions, "Take a walk at night. Walk so silently that the bottoms of your feet become ears."[31] Silence also serves a simultaneously musical and moralizing purpose in Schafer's "ear cleaning" exercises from 1967. In his book *Ear Cleaning: Notes for an Experimental Music Course*, the composer sought to entreat creatively "atrophied" musicians, desensitized by the ubiquity of what he called "noise exhibitionism" (i.e., noise pollution) in an increasingly industrialized world, to open their ears anew to the sounds of the environment, where "ear cleanliness is an important prerequisite for all music listening," in the composer's words.[32]

Schafer thus intended to recuperate, recalibrate, and refine the musician's auditory perception by attending to silence as an abundant soundscape, a sensitivity that for Schafer was integral to one's *ethical* development as a listener.[33] While Oliveros differs from her male contemporaries in her emphasis on the embodied dimensions of listening, these three composers nevertheless find common ground in their positive recovery of silence and appeals to listening as a *virtuous* endeavor promising an expanded definition of the self and of music. As Losseff and Doctor note:

> Silence had the potential to make the listener aware, to attend to silence, to art, to the sounds all around. Not only was art not obliterated, but the opposite was true: heard through ears attuned outside the Western norm, acknowledging silence enables the realization that "what one might call art is omnipresent."[34]

Indeed, Cage et al.'s reconceptualization of silence was rooted in a longstanding and explicit engagement with Zen Buddhism and the writings of Daisetz Teitaro Suzuki, where the spiritual preeminence of silence was reflective of the Buddhist negation of the will, as well as the emphasis on stillness and tranquility in the Indian concept of *shanti rasa* and the Taoist concept of *wu wei*.[35] Keen to dispense with the values and formal conventions of Western art music,[36] American and European postwar composers sought "vitality and definition through foregrounding nonwhite cultural characteristics," whether stemming from Eastern religious epistemologies, African musical traditions, or Black vernacular music, while conveniently rendering the persona of the white composer thematically absent, muted, and unspoken through a "vogue of negation," as Lloyd Whitesell aptly puts it, of which musical appeals to silence were a part.[37] Similarly, in his recent book *The Musician as Philosopher*, Michael Gallope writes that among postwar thinkers and composers, "the self was taken to be ideological, given, normal," such that "music was a way out, a way beyond, through the other."[38]

As Kraut observes, "Artistic silence has always been entangled with various forms of power."[39] To that end, the musical recovery of silence and the normative listening subject formed not only through an idealization of non-Western others, but through a hypothetical and symbolic engagement with *deafness*. In the paragraphs that follow, I argue that for Cage and Schafer, deafness was the quintessential embodiment of what Schafer described as "negative silence . . . an unutterable impasse, a negative state beyond the realm of the possible, of the attainable."[40] This is clearest from Cage's explicit

appeals to the figure of deafness in his writings on silence and in Schafer's writings on the hearing hazards resulting from noise pollution and the need to "improve the orchestration of the world soundscape."[41] For these composers, deafness was phenomenologically antithetical to their positive musical reconstitution of silence and the desired sensibilities of the ideal listening subject. Put differently, the association of deafness with irrevocable silence in this discourse bolstered the unmarked hearing subject's radical monopoly over music's reconstitution.

Even as he sought to collapse binary opposites, Cage explicitly distinguishes *his* silence from the absolute silence he associates with deafness, invoking the figure of deafness on more than one occasion to demonstrate precisely what his silence is *not*, thus positioning deafness as the total absence and negation of sound, akin to musical nothingness. A postscript in his manifesto reads as an imagined dialogue between an "uncompromising teacher" of experimental music philosophy and his "unenlightened student," modeled after *The Huang Po Doctrine of Universal Mind* (1947), one of the foremost teachings of Zen Buddhism. In it, Cage's student poses a series of innocent questions regarding the viability of experimental music, only to be rebuked by the paternal Zen master. In one notable instance, Cage chastises his student for daring to question the negation of musical intention through chance, and whether or not it was *music*, by responding:

> You are slow-witted, for you have never brought your mind to the location of urgency. Do you need me or someone else to hold you up? Why don't you realize as I do that nothing is accomplished by writing, playing, or listening to music? Otherwise, *deaf as a doornail*, *you will never be able to hear anything*, even what's well within earshot. (Emphasis mine)[42]

In this passage, Cage instrumentalizes the figure of deafness qua silence through recourse to a familiar figure of speech (i.e., "deaf as a doornail"), once again weaponizing it to insult his student's intelligence and level of musical understanding, despite the student's formal musical training (i.e., "You are slow witted" and "Do you need me or someone to hold you up?" and "Nothing is accomplished by writing, playing, or listening to music"). Here deafness also symbolizes the unenlightened aesthetic outlook Cage associates with inherited orthodoxies of the Western art music tradition, where, to experience the unintended sounds of silence as musical plenitude and to relinquish control and intentionality is to overcome the "deafness" of generations past

and listen anew. Deafness thus stands in as the moral inverse of Cage's musical reconstitution of silence and his ethical reconstitution of the listening subject in turn.

Among his most puzzling commentaries on deafness comes in "Where Are We Going? And What Are We Doing," a set of four stream-of-consciousness lectures intended to be read as a performance. Performers are instructed to read one of the four lectures, which was to be "superimposed" on the prerecorded readings of the remaining three lectures contained on single-track tapes for rent through C.F. Peters. In one passage in the second lecture, Cage asks:

> Had a musician to choose between death, deafness, and blindness, which would he choose? Death's inevitable, does not sting, and time shows it's good for music. Blindness would certainly sharpen his sense of hearing. Deafness . . . well . . . Beethoven.[43]

Here Cage weighs his hypothetical options—death, blindness, or deafness—according to their perceived musical value, to choose the lesser of three evils. He immediately minimizes death by appealing to its inevitability and the musical value it brings. Next, Cage weighs the musical merits of blindness, framing it as deafness's phenomenological opposite where audition is concerned, reinforcing the popular misconception that blindness automatically bestows heightened musical sensibilities through an ostensibly sharpened sense of hearing. Finally, when it comes to deafness, Cage invokes Beethoven, the composer who readily admitted to his brothers, in the famous 1802 *Heiligenstadt Testament*, having contemplated taking his own life on account of his progressively deteriorating hearing, if not for the grace of God. In Beethoven's view, deafness was fundamentally at odds with his identity and vocation as a composer, a source of increasing shame and alienation, evident from the following passage:[44]

> Ah, how could I possibly admit such an infirmity in the one sense which should have been more perfect in me than in others, a sense which I once possessed in highest perfection, a perfection such as few surely in my profession enjoy or have enjoyed.[45]

To be sure, Cage could conceivably be citing Beethoven to affirm the musical value of deafness made known through the composer's canonical status in the Western art music tradition. Yet Cage undoubtedly regarded Beethoven

as emblematic of the self-expression inherent in classical and romantic music that he so keenly disavowed in his appeals to negation, non-expression, and compositional objectivity.[46] He rather seems to be suggesting in a flippant way that, if given the choice between deafness and death, the musician should be inclined to choose death, thus simultaneously romanticizing and trivializing death while further stigmatizing deafness.

The figure of deafness qua silence figures prominently in Schafer's overarching acoustic ecology and leadership of the World Soundscape Project, a research initiative that sought to raise awareness around the perils of noise pollution. If for Cage deafness is remote, unthinkable, and far removed from his own experiences of sound, Schafer approaches deafness as a legitimate health hazard and increasing danger, with noise pollution having "reached an apex of vulgarity." For Schafer, noise pollution was a menace to the very musical sensibility he was seeking to nurture in his appeals to the ambient, primeval silence of the soundscape. He cautioned that "many experts have predicted *universal deafness* as the ultimate consequence unless the problem can be brought quickly under control."[47] The scale and urgency of Schafer's warning regarding the threat of noise-induced hearing loss is reminiscent of Bell's insistence that the creation of a "deaf variety of the human race" was imminent in the face of deaf-deaf marriage and the proliferation of manualism in the nineteenth century. Recall that Bell cautioned that the "production of a defective race of human beings would be a great calamity to the world."[48] While prelingual deafness and noise-induced hearing loss have markedly different causes and noise-induced hearing loss is not genetic but environmental, the shared panic between Bell and Schafer around the ostensible proliferation of deafness and their resulting suggestion that it need be averted lest deafness overtake and weaken the human species is arguably reflective of a similar logic.

In *The Book of Noise* (1977), Schafer reinforces the catastrophic scale of this threat in a section entitled "Noise: A Killer." The section features subsections with alarmist headlines in uppercase lettering: "A MILLION DEAF WORKERS" addresses the ubiquity of noise-induced hearing loss in the industrial workplace; "THE DEAF TEENAGER" addresses the risk of prolonged exposure to amplified music among young people; and "WHY THE AFRICANS HEAR BETTER" cites the absence of customary age-related hearing loss (i.e., presbycusis) among the Mabaan Africans, a single tribe in rural Sudan, as evidence that *all* Africans have "superior hearing" relative to their white Western counterparts due to their "noise-free environment."[49] Schafer uses these examples to champion better "aural hygiene" and noise-

abatement strategies, making clear that noise-induced hearing loss is a kind of *death*, where noise has the capacity to *kill* hearing, plainly evident from the heading "Noise: A Killer." The symbolic equation of deafness with death is evident in some of Schafer's other writings on silence and the soundscape. Though unnamed, the figure of deafness looms in his assertion that "silence is the outcome of the rejection of the human personality. Man fears the absence of sound as he fears the absence of life."[50] This statement makes the existential stakes of *true* acoustic silence known, while affirming the primacy of Schafer's hearing subject position.

The figure of deafness is thus ever present in Cage's and Schafer's musicalization of silence and their ethical reconstitution of listening. Deaf people, by contrast, are conspicuously absent, relegated to the extreme margins of sensory experience. Unlike Oliveros, neither Cage nor Schafer so much as acknowledges the multisensory dimensions of listening or makes room for a differentiated spectrum of hearing abilities.[51] Schafer's panic around the widespread degradation of hearing assumes musical perception is either severely compromised or altogether nonexistent. The postwar musicalization of silence hinges on a construction of hearing as an all-or-nothing requirement for musical perception; hearing and deafness are totalizing and diametrically opposed, with no middle ground between them.

Sound of Metal and the Figure of Deafness

The Academy Award–winning film *Sound of Metal* (2019/20) engages in a similar dialectics of silence through an immersive soundscape that adopts the standpoint of its main character, Ruben, a metal drummer, who is plunged into the depths of silence and existential despair when he suddenly loses his hearing. The film positions Ruben's hearing loss at the extreme outer threshold of human audition, directly transmitting that experience to the hearing viewer through its sound design, which I argue is a misguided simulation inspired by the filmmakers' visit to the anechoic chamber. Like Cage, the filmmakers emphasize the chamber's amplification of the subject's bodily interiority, what they describe as an insularity and isolation they readily equate with deafness. The film makes clear that what little remains of Ruben's hearing, coupled with any multisensory inclinations he exhibits in the months following the onset of his hearing loss, is ultimately insufficient and incomplete, incompatible with the protagonist's identity and worldview.

In the opening scenes, Ruben's hearing loss hits him hard and fast with very little forewarning. Several minutes in we see him backstage setting up



Figure 1. Official poster of the 2020 US release of *Sound of Metal*, Amazon Studios, 2019

the merch table with his bandmate and girlfriend, Lou, chatting away with a fellow touring band. He is suddenly overcome by a piercing inner ringing tone, which is followed by near complete silence. A panic-stricken Ruben quickly turns away from the group to conceal the look of terror on his face. He appears in the next scene on stage drumming away just as he had the night before. Only this time, while Lou screams into the mic, Ruben (and the viewer by extension) hears nothing but the rapid whooshing sound of his drumsticks as they charge through the air, pounding the drumhead and cymbals, which can scarcely be heard. He suddenly storms offstage in the middle of their set, pushing through the audience and fleeing the building as he gasps for air, tears streaming down his cheeks, at which point he reveals to the confused and dismayed Lou, whose voice is severely muffled, that "I can't hear anything!" Ruben's fateful confession is only comprehensible to the au-

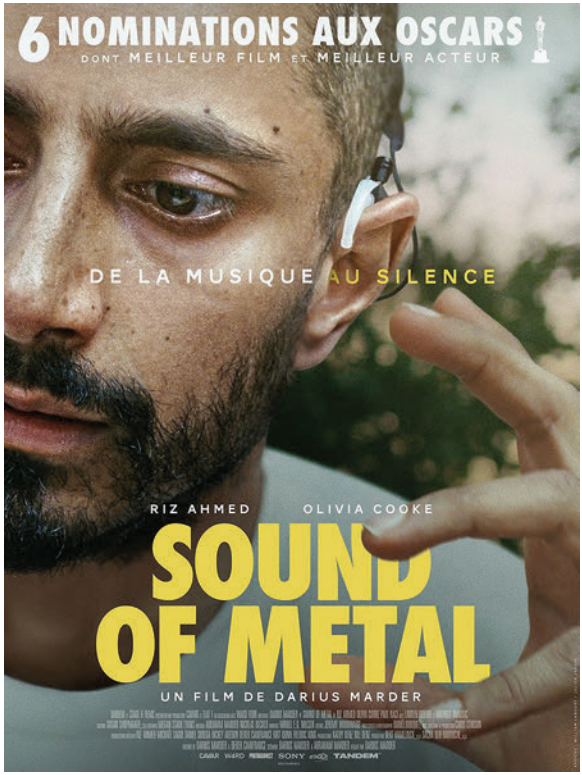


Figure 2. Official poster of the 2021 French release of *Sound of Metal*, Amazon Studios, 2019

dience because of the film's selectively embedded closed captioning, used for those prolonged and bleak moments when we are inhabiting Ruben's newly deafened point of view, an integral part of the film's sound design.

The next scenes work to establish significant distance and incoherence between Ruben and his outside world as the sound design alternates between his newly deafened perspective and that of the hearing viewer. Alice Alonso Limongi has described the emphasis on ambient noise in establishing the hearing audience's viewpoint relative to Ruben's subjective "point-of-audition sound" (Carreiro et al. vis-à-vis Rick Altman and Michel Chion) as a "tool of empathy," where the film "draws attention to the wealth of sounds heard on a daily basis, but ignored, and how one would miss them if they were suddenly gone," in Limongi's words.[52] These drastic perceptual contrasts also work to facilitate a breakdown in communication, with sound effects that double as poignant metaphors for Ruben's sense of loss and increasing social and sensory alienation. For instance, in a scene at the pharmacy, Ruben hears nothing but a low hum as the pharmacist yells and writes down

instructions, telling him that there is an audiologist that "can see you right now," his words muffled, as if spoken and heard underwater from a distance, as if Ruben were drowning. In the next scene, following a decisive and grim diagnosis of near profound deafness, the audiologist, in a scornful tone, tells Ruben to "eliminate all exposure to loud noises . . . the hearing that you have is not coming back . . . your first responsibility is to preserve the hearing that you have," words that sound far off and staticky as they crack and cackle, as if the audiologist is relaying a message over a radio with a weak signal to someone far off. It is as if Ruben is lost in outer space, alone on another planet, a destiny of his own making, emphasized by the audiologist's harsh pronouncement that Ruben need bear *responsibility* going forward. These increasing communicative impasses provoke an anger that overtakes Ruben, culminating in a violent episode where he destroys all of his gear and recording equipment in a fit of rage as his girlfriend Lou watches on in despair, her pleas for him to stop literally *falling on deaf ears*. Ruben ultimately yells at her, "I'm fucking deaf! What I need is a fucking gun in my mouth!" We later learn in a phone call between Lou and Ruben's sponsor that Ruben is actually a recovering heroin addict. Fearing the sudden onset of his deafness could trigger a relapse, Lou and the sponsor locate a deaf-run facility for recovering addicts, where Ruben eventually agrees to stay, begrudgingly accepting help in the face of no viable alternatives.

The remainder of the film charts Ruben's herculean struggle to overcome his rage and accept, navigate, and manage the complexities of his condition. For a time, he learns to live with dignity and self-respect among a deaf community, learning ASL and endearing himself to the director of the rehabilitation facility and his fellow residents. As his time at the facility draws to a close, he sells his drum kit, all of his gear, and even his trailer to pay for cochlear implantation. Following his surgery, he returns to the rehabilitation home in search of a loan from the director, who turns him away, insisting that Ruben is no longer welcome at the center, that his decision to get implanted is fundamentally at odds with the values of a community that teaches that deafness does *not* need to be fixed, that it is *not* a disability. The film ends with Ruben attempting to reconcile and reconnect with an ever-apprehensive Lou, as he adjusts to life with cochlear implants, evidently disappointed that they do not restore his hearing as he remembers it but rather facilitate a hearing that is tinny, distorted, and shrill, a disorienting experience to which the normative hearing viewer is aurally privy. So impactful was the film's "immersive world of silence" that the sound design was widely acknowledged as pathbreaking, taking home the Oscar for Best Sound and Best Film Editing in 2021.

Like Cage, the filmmakers' "search for silence" and way of getting "in tune with deafness," as the headlines purport, began in an anechoic chamber, an experience that was foundational to their conception of deafness and is a major part of the film's origin story. Sound editor Nicolas Becker explains that he and director Darius Marder wanted to "work with the idea of subjectivity, of inner sound," which prompted a trip to the Institute for Research and Coordination in Acoustics/Music studio's anechoic chamber, where they sought to fully experience the physicality of sound in silence and in total darkness, as is customary for the chamber. As Hagood explains, anechoic chambers enjoy a mythical status in the popular imaginary due in no small part to Cage's influence: "These are haunted spaces, places individuals enter alone to encounter the phantoms that haunt their minds and auditory systems. Places where people would go mad, if left alone there long enough."[53] For Becker and Marder, this was as close to an experience of deafness as they could hope for. Their description of their time in the chamber resonates so closely with Cage's that it is hard not to make a connection: "When you're in it, you start hearing the sound of your tendons and the blood flowing through your body."[54] This experience directly informed the film's focus on what the filmmakers call "body sound"—that is, "everything that you can hear through your body"—in addition to the descriptions of late-deafened cochlear implantees, to a lesser degree.[55] Becker explains that the sound design centers in large part on the amplified sounds of actor Riz Ahmed's body—his breath, voice, and the movements of his muscles and tendons. These sounds were captured during the filming using geophones, hydrophones, stethoscopes, and microphones: "We had a mic on the skull, we had a mic in the mouth and we had a mic on the chest."[56] He explains further that the intention was to create a sense of "isolation," where "the sound of your own body gets louder," a physical and psychological isolation to which the viewer is made privy.[57] Carreiro et al. explain that Marder strengthens the viewer's experience of Ruben's subjective point-of-audition and alienation through the visual technique of alternating between tight, zoomed-in, close-up shots and shots filmed from a distance: "Whenever Ruben is shot in close-up, the audience will hear the way he does . . . when there are cuts in the image and the camera moves further away from him, in occasional master shots, sound is again represented objectively."[58]

In these ways, the sound design and story are told overwhelmingly from a *hearing* perspective, offering a phenomenological approximation of what it would *sound like* to suddenly go deaf that often takes on an alarmist tone, reminding the hearing viewer of all that Ruben has lost and risks losing still—

his hearing, his music, his girlfriend, his sobriety, his dignity, his sanity, and ultimately, his life. In this way, *Sound of Metal* functions as a form of filmic "disability simulation." Disability simulation is the practice of adopting or recreating the physiological conditions associated with a particular disability, often through props and assistive technologies as a means of gaining insight into the disability in question. It is prominent in educational and rehabilitative health care settings, where typical configurations include a blindfold to simulate blindness, a wheelchair to simulate mobility impairment, earplugs to simulate deafness, et cetera. In fact, the filmmakers were even keen on "simulating different stages of hearing loss" for Ahmed throughout the shoot, equipping him with pink noise-transmitting earplugs.[59] Disability studies scholars make clear that the lived experience of disability cannot be reduced to a set of static physiological traits to be artificially mimicked or "put on" by an able-bodied person. Blind advocate Arielle Silverman writes that disability simulation artificially "thrusts people into disability without any training in alternative techniques or changeable environmental barriers. Such simulations are designed to produce fear and distress to play up the plight of disability."[60]

The sound design's emphasis on Ruben's bodily interiority and its simulation of his bodily sounds is fundamentally misguided in its assumptions about deaf sense-making and deaf subjectivity. The suggestion put forth by the sound design is that deafness entails an automatic inner amplification of the subject's inner bodily sounds that supersedes and overtakes external auditory and non-auditory sensory inputs, pushing the subject further inside himself. This reinforces a psychologically and physically isolationist view of deaf sense-making: Here Ruben is subsumed, consumed, and bounded by the sensory inputs of his own body and unable to fully grasp and *make sense of* the outside world. Moreover, in a filmic sleight of hand, recordings of the lead actor's inner "body sounds" stand in as "everything that you can hear *through* your body," thus conflating the sounds internal to Ruben's body with sounds external to his body, scrambling any concrete sense of interiority and exteriority and subject and object in ways that contribute to Ruben's ongoing disorientation and sense of being overwhelmed. This is arguably akin to what Hagood characterizes as the anechoic chamber's decontextualization of sound to the extent that its "very purpose . . . is to silence the context that forever remakes sound and meaning."[61] Indeed, Ruben's sense-making is bounded by a maddening feedback loop that silences the larger context that remakes sound and meaning. Moreover, the creation of this immersive soundscape required, as the filmmakers confess, a high degree of mediation,

custom-built sound recording and production equipment—what are in effect prosthetic listening devices—to zero in on sounds well beyond the range of normative human audition, while presenting them as a natural and realistic simulation of hearing loss.

In its simulation of deafness, then, *Sound of Metal* succumbs to an able-bodied bias, or "hearing gaze," so-called by Deaf filmmaker Jade Bryan, working to establish an empathic link between the deaf protagonist and the hearing viewer-listener through overdramatized aural deprivation. In the process, it reinforces a polarizing, irreconcilable division between hearing and deafness that defines Ruben's tragic struggle, a distance he can never fully bridge.[62] Many of the scenes simultaneously inspire gratitude and fear in the hearing viewer, particularly given the suddenness with which Ruben's hearing loss sets in, its seeming severity, and the extent to which it dramatically alters the course of his life. This notion of disability simulation is all the more poignant in the context of *Sound of Metal*'s casting: Whereas the filmmakers cast deaf actors and sign language users in several of the deaf roles, they maintain that casting a *hearing* actor (Ahmed) in the role of Ruben—the protagonist—was essential in order to "thrust [Ruben and the viewer] into an unfamiliar world."[63] Of this casting decision, Limongi writes:

> Although most other actors are Deaf, the film's main character, and the axis point for the thesis, is played by a hearing actor. Through Ahmed's casting and the decision to have him play intimate moments representative of Deaf life, the film suggests that an accurate portrayal of the most guarded times of the Deaf experience is perfectly represented by a non-Deaf actor.[64]

Moreover, in portraying a notably bleak view of deafness rooted in totalizing silence and a disproportionately severe, isolationist view of deaf sociality and sign language use, the film works to instill a newfound appreciation in the viewer for the precarity of their normal, intact hearing that is tinged with a sense of dread, knowing how it could be otherwise. The near constant and startling contrasts between hearing and deafness, between sound and silence, function both as a tool of empathy, to invoke Limongi's characterization, while leaving the viewer to wonder, *Could this happen to me?* This panic is evident from YouTube comments responding to some of the film's opening scenes: "This scene was scarier than anything I've ever witnessed in any horror or thriller film," "This movie made me realize why I have my ears," and "Silence is terrifying."[65]

The film ultimately perpetuates a range of misconceptions about hearing loss and deaf culture that merit further unpacking. While a ruptured ear drum or intense acoustic trauma could indeed trigger sudden onset hearing loss, noise-induced hearing loss typically develops over time, with early warning signs and triggers along the way. One audiologist further opined in a review of the film's inaccuracies that "audiologists do not quantify severity of hearing loss through percentage" the way that Ruben's does, presenting an oversimplified fiction that drives the point of Ruben's hearing loss home for the non-deaf viewer in terms they can readily understand.[66] Similarly, there is no discussion of steroid treatment or hearing aids, options that are less invasive and more affordable than cochlear implants. To that end, the film presents a monolithic and disproportionately severe view of the deaf community as fundamentally intolerant of cochlear implantation and speech, belying increasing fluidity between communication modalities among deaf people. Such practical, concrete information about the cause and specifics of Ruben's condition, and alternate pathways toward self-acceptance and belonging, are withheld from the viewer, omissions that intensify the overarching atmosphere of confusion, suspense, despair, and alienation.

From a musical standpoint, *Sound of Metal* succumbs to a stigmatizing representation of deafness that all but signals the end of music, arguably serving as a cautionary tale about the perils of frequent exposure to loud sound and an alarmist call for musicians to safeguard their hearing. We are told that the *true* sound of metal is deafening silence. Initially, the vulnerability of Ruben's newly deafened state is seemingly at odds with the idealization of hypermasculine power, control, grit, and resilience in the metal tradition, a fate he violently resists through his persistent fits of rage, which almost register as a form of overcompensation.[67] The automatic equation of disability with weakness often results in a feminization that makes disability doubly intolerable among men: an emasculating condition that risks destabilizing the hetero-patriarchal order.[68] Ruben's self-destructive rage and social isolation also arguably reinforce the historical conflation of deafness with madness; while hearing (and speaking) were central to normative constructions of human subjectivity and reason in Western metaphysical discourse, deaf-mutes were readily deemed mad, just as the process of losing one's hearing, as Ruben does, was believed to drive a person mad.[69] In time, however, Ruben begins to regain masculine composure by taking control over his life and making the most of his situation, even briefly reconnecting with his love of music, to the filmmakers' credit. For instance, in one scene, he discovers that he can feel the rhythms vibrating as he drums with his bare hands on the bottom

of an outdoor slide while minding a student at the local deaf school who has his ear pressed to the slide, a musical spark that culminates in a percussion demonstration for the deaf schoolchildren.

Yet the film stops short of fully developing any alternative musical futures for Ruben outside of an auditory framework. Any musical curiosity or sensibilities he exhibits through rhythm and visual cues are insufficient compensation for his audiological loss, a loss that becomes ironically more profound after implantation as he comes to the realization that his former hearing will never be restored. To that end, the film's final scenes work to cement the incompatibility of music and deafness through a series of striking auditory contrasts that highlight the alienating rift between normative hearing and implanted hearing, with music as the central reference point. In their meticulous spectrographic analysis of the film's sound design, Carreiro et al. note that the creation of Ruben's newly implanted sound universe is distinct from the objective, hearing sound and the protagonist's initial subjective point-of-audition established in the first two-thirds of the film: It is a universe replete with what they term "acoustic 'dirt,'" that is, high- and low-frequency metallic noises, distortions, modulations, and reduced audio quality, rendering sounds acoustically "grotesque" in ways that impact their intelligibility.[70] For instance, in the penultimate scene, Lou and her father sing a duet together at the piano as Ruben observes from a distance along with the other guests. His newly implanted hearing is tinny and garbled, the far-off, muffled sound of Lou's voice over the plinking piano accompaniment crackling through intense static, like a weak radio signal stuck between two stations. Film editor Mikkel Nielsen described the sound in this scene as deliberately lacking any three-dimensionality so as to create "a feeling of complete loneliness, and you being so disoriented because all of the sound sources come from everywhere," confessing that it was "almost like a horror movie for me as a hearing person."[71] This scene symbolizes not only the growing distance between Ruben and Lou, but also the irreconcilable discord between Ruben and the hearing and music he once knew; as Carreiro et al. write, the implant leaves "the sound world so unrecognizable that it becomes intolerable."[72] This logic culminates in the film's closing scene, fittingly titled "The Silence," wherein Ruben, upon hearing the warped, discordant sound of church bells, removes his processors, and the soundtrack abruptly cuts to total silence as he sits alone on a park bench in the middle of a city square, as if to signal his ultimate resignation, what the filmmakers describe as "the final scene of surrender."[73]

Sound of Metal dramatizes the customary construction of deafness as a

state of totalizing silence, instilling a sense of heightened panic in the hearing viewers as they are made to newly appreciate the extraordinary perceptual distance between hearing and deafness, undermining any aural middle ground and the value of multisensory forms of musical engagement. The film tells us that deafness is the specter that haunts all musicians, an audiological state of nearly total soundlessness, an ever-growing, irreversible silence beneath and beyond the threshold of normative audition and musical perception. The film ultimately reinforces and privileges an auditory construction of music, sidelining the musicality of rhythm, tactility, and visual motion—even for a percussionist—while altogether dismissing the potential musicality of technologically assisted hearing and the "heterogeneity of ear-listening."[74] As deafness is seemingly thrust upon him without fair warning, Ruben is involuntarily made to embody a profound, isolating, and enduring silence that is fundamentally at odds with his musical identity, an existential conflict that he can never resolve. Ultimately, *Sound of Metal* invokes the figure of deafness qua silence to signal the disqualifying limit of normative musical experience, enabling viewers to safely perceive and even *inhabit* deafness from their privileged, unmarked, normative position, thereby affirming the perceptual and cultural primacy of hearing over deafness in the process.

Cage, Schafer, and *Sound of Metal* all position deafness as a bleak state of silence and involuntary withdrawal in ways that reflect on anxieties and fantasies about the outer limits of human perception and subjecthood, the loss of music, and even humanity's impending decline. These examples call on the figure of deafness qua silence to raise the existential stakes of their respective musical agendas, framing deafness as an extreme point of contrast against which normative audition and idealized listening are formed. In so doing, they foreclose the possibility of a more diverse spectrum of auralities and of the multisensory, multimodal contours of sense-making and musicianship.

To counteract these foregoing portrayals of deafness, I next examine the role of silence in the creative work of American-born, Berlin-based sound artist Christine Sun Kim. In her hand-drawn scores, installations, and performed works, Kim foregrounds the visual-spatial and tactile dimensions of deaf sense-making as it spans sonorous and non-sonorous contexts. Her music speaks to the inaudible, multisensory dimensions of sound through predominantly visual-spatial means—written cues, musical symbols, and physical gesture—recasting music along non-sonorous lines in the process. I show that Kim's music operates, by and large, outside of an auditory framework, newly constituting listening along a visual-spatial and kinesthetic continuum, collapsing straightforward divisions between sensory types in the pro-

cess. Through engaging and visualizing diverse sensory inputs, Kim's music is unbounded by a dialectics of silence, rather reframing deaf subjectivity and musicianship through the concepts of bodily autonomy, perceptual agency, and musical-self-determination.

Christine Sun Kim's Ethos of Quiet Refusal

Exhibited along the east facade of the Henry Art Gallery at the University of Washington in Seattle is Christine Sun Kim's formidable site-responsive mural installation *Ghost(ed) Notes* (2024). Commissioned by the gallery and on display from January 2024 to January 2026, the mural features Kim's by-now iconic hand-drawn musical notation, presented in the manner of a score: a series of repeated, lone quarter notes—or "ghost notes"—float above and beneath three undulating four-line staffs, the notes rising, falling, and failing to fully puncture the inner and outer lines of the staffs as they seemingly pull away from the beams and note heads, narrowly escaping contact. This tension accounts for the staffs' distinctive ripple effect, with the ghost notes gathered and nestled in the rounded pockets at the outer margins of musical inclusion and signification. The title refers to one of the most dreaded and passive aggressive forms of rejection in "ghosting" or being "ghosted," where sent messages go unanswered (often "left *on read*") by a receiver who suddenly and inexplicably "disappears" through a complete withdrawal from communication, all but denying the sender's existence in the process. Kim intended the piece as a reflection on her perpetual exclusion from dominant systems of power, voice, and signification, where ghost notes "indicate a slight sound without a specific pitch, almost like a silence, but with rhythmic presence."[75] By contrast, she explains that the musical staffs stand in for the social institutions that have *ghosted* her upon request for reasonable accommodation, thus failing to recognize, make space for, and ultimately embrace deaf ways of being, a message poignantly reinforced through the mural's placement on the *outside* wall of an art gallery.[76] To behold and apprehend the mural or *score*, then, is to *quietly take note of* and reflect upon the structures, sites, and subjects of exclusion that form the "palpable gaps and notes left outside the margins of audibility," to realize that "no sound is incidental."[77]

By now a leading figure in the contemporary art world, Kim has exhibited her work and performed in some of the foremost art institutions and festivals in North America, Europe, and Asia, including the Museum of Modern Art; the Whitney Museum of American Art; PS1; the Rubin Museum; the Tate Modern; the Akademie der Künste; De Appel; White Space in Beijing;


GHOST(ED)
NOTES

Sound Live in Tokyo; and Festival Bo:M in Seoul. As Kim's artistic and political platform has reached a wider audience, it has resulted in impressive commercial success and mass appeal, thrusting her into the global spotlight, evident from her large following on Instagram and recent appearance in a Calvin Klein advertising campaign for International Women's Day.[78]

Over the years, Kim has developed a distinctive multidisciplinary creative practice that includes drawing, performance, installation, murals, billboards, sculptures, and video that is unified through a sustained exploration of sound as a form of "social currency."[79] Indeed, Kim's creative practice famously centers on "unlearning" what she terms "sound etiquette," a set of naturalized behavioral codes that dictate when and when *not* to make sound, an implicit social contract that divides sharply along hearing and deaf lines. Kim elaborates: "They [hearing people] would tell me: 'Be quiet. Don't burp, don't drag your feet, make loud noises.' I learned to be respectful of their sound. I saw sound as their possession."[80] As the daughter of Korean immigrants to the United States learning English and ASL simultaneously, Kim quickly came to understand sound as a locus of power and control that resided with the white hearing majority, acutely aware of the ways her own sound reflected racialized intergenerational anxieties around compliance and assimilation. As Roshanak Kheshti explains, "Kim's coming-of-age story narrates the hereditary transfer of a disciplinary apparatus which shushed and glared at her parents' racial noise on its way to chiding her racialized deaf noise."[81] Her creative mission thus culminates in a resolve to reclaim "ownership" of sound, subverting these asymmetries of power by freely exploring sound on her own terms through a strong recuperation of bodily sovereignty and perceptual agency as a blueprint for musical self-determination and world-building.[82]

Crucially, Kim's creative practice is decidedly uninhibited by a cultural dialectics of silence, where challenging preconceived ideas about deafness and its presumed relationship to silence is a recurring theme. The remainder of this chapter thus charts an ethos of quiet refusal in Kim's work. As Ian MacMillen, Darci Sprengel, Benjamin Tausig, and Yun Emily Wang persuasively argue, quiet can be an "analytic for heterodox politics, aesthetics, socialities, and intimacies that eludes binaries of sound and silence," particularly among minoritarian subjects and "muted speakers" who circumvent "a discursive norm in which loudness equals audibility," where quietness forges

Figure 3. Christine Sun Kim, *Ghost(ed) Notes*, 2024. Mural. Photo credit: Jueqian Fang. Shared courtesy of Christine Sun Kim, François Ghebaly, Los Angeles and New York, WHITE SPACE, Beijing, and Gallery Hyundai, Seoul.

"dissident links at the margins of sonic realities."[83] They suggest that quiet resonates with anthropological notions of *refusal*, where refusal is understood as "an act of withdrawal from the stewardship of a sovereign authority, whose offers of uplift may be just as unwelcome as its modes of discipline."[84] In Kim's creative output, quiet refusal indexes a disavowal of oralism and audism through both a refusal to "voice" and a refusal to comply with sound etiquette. She very clearly rejects the three "sites" H-Dirksen L. Bauman supplies in his definition of audism, cited in chapter 1: that is, "1. the notion that one is superior based on one's ability to hear," "2. a system of advantage based on hearing ability," and "3. a metaphysical orientation that links human identity with speech," in other words, *phonocentricism*.[85] I argue that Kim's quiet refusal entails a simultaneous opting out of the shame ingrained in the sonic logics of racial assimilation. Indeed, Cathy Park Hong has argued that sound and shame are foundational to the formation of racial others and ingrained in the model minority myth to which Asian Americans are subject, where shame is a "minor feeling" insofar as it fails to register in hegemonic affective paradigms.[86] Kim likewise highlights the ways her "Korean-ness" "shows up in my work" as an underlying affect relative to the more explicit focus on her deaf identity, that is, "in terms of *emotional* responsiveness" articulated through a wry, blunt humor that she frames as "a method of survival."[87]

Kim's quiet refusal finds its voice through an idiosyncratic integration of visual-spatial cues from ASL, notational symbols from glossing, closed captioning, and Western music notation, a language that *speaks to* the multimodal unruliness of deafness and its diverse semiotic repertoires, concepts described in chapter 1 vis-à-vis the work of Friedner and Kusters.[88] Kim's aesthetic vocabulary permeates her work regardless of scale or specific media, often taking the form of a hand-drawn score, of which *Ghost(ed) Notes* is an example, typically featuring the repetition of a single musical cue—*p*, *f*, notes, rests, bar lines, et cetera—with titles that often double as pithy one-liners, sometimes visually supplemented with other insider cues from Deaf culture. Kim's language of quiet refusal neither precludes sound nor denies sound experienced through aural means, but simply champions an understanding of music that is not contingent upon auditory perception and sonorous forms of expression. As Julia Silvestri has made clear, the conceptual capaciousness of sound among native sign language users transcends the sonorous such that active visual-spatial fields are readily characterized as loud, noisy, and musical through organized movement.[89] In these ways, I approach *quiet refusal* as a multisensory, multimodal ethos that is unbounded by straightforward divisions between sound and silence and between audible and inaudible.

Kim's aesthetics of quiet refusal can also profitably be understood relative to the politics of sound, silence, and language in the formation of diasporic racial others. Patti Duncan argues that Asian Americans have been made to occupy a silent position at "the margins of language and culture," whether through internment, migrancy, indentured servitude, or what Cathy Park Hong has written about as the model minority myth. Writes Duncan, "The price of assimilation into and acceptance within US culture has often been enforced silence. Asian American women are then both praised and blamed for their perceived silence"[90] and its associated passivity, deceptiveness, and inscrutability.[91] For Duncan, reclaiming the power of silence serves as "a means of resistance to the seemingly impossible task of becoming (white) American-feminine."[92] Hong adopts the opposite strategy through a resolve to *unmaster* English, as she describes in her essay "Bad English," which gives voice to the intergenerational anxieties in the false promise of linguistic and racial assimilation: "It was once a source of shame, but now I say it proudly: bad English is my heritage . . . To *other* English is to make audible the imperial power sewn into language, to slit English open so its dark histories slide out."[93] The semiotic and multimodal richness of Kim's language of quiet refusal sits at the crossing of Duncan's and Hong's approaches. At the risk of inverting and muddying sensory and linguistic registers, Kim's work asks us what might it mean to *other* sound and its attendant norms and etiquette, and to do so *quietly*? How can the power sewn into music be made *visible* through the lived experiences of subjects at "the margins of sonic realities," to also invoke MacMillen, Sprengel, Tausig, and Wang's verbiage?

The figure of deafness is an object of explicit contestation in Kim's scores, where she subverts a pathologizing, deficit construction of deafness to reflect anew on the multimodal, multisensory unruliness of deaf subjectivity. Accordingly, *Pianoiss . . . issmo* (2012) appeals to the elusiveness of silence by substituting decibels (i.e., dB), the standard unit used for measuring the amplitude of a sound and quantifying degrees of hearing loss, with *pianos* (i.e., *p*), a dynamic marking used to signal "quiet" in a way that is open to subjective interpretation and free of any concrete, objective measures or frames of reference. Kim describes her rationale as follows: "Although people often associate silence with deafness, when I started employing sound in my art, I saw how little I actually knew about silence."[94] By dividing *p* into successively quieter increments with a mathematical precision akin to rhythmic subdivision, then, Kim suggests that "no matter how many thousands upon thousands of *p*s there may be, you'll never reach complete silence. That's my current definition of silence: a very obscure sound."[95]

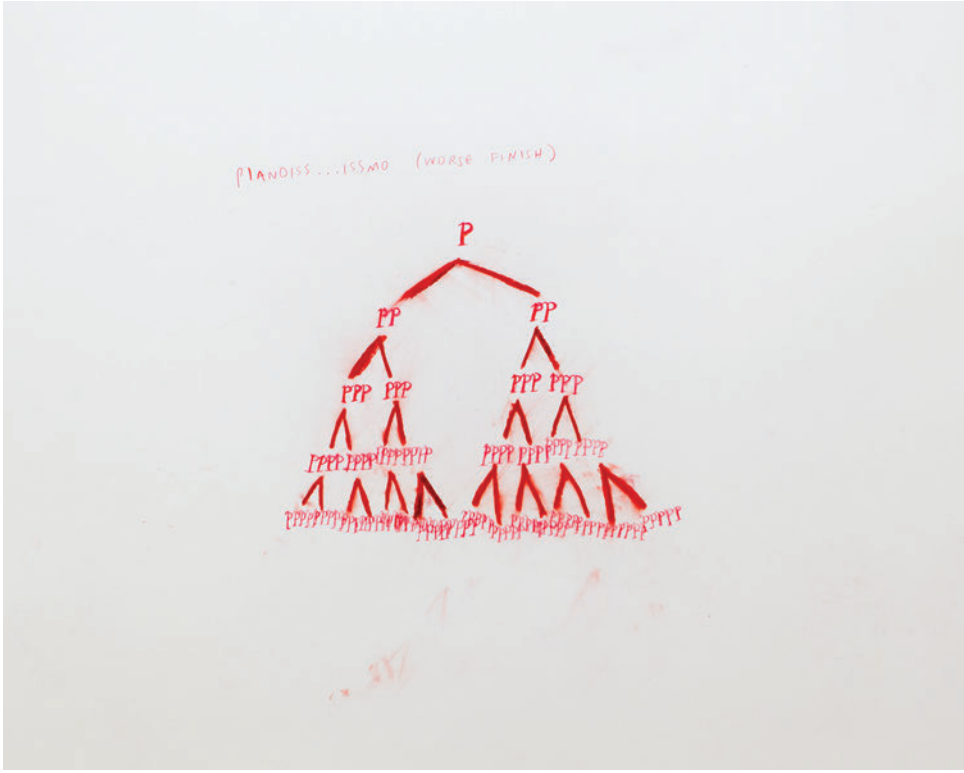


Figure 4. Christine Sun Kim, *Pianoiss . . . issmo (Worse Finish)*, 2012. Pastel and pencil on paper. 38½ × 50 × ⅛ in. (97.8 × 127 × 0.3 cm). Photo credit: Erica Leone. Shared courtesy of Christine Sun Kim, François Ghebaly, Los Angeles and New York, WHITE SPACE, Beijing, and Gallery Hyundai, Seoul.

In many of Kim's scores, music notation sheds new light on the visual-spatial dimensions of sign language that written language alone fails to capture, all the while making light of certain striking similarities between music notation and the manual shapes of ASL.[96] In particular, the written code system developed to visually transcribe and convey ASL, often called a "gloss," functions "very much like the staffs, symbols, and notes of musical notation systems" and requires formal training and cultural insider knowledge to decipher.[97] As Chae-Lin Kim explains, "Kim applies the mechanics of gloss to her drawings, because her drawn lines indicate musical symbols that come from hearing (music) culture and/but which are used to notate ASL-signs."[98] She observes that among the most prominent and recurring

examples of this integration can be seen in Kim's consistent use of a four-line staff, as in *Ghost(ed) Notes*, as opposed to the usual five-line staff found in Western music: The word "staff" is signed bending the thumb behind the *four* out-stretched fingers of the hand, and moving the arm across the horizontal plane. The same handshape can be used to sign "rainbow" through creating a curved line with the arm that closely mirrors the shape of a rainbow, a manual continuity Chae-Lin Kim explains is cleverly conveyed in Kim's 2014 work *Rainbow as Score* (2014).[99]

In *The Sound of Temperature Rising* (2019)—which is from Kim's larger "Sound Of" series—the rainbow staff doubles as four sets of ties or slurs, while indicating a successive increase in register and rhythmic intensity as the four arcs of the rainbow, each corresponding to one half note, fan upward and across the page, giving rise to four quarter notes at the end of each line.[100] Kim here assigns the invisible cutaneous perception of an increase in temperature a dynamic *sound* expressed through a sweeping visual-spatial gesture that resonates in both manual and musical contexts, while also serving as an apt visualization of an environmental or psychosomatic process, like a spike in blood pressure, the quickening of one's heartbeat in a heated moment, or as Kim suggests, an increase in metabolic speed tied to pregnancy.[101]

How to Measure Loudness (2014) turns "hearing loss" on its head by substituting decibels (i.e., dB), the standard unit used for measuring the amplitude of a sound and degrees of hearing loss, with *fortes* (i.e., *f*), a dynamic marking used to signal loudness. Arranging her score in the manner of a decibel chart, Kim supplies her own written example sounds, such as "*fffffff* hot sweaty concert," "*fff* subway announcement," "*f* silence into speech," and "*mf* sleep." Some of her examples do not ordinarily correspond to a sound: "*ffff* Asian flush," a common term for the medical condition "alcohol flush reaction," refers to the heated, blotchy facial glow some people experience upon drinking alcohol that is notably common among people of East Asian descent, a physiological reaction caused by the release of a toxin as the body metabolizes alcohol.[102] By describing this phenomenon in terms of loudness, Kim arguably suggests something about the acoustic setting where alcoholic flush might be likely to occur—a party or dinner with friends, a bar, a club—and the conspicuous, public nature of the experience, where "loud" serves as a metaphor for describing an inconspicuous and highly visible phenomenon. The companion piece, *How to Measure Quietness*, proceeds according to an identical visual formula using *pianos* (i.e., *p*), which are paired with a similarly poignant commentary on the inscrutability of silence, where degrees of quiet are equated with things like "heartburn," "anxiety," and "silent treatment."

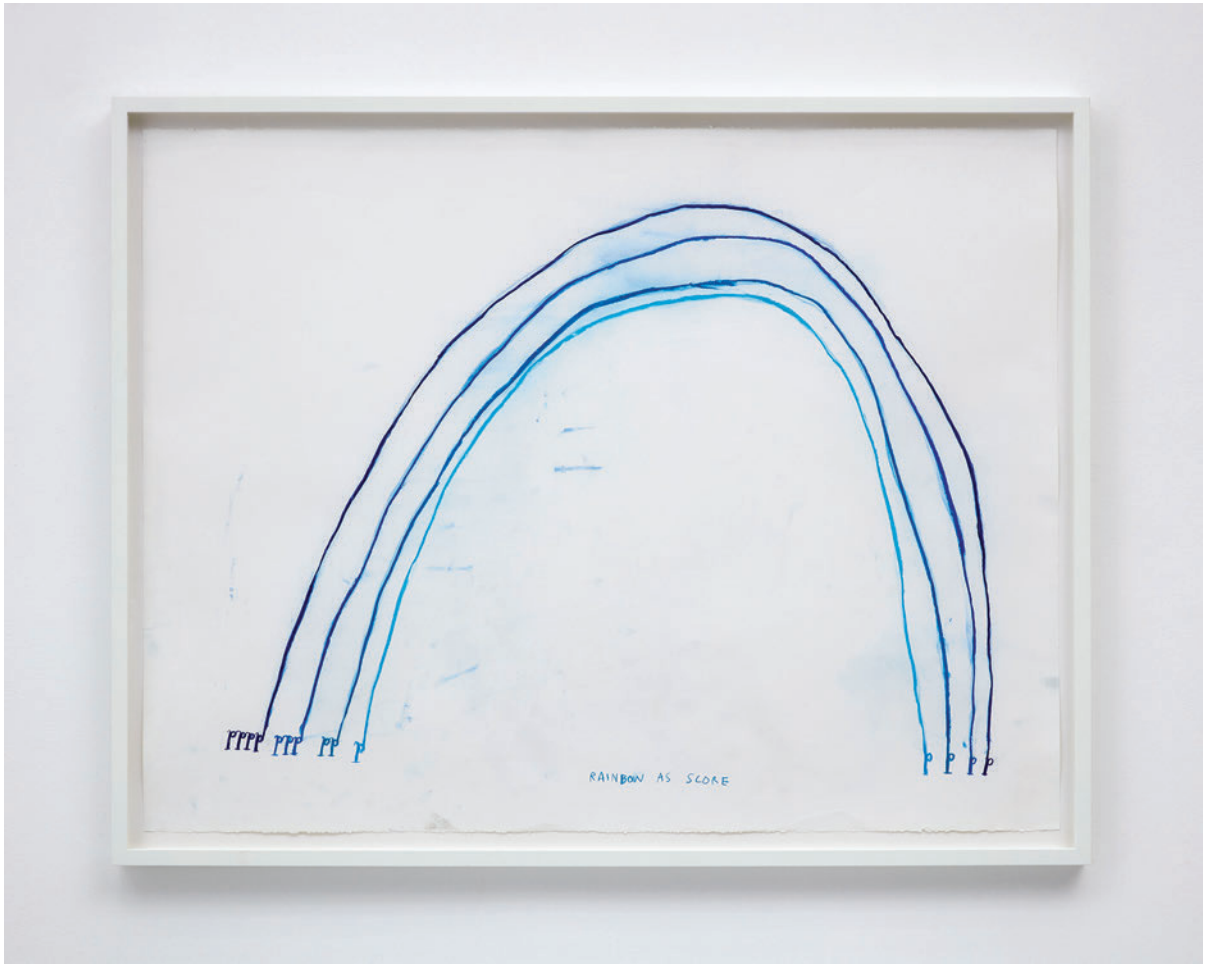


Figure 5. Christine Sun Kim, *Rainbow as Score*, 2014. Dry pastel and pencil on paper. 38 × 50 in. (96.5 × 127 cm). Photo credit: François Ghebaly Gallery. Shared courtesy of Christine Sun Kim, François Ghebaly, Los Angeles and New York, WHITE SPACE, Beijing, and Gallery Hyundai, Seoul.

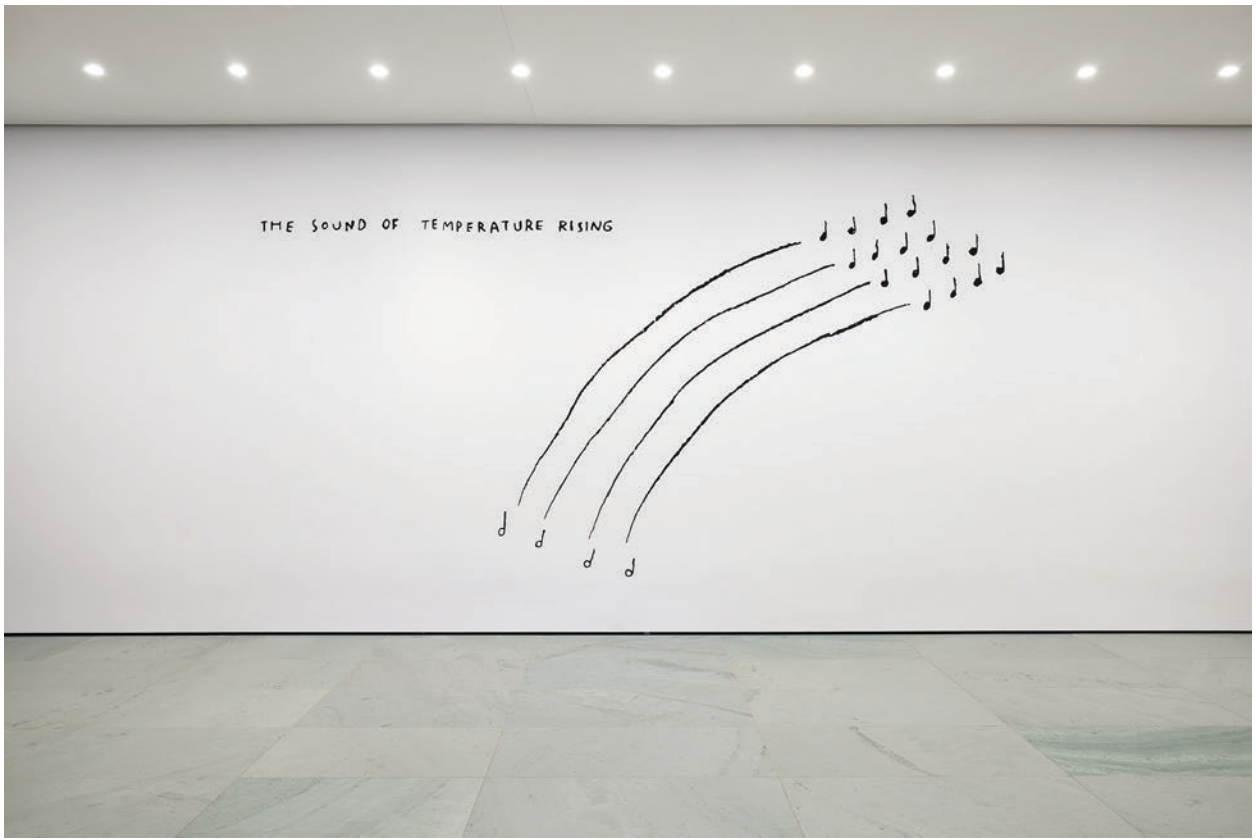
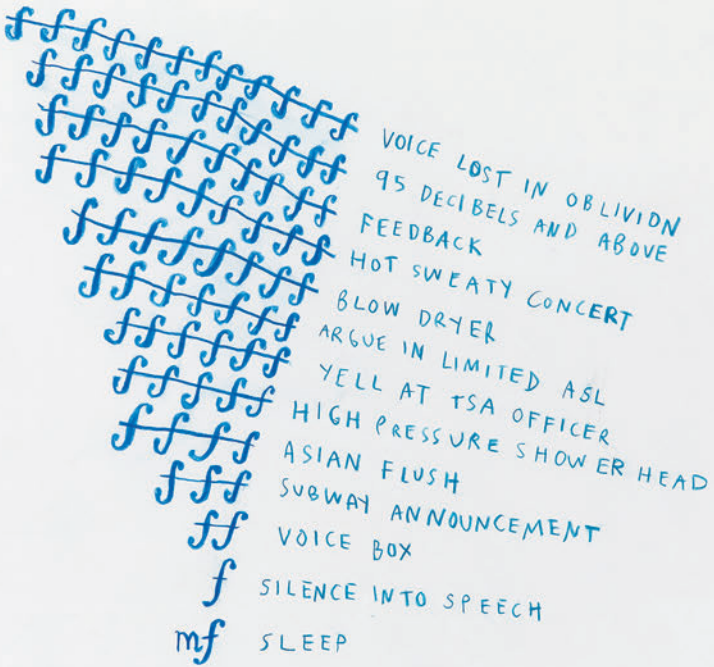


Figure 6. Christine Sun Kim, *The Sound of Temperature Rising*, 2019. Mural. Photo credit: MoMA. Shared courtesy of Christine Sun Kim, François Ghebaly, Los Angeles and New York, WHITE SPACE, Beijing, and Gallery Hyundai, Seoul.

HOW TO MEASURE LOUDNESS



In *How to Measure Loudness* and *How to Measure Quietness*, Kim thus shows that, whether hearing or deaf, we gauge degrees of loudness and quietness through the built environment, social interactions, intimate physical states, and subjective frames of reference that more readily correspond to the vagueness of dynamic markings than to dBs. *Forte* and *piano* imply successive and relative increases and decreases in volume that are unbounded by quantifiable audiometric thresholds or a pathologizing measure like "95 decibels and above," the audiometric marker of "profound deafness." Kim's message is amplified through both transcripts' overt conical shape, a visual reference to various spatial forms of amplification and instruments of aurality: the contours of a gramophone horn, a loudspeaker, a trumpet, the shape of the human ear. To the extent that they showcase the interdependence of one's listening and conception of loudness and quietness with the built environment, *How to Measure Loudness* and *How to Measure Quietness* challenge any sense of a biologically normate subject with perfect, unmediated hearing.

In *Muffled Club Music* (2016), Kim uses quarter notes to supplement an oft-used style of nondescript closed captioning for deaf and hard of hearing viewers. Though suitable for dialogue and song lyrics, captions for nonverbal ambient sounds, background noise, and instrumental music are often generic and unimaginative. In this case, "club music" is a vast and varied category and is also possibly a situational cue, while "muffled" merely signals diegetic depth: The caption thus reveals little about the actual music playing in the background. Where the caption fails, the percussive quality of Kim's score brings the music to life, giving it shape, direction, texture, weight, and tactility: the steady rise and fall of the quarter notes captures the rhythmic intensity of bass-heavy "club music," a loud, immersive phenomenon that is *felt* as rhythmic pulsations penetrating the body more readily than it is *heard* as a melody, reinforced through omission of a staff.

Stairway for a Composer to Work In (2016) and its companion score, *Studio for a Composer to Work In* (2016), affirm the generative role of quietude as a precondition for music and its attendant expressive potential through successive separate blank measures made from Kim's signature four-line staves, organized into separate columns and rows. Together with their programmatic titles, the scores read as tabulae rasae, sites of musical possibility, the be-

Figure 7. Christine Sun Kim, *How to Measure Loudness*, 2014. Dry pastel and pencil on paper. 38 × 50 in. (96.5 × 127 cm). Photo credit: Ismail Noor / Seeing Things. Shared courtesy of Christine Sun Kim, François Ghebaly, Los Angeles and New York, WHITE SPACE, Beijing, and Gallery Hyundai, Seoul.



Figure 8. Christine Sun Kim, *Muffled Club Music*, 2016. Charcoal on paper. 19.68 × 25.6 in. (50 × 65 cm). Photo credit: Kell Yang Sammataro. Shared courtesy of Christine Sun Kim, François Ghebaly, Los Angeles and New York, WHITE SPACE, Beijing, and Gallery Hyundai, Seoul.

ginnings of an open-ended, yet-to-be determined creative process, signaled through the omission of a time signature, key signature, clef, and double bar lines, musical symbols that would otherwise impose parameters, rules, and limits on musical sound and musical time. To that end, Kim deploys "staves not as static objects, but rather as dynamic moving figures that can be expressed through manual signs,"[103] where "the lines already contain sound through subtle smudges and smears. In Deaf culture, movement is equivalent to sound," as Kim explains to Chae-Lin Kim.[104]

Stairway and *Studio* read as a powerful rejoinder to French modernist humorist Alphonse Allais's *Funeral March for the Obsequies of a Deaf Man* (1897), a score whose twenty-four blank measures imply, in no uncertain

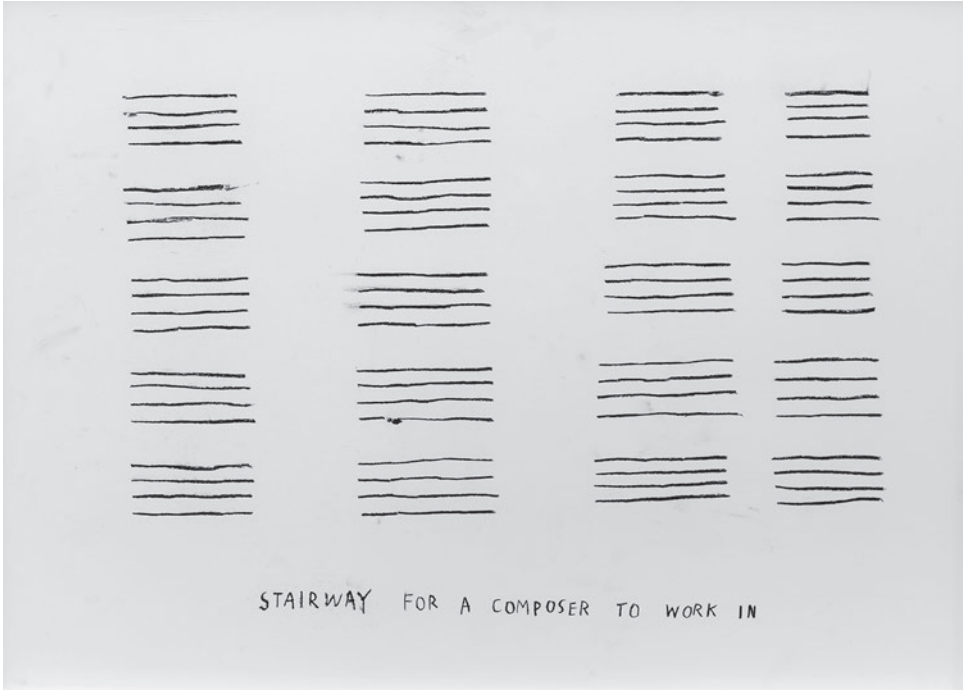


Figure 9. Christine Sun Kim, *Stairway for a Composer to Work In*, 2016. Charcoal on paper 19.69 × 27.56 in. (50 × 70 cm). Frame size: 20.47 × 28.35 × 1.38 in (52 × 72 × 3.5 cm). Photo credit: Greene Naftali. Shared courtesy of Christine Sun Kim, François Ghebaly, Los Angeles and New York, WHITE SPACE, Beijing, and Gallery Hyundai, Seoul.

terms, that music ceases in deafness, equating it with absence, emptiness, and the finitude of death. They also speak back to Cage and *4′33″*, affirming the intangible nature of silence from the seemingly antithetical position of deafness. In so doing, they quietly refuse the naturalized associations of deafness with absolute silence, while *holding space*, both figuratively and literally, for the multisensory, multimodal dimensions of musical expression. If *Ghost(ed) Notes* speaks to her exclusion from hegemonic systems of signification and institutional spaces, these scores see Kim making room for herself as a *composer*, full stop, whether in the unlikely, if resonant space of a stairway or the private confines of a studio, establishing kinship with the feminist ethos of Virginia Woolf's *A Room of One's Own* (1929).

In Kim's hand-drawn scores, notation is unencumbered by pitch and measured time, instead serving alongside words as a quiet rhythmic soundtrack,

just as dynamic markings are abstracted from musical notation and harnessed in place of decibels to convey varying degrees of intensity, be it sonic, physical, or emotional. Through a signature economy of means, she bestows sound with color, texture, and affect, inviting the hearing viewer to newly contemplate the embodied dimensions of sound through visual-spatial attentiveness, nurturing an expressive continuity among music, sign language, and the written word. Kim's scores also convey spatial depth, movement, tactile immediacy, collapsing the divisions between musical sound and musical time and between discrete sensory types, where viewing is feeling is listening and so on.

Kim's scores are reminiscent of mid-century graphic notation and text-based scores like Oliveros's *Sonic Meditations*. Developed in collaboration with a running workshop of women participants, the meditations offer instructions for drawing attention to different facets of sound and silence, joining ambient hearing with focused embodied listening, what Oliveros called "Deep Listening," her trademark. They can be performed alone or in a group, with or without musical instruments. They presume neither the ability to read music nor any formal musical training, in order to ensure that anyone can participate in making sounds, where "music is a welcome byproduct."[105] Even the brevity and physicality of Kim's scores resonates with Oliveros's Meditation no. 5: "Take a walk at night. Walk so silently that the bottoms of your feet become ears."[106] Similarly, Kim's scores ask little of us in terms of time and skill. Yet, rather than reading as directives with an explicit set of actions to be performed, Kim's scores read as statements on the implicit role of sound in systems of power from the standpoint of a subject at the cultural margins of the hearing world. In these ways, her scores invite quiet self-reflexive contemplation on the part of viewers rooted in their own subjective cultural frames of reference as they interface with Kim's experiences as a deaf woman of color. To read her scores as a hearing person is to encounter an idiosyncratic musical language that refuses the ingrained structures and syntax of majoritarian systems of signification.

Through a substantive corpus of work and the ever-widening scale of her work, Kim has taught the hearing world to *read* her language and to *listen*, including in times of crisis when words and dominant modes of communication have failed. For instance, during the height of the pandemic in May 2020, handwritten in white uppercase letters at the top of several large digital billboards in Times Square, New York, the salutation "Dear Essential Workers" appeared. Underneath were five hand-drawn, beamed eighth notes, stacked one on top of the other. The note heads were spaced wide enough



Figure 10. Christine Sun Kim, *Dear Essential Workers*, 2020. Digital billboards with animations. Photo credit: Maria Baranova and Times Square Arts x For Freedoms. Shared courtesy of Christine Sun Kim, François Ghebaly, Los Angeles and New York, WHITE SPACE, Beijing, and Gallery Hyundai, Seoul.

apart that the beams connecting them doubled as five lines of a blank musical staff, in one case, wrapping around the bottom corner of a skyscraper. A second passed before the words "thank" and "you" appeared in the same handwriting, this time in pale blue: a "thank" for each of the note heads on the left side of the screen, and a "you" for each of them on the right. The regularity of the flashing *thank yous* and their syllabic setting, read left to right, cued the viewer to clap, say, or sing the words—internally or aloud—in support of New York's frontline workers, echoing the then daily 7:00 p.m. citywide #ClapBecauseWeCare. The empty staff lines, by contrast, prompted quiet reflection, an invitation to *stand still* and *hold space* in what was an otherwise busy, boisterous commercial arena so that viewers might grieve the thousands of lives lost. Striking in its concision, the ode conveyed sincerity, intimacy, and solidarity amid prolonged social isolation, part of a collaborative art campaign honoring essential service workers through digital "public service announcements" in New York, Boston, and Chicago, featuring pieces by more than thirty artists and designers.[107]

Kim's ethos of quiet refusal is likewise central to her performed works, most notably in *Face Opera II* (2013), where it reflects on normative constructions of voice, as I have extensively detailed elsewhere. As Maler writes, "Our dominant ideology of voice in Western culture privileges the audible voice and understands the voice as emerging from the human mouth," a phonocentric ideology that has had a historically detrimental impact on deaf ways of being.[108] In the five-act opera, then, Kim and a group of fellow prelingually deaf performers and sign language users offer what Kim notes is "a commentary on how society places value on vocal and spoken languages" at the expense of visual languages by *singing* using silent facial expressions belonging to the ASL lexicon without reference to preexisting sounds.[109] Indeed, sign language "is utterly corporeal," to quote Alexis MacIntyre, executed through a simultaneity of manual signs and specific facial expressions and markers, including mouth shapes and head, shoulder, and body movements called "non-manual signals" that help stabilize and contextualize handshape use and elucidate grammar.[110] In these ways, "the signed voice is inalienable from the body, which is not only the site of expression, but the expressive medium itself," as MacIntyre observes,[111] collapsing the division between material and symbolic constructions of voice, "a site of interplay between 'voice as symbol' (e.g., of agency) and 'voice as sound and material,'" to borrow Eidsheim and Annette Schlichter's verbiage.[112]

In *Face Opera II*, Kim isolates and musicalizes the nonmanual facial aspect of sign language through adopting the "opera format to encourage them [the audience] to 'hear' by looking at [the] choir singers' moving faces," in her words.[113] Throughout acts 1–4, Kim and her eight collaborators *sing* using silent interstitial visual-spatial gestures conceived and executed without any auditory frames of reference, alternating between conductor and chorus roles. For instance, the first act, "Open Eight," stages ASL facial expressions to a series of unrelated concepts that could hypothetically be signed using the "open eight" handshape, hence the act's title. Reading from an English transcription of the ASL concepts—what I earlier described as a gloss—on an iPad screen that is deliberately visible to the audience, the conductor leads with her unique facial interpretations. The chorus then responds with coordinated and precisely timed facial gesture, keeping their hands firmly stuffed into their pants pockets, eliminating the strong physical impulse to also sign with the hands.[114] The gloss contains successions of closely related sentiments such as the consecutive sequencing of "early," "obsessed," and "sick," as well as many striking and oftentimes humorous juxtapositions like the immediate progression from "depressed" to "masturbate," expressive contrasts that are markedly visible on the singers' faces.



Figure 11. Christine Sun Kim, *Face Opera II*, 2013. Performance. Photo credit: Conrado Johns. Shared courtesy of Christine Sun Kim, François Ghebaly, Los Angeles and New York, WHITE SPACE, Beijing, and Gallery Hyundai, Seoul.

Face Opera II refuses the customary coupling of singing with audition by severing the related associations between the singing voice and the vocal cords, forging a new form of sung expression that is unbounded by the sonorous. This conception of music aligns with what Maler characterizes as the visual, spatial, tactile, and kinesthetic nature of non-sonorous deaf musicking and song signing in which music is understood as "culturally defined, intentionally organized movement," what Maler calls the "signing *singing* voice."[115] As Eidsheim contends, "the ontology of singing is masked by our fetishization of sound . . . the singing body extends beyond that which we conventionally recognize as the vocal instrument."[116] To apply Maler's modification of Brian Kane's model of voice, Kim and her collaborators displace the singing voice from its assumed origin in the vocal tract to locate and initiate vocal expressivity (*topos*) elsewhere on the body, suggesting that singing does not require vocalized sound (*echos*) as a fundamental precondition for its existence, but simply embodied *motion*, what Maler argues takes the place of sound in signing.[117] In so doing, Kim not only draws attention to the expressive function of bodily gesture (*logos*) in operatic and other forms of singing, but implores her audience to consider the inherent musicality of ASL facial expressions in isolation and without supplying a manual handshape, bracketing off sound and hearing in order that audiences might listen primarily through visual-spatial attentiveness.[118] Where the musicalization of facial expressions in the signing singing voice is concerned, as in *Face Opera II*, Maler argues that the expressive facial trajectory of tension and release executed through movement is precisely what "makes the face sing."[119]

Face Opera II refuses the musical primacy of the sonorous and the formal distinctions between musical sound and musical time. To *listen* to *Face Opera*, hearing audiences need to suspend the usual expectations that come with pitch-oriented conceptions of melody and phonocentric conceptions of voice. Indeed, in the signed voice, "rhythm adumbrates an embodied voice unbound to hearing or vision or any exact spatial dimension—rhythm as the unfolding of actions in time, the verbing of voice, or voicing as a process," as MacIntyre writes.[120] She argues further that "when pitch is treated as a subjective property of the sung voice, and not its ontological requisite, the absurdity of a Deaf musician is less credible."[121] In *Face Opera II*, the equivalent to "melody" is enacted through contrasting rhythmic gestures that are not tied to frequency but to translingual concepts embodied and enacted by the performers in time and space. As a piece of music, *Face Opera II* ultimately collapses the division between the sonic artifact (the sign) and motion/gesture (the signified) in normative linguistic and musical frameworks, where

rhythm and melody coalesce on the surface of the body as non-sonorous, visual-spatial gesture.

And yet *Face Opera II* is not altogether without intended sound, a fact that I want to suggest deepens Kim's ethos of quiet refusal, particularly as it reflects on the privileges conferred through phonocentric voice. In act 5, "Soupoon," the opera's preceding silence gives rise to a deliberate sonic rupture wherein the singers *voice* for the first and only time in the performance. Here the conductor signs purposefully without facial expressions, leading the chorus in a story from deaf folklore. A performer serving as intermediary then supplements the signing with his own improvised facial expressions and *vocalizations* in an attempt to contextualize the meaning of the conductor's signs, projecting his voice through a microphone. The singers assemble in a line facing the conductor, laying their right hands on one another's backs to gauge the volume of their neighbor's voice as it vibrates along the spine, while simultaneously observing the intermediary's mouth shapes, creating their own vocalizations accordingly. Their nonverbal vocalizations occur in fits and spurts, ranging from abrupt, guttural, intoned noises to sustained howls and yells; they are knowingly imprecise, and fluctuate drastically compared with the rhythmically synchronized silent gesture of the preceding acts. Fittingly, the act's title is a playful misspelling of the word "spoon," a typographical representation of what originated as a *mishearing* on Kim's part when attempting to deduce the intermediary's vocal cues through lipreading, and without the help of facial expressions to contextualize the conductor's signs.

"Soupoon" challenges the long-standing pathologization of deaf vocal utterance through vividly recalling and inverting the performative dynamics of a speech therapy session. An outgrowth of oralism, speech-language pathology (SLP), or simply speech therapy, is a clinical practice that diagnoses, treats, and prevents different types of speech and communication "disorders" through entraining normative phonation and elocution using a wide variety of imitative techniques.[122] Many prelingually deaf people are intimately familiar with speech therapy, particularly if they were born to hearing parents, use a hearing aid or cochlear implant, or attended a mainstream (i.e., non-deaf) school.[123] Whereas for many deaf people, speech therapy can be empowering, facilitating integration with hearing society, for others, speech therapy can prove demoralizing and even traumatizing, as Arden Neisser details in *The Other Side of Silence*.[124] Even the manner by which the singers in act 5 ascertain the sound and the shape of their neighbor's voice through intimate tactile cues poignantly invokes the mimetic nature of speech therapy as well as its discomforting physical intimacy, where deaf patients are sometimes

prompted to even feel the speaker's voice box to better grasp the mechanics of vocal production.[125] Joshua St. Pierre and Charis St. Pierre argue that, more generally, SLP "emerged as a response to the early twentieth-century demand for docile, efficient, and thus productive speech" as an extension of the "increasing centrality of communicative networks within modern society and the need for a corresponding apparatus to govern speech."[126] They argue that the practice of "speech correction" was and is in no uncertain terms a form of discursive power enforced through *bodily contortion* by the *disciplining* of the unruly tongue so that the disabled speaker might conform to the "dominant norms of communication," what was and remains a means of integrating and assimilating "disabled speakers into the productive flows of communication."[127] SLP focuses on developing communicative competence in deaf and hard of hearing children through speech and language, while ridding the voice of any characteristic markers of deafness, the underlying idea being that deaf vocality is "unattractive or ugly."[128] To that end, Maler highlights the negative reaction on the part of many deaf viewers of the film *CODA* to Ruby's—a hearing child of deaf adults, that is, a CODA—description of her families' voices as "ugly," explaining that many viewers confessed to having endured humiliation in school and in speech therapy on the same grounds.[129]

Kim notes that a few of her fellow performers were triggered by such histories and connections and were "uncomfortable with the idea of uttering or vocalizing something that would automatically get away from their bodies and be heard by the [hearing] audience."[130] For the willing participants, however, it offered a unique opportunity to challenge the normative contours of phonocentric speech and the narrowly defined standards of vocal beauty in the operatic singing tradition in keeping with the piece's title.[131] Kim ultimately concludes that "performing this act was an amazing experience because we felt it went against what we had been taught but liberating at the same time."[132]

Kim's defiance regarding this moment of vocalized rupture recalls deaf writer and author Albert Ballin's strong rebuke of oralism in the opening of his 1930 book *The Deaf Mute Howls*:

> Long, loud and cantankerous is the howl raised by the deaf-mute! It has to be if he wishes to be heard and listened to. He ought to keep it up incessantly until the wrongs inflicted on him will have been righted and done away with forever. . . . His peculiarities and grotesque characteristics are created by you—one of the fortunate blessed with speech. They are caused by your ignorance of the real situation

> and by your unintentional neglect of his crying needs. . . . You are so deceived by the quietude of the victim himself who is usually unable to present his grievances convincingly.[133]

Ballin places the onus squarely on the hearing in all their ignorance and neglect (whether intended or not), imploring them to take responsibility for the abuse and injustices committed against the deaf in the name of oralism. For Ballin, there is power in the "loud, long, and cantankerous" howl raised by the "deaf mute" insofar as it can convey the pain and grievances of the "deaf victim" through a vocalized nonverbal expression that, if kept up incessantly, will ultimately "be heard and listened to."

In "Soupoon," Kim and her willing collaborators thus defy deaf cultural apprehension around voicing in the manner Ballin describes, literally *breaking the silence* of an otherwise non-sonorous opera through a decisive refusal of the docile, efficient, and productive flows of phonocentric voice, to invoke St. Pierre's characterization. In so doing, Kim once again resists majoritarian systems of signification, the sonic logics of deaf assimilation, and idealized vocal beauty by reclaiming ownership over sound and voice, offering a collective expression of bodily sovereignty, perceptual agency, and musical self-determination.

To be sure, at the heart of Kim's repurposing of musical symbols and concepts in the fashioning of her own aesthetic language lies a quiet ambivalence. Namely, for Kim, there is a notable disparity between the cultural authority bestowed upon music compared with the status of sign language that she consciously addresses and capitalizes on in her work. She notes that while music is a "built-in system that is familiar to society, it's something that has been around for centuries, it has its mark in human history," sign language—be it ASL or another sign language—does not benefit from the same history of full recognition and support.[134] She thus "changes the form of my ideas, borrowing something like musical notation, to convey my ideas and concepts" to make them accessible to a wider audience—that is, to make them *listen*—a process that she notes is akin to her use of interpreters. She shrewdly remarks, "And that's how I play the game!"[135] This is reminiscent of Ballin's resignation around the need for the deaf to loudly *voice* their discontent in order that their grievances might be heard and made known. Kim's statement about playing "the game" reveals a similar cynicism on her part, both toward music as an established system of signification and toward the neoliberal logics of a contemporary for-profit art world with a penchant for tokenizing minoritized artists, while falling short of reasonable accommo-

dations and actual structural change. If sound is, in her words, "like money, power, control—a social currency," a thing that is "so powerful that it could either disempower me and my artwork, or it could empower me," she decisively claims, "I chose to be empowered."[136]

Kim's work thus reclaims possession of sound through "gaming" a "system of advantage based on hearing ability," to invoke Bauman's definition of audism. The animating principle of her creative output is one of quiet refusal, a refusal to voice, a refusal to comply with the sound etiquette implicit in the intergenerational experience of an intersecting racialized and disabled assimilation, and a refusal to conform with prevailing modalities and semiotics of communication. In the process she *others* sound and its attendant norms, making the power sewn into voice, "silence," and music newly *visible* in the process, a language in which "no sound is incidental."

Conclusion

Through its deep and abiding cultural ties to silence, "deafness" has played a formative, if antithetical, role in the Western musical imaginary, where it has been invoked to denote the extreme margins of human audition, musical experience, and subjectivity in ways that affirm and center hearing while relegating deafness to the extreme margins of sense. When understood as absolute silence, deafness is at once idealized and demonized as an elusive threshold and litmus test, sought out and inhabited through poor simulation, and co-opted as a site of discursive and creative inspiration, as my discussion of Cage, Schafer, and *Sound of Metal* made clear. The examples featured in the early part of this chapter are but three of countless others that frame hearing in absolute "all-or-nothing" terms as a necessary precondition for musical perception with no middle ground, disregarding the diverse multimodal, multisensory unruliness of deaf sense-making, signification, and subjectivity.

Silence is not an inherent, natural, or automatic part of deafness; in fact, absolute silence is just as elusive and obscure for Kim as it was for Cage. That's not to say, however, that historically the deaf experience has not been shaped by the negative dialectics of silence. Indeed, silence has been coercively thrust upon deaf people like a noose around their necks, reinforced through the suppression of sign language and agential voice, the correction of unruly deaf speech, and a perpetual exclusion of deaf people from dominant systems of signification.

The multimodal, multisensory capaciousness of quietude in Kim's work thus serves as a vital corrective to the naturalized associations between deaf-

ness and silence in the Western cultural imaginary. Her creative practice of quiet refusal subverts the figure of deafness qua silence and the cultural primacy of audition through emphasis on a visual-spatial, tactile, and kinesthetic continuum of sense-making, while simultaneously acknowledging the interlocking power of hearing, speech, and sound in the formation of disabled and racialized others. She has devised a new form of musical signification, an aesthetic language of quiet refusal that speaks to the historic and ongoing sites, structures, and subjects of cultural exclusion while strongly appealing to bodily sovereignty, perceptual agency, multisensory interdependence, and musical self-determination. By newly framing deafness as a dynamic form of musicianship, she expands the ontological contours of music, paving the way for more diverse and inclusive forms of musical world-building.

Three

Deafness qua Vibration

Hearing is basically a specialized form of touch. Sound is simply vibrating air which the ear picks up and converts to electrical signals, which are then interpreted by the brain. The sense of hearing is not the only sense that can do this, touch can do this too.
—Evelyn Glennie, "Hearing Essay" (1993)[1]

Sound at its lowest and loudest, begins to break down into separate, palpable vibrations. Bass notes in the ground, underfoot, in our bones. Slow the sound down further and each vibration might be separated out, counted, added up; there is no more sound, just individual shocks, one at a time.
—Shelley Trower, *Senses of Vibration* (2012)[2]

Sound knows no frontiers; it disperses, permeates and then spreads out in all directions. All routes are possible as long as sound retains sufficient energy and the matter it travels through is capable of distortion . . . [E]verything around me is vibrating in an atmosphere of hypersensitivity. At exactly the same moment, sound is traveling to and fro in the humidity of tropical forests, in the frozen wastes of taigas, in the arid expanses of deserts. . . . Omnipresent outside, sound also rumbles continuously inside us. It enters through our ears and does not re-emerge, it travels effortlessly through our bodies, it reaches our organs, touches our unborn children.
—Jérôme Sueur, *Natural History of Silence* (2024)[3]

Introduction: "Sleep Sound" or "Music as the Great Equalizer"

In March 2014, Jamie xx—founding member of the celebrated UK indie pop three-piece The xx, and DJ, remix artist, and producer of such tracks as Rihanna & Drake's "Take Care"—released his solo single "Sleep Sound," a "spacey doo wop" dance track that, along with the A-side single "GIRL," would serve as the joint preview to his award-winning debut solo album, *In Colour* (2015) with the British indie record label Young.[4] "Sleep Sound" features a panoply of filtered cascading synths, distorted dancehall-style

steel drums, and multiple processed vocal samples, including the openings of Alicia Keys's "Karma" (2003) and "It's a Blue World" (1952) by The Four Freshmen, set atop alternating four-on-the-floor and cutting breakbeats. This undulating collage of sounds culminates in a series of instrumental and vocal motifs, that, with the use of reverb, filters, and wide audio panning, amount to a dynamic visceral interplay between direct, proximal listening and more remote, indirect experiences of the music as the sounds and underlying beat drift in and out of earshot at any given moment. Indeed, *Pitchfork* critic Mark Richardson noted that xx's treatment of the vocal samples created the impression of "tumbling through time . . . filtered and submerged, a dream of water that's soothing even as it hints of drowning."[5] Spencer Kornhaber of *The Atlantic* observed that the song "evokes what it's like to be tossing and turning as the neighbours party loudly, and I've found myself humming the melody that emerges from the din."[6] Critics and fans remarked that this corporeal tension pervaded *In Colour* as a whole and evoked the physicality and transience of raving, ultimately serving as xx's nostalgic, albeit problematic homage to early UK rave culture.[7]

The April 2014 music video for "Sleep Sound" used a seemingly novel concept to capture the song's notably visceral dynamics: Showcasing moments from a one-day exploratory dance workshop facilitated by hearing filmmaker, multimedia artist, and poet Sofia Mattioli for members of the Manchester Deaf Centre Youth Group, the concept aimed to explore "how music can be created *by only having silence* and creating sound with the use of the imagination" (emphasis mine).[8] In the video's lengthy written prologue, Mattioli attributes the film's inspiration to an encounter she had while listening to music (using her headphones) on the train "when a girl who had been staring at me for a while handed me a note explaining that she was deaf and could almost feel the music by watching me." Mattioli continues, "This moment came back to me as I listened to 'Sleep Sound' for the first time. I felt the desire of going deeper. It is with gratitude that I found participation from The Manchester Deaf Centre, *who believed they could feel the same way*" (emphasis mine).[9] She concludes, "I hope this is the beginning of a journey where love, imagination, silence and music join together to become a whole. This is the first time we danced together to 'Sleep Sound.'"[10] Accordingly, the revered video channel Nowness, a platform with significantly more indie cachet than YouTube, advertised the video as one wherein "deaf dancers move to the silence with artist Sofia Mattioli."[11]

With sweeping 360-degree HD camera work, the music video is presented entirely in slow motion, prolonging a series of intimate, tender mo-

ments between Mattioli and this diverse group of marginalized youths as they communicate through movement, instilling a sense of awe and wonderment in the viewer. Our gaze follows the blissful Mattioli as she gracefully sashays across the dance studio, with overhead spotlights on her lithe body as she grooves to the beat, beckoning her dance partners to come hither with a gentle flick of the wrist and a coquettish over-the-shoulder smile, allowing the young men to take the lead in a ballroom hold, while instructing the young women to mimic her hand gestures in the manner of Simon Says. The camera occasionally lingers on close-up shots of the individual dancers' faces, as if to emphasize their innocence and joy as they smile from ear to ear, while specks of dust slowly float about the air. The video closes with a sentimental epilogue, presumably written by Mattioli: "All the music around me was silence in my head. All the silence around me was music in my head. Love was all the silence, all the music, around me in my head."[12]

Not surprisingly, critics praised Mattioli and xx's collaboration as "astonishing," "moving and beautiful," "heartwarming."[13] Constance Bloch noted that the film's beauty lay in its unlikely premise: "Jamie XX has revealed a very moving video that showcases deaf people in an unexpected way . . . resulting in a film so moving and disarming in its sincerity."[14] "What beautiful evidence of how rhythm triumphs senses, breaking boundaries that our physiology creates," wrote one viewer on the Nowness comments thread.[15] Another cited the video as a testament to music's power to transcend "race, gender, age, personality," as comments proclaiming music as the "universal language" and "great equalizer" proliferated on YouTube, along with ample remarks about Mattioli's beauty and altruism: "Who is that luminous dancer? She's irradiating the whole place with her talent and humanity."[16] For some, the video inspired newfound gratitude for their hearing, while intensifying the pity they felt for deaf people. One viewer recommended that others listen on a "big speaker or a speaker close to you—you can then feel the song and the beat and only imagine what deaf people have to struggle with [*sic*]," as if to simulate the perceptual extremes of deafness, while another wrote, "i'm so sad that they [the deaf] can't hear the music as i do," proclaiming the ear as "that incredible organ which make [*sic*] my life really more beautiful."[17] No matter, the general sentiment among viewers was that the video offered a powerful revelation on deafness, music, and humanity more generally. As one viewer crassly wrote, "No soul can be deaf to this . . . fucking beautiful."[18] *Pitchfork* magazine would declare it one of the top fifty best music videos of the last decade, and it would go on to win the coveted "Best [Music] Video" of the year award from Britain's *Q Magazine* in the fall of 2014.[19]



Figure 12. Still from 00:52 of the music video for Jamie xx, "Sleep Sound," 2014



Figure 13. Still from 03:05 of the music video for Jamie xx, "Sleep Sound," 2014

This enthusiasm did not necessarily hold true among all viewers, however. A central figure of the previous chapter, sound artist Christine Sun Kim, offered a take that stood apart from the otherwise gushing commentary when in a tweet linking to the music video, she asked, "Maybe a little self congratulatory?"[20] Another YouTube commenter astutely observed that, "with all the editing, it's a little hard to see if they [the deaf dancers] are actually able to feel/see the music."[21] Indeed, far from an authentic portrayal of deaf musical

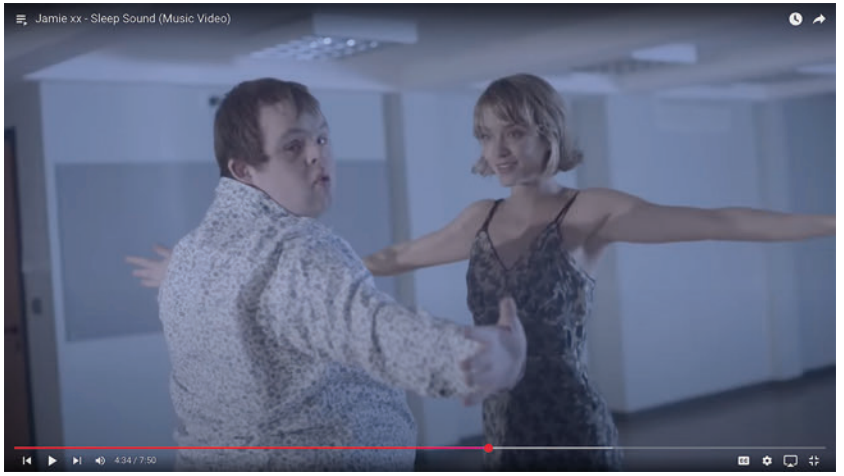


Figure 14. Still from 04:34 of the music video for Jamie xx, "Sleep Sound," 2014

experience, the "Sleep Sound" music video showcases an uninformed hearing encounter with deafness, as told through Mattioli's utopic vision of dance music, where the practical dimensions of musical perception are largely obscured. Here the seemingly tactile immediacy of the music's vibrations ostensibly transcends the presumed audiological silence of deafness, vanquishing the physiological and social divisions between hearing and deafness in the process, as the video's reception evinces.

In the previous chapter, I argued that deafness is persistently equated with silence in the Western musical imaginary, as exemplified in the postwar aestheticization of silence in Cage's and Schafer's writings and in the recent film *Sound of Metal*. I made clear that this discourse positions deafness as a physiological extreme beneath and beyond the threshold of normative hearing that forecloses the possibility of musical perception, exemplifying a recurring musical trope in the musical imaginary I term deafness qua silence. In the "Sleep Sound" video, this trope is not only firmly intact but also serves as the prerequisite and counterpoise to another sensory extreme: deafness as heightened tactile sensation, or deafness qua vibration. These two sensory polarities work in tandem to construct a coherent script for deafness that is rooted in a one-to-one sensory replacement logic of compensation and overcoming. In other words, the prospect of inborn vibrational acuities among the deaf has the effect of neutralizing and canceling out the profound auditory loss that deafness supposedly entails, a formulation wherein sensory gain

compensates for totalizing sensory deficit. To that end, the "Sleep Sound" video bestows the figure of deafness qua silence with a newfound sense of sensory plenitude centering on vibration and intensified tactility, what I call "deafness qua vibration."

This chapter thus investigates the form and function of the figure of deafness qua vibration relative to the figure of deafness qua silence in the Western musical imaginary. To that end, using my preceding analysis of "Sleep Sound" as my point of departure, I reveal that the figure of deafness qua vibration is implicit in the emancipatory rhetoric around loud, percussive sound and deep bass in the cultural discourse around EDM, metal, and other genres of maximal music. Indeed, "deafness" is invoked among musicians, critics, and concertgoers who participate in these genres to denote the phenomenological point at which hearing and touch merge, a site of *jouissance* that hearing people can embody through the loud music, a means of liberation that transcends difference and fosters unity. Next, I demonstrate how the figure of deafness qua vibration manifests in popular reporting on cortical plasticity: Headlines and best-selling popular science books often falsely generalize and overstate the prospect of inborn, heightened, tactile gain among the deaf and a resulting rhythmic propensity for music, a one-to-one sensory compensatory logic that is often lauded as proof of a universal genetic predisposition to music in the human species in best-selling books on music perception and cognition.

I make the case that the figure of deafness qua vibration is ultimately representative of the wider cultural vogue of vibration, which romanticizes sound's vibratory substrata as an omnipresent, liberatory force, falsely bestowing sound with an agency that surpasses human will, as the passages quoted at the top of this chapter exemplify. In these ways, the chapter argues that vibration, like silence, has become an overblown and alluring musical signifier that is perpetually made to reflect on the figure of deafness, just as "deafness" intensifies the mystique of vibration and tactility in our current musical imaginary. I argue that aspirational claims around the virtues of vibration, and the figure of deafness qua vibration specifically, reinforce a passive conception of sense-making and musicking rooted in totalizing, discrete, all-or-nothing sensory types, namely hearing and touching. This discourse lives up neither to the findings of empirical neuroscience research nor to the musical experiences of deaf people, as I make clear.

The second part of the chapter thus aims to complicate this oversimplistic understanding of vibration and sense-making through discussion of two musicians whose reception is, in many ways, emblematic of the cultural

hype and compensatory narratives around vibration, by no fault of their own. Upon closer investigation, however, Troi "DJ Chinaman" Lee, MBE (Member of the British Empire), founder of the UK deaf-led musical collective Deaf Rave, and Scottish percussionist Dame Evelyn Glennie attest to the banalities and logistical dimensions of vibration and tactility, framing perception along a multisensory continuum that is inextricably bound up with the materiality of the built musical environment. Lee makes clear that amplification technology and frequency bands are indispensable to the transduction of vibration and propagation of deep bass at Deaf Rave's live events. Their events are inclusive of diverse expressions of deafness, with venues curated and configured to support visual-spatial gesture conceived not simply as a supplement to vibrational cues, but as a foundational site of musical expression. Similarly, Glennie advocates for an active, multisensory approach to listening that likewise harnesses visual-spatial cues and residual hearing, often through evocative language that also conveys spatial depth and action. For instance, her repeated suggestion that listeners ought to "touch the sound" and frequent suggestions that she is "drawing out" and "getting on top of" or "inside" the sound serve as powerful analogies that affirm the perceptual agency of the musician over the sound in ways that unsettle the passive construction of tactile perception implicit in the figure of deafness qua vibration.

"Sleep Sound" and the Figure of Deafness qua Vibration

Recall from my discussion of *Sound of Metal* in the previous chapter that the film does little to explore alternate futures for Ruben's musicality beyond the context of his former normative hearing, instead indulging in catastrophic thinking around acquired deafness among musicians through a sound design that simulates his newly deafened state as one of irrevocably profound silence and social isolation as a result. Ruben is thus made to embody the figure of deafness qua silence, a totalizing, irreversible condition to which he must ultimately surrender. "Sleep Sound" also invokes the figure of deafness qua silence, as Mattioli's closing words, "All the music around me was silence in my head," make explicit. Yet, unlike *Sound of Metal*, "Sleep Sound" offers a way out of deafness's seeming negative perceptual trap by situating tactility as a viable and singular experiential strategy that is equivalent to hearing in terms of its musical power and function. "Sleep Sound" suggests that vibration has the unique capacity to undo the usual antithetical terms of music and deafness, allowing for a kind of common musicality that transcends all manner of difference, "breaking down the boundaries our physiology cre-

ates," affirming the "universal power of music" as "the great equalizer" in the process, to invoke some of the aforementioned statements. "Sleep Sound" thus lauds the prospect of musical perception beyond the auditory by reducing its deaf subjects to a set of physiological extremes centering on total auditory deficit and heightened tactile acuities, foreclosing a more dynamic, plural account of deafness and of hearingness, and of the inherent diversity of human sense-making and musicking. Further, this formulation frames its deaf subjects' unexpected capacity to perceive music and dance amid presumably profound audiological silence as necessary preconditions for human subjecthood. In so doing, it ultimately neutralizes the ableist anxieties around deafness so prominent in *Sound of Metal* by indulging in corresponding ableist fantasies about the universal power of music to transcend all manner of difference, even deafness.

Through engaging in the romance of this one-to-one sensory replacement logic, the music video ultimately unfolds as an inspiring musical revelation on deafness crafted for the benefit of the hearing viewer, once again centering the hearing gaze, a concept discussed in the previous chapter. As she waxes lyrical about the stuff of music, Mattioli repeatedly centers her own perspective in her self-appointed role as musical facilitator, positioning herself as the bridge between hearing and deafness, and music and silence by extension, enabling a group of outsiders who she claims "believed they could feel the same way" to explore "how music can be created by only having silence and creating sound with the use of the imagination." Accordingly, both Mattioli and hearing critics understand her work in the video as remediating a lack among deaf people by nurturing their musicality and sense of belonging within the hearing world. In this way, Mattioli's interventions inadvertently index the fraught legacy of oralist paternalism and the legacy of wrongful advocacy therein.[22] This link is all the more significant given that Mattioli teaches her deaf participants not simply how to listen but how to experience and perform their musicality in a way that visibly registers with a hearing audience through movement and dance, what one fan described as a "freaking gorgeous delight to the senses."

Indeed, through her charitable demeanor and infantilizing gaze, Mattioli unwittingly flaunts her hearing privilege relative to her deaf subordinates, who ultimately stand in to affirm her altruism and to fulfill certain ableist stereotypes, often by inhabiting more than one position of marginality simultaneously. For instance, the tenderness of her interactions with the little boy in the video's opening and closing sequences exemplifies what film scholar Martin Norden has termed the trope of the "Sweet Innocent": a child "per-

fect in every way except for the disability, respectful, humble, gentle, cheerful, godly, pure," bringing out "the protectiveness of every good-hearted able-bodied person."[23] The earnest, patronizing manner by which she stares intently at the young man with Down syndrome as they dance together, almost as if she is looking through him, beyond his disability toward a common humanity, serves to reinforce her altruism. By contrast, the overtly flirtatious, uninhibited nature of her interactions with the young Black man clad in a white T-shirt reveals that she is racially indiscriminate in her affections, highlighting the implicit whiteness of the hearing gaze. Side by side, these young deaf people underscore Mattioli's able-bodiedness, beauty, whiteness, and benevolence, evident from the video's reception. By stating that "she is beautiful *because these deaf people are getting music from her dance*," one viewer explicitly thematizes the video's interweaving of Mattioli's performance of able-bodied femininity and her role as a kind of (white) hearing savior that rescues her deaf participants from their music-less existence.

Mattioli thus leverages her cultural privilege as an able-bodied white woman to position herself as the ultimate unattainable muse capable of sparking newfound curiosity, excitement, musical self-expression, and even sexual desire among this marginalized group of deaf participants. While the individual dancers are named and thanked in the film's closing credits, their agency remains of little import next to Mattioli's towering presence as the one who awakens the silent music within. The film hinges upon a sense that deafness is otherwise a form of bodily and social entrapment in accordance with William Cheng's assertion that disabled people are unfairly stigmatized as "bound to asexual or pre-sexual states, stunted in physique and intellect, and otherwise trapped in slow bodies and minds."[24] In these ways, Mattioli exploits the figure of deafness qua silence and deafness qua vibration to affirm her creative prowess and the symbolic allure of her white, able-bodied femininity. By calling upon her maternity, abundance, and sensuality, Mattioli presumes to *undo* the physiological and social deficit that her deaf participants are made to embody by virtue of their deafness and other intersecting positions of marginality, unlocking a latent, inborn musicality. In that sense, "Sleep Sound" deploys the emotional framework of inspiration porn through a hearing gaze that is also *implicitly white*, where the compounding stigma of sensory deficit and racial adversity intensifies the inspiring prospect of deaf musicality.[25] The logic of inspiration porn is clearest from Mattioli's stated desire that her interventions restore wholeness between music and silence, and hearing and deafness, and other categories of difference by extension. Her own sentimental words, "I hope this is the beginning

where love, imagination, silence, and music might join together and *become whole*," prompt viewers to invoke similarly emotionally fueled, problematic platitudes like "music is the great equalizer" and the "universal language," as previously quoted. This emotional framework cements Mattioli's oversimplified understanding of deafness while promoting a false vision of music as inherently inclusive of deafness, flattening and obscuring the unruliness of sense-making, deaf or otherwise.

"Sleep Sound" makes clear that vibration, like silence, has become a potent symbol in the Western musical imaginary, bestowed with emancipatory potential that deafness intensifies. Of note here is the way Mattioli foregrounds *feeling* in her recounting of her initial encounter on the train, that the young deaf girl could *feel* the music by watching Mattioli's movements, that Mattioli was embodying a musicality that could be imparted through movement, and that the Manchester Deaf Centre participants "believed they could *feel* the same way." To that end, note how she also gestures toward some kind of ambiguous, all-encompassing transcendent feeling in her concluding statement: "All the music around me was silence in my head; all the silence around me was music in my head." These appeals to feeling blur the divisions between musical perception and affect in precisely the way that Luis-Manuel Garcia-Mispireta explains is typical of EDM culture more broadly, where feeling is simultaneously understood as the capacity to sense musically through touch *and* as an emotional response to the music. He explains further that the centrality of feeling in EDM is due to the way that it "foregrounds percussion, texture, grain, and other sonic elements that resonate with heightened haptic experience," where *beats* in particular "not only play an associative or representational role in relation to touch; they are impactive and tactile in themselves."[26]

"Sleep Sound" thus implicitly capitalizes on the polyvalent material and affective status of feeling and vibration in EDM culture to establish an automatic affinity with deafness. The video and its reception strongly suggest that the music affords a heightened sense of corporeal experience to which deaf people have unique access through some inherent, albeit oftentimes dormant tactile sensibility, where vibration is framed as an unmediated, all-encompassing sensation. As a polyvalent phenomenon expressed in beats, rhythm, vibration, movement, feeling, and *imagination* (to borrow Mattioli's word), haptic experience in "Sleep Sound" figures as both (1) a kind of universal musical mechanism that transcends the audiological limits of deafness and (2) a sensory modality that deafness more readily foregrounds through auditory deprivation. The video's commitment to this mythology ultimately

undermines the significance of vision in deaf experiences of music, ironic given that Mattioli positions herself as the central object of the dancers' and viewer's gaze. Indeed, vision can serve as a complement to tactile experiences of music or as a perceptual device with its own musical function. Shelley Trower explains that the "vibratory quality of sound can be experienced as palpable and audible *and also visible*. We can feel, hear and see a subwoofer vibrate, and *see* its effects on other bodies or matter" (emphasis mine).[27] Furthermore, "Sleep Sound," like *Sound of Metal*, also dismisses the musical legitimacy of audition vis-à-vis auditory assistive devices like hearing aids and cochlear implants, undermining aural diversity and a heterogeneity of ear listening (concepts defined in chapter 1) in the process.[28] As I describe in detail in the next chapter, whereas hearing aids and cochlear implants are designed chiefly to amplify speech sounds through a compression technique that that is ill-equipped to deal with the customarily wider dynamic range of music, technology is rapidly improving to better accommodate the unique acoustical properties of music, such that many deaf users avail themselves of the musical affordances that auditory assistive technologies provide, as a supplement to visual-spatial and tactile forms of engagement.[29] Finally, while overhead speakers feature in the video's staging, Mattioli's rhetoric obfuscates the role of sound amplification technology and other logistical dimensions in the propagation of vibration to the extent that it is musically functional.

To be sure, EDM invites diverse opportunities for corporeal engagement through driving rhythms and pounding beats that are especially percussive and impactive when played over a sound system in live performance, evident from the large contingent of deaf people who find EDM and other loud, bass-heavy, and percussive genres of music like heavy metal, hip-hop, or even classical percussion uniquely appealing for these reasons. Indeed, deaf raver Dorien Merckx explains, "I prefer music that has a beat in it; otherwise I can't feel it. Calm and melodic music doesn't really do it for me. Music with a good beat is so much better. Then I really feel like moving to the beat."[30]

Crucially, however, no music is automatically accessible to or inclusive of deaf listeners on its own by virtue of any rhythmic and tactile substrata. The propagation of vibration and its sustained tactile perception in any genre of music depend to a large degree on modes of amplification, the size and quality of a given sound system, sound pressure levels (dBs), frequency bands (Hz), and the acoustical properties of a given venue, whether for hearing or deaf listeners, as I will later detail.[31] Deaf dancer Chris Fonseca attests to several aspects of this mediation when he notes, "I touch the speakers, I touch the walls, and I have my feet firmly planted on the floor, and I feel the vibra-

tions. I connect and I feel the beat."[32] As Fonseca suggests, a body's capacity to sense vibrations as acoustic waves transmitted through the air or any other medium through tactile and haptic receptors is a highly mediated process with tremendous variation between individual perceptual experiences, dependent upon a diverse range of environmental, technological, and subjective variables. In her account of Deaf rapper Sean Forbes, Jeannette Di Bernardo Jones emphasizes the role of amplification in Forbes's perception of sound and the rhythmic dimensions of lyrics, noting that he has also repurposed a device known as the Buttkicker, what she describes as a "low frequency audio transducer that allows the user to feel powerful bass without excessive volume."[33] Jones explains that the all-deaf band Beethoven's Nightmare likewise relies on high degrees of sound amplification technology to *feel* the rhythmic dimension of their music, while simultaneously communicating musically through sign language and movement.[34] Cassandra Loeser and Vicki Crowley highlight the significant role of *musical instruments* and instrumentality in the simultaneous creation of embodied musical sensations and in the formation of deaf subjecthood: In the case of one metal band, they reveal that the bass guitar enacts an "embodied communicative practice" through which the deaf band member perceives and "speaks with sound" while stylizing "different modes of embodied masculinity."[35]

More generally, Mark Griffin further accounts for the varied impact of vibration across individuals when he asserts that "the shaking of the human body—a complex, active, intelligent, dynamic structure—should not be expected to have a single, simple, or easily predictable consequence. Vibration may be a nuisance or nauseating, exhilarating or excruciating, a source of pleasure or the cause of pain."[36] Through its recourse to idealized, all-or-nothing sensory types, then, "Sleep Sound" thus overshadows the dynamic, interdependent contours of vibration and its musical function as a listening strategy, just as it denies the viewer the opportunity to contemplate the heterogeneity of deaf ontology and subjectivity.[37]

The Cultural Politics of Vibration: Deafening Sound and Suprasensory Gain

The sensationalism around deafness and vibration apparent in "Sleep Sound" is ultimately representative of what I argue is a wider cultural zeitgeist of vibration and the related fetishization of extreme volumes in EDM, metal, and other maximal genres of music. Too often, cultural (and even *academic*) discourse romanticizes sound as an omnipresent, boundless, hypersensitive

force born of movement and energy, propagating vibrations that penetrate, permeate, and resonate within and across media, connecting diverse manner of species, objects, and landscapes, as the passages that quote Jérôme Sueur at the top of this chapter make clear. To that end, Sueur bestows sound with an *agential* power when he asks, "What is this quivering yet formless creature which constantly makes its presence felt, even as we sleep . . . travelling along our nerves like a train advancing on its tracks, and finally awakening the neurones in our brains?"[38] For Sueur, the very undeniable fact of vibration as it manifests through movement all around us is the singular proof that silence, as the absence of stillness, does not exist. In some instances, vibration is even framed as a catalyst for emancipatory forms of subjectivity, affect, and listening, bestowed with the power to transcend difference, with little regard for its interdependence with other sensory modalities, often by downplaying its logistical and technological contingencies, and its dependence on human actors. Indeed, vibration is seemingly irreducible to a single inanimate object, affect, or *sense*, even.[39] Frances Dyson interprets this as an *incorporation of hearing by touch* in affective terms that undo straightforward mind/body dualisms and divisions between subject and object:

> Immersed in sound, the subject loses its self, and, in many ways, loses its sense. Because hearing is not a discrete sense, to hear is also to be touched, both physically and emotionally. . . . In listening, one is engaged in a synergy with the world and the senses, a hearing/touch that is the essence of what we mean by gut reaction—a response that is simultaneously physiological and psychological, body and mind. These characteristics rattle the foundations of Western metaphysics and Western culture generally, by questioning the status of the object and of the subject, simultaneously.[40]

And yet, the very same polyvalent, all-encompassing nature of vibration to which Trower refers—the thing that makes vibration so musically and conceptually generative—is precisely what makes it uniquely susceptible to fetishization as a proxy for perceptual transcendence within the realm of music, particularly where the figure of deafness is concerned.

For instance, in electronic dance music culture, heavy metal, and other genres of maximal music, vibration and the figure of deafness occupy symbolic pride of place, where bands, DJs, critics, and fans laud the *deafening* capacities of loud sound as a phenomenon that blurs the boundaries between hearing and touch, and figurative and literal understandings of deafness by

extension. DJs and promoters consistently invoke the "deafening" tag to signal maximum volume, whether in album titles, as with techno DJ REZZ's album *Silence Is Deafening* (2016); in band names like the Norwegian experimental electronic band Deaf Center; in song titles, such as Plunkie & VolkStroker's EDM track "Deafening" (2014); and in promotional material, as with EDM.com's Facebook post exclaiming, "The 'Silence' is DEAFENING! Witness the fury of OnTronik & We Bang—OUT NOW," to promote the release of the duo's 2014 track "Silence."[41] As a metaphor associated with extreme loudness thresholds, the term "deafening" is frequently used by critics and fans to describe the physical sensation of being impaired and overstimulated at once, often during the much-anticipated "drop" or breakdown, as the build and surge in loudness temporarily deprives listeners of their ability to hear, while intensifying their capacity to feel. For instance, in a review of Orlando's 2022 EDM festival *Invasion*, one critic lauded DJ Jessica Audiffred's "ear-deafening bass drops," much like critic John Cameron remarked that in the highly anticipated collaborative track by metalstep DJs Excision and PhaseOne, "distorted guitar licks are incorporated into an exhilarating buildup before a deafening drop takes center stage in the arrangement."[42] Similarly, in a review for DJ Ravenscoon's debut album *Revolve* (2021), critic Jayce Ullah-Blocks uses deafness as a metaphor for loudness when she highlights one track's "deafening snares and crunchy soundwaves. Nothing short of an absolute banger . . . making this one of the best bass tunes we've heard all year."[43] Note that the review also features countless other references to the music's sheer physical power, suggesting that the opening track features "a metric ton of nuclear sound . . . [and] exudes sonorous anarchy" with its "pulverizing basslines," and that another track "packs a vigorous punch."[44] In the context of live musical performances, the term "deafening" is often also used to describe the din of a crowd and collective affect of an audience's excitement at a live show, as in the following *PixMob* review of a Tiesto festival performance: "As Tiesto's hit track 'Wasted' reached the chorus, all 22,000 wristbands lit up in bright yellow, bringing the crowds from loud to deafening."[45] These appeals to the figure of deafness thus frame it as a desirable, heightened physiological state induced by loud, electronic, bass-heavy music, a way for EDM insiders to gauge and evaluate the music's cachet.

In many instances, listeners invoke the figure of deafness in a simultaneously physiological and affective sense to describe the feeling of being overpowered by loud music to the extent that it inhibits their capacity to hear, sometimes to the point of pain, while penetrating and filling their bodies with sound and vibration, resulting in a kind of music-induced euphoria

and altered state of consciousness. For instance, in a tribute to the late Mika Vainio of the Finnish EDM two-piece Pan Sonic, critic Jennifer Lucy Allan invokes this sense of deafness at the end of a long personal testimony attesting to the physical intensity of his music: "Vainio's beats weren't beats at all, they were sound and feeling of a black hole opening up in the centre of your chest," she writes. Lucy references a similar experience at a show at Koko in London, where "my body hummed and the whole place vibrated," leading her to conclude that Vainio's influence on electronic music was "*deafeningly felt*," where deafness serves as the ultimate measure of the music's corporeal and affective power.[46] Similarly, following a performance at a music festival in Toronto, Stephen O'Malley, frontman of the notoriously loud drone metal band Sunn O))), tweeted to followers, "Deaf becomes you," not as an expression of solidarity with potential deaf fans, but as a provocation: Deafness is the material and affective condition that hearing listeners necessarily embody through engagement with the band's music, particularly in a live setting. One of the band's most memorable slogans, "Ever breathe a frequency?," is also suggestive of the penetrating force of their music in a way that resonates with Allan's characterization of Vainio's music, the sense that their music is so impactful in its loudness that it penetrates the skin, forcibly entering your body as you inhale, filling you up like oxygen, and "opening up in the center of your chest," to borrow Allan's description.[47] Sunn O)))'s critics and fans characterize the music's physiological impact in similarly transcendent terms, through such statements as "Go Deaf with this stream of Sunn O)))'s new record Kannon," or "Sunn O)))'s deafening dirges carry crowds to altered states," and "something transformative about a band whose music gets into your bones . . . a live setting that infects listeners," and "I'm pretty sure my soul left my body and transcended through space and time when Sunn O))) played."[48] When critics and audience members invoke the figure of deafness in these contexts, the implication is that the sheer sonic force of the music reconstitutes a person on an ontological and metaphysical level, whether in the short or long term. Here one's capacity to tolerate loud sound reflects directly on one's devotion to the music, DJ, or band in question and the desire to be transformed by it in ways that enable a sense of oneness between musician/band/DJ and audience, promoting a sense of insider belonging.

The cultural idealization of loudness evident in the aforementioned reviews resonates with Demers's characterization of listeners' experiences of "maximal electronic music," where "the pain and tedium . . . can be accompanied, even eclipsed, by something resembling ecstasy . . . these moments are transactions, trade-offs in which the compensation for agony, imprisonment,

or the *deprivation of the senses* is enhanced appreciation for the other sensory faculties" (emphasis mine).[49] Zachary Wallmark tells of the very same dynamic at play in death metal:

> It is an article of faith in the death metal world that the music, both in concert and on record, *must* be experienced at very high volume levels . . . physical volume also has an imperative phenomenological function in the music, overwhelming listeners, drawing them into the complex nexus of the sound, and explicitly appealing to them at the site of the body. Like trance or dubstep, death metal is at its best when it is *felt*, not just heard . . . loudness at the threshold of pain is required to break down the barriers separating inside (self) and outside (other).[50]

Sterne has similarly described the "overwhelming phenomenology of loudness" characteristic of certain genres of live music and sporting events, and even across different industrial and hospitality workplaces where volumes typically reach 120 dBs and above as offering a potentially sublime experience where hearing and touch merge. Writes Sterne, "As in the very definition of the sublime, almost no auditory experience at high volume is purely or even separately sonic."[51] Fink argues that the preponderance of sub-bass frequencies below 100 Hz in bass-heavy genres of music like house, techno, EDM, and Jamaican dancehall, among others, makes bass uniquely susceptible to a kind of overidealized sonic materialism, the frequent implication being that "at the limits of the audible, especially the lower limit, the 'jouissance of sonic physicality' is more powerful than any possible content that conventionally audible music might possess."[52] In all of these scenarios, when decibel levels reach the point at which they become "deafening" or when frequencies reside beneath the threshold of human audition, the perceptual divisions between hearing and deafness, and auditory and tactile stimuli become obsolete, engendering a sense of terror, wonder, or pleasure, facilitating what Sterne describes as "a different relationship to one's own body" where hearing and touch coalesce.[53] But the question remains, for whom, and to what end?

Indeed, note that when deafness is invoked in these aforementioned musical accounts as a means to describe the physiological and affective impact of loud sound—that it is at once profoundly *deafening* and inescapably penetrative—*hearing* is the implicit phenomenological and *social* precondition required for perceiving and appreciating the ostensible sublime pleasure it entails. In other words, in the short term, musically simulated "deafness" is

available to hearing people as an extreme, albeit temporary form of audiological loss and heightened tactile sensation, an altered state they can seemingly safely and temporarily tap into from the comforts of their hearing subject position, and without compromising on the privileges that hearing affords, at least in the short term. Indeed, the great irony is that actual *hearing loss* and other types of hearing damage are common, long-term material consequences of prolonged exposure to loud volumes, a phenomenon numerous scholars have analyzed, and one I will also account for in greater detail in the following two chapters.[54] Crucially, these idealized musical accounts of the supreme pleasure of deafening volumes are fundamentally different from deaf accounts of music, and the experience of deafness as a stigmatized form of deficit, an unaccommodated difference, and/or a cultural identity. When framed as a desirable consequence of exposure to loud music, then, prevailing *appropriations* of "deafness" in EDM and other loud genres of music inadvertently privilege and recenter able-bodied sensory experiences to the exclusion of actual deaf perspectives.

The phenomenological cachet of tactility and deafness in EDM and other loud, maximal genres of music connects with a wider able-bodied fetishization of sensory deprivation, and specifically the prospect of automatic supranormal sensory gain in instances of profound sensory deficit. Indeed, popular reporting on the effects of cortical plasticity among the deaf tends to overstate the sensory extremes of deafness through aural silence and tactile plenitude (and vision, to a lesser degree), lauding the potential for inborn, heightened, vibrotactile perception among the deaf as a favorable and *necessary* compensation for hearing loss. Countless sensationalist headlines make inflated claims about the extent and ubiquity of such sensory adaptations, often relying on oversimplified aural analogues: "Super Powers for the Blind and Deaf," "Deaf People Hear Touch?," "Brains of Deaf People Rewire to 'Hear' Music," "Feel the Music: Deaf People Use 'Mind's Ear' to Process Vibrations," "Deaf People 'Develop Super-Vision to Compensate,'" and "Deaf People 'Feel Touch' with Hearing Part of Brain."[55]

Certain best-selling accounts of music perception and cognition have likewise indulged in a version of this fantasy, situating it as indisputable evidence of music's universality, often by invoking Glennie's example, ironically demystifying cognition through a re-mystification process of sorts. Our "propensity to music," argues the late neurologist Oliver Sacks in his wildly popular *Musicophilia: Tales of Music and the Brain* (2007), is an innate sensibility encoded in the human genome.[56] As evidence of music's genetic preeminence Sacks highlights instances of ostensibly unexpected musical competence in

the face of disability, disease, and neurological injury, establishing continuity with his previous representations of disability. In his earlier *An Anthropologist on Mars* (1989) he writes, "Defects, disorders, diseases . . . can play a paradoxical role, by bringing out latent powers, developments, evolutions, forms of life, that might never be seen, or even be imaginable, in their absence."[57] According to this dubious logic, deafness uniquely reflects the extremes of music's genetic primacy. Sacks hypothesizes, "Even profoundly deaf people may have innate musicality. Deaf people often love music and *are very responsive to rhythm, which they feel as vibration, not as sound*. The acclaimed percussionist Evelyn Glennie has been profoundly deaf since the age of twelve."[58] Similarly, in their book on the psychology of music Andreas Lehmann, John Sloboda, and Robert Woody speculate, "If music is a universal capacity of the human brain, it is important to ask whether anything could ever go wrong with a brain to render it incapable of dealing with music. We know from some astonishing life histories (e.g., the percussionist Evelyn Glennie) that even profound deafness does not automatically exclude high levels of musical achievement."[59] Through her signature technique of listening through touch, Glennie has thus been made to serve as the prime evidence of what music psychologists and neuroscientists generally approach as an innate musical instinct, that is, a human evolutionary basis for music.[60] Popular reporting on this purported phenomenon appropriates the figures of deafness qua silence and deafness qua vibration as complementary terms in a musical litmus test: If people who otherwise inhabit a world of totalizing silence can compensate for hearing loss through perceiving music rhythmically, musical ability must be innate and ubiquitous across the human species after all. Not only does this logic privilege an auditory construction of music as pitch as normative, relative to a nonnormative conception of music as rhythmic, but it also strongly reinforces the marginalized status of deafness and its position at the outer threshold of human sense-making, musicking, and subjectivity.

In actuality, "cross-modal plasticity," the neural phenomenon to which these headlines and best-selling accounts most often refer, has been found to be consistently evident only in instances of deafness present before infant language acquisition (i.e., prelingual deafness). In these cases, the auditory cortex assumes sensory processing tasks associated with other modalities, leading to "supranormal" performance of discrete visual and tactile functions. Thus, rather than cross-modal plasticity resulting in a "generalized overall improvement" to the intact sensory modalities, as popular science would have it, "only specific features of the replacement modality are affected."[61] The suggestion that deaf people compensate for hearing loss through extraordi-

nary sensory "superpowers" epitomizes the overcoming narrative and supercrip trope: It perpetuates the idea that deafness can and *should* be overcome through personal triumph and remarkable compensation in another area, transferring the burden of stigma from society to the disabled individual.[62] In this case, the deaf supercrip masquerades as a more charitable conception of deafness by shifting the focus from sensory deficit and stigma to sensory gain and inborn talent, undermining the real social obstacles that deaf people face.[63] Neuroscientist Christina Karns has observed that the frequent portrayal of cross-modal plasticity as a "superhuman" ability "makes supergood fiction, but it would never work in real life."[64] Indeed, note that it is not a phenomenon with which Glennie has ever explicitly identified, nor is it a term that deaf people deploy with any regularity as a way of making sense of their sense-making. Among deaf and hard of hearing individuals, the notion of sensory gain is often understood as a type of combined physiological and cultural convergence, where vibrational and visual acuities are rooted within and developed in connection with deaf sociality and communicative strategies, as I will later detail in my discussion of Deaf Rave.

More generally, the ostensible promise of sensory gain as an automatic compensatory mechanism of the brain in instances of sensory deprivation is rooted in what Siebers terms "the ideology of ability," that is, the implicit cultural "preference for able-bodiedness," and especially reflective of the notion that "disabilities are the gateway to special abilities. Turn disability into an advantage."[65] Here the ostensible advantage is hearing through the sense of touch and other heightened sensory faculties that equip the deaf with physiological capacities not present in hearing people. This cultural fantasy similarly aligns with the logic of "compulsory able-bodiedness," described by McRuer as "a system that repeatedly demands that people with disabilities embody for others an affirmative answer to the unspoken question, 'Yes, but in the end, wouldn't you rather be more like me?'"[66] In this case, tactile gain neutralizes and compensates for hearing loss, bringing a deaf person closer to the able-bodied norm.

Such fetishistic accounts of deaf musicality as inherently or extraordinarily tactile, rhythmic, and embodied—that is, deafness qua vibration—relative to implicitly hearing, pitch-centric conceptions of music are rooted in a musical mind-body split that has historically divided sharply along gendered and racial lines. On a very basic level, the gendered terms of Cartesian dualism relegate the senses to the symbolic domain of the feminine in opposition to masculine reason, an arbitrary hierarchy that readily maps onto the naturalized divisions between rhythm and pitch in Western musical discourse,

plainly evident in Levitin's formulation: "Rhythm stirs our bodies. Tonality and melody stir our brains."[67] Music scholars have thoroughly accounted for how this divisive logic reinforces hegemonic power differentials. Where gender is concerned, musicology's legacy of positivist inquiry resulted in a long-standing historical inattention to the symbolically feminine dimensions of music, including embodiment and subjectivity, and female composers and musicians by extension. Where race is concerned, the mind-body split manifests in historically essentializing portrayals of Black vernacular music (and Black people) and non-Western music as innately and extraordinarily rhythmic and embodied relative to Western Euro-American art music.[68] Tom Perchard writes of the historical violence done through "linking blacks with a supposedly unshakable primality, separating whites from the same, here identifying black rhythm with the pre-reflective and bodily and some whiter kind of music with the mind,"[69] what Kofi Agawu described as the persistent association of Black people with an "essential and irreducible rhythmic disposition" in his landmark 1995 essay on the *invention* of African rhythm.[70] Claims that the "Sleep Sound" video reveals "how rhythm triumphs senses, breaking boundaries that our physiology creates," and that deaf people "*are very responsive to rhythm, which they feel as vibration*" reinforce the notion that rhythm and vibration are primeval musical phenomena to which deaf people have special, unmediated access by virtue of their inability to hear.[71] Just as the stereotype linking Black people to rhythm and the body was wielded to separate them from white people in a supremacist musical ideology, the association of deafness and vibration, rhythm, and tactility has similarly infantilizing implications when used as the ultimate litmus test for our human "propensity to music" and the brain's underlying "music instinct." Where deafness is concerned, this is a logic that at once assimilates the deaf into the category of "human" by virtue of their ostensible rhythmic and vibrotactile musical proclivities while reinforcing the subordinate physiological and social status of deafness relative to the hearing norm.

The preeminence of vibration and tactility in the figure of deafness arguably strengthens vibration's long-standing symbolic and affective ties to different forms of alterity rooted in Western imperialist engagements with non-Western others. For instance, Trower argues that modernity's preoccupation with detecting, measuring, enumerating, and ultimately controlling vibrations was reflective of an underlying discomfort and struggle with the speed of industrialization and the inaudible, ultrasonic vibrations its technologies emitted. Vibrations beyond the limit of human auditory perception and human consciousness in particular were thought mysterious and dan-

gerous, in some instances ostensibly causing damage to the nervous system, and even inducing sexual pleasure in women through rail travel, cycling, and the like that need be avoided.[72] As I explained in chapter 1, Curtin writes of how modernist avant-garde composers like Antonin Artaud and the Zurich Dadaists foregrounded vibrational intensity in their compositions to both destabilize the bodies of their listeners through catastrophic noise (as in Artaud's *Les Cenci* [1935]), and "effect a primitive aesthetic" by facilitating a physical encounter with what Curtin calls "a notional Other (the 'primitive') in contradistinction to 'modern man,' who was supposedly encumbered by civilising structures and disconnected from his primal roots."[73] Percussion was the central means by which to vibrationally conjure this notional other and to ensure that its impact haptically registered on and in the bodies of its audience, affording skin-to-skin contact. The musical exoticism and eroticism of vibration was ultimately fueled by European colonial exploits and orientalist fantasies, evident from the use of Javanese gongs, temple blocks, cowbells, cymbals, and other non-Western percussion instruments in such performances. Also of relevance from this book's introduction is Kheshti's characterization of the persistent emphasis on music's vibrational dynamics in the world music culture industry of the 1990s, where "touching listening" was thought central to facilitating a sensual encounter between white Western listeners and an exotic non-Western fetishized other.[74] Thus, vibration has been made a material vessel for cultural anxieties and fantasies around difference, be they technological, gendered, racial, or otherwise. The aforementioned discourse in EDM and metal similarly frames the material and affective impact of loud, immersive sound *felt* as vibration—the sublime threshold at which touch overtakes hearing—as a simultaneously painful and pleasurable encounter with *deafness*, yet another form of otherness.

The examples presented in this section as a whole are invested in an emancipatory, humanizing construction of vibration as a catalyst for alternative forms of subjectivity, listening, affect, and relationality, falsely bestowing it with the agential power to cut across, transform, and assimilate difference. Paradoxically, the cultural fetishization of loud sound as vibration reinforces long-standing hegemonic power dynamics, especially where the ideologies of race and ability are concerned. Ultimately, grandiose claims about loud, percussive sound facilitating a type of exalted musicality where hearing and touch coalesce; claims about vibration's capacity to transcend audiological deficit; and claims about any inborn compensatory vibrotactile and rhythmic acuities among the deaf writ large are representative of an underlying ableist desire to colonize, inhabit, and assimilate deafness, subordinating it

to hearing within an implicit ideology of sensory difference. Seldom do the aforementioned examples acknowledge what vibrotactile modes of listening actually entail from a sensory, logistical, and technological standpoint, and their dependency on the deliberate interventions of human actors. Fink eloquently describes the fetishization of sub-bass frequencies in EDM culture as an unsubstantiated "celebration of the irrational, the unknowable, and the unstoppable power of deep bass to alter physical reality by vibrating, and thus decolonizing, the body politic as a whole,"[75] while making clear that such aspirations are unrealistic and disproportionate relative to the actual physiological impact of vibrations on the human body.[76]

The following sections pursue this line of inquiry through two case studies—Troi Lee and Evelyn Glennie—in an effort to demystify, destabilize, and diversify prevailing cultural accounts of vibration, while dispensing with the figure of deafness qua vibration. These musicians, while active in markedly different musical milieus, have both established a reputation around the vibrational dimensions of music. In many ways, Glennie's reception inadvertently exemplifies and reinforces the sensationalism associated with vibration and tactility. And yet, I show that in actual practice, both Lee's and Glennie's accounts point to the logistical complexities, technological limitations, and perceptual banalities of vibration, as well as the significance of perceptual agency relative to passive constructions of sensory experience evident in the prevailing cultural fetishization of vibration. Side by side, they newly delineate the politics of representation, accessibility, and inclusion in the musical realm while offering a more plural account of musicianship rooted in bodily autonomy, perceptual agency, and musical self-determination.

Deaf Rave: "We Feel It"

The deaf-led musical collective Deaf Rave was founded in 2003 by self-proclaimed "Hackney born and bred" musician Troi Lee, MBE (Member of the British Empire).[77] Born profoundly deaf to a hearing family, Lee is a hearing aid user who grew up "oral," using speech and lipreading. He began using British Sign Language (BSL) at age 17 as a regular attendee at a local Deaf pub night, relishing the diverse range of communication strategies available to deaf participants, including spoken English, BSL, and Sign Supported English (SSE). (SSE mixes BSL manual handshapes with English grammar, finger spelling, and mouthing, a type of "code bending" and middle ground between manual and oral expression.)[78] In contrast to more traditional or ideal-type expressions of a deaf cultural identity, Lee's conception



Figure 15. Troi "DJ Chinaman" Lee, the Roundhouse, 2022. Photo credit: Rajvi Vaya—VayaMedia. Shared courtesy of Troi Lee, MBE—Deaf Rave.

of deaf identity welcomes and embraces engagement with hearing culture and does not preclude the possibility of speaking, using auditory assistive technology, or listening to music.

His Sony Walkman and Public Enemy cassette were his initial entry point into music; soon after, he began tuning in to "pirate radio stations" and attending his twin brother's band's shows, and raves DJed and MCed by his cousins. Lee credits his interest in EDM and knowledge of music more generally to these wide-ranging musical influences, though he indicates that his musical passions made him an outlier among his deaf peers, as few were interested in going raving with him.[79] Lee suspects that some of this apprehension stems from the mixed reception of deaf musicians among hearing musicians; he notes that in his case, his ability to speak and lip read put him at an advantage, whereas others might require an interpreter.[80] Eventually he began collecting records and acquired a turntable, trying his hand at DJing, initially gravitating toward garage music. His stage name "DJ Chinaman" pays homage to his Chinese-Vietnamese heritage through reclaiming an otherwise pejorative racial slur for Chinese immigrants; it is likewise motivated by his racial marginalization within his local deaf community, where, he notes, "it was very rare to see another Deaf Chinese person."[81]

Among the first and only of its kind in Europe, the deaf-led Deaf Rave was born of Lee's desire to create an accessible, safe, and inclusive space for members of the local deaf community to socialize that was free of the hearing-on-deaf violence that plagued the regular deaf pub nights, which often resulted in deaf attendees being banned from the pubs.[82] He explains, "I was fed up and had the thought, 'why not create a safe environment for one night?' Something that could continue for hours from 9pm to 6am the following morning."[83] Of equal importance was Lee's vision to give deaf performers "a platform to display their love for music," in the absence of opportunities for deaf people in EDM culture more generally.[84] News of Lee's first Deaf Rave in Hackney quickly spread, leading to the sale of a whopping seven hundred tickets and drawing an international audience of deaf ravers.[85] Over the years, Deaf Rave has quickly grown and customarily hosts quarterly raves sponsored by numerous funding bodies, including the prestigious UK Arts Council.

Deaf Rave is a racially diverse community, reflective of the cultural landscape of London and the community's international membership more broadly. Deaf Rave events likewise support all manner of deaf communication, from signing to speaking, and are also open to hearing people. This approach contrasts markedly with older cultural models of deaf identity that expressly frown upon "voicing" on account of its historical ties to oralism, and where cultural protectionism might also discourage cultural interaction with the hearing world. This diverse conception of deaf subjectivity and multimodal approach to communication—or the diverse *semiotic repertoires* of deafness, to invoke Kusters et al.'s model discussed in chapter 1—extends to Deaf Rave's embrace of musical plurality among its ravers. Lee explains, "half of the deaf community enjoys music thanks to technology, just like me. The other half is here because it's a place to socialize. People come and go. . . . But we continue to offer them a safe place."[86] Deaf Rave thus aims for a broad approach to representation and inclusion that encompasses both local and international participation, and perspectives from across the vast audiological and sociocultural spectrum of deafness.

In many ways, Deaf Rave's decidedly more plural embrace of deaf identity resonates with McIlroy and Storbeck's bicultural "dialogue model" of deafness in that it allows for a fluid, cross-cultural conception of deafhood, one McIlroy and Storbeck rhetorically signal through capitalization of *F* in "DeaF," as noted in chapter 1.[87] While it is open to hearing people, Deaf Rave prioritizes deaf accessibility and inclusion by fostering a musical and communicative space crafted by and for deaf people, and often in ways that inad-

vertently put hearing people at a disadvantage. For instance, Lee explains that while the deaf people are "signing away . . . the hearing community obviously can't hear what the hell's going on. We put extra bass on the sound system."[88] Lee's characterization of loudness here points to some of the practical challenges missing from laudatory characterizations of "deafening" volumes and heavy bass promising sublimity, pleasure, and the integration of hearing by touch. As Lee makes clear, such loudness thresholds impair a hearing person's ability to safely communicate, while deaf individuals can sign.

Sound amplification technology is central to Deaf Rave's articulation of musical expressivity, accessibility, and inclusion in that it is precisely what facilitates the perception of heavy bass that its members find so appealing. Lee scopes out and assesses potential venues in advance to ensure their sound systems are equipped to host his live events: "We feel the beats via vibrations or sometimes just turn that bass up!" Lee also makes clear that sound amplification technology works in tandem with the architectural space—a form of sound amplification technology in its own right—where ravers' experience of music is tied to the materiality, texture, and configuration of the built environment, whether indoors or outdoors. Notes Lee, "our clubbers rely on walls, pillars, any surface to feel the vibrations. We need the baddest and loudest systems you can get!"[89]

Lee's emphasis on the logistical dynamics of sound reinforcement for optimal bass and sound pressure levels overall is crucial given how the romance associated with loudness and deep bass in particular often fails to give the lie to what Fink notes are the "material constraints and affordances" of sub-bass frequencies. For instance, at indoor venues, what is called "corner loading" is often used by placing subwoofers in the corner(s) of the hall or room to reinforce sound output and direct subwoofer bass back into the dance floor, achieving an acoustic effect that is similar to the natural amplification achieved by cupping one's palms around one's mouth as one speaks. Another common amplification strategy is to use a subwoofer array, that is, the close placement of two or more subwoofer speakers so as to reinforce and strengthen the overall sub-bass response of the sound system, with several different configurations designed to produce what is called "constructive interference" of two or more soundwaves, ultimately intensifying sound pressure levels within a given space. Even in the midst of these and other reinforcement strategies, Fink clarifies, "Bass is something we feel. But the same can be said of every sound that goes into music, and we don't actually 'feel' the sub-bass very much, in absolute terms . . . our ears did not evolve to be efficient at transducing vibrations outside of the narrow band (2–5 kHz)



Figure 16. Deaf Rave at Boomtown Fair (Festival), 2025. Photo credit: Rajvi Vaya—VayaMedia. Shared courtesy of Troi Lee, MBE—Deaf Rave.



Figure 17. Deaf Rave at Boomtown Fair (Festival), 2025. Photo credit: Rajvi Vaya—VayaMedia. Shared courtesy of Troi Lee, MBE—Deaf Rave.

into which fall the strongest formants of human speech."[90] In order to actually *feel* in the sub-bass register on the skin or subcutaneously in the body, sound pressure levels need to reach at least 130 dBs, what Fink explains is a "radical attenuation of intensity."[91]

Just as Fink asserts that "attempts to create whole-body haptic effects through airborne sound alone are doomed to fail," Deaf Rave harnesses additional technological supplements to enhance and optimize its members' perception of the bass and beats.[92] For instance, their live events often also feature a number of vibrotactile vests available for use through a partnership with SUBPAC, the manufacturer of a wearable vest that "quietly and accurately transfers deep bass frequencies to create an immersive, physical, full-body experience," or "headphones for your body."[93] SUBPAC vests are built on three principles, or "layers" of immersion, as described on their website: "haptics: receptors on skin register vibrations on surface," "introception: receptors in muscle detect subtle change in force and pressure," and "bone conduction: vibrations pulse through bones to the inner ear and are sensed as hearing."[94] Lee's account sheds light on the vital role of sound amplification in the transduction of vibration and propagation of bass, making clear that the one-to-one sensory replacement logic substituting hearing with vibration wholesale in representations of deafness, as in "Sleep Sound," are fundamentally misguided. As Fink writes, "The ear is so delicate, so sensitive to sound energy, that any other part of your body produces, by comparison, only a faint sensory trace when vibrated."[95] At the same time, Lee makes clear that new and emerging sound technologies such as these merely have the potential to enrich *preexisting* deaf musical strategies, enabling deaf ravers to make the most of the loud, bass-heavy musical environments through enhancing on-body haptic sensations already cultivated through deaf social practice. Indeed, deaf people have long nurtured a propensity for touch through deep cultural insider knowledge that informs their musical perception in ways that are not readily quantifiable or easily put in words.[96] Conceptions of "touch" among sign language users surpass straightforward, singular attention to vibration. Sign language engages the whole of the somatosensory system, and signed social interactions are unique for their emphasis on touch, which goes hand in hand with cultivating a visual-spatial awareness: shoulder tapping is commonly used to get another person's attention and to initiate a face-to-face signing interaction; signers establish physical proximity with one another and use mutual touch to maintain connection while conversing; and touching is used to signal one's intention to take a turn in a signed conversation.[97] Thus, for Lee and Deaf Rave, the prospect of sensing

musical vibrations through touch is ultimately interdependent with technology, where technology supports and enhances underlying cultural modes of tactile perception, facilitating a dynamic multisensory awareness where tactile and visual-spatial cues coalesce.

To that end, recall that vision is of central importance among deaf sign language users as the sensory mechanism through which deaf subjectivity and community take shape, in contrast to hearing, evident from ancestral and ethnic claims to deafhood through the assertion that they are "a people of the eye" and the sign "LISTEN-EYES."[98] Accordingly, Deaf Rave events always feature live visual performances alongside the music, just as Lee takes great care to ensure an accessible and interactive visual atmosphere through lighting design that enables clear sight lines with the performers and main stage space. Among the many genres of deaf visual performance showcased at Deaf Rave live events is "dip-hop"—that is, *deaf* hip-hop—a genre that combines sign language with vocalized oral rapping, using "low frequency bass patterns for its beats and sign language for its lyrics, creating a flow between the two that is both visual and tactile," as Katelyn Best observes.[99]

The concurrence of visual and tactile flow that Best notes is characteristic of dip-hop was evident in Deaf DJ/VJ MC Geezer's performance of his then-forthcoming track "Can They Ever Know" (2022) at the 2021 Deaf Rave Festival at the Fabric Studio in London. The track begins with MC Geezer's own deaf-inflected rapping to the words "Hea-ring peo-ple won-der how deaf make mu-sic," delivered syllabically as straight eighth- and quarter-note rhythms spread out over four measures, to which he immediately replies, "Feel it, we feel it, feel it, we feel it" as a series of eighth and dotted-eighth rhythms over four measures. Geezer's reply cues the sung vocal sample, "Can they ever know? Can they, can they ever know? Can they ever know what we are feeling?" and the heavy thud of the bass drum, which continues throughout the track, often struck on the first beat of each measure. As the song progresses, new percussive sounds like snares, claps, hi-hats, and high-pitched synth bells are added above the underlying 808s. MC Geezer's signing takes shape against the background beat, while creating an independent visual-spatial "rhythmic stream," to borrow Maler and Komaniecki's term, that does not always align with the metrical flow of the oral rapping. Indeed, because the distinct grammatical structures of sign language do not directly map onto English and vice versa, dip-hop features what Maler and Komaniecki explain are "two distinct language modalities" whose simultaneity often results in a "metrical dissonance" as well as two distinct relationships with the background beat.[100] In certain cases, MC Geezer's signing is slightly out of sync



Figure 18. MC Geezer, the Roundhouse, 2022. Photo credit: Rajvi Vaya—VayaMedia. Shared courtesy of Troi Lee, MBE—Deaf Rave.

with the metrical flow of his rapping, whether falling slightly behind or following its own independent rhythmic trajectory altogether; and often the signing does not align with the demarcation of verses and hooks reflected in the oral rapping. Thus, the concurrence of signed visual-spatial rhythms, rapped rhymes, and the underlying beat in dip-hop performances like MC Geezer's result in intricate, multimodal rhythmic textures, with individual parts operating on different and sometimes non-interlocking timescales. MC Geezer's performance of "Can They Ever Know" undermines the singularity of vibration in popular accounts of deaf musicking through an expressive and perceptual symbiosis of visual-spatial, tactile, and *aural* cues across different linguistic and musical registers simultaneously.

Deaf Rave also reveals that in many instances, vibration and tactility are musically *subordinate* to vision and visual-spatial modes of perception, particularly in instances where maintaining consistent contact with the floorboards is not feasible, as with dancing. Directors of the celebrated Dance Company at the all-deaf Gallaudet University note that even with a state-of-the-art sound system boasting maximal volume and bass, movement naturally impedes the consistent perception of musical vibrations underfoot: "Many people have the misconception that deaf people 'hear' by feeling vibrations

through the floor. How is this possible, especially if a person is moving and jumping so that they do not keep in continuous contact with the floor? What if the floor is not wood, but solid concrete?"[101] Gallaudet Company dancers rely primarily on sign counts in order to ascertain rhythmic patterns and master individual dance steps in choreographed dance routines, using residual hearing and underfoot vibrations to a lesser degree.[102] Deaf *Dancing with the Stars* sensation Nyle DiMarco notes that when it comes to dancing he experiences music by watching his dance partner Peta Murgatroyd: "I'm actually very visual. . . . Peta brings out the performance. She's a performer. I feel like I can see the music and can see how the character of the music actually flows. For me, that's music to my eyes."[103]

DiMarco's emphasis on ascertaining and expressing musical flow through embodied visual-spatial cues independent of vibration aligns with the expressive and perceptual preeminence of vision on display in the original performances of Russian deaf "finger tutter" Andrey Dragunov, who performed at the 2020 Deaf Rave Lockdown. Finger tutting is a type of street dance stemming from the full-body parent dance known as "tutting," wherein a dancer uses their arms and body to mimic the distinctive geometric poses found in Egyptian hieroglyphics, often in a characteristic popping and locking manner, typically to a dubstep backing track. Deaf finger tutters like Dragunov are unique in that they not only combine classic tutting moves with their own original finger moves as a hearing tutter would, but also incorporate manual handshapes and facial expressions from sign language, blurring the boundaries between semantic and non-semantic forms of expression and cultural insider/outsider knowledge in the process. Dragunov's finger-tutting performances were particularly conducive for the virtual delivery format of Lee's "Deaf Rave Lockdown" livestreams, where viewers could enjoy the performance with or without sound, with Dragunov projecting musical flow through rhythmicized visual-spatial gesture unbounded by strict ties to a backing track.

For Lee, ensuring that these diverse multimodal channels of musicking are in place at his events is ultimately a question of inclusion and accessibility driven by his own firsthand, insider knowledge, making the musical interventions of hearing people like Mattioli feel uninformed, patronizing, and inadequate. Lee's stewardship over musical accessibility and inclusion in Deaf Rave epitomizes Williamson's notions of *literal* and *figurative* access, concepts previously detailed in chapter 1.[104] Deaf Rave ultimately offers attendees *literal* access to a dynamic, inclusive musical space designed for their express enjoyment, and a creative platform through which to showcase their

musical talents. Lee achieves *figurative* access by creating musical opportunities and a sense of community that reverberates beyond the event space, raising the profile of deaf musicking in both local and international contexts by placing a historically marginalized group of musicians at the center of EDM.

To return to the central message of MC Geezer's track "Can They Ever Know," as a deaf assertion offered in the face of hearing suspicion, "We *feel* it [the music]" affirms the polyvalent conception of a heightened haptic experience that pervades EDM culture, while also pointing to the sophistication of deaf conceptions of musical *feeling* beyond the cultural fetishization of vibration, the figure of deafness, and the musical idealization of loud sound. Whereas Mattioli obfuscates the means by which the participants in her dance workshop feel music by reducing deafness to a set of sensory extremes, Lee and his fellow ravers make it clear that musical feeling encompasses and engages the whole of the sensorium, including tactile, haptic, visual-spatial, kinesthetic, and even auditory perceptual devices. Where feeling is understood as vibrotactile feedback specifically, Deaf Rave reveals that its literal production is interdependent with frequency bands, sound pressure levels, sound amplification technology, and bass propagation, variables that are mediated through the material and structural dimensions of the built environment, and formal musical parameters. In many instances, vibrotactile feeling and visual-spatial sensation work in tandem; in others, visual-spatial stimuli have their own distinct musical and perceptual function independent of sonorous cues. The relational and affective dimensions of feeling also manifest through a plurality of semantic and non-semantic expressive strategies, spanning signing and voicing, heightened forms of musical expression like rapping, and forms of visual performance. Deaf Rave evinces that this polyvalent conception of musical feeling is achieved and sustained by well-informed human actors like Lee, whose intentional creative labors defy passive, monolithic constructions of vibration and tactility implicit in the figure of deafness, and are rather rooted in the lived experience of deafness as an intersectional phenomenon.

Evelyn Glennie: Touch the Sound

Scottish percussionist Dame Evelyn Glennie's signature claim, that "feeling and touching sound is my domain," is by now a widely cited testament to the inescapable materiality of sound as vibrational transfer that cuts across the perceptual distinction between hearing and touch, and the divisions between hearing and deafness by extension.[105] In particular, she decenters the ear as

the primary perceptual orifice through which sound enters the body, while upending deficit models of deafness and auditory conceptions of music: "Hearing is basically a specialized form of touch. Sound is simply vibrating air which the ear picks up and converts to electrical signals, which are then interpreted by the brain. The sense of hearing is not the only sense that can do this, touch can do this too" (quoted at the top of this chapter).[106]

A three-time Grammy award winner and recipient of the Order of the British Empire and numerous other accolades, Glennie has decidedly made a name for herself as a world-leading solo percussionist, that is, on her extraordinary musical prowess alone. While she embraces a non-pathologizing view of hearing loss, she does not necessarily self-identify as "deaf" or "disabled," instead preferring the term "deafened" not simply to differentiate her self-conception from the cultural minority model of deafness, but to ultimately highlight the critical merit of her musical achievements over the sensationalism ascribed to her deafness.[107] Nevertheless, her deafness remains tantamount to her public image, evident from the extent to which her example inadvertently misinforms popular conceptions of deaf sensory perception, particularly with respect to the prospect of automatic, inborn, heightened tactile acuity among the deaf.[108] Not surprisingly, the universalizing tone of her popular reception engenders mistrust in the minds of certain deaf people for whom such assertions about listening through touch, to the extent that it is a viable means of musical perception, are unrealistic. One user on the popular Alldeaf online discussion forum sums up his impressions: "not exactly a simple declaration re the DEAF and music. Not every DEAF person can 'feel' music like a select few eg Evelyn Glennie."[109] He continues, "I have tested the theory of being able to 'feel music by putting my hand on a loud speaker playing music'—vibrations only! I don't identify as music."[110]

Yet close attention to Glennie's own descriptions of her deafness and her listening practice makes clear that hers is a highly sophisticated, idiosyncratic form of listening that is inextricably tied to her early formal musical training, residual hearing, and perfect pitch, where vibrotactile perception merely serves as a physiological and conceptual entry point for engaging the whole of the sensorium. Indeed, Glennie was born hearing and was already an accomplished young pianist when her hearing began to diminish at age eight, though she retained a certain degree of residual hearing that she explains has always contributed to her perception of sound alongside her perfect pitch, facts that are seldom acknowledged in public accounts of her deafness.[111] She explains, "The fact that I can hear the precise pitch of a note in my head and place it exactly in relation to other notes has been a tremendous advan-

tage."[112] Perfect pitch (or absolute pitch) is the ability to identify or produce a specified pitch without reference to a prior tone, an elusive act of cognition that depends on a combination of physiological and cultural variables, including early and consistent exposure to music, the equal-tempered C major scale, and a familiarity with the linguistic structures of Western music, an altogether exceptional ability, even among the most accomplished musicians, as I discuss in the next chapter. After the onset of her hearing loss, Glennie switched from piano to percussion in an effort to retain her existing musical skills, since the instruments' low registral qualities and notably tactile dimensions offered considerable opportunities for cultivating new sensory awareness not necessarily possible with the piano. Under the tutelage of her percussion instructor, Ron Forbes, Glennie began experimenting through painstaking trial and error. Playing barefoot and removing her then newly acquired hearing aids allowed her to more readily sense the vibrations in different parts of her body, forgoing dependence on her ears.[113] Over the years she developed a highly nuanced form of active listening that treats the body in the manner of what she has described as a "resonating chamber" by which to sense the musical vibrations as they penetrate different points along the skin with varying levels of intensity, depending in large part on frequency and sound pressure levels, all the while taking stock of subtle differences in the sound's attack and its physical point of contact—for example, the chest, the stomach, the top of the pinkie finger—and its weight and distribution within the body.

As Glennie describes it, "touch" as tactility alone is a misnomer in that sensing vibration through touch is only feasible because of its contextual interdependence with the other senses, and her own prior auditory frames of reference:

> If I see a bird flying above me I use my memory of what a bird in flight sounded like and I imagine what sound it might be making now. . . . Birds are also quite noisy as they gather on wires or in trees, they whistle and sing, squawk and chatter. I soon learned to recognise those sounds as they would have been felt on my high cheek bones where the high sounds might still sit today.[114]

Her description makes clear that "touching the sound" is a dynamic process of multisensory inference and imagination built on the integration of visual-spatial, kinesthetic, and tactile cues with her own previous hearing frameworks in a way that enables her to both anticipate and supplement vibrational cues as needed. Glennie thus invokes "touch" as a conceptual metaphor for a

type of deliberate multisensory attentiveness to sound that spans nonmusical and musical scenarios: "We can also see items move and vibrate. If I see a drum head or cymbal vibrate or even see the leaves of a tree moving in the wind then subconsciously my brain creates a corresponding sound."[115] Through the synchronization of visual cues with corresponding imagined sounds, the image and its movement thus serve as a sort of index that triggers memories of the "sound" internally in a way that enables her to intuit sounds, with all of her other senses at the ready. Her perfect pitch and residual hearing arguably assist in this process. For instance, Glennie notes that she initially had difficulty tuning the timpani on account of her hearing loss, but eventually came to associate incremental changes in the tautness of the drumhead with individual pitches, using her perfect pitch to ascertain the desired note. Straus has characterized Glennie's listening practice as representative of what he dubs "deaf hearing," that is, "hearing as seeing, hearing as feeling, hearing as movement, hearing as silent, out-of-time contemplation—deaf hearing provides an alternative to normal hearing."[116] Crucially, Glennie's paradigm also embraces the affective connotations of *touch*, stressing that "listening is about more than just hearing; it is about engaging, empowering, inspiring and creating bonds. True listening is a holistic act."[117] She seeks to impart this holistic practice as she claims to "teach the world to listen" by calling on her audiences "to deconstruct the limits of their perceptual taxonomies, opening their bodies up as tools for *engaging* sound," as Kheshti explains.[118] And while the holistic, multisensory awareness she champions may be something that others can readily tap into, as she suggests, the extent to which it serves her musicianship is by no means universal, but rooted in a highly individualized set of techniques that she has consciously developed and refined over the course of several decades.

In these ways, Glennie's listening paradigm offers a vital articulation of bodily autonomy and perceptual agency that is otherwise conspicuously absent from the figure of deafness and the cultural fetishization of vibration. Rather than involuntarily being acted upon or metaphysically undone by impactive airborne vibrations, as is often the framing in accounts of loud sound in EDM, metal, and other maximal genres of music, Glennie frames listening in decidedly *active* terms, claiming ownership of this process by consciously engaging the body as a first point of contact with the outside world, a means to "*address* the environment" and evaluate its meaning through alert, receptive, thoughtful reflection.[119] Her listening expertise is not born of an automatic heightened tactile acuity common across all deaf people, but rather originates in the attentiveness and deliberate actions of the listener/musician,

a sensitivity cultivated through conscious practice internalized over time in ways that arguably challenge perceptual divisions between mind and body. As percussionist, Glennie is the musical arbiter and has creative control over the sound in that she quite literally *draws* it out from her percussion kit. To that end, her frequent suggestions that she is "*on top of* the sound" (emphasis mine) affirms the perceptual agency of the musician over the sound, and not the other way around.[120] Despite the universalizing tone of her reception, Glennie's practice of touching the sound ultimately centers on and celebrates the perceptual agency of the musician over her sensory surroundings. Recall that Monson describes perceptual agency as "the conscious focusing of sensory attention that can yield differing experiences of the same [musical] event . . . what people choose to do with musical sounds given the sensory inputs, the manifold cognitive processing possibilities of the brain, and sociocultural contexts in which they listen and perform."[121] Monson explains further that the conscious sensory practice and the decision-making that perceptual agency entails eventually gives rise to "embodied knowledge and the freeing of the conscious mind for creative aesthetic discovery and expression . . . there are conscious, formerly conscious, and unconscious aspects involved in these creative processes."[122] Thus, even as Glennie reliably narrates her own experiences and seeks to demystify her musicianship for the benefit of her audiences, it is precisely the blurring of formerly conscious and unconscious practice that, she notes, makes the process of listening through touch as a profoundly deaf person "very difficult to explain."[123] In these ways, Glennie reminds us that sense-making can be neither quantified through objective measures nor subject to theoretical abstraction, that language is often altogether inadequate. Nevertheless, her emphasis on perceptual agency is transformative relative to constructions of deaf sensory perception as passive and unmediated, whether rooted in totalizing notions of auditory deficit or overblown notions of vibrational gain.

I want to make the case that this perceptual agency is evident in Glennie's earliest percussion compositions, which arguably newly elucidate the role of vibration and touch as compositional devices, and some of the ways the disabled body impresses itself upon music in a manner that defies the figure of deafness. To that end, Howe's soaring analyses of modernist pianist Paul Wittgenstein's left-handed arrangements of canonical piano repertoire are instructive in that he reveals the ways Wittgenstein's disability literally shaped the sonic fabric of his musical craft. Similarly, in *Hearing Beethoven*, Wallace posits that the infamously widely spaced ten repetitions of the G major chord in the finale of Beethoven's A-flat major Piano Sonata No. 31, op.



Figure 19. Evelyn Glennie performing the Léonie Sonning Music Prize Concert at DR Koncerthuset, 2023. Photo credit: Agnete Schlichtkrull. Shared courtesy of Esben Tange, Léonie Sonning Music Prize Foundation.

110—a compositional choice that has long mystified Beethoven scholars—are directly reflective of the composer's hearing loss.[124] Published in 1822, the op. 110 sonata was composed shortly after the composer's hearing loss had stabilized, and at a time when Beethoven was experimenting with his famous "hearing machine." The hearing machine was a cupola fashioned from sheet metal designed to fit atop his Broadwood piano in place of the standard lid, as I noted in chapter 1. The hearing machine would have provided further amplitude and increased volume by virtue of its design, allowing the composer to sit enveloped by the wide, cavernous opening, a larger-than-life-size gramophone horn, as Beghin has detailed.[125] Following a fugal passage and repetition of the movement's opening arioso, the chord's arrival is abrupt and its consecutive repetitions unexpected. Wallace elaborates on a potential aesthetic rationale:

> It begins at the default dynamic level of *piano* and crescendos, with both the damper and *una corda* pedals held down, to an unspecified louder volume. . . . Everything here suggests maximum freedom and spontaneity, and it is tempting to imagine Beethoven at the keyboard playing this chord repeatedly until it reached what was for him the



Figure 20. Lotte Rømer, Evelyn Glennie, and Jessica Holmes, "Music and Deafness Roundtable," University of Copenhagen, 2023. Photo credit: Agnete Schlichtkrull. Shared courtesy of Esben Tange, Léonie Sonning Music Prize Foundation.

> threshold of audibility. Where that threshold was reached is impossible to guess, since he did not specify the dynamic level at which the crescendo should peak.[126]

Implicit in Wallace's description is an intensified tactile immediacy of a composer's engagement with his instrument. The piano is, after all, a *percussion* instrument that Beethoven knew intimately to the touch. The physical sensation of repeating a chord by depressing and releasing the keys over and over, applying increased pressure with each subsequent chordal iteration, entails a certain individual joy, as the player submits to the G major sonority in this case, basking in its glow. Perhaps this compositional choice is driven as much by reaching the "threshold of audibility" as it is by the physical joys of surrendering to this single chord. This fleeting moment is a small portal into what Beethoven might have been feeling in his body at the time, forever ensconced in the three measures of his sonata for the performer to relive anew.

I want to offer a similar hypothesis regarding a potential motivation behind certain compositional nuances in Glennie's solo marimba chorale, *Light in Darkness*. Penned at age twelve during the four-year-long period coincid-

ing with the onset of her hearing loss, the piece is from a set of *Three Chorales* scored for the five-octave marimba and played with four mallets. The *Three Chorales* have since become a staple of the marimba repertoire, and they are often performed as single stand-alone pieces by beginners and professionals alike. In those early years, much of Glennie's training consisted of trial and error, involving numerous experiments, leading to improvisations that eventually took the form of notated transcriptions and compositions. At first glance, *Light in Darkness* looks like a rather straightforward étude in the chorale style, with simple homophonic part-writing and limited melodic development. There is an ascending four-note melodic motif that repeats throughout as it moves successively between the voices. Generally, the voices move outward and inward from the centerline of the marimba. To untrained eyes, the score's many suspensions and sustained tones belie a percussive, rhythmic sensibility that is apparent in any recording. As is standard for the marimba chorale genre, individual pitches are to be executed as multiple independent, alternating mallet strikes, regardless of their rhythmic duration. This is a specific technique known as "rolling," in this particular instance, one-handed rolling with two alternating mallets in each hand. Rolling is used to create sustain when long note durations are called for. Relative to other percussion instruments, the marimba has a rapid decay, particularly in its upper register. Executing the sustained, legato part-writing of a marimba chorale thus requires that all notes be rolled, as indicated at the top of the score. The coordination, balance, and control required to execute continuous one-handed rolls is challenging even for the most expert of players. While some composers choose to notate rolls as individual repeated measured pitches—for example, in measured sixteenth, thirty-second, or sixty-fourth notes—most rolling is unmeasured, and so is typically signaled by simply using three diagonal slashes through the stem of any note value, or without any indication whatsoever. There is a sense in which notating rolling as measured pitches arguably undermines the rhythmic flexibility and stylistic intuition that otherwise governs how this special technique is executed. Put differently, rolling is an expressive device that arguably defies the regularity of measured, musical time, a way of feeling pitch through repetitive attack.

It is possible that the percussive, rhythmic execution of sustained pitches through rolling is particularly appealing for a person whose conception of pitch has changed significantly and inconsistently in the midst of her hearing loss. As mentioned in the previous chapter, for people with hearing loss, pitch is an especially challenging perceptual and musical category, since hearing loss differs within different frequency ranges. Pitch and the succession of

musical pitches belonging to a single melody can thus be fleeting and highly irregular, particularly when there is rapid decay. Sensing frequency in the body through vibration with any regularity, as Glennie does, requires immediate contact with the instrument and ongoing sustain. When she plays the marimba and other mallet instruments, she removes her shoes to facilitate direct contact with the floor, enabling the vibrations to penetrate the body without much interference. The perseveration of the piece's four-note motif as it weaves its way through the individual voices is likewise a compositional choice that might reflect on her hearing loss: It is a way to literally *make sense of* and explore a single musical utterance in different registers. When pitch sensed as vibration is highly variable, a simple motif of this kind executed through steady, percussive contact with the instrument can be used as a point of reference while the percussionist draws out and probes the sound to get *on top of* it, to borrow Glennie's verbiage.

The title *Light in Darkness* posits a striking visual analogy that is particularly instructive within the context of sensory disability, offering a way to think across totalizing constructions of blindness and deafness. In particular, the way Glennie rolls her mallets to achieve vibrational sustain and feel frequencies registering in her body is akin to the way a blind person uses a probing cane as a prosthetic device to navigate the built environment, as the cane extends one's sensory facilities, enabling users to detect any obstacles in their path, engaging in a tactile feedback loop of sorts. In the midst of an ever-changing period of audiological loss where the ground beneath her feet was constantly shifting, so to speak, Glennie was able to reorient her relationship to music and create a stable foundation by engaging the tools she had at her disposal: Her percussion kit, her mallets, her hands, feet, and whole body enabled her to not simply *see* light in the metaphorical darkness, and *feel* sound in the proverbial silence, but to initiate, control, and *shape* these sensations for herself on her own terms, that is, to assert her perceptual agency as she practiced musical self-determination.

In these ways, *Light in Darkness* arguably bears traces of compositional choices corresponding to the young percussionist's then newly acquired hearing loss that contrasts markedly with romantic appeals to the ostensible automatic power of vibration, tactility, and rhythm to triumph over auditory deficit. Far from a passive, inborn sense of heightened vibrotactile acuity, as in the figure of deafness, Glennie's account of touching the sound offers a powerful commentary on the creative prospects of sensory gains amid unexpected loss. Above all, Glennie's paradigm places the musical subject, whether deaf or hearing, and bodily autonomy and perceptual agency at the center of that discovery process in a way that affirms her assertion that "*we* are the sound."[127]

Conclusion: Music and Deafness Beyond Deafness qua Vibration

The first half of this chapter elucidated the form and function of the figure of deafness qua vibration relative to the figure of deafness qua silence in the Western musical imaginary. I argued that, together, these idealized sensory types serve a dialectical sensory replacement logic in which heightened tactile acuities overcompensate for totalizing auditory deficit, as is evident in the conception and reception of the music video for Jamie xx's "Sleep Sound." I revealed that more generally, the figure of deafness qua vibration figures prominently in EDM and metal discourse, signifying the extreme physiological point at which hearing and touch unite. Indeed, "deafness" is a coveted state of simultaneous sensory deprivation and abundance that hearing listeners and concertgoers aspire to inhabit through bass-heavy and rhythmically impactful music played at "deafening" volumes, often culminating in the "drop." The figure of deafness is likewise implicit in the cultural sensationalism around cross-modal plasticity and the belief in enhanced tactile acuities among the deaf as an automatic compensation for a presumed total lack of hearing. It is often falsely cited as evidence of a universal rhythmic predisposition to music in best-selling books on music and the brain. This discourse neither accords with the facts of empirical neuroscience research nor reflects the musical experiences of deaf people.

In our present cultural moment, an emancipatory quality is bestowed on vibration, conceived as an immersive, all-encompassing, and unifying phenomenon that blurs the lines between hearing and touch, perception and affect, self and other. When falsely conceived as a simultaneous state of absolute auditory silence and heightened tactile sensation, deafness is made to reflect on vibration's ostensible musical virtues as the inclusive foil to an exclusively auditory construction of music and on music's purported virtues as a universal sensibility encoded in the human genome. These romantic, idealized constructions of vibration ultimately reveal little about sensory perception, about deafness, and about music. Instead, they reinforce a passive understanding of sense-making that centers on distinct all-or-nothing sensory types without regard for the logistical constraints and perceptual limits of vibration, and without acknowledgment of the listener's perceptual agency.

Lee, MC Geezer, and Glennie reveal that heightened tactile acuities are not an inherent property or essential outcome of deafness, just as music is not automatically accessible or inclusive on account of its vibrational and rhythmic sensibilities. They likewise make clear that vibration on its own is a banal and unreliable perceptual framework. For Lee and Glennie both, tactility

exists within a multisensory continuum alongside other perceptual devices, interdependent with the materiality of the built environment and the creative interventions of human actors. As the primary architect of Deaf Rave, Lee secures suitable venues and amplification technology to ensure the propagation of deep bass such that it can be *felt* as impactive, pounding rhythms. He designs individual event spaces with clear sight lines to support and nurture visual-spatial gesture as a vital form of communication *and* musical perception and expression, whether in tandem with or independent of vibration, culminating in diverse forms of performance from live DJ sets, to song signing, to finger tutting and dancing. Glennie champions a highly *active* form of listening, one that goes well beyond simply developing an awareness of music's underlying rhythms and tactile substrata. For Glennie, "touching the sound" happens across and in between sensory registers, from residual hearing to visual-spatial gesture, to movement, inference, and imagination. It is enmeshed within a built environment where the musician's capacity to sense, respond, and shape the sound depends on the physical reciprocity she cultivates with her instruments, what are in effect prosthetic extensions of her body. In these ways, these musicians exemplify the core tenets of expert listening, where musicianship is built on bodily sovereignty through a strong appeal to perceptual agency, the interdependence of the senses, and the material continuities between the musician's body and the built musical environment. Whether in the language they use to describe music or the actions they undertake to feel it and create it, Lee and Glennie are engaged in musical world-building, creating new musical space in which the heterogeneity of deaf subjecthood, sense-making, and musical self-determination may flourish, promoting new forms of musical belonging in the process.

Four

Hearing Beyond a Natural Ear for Music

In loving memory of Lotte Rømer (1950-2026)

> A realization I had recently [is that] for my whole life, anything I've heard with some measure of clarity was through a digital sense (hearing aids). I can't even imagine the many ways in which this electronic "sense" might have shaped a choice, decision, or opinion I've made.
> —Jon Ehlers aka sunlight.exe., Instagram, July 30, 2025[1]

> When I'm feeling insecure about my identity as a hearing disabled musician, I have to remind myself that music is an art form. A lot of what is "good" or "bad" relies heavily on the subjective culture that each listener has been exposed to. . . . As a child, I spent a lot of time writing my own music despite very limited training. It wasn't about having a "natural ear" for music. It was about wanting control over something. When you're growing up with a hearing disability, you often find yourself in moments with no control over your surroundings and how it affects your comfort. Through music, I felt I had some control over the way a room sounded for the first time. Obviously, there's also the pleasure of creativity that goes into it, but being able to pull the levers of my audio surroundings for the first time was a big motivator to keep me going.
> —Jon Ehlers, August 20, 2025[2]

When I was completing my bachelor of music degree in my early twenties, my cello instructor—a renowned performer and wonderful music pedagogue—once proclaimed in a lesson, "You really have *a natural ear for music*." We were debriefing about my recent performance of Cello Sonata No. 1 in E minor, op. 38 by Johannes Brahms in his spring semester studio recital. He continued, explaining that my roots as a singer were evident in the way I approached playing the cello with an "innate" sense of breath, phrasing, and lyricism, intuitively sensing the subtleties of interpretation and expression implicit in the score. "You always know how the music

should sound, how it should go. You are innately musical. You would make a wonderful conductor." He was not one to lavish false praise, known among students for being very direct, albeit constructive in his criticisms, so I took it as the ultimate compliment, even if I had no interest in pursuing conducting. My parents and music teachers had said it repeatedly growing up, and not simply of me, but also of my sister and brother on account of *their* musical accomplishments, and the seeming effortlessness with which we all took to music. That all three of us appeared to share this trait—one we presumably inherited from our mother, a pianist—seemed only to strengthen our individual claims to innate musicality. Once away at university, the pool of musical talent widened significantly in ways that cast doubt on my own sense of my musical aptitudes. Thus, hearing it from my cello professor renewed my sense of confidence, even more so because I knew full well that I was not the most technically proficient cellist, and by no means the best cellist in his studio. I felt affirmed, exceptional, and set apart knowing I was bestowed with an inborn sensibility that transcended even the foibles of my cello playing. That sentiment followed me as my cello playing and singing began to take a backseat to my academic pursuits in the years following my undergraduate degree: I took comfort in the idea that I was innately musical, that it was a natural, immutable part of who I was as a person, that even amid long periods of musical inactivity, it would always lie dormant within me, and could be effortlessly summoned at a moment's notice.

Ehlers's and my anecdotes sit at opposite ends of the spectrum, both in terms of our formal musical training and in terms of our relationship to hearing; he a self-identifying "hearing disabled" musician, autodidact, and longtime hearing aid user, me a classically trained singer and cellist who is implicitly hearing. Our stories speak to questions of musical identity and belonging, the subjective nature of musical taste, the biases and ambiguities implicit in the notion of a "natural ear" for music, and the presumed natural sensibilities of some musicians over others. Whereas my story arguably reinforces certain deeply ingrained ideas around musicality as an innate and exceptional sensibility, Ehlers's conception of musicianship invites us to rethink the nature of "musicality" as an inborn proclivity evidenced through a "natural ear." His suggestion that it was *through music* that he was able to "to pull the levers of my audio surroundings" for the first time, amid an otherwise unstable perceptual reality that left him feeling powerless, does not simply defy expectations around music and deafness, but also speaks to an expanded sense of aurality. For Ehlers, his digital hearing or *electronic sense*, as he calls it, is consequential for his experience of the world, though not necessarily indis-

pensable to his perception of music, as we will discover. His digital hearing is an integral part of his natural hearing and individual *hearing reality*, and how it informs his conception of bodily autonomy, perceptual agency, and musical self-determination. It forces me, the writer of this book, to reflect anew on my own long-standing sense that I am *naturally* musical, that I have a "natural ear for music," and all that that statement means.

This chapter newly confronts the biological determinism implicit in conceptions of innate musicality and the preeminence of the ear therein by examining the technological and cultural production of "natural" hearing in the design, branding, and (musical) programming of digital hearing aids. By attending to innate musicality and "natural" hearing as exclusionary social constructions, my aim is to offer a more robust, dynamic account of musical ear listening and musicianship as they straddle acoustic and digital realms of hearing experience, that is, to highlight a plurality of hearing natures. As Sterne writes in *The Audible Past*, sound technology automatically conjures "an implied opposite: the *nature* of sound and hearing."[3]

I thus begin by unpacking what it means to have a *natural* ear for music, that is, to be *naturally* musically inclined, alongside the fetishization of "absolute pitch" and the resulting pathologization of "tone deafness." As Lindsay J. Wright explains, musical ability is uniquely "susceptible to naturalizing ideologies" because of the "diversity of skills required for expertise in composing, improvising, performing, or even listening to music."[4] She thus argues that "musical 'talent' operates as a floating signifier" that is "granted a range of contingent meanings—as a constant site of discursive struggle rather than as an immutable object of discourse grounded in a set of seemingly objective facts."[5] To that end, drawing from a range of examples in music psychology, music pedagogy, and music history, I reveal that this discourse on musicality as reflected in a so-called "natural ear for music" rests on a narrowly defined ontological understanding of music and musicianship vis-à-vis varying degrees of what is framed as exceptional aurality, whether inborn or acquired, and often also oral speech. This overdetermined sense of aural attunement collapses the divisions between literal and metaphorical conceptions of the ear as the organ of hearing and the "ear" as an innate musical sensibility. I also make clear that, too often, conceptions of musical talent and differentiated notions of hearing therein indulge in fantasies regarding the unequal biological distribution of musicality as manifest in exceptional aurality across the population, where eugenicist notions of racial difference and disability have long been at stake.

Next, I denaturalize "natural" hearing (and a natural ear for music) by

attending to it as an elusive construct ingrained in the design, manufacturing, branding, and programming of digital hearing aids. To be clear, whereas "normal" hearing refers to decibel ranges and frequency thresholds, *natural* hearing refers to the biological process by which sound engages the outer, middle, and inner ears and is processed by the auditory cortex. Where auditory assistive devices are concerned, natural hearing is conceived not only as unadulterated, unmediated, unamplified, or unaided hearing but also as a perceived sound quality. Indeed, the fetishization of acoustic fidelity in the design and branding of digital hearing aid technologies aims to minimize any discrepancy between the original sound and its amplification, electronic processing, and delivery through an "aesthetics of auditory realism," to draw on Sterne's discussion of sound-reproduction technology.[6] Stephanie Lloyd and Alexandre Tremblay explain that, more generally, hearing is not a linear process of "transferring messages from the 'outside' to the 'inside'" but "is instead thought to be in constant and necessary engagement with the environment, developing in response to environmental signals."[7] In other words, all hearing experience is governed by transduction, leading them to declare "no hearing without signals."[8] I thus make clear that so-called "natural hearing" is not an innate sound quality, objective metric, or singular experience, but rather an elusive, approximate, and highly individual benchmark undergirding the design and customization of digital hearing systems, as scholars in deaf studies, sound studies, and medical anthropology have observed.

Building on the work of Jaipreet Virdi, Beate Ochsner, and others, I argue that technological discourse on natural hearing and creating a natural, effortless hearing experience for users through increasing automation undermines and obscures the intricate processes by which hearing aid users develop and hone their listening skills, train their devices, and exercise significant agency over their hearing and musical experiences by extension. To that end, I also take seriously Friedner's observations regarding the extent to which cochlear implant habilitation processes have been shaped by normative ideals, as well as Stephanie Lloyd and Chani Bonventre's argument for "abandoning the normative hopes and expectations condensed into the bionic metaphor."[9] While their work deals specifically with discourse on cochlear implantation and notions of brain-computer interface (of which the hearing aid is *not* an example), they nevertheless offer a resonant way of approaching prosthetic hearing aid technology more generally, helping to newly account for user agency in the production of digitally assisted hearing and to account for a plurality of hearing natures.

The final part of the chapter thus draws on insights from interviews with

Danish rock musician, singer, and chairperson of the Copenhagen branch of the Danish Association of the Hard of Hearing Lotte Rømer, and Jon Ehlers, the keyboardist, synth player, bassist, and vocalist of Bangladeafy and front man of the solo outfit sunlight.exe. Whereas Ehlers was born with sensorineural hearing loss and has used hearing aids for most of his life, Rømer has late-onset sensorineural hearing loss, such that her experience adjusting to hearing aids was informed by her prior hearing, the demands of her professional musical endeavors, the progression of her hearing loss, and the ongoing development of digital hearing aid technology. Side by side, Ehlers and Rømer give voice to a dynamic sense of hearing that upends cultural investments in "natural" hearing, as well as the false promises of automation in digital hearing aid technology. Their musical endeavors highlight the ingenuity and creativity that flow from a more diverse spectrum of aurality that encompasses auditory assistive technologies as an extension of bodily autonomy, perceptual agency, and musical self-determination. I ultimately suggest that disabusing ourselves of the cultural myth of inborn musicality and the overdetermination of the ear therein, and the punishing logics of natural hearing more generally, is vital for reimagining and reinvesting in hearing as a multifaceted phenomenon in ways that support a more diverse and inclusive conception of music and musicianship in line with expert listening. To be sure, while I do highlight some parallels and points of contrast between hearing aids (HAs) and cochlear implants (CIs), CIs are admittedly beyond this chapter's scope, but nevertheless a vital area of musicological inquiry going forward.

A "Natural" Ear for Music?

I share the anecdote from my own musical training not because I still believe I am somehow musically exceptional (or to bemoan having missed a potential calling in conducting) but because there is really nothing exceptional about the expression, the scenarios in which it has been uttered throughout my life, and the sentiments it inspires. And I know that many readers in music studies have been told the same thing at some point in their lives and have likely said it about and heard it said about other musicians. This expression is so familiar as to be banal, loosely invoked, though uttered with seeming authority by musicians and nonmusicians alike, while totally elusive and impossible to fully quantify. Its singularity is telling, caught somewhere between object and metaphor: The expression "a natural ear for music" implicitly frames the ear as the essential anatomical gateway through which objective musical truths

are apprehended, yet the phenomenon it describes is somehow irreducible to the organ of hearing, rather highlighting an inborn sensibility, instinct, or "ear" in the figurative sense that dwells *inside* the soul of the musician. The statement is used to flag innate musicality, to distinguish good, competent, learned musicians from "natural born" musicians in the same manner that innate athleticism and physical prowess are lauded in some athletes through the analogous expression "a *natural-born* athlete." Similarly, people who possess the uncanny ability to "play by ear" or "pick up" an instrument without any prior musical training, or have a "*naturally* good singing voice" to a lesser degree, are often described as "*naturally* musical," as having "a *good* ear for music" or "a knack for music." Such statements denote a natural musical inclination or competence independent of musical training, often signaling raw, undeveloped talent and potential for greatness. A *natural ear for music* is thus an expression that avows, in no uncertain terms, that musicality is first and foremost an inborn *gift*, while lending itself to *hereditary* constructions of talent (e.g., my family), and often marking imminent musical *potential* that is not yet fully realized, strongly resonating with several of the parameters Wright describes in her discursive typology of musical talent, which I have italicized for emphasis.[10] As a declaration, a natural ear for music is thus prescient and loaded with affect and optimism, anticipating the *impact* a person might have, impact being another key parameter in Wright's model.

"Perfect pitch" or "absolute pitch" (AP) tends to also beget similar evaluations, albeit around a *learned* musician's preexisting innate musicality, read as the ultimate outcome of a well-cultivated musical talent, arguably reinforcing the notion that talent can be cultivated through *passion* and perseverance, another key framework in Wright's discursive typology of musical talent.[11] AP is understood as "the ability to identify or produce the pitch of a sound without any reference point," a condition that "depends on both genetic factors and exposure to musical training during childhood."[12] What is called "relative pitch"—that is, "the ability to perceive pitch relations" rather than the names of isolated pitches, as with AP—is also sometimes lauded as a marker of innate musicality, and prized for its musical functionality. AP is often the phenotype (i.e., the interaction between genes and environmental input) geneticists use to study the genetic prospect of "musical inheritance"—a musical genetic predisposition—and its widely documented unequal distribution across the population.[13] Indeed, there is significant interest in the genetic and environmental causes of AP in general and the widely documented higher prevalence of AP among East Asian musicians in particular relative to their Caucasian American and European counterparts. The "tone language hy-

pothesis" contends that tonal languages like Vietnamese and Mandarin enable the development of AP in infancy, though it does not account for those East Asian languages that are not tonal like Korean or Japanese, and there are other studies that refute a genetic basis for "an Asian advantage" with AP.[14] There is also a large body of research devoted to understanding the connections between AP and sensory and intellectual disabilities, given its prevalence among "individuals with congenital blindness, Williams syndrome, and autism spectrum disorder."[15]

Generally speaking, AP has been strongly linked to cultural discourse around innate musicality in the Western musical imaginary, as Psyche Loui writes:

> Among "The Greatest" Western classical composers as identified by *The New York Times* (2011), historical evidence has identified more than half as AP possessors. While this does not imply that AP is sufficient or even necessary for exceptional musical creativity, this high occurrence of AP among great composers has led some to suggest that AP is an "ultimate in musical endowment" (Ward, 1999), or one of many possible indices of genius, musical creativity, and/or exceptional ability in the musical domain.[16]

While it is unclear how historical evidence could possibly corroborate beyond a reasonable doubt the existence of AP in half of "The Greatest" composers of the Western art music canon, the point is that the belief that AP is an exceptional musical gift conducive to greatness nevertheless exists.

By contrast, the expression that a person has "no ear for music" or, worse, is "tone deaf" is invoked to denigrate those who ostensibly have no musical sense or potential whatsoever. Tone deafness is even pathologized under the clinical label "congenital amusia," which describes an inborn "tonal insensitivity to music which is recognized simply as unorganized noise," or a "defect in processing pitch" that extends "to musical memory and recognition, singing and timing of music" or "rhythm perception impairment," known more colloquially as "beat deafness" or "rhythm deafness."[17] As a neurological "deficit" or "disorder affecting musical function," amusia effects an estimated 1.5 percent of the population and can ostensibly "selectively involve pitch, interval, rhythm, timbre and emotional response."[18] These ostensible tonal and rhythmic inabilities are named through the figure of deafness (not unlike the function of blindness in the label "color blindness"), reinforcing the links between deafness, ignorance, and musical lack or absence, evident from the

damning term "amusia." Oliver Sacks writes that "sometimes tone deafness can be quite gross," recounting a cantor at his temple who "could hit jarringly wrong notes, sometimes a third of an octave away from where he should have been." When the rabbi rather insisted to Sacks that the cantor was doing his best, Sacks opined, "One could not have a tone-deaf cantor; this was, to anyone musical, akin to having a clumsy surgeon."[19] Such pathologization and stigmatization of ostensible musical "inability" arguably inspires faith in the notion that extraordinary musicality is likewise inborn, whether in the form of AP or by some other means.

And yet perfect pitch, relative pitch, and congenital amusia tell us less about the actual *nature* of innate musicality and inability than they do about the long-standing *naturalization* of a certain narrowly defined and culturally valorized conception of music and musicianship. Where AP is concerned, Mark A. Jobling clarifies that it is "found in only approximately 1% to 2% of music students and musical professionals, *so it is far from being a proxy for musicianship*" (emphasis mine).[20] Sacks himself suggests that AP is "disabling" when it comes to executing musical tasks like tuning and transposition, insisting that it "it is an isolated ability with no inherent connection to musicality."[21] Ken'ichi Miyazaki has in fact characterized AP as an "inability" to the extent that it is not especially useful in practice, sometimes inhibiting a musician's capacity to identify and infer pitch relationships in tonal contexts.[22] Indeed, AP is rooted in "fine representations of pitch into fixed categories and ready association between pitches and labels."[23] The same can be said of relative pitch insofar as identifying scale degrees and intervals is concerned, as Miyazaki et al. have shown.[24] Wright notes that the degree to which perfect pitch is desirable or automatically equated with talent is culturally dependent. Whereas in some cultures it holds little if any musical relevance, in American violin pedagogy it is revered and often cultivated as the ultimate teaching outcome, one that affords access to further musical development for those students who possess it.[25] AP and relative pitch—two conditions that are often lauded as evidence of innate musicality—and their purported antithetical genotype in congenital amusia are ultimately contingent upon and enshrine a Western hearing-centric conception of pitch and melody, while saying little of the multisensory, multimodal dimensions of musical experience and expression. They by no means account for the diversity of what music is and can be and how it can be apprehended and practiced.

To return to our original notion of a *natural* or *good* ear for music, it is limiting for the same reasons as AP, and yet because it *lacks* a stable empirical definition and cannot be corroborated in the same ways as AP and amusia,

it is arguably all the more alluring and susceptible to widespread, loose, and variable applications. In other words, it is a declaration rooted in subjective impressions, instincts, whims, and biases more than it is driven by objective, tangible, or universal criteria (no matter how limiting such criteria might be in the case of AP, relative pitch, and amusia). And it is the inherent elusiveness of these ideals that helps reinforce the cultural myth of innate musicality as an inequitable phenomenon. Indeed, Wright claims that the polysemic nature of musical talent more generally makes it a "highly contested site of discursive struggle," where the opportunity to identify talent "reflects and grants social power."[26]

As idealized constructs, a "natural ear for music," a "good ear for music," and discourse on AP and relative pitch (to a lesser degree) all speak to the uneasy tensions between the deeply ingrained sense that musicality is inborn versus its framing as an essentially cultivated practice born of one's environment and social conditioning. More important for our purposes, the natural musical ear explicitly and implicitly reflects the primacy of the ear and the "ear" as the original principal signifiers of musical talent in the Western musical imaginary, whether that talent is inborn, taught, or arises through some combination of the two. In *The Natural Musician: On Abilities, Giftedness, and Talent*, music psychologist Dina Kirnarskaya sharply distinguishes the general human capacity for competent musicianship (similar to what Sacks describes) from innate musicality possessed by what she insists is a very small number of exceptionally talented musical individuals.[27] She argues that we are not all created equal, bemoaning the impact of "political correctness" on stunting psychological thought around what she insists is ultimately a genetic (though decidedly not hereditary) basis of abilities. She cites the fact that many talented musicians are self-taught and excel in the absence of a formal musical training and moral and institutional support as the strongest and most straightforward evidence of musicality's underlying biological basis.[28]

The ear enjoys literal and figurative pride of place in Kirnarskaya's model, where it is used to describe a differentiated spectrum of musical abilities, from the musical propensities of all humans to the competencies of ordinary musicians to the extraordinary inborn musical refinement and finesse of "the natural musician," the book's namesake. The "analytical ear" has its origins in speech and describes a basic auditory understanding of music common in all humans, enabling us to identify and distinguish nuances of pitch while identifying differences and similarities in musical sounds. The next step is "the musical ear, the sense of rhythm, and musical memory," which belongs to the domain of ordinary musicianship. Note that while Kirnarskaya regards

AP as a form of extreme musical giftedness, like Sacks, she contends that it is neither a prerequisite for nor a sign of innate musical talent; moreover, she clarifies that it is also a byproduct of musical training that can in fact diminish through decreased exposure to music.

Innate musical talent is ultimately built on evidence of what Kirnarskaya calls *the expressive ear* and *the architectonic ear* respectively.[29] The expressive ear describes the "emotional-ideational aspects of music," a quality that the author proposes can be quantified and assessed through a musician's ability to identify what she frames as objective "communicative archetypes" ostensibly inherent in music independent of formal and stylistic properties.[30] Kirnarskaya describes the architectonic ear, the second essential attribute of innate musicality, as the coherent expressive integration of musical elements across large time spans by a composer, or the "congeniality" a performer exhibits through the act of interpretation: "Talented musicians feel and understand an author's style as if they themselves were its creators—not a single note or pause seems random or incidental," a skill she notes "does not proceed automatically from the development of the known musical abilities."[31] For Kirnarskaya, innate musicality is necessarily elite and exclusionary on these grounds and should be cultivated through the appropriate channels to ensure optimal success.[32]

I must confess that reading Kirnarskaya's characterization of the expressive ear and architectonic ear for the first time was like having someone demystify a former belief system. Her shrewd descriptions inadvertently afforded a critical encounter with certain implicit ideological precepts deeply ingrained in me through my many years of musical training, ideals that had shaped my perception of my own musicianship and my engagement with other musicians. By plainly spelling out the basic assumptions and values at the heart of a tradition with which I had formerly identified, her book enabled me to more carefully ponder its implications.

It goes without saying that this biologically deterministic theory of innate musicality is reductive, punishing, and steeped in the narrowly defined ideals of the Western art music tradition, simultaneously venerating the genius composer, solo performer, and work concept, to the exclusion of countless other genres of music and forms of musicking. This thinking is evident even in the way would-be musicians are reassured that there are a range of respected musical vocations and forms of expertise belonging to the "Musicians' Guild" that do not require inborn talent, from teaching to sound engineering, to choral singing, to work as rock, pop, and jazz instrumentalists and vocalists, to careers in music publishing, editing, and management: "So,

practically everybody but about 4 percent of totally tone-deaf . . . are invited to join the Musicians' Guild. All of us are very welcome!"[33] Indeed, as Wright explains, declarations of musical talent are embedded with "power dynamics and regimes of value."[34] In Kirnarskaya's model, then, the ear, in all its singularity and overdetermination, is emblematic of the power and regimes of value associated with the Western art music tradition.

To be sure, Kirnarskaya's genetically driven framework does not stand in for the whole of music psychology and music perception and cognition insofar as scientific theories of musicality are concerned. As Wright explains, the general scientific consensus is that nature and nurture are "falsely antagonistic categories" and that such reductive "causal narratives" belie the complex biological and environmental interplay in the formation of musical talent.[35] She notes, however, that the presumed biological basis of musical behavior, traits, "potential," and innate "giftedness" remains not simply a robust area of scientific inquiry, but a deeply ingrained ideal in Western music. She claims this is evident from a corresponding dearth of musicological scrutiny around its inequitable cultural construction, a fact that makes Wright's pathbreaking work and discursive typology of musical talent all the more vital.[36] Where musicology and Euro-American musical contexts are concerned, Wright notes that there exists little substantive musicological research on "talent," compared with long-standing musicological scrutiny of genius.[37] She persuasively argues for a clear distinction between these two categories; whereas talent is generally understood as scalable, genius is a non-scalable totalizing construct.[38] To Wright's assertions I would add that *the ear* remains an uncontested metric and signifier through which to gauge the naturalness of one's musical abilities, just as expressions like a "natural ear for music" endure in our musical vernacular.

Not surprisingly, as a "privileged social and scientific category" (to invoke Wright's apt terminology), constructions of innate musicality have strong and abiding roots in racist and ableist ideologies and *eugenics*.[39] For instance, Wright argues that through his blackness, blindness, and cognitive impairment, nineteenth-century Black pianist Thomas "Blind Tom" Wiggins challenged the Euro-American "public possessive investment in the whiteness of musical talent."[40] Wright meticulously documents the myth of innate talent in Blind Tom's reception, namely that his talent was *discovered* by his white enslavers, "awakened from slumber by the piano's presence" without any formal musical training; that it was an immutable, passive *gift* lodged within his body made known by his "accurate ear," but separate from any sense of personhood or his perceived deficiencies; and/or that it was utterly supernatural,

a deceptive form of magic.[41] She argues that to one extent, audiences and critics had difficulty making sense of Blind Tom's perceived talents relative to prevailing phrenological discourse around racial inferiority and notions of idiocy. On the other, the passivity, imitativeness, and soulless automation many ascribed to his performances aligned with dehumanizing constructions of Black people and savants.[42] Indeed, autistic musical savants have long been regarded in dehumanizing terms through a kind of enfreakment of virtuosity as a performance of aural automation. As Joseph Straus explains, "The autistic savant is often portrayed as a kind of living computer, a human database, with a mysterious, incomprehensible, and seemingly superhuman gift of memory and calculation (Murray 2008)" that extends to music.[43] He observes that oftentimes critics, writers, and medical researchers, whether in the nineteenth century or in the present day, describe autistic musical savants as lacking feeling, imagination, and creativity, that their performances, while virtuosic, are sterile, merely the byproduct of a passive rote memory akin to a tape recorder, camera, computer, or other mechanical device.[44] Maler has shown that the very same criticisms were leveled against deaf music-making in the nineteenth century, whether among oralists or manualists, a framing of deaf musicking as altogether unnatural and machinelike, rooted in a mechanical reproduction of rhythm and melody, even in instances where early hearing aid technology was implemented to facilitate a more "normal" perception of music.[45] Suffice it to say that discourse on innate musical talent is historically rooted in eugenicist notions of racial and ableist superiority that deny the musicality of certain groups over others. Wright ultimately concludes that "although innate musical talent is widely described and experienced as a biological fact, it is best theorized as a social fiction—a performative accomplishment that naturalizes and perpetuates unequal distributions of power and capital."[46]

It is worth underscoring the influence of music psychologist and eugenicist Carl Seashore in twentieth-century American discourse around musical talent, and the preeminence of the ear as a defining metric of innate musicality in his musical aptitude tests, that is, the Seashore Measures of Musical Talent.[47] For Seashore, musical talent was not reducible to one thing, but rather was a dynamic hierarchy of essential traits that could be precisely measured and subjected to "exhaustive classification" centering on "the characteristics of sound which constitute music" on the one side, and the corresponding "mental powers which are needed for the appreciation of musical sounds" on the other.[48] These so-called mental powers could be tested through what Julia Koza succinctly describes as "a battery of tests that use pairs of sounds

to measure an individual's ability to discriminate" across the areas of pitch, intensity, time, consonance, tonal memory, and eventually rhythm.[49] Overwhelmingly, Seashore's tests were rooted in "the assumption that 'hearing' is equivalent to 'musicality,'"[50] as Wright pithily explains. By presuming to objectively evaluate the "physical structure of the pitch-differentiating apparatus in the organ of Corti in the inner ear," Seashore positioned the ear as the universal and sole arbiter of musical ability.[51] Moreover, he insisted that these physiological thresholds of pitch discernment were fixed in accordance with the immutable character of an individual's Corti and could only be marginally improved through practice:

> The limit of pitch hearing is like the limit of acuity of vision. As training in the use of the eye does not improve the dioptric system of the eye so that one may see finer print or greater distance; so practice does not modify the actual structure of Corti in the ear so as to make it more responsive to pitch, except in the sense that a violin may be improved by use.[52]

Seashore intended the Measures of Musical Talent as a *diagnostic* method that could not only be performed by music psychologists in a "laboratory," but also applied in elementary schools in order to separate children worthy of musical education from the "helplessly unmusical and save them from an intolerable imposition," while rendering music training more "conscious and specific" through isolating and *drilling* what he characterized as the fundamental "elements of music."[53] Despite its obvious shortcomings, Seashore's Measures of Musical Talent would become standardized under the rubric of "psychometrics" and applied not simply in music psychology and American music education, but for a variety of purposes across diverse fields—whether in its complete or partial form—from recruitment of submarine sound operators during the Second World War, to a range of medical diagnoses as recently as the past decade, as Koza demonstrates.[54] Koza argues that "even when he did not mention eugenics or euthenics," Seashore's writings were consistent with prevailing eugenicist ideology.[55] Thus, the ear, and more specifically the organ of Corti, was the most powerful sorting mechanism in separating the wheat from the chaff on what was a historically consequential spectrum of musical talent, where the ostensibly essential ontological properties of music were defined and classified along a narrowly defined hierarchy.

In contrast to the genetic model of musicality and the notion of a natural ear for music, Shinichi Suzuki, founder of the celebrated Suzuki method of

music pedagogy, famously "did not believe in innate talent," as Robert Fink explains, rather insisting that "every child is able to learn" and "grow into a child with a rich musical sense" that began with a disciplined, repetitive listening regimen—a specific type of ear training—established in infancy before progressing to playing.[56] Suzuki's unique method of "Talent Education" was rooted in what he called the "Mother Tongue Method," a phonocentric approach to music education that promotes the early cultivation of musicality in children as a form of organic talent development akin to language acquisition in infancy. The method

> is based on an entirely natural event—the learning of the mother tongue. This process is occurring every day and demonstrates, in a most impressive manner, the incredible learning potential of small children. . . . However, it has also been shown that if nerve cells are not stimulated in the proper way and at the appropriate time, these missed opportunities can hardly be corrected.[57]

Suzuki's signature recipe for musical success, then, is seemingly rooted in what Kirnarskaya terms the "pedagogue-driven" as opposed to the "god-given" model of talent formation. Or, as Suzuki put it, "the environment develops a person's ability" and crucially, through a singular, repetitive form of early ear training and disciplined listening, lest that aural predisposition be squandered.[58] Wright details the influence of Zen Buddhism on Suzuki's teaching philosophy as it culminated in several ideals specific to the Soto tradition, including a "gradual mastery through calm introspection and observation" and an approach to creativity that focuses on "the cultivation of inner experience and character" over innovation.[59] Indeed, in Suzuki's teaching philosophy, the ear and ear training were the natural gateway not simply to musical talent development but also to *spiritual* growth, the means by which children might ultimately "acquire a noble mind and a beautiful heart," evident from his slogan, "First character, then ability."[60]

The Suzuki method marked a paradigmatic shift in thinking around music pedagogy in mid-century America, where it enjoyed widespread uptake among music educators, as both Fink and Wright make clear.[61] At the same time, Fink reveals that the public reception of the Talent Education children's tours through the United States in the 1960s engaged in blatant orientalism, with one *Time* magazine headline referring to the performances as an "Invasion from the Orient." I quote Fink, who succinctly paraphrases the article's characterization of the tour as follows:

> The article, filled with condescending and casually racist clichés, reads like a tract written 100 years earlier: the idea of "migrant Orientals," whose ears are attuned to the "whining microtones of Oriental music," playing Western music on the violin may seem freakish, but, as it happens, "the stringed instruments were physically ideal for Orientals: their nimble fingers, so proficient in delicate calligraphy and other crafts, adapted easily to the demands of the fingerboard."[62]

Fink goes on to explain that the students were elsewhere described as "cool perfectionists" who played with "a lack of emotional intensity," a reception that he argues ultimately exposed American anxieties around the corruption of European art music through what was perceived as a Japanese culture of automation and mechanical assembly line production.[63] I would add that the Suzuki method's reception aligns with long-standing tensions between a *natural ear for music* and the cultivation of musicianship through the practice of "ear training" in the construction and perception of musicality, while very clearly exhibiting the West's "possessive investment in the whiteness of musical talent," to invoke Wright.[64]

Fink's surmising that this reception reads like a racist tract from a bygone era is on point: Zhuqing (Lester) S. Hu uncovers a similarly vexing Orientalist thinking in the musical writings of eighteenth-century Jesuit missionary Jean-Joseph-Marie Amiot and his contemporaries, who promoted a distinction between so-called "Chinese ears" and "European ears."[65] Hu reveals that Amiot in particular described the Chinese people he encountered as being "unable to appreciate the subtlety of European harmony," as "having only their stupid or dull organs by which to judge their sensations," an ostensibly desensitized hearing he attributed to a number of historic, climatic, and physical differences, all of which were imagined.[66] At the same time, Amiot paradoxically weaponized his racist depiction of Chinese aurality to castigate European listeners whose ears were not attuned to hear the delicate natural harmonics to which Chinese ears were attuned, and thus depended on "artificial" harmony as a result.[67] Hu also sheds light on extensive parallels drawn between the "sharp-eared" Chinese and the "deaf and dumb" by several contemporaneous thinkers, including Johann Gottfried Herder, who framed the two groups as "unthinking imitators" on account of their supposedly stunted or absent hearing. In Herder's view, the supposedly syllabic vocal utterances and stilted syllabic song of the Chinese combined with their compliance with herd leadership was akin to the "deaf and dumb" who communicated through primitive gesture and were instinctively inclined to act without thinking.[68]

Side by side, the reception of the Suzuki Talent Education program in mid-century America and the elaborate distinctions drawn between "European ears" and "Chinese ears" by eighteenth-century European thinkers shed light on some of the ways aural attunement has been used to prop up racist ideologies regarding the unequal nature of musicality as an exclusive property of the Western art music tradition.

To be sure, the range of examples surveyed in this chapter thus far by no means represents the full scope of the past and present discourse on musicality and questions of natural talent. Wright and Koza have meticulously documented these histories and debates, and I would direct readers to their scholarship. Nevertheless, I highlight these examples to (1) illustrate some of the epistemic exclusions that follow from conceiving of musicality through different categories of overdetermined, exceptional aurality, from absolute pitch, to the natural, architectonic, or expressive ears, to the Mother Tongue Method and the like; (2) to highlight how such differentiated notions of musical "naturalness" and/or aural attunement have been weaponized to uphold racist and ableist ideologies of difference; and (3) to underline the need to explore more diverse forms of hearing and musicking beyond the narrowly defined terms of a natural ear for music and musicality more generally.[69] Indeed, investigating what I frame in the following section as the audiological and cultural production of so-called natural hearing in the design, branding, fitting, and musical programming of digital HAs throws into sharp relief any idealized notion of a natural ear for music and its dubious role in conceptions of innate musicality.

"Natural" Hearing?

Unequivocally, naturalness is a concept with a polarizing and paternalist legacy in the history of deafness, misinforming and shaping deaf experience at all levels beyond simply assistive technology. As Maler notes, nineteenth-century manualist discourse highlighted the naturalness and thus *godliness* of sign language among the deaf compared with the artifice of speech, and the mechanical, inauthentic nature of deaf music-making insofar as it enabled the deaf to falsely pass as hearing. Of course, oralists held an opposing view, in that they regarded speech as the central means by which to *advance* (to borrow Maler's language) a sense of naturalness and normalcy among the deaf, where naturalness was strongly informed by eugenicist constructions of the ideal human (and not necessarily by its links to God).[70] Maler also reveals that the development and implementation of early electrical HA technol-

ogy was driven by the simultaneous desire to facilitate normal hearing and a more *natural* (read *hearing*) experience of music, as with the Akoulathon and Acousticon.[71] More generally, this assimilationist logic and strong desire for (and among) deaf people to pass as hearing informed the persistent miniaturization of analog HA technology—often at the expense of sound quality—throughout the twentieth century, as Mills has made clear.[72]

The concept of natural hearing and creating a natural hearing experience remains a cornerstone of digital HA and cochlear implant design and modern audiology, and an implicit ideal in an increasing number of HA programs created specifically to deal with music in contrast to speech. In the section that follows, I begin by examining the ambiguous nature of natural hearing as a physical process, perceived sound quality, and audiological ideal. To be clear, by approaching natural hearing as a dynamic cultural production, my intention is not to undermine the importance of natural hearing in HA users' experiences of sound, nor do I presume to decode or dwell on the technological mechanisms and inner workings of digital HA systems. Rather, my objective is to shift focus away from the increasing automation of HA technology toward the agency of individual users and the unique insights of their hearing realities in line with recent work in sound studies and deaf studies. Denaturalizing the construct of a singular natural hearing—and a natural ear for music by extension—will ultimately enable us to better appreciate the diverse auditory experiences and musical endeavors of HA users in line with expert listening.

To begin with, in the context of HA design and audiology, natural hearing or "acoustic" hearing is understood first and foremost as *unaided*, unamplified, or unmediated hearing. If "normal" hearing refers to the ability to hear at frequency thresholds between 20 and 20,000 Hz at a volume threshold between 0 and 25 dBs, natural hearing refers to the biological process by which sound enters and engages the outer, middle, and inner ear, where it is transformed into electrical signals and transmitted to the brain by the thousands of small hairs in the cochlea.[73] To be clear, auditory assistive technologies do not restore or recuperate natural hearing, regardless of whether hearing loss is congenital or acquired, but can significantly improve a person's hearing thresholds. As audiologist Cliff Olson explains, damage to the cochlea or auditory nerve "creates a situation where even if we overcome your level of hearing loss with amplification, we're still stimulating a damaged hearing system, so even if you end up hearing great with your hearing aids, your ability to hear sounds naturally is diminished."[74] Indeed, HAs work by amplifying sound through a miniature battery-powered system comprising a microphone (which picks up

sound), an amplifier (which boosts sounds), and a speaker or receiver (which sends the amplified sound through the ear canal). Whereas analog models continuously amplify all manner of sounds on an ongoing basis, digital hearing systems function by converting analog soundwaves into digital signals for processing and customization, before converting them back into soundwaves for amplification. In contrast to HAs, cochlear implants bypass the typical perceptual processes of the ear that constitute natural hearing to electrically stimulate the auditory cortex directly; they are thus often "portrayed as the artificial reproduction of natural, acoustic, or 'normal' hearing," as Lloyd and Bonventre explain.[75]

Creating a natural hearing experience is a central focus in the marketing of digital HA systems, and figures prominently in the HA fitting process in terms of the physical fit and feel of the HA(s), perceived sound quality, and the overall user experience. Where the first category is concerned, I refer specifically to users' perception of the technology's materiality in relationship to their own body, that is, the dynamic tactile interplay between body and machine. Users typically want their aids to feel as inconspicuous as possible in terms of size, placement relative to their ear(s), and overall comfort. There are several standardized styles of HAs, from behind-the-ear (BTE), to receiver-in-canal (RIC), to completely-in-canal (CIC), to in-the-ear (ITE), to in-the-canal (ITC), selected and prescribed according to not only hearing loss type and degree but also the lifestyle of the individual users, their priorities around discretion, and also insurance coverage. Audiologists and users also take account of HA mold, tubing, and venting to ensure the most suitable device is selected. The degree to which users physically and psychologically habituate to the feel of their hardware will also inevitably depend on its perceived sound quality and function, a point to which I will return below.

To be sure, the physical *feeling* of naturalness, inconspicuousness, ease, and comfort on the part of the user is not the same thing as *visual* discretion at the level of HA hardware, though the latter can have a significant impact on the former. As Mills makes clear, historically HA design was guided by a widespread desire for visual inconspicuousness, one achieved through both flesh-colored and increasingly miniaturized aids in response to cultural stigma associated with deafness, and the resulting desire among HA users to *pass* as hearing.[76] In recent years, HA design has undergone an aesthetic transformation of sorts, as both Katie Brown and Jaipreet Virdi show, drawing inspiration from the ubiquity of earbuds and headphones and consumer electronics more generally, and the aesthetics of eyewear, jewelry, architecture, and automotive design.[77] However, as Virdi argues, when the

aesthetic rebranding that sees bold conceptual designs that seemingly embrace and celebrate rather than conceal "outward signs of disability" is driven by non-deaf designers to the exclusion of deaf users, it risks paradoxically reinscribing the ableist desire for discretion through emphasis on normalization through fashion, thereby providing a social cure for stigma. She notes that such designs often envision a "post-deaf" world driven by what Ashley Shew describes more generally as "technoableism."[78] Even as some cochlear implant and HA users have embraced the bionic and the prosthetic as empowering, transformative self-concepts,[79] Lloyd and Bonventre's aforementioned critique of the bionic metaphor is based in a similar concern around its rootedness in reparatory narratives of technological salvation, and emphasis on normative speech and hearing outcomes to the exclusion of other sensory experiences.[80] More generally, disability studies scholars have long bemoaned the cultural fetishization of the prosthetic, a trope that, Sarah Jain explains, "turns on the problem of 'wholeness' of the body and cannot help but invoke the questions of whose bodies are whole and how this wholeness is culturally determined and recognized."[81]

To return to the perception of naturalness as it concerns the distinction between HA fit and aesthetic in/discretion, many hearing aid users do not have the luxury of being "preoccupied with design or the vanity of passing" when they simply need their aids to function in mainstream (hearing) society.[82] Suffice it to say that the degree to which aesthetic inconspicuousness informs users' physical and emotional sense of naturalness relative to their device, or is something they necessarily prioritize over other considerations, varies from one individual to the next.

When pursued, often relentlessly, as a specific sound quality (as opposed to a biological process), the concept of natural hearing becomes even more elusive and challenging for audiologists and users alike, the idea being that HAs should sound as *natural* as possible, that they have an acoustic and natural tonal quality, as opposed to a tinny, distorted quality. Indeed, achieving a natural sound quality is a major theme in the marketing and customization of digital HA systems, and a priority among new HA users, who often desire that their aided hearing sound as close, authentic, or faithful to their former unaided hearing experiences as possible. In a promotional video for Widex, Olson claims, "Unless you were born with a hearing loss, there is likely a time in your life where you remember things sounding more natural . . . and this natural sound is what everybody is trying to get back to when they treat their hearing loss with hearing aids."[83] He goes on to suggest that not only do people have a different understanding and perception of what sounds natu-

ral, but that the digital processing of contemporary HAs, while designed to improve audibility, does not "necessarily make sounds 'natural' *to you*."[84] He explains that this is a signal-processing issue that Widex has sought to solve through a new programmed hearing processing pathway that ensures the processed sound is "as close to the original incoming sound" by reducing time delays. This is particularly relevant in cases where a person has hearing loss in the mid-to-high frequency ranges only and is thus fitted with an open dome aid to allow natural low frequency sounds to enter directly into the ear canal; the delay between direct, acoustic sounds and digitally processed amplified sounds can result in a type of unpleasant distortion called the "comb filter" effect.[85]

Widex global brand manager Jan Ziegler, senior evidence and research specialist Laura Balling, and senior director of audiological development Dana Helmink write that "the key promise of Widex hearing aids is that *they provide a sound so natural* that people forget about their hearing loss" (emphasis mine).[86] Widex's website affirms this promise: "Imagine a world where hearing aids don't just 'aid.' They transform the auditory experience into something so natural, that the user forgets about their hearing loss."[87] The newest digital hearing aid systems incorporate AI-powered sound processing to enable "automatic adjustments to different sound environments for a more *natural hearing experience*," as with Starkey Hearing Technology's "Livio" line (emphasis mine).[88] Similarly, the motto for Starkey's latest Evolv AI HA model promises to "effortlessly connect to better hearing" and belongs to "Starkey's complete family of *effortless* hearing technology. Evolv AI seamlessly connects and adapts to your patients' lives to make it easier to hear in even more listening environments," boasting "55 million automatic adjustments per hour" (emphasis mine).[89]

Crucially, the unending pursuit of natural sound in the design and marketing of digital HAs hinges on the idealization of *fidelity*. Sterne's remarks about the fetishization of fidelity in discourse around early sound-reproduction technologies rings true for contemporary digital HA systems:

> The desire for sound-reproduction technologies to capture the true world as it was and transmit it perfectly was, thus, tempered by the knowledge that the apparatus had its own grain; the supposedly mute machines had many voices of their own. The dream of the perfect machine as a vanquishing mediator came into conflict with the practical knowledge of sound reproduction as a specialized social network that

> shaped the sounds going in and through it. The desire for a slice of reality coming through the diaphragm of the machine gave way to a somewhat variable aesthetics of auditory realism.[90]

The "grain" and the otherwise "muted voices" of the technological apparatus to which Sterne refers are precisely the excesses of sonic reproduction that digital HA technology attempts to minimize and eradicate through an "aesthetics of auditory realism." The opening lines of Antrobus's "Echo" make the vociferous artifacts of sound reproduction plainly evident: "My ear amps whistle like they are singing / to Echo, goddess of noise, / the raveled knot of tongues."[91] For Antrobus, the HA is far from a "vanquishing mediator," but a receptive, if volatile, apparatus with its own grain, making itself known through incursions that register as distortion and misfires. The design and marketing of digital HA technology is thus shaped by a desire to limit any disjuncture between the presumed original sound and its processing and amplification through an aesthetics of auditory realism.

Together, the physical materiality of the hardware, the quality of the amplified sounds, and the degree to which they are experienced as "natural" and authentic to a given user's prior unaided hearing experiences (if relevant) have a major impact on what audiologists call "hearing aid acclimatization." HA acclimatization is the neurological and psychological process of adaptation and habituation wherein the brain relearns how "to focus on important sounds while filtering out distractions," one that should ultimately lead to a "*natural* hearing experience," as the companies Lexie Hearing and Audibel explain (emphasis mine).[92] Indeed, Virdi writes that the concept of a "prosthetic 'good fit' for a technology to be effective and comfortable requires integration with the body to the extent that either a user forgets they are wearing or using technology, or the machine merges with the flesh."[93] Too often, the repeated promise of naturalness, effortlessness, and automation in the design, manufacturing, and overall branding of digital HA systems belies the role of clinical fittings and everyday adjustments undertaken by individual users. Beate Ochsner observes that the "simplicity" and "seamless mediation between the external acoustic world and (individual) auditory experience" on the part of countless HA advertising campaigns too readily promotes the notion of a "natural, pure, and unadulterated listening as if free from any contingencies that might disrupt or mediate auditory perception."[94] Even the aforementioned Widex executives emphasize that the company's "promise of natural sound" is achieved through a complex process involving not simply optimal

design and manufacturing but also regular clinical fittings and ongoing real-life user modifications, a process they aptly term "*the technologies* of natural sound" (emphasis mine).

As the passage quoted from Olson's promotional video above makes clear, "natural," unaided, acoustic hearing is understandably a guiding frame of reference for first-time HA users and often shapes expectations around HA outcomes, for better or worse. In many ways, the aforementioned marketing of digital HA systems promising a natural, effortless hearing experience arguably plays on this desire to the detriment of the user and the audiologist responsible for managing hearing care. HA acclimatization is a process that can take a significant amount of time and requires diligent, patient, consistent monitoring on the part of the user, and a host of other variables. Once a patient has acclimatized to the HA, audiologists will often perform what is called "hearing aid verification" and "hearing aid validation" to ensure proper and optimal function of the HA as part of a clinical post-fitting follow-up.[95] HA verification uses probing microphones to take objective "real-ear measurements" of the sounds to "ensure that hearing aid gain and output meet prescribed targets for each individual."[96] This is an especially crucial step because the algorithm in what is called the "manufacturer's first-fit" is very often "an inadequate amplification prescription and often provides less gain than is necessary," as Lindsey Jorgensen explains.[97] HA validation follows from and is complementary to HA verification, which evaluates users' subjective experience of their HAs to ensure that they are working for them in terms of desired sound quality, balance between ears, and the overall comfort of the device. Validation also involves measuring speech comprehension and comparing it with a user's levels prior to the initial fitting.[98] Jorgensen also stresses that age of onset will have a significant impact on users' experience and sense of satisfaction with their HAs, where "the motivation for treatment and expectations greatly influence outcomes. . . . Individuals in the initial stages of change and motivation will need counselling focused on psychological, social, emotional and occupational effects of hearing loss."[99] Setting realistic expectations and managing them are thus a major focus of contemporary hearing care, what audiologists Sara Mamo and Tomma Henckel aptly refer to as "soft skills."[100] They counsel fellow audiologists serving first-time HA users that "after making programming adjustments, do not miss the opportunity to manage expectations based on the inherent distortion of the auditory system and the need to incorporate good communication behaviors in order to achieve the communication goals set prior to the HA fitting."[101] They continue:

> Hearing loss is not an acute condition that an audiologist fixes; rather, it is a chronic condition that the person and their family must learn to manage. Each stage of the follow-up journey should work toward increasing the HA user's level of independence and feelings of self-efficacy such that the HA user can eventually do their own problem solving, even in novel situations.[102]

Setting aside the paternalist language, it is clear from audiological discourse that "natural" hearing—or auditory realism—is less a static, objective sound quality or audiometric standard than a branding strategy on the part of HA manufacturers, an aspiration on the part of certain HA users, and an ongoing collaboration involving multiple actors. Highlighting this discourse thus reveals the significant prosthetic interdependence not simply between user and technology, but between user and audiologist in the cultural production of natural hearing or a natural hearing experience.

To that end, Mamo and Henckel's emphasis on supporting and nurturing user agency and problem-solving is also instructive for our purposes. Ochsner argues that digital hearing systems ultimately subvert customary understandings of natural hearing by reconfiguring hearing in dynamic ways, "revealing a complex interplay between algorithmic control and user autonomy."[103] Invoking Sterne and Niklas Luhmann, Ochsner situates hearing through digital hearing systems as a distinct "audile technique" that encompasses both (1) *system-driven contingencies*, that is, the *automated personalization* offered through standardized options preconfigured in the device settings, and (2) manual *user-driven contingencies*, which speak to the active process of *individual customization* and fine-tuning users undertake on an ongoing basis.[104] Ochsner's formulation holds even with the advent of AI-driven automatic adjustments, where users continue to have considerable involvement in customizing and training their hearing devices. Indeed, Balling et al. write of this as a "*collaboration* between hearing aid users and artificial intelligence," where machine learning relies on regular user input to optimize sound (emphasis mine).[105]

Ochsner argues that this dynamic interplay between the programming of the technology and users' input and control ultimately reveals "hearing not as a fixed or stable function, but as the outcome of multiple, interdependent contingencies."[106] She writes,

> Auditory perception does not mirror a stable external reality; rather, it is shaped by specific distinctions operative within technical, social,

> and economic systems . . . even ostensibly "unmediated" hearing is contingent: it reflects a constructed mode of meaning attribution that could have always been otherwise.[107]

Musician and composer Olivia Ting writes of a similar orientation toward her assistive hearing technology, or "hearing instruments":

> I never questioned that my sound "reality" was, in fact, shaped by artificial algorithms programmed by earnest scientists or programmers who were doing their best to interpret the intricacies of the human ear. . . . My hearing reality lives somewhere amid the galaxy of parts that compose my assistive hearing devices. . . . My hearing instruments have their own animacy that reminds me of the piano's volatility; both require effort and care from the user/player to make cohesive meaning.[108]

Ting's sense that digital hearing systems require effort and care to make cohesive meaning aligns with the spirit of bodily autonomy, perceptual agency, and musical self-determination in the context of expert listening. Ehlers's reflections on his relationship to his HAs as a person born with sensorineural hearing loss also resonate with Ochsner's assertions regarding the lack of a stable, natural, external auditory reality to which hearing corresponds. He also writes of digital hearing not as hearing alone, but as a multisensory endeavor. "Digital hearing" is "best defined as having all aspects of your reality be experienced through the natural function of your senses, except for your hearing. The 'digital' aspect comes directly from the use of hearing aids."[109] He notes that "a lot of this *digital hearing reality* can only be weighed against *my own reality* when the hearing aids come out" (emphasis mine).[110] In that sense, as an audiological benchmark, one's understanding and experience of "natural" hearing as it is construed in terms of sound quality is ultimately relative, dependent on one's degree of residual hearing and prior unaided hearing experiences.[111]

As computer-brain interfaces, cochlear implants literally *transform* the sensorium of the user in ways that also render the distinction between natural and "artificial" or technologically mediated forms of hearing obsolete. The fact the electrical signals CIs emit literally reorganize the brain in ways that are distinct from the neurology of normal hearing, argue Lloyd and Bonventre, compels "us to consider the individual and heterogeneous ways people create and inhabit new 'natures' with bionic devices."[112] Lloyd and Bonventre

note that overemphasis on speech and hearing outcomes obscures the intrinsic diversity and novelty of CI users' sensory experiences that fall outside of that normative rubric. Where music is concerned, they explain that CI users rely "on the 'brightness' of sounds more than melodic pitch, and judge music as happy or sad based on tempo rather than mode," summarizing the work of Swanson et al. and Hopyan et al. respectively.[113] While this chapter does not deal with CIs, I am nevertheless inspired by Lloyd and Bonventre's argument that users of assistive auditory technologies inhabit *new natures* where "the artificial is natural," to invoke the title of their article, what Ehlers and Ting refer to in terms of an individual hearing "reality." Ehlers's musical hearing reality is further shaped by the wearable nature of HA technology, which enables him to put on and take off his HAs as he moves between aided and unaided dimensions of his hearing reality.

Ochsner's and Lloyd and Bonventre's frameworks and Ting's and Ehlers's remarks are instructive for unsettling the genetic determinism implicit in the ideal of a natural ear for music, and any singular sense of "natural" hearing insofar as it is unaided, unamplified, acoustic, and rooted in a false aesthetics of auditory realism. They also uncover the technoableism implicit in the bionic metaphor and the sensationalism around the increasing automation of digital HA programming, offering an opportunity to rethink the musical experiences of HA users. In many ways, this resonates with Kafer and Virdi's emphasis on "crip" and "deaf" futurity respectively as vital to "a world in which disabled perspectives and expertise are essential for technology design and community building."[114] In this case, I am thinking about deaf futurity in the context of musical self-determination and inclusive musical world-building.

Music and Digital Hearing Aids

Facilitating the perception of oral communication has historically been the central design priority of auditory assistive technologies, often at the expense of other types of sounds, like music. Indeed, speech is so significantly embedded into the design and audiological discourse around auditory assistive technologies that it is often framed as the most important outcome of HAs and cochlear implantation, an assimilationist logic that deems CI recipients who do not attain speech "oral failures," as Friedner has observed.[115] With that being said, Maler reveals that music was nevertheless used alongside early HA technology during its advent in the nineteenth century as part of larger assimilationist campaigns where public demonstrations of the technologies in question involving both opera singers and deaf children promised

"miraculous musical recoveries."[116] These technologies were integrated into oralist education, where restoration of the student's capacity to hear music was regarded as "the ultimate proof" of assimilation, even as technologically assisted music-making among the deaf was subject to ongoing dehumanizing suspicion that framed it as mechanical, machinelike, and unemotional.[117] An interesting and important counterpoise to this discourse is 1950s American singer, jazz pianist, and HA user Johnnie Ray, whose recordings and performances were widely perceived as musically and emotionally *authentic*, arguably even more so because of the impact his deafness had on his singing voice alongside the staggering visibility of his analog HA at a time when such markers of deafness were deeply stigmatized.[118] Suffice it to say that the history of music and HA technology is inextricably bound up with cultural anxieties regarding conceptions of naturalness versus artifice, and the tensions between balancing the need to facilitate the stable perception of speech with the rather more unique demands of music.

In our present moment, music arguably remains one of the most challenging categories of sound for digital HA processing technology because it has a much wider dynamic and spectral range than speech. Speech signal processing typically suppresses all other noises to boost speech sounds—what is called "speech-in-noise" perception. Ehlers describes this in-built digital compression as a kind of spatial equalization that diminishes and flattens the depth perception of sound in ways that can have a disorienting effect, even where speech is concerned:

> Imagine you hear a person modestly speaking at the back of a room, but it's at the same volume as the person speaking directly in front of you. The depth perception of sound is gone. What is far sounds near and what is near also sounds near. It'd be as if your vision was all two dimensional and everything appeared flat. When this occurs, I am often in a conflict. I have to dial my thinking senses into filtering out the background noises and focus only on the conversation or instrument in front of me.[119]

Speech-in-noise compression thus further complicates music listening because music "is inherently multi-source and rarely embedded in noise; the ambience of a performance space, including reverberation, are essential elements of the experience of music," as Tom Scheller and Kelly Fitz of Starkey Hearing Technologies write. Suppressing these signals can thus significantly "degrade" and "adversely impact music listening."[120] The result is often com-

promised musical detail and nuance, and spectral distortion, where volume, saturation, and harmonics also play a role, as Ehlers describes: "With hearing aids in, audio reaches some degree of saturation. When audio is saturated digitally, the volume is increased but so too are the harmonic qualities which can lead to uncomfortable distortion . . . it can be like taking the natural sounds you hear around and running it through a distortion pedal."[121] He elaborates further that, for an audience member in a live setting, "hearing aid compression might kill some lovely dynamic subtleties in a performance. For example, if a volume swell and slow descent of a string section is crucial to a piece of music, it might sound as if the string section is playing at the same depth the whole time."[122]

A collaboration between the University of Leeds and Sheffield Teaching Hospitals NHS Foundation Trust and funded by the UK Arts and Humanities Research Council, the Hearing Aids for Music (HAfM) project surveyed and interviewed over fifteen hundred HA users, many of whom "reported problems with pitch perception, hearing lyrics in music, and distortion," as Alinka Greasley explains, particularly in live settings, leading many to remove their HAs.[123] At the same time, many reported that using aids to listen to classical music and/or play an instrument enabled them to hear a more complete spread of pitches than without, whereas others reported it made things worse.[124] Their findings reveal that in general, the intensity of HA users' frustrations with musical experiences increased according to severity of hearing loss and/or the extent of one's prior musical training.[125] Overall, the objective of the HAfM project was to highlight key insights and patterns in the data set to better inform clinical practice and "manage expectations among hearing-impaired listeners about the types of experiences they may have in musical contexts."[126]

These experiences are known to HA designers and manufacturers, such that improving the perception of music to create a more natural, authentic hearing experience is both a puzzle and priority of contemporary digital HA design, where it exists in constant tension with the need to facilitate the perception of speech. Kimberley Bradshaw writes that among the most common features used in HAs designed to deal with music are an increased number of microphones for improving both "the clarity and directionality of sound"; the reduction of background noise; telecoils, enabling connectivity with wireless devices and musical instruments; multiple program settings built for greater user control to make adjustments in different environments; and customized frequency response for different vocal and instrumental frequency ranges according to the musician's specific needs and preferences.[127] Bradshaw explains

that Oticon Inc's award-winning MyMusic program is built on an enhanced signal-processing system, additional amplification of and balance across highest and lowest frequencies, and accuracy and continuity across dynamics for both live and streamed music.[128] Similarly, Starkey Hearing Technologies describes a fitting rationale "based solely on what is important for listening enjoyment of music," including "providing transparent sound quality while restoring loudness for music" by using flat gain and nonlinear compression, and "providing audibility for soft music" through improved gain, new "compression architecture" designed to make "dynamic amplification as compatible with music as possible," and new in-built controls to facilitate the device's music memory.[129]

While the HAfM project acknowledges the importance of these technological advancements and initiatives, it likewise emphasizes that, in the absence of robust scientific research and generalizable design protocols equipped to deal with the inherent diversity of music, musical experiences, listening scenarios, and preferences among individual users, "behavioral strategies" for musicians and listeners and "practice-based strategies" for audiologists are the most efficient and effective means for improving the perception of music.[130] For instance, in the leaflet "Music Listening with Hearing Aids" HAfM recommends using an HA's built-in Bluetooth streaming, apps, telecoil and loops; wearing amplified headphones without HAs to increase low, mid, and high frequencies; and wearing noise-canceling headphones *with* HAs. It also has a list of recommendations for feasible adjustments to venue, reverberation, and physical positioning to help improve experiences, as well as recommendations for practicing listening. Above all, HAfM stresses that perseverance, patience, and practice "pays off," offering several tips for training through regular music listening. HAfM also published a companion leaflet for "fitting hearing aids for music listening," which includes suggestions for adjusting for "general everyday settings" that are not normally "problematic to everyday listening" that will improve music listening. It also includes a separate set of recommendations for adjusting "specific settings within a music program," and specific checklists to use for fitting singers/instrumentalists. Some of the specific recommendations include disabling the feedback manager, frequency transposition/compression, noise management, wind-noise management, and microphone adaptable directionality, among other settings.[131] We will certainly see some of the audile techniques described by the HAfM project echoed in Rømer's and Ehlers's musical accounts below.

It is also important to note that not only can HA settings be manually

and/or automatically adjusted in innumerable ways, but the hardware can also ultimately be switched on or off, put on or taken off, or put in and taken out in the case of CIC HAs. Ehlers writes,

> If the volume of a PA system or other amplification is at a comfortable volume, I will typically keep my hearing aids in as I am trusting them to do what they are designed to do: send me the audio information I need to execute my own tasks. As a working musician, I am not always in situations that I have that lovely "control." . . . If I am in a situation in which I do not need my hearing aids to perform music, this could mean one of two things: 1) my natural hearing needs are being met and the volume of the room is probably quite loud or; 2) the room is too loud and it's creating an uncomfortable level of saturation in my hearing aids.[132]

Thus, it is never an either-or relationship between HAs and music. Far from being passive subjects at the mercy of their devices, HA users are accustomed to actively taking charge of their perceptual experiences and deciding when, how, and *when not* to use their HAs where music is concerned. Such accounts expand existing definitions of hearing beyond the conceptually narrow parameters of a singular, idealized "natural" hearing, revealing that sound is always-already technologically mediated through other spaces and technological devices, that hearing exists along a spectrum that encompasses acoustic, amplified, and digitally processed sounds at many stages.

Ultimately, HAs can be vital to deaf and hard of hearing experiences of music, and there is tremendous potential for improvement in terms of design, programming, and fitting rationales. Much of this research is explicitly focused on creating more pleasant, meaningful, and functional musical experiences for HA users, where the emphasis on fidelity and an aesthetics of auditory realism is often shaped by a user's prior musical experiences. Yet it is also worth probing the unexpected and unpredictable ways in which HAs transform music perception and music itself. What of those musical experiences that relish the distortion and incongruence of digital hearing in its privileging of speech over music? What might they tell us about the multimodal, multisensory unruliness of deafness and the heterogeneity of ear listening more generally? What do such auditory realities reveal about the process of transduction in all hearing and the plurality of hearing natures? What do they reveal about bodily autonomy, perceptual agency, musical self-determination, and inclusive world-building among deaf and hard of hearing

musicians? Whether through the inevitable residue of sound amplification, the perceptual misfires between aided versus unaided hearing, or the creative affordances of Bluetooth technology, then, I propose that digital HA users transform our sense of what natural hearing is and what music can be. Lloyd and Bonventre's suggestion that CIs offer "previously unimagined understandings of hearing" is relevant to my discussion of music and HAs, insofar as they "open up a multiplicity of ways of conceiving what it means to hear, situating the experience less as a question of deaf or not deaf and instead as a developmental process."[133] It is in this spirit that I turn to this chapter's central case studies in Lotte Rømer and Jon Ehlers.

"In the Middle of the Music Again" with Lotte Rømer

Lotte Rømer is a Danish singer-songwriter, composer, multi-instrumentalist, and entertainer, an iconic figure of the 1970s and 1980s Danish rock scene who is celebrated for her roles as singer and bassist in both Hos Anna and the Lotte Rømer Band, as keyboardist for Danish musician CV Jørgensen, and for her work as a composer and musician in the Danish theater scene. As a late-deafened adult with severe genetic hearing loss, Lotte is also a longtime advocate for hearing loss awareness and acceptance in Denmark, work that began in her previous role as head of department for EarVision by Widex and continues through her ongoing work as chair of the Copenhagen branch of the Danish Association of the Hard of Hearing. Over the years, Lotte has delivered numerous lectures and has published two memoirs on living with hearing loss entitled *Hva'?* (1999) ("Huh?") and *Hva Så?!* (2011) ("Say What?!").

As a lifelong musician, a major part of Lotte's advocacy centers on relaying, demystifying, and improving the musical experiences of hard of hearing people, particularly among HA wearers. To that end, I first became acquainted with Lotte in connection with the roundtable "Music and Deafness" in February 2023 that I organized in collaboration with the Danish Broadcasting Organization in honor of Evelyn Glennie winning the 2023 Sonning Music Prize, Denmark's top prize in classical music. The panel centered on demystifying the relationship between music and deafness from diverse perspectives, while combating stereotypes about deafness. Lotte served as one of our guest speakers alongside Glennie, myself, and neuroscientist Peter Keller, professor at Aarhus University's Center for Music and the Brain.

Prior to meeting in person, Lotte and I corresponded over email, communication that was foundational to the roundtable's conceptual and logistical



Figure 21. Lotte Rømer Band, *3–1* album cover, 1981

development. Lotte made clear that, while she is "completely deaf" without her hearing aids, "I will never call myself 'deaf'" since in Denmark the term refers primarily to sign language users, who, as Lotte explains, are increasingly in the minority on account of the rise in infant cochlear implantation, fully subsidized through Denmark's universal healthcare program.[134] She also noted that when speaking English in person, I would need to be patient with her, given that English and Danish deploy markedly different phonation and mouth shapes, making hearing and speech, and particularly lipreading, challenging, a mode of communication she relies upon to supplement aural cues. Of course, we hired a live virtual captioner for our roundtable to support Lotte and all members of the audience who were deaf and hard of hearing, which had the added benefit of enabling non-native English speakers



Figure 22. Lotte Rømer Band, *Paradisets Have* single cover, 1983

to more closely follow the discussion of what was a largely unfamiliar topic, helping to bridge the language barrier.

Lotte is a warm, effervescent person and a deeply engaging public speaker, having captivated the audience at our roundtable with her earnest and humorous account of her hearing loss and lively descriptions of her musical experiences. We continued to stay in touch over email after the roundtable with the aim of including her in my book. This section thus contains material from our correspondence before and after the roundtable in 2023 and 2024, excerpts from the unpublished English translation of Lotte's second memoir, *Say What?!* (2006), that Lotte shared with me to supplement her answers to my interview questions, and a final set of in-person interviews conducted in October 2025.

Through my summary of our ongoing discussions and through the passages drawn from her memoir, Lotte offers vital insights into the process of



Figure 23. Peter Keller, Lotte Rømer, Evelyn Glennie, Jessica Holmes, and Tore Tvarnø Lind, "Music and Deafness Roundtable," University of Copenhagen, 2023. Photo credit: Agnete Schlichtkrull. Shared courtesy of Esben Tange, Léonie Sonning Music Prize Foundation.

HA acclimatization and the unique role of music therein, and the stakes of hearing when music is a person's primary vocation and livelihood. She speaks to the cultural production of hearing—whether natural or digital—in terms that align with the notion of prosthetic interdependence, as a dynamic and ongoing interplay or tension among system-driven and user-driven contingencies (to invoke Ochsner's distinction); between user and manufacturer in the case of her long-standing and consequential partnership with Widex; and between user and audiologist. Above all, through her expert listening, Lotte reveals the many facets and dimensions of her hearing reality as it has evolved over thirty-seven years in ways that transform our sense of what hearing is and of what music is and can be.

I asked Lotte to describe, once more, the trajectory of her hearing loss: "I became aware of my hearing loss in 1980, when I was just over thirty years old. It turned out that at the time, I had moderate hearing loss of the hereditary and progressive type, inherited from my father's family."[135] She explains that she sought out her diagnosis during an examination of her vocal cords, which

were an area of ongoing concern for her given the heavy wear-and-tear on her voice as a rock singer. When the ever-surprised doctor inquired as to her motivation for wanting a hearing exam, she cited her hunch about a genetic predisposition and the fact that her boyfriend claimed she "acted distracted and don't listen."[136] She added that she found herself thinking, "Maybe I was just self-centered and preoccupied—*arrogant*, as some had said. Forgot to greet folks. Misunderstood appointment dates. Personally, I thought I was putting in a lot of effort, but there were still a few too many misunderstandings on the home front."

To that end, she felt a sense of relief in the diagnosis: "Deep inside I had known it, perhaps for a long time." "It had been easy to find all sorts of explanations for why I had to ask people to repeat what they said, why I had difficulty concentrating in a group of people, and so on."[137] Lotte says that recognizing the many ingenious ways she had already been compensating for her hearing loss helped put her diagnosis into perspective: "I learned to 'go where the sound is.' If someone was speaking to me from the kitchen, I rushed to the kitchen; if someone was speaking to me from the living room, I was there in a flash."[138] At the same time, she was overwhelmed with thoughts of "*the hardship*" her father and grandfather endured. "My dear father with all his HAs, his exasperation and his ability to conceal it at all times from everyone. The violin that had been shelved because he couldn't play in tune."[139]

Her father's lifelong struggle with self-acceptance immediately motivated her to be upfront with her friends and coworkers. She felt a sense of empowerment in taking ownership of her hearing loss and "coming out" in the hopes of setting the record straight. She also resolved to continue making music in spite of her diagnosis: "I would do everything I could so music would not become the kind of sorrow—the loss—it had been for my father."[140]

At the same time, Lotte felt very apprehensive about sharing her diagnosis with the general public because people might falsely attribute any perceived shortcomings in her music to her hearing loss, which might jeopardize her livelihood in turn: "No one 'well-known' was willing to step forward, and up till now I hadn't been either. I dared not, fearing what would happen to my professional life. I could just imagine the reviews: 'Rømer's new show is a disappointment, but of course she can't hear anyway!'" Lotte tells the story of having to begrudgingly disclose her hearing loss when she was being interviewed and photographed for a feature in a magazine and could neither hear the photographer nor read his lips from behind the camera. She made the journalist promise that the editorial would focus solely on her music and not her hearing loss, but she was ultimately outed by the press with the headline

"Lotte Rømer Going Deaf." She notes that initially she "flipped out, felt offended and misused. I was *not* going deaf, but had hereditary, progressive hearing loss," but that, in the end, "my courage inspired a great response" and led to numerous new musical commissions.[141]

Lotte explains that more than her hearing loss, it was her tinnitus that was an even greater inconvenience and source of discomfort, particularly in connection with her work as a musician: "My greatest problem during those years was the racket in my head, especially after giving a concert. I have had tinnitus for as long as I can remember. I simply never paid it any mind. As a child I thought I could hear a variety of very faint tones in my head. I just thought it was normal, and actually went around singing harmony to them. The noise increased as an adult."[142] She writes, "My tinnitus—a faithful companion for many years—clamored in the background," at times impinging upon her ability to sing: "Sometimes I lost my tonal sense and had to 'fake' a couple of lines until I found it again."[143]

Following her hearing loss diagnosis, Lotte "was advised by the audiology department to play with earplugs so as not to get hearing damage on top." To start, she wore a makeshift set of earplugs using "a cigarette filter (without paper) cut across and folded. Later I used the standard yellow ones, but cut across and with a hole in the middle (using a hole punch). This is because I have a small ear canal. Both solutions eliminated the sharp treble from the sound, which also reduced my tinnitus," much to her relief.[144]

Shortly after her hearing loss diagnosis, Lotte developed nodes on her vocal cords, which had to be surgically removed. She notes that the prospect of losing her voice and the ability to sing, along with her doctor's recommendation that she cancel all upcoming gigs indefinitely, frightened her more than the prospect of losing her hearing, since it would jeopardize her livelihood: "From one day to the next my world was turned upside-down. I'd never made a lot of money, but the music and the singing had always been there. My ears, supremely important in the world of music, were causing me a lot of anguish, but I had always been able to count on my voice."

After a two-month vocal rest prescribed by her doctor, Lotte began rehabilitating her voice with the help of a classical singing instructor: "My singing teacher and I had talked a lot about my hearing, not least of all my fear of singing off-key. We worked a great deal with intonation exercises, and it turned out I had no problems if I just sang intuitively, without thinking too much."

"This was difficult. I was so used to judging music with my ears—listening with my ears and then finding the right intonation. Now, in effect, I had to quit listening—to my own voice in any case—and listen with my body and

other senses instead."[145] Lotte stresses that this required consciously suppressing her hearing reflexes and letting go of her fixation with pitch so that she could rely on the muscle memory of her vocal apparatus, while establishing a sense of groundedness and strength in her body. She notes this was needed in order to be able to focus on the expressive dynamics of singing, to concentrate on telling a story and engaging the audience, what in her view should always be the top order of priority.[146] Her initial struggles throughout the rehabilitation process led her to wonder whether the loss of her voice was a signal to stop playing music altogether. In this early period, she also stopped teaching music courses, what had previously been a major source of income, because "it took too much energy, and in spite of the students' enthusiasm" and her openness about her hearing loss, "I often felt unable to evaluate their musical efforts."[147]

While Lotte's progressive hearing loss motivated her to withdraw from performing and teaching—at least for a time—she threw herself into *composing*, an activity she felt was more conducive to hearing loss than the others. Indeed, in that period she secured numerous high-profile contracts composing scores for a variety of Danish television series and theater productions: "Writing songs for myself didn't work, but I had no problem writing songs for others. . . . Eventually it became a kind of sport to imagine the music in my head and then simply note it down."[148]

After a second exam in 1987 at the audiology clinic revealed that her hearing had worsened in the short time since her initial diagnosis, Lotte was fitted for an analog HA: "I got my first in-the-ear hearing aid (ITE), but only in my right ear."[149] She describes her initial reluctance to get an ITE in her left ear as being a holdover from her father, who had insisted that maintaining "a degree of 'natural sound'" was necessary in order to avoid feeling closed in by "unnatural" sound, a logic that Lotte would later come to realize was flawed and to the detriment of her existing hearing thresholds.[150]

Lotte explains that her HA initially sounded "hideous and shrill. It was as though every sound came pounding into my head at the same volume. A dinner with just four people sounded like the kitchen was caving in. When someone laughed, my finger flew up to the volume knob. The traffic sounded like a stock-car race. And my tinnitus got worse. It was like the hearing aid amplified the wrong frequencies."[151] Lotte explains that she "did not use it [the hearing aid] for music, only in peaceful surroundings. And listening to music with it did not work."[152]

Dissatisfied with her ITE, Lotte felt uniquely motivated to lend her expertise in sound and music to better support audiology clinics and HA man-

ufacturers in their ongoing efforts to improve HA technology: "In addition to being born with absolute hearing [pitch], I had a lot of experience from studio work (recordings), where I often participated in mixing the music and learned about frequencies, compressors, limiters, etc. When fitting my HA, I could set frequencies, for example, by asking for 500 Hz more or 4KHz less. And I started using them when I played music, where they helped me hear the music better."[153]

"For me it seemed logical that with digital technology it would be possible to produce hearing aids that were smaller, but with many more sound components. And from the music world, I also knew it was possible to reduce distortion and noise by manipulating the sound on its way from microphone to loudspeaker."[154]

She began by volunteering as a test subject for the HA manufacturer Oticon in 1988, which also helped her adjust her ITE, which went some way toward improving her experience as a new HA user.[155] She also participated in a trial at the hospital where they were testing new, digital HAs, a process that she felt was worthwhile and important, though emotionally and physiologically taxing: "It meant being confronted with my poor hearing to a much larger degree, and several people at the clinic gave both me and my failing hearing curve worried looks."[156]

All the while, Lotte continued to use her analog HA. She notes that while it was not suitable for performing amplified rock music, she came to rely on it in the live performance of acoustic music.[157] In her memoir, she recounts serving as the lone stage musician in a 1989 Danish theater production of Yukio Mishima's *Madame de Sade*—entitled *Markise de Sade* in Danish—at the Aveny-T Theatre in Copenhagen, for which she composed and performed the soundtrack, and arriving at the theater ahead of a scheduled performance only to discover that her HA had run out of battery. The stage manager and actors assured her she would be fine without her HA, but the thought of playing without it frightened her, ultimately leading the stage manager to postpone the show's start time by a few minutes so that Lotte's son could rush to the theater to drop off her extra battery. She notes, "It was important to me when I performed in [that production] to have my HA because there were no microphones and it was unamplified, and I was playing acoustic instruments, and I had to be able to hear what they were saying on stage, since I was placed at a distance from the performers."[158] While at the time Lotte was embarrassed and panicked, she cites it as evidence of a newfound welcome dependence on her HA, one she regarded as a triumph.

Toward the end of 1997, Lotte entered into an agreement with her ITE

manufacturer, Widex, to serve as a spokesperson on hearing loss awareness, "a partnership that resulted in many years of work; I have now given over 1000 lectures on the subject. The first 2–3 years in particular were packed with lectures, e.g. of 15–20 per month during some periods," as well as appearances on national television and radio and in newspapers and magazines.[159]

The success of her collaboration with Widex, along with the fact that she had never been able to find any books on the subject of hearing loss despite its ubiquity, ultimately led her to write and publish two books on the subject: "My insights were built largely on my own experiences and feelings, a good helping of lectures on hearing, and not least of all a clear impression of the existence of a range of prejudices and myths about so-called 'invisible disabilities,' painless, invisible and no big deal for outsiders, but often a major obstacle for the hard of hearing in getting their lives to function."[160]

Lotte's partnership with Widex was a foundational step in the evolution of her relationship to HA technology: "Widex also offered . . . to let me try their new digital hearing aid (DHA), and in 1998 I got my first completely-in-canal hearing aids (CIC), which was a huge help to me. The company was also happy with my audio experience."[161]

Indeed, she recounts spending Christmas with her sister shortly after being fitted for her digital CICs and accidentally dropping one on the stone floor, an experience that devastated her in the moment, but also made her realize just how "my hearing aids were no longer a necessary evil. Instead, my feelings toward them had turned into a warm love affair. . . . I polished my new devices lovingly every evening. . . . Unlike my older family members' attitude toward their hearing aids, I was proud of mine and was glad to show them off."[162]

"The really big change was when Widex developed a music program [for their HAs], which removes noise reduction, and adds a little loudness, so that you keep the dynamics in the music. The first time I had them at home and listened to music, I burst into tears of joy; for the first time I was *in the middle of the music again*, it was no longer a 'flat wall' outside me. From then on, my HAs have been in my ears from the time I get up until I go to bed (today I am completely deaf without HAs)."[163]

After being outfitted with her new digital HAs, Lotte felt confident enough to begin performing live music again. At the same time, her digital HAs could sometimes pose problems for music listening: "The notes 'fool' me with their frequencies, so that in spite of my perfect pitch, I don't always hear a high A as an A-note, but several intervals lower," an unsettling experience

that can sometimes apply to the whole auditory spectrum, "with unpredictable results."

She also describes this auditory "trickery," for lack of a better word, in generative terms as a curious outcome rich in creative possibility. For instance, she recounts a favorite cassette tape that she and her brother would listen to growing up featuring swinging South African choral singing, simple harmonies, and dance rhythms. She describes descending her back staircase many years later to take out the trash when all of a sudden she "could hear a sound in the distance in the midst of all the others. It was that of an African choir, 'humming' beautifully. Was this the choir singing I knew? I looked up, trying to find an open window. Who could be listening to that lovely music?"

"But there were no open windows, and for the moment, the sound disappeared. Then it started again. I deposited the trash and headed toward the street to find the source of those musical tones. When I opened the gate, the sound grew louder, and immediately the beautiful humming turned into something new altogether. There I stood, staring stupidly at a fat, clumsy cement mixer that was churning around with a rolling, rhythmic sound. Chattering away with an open mouth, it was grinning right in my face. I had to laugh out loud. Could my ears really be *so* mistaken?" She concludes, "But hey, that the sound of a cement mixer in my hearing aids could be transformed into an African choir *is* a bit of an accomplishment!"

In our final interview in October 2025, Lotte and I meet in her beautiful apartment in Vesterbro, Copenhagen—the city's former red-light district, where we both live—to enjoy a cup of coffee and a meal. Lotte told me that it had been a year and a half since she was fitted with her first ever set of behind-the-ear (BTE) HAs after eighteen years of wearing CICs. It took nearly a year of fittings before she and her audiologist settled on the right pair and the right sound: "At last, we found a sound which was as close as it could be to my old [Widex] CIC." She did not opt for the latest Widex CIC model (from the Magnify family) since the sound was nothing like that of her beloved former CICs, which were part of the Widex MIND family. Lotte was fitted for her first pair of MIND CICs in 2006, which she wore for over ten years, despite her eligibility for a new pair of HAs every four years in the Danish healthcare system. By 2016, the MIND family series had been succeeded by newer product lines, but she was so attached to the MIND's sound

and dissatisfied with the alternatives on offer that she approached Widex directly to see if they had a pair "lying around," for which she happily paid out of pocket. After eight years, her second pair of MINDs started coming loose in her canals from heavy use, creating unpleasant distortion and feedback, leading her to seek out an appointment with her audiologist. She noted that, while the MIND CICs were not equipped with Bluetooth technology like newer digital HAs, the computing, loudspeaker, and music program were simply "incredible," a winning combination that she notes is simply not intact in the newer Widex CIC product lines, like Magnify. Lotte also explained that while CICs are not generally considered optimal in instances of profound progressive sensorineural hearing loss like hers, the Widex MIND CICs nevertheless offered "the best hearing" and would forever remain *her* optimal hearing, a benchmark to which she would continue to aspire, all the while recognizing that other models "will never be the same."

More generally, she favors the CIC as an HA type because the placement of the microphone in the ear canal affords the most direct, immediate, unfettered sound delivery format while preserving the ear's natural sound localization capacities in the pinna effect, enabling her to very easily determine the sound's direction. By contrast, BTE or receiver-in-canal types disrupt the pinna effect through use of directional microphones placed behind the ear, sometimes resulting in front versus back sound localization errors. Indeed, Lotte explained that while her chosen Widex Moment BTE HAs were actually "quite good" and very "functional," having the main hardware sitting behind the ear creates a very different auditory experience that, when coupled with the spatialization effects built into the device, can be disorienting. These built-in spatial effects are especially troublesome in her device's music program, which contradicts and complicates her own intuitive sense of where the sound and individual instruments are coming from. She insisted, "I need the best sound without any special spatial features."

Lotte expressed apprehension about the increasing automation of digital HA technologies in general and the insistence on the part of many manufacturers that the latest digital HAs are equipped with the capacity to detect music so as to automatically make the necessary adjustments. Lotte retorted, "I mean, there's music in our speech; how can the hearing aid know that and know what that means?" Recounting a choir practice over the weekend and questioning the technology's ability to adequately distinguish between singing and intermittent speech in the context of a musical rehearsal, she concludes, "*I don't believe in that*. I don't want the technology to decide what I hear. *I* want to hear what *I* want to hear, not what the technology thinks I

should hear. Of course, the noise reduction [in all digital HAs] is grounding, and I also have the ability to make my own programs using my HA app. . . . But, in the end, it's about having the best possible sound, and *I* will decide what *I* hear, and when it's *good*."

Lotte explained, however, that the advantage of the BTE over CICs lies in its built-in teleloop and Bluetooth technology, which CICs are not typically equipped with due to size constraints. The BTE's Bluetooth technology delivers audio and music directly from her phone to her HAs and can even deliver sound directly from her MacBook with the help of her Widex SoundConnect, a dongle she plugs directly into her computer's USB port to aid with streaming stereo.[164] She emphasized that these features have had a "fantastic" impact on her life. She recounted watching a German television series called *Die Bergretter* (or *Bjergvagten*, in Danish), a drama centering on the lives of a search-and-rescue team in the Austrian Alps, now in its sixteenth season, and being overcome with tears of joy upon hearing the musical soundtrack with such precision and accuracy for the first time in a long time. She was so taken aback that she had to phone her sister to confirm that the music she was reacting to was actually good, as she suspected. She chuckled, "I now enjoy all the music from the movies I watch." Lotte noted that especially as her interest in *playing* music has waned, being able to listen to music so fully in these ways has had a transformative impact on her life.

I asked Lotte what she thinks of "natural" hearing. She explained that for her, it's an irrelevant concept at this stage: "I can't answer that, because I don't have access to that experience of sound anymore," stressing that her sense of what is natural and normal was profoundly shaped by her former MIND CICs far more than any prior or residual hearing. She noted, however, that regardless of digital HA type, when sound is digitally processed and then amplified, you inevitably lose an element of the sound's acoustic "personality" (or timbre) through the suppression of overtones and undertones. Even when she tries to fill in the blanks with her previous frames of reference, it is hard to say, "'This sounds natural' and 'This doesn't sound natural'" with any degree of certainty or objectivity. She emphasized that any amplified sound is ultimately distorted sound, chuckling as she confessed, "I only hear distortion, but it's what's natural *to me*." At this point, her sense of natural hearing is so bound up with her digital HA reality that the recommended next step in her "hearing journey," undergoing cochlear implantation, would require her to start over and "forget everything I know about hearing." It is a decision she would not take lightly.

Over the years, Lotte's audiologists have stressed that despite her pro-

found hearing loss, she has *exceptional* hearing, one that they suspect stems directly from her musicianship. They emphasize that she is not like other HA users in the meticulousness with which she approaches her HA fittings and HA acclimatization, that her ability to perceive nuance, distinguish between minor sonic details, and describe those experiences is not the norm. She has misgivings about this characterization, however, in that it is often wielded to intervene in and manage her expectations, the implication being that they are too high relative to what is realistically possible. Lotte sees this as a missed opportunity, that, too often, hard of hearing people will defer to the authority of their hearing care professional without advocating for their needs or trusting in their own expertise. Lotte rather thinks of herself as the audiologist's equal and complement, emphasizing that her knowledge and lived experience is just as valuable as theirs. A major part of her advocacy work, then, has involved equipping fellow Danish HA users with the critical frameworks and language for understanding and describing their hearing experiences, so that they can better communicate with audiologists, leading to better hearing outcomes.

Lotte's journey is a masterclass in expert listening. As a self-identifying hard of hearing person, Lotte gives voice to the diversity of deaf subjectivity and ontology and the heterogeneity of ear listening therein. She sheds light on the ways hearing loss interfaces with different social norms, musical ideals, and professional expectations built around the myth of normal, *natural* hearing. She attests to the compounding perceptual and emotional effects of progressive hearing loss, vocal injury, and tinnitus, and the intricate, ingenious labors and problem-solving undertaken to meet the demands of her professional life and maintain her livelihood as a musician all the while. Even as Lotte took steps to rehabilitate her voice after surgery, her progressive hearing loss scrambled her sense of her own voice, such that the deeply ingrained expectation to sing in tune became a mental stumbling block that ultimately saw her withdraw from singing for a time. The slippage between hearing and bodily listening that Lotte describes, and the mental and physical energy required to consciously suppress her existing hearing reflexes to more closely attend to vibrotactile sensation in the perception of sound challenges the mistaken assumption that listening through touch comes naturally and automatically to deaf people, that it is always-already musically viable. It was composing that enabled her to more fully express her creative freedom and regain her

confidence, where the act of writing and notating music was uninhibited by the pressures of performing live and singing in key. To that end, she offers crucial insight into the ways bodily autonomy evolves in connection with the modalities and perceptual affordances of the discrete musical activities with which a musician is engaged. In the process she has flourished as a musician and advocate, blazing a trail for other musicians faced with the prospect of hearing loss, while building a more inclusive musical world.

Lotte's account also illustrates the ways perceptual agency develops in conjunction with HA technology, particularly as it has evolved in the time since she was fitted with her first HA in the late 1980s. Some of these technological advances led to unwelcome, yet necessary adaptations on her part. At other points, they gave rise to unexpected breakthroughs, musical or otherwise, as with the advent of Bluetooth connectivity. The prosthetic reciprocity Lotte has established with each new pair of HAs was born of trial and error, setbacks, troubleshooting and problem-solving, and self-advocacy, as she forged a new language for describing and improving her hearing in collaboration with her longtime audiologist and with Widex, her preferred HA manufacturer. In these ways, she has put herself at the forefront of her own hearing reality.

Lotte reveals that the trust placed in increased automation in digital HA systems is misplaced in that it undermines the bodily autonomy, perceptual agency, and musical self-determination of the individual user. Often, automation can lead to unintended problems in the name of ease and convenience that the user must consciously work to correct and compensate for. Lotte's desire to be in control of the sounds she hears, and in terms of deciding what is and *is not* music over the built-in presets and programming of her HAs, aligns with Ochsner's arguments around the tensions between automated personalization and user customization in the ongoing production of hearing.

Lotte reveals that so-called natural hearing is a relative, if irrelevant term, subject to the unique dynamics of one's individual hearing reality as it is shaped, reshaped, and conditioned by and through technology along different time scales. In these ways, her account challenges any sense of a fixed, unmediated external hearing reality and an aesthetics of auditory realism, rather speaking to the dynamic, contingent nature of hearing and the user's role in making "cohesive meaning," to invoke Ting's verbiage.[165] Indeed, more than they need to produce a faithful reproduction of sound's "acoustic" properties, HAs need to deliver sounds in a coherent, functional manner to the extent that the user can derive and ascribe meaning in a variety of contexts. For Lotte, any amplified sound is "distorted," but that distortion forms a

new, viable hearing reality. Her conception of "natural" hearing, then, is informed not so much by her former unaided hearing or an attachment to the imagined fidelity of acousticness, but through a reciprocity developed with a specific CIC HA model against which she has measured all subsequent digital HA systems.

Lotte's anecdote around mistaking the sound of a cement mixer for an African choir resonates with Antrobus's poem "Echo," quoted in the opening of this book, where he likens the distortion piping through his "misty hearing aid tubes" to its own kind of music relative to Gaudí's lauded "golden decibels of angels." Both offer vital insight into some of the "misfires" of digitally aided hearing, opening onto heretofore obscure dimensions of auditory perception and their musical potential. Not only does Lotte's account defy normative audition, but it disrupts any static construction of musical perception while dispensing with the cultural myth of a "natural ear" for music. Lotte rather champions a conception of musicianship rooted in a meticulously crafted sense of her own audition and listening expertise as it has evolved in tandem with technological advancements in digital HA technology and the progression of her own hearing loss.

"Shakin' Up the Molecules in the Room" with Jon Ehlers of Bangladeafy

Alternately described as noise rock, industrial rock, post-rock, math rock, prog rock, grunge, punk rock, and electronica, Bangladeafy's music is characterized by its stylistic eclecticism, loudness, and rhythmic complexity, a two-piece named after drummer Atif Haq's Bangladeshi heritage and Ehlers's sensorineural hearing loss. All six of Bangladeafy's albums comprise densely packed, spirited, through-composed arrangements where one track moves seamlessly into the next, replete with industrial noises, jazz, drum-and-bass, futuristic 8-bit video game and robotic sounds, occasional metal screaming, and rapid rhythm changes. Writing for *The Moshville Times*, critic Matt W likened their twenty-two-minute-long EP *Ribboncutter* (2018) to a "controlled explosion," whereby "the constant creative riffs by Ehlers and technical drumming of Haq is another level . . . these guys are so far out it's worth wondering if they'll build a hut on Mars."[166] Similarly, critic Vidur Paliwal described their 2020 album *Housefly* as a "brain-teasing," "chaotic," "multi-dimensional puzzle" and "buzzing monster," while critic Darryl Sterdan claimed their 2024 album *Vulture* was "fierce and fearsome," comprising "short, sharp shots of shape-shifting, full-throttle rhythmic intensity," an ethos evident from the

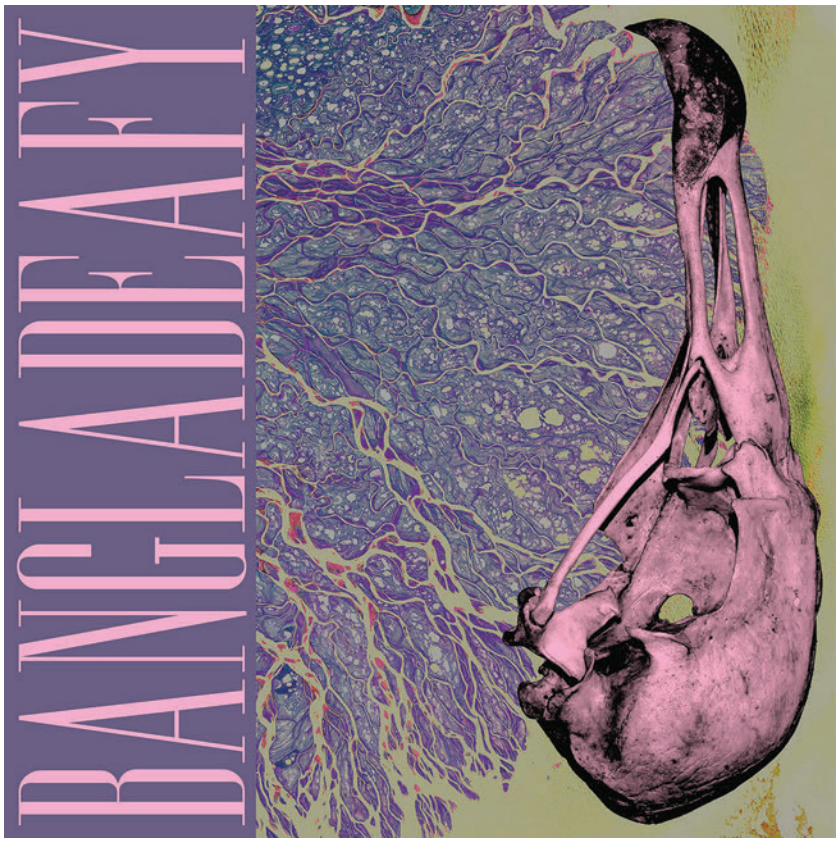


Figure 24. Bangladeafy, *Vulture* album cover, 2024. Artwork by Greg Meisenberg. Shared courtesy of Jon Ehlers.

album cover (see Figure 24).[167] Suffice it to say that over the years, the band has developed a reputation among critics and fans for their frenetic, frenzied sound and their virtuosity as instrumentalists, both in their work as studio musicians and as live performers.

I first learned about Bangladeafy in 2019 when a friend sent me a link to a 2016 interview with Ehlers published in *Noisey* with the attention-grabbing title "Bangladeafy's Jon Ehlers Is Doomed to Play Rock Music, Hearing Disability Be Damned." I was immediately taken with the band's name and drawn to *Noisey* writer Alex Deller and Ehlers's discussion of the lack of disabled representation in popular music. I was also intrigued by Ehlers directly attributing his music's complexity and energetic drive to his "being neurotic"



Figure 25. Bangladeafy band members Jon Ehlers and Atif Haq, 2024. Photo credit: Jenna Hill. Shared courtesy of Jon Ehlers.

and to a competitiveness stemming from his deafness.[168] Having listened to some of their recorded music, I wanted to interview Jon for my book during a planned trip to New York City, so I reached out over email, and he happily obliged.

Ehlers wears his heart on his sleeve: Spanning the length of his outer left forearm is a black-and-white tattoo of a tuning fork with one prong (or tine) slowly disintegrating (see Figure 25), doubling as a symbol of his hearing loss and of his creative defiance in the face of auditory and musical norms of which the tuning fork is emblematic. Typically made of stainless steel or aluminum and in different sizes corresponding to different frequencies, tuning forks are vibrating sound resonators that produce a perfect, constant pitch against which musical instruments can be tuned. They are also used in audi-

ology as diagnostic tools for distinguishing between conductive and sensorineural hearing loss.[169]

As his tattoo suggests, Ehlers is deeply invested in rethinking aurality and musical experience beyond normative frameworks and the notion of "natural," "normal" hearing or a natural ear for music. His account speaks to the uniqueness of his hearing reality, one shaped by a constant negotiation between the musical affordances of digitally aided versus unaided hearing, and through the reciprocity he has cultivated with his fellow musicians and with musical instruments. He has developed an idiosyncratic set of audile techniques and performance practices for navigating both the limits and musical affordances of his HAs in ways that disrupt the sensationalism around automation in the branding of digital HA systems. As with Rømer, Ehlers has spent much of his professional life balancing the demands of his work as a studio musician and as live performer with the creative freedoms his hearing loss affords. Above all, his account centers on a strong appeal to creative autonomy and musical self-determination in accordance with expert listening.

It was a cold and rainy Friday afternoon in late November 2019 when Jon and I finally met at Hungry Ghost Coffee at the corner of Fulton and Oxford Streets in Fort Greene, Brooklyn. After several minutes of waiting in line and exchanging pleasantries, we quickly realized that the cacophony of this small, high-traffic space was not conducive to the kind of conversation we had planned to have. I had booked some time in my friend's music studio just a few blocks down on Fulton in the event that we should need a quieter space, so I offered it up as an alternative, Jon agreed, and we headed over. Once there and sitting in front of the electric fireplace, coffees in hand, we got to talking.[170]

I led with the seemingly innocent question, "So what was it that first got you into music?" to break the ice and establish common ground around our shared love of music, a question that I figured would enable me to learn about his early musical experiences without imposing my own agenda, one I could just as easily ask a hearing person. Yet as the words left my mouth, I started to second guess myself, realizing the question could also be taken another way, my intentions misconstrued, namely, as an implicit form of musical gatekeeping on the part of a hearing person unduly suspicious of a deaf person's interest in music and searching for innate signs of difference.

To my relief, Jon took the question at face value and told me about his lifelong love of Nine Inch Nails (or NIN) and the synthesizer, how both were

foundational to his early musical exposure and continued to influence his own music twenty-five years later. He cited seeing the music video for NIN's "Closer" on MTV as a transformative moment in his thinking around the expressive possibilities of popular music. He elaborates: "I did enough chores and got the cassette tape [of NIN's *Downward Spiral*]. I listened to it for the first time in a hammock while camping with my family, and I'd never heard anything like it. It was like, *This is not the music that I'm used to. It's really weird and it's noisy, but I like it*, and that's been my reference point for everything, everything that I do."

"Pretty quickly after that I asked my dad, I was like, 'What is that noise in that song 'Closer'?' He's like, 'Oh, that's the synthesizer,' 'Can I get one?' 'No you can't. They're too expensive.' But, he said, 'Your grandma wants to get rid of her piano.' We got an upright piano, took piano lessons, and I learned really fast." He contrasts his resolve to pursue music with the practical challenges of playing sports as a HA user: "I tried to be athletic, and it didn't really work out too well, especially having hearing aids and you sweat, you've got to take them out, and any time that happened we'd lose them in the grass and they would get eaten by the lawnmower or the dog would eat them." Despite being a fast learner at the piano, he explained, his teacher dropped him "because I wasn't learning what he wanted me to learn. . . . Since then I've been self-taught, and my parents were always really supportive. . . . I'm a weird keyboard player. The formal training just did not stick." He eventually went on to learn fretted instruments, crediting his high school guitar teacher with having taught him a great deal about guitar playing, though he comments, "Bass, which I'm most known for? Self-taught. Picked up all those techniques from just observing."

I asked Jon whether he'd thought about the impact his deafness has had on his music and how it informed the process of teaching himself to play and his resulting playing technique. Reflecting on my question and revisiting his answer with the passage of time, I realize I was asking him to prove a negative, asking him to think through any musical idiosyncrasies as an inherent condition of his deafness. In other words, I was asking him to speak *my* language and defer to *my* perspective as a hearing person, a flawed logic made clear by turning the question back on myself—*Had I thought about the impact of my hearing on my understanding of music?*—a reversal that speaks volumes about my own implicit biases and ingrained patterns of thinking around music at the time.

Unsurprisingly, when faced with my question, Jon hesitated: "I *have* thought of it. It's just hard to answer because *I don't know anything else*."

He searched his thoughts and answered, "I work with a lot of drummers, and I'm usually the first person to write after the drummer. I'm listening to drumbeats, and I think I might hear them a little bit differently . . . because traditionally, I think what a bass player would do is kind of focus on the bass drum, like kind of just sit on that and match a root note of the bass drum. And I'll kind of fill in all the space with it because the way his [hi hats] come through in my head . . . where I'm like, *I have to work with that hi hat, I have to work with that snare drum*."

In our 2025 email interview, Ehlers described this further in relationship to HA compression: "In a music setting, the depth of sound may be important. An example scenario would be if multiple musicians are playing a complicated polyrhythm, you need to ask yourself which rhythm is the one you need to hear the most to avoid making an error or losing the tempo. If I have hearing aids in and I need to focus on the drum pattern, but I am hearing the guitar or vocals at the same depth as the drums, it might be time to take my hearing aids out."[171]

He added, "I don't like playing in the pocket, or I don't traditionally play in the pocket, just because I'm hearing all this other stuff, and I'm thinking *this space needs to be filled*, maybe that might be the way?" I inquired about his setup on stage, to which Jon enthusiastically replied: "I need to be right on top of the [drum] kit . . . [with] my keyboard rig and my placement. . . . And we've got accustomed to doing that where it sounds best in a DIY setting. . . . It needs to sound balanced. And for me . . . I need to be able to *hear everything*, to *see* [my drummer] as best as I can without being in his kit. Like sometimes he gives me a hard time, I'm too close, like when I'm tightening up he goes, 'Dude, I need more room, I need more room.' So yeah, my placement for the past couple of years, I have been very close to him."[172]

Jon continued,

> Just imagine . . . you have a blinking light as your BPM [beats per minute]. I have to work off something like that. You don't actually hear it because it's a live setting, and we're in a lot of live settings where I don't know what's going on, I don't know where the sound is . . . and since I'm very visual with drummers in particular . . . I have to know their rudiments in and out. It can be tough. . . . It's easy to get lost, but since I have that ability to understand what my drummer is doing visually, like even though there's a wall of noise coming, I can correct myself on the fly. If I'm completely lost, I know improv a little bit where I know I can just wing it. . . . I can pull it off. I think it's better



Figure 26. Jon Ehlers, 2024. Photo credit: Megan Taylor Mead—MT Photos 315. Shared courtesy of Megan Taylor Mead.

> than stopping. . . . There have been instances where that has happened, and it's a temporary loss of information and you can't really proceed further. . . . It's a skill . . . being able to visually correct yourself when you can't hear it. . . . [Our music] it's not easy beats. It's not like 1, 2, 1, 2, 3.[173]

I nodded my head in agreement. "No, it's really complex," I said, having witnessed the rhythmic sophistication and discordance he described, a distinctive tear in much of their recorded music and live performances. I have also observed the intensification of the musical space and intimacy between bassist and drummer to which he referred in Bangladeafy's live performances.[174]

Jon continued,

> Yeah, so . . . it's my responsibility to know my drummer's rudiments, and maybe because I'm hearing disabled, I've just always been competitive, like, trying to prove myself, that I just drilled it into my head. Meanwhile, most musicians probably just hear it and probably accept it at face value . . . and they don't explore more nuances of what's going on . . . like, *I'll tackle the beat from a million different directions*, because I think it's in my nature to be competitive in that way. You don't have control, *you don't have control*, particularly with the way I grew up, you don't have control over your situation, being hearing disabled, so you will try to get control however you can. Does that make sense?[175]

"That makes a lot of sense," I said. He continued, "As I've gotten older, I've kind of reassessed. . . . I kind of went through it most of my life not thinking about it, but me and my sisters, all three of us used to fight a lot, and I think it's because we didn't have the control that we wanted over our bodies, over our environments."[176]

I was struck by Jon's strong appeal to bodily autonomy and the ways it informs his desire—or self-professed *need*—to exercise control over his music in live performance through a thorough examination and internalization of the underlying rhythms. His suggestion that he tackles the beat "from a million different directions" implies a spatial orientation and dimensionality, the sense that a beat or rhythm is not simply bounded by linear time, but can be approached in isolation from many sides, angles, and vantage points. In many ways, his remarks are reminiscent of the ways Glennie speaks of getting *inside* or *on top of* the sound of her percussion kit as part of her physical reciprocity with the sound and her percussion instruments.

I next inquired about the role of his fastidiousness in his work as a studio musician: "I know you've recorded *virtually* for other bands. Do you think your interest in that setup has to do with control, or your desire to maintain creative control?"

"Yes, absolutely . . . I used to do the improv thing and you can get into a situation where you can't really hear everything. Or *I* can't hear everything the *right* way, whatever the right way is. Or, I think I'm not hearing it the right way and it's out of my comfort zone."[177]

In an email interview I conducted with him in 2025, Ehlers explained this aspect of his hearing further: "My personal hearing disability is 'scooped,' meaning the information in the mid-range is almost non-existent without my hearing aids in. This leaves me with a muffled world, mostly receiving information from the low range. When I am walking down a busy street with no hearing aids, I'll primarily hear the low rumble of large trucks and/or the high range of sirens and horns. For further clarity to the reading audience, I live on a very busy intersection. At night, the people talking on the sidewalk and some car stereos do not bother me as much as the low growl of an idling truck would. I sleep with a noise machine to drown out the chaos."[178]

He continued in the email, reflecting on how that plays out in a musical setting: "When it comes to music, I hear the world in a scooped way (no mids), so I often want to make up for it when it comes to making decisions about my own presentation. Oftentimes, I overcompensate and will dial in a tone on my synth or my bass that is pleasantly mid-heavy to me but may be unpleasant to others."[179]

In our original interview, he reflected on how this informs how he works in the studio:

> I like to work where I can control everything, and I will get mixes where I'm going to be playing over it, and I will EQ it the way that *I* want so that *I* can hear it right. . . . I don't EQ it because I don't like the way it's already EQed; I EQ it so that *I* can hear it properly. Last week, I got hired to play bass on this band's new album, so they sent me everything: guitar, drums . . . but there was one particular part, the double bass drop, and I just couldn't hear it, and I knew it was there, like, I could *feel it* more than I could hear it. But I needed to be able to *hear* it so that I could get it right, and I had to EQ it and scoop everything else so I could hear that. And maybe regular musicians with regular hearing might have been like, "Oh yeah, it's right there, I can

> understand it." It's those situations where I'm like, *Am I a bad musician because I can't hear it right?*[180]

I instinctively shook my head and replied, "No! You're a better musician for it probably," even though he was simply posing a rhetorical question, not necessarily asking me to validate his musical abilities. He continued,

> It's just like, I *know* it has to be done a certain way. This is music that's not mine, so I do have to honor something that they're asking. . . . Because I have a cheap setup and I record everything dry, without effects, I'll tell a band, "This is what I'm going to do, this is how I'm going to do it, I've been doing it for years and it works out fine. I'm going to record everything at home, you can re-amp it in the studio . . . but what I'm sending you is just a flat signal and recorded my way at home." And no one's been upset.[181]

I'm intrigued by Jon's reflections on the reciprocity between hearing and feeling in his work as a studio musician. Of particular note is his manner of equalizing the amplitude of specific frequencies within a given track or mix in his own way so as to aurally verify and supplement otherwise elusive, obscure aspects of the music after they've been felt by carefully adjusting the audio levels in order to work with and record over individual tracks in a given mix with technical precision. What he refers to as a "scooped" sound, a common technique in music production, involves isolating individual "tracks" in a mix and adjusting their frequencies by specifically bringing up the bass and treble frequencies while minimizing, muting, or eliminating the mid-frequencies. In Jon's case, he does this until he can *hear* what he *feels* and instinctively knows is there. Here hearing and feeling work in tandem as a dynamic perceptual mechanism; while tactility is not altogether viable on its own when recording and mixing in the studio, it clues him in, prompting a more concerted, targeted form of hearing.

I next inquired about *loudness*: "What do you think about this cultural fascination we have now with loud volume, particularly with sound systems improving?"

He readily admitted, "I'm guilty of that. I'm not really a gear guy, but I had to become one, because I wanted to go louder too. . . . For the first couple years with Bangladeafy, I thought 350 watts was loud enough. I thought that was loud. And then I thought, something's missing, something's missing.

I started doing the keyboard stuff and it wasn't cutting through the way I wanted. So I started poking around. I went up to 500. And now I think I operate mostly at about 1,000 watts."

I replied enthusiastically: "This is really interesting, because I've never really thought of it [loudness] in terms of wattage; I've always thought of it in terms of decibels, like 120 and above."

He replied,

> Wattage is misleading, because it's more of an electricity thing, but it does in some way translate to *louder*, more power. . . . I'm using more speakers now, let's put it that way. I run my bass through two amps now rather than one. . . . We also do a lot of house shows, like DIY spots, and you want to be loud. . . . Why [is it that] that culture exists? I hate to be that person who is like, "Life's boring," but at night you've got to come for the party and the excitement, and you want the most extreme experience you can get out of life without dying. . . . There's something about it. *You're stirring up the molecules in the room*. That's what you're doing, and some people like to push it even further. Me, because of the hearing aids, I like to just stand *away* from the pit.[182]

Jon's reflections are instructive for my thinking around cultures of loudness. Insofar as it measures energy transfer rates and amounts of electrical power, wattage more readily captures the implicit technological mediation of loud sound and its material propagation compared with dBs in ways that help temper and demystify the romanticization of loudness and the figure of deafness therein. While sound pressure levels are inescapably material, dBs are an arguably abstract unit of measure to the extent that they tell us nothing about the sound's source or its acoustic transmission. By contrast, not only do watts give an approximate sense of output level, but they are also bound to a concrete material electrical object, that is, "gear"—audio equipment like amps, speakers, and subwoofers—responsible for the material transfer of energy and loudness by extension.

The cultural pursuit of loudness and the extreme thresholds of human experience that Jon described—culminating in his apt suggestion that the band is "stirring up the molecules in the room"—arguably exemplifies what Sterne has described as the kind of "subjective self-assertion" that loud sound sometimes affords, and aligns with aspects of the fetishization of loud sound in EDM and metal that we witnessed in the previous chapter. Crucially, in Bangladeafy's case, this pursuit does not capitulate to a "spectacle of masculine

stoicism," nor to the fraught logics of sensory deprivation implicit in the figure of deafness, as we have seen in other examples.[183] Critics and fans repeatedly highlight the physical and emotional impacts of Bangladeafy's music as simultaneously disruptive and cathartic experiences, not ones to necessarily be tolerated with stoicism, but rather felt and expressed as discomforting. One fan writes of *Housefly*, "You'll come out the other side of it feeling like you have just survived a major windstorm, messed up hair and all. Wow, what a powerful blast of energy and crazy music! . . . This little album just might be the kick you need to help you get through any future lock downs."[184] Another listener wrote of their song "Tar": "This music is perfect for driving through chaotic traffic—or for when I have intense indigestion."[185] Cook, interviewer for *The Moshville Times*, wrote that *Ribboncutter* is "panic attack stuff, I forget to breathe." Similarly, Sterdan wrote that their 2024 album *Vulture* makes you feel "constantly . . . off balance and on your toes, struggling to keep up as it scrambles your senses, lays waste to your expectations and leaves you confused, anxious and wondering what the hell just went down." Jeff Terich had similarly described their music as "an anxiety-ridden sprint through cacophonous bursts of sonic violence."[186] These descriptions are far from stoic, but rather *reactive*, wherein the music incites intense emotional and physiological responses on the part of the listener.

Jon ultimately attests to the core values of expert listening and musical worldbuilding. He tells of the formative role of music in his coming-of-age story, where it afforded a sense of bodily autonomy that contrasted markedly with the limited control he had over his body and environment as a child. Music served as an outlet through which he could fully explore and express his love of the synthesizer and "weird" sounds, a means of self-discovery and creative self-determination unbounded by the strictures of his short-lived formal musical training.

Like Lotte, Jon raises invaluable questions about what qualifies as "natural" hearing and a natural ear for music, giving voice to the heterogeneity of ear listening, and the dynamic role of HAs in musical experience. He addresses the tensions between the presets of HA technology and his own perceptual instincts, abiding by his own judgment and agency as a guiding principle when it comes to determining a sound's depth and directionality, rather than yielding to the spatialization prescribed in his HAs. By detailing the meticulous process through which he navigates and manages different musical con-

straints and professional demands in the recording studio, he sheds light on the active dimensions of perceptual agency, upending passive conceptions of sense-making. Guided by his own perceptual instincts, he scoops and equalizes the mix, "pulling the levers of his audio surroundings" to account for the shortcomings and misfires of his HAs, contesting the false promise of automation in the branding of digital HA technology in the process. By demystifying the dynamic nature of his own hearing reality, Jon challenges a static, stable conception of hearing, revealing hearing "as the outcome of multiple, interdependent contingencies," to borrow Ochsner's verbiage.[187]

To that end, his account also illustrates the multisensory interdependence of hearing, vision, and feeling across diverse professional musical contexts, a reciprocity that fortifies his hearing and serves him in his roles as a live performer, recording artist, and audio engineer. Jon also speaks to the prosthetic dimensions of listening not simply as it relates to his experiences as a HA wearer, but through the physical affinity he cultivates with his instruments, his gear, his production equipment, and his drummer Atif as extensions of his hearing and perceptual acuities. He speaks to the significance of wattage as a unit of measure that is unbounded by the fraught legacy of decibels and hertz, and rather rooted in conceptions of electrical power as it reflects on the inescapable technological mediation of sound and loudness. Together, Jon and Atif stir up "the molecules in the room," building an imaginative musical world that defies discrete genre categories and idealized sensory types, a world where Jon's musical sensibilities can flourish, a world that offers listeners a creative outlet and a language through which to make sense of their lived experiences and enjoy a sense of musical belonging.

Conclusion: Hearing Beyond a "Natural Ear for Music"

This chapter has sought to problematize the inequitable and exclusionary biological determinism implicit in historic and contemporary constructions of innate musicality and the uncontested physiological and symbolic status of the ear evident in the enduring declaration "a natural ear for music." As part of this, I examined the construction and production of "natural" hearing in the design, branding, fitting, and musical programming of digital HA technology in terms of both overall user experience and sound quality through an aesthetics of sonic fidelity and auditory realism.

Approaching "natural" hearing (as it is distinct from and overlaps with "normal" hearing thresholds) as an interdependent technological and cultural production rather than as a fixed biological process or objective sound qual-

ity means bearing several important truths in mind at once. First, since its inception, HA technology has been bound up with a technoableist logic that arguably persists in the contemporary design and marketing of digital HA systems. Second, discourse on digital HA technology is bound up with enduring anxieties around the discrepancy between a presumed original sound and the distortion of its amplification, and a strong desire to bridge, minimize, and eradicate that gap through an aesthetics of auditory fidelity. Third, neither the history of technoableism nor the false promises of auditory realism diminishes the legitimate prerogative of many HA users to experience aided hearing as naturally as possible and in a way that feels authentic or natural to them, a need and desire that often extends to their musical experiences. Fourth, the increasing automation of digital HA systems, particularly through ongoing implementation of AI machine learning, should not overshadow the significant role played by individual users in the production of their own hearing, and the perceptual agency and creative self-determination they exercise through music.

The musical implications stemming from this reappraisal of a "natural ear for music" and a singular, idealized sense of "natural" hearing are multiple. To start, it unsettles the primacy and inequalities of biological naturalness and auditory refinement in discourse on musicality by drawing attention to more diverse hearing realities as they encompass and cross acoustic and digital realms of experience. It highlights new interdependent and virtuosic forms of listening expertise cultivated outside the dominant and deeply ingrained talent paradigms of Western music discourse. It both instrumentalizes and challenges the perceptual constraints associated with stable ontological definitions of music when they are tied to a specific perceptual process or sound quality. For Rømer and Ehlers, musical experience encompasses aided and unaided hearing and other sensory modalities in ways that defy straightforward divisions between natural and acoustic hearing on the one side, and artificial and amplified hearing on the other. This reappraisal of what counts as musical hearing and listening expertise promotes new forms of epistemic inclusion and musical world-building. Musicians like Ehlers and Rømer carve out much-needed creative space for themselves and their individual hearing realities while promoting new and different kinds of musical experiences for others.

Five

Auditory Self-Regulation

The 2018 remake of *A Star Is Born* starring Bradley Cooper and Lady Gaga tells of the romantic rise and fall of two star-crossed lovers, bound together by a shared love of music, a bond that no amount of addiction, jealousy, and abuse can seemingly undo. It is also a film that reveals much about the cultural anxieties associated with noise-induced hearing impairment beyond strict hearing loss, and its uniquely acute impact on a professional musician. Namely, the film situates tinnitus as the private cause of country-rock star Jackson Maine's public downfall, beginning with his anxiety attacks and substance abuse, progressing through his violent fits of rage, emotionally abusive behavior, and ending with his tragic suicide (a role performed by Cooper).[1] The viewer is frequently made to bear witness to and *hear* the high-pitched inner ringing suddenly hitting Jackson on stage as he winces, struggling to maintain composure and conceal his discomfort from his audience and bandmates.[2] By frequently subjecting the viewer to the viscerally unpleasant shock of Jackson's sudden tinnital ringing, the film *raises the alarm*, so to speak, reinforcing the notion that normal hearing is precious, to be safeguarded at all costs lest psychological torment ensue. Jackson makes clear that to wear the in-ear monitors prescribed by his audiologist—what are in fact highly common devices used by musicians of all stripes with or *without* hearing loss—is to admit weakness and defeat, to jeopardize his down-home, hardened masculine image, making clear that he would sooner suffer through the pain of his condition than risk public emasculation.[3] As the film progresses, it becomes clear that for Jackson, tinnitus signals the end of his musical career and the demise of his relationship with no viable path to rehabilitation or reconciliation, ultimately causing him to self-medicate and self-sabotage. Hell bent on destruction, he even punishes his wife Ally (played by Gaga) for her extraordinary musical achievements and meteoric rise to stardom in

the pop mainstream, despite her unconditional love and support, privately degrading her and publicly humiliating her in a way that inspires an utter disdain for Maine in the viewer.

As an ongoing private struggle and source of shame culminating in Jackson taking his own life, tinnitus follows a narrative arc that powerfully resounds with the notion that a disabled life is not worth living, that it entails a pain and suffering that is altogether unmanageable and insufferable, not simply for the individual, but for those around him. Further, Jackson's demonization hinges on his tinnitus triggering a veritable descent into madness, causing him to seemingly completely *lose his mind*. This representation of disability follows a prescriptive logic that musicologist and film studies scholar James Deaville has described in terms of a *eugenicist* imperative, that is, the cultural impulse to suppress, silence, weed out, ostracize, and ultimately *eradicate* those bodies that disrupt normalcy and order, those that threaten the body politic.[4] And yet, where managing his tinnitus is concerned, the film frames the in-ear monitors that Jackson refuses to wear and the prescription drugs that ultimately fuel his addiction as the only and sole preventative measures and treatment options. Indeed, as one anonymous writer opined in a review of the film appearing on the popular tinnitus website *Mundo Tinnitus*, at no point in the film does Jackson's desperation compel him to seek out alternative forms of treatment by simply "googling means of relief from ringing in his ears" or even "speaking about tinnitus with his partner," leading the blogger and self-identifying tinnitus "sufferer" to decisively insist, "This film does not represent us."[5] As the story progresses and Jackson refuses to comply with his audiologist's recommendations, then, he is faced with an existential paradox, whereby *music*, the very thing that gives his life purpose and meaning, is also the root cause of his suffering. His continued unprotected exposure to music will only exacerbate his symptoms, a contradiction that is ultimately his undoing.

By contrast, the 2017 film *Baby Driver* portrays the relationship between music and tinnitus in an arguably more generative light by highlighting music's remedial and life-affirming potential in instances of chronic tinnitus. Directed by Edgar Wright with sound design by Julian Slater, the film tells the story of a young man named Baby (played by Ansel Elgort) who serves as the skilled getaway driver and indentured servant to heist ringleader Doc and his band of bank robbers and mercenaries. The viewer immediately learns that Baby has tinnitus and uses music to drown out its ring: Baby is never voluntarily without his earbuds, iPhone, and iPod, always with playlists at the ready and tracks cued up to suit any mood or occasion, from his walks through the

city to his adrenaline-fueled high-speed car chases. Baby's playlists also serve as the film's soundtrack, with each sequence timed, synchronized, and pitched according to the song playing in his earbuds at any given moment. As the ambient sounds of the cityscape and daily life bleed into and become enmeshed with the music in his headphones, they blur any straightforward division between diegetic and nondiegetic sound, while reflecting the musical architecture of Baby's universe.[6] Baby's tinnitus is neither a source of shame nor a fact that he necessarily conceals from his coworkers, most of whom gladly accommodate his dependence on his music and tendency to quietly withdraw into his own private world, often willingly advocating on his behalf. Through its comprehensive integration of sound design and music, then, *Baby Driver* presents an imaginative, albeit romanticized musicalization of tinnitus that fosters kinship between the disabled protagonist, his coworkers, and his audience by capitalizing on the cultural prominence of earbuds, personal musical devices, and the joy found in curating playlists to cultivate a particular mood, a cherished means of musical self-determination right at one's fingertips.[7] In so doing, the film illustrates the practice of "fighting sound with sound" and using "music as silence" (to invoke Hagood's terminology), a common strategy for temporarily drowning out and suppressing one's tinnital ring, and the anxiety and physiological turmoil that often accompanies it.[8]

Despite their shared sensationalism and the evident recourse to ableist representational frames in *A Star Is Born*, the two films give voice to some of the complexities of auditory conditions that do not fit the usual perceptual dynamics and social scripts associated with deafness and hearing loss. In particular, the films point to many of the contradictory ways tinnitus, as an experience that is distinct from (though often overlaps with) hearing loss, is mediated by sound, music, and silence. Note that both films frame the nexus of music and tinnitus in existential terms, where music has the capacity to both affirm and deny the protagonist's humanity in the face of what is portrayed as an audiologically untenable and even *maddening* condition. While central to Jackson's identity, music is an unavoidable occupational hazard, intensifying his tinnitus to the point of desperation, compelling him to take his own life. By contrast, music is Baby's only coping mechanism and means of self-regulation, offering a kind of "silence" to the extent that it drowns out his underlying symptoms in a way that is crucial to his maintaining a sense of stability, safety, and control within his everyday environment. For Baby, silence is a dreaded state in which the tinnitus rings loudest, provoking an intense anxiety that jeopardizes his psychological well-being and sense of self. In that sense, the films reveal that music reflects on tinnitus in paradoxical ways, serving at once as the principal

cause and ongoing trigger, and as the only balm and remedy, where questions of life and death are seemingly at stake.

Through attention to the musical implications of tinnitus and hyperacusis, this chapter continues the book's overarching project of diversifying musicological understandings of hearing and sense-making more broadly. In the previous chapter, I argued against a naturalized conception of a so-called natural ear for music in dominant paradigms of musical talent, and a singular notion of "natural" hearing more generally. I suggested that the cultural construction of "normal" hearing refers not simply to sound pressure levels, frequency thresholds, and audiometric zeros, but also to a naturalized, nonlinear perceptual process by which soundwaves enter and activate the ear and brain—that is, unaided hearing—and the idealized sound quality associated with that process, as in "natural," "acoustic," hearing, one bound to a false aesthetics of fidelity. I revealed that natural hearing is not a fixed biological process or objective sound quality, but rather a cultural production, one plainly evident in the design, branding, fitting, and musical programming of digital hearing aid systems, where recuperating, retaining, and recreating some semblance of what "natural" hearing feels and sounds like is framed as the ultimate outcome. In music discourse, natural hearing is understood as a given or bare minimum requirement for musical understanding and expertise. Naturalness is further emphasized in discourse on innate musicality as a biologically inequitable phenomenon in which racial difference and disability have been strongly implicated in the past. I revealed that musicians and hearing aid users like Lotte Rømer and Jon Ehlers challenge a fixed objective hearing reality through forging new "hearing natures" in conjunction with their digital hearing aids in ways that upend straightforward divisions between natural, acoustic, unaided hearing, and technologically mediated, aided, amplified hearing. Through cultivating listening expertise beyond the ingrained talent paradigms of Western music discourse, they challenge the very nature of a "natural ear for music," rather emphasizing the plurality of hearingness or hearing natures.

This chapter builds on that momentum by focusing on tinnitus and hyperacusis as auditory experiences that defy the straightforward perceptual divisions between hearing and hearing loss, while challenging what normal, natural hearing *sounds like*. My objectives are motivated by the widely documented ubiquity and simultaneous stigma around noise-induced hearing loss and other auditory disorders among musicians, and their implicit normalization in turn. Indeed, musicians in both classical and popular milieus are prime candidates for developing tinnitus and hyperacusis, whether alone or

together with noise-induced hearing loss.[9] Some studies place musicians at four times greater risk than nonmusicians for developing such auditory conditions, where tinnitus in particular is "more than twice as prevalent among musicians as non musicians, affecting two in eight of the musical population," while "hyperacusis is disproportionately common amongst musicians, regardless of genre."[10] Baguley writes of the more general neglect of people with tinnitus by healthcare systems, despite "well documented situations of crisis and calamity."[11]

Attending to tinnitus and hyperacusis and the musical artifacts of auditory self-regulation uncovers the implicit nature of auditory normalcy and its ties to the ingrained assumptions around sonic fidelity and auditory realism discussed in the previous chapter. Drawing on the work of Hagood and Thompson and on Matthew Tomkinson's notion of "mad listening," I suggest that tinnitus and hyperacusis are conditions that complicate the implicit divisions between subjective and objective auditory experience, and any sense of a fixed exterior sonic reality to which all hearing is automatically attuned. I also make clear that tinnitus and hyperacusis intervene in binaristic constructions of loudness/silence and hearing/deafness, by emphasizing the transformative power of *quietude*. As with Christine Sun Kim in chapter 2, quiet is approached as a liberatory perceptual and affective experience that is unbounded by volumetric categories and the negative dialectics of silence.

Beyond the drama of the silver screen, there exist numerous accounts of tinnitus and hyperacusis that speak to some of the same perceptual, existential, and musical dynamics hinted at in the two films. For instance, in an op-ed that appeared in *The Atlantic* with the memorable title "A Musician Afraid of Sound," professional cellist Janet Horvath exquisitely details the intense physical pain and psychological turmoil resulting from her hyperacusis, a disorder of loudness perception often caused by prolonged exposure to loud sound, putting musicians at increased risk:

> My husband can't kiss me, even on the cheek, because the slightest touch sets off ripples of pain in my head, my face, my jaw. Every noise is an assault—a car alarm goes off, a baby squeals, a group of giggling teens race into the elevator. The ping of an ATM machine. Cicadas chirping. The roar of a leaf blower feels like a knife rotating in my ear. In sympathy, my husband and son tiptoe around me and recoil with each ding. When I must go out, I stuff my ears with custom earplugs and wear Bose noise-cancelling headphones, but they don't help much. It is impossible to predict when noise will bring me to my knees. . . .

> I am a professional musician who can't tolerate sound. . . . I had loved the cello, the instrument whose sound is closest to the human voice, since I began playing at age 16—but now, with the world's volume stuck on high, all I could think about was escaping to silence. . . . My own sense of identity crumbled. It was excruciating that what I loved so much could bring me so much pain.[12]

As Horvath makes clear, her hyperacusis was triggered by an increasing number of mundane ambient sounds in her everyday life; *musical* sounds, like the sound of playing her cello; and even intimate sounds close to the body, like the soft sound of her husband's lips as they gently grazed the surface of her skin. As her tolerance threshold for loudness progressively diminished, Horvath's intolerance for sound became seemingly indiscriminate and acute, where even quieter sounds customarily deemed unobtrusive had the same physiological effect as the louder sounds. She describes the process of withdrawing from the outside world, even from her loved ones within the privacy of her own home, as a "silent exile" and "solitary confinement."[13] Later in the op-ed she explains that, regrettably, her ever worsening condition necessitated she resign from her post as first-chair cellist of the Minnesota Orchestra, since not even musician's ear plugs could dampen the cumulative effects of sitting and playing in the middle of the orchestra pit, that is, a kind of consistent front-line exposure to loud volumes that her work entailed, the root cause of her hearing difficulties in the first place. Horvath later explains that her search for a diagnosis was a long, protracted, and demoralizing process that involved much gaslighting on the part of physicians who mistakenly insisted her problems were *psychiatric* in the absence of any measurable hearing loss. When one savvy ear, nose, and throat specialist ultimately diagnosed her with hyperacusis, Horvath felt a tremendous sense of relief, remarking, "*So,* I thought, *I'm not going crazy after all*."[14] This knowledge was at once empowering in that it eventually led to more sustainable short-term solutions that enabled Horvath to regain control of her everyday life, including being fitted for hearing aids that she could use to manually "lower the volume of sound without altering its clarity."[15] At the same time, her diagnosis, and the ultimate realization that she would never be able to perform music with the same intensity and regularity as she had been for most of her life initially caused her to sink into a "deep depression," leading to the sobering assertion that her own "sense of identity" as a musician was crumbling.

Tinnitus arguably instigated a similar identity crisis on the part of Romantic Czech composer Bedřich Smetana (1824–84):

> That ringing in my head! That noise! . . . Deafness would be a relatively decent condition, if only all was quiet in my head. But the greatest torture is caused me by the almost continuous internal noise which goes on in my head and sometimes rises to a thunderous crashing. This dark turmoil is pierced by the shrieking of voices, from strident whistles to ghastly shrieks as though furies and demons were bearing down on me in furious rage; the sound of dissonant trumpets and other instruments mingle with this wild cacophony and all that together drowns the thread of the music which had been born or were [*sic*] being born in my imagination, so I have to leave my work with a feeling of horror, and then, in desperation, I begin to wonder how it will end with me.[16]

Here Smetana speaks of the near constant roar and ring of his tinnitus—what he rightfully recognized as a precursor to his eventual hearing loss—as something that significantly interfered with his capacity to listen to and enjoy music, making it particularly difficult to practice what he described as a kind of silent inner listening required for composing and score reading. He even went so far as to lust after the relative silence he presumed deafness would entail over the near constant ring of his tinnitus as the lesser of two evils insofar as it would enable him to compose in peace and quiet. Also of note is his characterization of his tinnitus as a merciless demon that angrily bore down and tortured him incessantly, inciting feelings of horror, desperation, and dread around his own legitimacy as a composer and ultimately, his mortality, evident from his sobering admission, "I begin to wonder how it will end with me." If his colorful commentary regarding his "dark turmoil" strikes as overly dramatic, it nevertheless represents a deliberate attempt at verbalizing an internal, subjective experience of noise to which others do not have access, and its resulting impact on the human psyche.

Singer and actress Barbra Streisand likewise spoke to some of the perceptual and psychological challenges of her tinnitus in a 1985 interview with the late American talk-show host Barbara Walters, with music as an area of focus. I quote the relevant interview passage below since Walters's questions and responses are as instructive as Streisand's answers:

> BARBARA WALTERS: "I had read that years ago, you said that there was a ringing that you had in your head."
> BARBRA STREISAND: "In my *ears*."
> WALTERS: "That never stopped."
> STREISAND: "Mmhmm."

WALTERS: "Do you still have it? Where is it?"
STREISAND: "It's . . ."
WALTERS: "What do you hear that I don't hear?"
STREISAND: "I hear high-frequency noises. When I went to have my hearing tested, I had supersonic hearing. I hear more."
WALTERS: "You hear sounds that other people don't hear."
STREISAND: "Mmhmm. It's annoying, that's what it is, because I long to hear silence."
WALTERS: "And you always hear *these* sounds."
STREISAND: "And that's one of the reasons that I always felt different as a kid, because this happened to me when I was nine years old."
WALTERS: "Tell me about it."
STREISAND: "It just happened one day. I remember I was in the sixth grade, and I started to hear these strange noises, and I couldn't block them out, and I would put scarves on my head and walk around, but actually the scarves around my head drove the sound deeper inside me and made the sounds louder. But I lived with a secret: I was afraid to find out what it was. Years later, when I did go to the doctor, there's nothing that they can see, but you can speculate it might be a nasal catarrh, a special bone . . . no one can see it."
WALTERS: "Does it affect your singing?"
STREISAND: "I don't know."
WALTERS: "But when something is wrong, you can't stand it; you've got to have it right, don't you?"
STREISAND: "Well of course."
WALTERS: "Do you *see* things differently than other people—I don't want to make you sound cuckoo—but do you *see* things that other people don't see?"
STREISAND: "I don't know what other people see; I only know what I see."
WALTERS: "What do you see?"
STREISAND: "I just have visions, fantasies. I see things completed. I can visualize."[17]

Here Streisand surmises that the persistent ringing in her ears is tied to her supersonic hearing (or ultrasonic hearing), a rare auditory effect causing people to hear sounds above the frequency threshold of "normal" hearing, the upper limit of which sits anywhere between 15 and 30 kHz. The singer

describes her tinnitus as an aggravating nuisance present since childhood. In her desperate yearning for silence, she sought to block out the sound, all the while internalizing a sense of fear and dread around its true cause, and the feeling that she was "different" and "lived with a secret." Walters wonders aloud whether Streisand's tinnitus and underlying heightened sense of hearing translates into sharpened musical perception, citing Streisand's meticulous approach to singing as evidence, a generative framing that goes against the deficit model of hearing loss. At one point she treats Streisand's tinnitus in near mystical terms, almost reading it as a mark of musical genius by connecting it to her propensity to purportedly *see* things that others do not, where seeing is presumably invoked as an analogue for hearing. The singer graciously indulges her host, though insists she has no context or frame of reference for what other people see, emphatically noting, "I only know what *I* see," suggesting that she can only speak from her own individual sensory experience. Walters's unrelated offhand remark about not wanting to frame Streisand as "cuckoo" in inquiring about her supersonic hearing and ability to see in ways that others do not is especially interesting in the context of tinnitus given its historical associations with "madness" and even clairvoyance in some instances.[18]

Accordingly, the chapter further elaborates on the *disabling* impact of music as a loud, sonorous phenomenon, alongside its remedial potential as a means of self-regulation, whether in the perceptual or emotional sense. The bulk of the chapter's analytical discussion centers on musician Stephen Harrison and his creative project Tinnitus Works, musical compositions designed to facilitate tinnitus relief, largely beyond scientific controls; and Monica Germino, celebrated contemporary solo classical violinist, and her "whisperviolin," a low-decibel violin designed to mitigate the effects of hyperacusis while protecting existing hearing thresholds. Through attention to what I characterize as self-directed musical relief protocols, I show how these two musicians bring about self-regulation of the bodymind in an invariably sonorous world, forging new forms of music in the process, a practice I call auditory self-regulation. Auditory self-regulation is indebted to Hagood's notion of "sonic self-control" in the sense that it describes a need to manage the unique demands of one's hearing relative to an unruly, dysregulated soundscape, though it does not typically involve blocking out unwanted sound through use of orphic technologies (i.e., earbuds, headphones, white noise machines, et cetera) as in Hagood's model. Auditory self-regulation, as I will later detail, is rather equal parts survival tactic and creative practice in that it harnesses the power of sound and music to confront unwanted sound

with the aim of relieving and remediating impaired audition and restoring equilibrium in the bodymind, whether in the short or long term. I invoke the term "bodymind" in connection with auditory self-regulation (as Hagood does with sonic self-control) to acknowledge the reciprocity between physical and mental processes in the lived experience of disability and impairment, where physical pain and disturbance beget psychological distress and vice versa.[19] In the case of tinnitus and hyperacusis, the concept of the bodymind is vital to recognizing the links between an individual's sense of physical and mental well-being, and to temper cultural anxiety around nonnormative hearing as *madness*, evident from sensationalist headlines like "Tinnitus Can Literally Drive You Crazy."[20] Above all, auditory self-regulation recognizes the perceptual agency of listening subjects over the sonic environment, and their capacity to musically intervene in the name of human flourishing. Auditory self-regulation describes musical strategies that exist beyond scientific controls, diagnostic frameworks, and medically prescribed treatments in ways that expand the limits of musical creativity and contemporary performance practice. While auditory self-regulation begins with the *self*, it is ultimately outward facing in its quest for answers, fostering new forms of community and creative collaboration in the process of forging novel musical solutions, as we will discover with Harrison and Germino.

Tinnitus and Hyperacusis in Focus

From the standpoint of modern audiology and otolaryngology, the cause and neurophysiological mechanisms of both hyperacusis and tinnitus are highly diverse and vary widely across individuals.[21] Tinnitus is the perception of an inner "phantom" sound without any external acoustic origin, that is, a sound that is not produced by sound waves.[22] The audiological configuration, type of sound, and experience of tinnital sound can manifest as ringing, buzzing, whistling, roaring, clicking, chirping, hissing, humming, and numerous other sounds, whether in one or both ears.[23] Tinnitus is not so much a condition per se but a *symptom* of any number of different possible underlying causes and/or physiological conditions spanning the gamut from prolonged exposure to loud volumes, to high blood pressure, to cardiovascular disease, to injuries to the head, neck, or jaw, among other causes. Tinnitus can either be temporary or chronic, and the perception of the phantom noise can be constant or intermittent. Hyperacusis is a disorder in loudness perception, such that "sounds of normal volume are perceived as too loud or even painfully loud."[24] The sound intolerance depends "only on its [a sound's] physical

characteristics (i.e., its spectrum and intensity). The sound's meaning and the context in which it occurs are irrelevant," as Baguley explains.[25] Much like tinnitus, its numerous causes and co-morbidity with other conditions contribute to its complexity, as does the lack of "normative data for loudness discomfort levels" (LDLs), the primary means of evaluating hyperacusis severity, where "normal" LDLs are set at 85 dBs.[26]

Tinnitus and hyperacusis occupy an ambiguous perceptual middle-ground between "normal" hearing and hearing loss, and cultural constructions of ability and disability in turn. Except in certain rare instances of "objective" tinnitus whereby an *actual* sound is generated by some inner physiological source or somatic process, tinnital sounds are subjective, in that they cannot be heard by others, resulting in a highly individual perception of an interior noise. As Streisand explains, "No one can see it," *it* being the source of her tinnitus; no one can *hear* it either. In this sense, Hagood describes tinnitus as existing "in a liminal space between our epistemological distinctions of body and mind, real and imaginary, subject and object. When I suffer from tinnitus, I other its sound as an intrusive presence—and yet, this sound is actually of myself . . . the sound of my own body-mind."[27] These logics are further evident from the fact that paying attention and consciously listening to one's tinnitus can often have the inadvertent neurophysiological effect of *amplifying* the inner sound in the listener's mind. For these reasons, Hagood observes, tinnitus is often portrayed as "an ideological and auditory 'false consciousness,'" resulting in the implicit expectation that tinnitus sufferers need to simply *overcome their minds*, a position that he notes reinforces a cultural ideology of ability. This same cultural expectation is at play in the case of hyperacusis, clear from Horvath's account of gaslighting on the part of her physicians.[28] To take Hagood's insights one step further, this presumed auditory false consciousness is arguably at the heart of the insidious cultural associations between these types of auditory impairments and *madness*, where listeners' capacity to reasonably evaluate their surroundings and their own inner perceptual experiences is culturally scrutinized and medically undermined, too often read as the gateway to or marker of insanity.

To that end, it is important to distinguish tinnitus and hyperacusis from a phenomenon known as auditory hallucinations—or *paracusia*—that is symptomatic of certain psychiatric conditions, namely psychosis, schizophrenia, bipolar disorder, paranoia, schizoaffective disorder, obsessive-compulsive disorder, and even post-traumatic stress disorder and severe clinical depression and anxiety, among others. An auditory hallucination typically entails hearing voices (i.e., auditory *verbal* hallucinations) and/or noises (e.g., music, ani-

mal and/or nature sounds, background noises, etc.) without external stimulus. Such voices and sounds can be perceived to originate from any number of sources, whether "as coming through the ears, on the body's surface, mind, or anywhere in external space."[29] The etiology of auditory hallucinations is diverse, but often they are the "result of spontaneous activation" of the brain's auditory network and/or an imbalance in neurotransmitters.[30] By contrast, "both tinnitus and hyperacusis are consequences of the central auditory system's compensatory responses to the reduced peripheral input due to either overt or hidden hearing loss," as Fan-Gang Zeng explains.[31] Yet hearing loss can also produce auditory *musical* hallucinations due to spontaneous activation of the auditory cortex, just as tinnitus involves the brain stem and temporal regions present within auditory hallucinations.[32]

Tomkinson has theorized about auditory hallucinations as forms of nonnormative auditory perception and idiosyncratic neurodivergent experiences he calls "mad listening," a concept that encompasses those "persistent ambiguities and slippages of auditory perception that are not so easy to taxonomize," or "the crazed aspects of my unruly bodymind that evade diagnosis."[33] Mad listening as a concept eschews pathologizing, neurotypical frames and instead "holds space for irrationality and unreason" while embracing Drever's notion of aural diversity.[34] Tomkinson identifies mishearings, repetition, looping, and obsessive fixations with autonomic bodily sounds, among other phenomenological "glitches," as staples of mad sound. In his "Notes on Mad Listening," he writes of his own intermittent sensitivity to loudness perception (of certain noises), as well as his occasional bouts of tinnitus.[35] Tomkinson thus defines mad listening as embracing the oftentimes uncomfortable "threshold phenomena" and spaces of epistemic uncertainty and indeterminacy as a means of challenging notions of sanism and stigma.[36] He notes that as a political strategy, mad listening "resists audist assumptions" in "challenging stigma and expanding the definition of listening itself."[37] At the same time, he cautions against conflating "everyday phenomenological quirks" with mad listening, which involves "more than divergent cognitive processing," evident from the "heavily-pathologized concept of hallucination" and its associated consequences, which can include institutionalization and incarceration.

To be sure, while tinnitus and hyperacusis also involve subjective distortions of auditory perception and are more than mere phenomenological quirks, they do not qualify as forms of "auditory hallucinations" from a medical standpoint. And while there exists a misconception that they result from an auditory false consciousness that is sometimes misconstrued as madness

or as *maddening*, tinnitus and hyperacusis are not themselves psychiatric conditions or forms of neurodivergence. Nevertheless, Tomkinson's "mad listening" is instructive for thinking beyond normative audition toward a more heterogeneous conception of hearing that embraces auditory spaces of uncertainty and indeterminacy "wherein distinctions are unsettled between inner and outer, near and far, real and imaginary, material and immaterial."[38]

Indeed, both tinnitus and hyperacusis are immanently *relational* in that they are "partly constituted by the wider context in which audition takes place," to borrow Thompson's apt characterization of tinnitus, mediated moment to moment through their interdependence with the sonic environment.[39] As Hagood writes, "Tinnitus is the sound of a subject's own auditory system, yet it interacts with environmental sound, growing subjectively louder in quiet spaces and quieter in loud spaces."[40] He has written elsewhere about his own experience of tinnitus as "emerging in the interplay between loud sociality and the subsequent return to quiet solitude. Absorbing the pleasures of high volume one moment, then contending with its sonic afterimage later . . . sometimes fearfully and regretfully."[41] By contrast, hyperacusis is triggered and intensifies in response to the perceived loudness of different environmental sounds, while silence temporarily subdues it. In these ways, tinnitus and hyperacusis blur straightforward divisions between sound and silence, and loud and quiet environments, where loudness can facilitate a kind of "silence"—or *quietude*—and silence triggers the onset of an internal loudness, as previously mentioned. Because tinnitus and hyperacusis are typically acquired and not inborn and are conditioned by and through a continuously evolving soundscape, they are often marked by a loss of control, freedom, and mobility and, ultimately, by a diminished quality of life. In all instances, the subject is at the mercy of their sonic surroundings with very little means to self-regulate, often leading to self-isolation and a desperate yearning for a return to auditory normalcy. For these reasons, tinnitus and hyperacusis demand constant negotiation and recalibration on the part of listeners as they navigate the sonic contours of their everyday life. Thompson observes that *listening with tinnitus* "amplifies the importance of disconnection: it requires us to take seriously the need not to listen, or to listen selectively" relative to the idealization of what she notes is "capacious listening" and connectivity in normative listening ideologies.[42] The same could be said of hyperacusis.

In many respects, tinnitus and hyperacusis arguably qualify as examples of what Sterne dubs "audile scarification" (as described in the first chapter), that is, forms of "culturally produced auditory impairment" resulting from repeated exposure to loud sonic environments, including live amplified music,

sporting events, earbud and headphone use, airplanes, bathroom hand dryers, restaurants, fitness classes, different industrial settings, et cetera. Audile scarification becomes increasingly normalized through its ubiquity, the result of culture impressing upon and irrevocably altering subjects' bodies and their capacity to hear, what Sterne characterizes as a "culturally coded" "inscription *in* the body."[43] Sterne and McKay have both detailed several instances where audile scarification is conceptualized not only as inevitable, but as *desirable*, a badge of honor, a respected mark of self-sacrifice, and/or a sign of insider belonging among members of different professional occupations, communities, and subcultures, such as among military veterans, construction workers (like my late grandfather), hospitality workers, machine operators, *and musicians*. Audile scarification embraces the cultural and physiological advantages of an increased tolerance to loud sound while affording new forms of subjecthood and belonging. In these ways, audile scarification diversifies conceptions of hearing loss while also highlighting the extent to which sound and music participate in the complex sociocultural and audiological construction of disability.

Yet, whereas under the rubric of Sterne's audile scarification hearing loss can be advantageous in the sense that it renders a subject more equipped to withstand loudness, hyperacusis and tinnitus often render people *less* equipped and more sensitive to loud sounds than prior to the time of onset. In many ways, tinnitus and hyperacusis are more profitably understood as analogous to *chronic pain*. Chronic pain is invisible and thus subject to the same kind of social ambivalence and mistrust as tinnitus and hyperacusis, inextricably tied to the built environment in ways that mirror the environmental contingencies of tinnitus and hyperacusis. As someone who lives with chronic joint pain, Dokumaci describes having to circumvent the everyday corporeal movements encoded in her built environment—what she terms the "habitus of ableism"—that compromise her physical well-being by exacerbating underlying pain. She aptly frames this process as "choreographing the dance of avoiding pain." As mentioned in the first chapter of this book, Dokumaci calls these small-scale, everyday idiosyncratic affordances "activist affordances," a means of making environments more habitable in the absence of adequate accommodation, not as "a question of choice or preference, but of necessity."[44] Dokumaci's characterization of a *shrinking* environment aligns with Horvath's account of her hyperacusis as necessitating a retreat from the outside world on account of its hazards, and even from the otherwise quiet intimacies of her domestic life and familial interactions, as *a matter of survival*. Similarly, Baby's need to mask his tinnital ringing with music to

emotionally self-regulate is also arguably an activist affordance, according to Dokumaci's model. It also aligns with Hagood's discussion of the use of orphic technology to "remain unaffected in changeable, stressful, and distracting environments, sonically fabricating microspaces of freedom."[45]

Ultimately, I view any such self-directed forms of accommodation and pain management, including the ingenious repurposing and retooling of musical instruments and creative technologies, as falling under the umbrella of *auditory self-regulation*. Crucially, auditory self-regulation in the context of expert listening is not bound by normal hearing thresholds, objective measures, diagnostic criteria, or treatment protocols. Neither is it driven by a desire to conform to specific social norms or behavioral codes. As a form of expert listening, auditory self-regulation is inherently subjective, recognizing that processes of regulation are inevitably different for each individual listener and bodymind.

To that end, it is important to distinguish the practice of auditory self-regulation—as a form of expert listening—from the kind of self-regulation described in neuroscience and behavioral psychology where self-regulation is framed as an adaptive mechanism of the brain that happens relative to existing social codes, behavioral norms, and notions of "good" versus "bad" group membership. Take, for instance, Todd F. Heatherton's description of our human capacity for self-regulation:

> As a social species, humans have a fundamental need to belong that encourages behaviors consistent with being a good group member. Being a good group member requires the capacity for self-regulation, which allows people to alter or inhibit behaviors that would place them at risk for group exclusion. Self-regulation requires four psychological components. First, people need to be aware of their behavior so as to gauge it against societal norms. Second, people need to understand how others are reacting to their behavior so as to predict how others will respond to them. This necessitates a third mechanism, which detects threat, especially in complex social situations. Finally, there needs to be a mechanism for resolving discrepancies between self-knowledge and social expectations or norms, thereby motivating behavior to resolve any conflict that exists. This article reviews recent social neuroscience research on the psychological components that support the human capacity for self-regulation.[46]

Heatherton goes on to stress that self-regulation to this end is "not always easy," given that "there is an inherent conflict between what is enjoyable for

the individual and what is best for the group."[47] This framing is explicitly normative and implicitly ableist to the extent that it promotes the idea that humans are automatically inclined to regulate themselves according to existing social mores through inferring the mental states of others in order to experience a sense of inclusion and belonging. It takes the norms as a given, placing the onus of adaptation and behavioral modification on individuals—at the expense of their own comfort and pleasure—rather than questioning the underlying social order. This is precisely the type of hegemonic social contract that Christine Sun Kim reacts against in her mission to unlearn sound etiquette, as described in chapter 2.

Auditory self-regulation is also distinct from a concept known in psychology as *emotional* self-regulation, which "refers to the complex process of initiating, inhibiting, and modulating the conscious aspects of emotion to effectively achieve one's goals," as Tammy Sonnentag and Mark A. Barnett explain.[48] The practice of emotional self-regulation is not only about achieving group membership, as in the self-regulation described by Heatherton, but can be instrumentalized in service of a wide variety of cognitive, physiological, and behavioral outcomes. Nevertheless, emotional self-regulation is often implicitly tied to an accepted set of normative social behaviors, where a person's capacity to control their emotions ideally aligns with existing etiquette around when, where, and how emotions can and should be expressed. What is referred to as emotional *dysregulation* "refers to the inability to adequately initiate, inhibit, or modulate emotions. Failure to adaptively regulate one's emotions, especially those that are intense and negative, may lead to behaviours that are unacceptable and antisocial."[49] The implicitly ableist logics of this paradigm are readily apparent in discourse around autism spectrum disorder, ADHD, and other forms of neurodiversity.

A listener practicing auditory self-regulation is not primarily motivated by a desire to conform to prevailing social and hearing norms in order to achieve group belonging, nor does auditory self-regulation promote the sacrificing of individual comforts to that end. Auditory self-regulation is, rather, rooted first and foremost in a subject's expert knowledge of their individual bodymind and a strong desire to preserve a sense of control amid an evolving and oftentimes unpredictable soundscape that may otherwise compromise that sense of equilibrium. Listeners engaged in auditory self-regulation are primarily motivated by a desire—nay *need*—to preserve a sense of integrity and security in the individual bodymind without compromising on their access to and relationship with music, while safeguarding against pain and discomfort. Auditory self-regulation describes a set of musically ingenious *survival tactics* in the absence of in-built safeguards, accommodations, and treatments, and

thus a conscious *creative practice* that mobilizes music in unexpected ways to support human flourishing. To that end, auditory self-regulation is generative: in the process of seeking out unorthodox solutions, the listener builds new networks and new creative alliances that ultimately engender new forms of music-making.

To be sure, tinnitus and hyperacusis can be treated through a variety of medical interventions, spanning the gamut from prescription drugs, to hearing aids, to cognitive behavioral therapy, to customized notch sound therapy, which draws on the principles of acoustic coordinated reset neuromodulation (a technique I will describe in the next section of this chapter). Yet many of these interventions are expensive and sometimes ineffective; there is seldom a one-size-fits-all approach to treatment, nor is there a straightforward *cure* insofar as permanently restoring one's former hearing is concerned.[50] The oftentimes demoralizing medical climate around tinnitus and hyperacusis intensifies feelings of shame and alienation and a subject's unwillingness to disclose their experience lest their claim be subject to stigma or suspicion for their failure to manifest their disability in clear physical terms. This is a risk that may feel heightened among professional musicians like Horvath for whom normal hearing is an implicit prerequisite.[51] And while it is difficult to establish a precise empirical correlation, there is robust statistical evidence linking tinnitus and hyperacusis to heightened risk of paranoia, insomnia, depression, anxiety, self-harm, and suicide ideation.[52] For these reasons, Hagood and Thompson caution against privileging accounts of tinnitus where the listener has successfully adopted a conception of listening as relational and interdependent as a way of "relaxing into their tinnitus," over those accounts that emphasize the constancy of tinnitus suffering and desire for a cure.[53] Again, my rationale for adopting the concept of the bodymind stems from the implicit interconnectedness of sensory perception and mental health, the implicit status of normative hearing in hegemonic constructions of *sanity*, and the extent to which music both exacerbates and alleviates these tensions, both culturally and physically. Thus, my understanding of music's disabling capacity in the context of tinnitus and hyperacusis very much extends to the psycho-emotional realm insofar as these experiences often result in inner turmoil for musicians that is seldom accommodated or easily remedied through medically sanctioned channels. Auditory self-regulation, then, is a vital strategy for restoring physical and emotional order and equilibrium in the individual bodymind, while promoting perceptual agency, musical self-determination, and musical world-building.

Accordingly, the remainder of this chapter further investigates the relationship between music and tinnitus and hyperacusis to elaborate on the *disabling* impact of music as a loud, sonorous phenomenon, as well as its remedial potential within processes of auditory self-regulation. Admittedly, I found the two musicians Harrison and Germino by happenstance, being that there is little institutionalized music discourse among musicians on tinnitus and hyperacusis. I discovered Harrison's collection of music by searching for tinnitus relief on YouTube during some of my own flare-ups, and wrote him to learn more about his motivations and creative process. While I was aware of Germino's work as a violinist through her long-standing involvement with the new music collective Bang on a Can, I only became aware of her musical advocacy around hyperacusis when I participated in a research and performance workshop on Beethoven's deafness at the Orpheus Institute in Belgium in the winter of 2018, when a musician and doctoral student at the institute alerted me to her work. My account of Harrison's and Germino's work pays particular attention to the unique ways they harness the power of music, community, and creativity to regulate their audition amid an invariably unruly soundscape, forging new musical worlds and new modes of hearing, listening, and sense-making in the process.

Stephen Harrison and Tinnitus Works

Lifelong musician, former DJ, and composer Stephen (Steve) Harrison has had tinnitus since 2003, the cumulative result of what he explains are three separate causes. The first: a workplace accident wherein he was hit in the jaw by a steel joust that knocked him and his coworkers across the construction site. The second: noise-induced hearing loss brought about by his many years DJing and clubbing in the UK deep house scene, combined with his frequent, unprotected exposure to loud noises through his longtime work in construction. The third cause and ultimate catalyst "that set it off was a flu which got in, gave me an ear infection," and his subsequent pushing through illness at work: "It started off as a quiet sound in one ear and progressed to both ears. It can get pretty loud at times; at its worst it's like standing near a jet plane when the engine is idling."[54]

Harrison explains that his tinnitus is bilateral, though more intense in his right ear, wherein he can typically hear the whistling tone above most ambient noise. He has also experienced temporary bouts of hyperacusis twice since the onset of his tinnitus. In the first instance, he suspects he "brought it on

myself by overprotecting my ears" through regularly wearing noise-canceling headphones and ear plugs to block out his tinnitus, succumbing to what he explains was a downward "mental spiral" where he was "really paranoid" about losing what remaining hearing he had, worried that he might "go deaf."[55] He explains that in hindsight, his efforts to regularly deprive his brain of specific kinds of sonic input were overzealous in that they effectively "turned up" his brain's "gain control," which made sounds within certain frequency thresholds insufferable. In the second instance, his hyperacusis occurred in the mid-frequency range, which made speech particularly painful to endure. Both times he was able to alleviate his hyperacusis through a combination of deliberate and involuntary exposure to sounds within the affected frequency range, gradually losing his sensitivity to those ranges organically over time. Harrison's tenacious, painstaking attempts to understand and regulate his own hearing and his meticulous accounting of its precise configuration and evolution are informed in large part by his musical background: "I am a musician, so I have a very serious attitude about my hearing. I need to have balance and clarity in the music and external sounds that I hear."[56] With respect to his tinnitus, he explains that after nearly twenty years, he is "mostly habituated" to this inner phantom noise, but, nevertheless, "I mourn the loss of silence."[57]

Over the years, Harrison has lent his expertise to the wider tinnitus community, working in a variety of voluntary capacities, whether as moderator of Tinnitus Talk, a popular online discussion and support forum for people with tinnitus; as a test subject in a set of clinical acoustical neuromodulation studies; or as cofounder of Tinnitus Hub, a UK-based not-for-profit organization that provides peer support "by patients, for patients" while connecting researchers and patients to better center patients' accounts in empirical investigations into tinnitus treatments in order to improve the scientific knowledge base.[58] Harrison explains Tinnitus Hub's patient-centered approach as follows:

> An audiologist can ask questions, but ultimately, it's *the individual* that has the experience, and because we don't have any objective measures [for tinnitus], the individual experience is the key part of the process. If you asked the wrong questions or the individual doesn't give the answers, because you're in a medical environment, you don't necessarily get the right answers.[59]

While Harrison highlights some of the practical drawbacks of modern audiology, he does not dismiss it wholesale, rather emphasizing the need for

greater dialogue between patients, researchers, and healthcare providers. Harrison thus champions a collaborative approach, wherein the lived experience of tinnitus and patient advocacy is vital to supplementing audiological expertise in the advancement of empirical scientific knowledge formation, and ultimately, effective treatment protocols.

Harrison told me that "tinnitus patient" is the community's preferred term over the affliction-driven medical designation "tinnitus *sufferer*," just as community members use the term "*reactive* tinnitus" to highlight its interdependence with the soundscape and its perpetually emergent nature.[60] (From the standpoint of marketing in the not-for-profit sphere, the term "sufferer" has negative connotations that Harrison notes would impede fundraising efforts; would-be donors "are generally not motivated to give by pity," he told me.) Harrison explains that patient-driven research, dialogue, and advocacy are vital not only because experiences of tinnitus are culturally "downplayed," but because available therapeutic interventions are limited and unreliable and stand to be better developed and improved through more direct patient involvement in the research and development. He explains that as it stands, the majority of the patients polled in a recent Tinnitus Hub survey indicated that "outside of anything that was doctor-led or consultant-led, it was *self-administered sound therapy* that was the biggest help" in relieving the tinnitus, often the result of trial-and-error experimentation undertaken on an individual basis.[61]

Enter Tinnitus Works, a musical project born of Harrison's frustration with the shortage of affordable and effective tinnitus treatments, and his desire to harness his knowledge of the scientific literature and direct involvement in empirically driven forms of tinnitus relief at no cost to the listener, albeit outside of any scientific controls. The original inspiration to compose and produce music in this vein came through his initial use of ambient, "chill out" music to mask his tinnitus and induce relaxation following its onset (i.e., tinnitus masking), coupled with his participation as a test subject in a trial for an acoustical neuromodulation device. Coordinated reset acoustical neuromodulation uses sound and music to retrain and, ideally, permanently restructure the perceptual circuitry of the brain so as to diminish or *eradicate* the tinnitus altogether. In a controlled setting, a patient's tinnitus tone is identified as closely as possible and subsequently targeted through the emission of four "spatially and temporally staggered" tones precisely attuned to the tinnital range to help reverse the neural synchrony through repeated listening.[62] Composer Brent Michael Davids gives an account of the basic principles of acoustical neuromodulation at work in nature with respect to his own bilateral tinnitus:

"I was laying on the ground on my side, sleeping, and noticed how quiet it [tinnitus] was, and then turned over—rolled over to the other side so my other ear was exposed, and then I heard crickets."[63] Initially puzzled as to the reasons for this disparity across left and right ears, Davids later realized that, because the crickets were chirping in the same frequency range as his tinnitus tone, his brain was automatically suppressing both sounds in the tinnitus ear, hence the "silence." Another common subcategory of acoustic audio therapy is "notch therapy," which works by omitting frequency bands within one octave around the patient's tinnital tone in an effort to reduce its amplification through centralizing the musical activity in other frequency bands, thus training the brain to suppress the tinnitus tone. To that end, Harrison describes another moment of unexpected sensory diversion that has been formative to his thinking around the aims of his own music when he had occasion to see the mixed-media zoetrope *All Things Fall* (2014) by British artist Mat Collishaw.[64] He felt captivated by its visual splendor—"The spinning up, light, and movement of so many things totally took my attention"—only to realize, after a time, that his tinnitus tone had temporarily ceased; he wanted to facilitate a similar experience of organic redirection or distraction for listeners and fellow tinnitus patients in his music. Harrison explains that, in general, the potential for cortical plasticity is the principal foundation of empirically grounded tinnitus sound therapy and is thus likewise "technically" at the heart of what he does: "it's all about trying to get the brain to do something different" through a process of distraction, unlearning, and retraining; in cases of tinnitus where "the synaptic connections between the brain and the ear have [been] damaged, they can be regenerated."[65]

While the original neuromodulation trial ultimately made Harrison's tinnitus worse, he was nevertheless interested in exploring the remedial potential of acoustical neuromodulation on his own terms, among other scientific techniques such as notch therapy, in combination with more ordinary techniques, like tinnitus masking. A lifelong guitar player, he quickly discovered the harmonic overtones of acoustic instruments were "horrendous," exacerbating and intensifying his tinnitus. He thus began his "descent," as he comically puts it, into the world of tinnitus-driven *digital* music-making, where he discovered endless variety and control. Harrison thus makes all of his music in Ableton Live or Reason and creates all of his own sounds using MIDI synthesizers for optimal control and mathematical calibration:

> I'm the sort of person that needs to do it myself; I never buy sample packs. . . . It's all just synthesized . . . taking the base synthesizer and

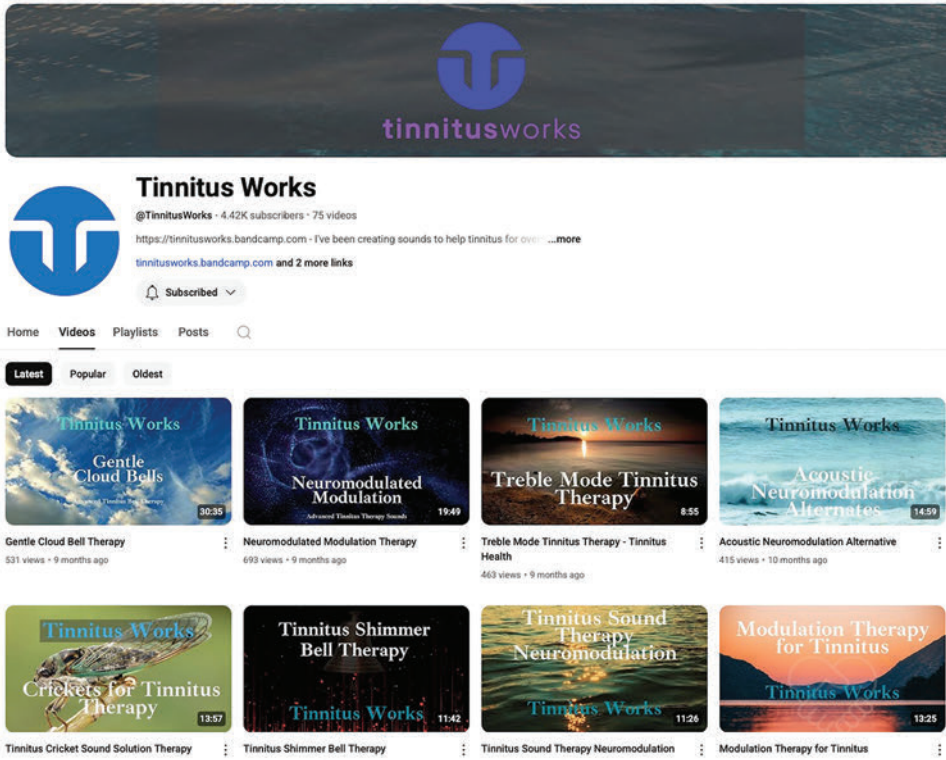


Figure 27. Tinnitus Works YouTube Channel, 2025

> just playing with the noises . . . literally just trial and error . . . a case of keeping it in the cadence until you find something that sounds nice, and making sure it works up and down the scale, or find octave ranges that it works in, and then going from there.[66]

His musical output consists of longer through-composed ambient soundscapes that combine nature sounds, sine tones, scales, short melodic fragments, bells, chimes, and harps; and shorter tracks called "exercises" intended for regular repeated listening that isolate and repeat a single sound effect across a given frequency spectrum, using rapid pulses of pure sine tones, as in his popular "acoustical neuromodulation" and amplitude modulation exercises. His compositions generally eschew development-oriented formal structures and, in many instances, are instead driven by *functionality*, wherein each sound is carefully calibrated to serve the larger goal of tinnitus relief,

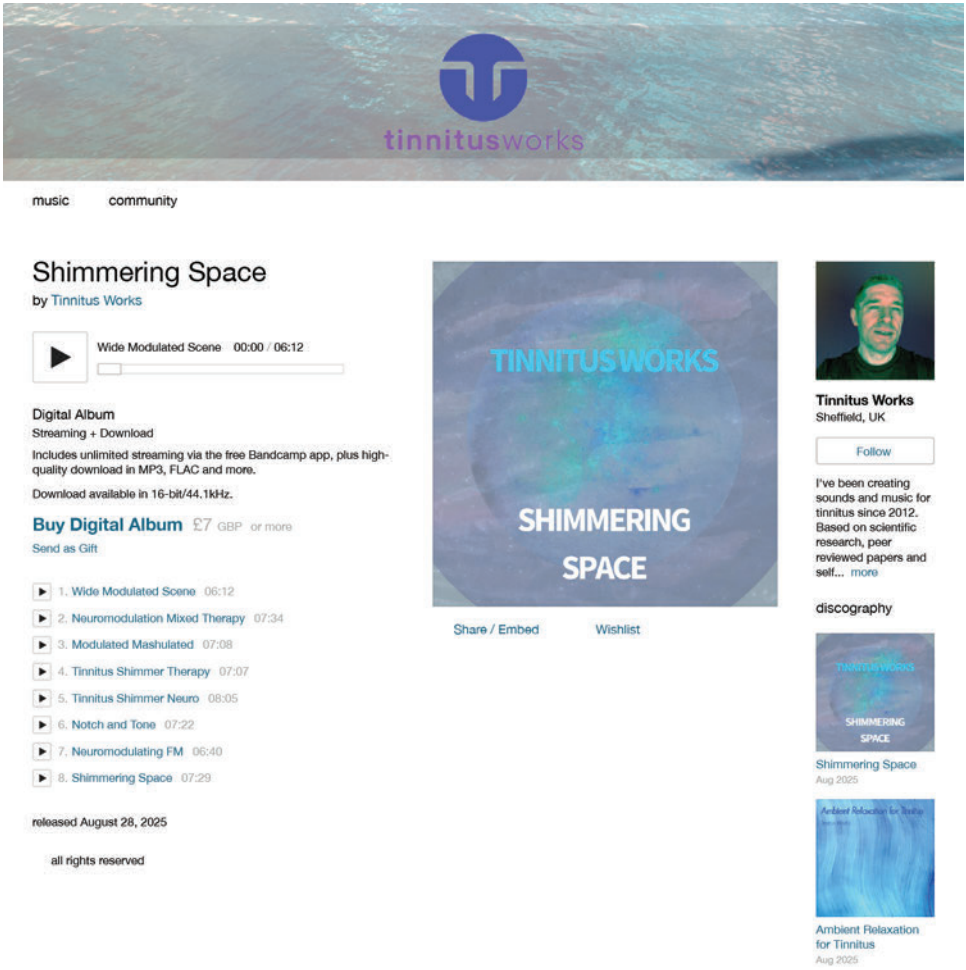


Figure 28. Tinnitus Works' *Shimmering Space*, Bandcamp, 2025

over both short and sustained periods of listening. Accordingly, listeners do not immediately seek out and listen to Tinnitus Works for aesthetic pleasure or to simply cultivate a passive atmosphere of calming background music, but specifically and primarily for its *remedial function*, listening attentively and regularly in a tenacious manner to generate self-regulation of the bodymind.

Users can stream Harrison's latest musical releases on his YouTube and Spotify channels, browsing titles such as *Ambient Relaxation for Tinnitus* (2019), *Bells to Soothe* (2019), *Rain Sounds to Soothe Tinnitus* (2019), and *Acous-*

tic Neuromodulation for Tinnitus (2019), among others. With over 3,850 subscribers on YouTube, Tinnitus Works has a committed following, evident from comments sections filled with enthusiastic testimonials. Harrison notes, however, that during the pandemic, when people were primarily at home in the kinds of quiet private spaces where tinnitus typically thrives, his YouTube views "plummeted," going from an average of approximately 10,500 views per month to 4,500 views per month, due to what he suspects is increasing competition with the common, though misleading, titles and search terms "tinnitus *cure*" and "tinnitus *therapy*." Harrison explains that this content falsely promises a cure for what is outside of any scientific control. For ethical reasons, Harrison thus consistently labels his work "tinnitus *relief*" so as not to inspire false hope and to be transparent about the limits of his music, even if that means limiting its discoverability.[67] Harrison emphasizes that this is crucial given statistical evidence linking tinnitus to increased rates of depression, anxiety, and suicidal ideation, and that his own personal experiences have made clear that questions of life and death are at often stake.[68] He explains that many people in the tinnitus community "aren't looking for 'relief' or a little bit of help," but rather have unrealistic "tunnel vision" in looking for "a cure, full stop."[69] Harrison thus states his aims very clearly for the benefit of his YouTube and Spotify followers online: "I use different techniques to try and interfere with tinnitus, either from scientific papers or from trial and error on myself. . . . Some things work better than others, some things may not work for you at all."[70] In a welcome video on his YouTube channel landing page, he explains further:

> I'm not a doctor. I'm not a medical specialist at all. I'm just a person with tinnitus who plays around with sounds. . . . One thing I'm not going to do with the sounds of music that I make is make outlandish claims. I'm not going to tell you something's going to cure you, because that's just a lie. . . . You find a sound on here that helps you, it's a sound that helps *you*.[71]

Harrison stressed to me that there is no universal science or one-size-fits-all approach to musical tinnitus relief, especially given that individual responses to music are always-already culturally conditioned. In these ways, he clarifies his intentions and the nature of his expertise and work while also inviting tinnitus patients to explore and experiment with sounds, cultivating a self-awareness around what *does* and *does not* work in terms of relief, so that they might also learn how to practice auditory self-regulation as a viable alterna-

tive to the oftentimes false promise of a cure. As part of this, his YouTube channel includes a reference track with a succession of repeated pure sine tones between 1 and 16 kHz, enabling listeners to identify their approximate tinnital range and select tracks from among his collection accordingly. In these ways, Harrison is committed to demystifying an oftentimes confusing, alienating, and demoralizing auditory process for fellow tinnitus patients, while equipping listeners with the tools to develop self-insight and a better understanding of, and sense of control over, their audition.

Released in partnership with the American Tinnitus Association, Harrison's 2012 album *Sounds to Soothe* represents the first of his tinnitus relief repertoire and debut of Tinnitus Works. Comprising thirteen individual tracks that play as a seventy-two-minute-long through-composed piece, the primary objective with this album is "to provide a period of listening that masks tinnitus and relaxes the listener, thus overriding the heightened emotional response to tinnitus," as Harrison explains.[72] *Sounds to Soothe* attempts "to induce relaxation" for listeners with an overactive nervous system using "sounds that I have observed and that others have reported to mask and soothe their tinnitus," set to slow tempos and carefully mixed to avoid any silences.[73] Harrison elaborates:

> In this album I used amplitude modulation, white noise, pink noise, static sounds, moving sound, bell sounds, high frequency sounds to interfere with tinnitus, solfeggio tones and much more. When I found something that seemed to work, I created a track around it or added it as an element.[74]

As part of this, the piece includes cacophonous nature sounds, including babbling brooks, birdsong, gentle winds, and so on, that build and wane throughout, backed by gentle pentatonic scalar passages, played by MIDI keyboard, strings, and harp and punctuated by drones and delicate, shimmering synth chimes and synth bells. More generally, synthetic bell sounds are among Harrison's favorite sounds to use because they are "natural modulators"—that is, the "shimmering" effect—where amplitude modulation has been shown to significantly suppress tinnitus.[75] The music sometimes gives rise to occasional chanting of primarily untexted vocables and low-pitched pan flutes.[76] Overall, the music sounds like much spa and ambient music, though with the addition of some non-aesthetic distorted sounds and synthesized tones, including buzzing, crackling fire, and static-laden high-frequency noise, like that emitted from a radio when its dial is positioned between two frequencies.

Harrison explains that these are "random" sounds he had strategically tuned and phased in and out of the music intended to "bring about short periods of silence for me, suppressing and appearing to perceptually 'reset' the tinnitus tones."[77] Part of this "resetting" strategy involved ensuring "relatively equal power" across the audible frequency spectrum throughout by incorporating tones within the higher frequency range, that is, between 13 and 15 kHz. Harrison tells me his rationale is based on his personal hypothesis related to the neurophysiological mechanism of tinnitus: because many tinnitus patients also experience high-frequency hearing loss, there is often a significant deprivation of high-frequency input to the tinnital brain, which is often the root cause of the tinnitus tone. Moreover, he explains that until very recently, the standard compression technique used for music on the radio and on music streaming platforms typically filtered out frequencies in the upper range to ensure maximum loudness and impact (though he acknowledges that the tides are beginning to turn).[78] Harrison thus works from the presumption that many tinnitus tones lying in the higher frequency range are likely the brain's response to a general deprivation of high-frequency sounds, whether due to an underlying hearing loss or by conditioning through frequent exposure to contemporary pop music through radio-play and streaming. He thus wanted *Sounds to Soothe* to include regular exposure to the higher-frequency spectrum so as to diminish the likely hyperactivity in the tinnitus range, with the aim of both masking and "perceptually resetting" the tinnitus, ideally triggering some kind of lasting change with regular, repeated listening. These audible, and otherwise discordant, non-aesthetic high-frequency tones, then, are what sets Harrison's music apart from ambient spa music, giving it a functional quality within the realm of tinnitus relief as a form of auditory self-regulation.

Sounds to Soothe also deliberately includes tones coinciding with neural oscillations in the so-called alpha state. To clarify, bioelectrical brainwave activity (i.e., neural oscillations) falls along a spectrum of four bandwidths (or states), each associated with successive Hz ranges and different alleged corresponding brain functions, the highest or most alert state being the "gamma state" (25–100 Hz) and the lowest being the "delta state," which is associated with sleep and the subconscious (0–4 Hz). While the "beta state" (13–40 Hz) is associated with alertness, focus, and concentration, the "alpha state" (8–12 Hz) is understood as one "of relaxed wakefulness," the most conducive to peace, calm, and restoration.[79] Beyond manual electrical brain stimulations, certain activities—such as meditation, yoga, listening to certain types of music—can *sometimes* induce the alpha state in some people, *ostensibly*

causing everything from relaxation, to a "boost in creativity," to a decrease in depression and anxiety, to heightened problem-solving skills.[80]

In our interview, Harrison explained that older research into the neurophysiological basis of tinnitus has shown that people with tinnitus have less brain frequency in the alpha range because of the stress on their limbic system; he suggested that this is perhaps why his compositions in the 10 Hz range are seemingly such a successful means of tinnitus suppression among his listener base, judging by their positive responses.[81] Harrison thus applies this logic concerning the alpha state in *Sounds to Soothe* and across his musical output, including in his amplitude modulations, hypothesizing that *maybe* it might facilitate a period of relaxation for a tinnitus listener with an overactive nervous system.

Harrison's acoustical neuromodulation exercises also represent a major part of his tinnitus relief output and are among his most popular works on YouTube. In these short exercises, he applies the core tenets of acoustical neuromodulation in different specified frequency ranges using a variety of scales and intervals. Recall that acoustical neuromodulation involves four "spatially and temporally staggered" tones attuned to a patient's tinnital range to help reverse the neural synchrony through repeated listening.[82] In his exercises, Harrison uses pure sine tones to achieve optimal results: because they only have one sinusoidal wave form and do not have any overtones, they are more precise than musical tones (which contain overtones) in helping to identify the frequency range of the tinnitus tone as closely as possible and subsequently targeting it more effectively. Generally, his acoustical neuromodulation exercises proceed as a series of short, randomized sequences of equal duration each consisting of a rapid succession of sixteen pulse tones one after the other. Each randomized sequence covers every note in the scale in question, generating a steady succession of single, five-second pointillistic bursts of computer tones, with short breaks between each burst. Harrison explains that he uses existing musical scales as opposed to coming up with new ones because "our brains are just so attuned to the Western harmonic scale, that *it works*, so if you try and take it out of that, especially for anybody who is musically trained or has a musical ear, it's jarring; we're just so used to these intervals."[83] These exercises are intended to be listened to regularly for shorter periods of time, and instruct listeners to "listen at a volume where you can hear but they are not intrusive—where they don't distract your attention, they should be soft but audible."[84] He continues, "The principle is to give the neurons stimulation across the entire frequency range and interrupt tinnitus.

It may work for you, it may not . . . it isn't a tinnitus cure, but it could help reduce the impact of your tinnitus."[85]

In keeping with his aim to empower patients by helping them develop new insights on their tinnitus, Harrison includes brief written descriptions to accompany all recordings uploaded to YouTube that clearly detail the specific techniques used, so that listeners can more readily identify what does and does not work for them. He also routinely checks and responds to queries in the comments section of his YouTube videos (in fact, this is how Harrison and I first met) and will often create new content based on requests conveyed in the comments section. His listeners generally respond in highly favorable terms, attesting to the effectiveness of his music. One listener writes of *Sounds to Soothe*, "This album is the ultimate in tinnitus attenuation" and "This album definitely helped calm the ringing in my ears. As a fellow music producer it is also relieving to hear that you can still make music pleasing even after stricken with tinnitus."[86] Another YouTube viewer writes, "20 god damn years. A couple of seconds of relief and it toned it down I almost started crying. This needs to be spread along others."[87] Many listeners even claim Harrison's is the best and only solution for tinnitus relief they have yet to come across: "This is the best soundscape I've heard to calm my Tinnitus—I play it all day and all night—it has helped salvage my work days & to sleep at night. . . . I could never have imagined the horror a constant chirping sound can inflict."[88] Some listeners quantify the tinnitus suppression his music affords in percentages: "This feels like it silenced my T by about 85% or even more."[89] Others share intimate and painful accounts of their underlying mental health as it relates to their tinnitus, as with one listener who writes of one of Harrison's tracks:

> This is the only thing that stops me from feeling suicidal from tinnitus. . . . I have gotten no relief from anything except this video. I just want to live. . . . Tinnitus is an invisible disability which can lead many to suicide. We need all the help we can get.[90]

A few people responded to this user's remarks publicly in the comments thread, while others no doubt did so privately, given the highly sensitive subject matter. In that sense, Tinnitus Works' YouTube channel also functions as a platform where fellow tinnitus patients find community, compare notes, pose questions, and offer one another moral support and encouragement in the midst of an oftentimes alienating and overwhelming experience.

Harrison's music is thus transformative for many fellow tinnitus patients, born of his mastery over the scientific literature, his desire to demystify and harness the principles of empirical scientific research in an ethical and accessible manner for the benefit of the tinnitus community, and his dynamism as a musician, composer, and producer. Harrison channels the underlying *reactive* quality of tinnitus—that is, its perpetual co-constituency with sound and music—to equip fellow patients with the tools to better understand what he describes as a *conditioned* reflex of the brain, empowering them to cultivate their own listening expertise so that they might discover effective, sustainable means of auditory *and* emotional self-regulation in a noisy and unpredictable world, to restore a sense of peace and calm in their own individual bodyminds. By charting new musical pathways, Tinnitus Works meets an urgent need in the absence of affordable medical interventions from beyond the commercial interests of the music industry. To that end, Tinnitus Works is ultimately part of a larger online cottage industry of diverse, homemade, sound-driven creative content—including autonomous sensory meridian response (ASMR) videos, guided meditations, self-help podcasts, et cetera—aimed at ameliorating a listener's physical and mental well-being to varying degrees and, crucially, beyond the institutionalized channels of the medical establishment.

Tinnitus Works bridges the historically sharp divisions between sociocultural and medical constructions of disability. Implicit in the concept of reactive tinnitus is the notion that audition is mediated, conditioned, and physiologically molded by cultural forces in both involuntary and voluntary ways that can enable and disable the listening subject, as in Sterne's audile scarification. At the same time, Harrison maintains that tinnitus patients can reclaim a sense of bodily autonomy and perceptual agency over their dysregulated audition amid a perpetually emergent soundscape by cultivating a listening expertise rooted in a scientifically informed perspective, albeit beyond scientific controls and medical supervision. To be sure, empowering tinnitus patients to better understand and intervene in their audition through self-regulation is not the same thing as shifting the burden of accommodation onto the disabled subject, the expectation being they need overcome their auditory false consciousness, to invoke Hagood's framing once more. Rather, Harrison situates patients at the center of a diagnostic process that they can initiate on their own terms independent of clinical diagnosis and treatment, whether by choice or *by necessity* on account of a dearth of affordable and effective treatment protocols. Here the social and medical models of disability are not at odds, but rather work in tandem, enabling tinnitus patients to bet-

ter understand and ultimately mitigate the cultural and physiological forces that impress upon the bodymind, to help them achieve optimal auditory self-regulation and a sense of equilibrium, no matter how fleeting.

As exercises intended to remediate a listener's dysregulated audition, Tinnitus Works invites comparison to Schafer's "ear cleaning" exercises from his *Notes for an Experimental Music Course*, discussed in chapter 2. Recall that in said exercises, the composer sought to entreat creatively "atrophied" musicians, desensitized by what he called "noise exhibitionism" in an increasingly industrialized world and *at serious risk of going deaf*, to open their ears anew to the sounds of the environment, where "ear cleanliness is an important prerequisite for all music listening."[91] Harrison's and Schafer's listening paradigms are alike in framing "silence"—or quietude—as an optimal state for the listening subject. Indeed, Harrison would arguably concur with Schafer's assertion that "silence becomes progressively valuable as we lose it," just as one of Harrison's listeners, writing in a discussion in the comments section below a Tinnitus Works YouTube track, poignantly wrote, "Sometimes I wonder how silence used to sound. . . . I wonder if Ill [*sic*] ever listen to silence again."[92] Yet Schafer's and Harrison's respective interpretations and applications of silence differ markedly. The ear-cleaning exercises *prescribe* silence as the starting point for what Thompson describes as the "capacious" ambient listening idealized in postwar experimental music and its ethically reconstituted listening subject.[93] Accordingly, in the exercises and assignments corresponding to "Lecture Two: Silence," Schafer provides his students with "a take-home assignment: Silence is elusive. Try to find it!" and later instructs them, "Just as in absolute darkness the tiniest light is an event of unique significance, in a container of profound silence even the dropping pin becomes uniquely important. Try this."[94] Paradoxically, the profound silence Schafer prescribes eludes tinnitus patients in that it is the very kind of experience of silence they yearn to restore, a space overtaken by tinnital ringing, silence being tinnitus's optimal acoustic precondition. For Harrison and fellow tinnitus patients seeking auditory self-regulation, "silence" is rather a sensibility or state of mind cultivated through "selective aurality," to borrow Thompson's apt term. As an alternative to silence, then, chapter 2's discussion is here relevant, where quiet signals a tranquility, peace, stillness, and calm unbounded by straightforward volumetric divisions between "sound" and "silence." By using sound to directly confront and suppress the tinnital tone, patients can achieve some semblance or impression of *silence*—or *quietude*, in other words—leading to restoration of equilibrium in the bodymind. As a creative and remedial practice, then, Tinnitus Works reimagines what hearing "silence" *sounds like* and

how it feels by rerouting and redirecting the listening subject's attention, forging new musical worlds in the process.

Monica Germino, the "whisperviolin," and *MUTED*

Amsterdam-based violinist Monica Germino was born in the Philippines, grew up in the United States, and holds dual citizenship in the United States and the Netherlands. She is a leading figure in the new music scene, celebrated for her soaring multimedia performances and signature integration of classical violin playing with electronics and live singing. A fierce advocate for new music, Germino has worked directly with composers, sound designers, stage directors, and instrument makers to commission bold new works while championing young artists, whether in her capacity as founder of ELECTRA, an all-female new music ensemble; her work with the founders of the new music collective Bang on a Can; or through her collaborations with some of the foremost composers of the experimental music tradition, including John Cage, György Ligeti, and the late Dutch composer Louis Andriessen, her beloved husband and closest interlocutor. Teaching and mentoring are an integral part of Germino's work: she has served as a guest professor and has led masterclasses at numerous international institutions, frequently pairing young violinists with composers, while encouraging experimentation and collaboration in a field that remains structurally conservative by default, thereby opening up much needed space for new approaches. As a performer working at the intersection of violin playing and new music, she has expanded the repertoire of extended playing techniques for solo violin, pushing the limits of instrumentality and virtuosity in the process. Through her capacity to juggle multiple parts simultaneously, from violin playing, to singing, to drumming, to choregraphed movement, and live electronics, Germino executes her own kind of solo polyphony, punctuated by her distinctive theatricality as a performer. Crucially, her creative practice is inherently collaborative: to cite but one example, she attributes many of the innovations in her violin playing to her long-standing creative partnership with pathbreaking sound engineer Frank van der Weij. Indeed, *New York Times* critic Corinna da Fonseca-Wollheim once remarked that in Germino's performances, "digital wizard" Van der Weij's sound designs supplant the piano as the "preferred duo partner" of the violin, where Germino capitalizes on the sonic and "dramatic possibilities of a partnership that is ultimately focused on empowering the violinist."[95]



Figure 29. Monica Germino and frame violin. Photo credit: Anne Reinke. Shared courtesy of Monica Germino.

In our Zoom interviews, Germino explained that her hearing began to decline over a decade before the eventual diagnosis of her hyperacusis. She noted she always had sensitive ears, leading her to ultimately resign from her orchestral post in the 1990s after suffering noticeable consequences.[96] What initially started as tinnitus eventually gave rise to an experience of intensifying pain in her ears in response to sounds above a certain volume to the extent that undertaking simple tasks around the house like emptying the dishwasher felt impossible. Even the sound of "my voice was a trigger," she explains. The final diagnosis was one of "decreased sound tolerance hyperacusis," a "dysfunction of auditory perception" where "sounds of normal volume are perceived as too loud or even painfully loud."[97] Another clinical source defines it as "a condition characterized by painful sensitivity to normal environmental sound" where ears can sometimes lose their "dynamic range," that is, "the ability of the ear to deal with quick shifts in sound loudness."[98] As hearing loss and prolonged exposure to loud volumes are among hyperacusis's common causes, Germino's audiologists strongly speculated that her hyperacusis was noise-induced, the direct result of her many years of violin playing. Germino explains that she sees this as the ultimate "poetic irony," given that

she had established a reputation for being among the *loudest* contemporary violinists and had played countless amplified shows, including many with her Violectra, a custom-made skeletal-frame electric violin designed by David Bruce Johnson.[99] Germino explains that while she did take precautions to protect her hearing as a soloist and ensemble player prior to the diagnosis of her hyperacusis (e.g, adjusting the placement of her monitors, being mindful not to stand in front of the speakers, being careful about where she stood in rehearsals, et cetera), she was unable to fully "let go of volume" after leaving the orchestra, taking what she realizes in hindsight were risks that would further jeopardize her hearing, all the while assuming that she was safe. She would later learn through ongoing consultations and tests with several different hearing specialists in connection with the design of what would eventually become the whisperviolin, that even her *solo acoustic violin* broke the 90 dB threshold under her left ear.

In many instances, hyperacusis can be treated through a variety of medical interventions, including tinnitus retraining therapy and broadband pink noise therapy, as well as a variety of self-directed interventions, all with the aim of increasing sound tolerance through regular sound exposure. Dan Malcore, editor of the Hyperacusis Network—an international patient-led peer support, research, and advocacy group equivalent to Tinnitus Hub—warns, however, that ENTs are infamous "for misdiagnosing our condition, giving poor advice and/or subjecting our ears to tests which collapse our tolerance to sound even more."[100] Furthermore, clinical definitions often emphasize the abnormal, *irrational* nature of a person's sound intolerance, with verbiage like an "*unusual* tolerance to ordinary environmental sounds," "consistently *exaggerated* or *inappropriate* responses to sounds that are neither threatening nor uncomfortably loud to a typical person," reinforcing shame and the mistaken associations between hyperacusis and unreasonableness or false consciousness, as alluded to in this chapter's opening. In the face of this moralizing scrutiny, Malcore maintains, just like Harrison, that "no one knows more about our condition than we do," situating the lived experiences of his fellow hyperacusis patients as central to the advancement of scientific knowledge and improvement of treatment protocols.[101]

As with Horvath, Germino's first audiologist recommended that she cease from playing altogether, lest she risk "going deaf," in her words. Subsequent physicians insisted she could keep playing so long as she wore hearing protection to preserve her remaining hearing. Whereas the former prognosis was utterly devastating for Germino, the latter prognosis was simply not musically feasible for somebody who had already developed a strong aversion

to hearing protection as an orchestral player in the 1990s: "I just couldn't do that; that wasn't going to work . . . the idea of wearing ear protectors was like sensory deprivation."[102] She elaborates, "Earplugs are deadening. They take away too much of the subtle details, such as the sound of the bow hair gliding across a string."[103] Germino's apprehension around earplug use strongly resonates with Rømer's in the previous chapter, who was determined to not diminish or dampen what little *natural* hearing remained with earplugs when her own responsiveness as a musician depended on her ability to sense musical nuances with her ears.

In the face of this seemingly bleak prognosis, along with limited treatment options and viable musical solutions, Germino instinctively felt inclined to walk away from violin playing altogether, recusing herself from scheduled performances. Not only was the physical pain intolerable, but what she describes as the totality and existential magnitude of the experience—the sense of loss and despair—was beginning to take a toll on her mental well-being, culminating in repeated panic attacks. She explains, "Playing the violin is my identity. What was I supposed to say now? Hi, I'm Monica and I'm . . ."[104] Her hearing loss was already a private struggle that she had avoided publicly disclosing given the culture of shame and stigma around hearing loss among professional musicians, despite its prevalence. Indeed, she notes that the ubiquity of hearing loss among classical musicians remains somewhat of an "open secret." In one interview with Persis Bekkering of *de Volkskrant*, Germino recalled that one of her colleagues in the orchestra questioned her motivations for resigning, remarking, "Well, aren't we all deaf?"[105]

And yet the long-standing stigma associated with hearing loss, coupled with the fiercely competitive nature of classical music and historically limited institutionalized hearing safeguards, means disclosure arguably comes with significant professional risk and a grave sense of personal loss, no matter how common hearing loss might be among musicians, as both Horvath and Germino make clear. While it is by now more or less standard practice for industrial workers' unions to mandate that members wear hearing protection to limit their exposure to steady broadband noise, music institutions have only recently begun to adopt and enforce best practices around hearing protection. Notable among them is the UK Musicians' Union, which holds employers accountable to specific noise compliance guidelines, including assessing risks from noise levels; taking action to reduce noise exposure that exceeds legal limit values; supplying employees with adequate training; equipping players with acoustic screens when noise levels exceed specific limit values and action categories; and, in some cases, subsidizing audiological assessments

and custom-made musicians' earplugs.[106] Yet official union policy on hearing loss does not necessarily correspond to implicit institutional values, such that hearing protection often comes down to the individual's willingness to disclose and self-advocate in the face of enduring stigma, the assumption being that hearing loss, or hearing damage of any kind, signals the end of one's musical career. Related to this is the sentiment that earplugs diminish musical perception and enjoyment and a performer's capacity to execute musically, as is clear from Germino's and Rømer's experience.[107] The grin-and-bear-it mentality and resignation among many professional musicians around the inevitable occupational hazards associated with exposure to loud volumes, and the sense that one ought to be willing to make physical sacrifices and endure the resulting consequences, reinforce the perception that hearing loss—or scarification, under Sterne's rubric—is just one of the realities of the job. For Germino, suffering through it was audiologically untenable, leaving retirement from violin playing the best and only option for the foreseeable future.

However, a turning point came when, as Germino explains, she called American composer and Bang on a Can cofounder Michael Gordon "to bow out of and replace myself in yet another future project." (ELECTRA had been in discussions with Gordon about writing a piece for the ensemble.) Germino explains that Gordon "listened but then he quickly moved on to the practical," approaching it as an opportunity to think through the creative possibilities that such musical constraints might afford, declaring, "I'm going to write a piece for you that's so soft, that I don't care if anyone can hear it."[108] Then composer and Bang on a Can cofounder Julia Wolfe joined in as well, intrigued and keen to think in concrete terms about what new and interesting sound worlds might emerge, what instruments and mutes might work best, what decibel levels and vocal ranges were possible, among other creative considerations. Composer David Lang (Gordon and Wolfe's fellow Bang on a Can cofounder) was also committed and engaged in the ongoing creative dialogues that would ultimately see the work come to fruition. Finally, Andriessen—who had served as a longtime inspiration and mentor to Gordon, Wolfe, and Lang since before Bang on a Can's inception in the 1980s—would write his contribution after a meeting in the summer of 2017 with Germino, Andriessen, all three Bang on a Can cofounders, and executive producer Neil Wallace, where the team talked through the creative process. The four parts would make their way into the whole, with some pieces intertwined, woven together by Germino herself with Andriessen's input. Indeed, in time, her colleagues' enthusiasm gave rise to newfound inspiration and optimism in Germino regarding the creative possibilities that would fol-

low, as she set out to devise a new set of low-decibel playing techniques to accommodate her hyperacusis, drawing on her existing collection of mutes and frame violins. (A frame violin is an acoustic violin with ribs only, that is, without a body or soundpost, which significantly restricts the instrument's overall loudness and capacity to resonate and project.)

Eventually, Dutch luthier Bas Maas and Dutch designer and friend Marcel Wanders collaborated on the design for a lower-decibel string instrument, "inspired by and loosely modeled on the 17th century pochette violin."[109] The *pochette* violin was part of the wide-ranging "kit" family, "pochette" and "kit" both serving as diminutive terms used for describing miniature string instruments. The pochette was not unlike the shape and function of the medieval boat-shaped rebec, though slightly narrower in body, proving advantageous for dance instructors who could easily carry them in their pockets.[110] Accordingly, Germino's custom-built whisperviolin is narrower than a standard classical violin, more or less equal in width to its own chin rest, and is equipped with dampening plugs along the right side of its body. It features elaborate hand-painted floral ornamentation, a hushing finger in place of the usual scroll, a bridge carved in the shape of a sumo wrestler, and a notably tall shoulder rest that serves as a kind of platform, elevating the instrument and player. Germino explains that most of all, Wanders was determined to make a beautiful and functional object, using creative ingenuity and aesthetic beauty to solve a problem and raise awareness among musicians in ways that might inspire further musical innovations down the line. Wanders elaborates: "It's such a tough situation—it's as if someone were to tell me not to look at beautiful things anymore because I'd go blind . . . [S]o I'm making her a violin, one that is not muted, not dumbed down, but sounds like it's whispering."[111]

As the whisperviolin was being built, Gordon, Lang, Wolfe, and Andriessen's collaborative efforts culminated in *MUTED*, a theatrical suite for solo violin, voice, whisperviolin, frame violins, mutes, and light design, with a run time of approximately forty to fifty minutes. *MUTED* was ultimately cocommissioned and presented by an international coalition of partners led by executive producer Neil Wallace of de Doelen, Rotterdam together with Oranjewoud Festival, Oranjewoud; Music on Main, Vancouver; the New York Philharmonic Orchestra and the Huddersfield Contemporary Music Festival; as well as other presenters including Muziekgebouw aan 't IJ, Amsterdam; November Music, Den Bosch; Korzo Theater, The Hague; and the Wonderfeel Festival, Baarn. In addition to the whisperviolin, *MUTED* calls for four other violins from among Germino's collection: "Mr. Blue" and tapping glove; a 1970 frame violin; an 1870 frame violin; and a traditional 1802



Figure 30. The Whisper Violin, design by Marcel Wanders, 2020. Shared courtesy of Marcel Wanders.

G. B. Ceruti violin. Germino explains that she was able to draw out a variety of sounds from each of her violins that she would alter or dampen using a variety of mutes from her vast collection. (Germino's collection includes over six hundred mutes made from a variety of materials including leather, rubber, cork, metal [brass, steel, silver, gold, etc.], bone, and so on, many of which are prefab and bespoke.) *MUTED* also showcases the violinist's talent for singing, speaking, and playing simultaneously. She explains that muting the violin while singing in her "untrained folk voice" solved the usual balance issues arising from the need to hold back her unmuted violin playing so as not to overpower the sound of her voice. The suite features Wolfe's and Andriessen's setting of a selection of Don Marquis's illustrated short stories about Archy, the cockroach, and Mehitabel, the alley cat, two unlikely friends. Germino explains that it was Mehitabel's desperation and perseverance in the face of continued bad luck that she has always found so inspiring, particularly in light of her hyperacusis: "I hope I can be like that . . . forging ahead no matter what."[112]

In keeping with Gordon's promise, *MUTED* deliberately challenges the listener on "all sorts of levels of decibels, all sorts of levels of volumes," as Germino explains, slowly ushering them into a state of progressive loss so that they have time to adjust and acclimate to each new level, ultimately conditioning their sensitivity to quieter and quieter sounds.[113] In that sense, it is a piece that critic Charles Passy writes "allows her [Germino] to explore the outer limits of the audible, the universe of expression and tonal subtlety that hides in extreme quietness."[114] To ensure that audience members could hear, numbers had to be kept low with seats arranged in a semicircle. The performance seating capacity was thus limited to fifty people, with some performances getting up to seventy, but never more, Germino notes.

MUTED begins with the sound of Germino tuning her violin, an at once routine and cherished ritual among string players, whether at the beginning of a private practice session or on stage moments before the start of a performance. Here Germino's tuning becomes part of the performance itself, as she walks around making eye contact with the audience members, who are seated in a semicircle. She explains that David Pay, Artistic Director of Music on Main, would later point out that this tuning exercise helped foster a sense of intimacy with the audience, while habituating them to the sound and volume of her violin, before slowly ushering them into the piece's low-volume universe. She explains, "Compare it to what happens when you enter a dark room and your pupils dilate and then they start to adjust and it isn't dark anymore . . . the same thing happens with sound: put the mute on, then

play for a while, then take the mute off, and suddenly it's very loud because you've adjusted to the lower level."[115] In *MUTED*, Germino conditions her listeners in this very manner: "Everything comes down, and you start experiencing everything on a [new] level."[116] The performance thus makes unusual demands of the audience by putting them in a position where they need to *strain to hear* without the ability to turn up the volume, so to speak. The experience of straining to hear can be physically discomforting, provoking concern and confusion over lapses in information, increasing the potential for mishearings and misunderstandings, a familiar scenario among those who are hard of hearing and inclined to feel challenged in quieter spaces. Germino also worked closely with lighting designer Floriaan Ganzevoort to ensure a seamless and dynamic integration of light and sound. Ganzevoort's program sought to reflect and reinforce the music's intimacy and incremental changes in volume, placing a tall lit tower in the center of the room to project successively softer and softer light, allowing the audience members' eyes to slowly adjust to their progressively dimmer surroundings.[117] The lighting design also featured changes in color, with brilliant blue and white lights towards the end of the piece.

MUTED is different from and more impactful than the sensationalized disability simulation crafted for the hearing gaze in the film *Sound of Metal* (discussed in chapter 2) wherein the figure of deafness and its association with absolute silence is used as a scare tactic, instilling panic in the hearing viewer through stark perceptual contrasts between sound and profound silence. Whereas the onset of Ruben's deafness and the viewer's experience of it is sudden and totalizing, registering as a complete shock and source of ongoing panic and trauma, *MUTED* invites the audience into a low-decibel sound world so that they might experience a new palette of sounds, gently conditioning their ears through incrementally softer and softer music, testing the boundaries of audibility, while altering the audience's perception of loudness. Except in instances of acoustic shock or injury, hearing loss usually sets in and unfolds gradually over a period of time. Unlike *Sound of Metal*, which repeatedly emphasizes that deafness begets an all-encompassing, impenetrable silence almost entirely devoid of sound and meaning, *MUTED* explores the musical subtleties of lower decibels by slowly pushing the limits of auditory perception to its lower threshold of audibility, where there is nevertheless music to be heard and meaning to be had. In that sense, *MUTED* defies static conceptions of deafness and its association with totalizing silence, rather offering a more versatile portrayal of audition beyond all-or-nothing sensory extremes. Finally, whereas *Sound of Metal* adopts a passive view of

the listening subject who is at the mercy of physiological forces beyond his control, *MUTED* enables the performer to reclaim a sense of agency over her hearing and musicianship. In the process, the performer invites the audience to cultivate a new kind of musical awareness that is attuned to the subtleties of lower volumes.

Indeed, more than an attempt at simulating the experience of hearing loss for the audience's benefit, *MUTED* was envisioned first and foremost as a way of mitigating Germino's increased sensitivity to sound pressure levels in conjunction with the whisperviolin, while exploring the possibilities of low-decibel music. Her intolerance to certain loudness thresholds is inscribed in the acoustical constraints of the instrument and the musical fabric of the score, allowing her to play without causing undue pain. Where auditory self-regulation is concerned, the whisperviolin and *MUTED* are different from Harrison's Tinnitus Works in that they do not aim to remediate and regenerate aurality per se but are intended to keep the effects of hyperacusis at bay while protecting existing hearing thresholds to prevent further loss. In so doing, they enable Germino to play violin without compromising her sense of bodily autonomy and to maintain a strong sense of musical identity and creative control in the process. In that sense, the whisperviolin and *MUTED* serve as vital forms of auditory self-regulation, restoring a kind of equilibrium in the bodymind, where one's sense of physical and mental well-being is inextricably bound up with the capacity to flourish as a musician.

In the time since *MUTED*'s debut, Germino has received numerous emails and messages across various platforms, including social media, from fellow musicians expressing their relief at her having gone public with her story and helping fight the stigma around hearing loss in the music industry, often disclosing their similarly pained, private accounts of noise-induced hearing loss and damage. For Germino, the whisperviolin and *MUTED*—the voices of the composers involved, and the new work that emerged from their collaboration—are ultimately a symbol of how things can be different. Her hope is that they might inspire a range of creative innovations, including further adapted instrument designs for safeguarding against hearing loss so that others might discover the "thrill of being able to play full power . . . on such evocative and beautiful instruments," without damaging their hearing. For Germino, the objective was never to promote consumerism through mass-manufacturing more instruments, but rather to promote curiosity at the level of *performance practice* and *music composition*, from recycling and repurposing old instruments, to imparting new adaptive playing techniques and novel ways of using mutes, to inspiring new ways of composing and collaborating

that harness the creative affordances of low-decibel music. As of February 2026, Germino is working in close collaboration with a team of composers and performers on the development of several new creative initiatives that build on the momentum of *MUTED* and the whisperviolin that will come to fruition over the next few years. Thus, through her creative advocacy, musical expertise, and ongoing collaborations and creative partnerships, then, Germino is not simply shifting the conversation around the prevalence of and stigma associated with music-induced hearing impairments, but working to build more imaginative musical worlds.

Conclusion

Despite their increasing frequency, tinnitus and hyperacusis inhabit a murky perceptual and cultural space between hearing and hearing loss, ability and disability, and scarification and impairment. As acquired impairments, they are often the result of prolonged exposure to loud sound, putting musicians at increased risk. Yet in the absence of robust social discourse on noise-induced hearing impairments, common representations of tinnitus readily follow the eugenicist logic of the figure of deafness seen in *Sound of Metal*. Like late-onset deafness, tinnitus is conceived as an insufferable, isolating, and altogether maddening condition, *terminal* to the extent that death is portrayed as the only certain and guaranteed balm in the absence of a cure. If tinnitus has its own set of tropes in cinema, hyperacusis is scarcely represented, let alone acknowledged or known about.

These auditory impairments expand the phenomenological and musical terrain of aurality beyond normative perceptual frames. They highlight a mismatch or disjuncture between subjective auditory experience and objective auditory phenomena, further challenging any singular sense of a stable external sonic reality, to draw on Ochsner's framing discussed in the previous chapter. In this way, they throw an aesthetics of auditory realism and the fetishization of sound fidelity evident in the cultural production of "natural" hearing vis-à-vis digital hearing aid systems into sharp relief, further deepening our understanding of hearingness in the process.

Harrison and Germino highlight that hearing *with* tinnitus and *with* hyperacusis entails listening with constant attention to the inner landscape of hearing as it interfaces with ongoing fluctuations in the outer soundscape. It means listening with a susceptibility to noise disturbance in a world that never ceases to quiet, taking steps to manage loudness thresholds all the while. When external sounds are subjectively experienced as indiscriminately

loud and painful, or when internal ringing is triggered and persists, some *semblance of silence*—or quietude—is required to restore equilibrium in the bodymind, whether achieved in the literal absence of sound, or in the presence of sound loud enough to drown out the ring, or sound that is precisely calibrated to confront and cancel it out altogether. Under the rubric of auditory self-regulation, then, the perception and meaning of "silence" is dynamic and subjective, encompassing both its literal articulation as a reduced listening environment with a limited spectrum of sounds and its construction as a *state of being* or affect, where sound itself promotes stillness and calmness of mind and body. In these ways, tinnitus and hyperacusis are profitably understood through the conceptual expansiveness of *quietude*, as both a term and experience that is unbounded by the volumetric underpinnings and negative dialectics of the loudness/silence and hearing/deafness binaries. Quiet more readily speaks to the liminal perceptual and affective dimensions of listening and sense-making that the implicit rubric of auditory normalcy cannot account for.

Harrison and Germino impart new techniques of *hearing*, hearing with and through loss, incursion, intrusion, and scarification, hearing despite the disabling impact of sound and music. They practice auditory self-regulation on an ongoing basis to recuperate and exercise bodily autonomy and perceptual agency, a life-affirming protocol that is devised independent of medical supervision and treatments or standardized accommodations, often when these channels of support have come up short or failed altogether. Auditory self-regulation is not concerned with conforming to hearing norms or to an existing set of social codes, but with establishing and maintaining a sense of equilibrium within the individual bodymind. Auditory self-regulation is conceived in relationship to the particularities of one's own audition relative to a perpetually emergent soundscape. Crucially, they reveal that in as much as it is rooted in the unique needs of the individual bodymind, auditory self-regulation is outward facing, generative, and committed to human flourishing. In their search for novel solutions, Harrison and Germino have initiated much needed dialogue where very little existed, raising awareness and combating stigma, while developing new forms of community and care, lasting musical partnerships, and new forms of music-making.

Indeed, Stephen Harrison and Monica Germino highlight the significant, if unlikely, role of music in processes of auditory self-regulation, albeit in very different ways between them. Under the moniker Tinnitus Works, Harrison creates listening exercises and diverse soundscapes built on a variety of materials and techniques, including pure sine tones, synthetic bells and

chimes, frequency modulation, acoustical neuromodulation, and simple tinnitus masking with the intention of providing fellow tinnitus patients with the sonic architecture for achieving self-regulation of their own bodymind through concerted, attentive listening along both short- and long-term timescales. Harrison's musical repertoire is intentionally therapeutic, representing an important musical niche that responds directly to the scarcity of practical, affordable, and effective care for fellow tinnitus patients seeking relief from their symptoms. Germino's bespoke whisperviolin is functional in the sense that its low volume makes playing more comfortable and approachable for those with hyperacusis, while preserving existing hearing thresholds. As a theatrical piece of music, *MUTED* is not simply functional in the sense that it readily accommodates players with hyperacusis, but a powerful musical reflection on the aesthetic merits of low-decibel music and the expansiveness of performance practice and musical creation.

As musicians and advocates, then, Harrison and Germino are at the forefront of emergent musical strategies for contending with the disabling impact of loud sound and the perils of noise-induced hearing impairments. Theirs is an *inclusive musical world-building* that takes account of aural diversity and the inconstancies of audition relative to the occupational hazards of the soundscape, and the simultaneous pleasures and perils of music, all the while nurturing new communities and creative alliances. Through an ingenious creative spirit and boundless curiosity, Harrison and Germino both make needed space for others who live with similar experiences—including and perhaps especially *musicians*—in ways that enable them to feel seen and affirmed in the face of long-standing stigma, while inspiring new forms of musical expression and creative fulfillment.

Coda

Expert Listening as Musical World-Building

This book has made clear that "deafness" figures prominently in the Western musical imaginary, where it nurtures an ongoing fascination with the extreme margins of sensory experience. Mistakenly construed as total auditory silence and heightened tactile sensation, the figure of deafness is invoked to hypothesize about, sensationalize, and even simulate the outer thresholds of perception and the ontological limits of music. Composers of the postwar experimental music tradition appealed to the figure of deafness as the antithesis of ambient silence and as a metaphor for the ignorance of those who did not understand its musical virtues. They also invoked the figure of deafness to warn of the audiological calamities of "noise exhibitionism" in humans. At present, the figure of deafness plays a leading role in Hollywood film, framed as a personal and oftentimes emasculating tragedy and impediment to music as the hearing audience is given unprecedented access to what are imagined as the extremes of profound hearing loss through the film's sound design. At the same time, the myth of inborn heightened tactile acuities among the deaf amid what is imagined as a totalizing absence of hearing wields tremendous affective power. Indeed, the figure of deafness is at the center of many narratives of disabled musical overcoming in music videos, best-selling books, and news headlines reporting on neuroscience research where deaf vibrational perception is made to reflect on aspirational claims about a universal human rhythmic propensity to music, even more so when other categories of difference are at stake. According to the logics of the figure of deafness, if *silence* is the fundamental affliction of deafness, *vibration* restores musical perception among the deaf, guaranteeing their humanity. In musical cultures that prize loudness, the figure of deafness stands in to denote the point at which touch

supersedes hearing amid extreme decibel levels, percussive beats, vibration, deep bass, and sub-bass frequencies, a sublime experience of sensory deprivation and overstimulation that hearing people can readily inhabit without risking their social privilege. In all instances, the figure of deafness reduces deafness to a set of static all-or-nothing sensory types and idealized states of being in both silence and vibration, while undermining the ontological multiplicity and unruliness of deafness, hearingness, and sense-making more generally.

The musicians in this book make clear that silence is not an inherent property of deafness, nor is heightened tactile sensation its essential outcome. Hearing loss is a diverse audiometric and experiential category that engages all sensory modalities, including vision, touch, and even hearing, which remains foundational to the lived experience of deafness, and deaf and hard of hearing experiences of music in many cases. People with hearing loss have a highly sophisticated understanding of sound and its cultural capital and the social terms and conditions of hearing. Hearing loss, in all its many guises, fosters an acute awareness of the implicit role of sound in everyday life and in systems of power, musical or otherwise, and a deep intimacy with its formal acoustic parameters by extension.

To that end, the musicians in this book invite us to completely rethink the category of hearing and its formative role in Western music discourse. Hearing with profound hearing loss, mild to moderate hearing loss, progressive hearing loss, and even tinnitus or hyperacusis—whatever the case may be—means hearing with a different kind of awareness of and orientation and sensibility toward loudness thresholds, frequency bands, harmonic overtones, timbre, tonality, directionality, spatialization, and technology as they span innumerable and seemingly banal listening scenarios. Often, this awareness and expertise arise as a matter of survival in a world that is inhospitable to auditory difference. Musicians like Ehlers, Rømer, Harrison, and Germino zero in on and harness the subtle intricacies of sound and audition in ways that are foundational to stabilizing and sustaining their hearing while ultimately nurturing their musicianship.

In the process, they make clear that so-called normal hearing is a misnomer. Normal hearing is a sociocultural production that rests on two distinct, though not mutually exclusive concepts: "normal" hearing and "natural" hearing. Whereas "normal" hearing generally describes decibel levels, frequency thresholds, the perception of human speech, and audiometric zero, "natural" hearing refers both to a particular auditory perceptual process that is (falsely) understood as unmediated *and* to an idealized sound quality that is believed to stem from that perceptual process, that is, "acoustic" hearing.

Normal hearing and natural hearing are consolidated and naturalized under the encompassing rubric of "normal hearing," where they are treated as a single, stable, unmarked category. Normal hearing serves as a baseline in diverse cultural spheres, including in the design, manufacturing, and branding of digital hearing aid systems, where emphasis on natural sound is shaped by a fetishization of acoustic realism and sonic fidelity. Normal hearing is also framed as the desired outcome alongside the perception and acquisition of speech in the habilitation of prosthetic hearing devices. It also figures prominently in Western music discourse, where it is understood as a prerequisite for musical understanding, expertise, and innate talent.

The musicians in this book thus unsettle ingrained constructions of auditory normalcy rooted in objective audiometric measures, fixed biological processes, a fixed external sonic reality, an aesthetics of auditory fidelity, and the promises of automation. Insofar as they are concepts that are meaningful for individual listeners, natural hearing and normal hearing are rather profitably understood as sensibilities formed through highly subjective and dynamic frames of reference forged through complex processes of habilitation and acclimatization in connection with diverse environments, instruments, and auditory assistive technologies, as Rømer and Ehlers make clear. As they uncover new layers and depths of human audition—or new hearing natures—these musicians evince that human audition is diverse, discontinuous, irregular, and subject to temporary damage and audile scarification alike. Hearing evolves, unfolds, and develops across disparate soundscapes and along different timescales throughout the human lifespan. Hearing is always-already mediated in that it engages multiple forms of technology, transduction, and amplification independent of or interdependent with auditory assistive technology like hearing aids and cochlear implants. Such accounts throw the perceptual fault lines between natural, acoustic, unaided sound and artificial, amplified, aided sound into sharp relief, thereby expanding the audiological spectrum of hearing in line with the principle of aural diversity.

At the same time, this book has made clear that music engages more than audition, more than tactility, and involves so much more than simply the sound itself. My case studies reveal that musicking encompasses a multisensory, multimodal constellation of sense-making spanning sonorous and non-sonorous registers in ways that are unbounded by straightforward divisions between hearing and deafness and ideal sensory types. They reveal that *musicianship* is not contingent upon an ontologically stable definition of music per se but rooted in the embodied virtuosities and creative values of the musicians in question and the musical worlds they envision and build.

Deafness, hearing loss, and the like not only invite us, then, to rethink the constructed normalcy of music but also serve as a catalyst for a more diverse and inclusive conception of musical expertise, one that challenges the myth of automatic inborn sensory gain, biological constructions of musical talent, and the sensationalism of technological automation, rather situating the musician and their agency at the center of musical knowledge formation. Through their repeated appeals to bodily autonomy, perceptual agency, multisensory interdependence, and musical self-determination, Christine Sun Kim, Troi "DJ Chinaman" Lee, MC Geezer, Evelyn Glennie, Jon Ehlers, Lotte Rømer, Stephen Harrison, and Monica Germino model *expert listening* to a high degree. I maintain that the measure of musical authority among expert listeners lies not in an idealized standard of listening or in any formal musical criteria, but rather in the musician's *lived experience*, and the expertise that stems from navigating a world that has often failed to recognize the legitimacy of musicianship among those with hearing loss.

Bodily autonomy in the context of expert listening rebuffs any sense of a biologically normate listener with perfect, unmediated hearing, just as it rejects any exclusionary physiological prerequisites for musical participation and expertise. It rather approaches music and music-making as a site of creative possibility, an outlet through which to recuperate and reassert a sense of bodily freedom and control, often by unlearning the cultural norms against which the disabled body has been disciplined. As Ehlers makes clear, bodily autonomy is oftentimes hard-won yet absolutely vital. Kim's mission to unlearn sound etiquette is a resounding assertion of bodily autonomy, where sound etiquette exists both as a set of prescribed hearing norms and as a politics of respectability rooted in the sonic construction and assimilation of racialized and disabled others. She makes her refusal to comply palpable through a command like "quit shoving silence down my throat," asserting her right to both physical sovereignty and agential voice. Insofar as it was born of Lee's efforts to create a safe and inclusive environment for deaf performers and music lovers free of the verbal and physical abuse of mainstream hearing venues, Deaf Rave is rooted in a strong collective appeal to bodily autonomy. For Lee and Deaf Rave, bodily autonomy is not a given, but co-constitutive with the built musical environment and the forms of access and inclusion it inscribes. Auditory self-regulation as practiced by Harrison and Germino likewise centers on an expression of bodily autonomy in that it stems from a desire to restore equilibrium in the bodymind amid its interdependence on a built environment replete with sonorous dynamics that often exacerbate tinnitus and hyperacusis. Rømer reveals that in many cases, bodily autonomy

is inextricably bound up with assistive technologies, like hearing aids in her case, as they extend the listener's auditory capacities, enabling her to "be in the middle of the music again." Bodily autonomy in the context of expert listening thus prizes physical self-determination and security of the bodymind as the starting point for perceptual agency and musical self-determination.

As a foundational expression of bodily autonomy, *perceptual agency* challenges passive narratives of automatic inborn sensorial compensation and disabled musical overcoming, rather emphasizing active and idiosyncratic processes of adaptation, optimization, and innovation, intricate labors that become naturalized and ingrained in the bodymind over time. Perceptual agency describes musicians' freedom to perceive and think through sound on their own terms, often by working against fixed sensory types, normative perceptual frames, and ideologically constructed sense-making. By rejecting an exclusively auditory construction of music, Glennie's practice of touching the sound goes beyond simply developing an awareness of music's tactile substrata through an inborn rhythmic propensity to music. It rather entails a highly sophisticated form of sense-making that is unique to Glennie. Touching the sound happens across and in between sensory registers, from residual hearing to visual-spatial gesture, to movement, inference, and imagination, and centers on a prosthetic reciprocity between the musician and her percussion kit.

The dynamic intersensorial complementarity, cooperation, and cross-talk to which Glennie and others allude—that is, *multisensory interdependence*—is central to perceptual agency. It is further evident from Ehlers's practice of EQing a track so as to aurally verify and supplement otherwise obscure aspects of the music he *feels* are there. Note that his feeling that there is more to the sound of a recorded track than he can hear collapses the hard-and-fast distinctions between feeling as literal touch and feeling as an intuition in the absence of definitive sensory input. It is an experience rooted in both a physical feeling and a strong cognitive impression that stems from a lapse in stable perceptual information, resulting in an impulse to acquire more concrete input by auditory means. In these ways, multisensory interdependence also speaks to the limits of existing conceptual frameworks in describing, qualifying, and generalizing about the intricacies and expansiveness of human sensory experience, and leaves creative space for that indeterminateness.

As the creative outcome of bodily autonomy and perceptual agency, *musical self-determination* refers to a musician's right to determine what constitutes music and musical expression for themselves without a firm commitment to an ontologically fixed definition. Musical self-determination is built on di-

verse *multimodal literacies*, spanning multiple creative disciplines, media, outputs, and entry points to music. The unequivocally visual dimensions of Kim's compositions make this clear in the ways they eschew auditory means of perception and expression and even preexisting sonorous frames of reference. The strong social and expressive capital of vision, visuality, and tactility at Deaf Rave's events as they culminate in diverse visual performances likewise reflects the multimodal dimensions of musical self-determination. In these ways, musical self-determination is unbounded by institutionalized discourse on musical literacy and musical skill (or Discourse with a capital *D*, as in Broomhead's model). Rather, under the rubric of musical self-determination, musical literacy and skill are formed in accordance with the musician's embodied virtuosities and creative aspirations. Musical self-determination also describes the unforeseen creative affordances implicit within the constructed normalcy of music that musicians harness in service of their own individual sense-making and creative aims. Glennie, Rømer, and Ehlers, among others, engage in predominantly sonorous expressions of music through sophisticated multisensory listening techniques, circumventing the implicit corporeal norms of the musical spaces they inhabit while nurturing their own musical sensibilities. By attending to the plural, idiosyncratic means by which musicians experience music and express themselves musically, musical self-determination promotes an expansive conception of musical world-building.

Indeed, the musicians featured in the pages of this book are ultimately engaged in *inclusive musical world-building*. It is inclusive not because it is conceived according to the tenets of universal design or necessarily even focused on eliminating physical barriers to musical access. The musical world-building this book accounts for is inclusive in that it diversifies the conceptual terms of what it means to be a musician and what it means to be an expert. By moving away from institutionalized conceptions of musical authority and skill, the musical world-building practiced by the musicians in this book expands everything from the language and conceptual frameworks used to talk about sense-making, music, and musical experience, to the basic materials of music itself. It is inclusive because it represents and affirms heretofore marginalized life experiences, ways of being, and forms of sense-making, while promoting new forms of musicianship and creative production around which new social discourse forms. It is inclusive because it builds new musical networks, communities, and creative partnerships, while nurturing and inspiring innovative collaborations and novel forms of music-making. In these ways, musical world-building nurtures new forms of musical belonging.

Music at the Margins of Sense has ultimately instrumentalized expert listen-

ing as an *analytical framework* in connection with a specific focus on deafness, challenging its construction as a form of totalizing auditory deficit alongside an exclusively auditory construction of music, as well as sensationalized depictions of an ideally sensing deaf person and the nature and primacy of "normal," "natural" hearing. Yet expert listening can also be mobilized and applied as a litmus test or informal checklist for analyzing the musical representation of a diverse number of marginalized subject positions and categories of difference, and assessing the degree to which such portrayals live up to or undermine lived experience. Expert listening also has wide-ranging applications as a musical epistemology—or *musical value system*—that calls on us to confront the constructed normalcy of music, our own implicit biases, and the naturalized terms of musical belonging within a given musical space or tradition as the necessary starting point for affirming more diverse forms of human variation, sense-making, and musicking. In these ways, expert listening promotes human flourishing. By framing the individual subject's embodied ways of knowing and lived experience as primary sites of identity formation, knowledge production, and musical skill, authority, and creativity, expert listening enables music scholars to recognize, closely study, and ultimately *incorporate* new and previously obscure forms of musicking in ways that can expand the existing remit of musicological research, diversifying our shared corpus of musical epistemic resources. Through engaging with historically marginalized accounts of music, expert listening calls on scholars to actively participate in inclusive musical world-building by collectively reimagining the nature of sense-making, music, and musicianship. Ideally, this paradigmatic shift in thinking will not simply open up vital, unforeseen spaces of musicological and sonic inquiry, but also enable more diverse forms of subjectivity, artistic production, community, and musical belonging to flourish down the line.

Notes

Chapter 1

1. Two versions of this poem exist with a minor difference between them: in the original 2017 version quoted at the top of this chapter, the line is "as though atheism is a kind of deafness," whereas in a later version (initially published in the UK in 2018, and in the US in 2021), the line is "as though Deafness is a kind of Atheism." See Raymond Antrobus, "Echo (a Deaf Sequence)," *Poetry*, March 9, 2017, accessed August 16, 2022, https://www.poetryfoundation.org/harriet-books/2017/03/echo-a-deaf-sequence; and Raymond Antrobus, "Echo," in *The Perseverance* (Tin House, 2021), 75–76.

2. Antrobus, "Echo (a Deaf Sequence)."

3. Antrobus, "Echo (a Deaf Sequence)."

4. Hearing and deafness, along with sight and blindness, are among the most commonly invoked metaphors for distinguishing believers from nonbelievers in the Bible. In literal terms, deafness and blindness are portrayed as forms of physical weakness and/or punishment. See Jennifer L. Koosed and Darla Schumm, "Out of Darkness: Examining the Rhetoric of Blindness in the Gospel of John," *Disability Studies Quarterly* 25/1 (2005): https://doi.org/10.1057/9780230339491_5; Geoffrey D. Robinson, "The Motif of Deafness and Blindness in Isaiah 6:9–10: A Contextual, Literary, and Theological Analysis," *Bulletin for Biblical Research* 8 (1998): 167–86; and Georgina Kleege, "Blindness and Visual Culture: An Eyewitness Account," *Journal of Visual Culture* 4/2 (2005): 179–90.

5. Visual alert doorbells are used by many deaf and hard of hearing people.

6. See Mara Mills, "Deafness," in *Keywords in Sound*, edited by David Novak and Matt Sakakeeny (Duke University Press, 2015), 45–54.

7. See Charles Taylor, "What Is a 'Social Imaginary'?," in *Modern Social Imaginaries* (Duke University Press, 2004), 23–30.

8. Taylor, "Social Imaginary," 25.

9. Harlan Lane, *The Mask of Benevolence: Disabling the Deaf Community* (Alfred A. Knopf, 1992), 43.

10. Carol Padden and Tom Humphries, *Deaf in America: Voices from a Culture* (Harvard University Press, 1988), 93.

11. John Drever and Andrew Hugill, "General Introduction," in *Aural Diversity*, edited by John Drever and Andrew Hugill (Taylor & Francis, 2022), 9.

12. See James Jerger, "The Quest for Audiometric Zero," *Hearing Review*, June 20, 2019, accessed September 25, 2025, https://hearingreview.com/resource-center/expert-insight/quest-audiometric-zero

13. See "ISO 226: 2023 (en) Acoustics—Normal Equal-Loudness-Level Contours," *International Organization for Standardization* (ISO), accessed September 25, 2025, https://www.iso.org/obp/ui/en/#iso:std:iso:226:ed-3:v1:en

14. Drever and Hugill, "General Introduction," 3.

15. David M. Baguley, "Aural Diversity: A Clinical Perspective," in Drever and Hugill, *Aural Diversity*, 18.

16. Mills, "Deafness," 51.

17. Christopher Krentz, *Writing Deafness: The Hearing Line in Nineteenth-Century American Literature* (University of North Carolina Press, 2007), 7.

18. Anabel Maler, "Music and Deafness in the Nineteenth-Century U.S. Imagination," *Journal of the Society for American Music* 16/2 (2022): 188; see also Miranda Fricker, *Epistemic Injustice: Power and the Ethics of Knowing* (Oxford University Press, 2007); and Gaile Pohlhaus Jr., "Relational Knowing and Epistemic Injustice: Toward a Theory of *Willful Hermeneutical Ignorance*," *Hypatia* 27/4 (2012): 715–35, and specifically "willful hermeneutical ignorance," 716.

19. Maler, "Music and Deafness," 187.

20. Susan Wendell, *The Rejected Body: Feminist Philosophical Reflections on Disability* (Routledge, 1996), 274.

21. See Michele Friedner and Annelies Kusters, "Deaf Anthropology," *Annual Review of Anthropology* 49 (2021): 31–47.

22. See Michele Friedner, *Sensory Futures: Deafness and Cochlear Implant Infrastructures in India* (University of Minnesota Press, 2022).

23. See Joseph N. Straus, "Composers with Disabilities and the Critical Reception of Their Music," in Straus, *Extraordinary Measures: Disability in Music* (Oxford University Press, 2011), 15–44; and Michael Accinno, "John Sullivan Dwight, Blindness, and Music Education," *American Music* 39/1 (2021): 89–118.

24. Terry Rowden, *The Songs of Blind Folk: African American Musicians and the Cultures of Blindness* (University of Michigan Press, 2009).

25. Stephanie Jensen-Moulton, "Finding Autism in the Compositions of a 19th Century Prodigy: Reconsidering 'Blind Tom' Wiggins," in *Sounding Off: Theorizing Disability in Music*, edited by Neil Lerner and Joseph N. Straus (Routledge, 2006), 199–215.

26. Michael Accinno, "Helen Keller, Music, and the Limits of Oralism," *Journal of Interdisciplinary Voice Studies* 4/2 (2019): 139–56.

27. Straus, *Extraordinary Measures*; Anabel Maler, "Songs for Hands: Analyzing Interactions of Sign Language and Music," *Music Theory Online* 19/1 (2013): http://www.mtosmt.org/issues/mto.13.19.1/mto.13.19.1.maler.html; Maler, "Musical Expression Among Deaf and Hearing Song Signers," in *The Oxford Handbook of Music and Disability Studies*, edited by Blake Howe, Stephanie Jensen-Moulton,

Neil Lerner, and Joseph N. Straus (Oxford University Press, 2016), 73–91; Maler and Robert Komaniecki, "Rhythmic Techniques in Deaf Hip Hop," *Music Theory Online* 27/1 (2021): https://mtosmt.org/issues/mto.21.27.1/mto.21.27.1.maler.html#best_2015-2016; Jeannette Di Bernardo Jones, "Imagined Hearing: Music-Making in Deaf Culture," in Howe et al., *Music and Disability Studies*, 54–72; Katherine Meizel, "Two Voices: Singers in the Hearing/Deaf Borderlands," in Meizel, *Multivocality: Singing on the Borders of Identity* (Oxford University Press, 2020), 91–114; Robin Wallace, *Hearing Beethoven: A Story of Musical Loss and Discovery* (University of Chicago Press, 2018); Tom Beghin, "Deafly Performing Beethoven's Last Three Piano Sonatas," *Beethoven Studies* 4 (2020): 209–38; and George McKay, "Johnnie-Be-Deaf: *One* Hearing-Impaired Star, and Popular Music as a Disabling (Deafening) Culture," in McKay, *Shakin' All Over: Popular Music and Disability* (University of Michigan Press, 2013), 120–49.

28. Drever and Hugill, "General Introduction," 2, 6. This is evident from the numerous nineteenth-century American writers Krentz surveys in *Writing Deafness* who sought to interrogate, probe, and test its limits.

29. Drever and Hugill, "General Introduction," 3.

30. On Deaf culture, see Carol Padden and Tom Humphries, *Inside Deaf Culture* (Harvard University Press, 2005); Harlan Lane, Richard C. Pillard, and Ulf Hedberg, eds., *The People of the Eye: Deaf Ethnicity and Ancestry* (Oxford University Press, 2011). See also "The Difference Between d/Deaf and Hard-of-Hearing," *ai Media*, accessed February 15, 2023, https://www.ai-media.tv/ai-media-blog/the-difference-between-d-deaf-and-hard-of-hearing-2/

Deaf studies scholar Rebecca Edwards writes of the initial motivations for capitalizing "Deaf" under the cultural model of deafness: "For hearing people, the term 'deaf' speaks of the body and its failings; it does not invoke a vibrant, subaltern culture with a language, community, and history of its own": Rebecca Edwards, *Words Made Flesh: Nineteenth-Century Deaf Education and the Growth of Deaf Culture* (New York University Press, 2012), 1. This convention was adopted by music scholars during the initial period of musicological engagement with disability studies beginning in 2005 and is one I used in my own early publications on music and deafness in 2016 and 2017 respectively.

31. James Woodward and Thomas P. Horejes, "deaf/Deaf: Origins and Usage," in *The Sage Deaf Studies Encyclopedia*, edited by Genie Gertz and Patrick Boudreault (Sage Publications, 2016), 285–87, https://doi.org/10.4135/9781483346489.n93. Woodward clarifies that he originally used "d/Deaf" to make an *academic distinction* between what he observed as different modes of deafness operating within the American Deaf community in the context of his ethnographic work at Gallaudet University in the 1970s, and never championed its use beyond that particular context in its historic, cultural, geographic, and linguistic specificity: "[A] rigid taxonomy of deaf/Deaf is dangerous, colonizing, and ethnocentric, and it reinforces tautological and spiral debates with no positive constructions to the understanding of what it means to be deaf/Deaf . . . the deaf/Deaf distinction also neglects the importance of intersectionality." Indeed, even the notion of a singular, monolithic

Deaf culture on which applications of "d/Deaf" often rest has been debated and contested by scholars in deaf studies and deaf anthropology in recent years, as I will later detail. What Woodward and Horejes likewise indicate is d/Deaf's neglect of intersectionality has been taken up by scholars like Rezenet Tsegay Moges and Carla García-Fernández, who have challenged the implicit whiteness of deaf culture and the first wave of deaf studies, calling attention to the ways racial discrimination both within and outside the culturally deaf community shapes BIPOC deaf identity formation. See Rezenet Tsegay Moges, "'From White Deaf People's Adversity to Black Deaf Gain': A Proposal for a New Lens of Black Deaf Educational History," *Journal Committed to Social Change on Race and Ethnicity* 6/1 (2020): 69–99; and Carla García-Fernández, "Intersectionality and Autoethnography: Deafblind, Deafdisabled, Deaf and Hard of Hearing-Latinx Children Are the Future," *Journal Committed to Social Change on Race and Ethnicity* 6/1 (2020): 41–67.

32. See Meizel, "Two Voices."

33. See also Friedner and Kusters's discussion of this change in convention in "Deaf Anthropology," 32.

34. Michele Friedner and Annelies Kusters, "Introduction: DEAF-SAME and Difference in International Deaf Spaces," in *It's a Small World: International Deaf Spaces and Encounters*, edited by Friedner and Kusters (Gallaudet University Press, 2015), ix.

35. Mills, "Deafness," 53.

36. See Annelies Kusters, Massimiliano Spotti, Ruth Swanwick, and Elina Tapio, "Beyond Languages, Beyond Modalities: Transforming the Study of Semiotic Repertoires," *International Journal of Multilingualism* 14/3 (2017): 219–32; and Annelies Kusters, "Introduction: The Semiotic Repertoire. Assemblages and Evaluation of Resources," *International Journal of Multilingualism* 18/2 (2021): 183–89.

37. Arseli Dokumaci, *Activist Affordances: How Disabled People Improvise More Habitable Worlds* (Duke University Press, 2023), 12.

38. Friedner and Kusters, *It's a Small World*, xvii.

39. Friedner and Kusters, *It's a Small World*, 12.

40. See Christopher Small, *Musicking: The Meanings of Performing and Listening* (Wesleyan University Press, 1998).

41. Jessica A. Holmes, "Singing Beyond Hearing," in "Colloquy: On the Disability Aesthetics of Music," *Journal of the American Musicological Society* 69/2 (2016): 542.

42. Blake Howe, "Music and Disability Studies," *Music Research Annual* 1 (2020): 7.

43. "Letter No, 089, 'The Heiligenstadt Testament,' Ludwig van Beethoven to His Brothers, October 6th, 1802," in *Letters of Note: Correspondence Deserving of a Wider Audience*, compiled by Shaun Usher (Canongate Books, 2021), 324–26.

44. Carolyn Abbate, *Unsung Voices: Opera and Musical Narrative in the Nineteenth Century* (Princeton University Press, 1991), 130. In Abbate's reading of nineteenth-century opera more generally, music can be "heard" and "not heard" by characters who oscillate between two symbolic orders she dubs "hearing" and "deaf-

ness," respectively.

45. "The idea that someone can *overcome* a disability has not been generated within the community; it is a wish fulfillment generated from the outside": Simi Linton, "Reassigning Meaning," in *The Disability Studies Reader*, 2nd ed., edited by Lennard J. Davis (Routledge, 2006), 165. For a discussion of the "supercrip" trope, see John S. Clogston, "Disability Coverage in American Newspapers," in *The Disabled, the Media, and the Information Age*, edited by Jack A. Nelson (Greenwood, 1994), 45–48.

46. Blake Howe, "Disabling Music Performance," in Howe et al., *Music and Disability Studies*, 191.

47. See Jan Peter Thomas et al., "Aetiology of Ludwig van Beethoven's Hearing Impairment: Hypotheses over the Past 100 Years—a Systematic Review," *European Archives of Oto-Rhino-Laryngology* 278/8 (2021): 2703–12.

48. See Wallace, *Hearing Beethoven*, 24.

49. See Wallace, *Hearing Beethoven*; and *Inside the Hearing Machine*, directed by Steven Maes, featuring Tom Beghin, Chris Maene, Robin Wallace, Thomas Wulfrank, and Martha de Francisco (Orpheus Institute, 2017): https://www.insidethehearingmachine.com/documentary

50. See Tom Beghin, "Beethoven's Broadwood, Stein's Hearing Machine, and a Trilogy of Sonatas," CD booklet for Tom Beghin, *Inside the Hearing Machine: Beethoven on His Broadwood—Sonatas Opus 109, 110, and 111* (Evil Penguin Records Classic, 2017), 25–57.

51. See Friedner, "Introduction," in *Sensory Futures*.

52. Kleege, "Blindness and Visual Culture," 180. See also David T. Mitchell and Sharon L. Snyder, *Narrative Prosthesis: Disability and the Dependencies of Discourse* (University of Michigan Press, 2000).

53. John L. Drever, "'Primacy of the Ear'—but Whose Ear?': The Case for Auraldiversity in Sonic Arts Practice and Discourse," *Organised Sound* 24/1 (2019): 86.

54. Drever, "Primacy of the Ear," 86.

55. Drever, "Primacy of the Ear," 86.

56. Drever, "Primacy of the Ear," 87–88. Drever notes that many composers of the Western art music tradition confessed to having hearing loss, tinnitus, and/or hyperacusis.

57. Drever and Hugill, "General Introduction," 2–3. In addition to Schaeffer's *quatres écoutes* (Schaeffer 1966), Drever names "Smalley's nine *indicative listening fields*; Truax's *listening-in-search and listening-in-readiness* (Truax 2001); Clarke's ecological listening (Clarke 2005); Oliveros's *deep listening* (Oliveros 2005); Norman's *referential listening* (Norman 1996); Kassabian's *ubiquitous listening* (Kassabian 2013); Back's *sociological listening* (Back 2007); Mullender's elite-level listener of the hostage negotiator (Mullender 2012)," in "Aural Diversity," 2–3.

See Denis Smalley, "The Listening Imagination: Listening in the Electroacoustic Era," in *Companion to Contemporary Musical Thought*, vol. 1, edited by John Paynter et al. (Routledge, 1993), 514–54; Barry Truax, *Acoustic Communication*, 2nd ed.

(Greenwood Press, 2001); Eric Clarke, *Ways of Listening: An Ecological Approach to the Perception of Musical Meaning* (Oxford University Press, 2005); Pauline Oliveros, *Deep Listening: A Composer's Sound Practice* (iUniverse, 2005); Katharine Norman, "Real-World Music as Composed Listening," *Contemporary Music Review* 15/1 (1996): 1–27; Anahid Kassabian, *Ubiquitous Listening: Affect, Attention and Distributed Subjectivity* (University of California Press, 2013); Les Back, *The Art of Listening* (Bloomsbury, 2007); and Richard Mullender, *Dispelling the Myths and Rediscovering the Lost Art of Listening (Communication Secrets of a Hostage Negotiator)* (Griffin, 2012).

58. On "prodigious hearing," relative to so-called "normal hearing" and "disablist hearing," see Straus, *Extraordinary Measures*, 151–52.

59. Straus, *Extraordinary Measures*, 152–53.

60. Fred Maus, "The Disciplined Subject of Musical Analysis," in *Beyond Structural Listening? Postmodern Modes of Hearing*, edited by Andrew Dell'Antonio (University of California Press, 2004), 29.

61. Maus, "Disciplined Subject," 15.

62. Lindsay J. Wright, "Discourses of Musical Talent in American Culture," PhD dissertation, University of Chicago, 2018; Lindsay J. Wright, "Black Musicality and the Invention of Talent: The Case of Thomas Wiggins," *19th Century Music* 47/1 (2023): 33–52; and Julia Koza, *"Destined to Fail": Carl Seashore's World of Eugenics, Psychology, Education, and Music* (University of Michigan Press, 2021).

63. See Ana María Ochoa Gautier, "Silence," in Novak and Sakakeeny, *Keywords in Sound*, 183–92.

64. R. Murray Schafer, "Lecture Two: Silence," in *Ear Cleaning: Notes for an Experimental Music Course* (BMI Canada, 1967), 7.

65. John Cage, "Experimental Music: Doctrine," in *Silence: Lectures and Writings by John Cage* (Wesleyan University Press, 1961), 14, emphasis mine.

66. The association of deafness with ignorance is akin to metaphorical characterization of blindness described by Kleege: See Kleege, "Blindness and Visual Culture." On "capacious" listening, see Marie Thompson, "Listening with Tinnitus," *FKW Zeitschrifft für Geschlechterforschung und Visuelle Kultur* 69 (April 2021): 34; and Marie Thompson and Mack Hagood, "Tinnitus, Exclusion, Relationality (Beyond Normate Phenomenology)," *Capacious: Journal for Emerging Affect Inquiry* 2/3 (2021): 66–80.

67. See Jade Bryan in Emma Purcell, "Sound of Metal: A Film Criticized for Its Representation of Hearing Loss to a Hearing Audience," *Disability Horizons*, October 2, 2021, accessed August 27, 2022, https://disabilityhorizons.com/2021/02/sound-of-metal-a-film-criticised-for-its-representation-of-hearing-loss-to-a-hearing-audience/

68. See Amanda Morris, "Representation or Stereotype? Deaf Viewers Are Torn over 'CODA,'" *New York Times*, March 30, 2022, accessed July 21, 2023, https://www.nytimes.com/2022/03/30/movies/deaf-viewers-coda.html#:~:text=It%27s%20predicated%20on%20the%20idea,fake%20issue"%20in%20the%20movie

69. Mary Bates, "Super Powers for the Blind and Deaf," *Scientific American*,

September 18, 2012, accessed April 16, 2016, http://www.scientificamerican.com/article/superpowers-for-the-blind-and-deaf/; "Deaf People Hear Touch?," YouTube video (SourceFed channel), 2:12, posted July 12, 2012, accessed October 3, 2016, https://www.youtube.com/watch?v=Q6sXPuvIJeA; Walter Neary, "Brains of Deaf People Rewire to 'Hear' Music," *UWToday*, University of Washington website, November 27, 2001, accessed April 16, 2016, http://www.washington.edu/news/2001/11/27/brains-of-deaf-people-rewire-to-hear-music/; Erica Klarreich, "Feel the Music: Deaf People Use 'Mind's Ear' to Process Vibrations," *Nature*, November 27, 2001, accessed April 16, 2016, http://www.nature.com/news/2001/011127/full/news011129-10.html; "Deaf People 'Develop Super-Vision to Compensate,'" *Mail Online*, October 11, 2010, accessed April 16, 2016, http://www.dailymail.co.uk/health/article-1319480/Deaf-people-develop-super-vision-compensate.html; Jeanna Bryner, "Deaf People 'Feel Touch' with Hearing Part of Brain," Live Science, July 10, 2012, accessed April 16, 2016, http://www.livescience.com/21509-deaf-people-brain-touch.html. Headlines are usually written by headline writers rather than authors or reporters, and are often deliberately made more sensational than the body of the report in order to generate immediate interest. They nevertheless have a notable cultural impact. Moreover, the brain and music are two topics that scientists recognize as being of especially intense public interest and are thus susceptible to this sensationalism. See "The Mythical Brain," editorial in *Nature Neuroscience* 17 (2014): 1137, https://doi.org/10.1038/nn.3802; Anna North, "The Dangers of 'Brain'-Speak," *New York Times*, June 5, 2014, accessed May 21, 2016, http://op-talk.blogs.nytimes.com/2014/06/05/the-dangers-of-brain-speak/?_r=0; Samuel A. Mehr, "Miscommunication of Science: Music Cognition Research in the Popular Press," *Frontiers in Psychology* 6 (2015): 988, https://doi.org/10.3389/fpsyg.2015.00988; Andrew Moore, "Bad Science in the Headlines: Who Takes Responsibility When Science Is Distorted in the Mass Media?," *EMBO Reports* 7 (2006): 1193–96; David F. Ransohoff and Richard M. Ransohoff, "Sensationalism in the Media: When Scientists and Journalists May Be Complicit Collaborators," *Effective Clinical Practice* 4 (July–August 2001): 185–88; and Peter Broks, *Understanding Popular Science* (Open University Press, 2006).

70. See Oliver Sacks, *Musicophilia: Tales of Music and the Brain* (Alfred A. Knopf, 2007), x; Sacks, *An Anthropologist on Mars: Seven Paradoxical Tales* (Picador, 1995); and Andreas Lehmann, John Sloboda, and Robert Woody, *Psychology for Musicians: Understanding and Acquiring the Skills* (Oxford University Press, 2007). For work that further examines the human evolutionary propensity to music, see, for example, Steven Mithen, *The Singing Neanderthals: The Origins of Music, Language, Mind, and Body* (Harvard University Press, 2007); Aniruddh D. Patel, *Music, Language, and the Brain* (Oxford University Press, 2008); Philip Ball, *The Music Instinct: How Music Works and Why We Can't Do Without It* (Oxford University Press, 2010); and Dan Levitin, *This Is Your Brain on Music: The Science of a Human Obsession* (Dutton, 2006).

71. The late Australian disability activist Stella Young coined the term "inspiration porn" in a series of blog posts and in a 2012 TED Talk. The term has since

been adopted by disability studies scholars and is especially popular among activists online. See Stella Young, "We're Not Here for Your Inspiration," *Ramp Up: Disability. Discussion. Debate* (blog), July 2, 2012, accessed July 9, 2016, http://www.abc.net.au/rampup/articles/2012/07/02/3537035.htm; and Young, "I'm Not Your Inspiration, Thank You Very Much," Transcript, *TedTalk Conferences LLC*, June 2014, accessed July 9, 2016, https://www.ted.com/talks/stella_young_i_m_not_your_inspiration_thank_you_very_much/transcript?language=en

72. For instance, Sacks hypothesizes, "Even profoundly deaf people may have innate musicality. Deaf people often love music and *are very responsive to rhythm, which they feel as vibration, not as sound*. The acclaimed percussionist Evelyn Glennie has been profoundly deaf since the age of twelve." Sacks, *Musicophilia*, 95 n. 3. Lehmann, Sloboda, and Woody speculate along similar lines, "If music is a universal capacity of the human brain, it is important to ask whether anything could ever go wrong with a brain to render it incapable of dealing with music. We know from some astonishing life histories (e.g., the percussionist Evelyn Glennie) that even profound deafness does not automatically exclude high levels of musical achievement": Lehmann et al., *Psychology for Musicians*, 30. See also Evelyn Glennie, "Hearing Essay," January 1, 2015, Evelyn Glennie website, accessed October 17, 2025, https://www.evelyn.co.uk/hearing-essay/

73. See Donna Jo Napoli, "Magic Touch: Deaf Gain and the Benefits of Tactile Sensation," in *Deaf Gain: Raising the Stakes for Human Diversity*, edited by H-Dirksen L. Bauman and Joseph J. Murray (University of Minnesota Press, 2014), 211–32.

74. Robert Fink, "Below 100 Hz: Toward a Musicology of Bass Culture," in *The Relentless Pursuit of Tone*, edited by Robert Fink, Zachary Wallmark, and Melinda Latour (Oxford University Press, 2018), 89. Zachary Wallmark writes that in death metal, loudness "has an imperative phenomenological function in the music, overwhelming listeners . . . explicitly appealing to them at the site of the body," while breaking down "the barriers separating self and other"; Zachary Wallmark, "The Sound of Evil: Timbre, Body, and Sacred Violence in Death Metal," in Fink et al., *Relentless Pursuit of Tone*, 67. See also Luis-Manuel Garcia-Mispireta, "Beats, Flesh, and Grain: Sonic Tactility and Affect in Electronic Dance Music," *Sound Studies* 1/1 (2015): 59–76.

75. Joanna Demers, *Listening Through Noise: The Aesthetics of Experimental Electronic Music* (Oxford University Press, 2010), 105–6.

76. See Jonathan Sterne, "Audile Scarification," in *Diminished Faculties: A Political Phenomenology of Impairment* (Duke University Press, 2021), 117–56.

77. Fink, "Below 100 Hz," 89.

78. See John Corbett, "Experimental Oriental: New Music and Other Others," in *Western Music and Its Others: Difference, Representation, and Appropriation in Music*, edited by Georgina Born and David Hesmondhalgh (University of California Press, 2000), 163–86; and Dylan Robinson, *Hungry Listening: Resonant Theory for Indigenous Sound Studies* (University of Minnesota Press, 2020).

79. Adrian Curtin, "Vibration, Percussion and Primitivism in Avant-Garde

Performance," in *Vibratory Modernism*, edited by Shelley Trower and Anthony Enns (Palgrave Macmillan, 2013), 228.

80. See Roshanak Kheshti, "Touching Listening: The Aural Imaginary in the World Music Culture Industry," *American Quarterly* 63/3 (2011): 711–31.

81. Mitchell and Snyder, *Narrative Prosthesis*, 5–6.

82. Mitchell and Snyder, *Narrative Prosthesis*, 6–7.

83. "Type, Degree, and Configuration of Hearing Loss," Audiology Information Series, American Speech-Language-Hearing Association website, 2023, accessed October 16, 2025, https://www.asha.org/siteassets/ais/ais-type-degree-and-configuration-of-hearing-loss.pdf

84. Michael Valente, Elizabeth Fernandez, and Heather Monroe, *Audiology Answers for Otolaryngologists: A High-Yield Pocket Guide* (Thieme Medical Publishers, 2011), 21. See also "The Audiogram," American Speech-Language-Hearing Association website, accessed October 16, 2025, http://www.asha.org/public/hearing/Audiogram/

85. Sterne, *Diminished Faculties*, 120.

86. Marie Thompson in Thompson and Hagood, "Tinnitus, Exclusion, Relationality," 67.

87. See Sterne, *Diminished Faculties*, 121.

88. Sterne, *Diminished Faculties*, 121. On tinnitus, see also Mack Hagood, *Hush: Media and Sonic Self-Control* (Duke University Press, 2019).

89. For a sociocultural discussion of the category "hard of hearing," see Barbara Stenross, *Missed Connections: Hard of Hearing in a Hearing World* (Temple University Press, 1999).

90. Membership in Deaf culture also extends to sign language interpreters and to the children of Deaf adults, who often use the acronym CODA. See Bencie Woll and Paddy Ladd, "Deaf Communities," in *The Oxford Handbook of Deaf Studies, Language, and Education*, edited by Marc Marschark and Patricia Spencer (Oxford University Press, 2003), 51–163.

91. "About ALDA," Association of Late Deafened Adults (ALDA) website, accessed October 16, 2025, https://alda.org/about-alda/

92. "About Tinnitus Hub," accessed October 16, 2025, https://www.tinnitushub.com/about/

93. Krentz, *Writing Deafness*, 6.

94. Edwards, *Words Made Flesh*, 2. See also Harry G. Lang, "Perspectives on the History of Deaf Education," in Marschark and Spencer, *Handbook of Deaf Studies*, 9–20; Douglas C. Baynton, *Forbidden Signs: American Culture and the Campaign Against Sign Language* (University of Chicago Press, 1996); Harlan Lane, *When the Mind Hears: A History of the Deaf* (Random House, 1984). Debates surrounding oralism and manualism were similar across the United States and Canada.

95. Oralist and manualist pedagogies originated in late eighteenth-century Germany and France respectively, and "the fate of these methods in the 19th century reflected the ongoing battles between these two European powers": Leila Monaghan, "A World's Eye View: Deaf Cultures in Global Perspective," in *Many*

Ways to Be Deaf: International Variation in Deaf Communities, edited by Leila Monaghan, Constanze Schmaling, Karen Nakamura, and Graham Turner (Gallaudet University Press, 2003), 1.

96. For Bell, oralism would thwart the proliferation of sign language and deaf-deaf marriage, a stance which culminated in his eugenicist manifesto; see Alexander Graham Bell, *Memoir upon the Formation of a Deaf Variety of the Human Race* (National Academy of Sciences, 1884).

97. Edwards, *Words Made Flesh*, 2. For most of the twentieth century, sign languages were widely regarded by linguists and anthropologists as primitive and pantomimic. It was not until the belated validation of American Sign Language as a fully formed natural human language in 1960 and scientific discoveries about the similar acquisition and cognitive processing of signed and spoken languages in the 1970s that attitudes toward manualism began to improve. See Cindee Calton, "What We Learned from Sign Languages When We Stopped Having to Defend Them," in Bauman and Murray, *Deaf Gain*, 112–29.

98. Edwards, *Words Made Flesh*, 2.

99. Lane, *When the Mind Hears*, 100. By comparison, manualism enjoyed relative prominence in France, where high-ranking clerics and public officials advocated for the value of a distinctly French deaf community and sign language as an extension of French national identity. Even as oralism gained institutional support in the nineteenth century, efforts to restore the *French method* (i.e., manualism) were ultimately successful. See Freeman G. Henry, "Introduction" to *Forging Deaf Education in Nineteenth-Century France: Biographical Sketches of Bébian, Sicard, Massieu, and Clerc*, by Ferdinand Berthier, edited and translated by Freeman G. Henry (Gallaudet University Press, 2009), xv–xxxvii; and Monaghan, "A World's Eye View," 1–9.

100. See Anabel Maler, *Seeing Voices: Analyzing Sign Language Music* (Oxford University Press, 2024), 35–42, 40–48.

101. In Deaf culture, "voicing" risks perpetuating the legacy of oralism and reinscribing the metaphysical associations between voice and subjecthood. See Padden and Humphries, *Deaf in America*; Brenda Jo Brueggemann, *Lend Me Your Ear: Rhetorical Constructions of Deafness* (Gallaudet University Press, 1999); and Jonathan Rée, *I See a Voice: Deafness, Language, and the Senses—a Philosophical History* (Metropolitan Books, 1999).

102. Michele Friedner, "Biopower, Biosociality, and Community Formation: How Biopower Is Constitutive of the Deaf Community," *Sign Language Studies* 10/3 (2010): 339.

103. Moges, "White Deaf People's Adversity," 69 and 70.

104. The last fifty years have witnessed an increase in "sign bilingualism" in deaf schools in the West where students are taught sign linguistics alongside the spoken vernacular. This has led to new conceptions of deaf identity and orientations toward Deaf culture. See Marc Marschark, Gladys Tang, and Harry Knoors, eds., *Bilingualism and Bilingual Deaf Education* (Oxford University Press, 2014).

105. Guy McIlroy and Claudine Storbeck, "Development of Deaf Identity:

An Ethnographic Study," *Journal of Deaf Studies and Deaf Education* 16/4 (2011): https://doi.org/10.1093/deafed/enr017

106. See Mills, "Deafness," and Kusters et al., "Beyond Languages, Beyond Modalities."

107. See Paddy Ladd, *Understanding Deaf Culture: In Search of Deafhood* (Multilingual Matters, 2003); and Harlan Lane, Robert Hoffmeister, and Benjamin J. Bahan, *A Journey into the Deaf-World* (Dawn Sign Press, 1996), 5.

108. Bauman and Murray, *Deaf Gain*, xxxii. As Michael Skyer makes clear, Deaf gain is an idea "that encompasses two distinct threads: intrinsic deaf gains, which are the embodied benefits of being deaf, and extrinsic deaf gains, which are the perceived contributions that deaf people create for all humankind": Michael E. Skyer, "Deaf Ecologies," *Journal of Deaf Studies and Deaf Education* 21/2 (2016): 234.

109. H-Dirksen L. Bauman, "Introduction: Listening to Deaf Studies," in *Open Your Eyes: Deaf Studies Talking*, edited by Bauman (University of Minnesota Press, 2008), 1. See also Woll and Ladd, "Deaf Communities"; and Benjamin L. Bahan, "Upon the Formation of a Visual Variety of the Human Race," in Bahan, *Open Your Eyes*, 83. For a list of terms pertaining to deaf identity, language, and education, see the "Glossary of Terms and Abbreviations," in Ladd, *Understanding Deaf Culture*, xvii–xxii.

110. See Bell, *Memoir upon the Formation*.

111. George Veditz, "The President's Message," in *Proceedings of the Ninth Convention of the National Association of the Deaf and the Third World's Congress of the Deaf, 1910* (Philocophus Press, 1912), 30; quoted in Michele Friedner and Stefan Helmreich, "Sound Studies Meets Deaf Studies," *Senses & Society* 7 (2012): 73. See also Bahan, "Upon the Formation," 83–99.

112. Antrobus, "Echo (a Deaf Sequence)."

113. Tobin Siebers, *Disability Theory* (University of Michigan Press, 2008), 4. See also Anna Mollow, "Identity Politics and Disability Studies: A Critique of Recent Theory," *Michigan Quarterly Review* 43/2 (2004): http://hdl.handle.net/2027/spo.act2080.0043.218

114. Douglas C. Baynton explains that the Deaf rejection of disability is "mainly intended as a refutation of the demeaning focus on deafness as defect": See Baynton, "Beyond Culture: Deaf Studies and the Deaf Body," in Bahan, *Open Your Eyes*, 307. For a critical discussion on the relationship between deafness and disability, see Harlan Lane, "Do Deaf People Have a Disability?," in *Open Your Eyes*, 277–92; Baynton, "Beyond Culture," 293–313; and Susan Burch and Alison Kafer, eds., *Deaf and Disability Studies: Interdisciplinary Perspectives* (Gallaudet University Press, 2010).

115. Burch and Kafer, *Deaf and Disability Studies*, xvii.

116. Annelies Kusters, Maartje De Meulder, and Dai O'Brien, *Innovations in Deaf Studies: The Role of Deaf Scholars* (Oxford University Press, 2017), 3.

117. Among the recent developments that Kusters et al. identify as necessitating the need for more dynamic conceptual frameworks and theoretical models are "the decline of deaf schools, the normalization of cochlear implants, the multiplication

of pathways into deaf communities, increased virtual and transnational contact, a diversification of intersectional backgrounds, and a growing number of hearing people who learn and use sign language": Kusters et al., *Innovations in Deaf Studies*, 3–4. See also Friedner and Kusters, *It's a Small World*, xvii.

118. Friedner and Kusters, *It's a Small World*, xii.

119. S. J. Wright, Gloshanda Lawyer, and E. H. Bart, "Decision-Making in the Era of Postmodern Audism," in *Who Decides? Power, Disability, and Educational Leadership*, edited by Catherine O'Brien, William R. Black, and Arnold B. Danzig (Information Age Publishing, 2022), 107.

120. Wright et al., "Decision-Making," 114.

121. Kristie Medeiros, Devonta Thomas, and Andrea Wohl, "Deaf BIPOC: Unpacking the Needs in the Community," Learning Center for the Deaf website, July 6, 2020, accessed October 16, 2025, https://www.tlcdeaf.org/about/news/deaf-bipoc-unpacking-needs-community

122. Erin Moriarty Harrelson, "Authenticating Ownership: Claims to Deaf Ontologies in the Global South," in Kusters et al., *Innovations in Deaf Studies*, 361–84.

123. Friedner and Kusters, *It's a Small World*. See also Karen Nakamura, *Deaf in Japan: Signing and the Politics of Identity* (Cornell University Press, 2006); Michele Friedner, *Valuing Deaf Worlds in Urban India* (Rutgers University Press, 2014); Friedner, *Sensory Futures*; and Annelies Kusters, *Deaf Space in Adamorobe: An Ethnographic Study of a Village in Ghana* (Gallaudet University Press, 2017).

124. To better account for Black deaf experience, Moges has proposed "Black Deaf Gain" as a means of "re-evaluating a master narrative of historical (and ongoing) oppressions of racism with antiblackness, audism, and linguicism": Moges, "White Deaf People's Adversity," 70.

125. Friedner, *Valuing Deaf Worlds*, 11–12 and 101–2.

126. M. Remi Yergeau, *Authoring Autism: On Rhetoric and Neurological Queerness* (Duke University Press, 2017), 253 n. 17.

127. Jaipreet Virdi, *Hearing Happiness: Deafness Cures in History* (University of Chicago Press, 2020), 5.

128. Christopher Krentz, "Duncan Campbell and the Discourses of Deafness," *History, Theory, Criticism* 27/1 (2005): 41. On the logics of invisible vs. visible disability and stigma, see Rosemarie Garland-Thomson, "Looking Away, Staring Back," in *Staring: How We Look* (Oxford University Press, 2009), 79–94. On the logics of disability and passing, see Jeffrey A. Brune and Daniel J. Wilson, eds., *Disability and Passing: Blurring the Lines of Identity* (Temple University Press, 2013).

Krentz writes of infamous eighteenth-century London "deaf" fortune teller Duncan Campbell, whose critics, suspecting Duncan's claim to deafness was fraudulent, tried to force him to *speak* in the hopes that, through his voice, Duncan would either confirm his deafness through poorly modulated speech sounds or reveal himself to be hearing through perfect speech. He notes that Duncan's "muteness apparently struck people more forcefully, perhaps because it was more palpable than his deafness": Krentz, "Duncan Campbell," 41.

Campbell's example illustrates some of what Tobin Siebers observes when he

describes that while visibly disabled people are denigrated for their failure to conform to the inconstant physical demands of normalcy, invisibly disabled people are often regarded with an air of suspicion for their failure to manifest their disabilities in clear physical terms. Namely, Siebers explains that in an attempt to legitimize their struggles and identity amid able-bodied skepticism, invisibly disabled people will sometimes "masquerade" their disabilities through physical exaggeration, a strategy that he explains can have challenging consequences, "when the desire that people with disabilities sometimes experience to overcome their invisibility and its attendant violence by exhibiting their impairments" has "the paradoxical consequence that they become even more invisible and vulnerable as a result": Siebers, *Disability Theory*, 103.

129. Virdi, *Hearing Happiness*, 7; Krentz, *Writing Deafness*, 13.

130. Wright et al., "Decision-Making," 100. See also García-Fernández, "Intersectionality and Autoethnography"; and Moges, "White Deaf People's Adversity."

131. Dokumaci, *Activist Affordances*, 12.

132. Mainstreaming is controversial from the standpoint of the Deaf community, who strongly support specialized schools for the deaf. See "Position Statement on Schools for the Deaf," National Association of the Deaf website, accessed October 16, 2025, https://www.nad.org/about-us/position-statements/position-statement-on-schools-for-the-deaf/

133. Inconspicuous design is achieved both through the persistent miniaturization of hearing aids and cochlear implant technologies, and through integration of fashion into medical engineering, rendering them more like music earbuds, mobile earpieces, and headphones. See Graham Pullin, *Design Meets Disability* (MIT Press, 2009), 23–28. Yet there exists a subset of deaf CI recipients who relish the alterity that the visibility of a CI affords, regarding themselves as neuro-prosthetically-enhanced cyborgs on the vanguard of post-humanism, a *movement* media theorist Mills dubs "deaf futurism." See Mara Mills, "Do Signals Have Politics? Inscribing Abilities in Cochlear Implants," in *The Oxford Handbook of Sound Studies*, edited by T. J. Pinch and Karin Bijsterveld (Oxford University Press, 2012), 320–46. See also Michael Chorost, *Rebuilt: How Becoming Part Computer Made Me More Human* (Houghton Mifflin, 2005).

134. Sterne, *Diminished Faculties*, 19.

135. Tina Childress, "Confessions of a Late-Deafened Adult," *See Hear Communication Matters* (blog), September 10, 2018, accessed October 16, 2025, https://tinachildressaud.com/2018/09/10/confessions-of-a-late-deafened-adult/

136. Thompson, "Listening with Tinnitus," 38.

137. Drever and Hugill, "General Introduction," 1.

138. Sherrie Tucker and Ray Mizumura-Pence, "Introduction" to *Improvising Across Abilities: Pauline Oliveros and the Adaptive Use Musical Instrument*, edited by Thomas Ciufo et al. (University of Michigan Press, 2024), 2–3.

139. See James I. Charlton, *Nothing About Us Without Us: Disability Oppression and Empowerment* (University of California Press, 1998).

140. Cassandra Hartblay, "Disability Expertise: Claiming Disability Anthropol-

ogy," *Current Anthropology* 61/S21 (2020): S34.

141. See Sara Hendren, *What Can a Body Do? How We Meet the Built World* (Riverhead Books, 2020).

142. Sami Schalk writes, "Processes within our being impact one another in such a way that the notion of a physical versus mental process is difficult, if not impossible to clearly discern in most cases": Sami Schalk, *Bodyminds Reimagined: (Dis)ability, Race, and Gender in Black Women's Speculative Fiction* (Duke University Press, 2018), 269. See also Eli Clare, *Brilliant Imperfection: Grappling with Cure* (Duke University Press, 2017), and Margaret Price, "The Bodymind Problem and the Price of Pain," *Hypatia* 30/1 (2014): 268–84.

143. See, for example, Margrit Shildrick, *Leaky Bodies and Boundaries: Feminism, Postmodernism, and (Bio)ethics* (Routledge, 1997).

144. Lenka Krhutová, "Personal Autonomy and Disability," *Review of Disability Studies* 13/1 (2017): 4.

145. Lennard J. Davis, "Crips Strike Back: The Rise of Disability Studies," *American Literary History* 11/3 (1999): 505.

146. Eva Feder Kittay, "The Ethics of Care, Dependence, and Disability," *Ratio Juris* 24/1 (2011): 57.

147. Hendren, *What Can a Body Do?*, 26.

148. Robert McRuer, *Crip Theory: Cultural Signs of Queerness and Disability* (NYU Press, 2006), 88–99.

149. Blake Howe has described this as the "ideological narrative of musical performance" in his analysis of one-handed pianist Paul Wittgenstein's reception, wherein "bodily limitations are to be superseded rather than affirmed, overcome rather than embraced" in Howe, "Paul Wittgenstein and the Performance of Disability," *Journal of Musicology* 27/2 (2010): 136.

150. Bess Williamson, "Access," in *Keywords for Disability Studies*, edited by Rachel Adams, Benjamin Reiss, and David Serlin (NYU Press, 2015), 14.

151. Howe, "Disabling Music Performance," 192. On "constructed normalcy" see Lennard J. Davis, *Enforcing Normalcy: Disability, Deafness, and the Body* (Verso, 1995), 23–49.

152. Hartblay, "Disability Expertise," S27.

153. Ingrid Monson, "Hearing, Seeing, and Perceptual Agency," *Critical Inquiry* 34/S2 (2008): S37, S52.

154. Monson, "Hearing, Seeing," S38.

155. David Howes and Constance Classen, "Introduction" to *Ways of Sensing: Understanding the Senses in Society* (Routledge, 2013), 5. Friedner writes further, "Dividing the senses into discrete categories is both an act of care and a form of violence, a way of both creating and inhibiting the wholeness of people's lifeworlds": Friedner, *Sensory Futures*, 31.

156. David Howes, "Cross-Talk Between the Senses," *Senses & Society* 1/3 (2006): 385–86.

157. Rebecca Sanchez, "Deafness and Sound," in *Sound and Literature*, edited by Anna Snaith (Cambridge University Press, 2020), 273.

158. Tucker and Mizumura-Pence, "Introduction," 1–2.

159. Paul Broomhead, *What is Music Literacy?* (Routledge, 2019), 6.

160. Margaret Barrett, "Music Literacy: I Hear What You Mean. Music Literacy in the Information Technology Age," in *More Than Words Can Say: A View of Literacy through the Arts*, edited by Joan Livermore (University of Canberra–Melbourne, 1997), 43.

161. Broomhead, *What is Music Literacy?*, 6.

162. Simon McKerrell and Lyndon C. S. Way, "Understanding Music as Multimodal Discourse," in *Music as Multimodal Discourse: Semiotics, Power, and Protest*, edited by McKerrell and Way (Bloomsbury Academic, 2017), 2–3. See also Georgina Born, "On Musical Mediation: Ontology, Technology and Creativity," *Twentieth Century Music* 2 (2005): 7–36.

163. Rosemarie Garland-Thomson, "Eugenic World Building and Disability: The Strange World of Kazuo Ishiguro's *Never Let Me Go*," *Journal of Medical Humanities* 38 (2017): 133.

164. Dokumaci, *Activist Affordances*, 5.

165. Friedner and Kusters, *It's a Small World*, xvii–xviii.

166. See Garland-Thomson's discussion of human flourishing in "Welcoming the Unexpected," in *Human Flourishing in the Age of Gene Editing*, edited by Erik Parens and Josephine Johnston (Oxford University Press, 2019), 15–26.

167. Cathy Park Hong, "Bad English," in *Minor Feelings: A Reckoning on Race and the Asian Condition* (Profile Books, 2020), 97.

168. Sterne, *The Audible Past*, 274.

169. Stephanie Lloyd and Chani Bonventre, "Habilitation Beyond the Bionic Metaphor: Producing Deafness of the Future," *Science, Technology, & Human Values* 50/2 (2023): 337.

170. See Hagood, *Hush*.

171. Hartblay, "Disability Expertise," S32.

172. Guthrie Ramsey, "Who Hears Here? Black Music, Critical Bias, and the Musicological Skin," *Musical Quarterly* 85/1 (2001): 39.

173. Sara Acevedo, "Praxis-Oriented Research Toward a Liberatory Disability Politics: A Contemplative Inquiry Approach," *Cultural Studies* 22/6 (2022): 593–604; Mel Y. Chen et al., eds., *Crip Genealogies* (Duke University Press, 2023); and Elaine J. Lawless, *Reciprocal Ethnography and the Power of Women's Narratives* (Indiana University Press, 2019).

174. "Expert Listening: Music and Deafness," University of Copenhagen, Department of Arts & Cultural Studies, February 19, 2023, accessed July 21, 2023, https://artsandculturalstudies.ku.dk/calendar/2023/expert-listening/. See also Nikolaj Lund, "Léonie Sonning Music Prize 2023—Evelyn Glennie—Documentary Film," *Vimeo*, July 7, 2023, accessed July 21, 2023, https://vimeo.com/843170595

175. Emma Dahlin, "Email Interviews: A Guide to Research Design and Implementation," *International Journal of Qualitative Methods* 20 (2021): 2.

176. Dahlin, "Email Interviews," 4.

177. For instance, rather than beginning with some variation of a presumptuous question like *How does your deafness (or hearing loss) inform (or affect, impact, influ-*

ence, etc.) your experience of music (or your musical craft or a specific musical work)? I learned to lead with open-ended, neutral questions like *Can you tell me about your relationship to music?* or *Can you tell me about the creative thought process behind this work?* While the former style of question presumes a negative relation and imposes an evident hearing bias, the latter questions are unqualified from the standpoint of hearing/deafness, open-ended framings that more readily affirm the subject's perceptual agency and musical self-determination.

Chapter 2

1. Cage, "Experimental Music: Doctrine," 64.

2. Evelyn Glennie in *Touch the Sound: A Sound Journey with Evelyn Glennie*, DVD, directed by Thomas Riedelsheimer (Munich, Germany: Filmquadrat, 2004).

3. Christine Sun Kim (@chrisunkim), X (formerly Twitter) post, June 28, 2015 (6:00 p.m.), accessed October 4, 2025, https://x.com/chrisunkim/status/615324012768567296

4. See Alexis Deighton MacIntyre, "The Signification of the Signed Voice," *Journal of Interdisciplinary Voice Studies* 3/2 (2018): 167–83.

5. Theodor Adorno wrote of an "acoustic stripe" and "second order presence" of ambient sounds emanating from sound recording technology and media. However, Cage is arguably the composer who wrote and worked most strongly with the concept. Theodor Adorno, "Memorandum: Music in Radio," unpublished essay, June 1938, Paul F. Lazarsfeld Papers, Columbia University, New York; quoted in Richard Leppert, "Commentary," in Theodor W. Adorno, *Essays on Music*, translated by Susan H. Gillespie (University of California Press, 2002), 219.

6. David Novak, "Playing Off-Site: The Untranslation of *Onkyô*," *Asian Music* 41/1 (2010): 48.

7. Padden and Humphries, *Deaf in America*, 93.

8. Mack Hagood, "Cage's Echoes of the Anechoic," *Australian Humanities Review* 70 (November 2022): 77.

9. *Oxford English Dictionary*, s.v. "silence: noun and interjection" 2.a, and 1.a, accessed September 28, 2025, https://www.oed.com/dictionary/silence_n?tab=meaning_and_use#22837306

10. *Oxford English Dictionary*, s.v. "silence: verb," accessed September 28, 2025, https://www.oed.com/dictionary/silence_v?tab=factsheet#22838536

11. Ochoa Gautier, "Silence," 183–84.

12. Bell wrote further that sign language is "a gesture-language that is developed by a deaf child at home, not because it is the only form of language that is natural to one in his condition, but because his parents and friends neglect to use the English language in his presence in a clearly visible form": Bell, *Memoir upon the Formation*, 43.

13. Edwards, *Words Made Flesh*, 2.

14. Nancy Creighton, "What Is Wrong with the Use of the Terms: 'Deaf-Mute,' 'Deaf and Dumb,' or 'Hearing-Impaired,'" National Association of the Deaf,

archived April 4, 2018, accessed September 28, 2025, https://web.archive.org/web/20180404052948/http://www.eamo.org/assets/spdeafterminology.pdf

15. Creighton, "What Is Wrong."

16. Maler has meticulously documented the staggering ways *music* was deployed alongside early hearing aid technology as a tool of oralist assimilation, where ostensible restoration of a student's capacity to hear music was lauded as the "the ultimate proof" of their integration, and public demonstrations of the technologies in question promised "miraculous musical recoveries" from the damning, totalizing silence that deafness was thought to entail; see Maler, *Seeing Voices*, 46.

17. Meizel, *Multivocality*, 92.

18. Ochoa Gautier, "Silence," 184.

19. *Oxford English Dictionary*, "silence" 2.a.

20. Nicky Losseff and Jenny Doctor, "Introduction," in *Silence, Music, Silent Music*, edited by Losseff and Doctor (Ashgate, 2007), 2; and Marcel Cobussen, "Cage and Silence," and "Silence and/in Music," in "Deconstruction in Music," PhD dissertation, Erasmus University Rotterdam, 2002, http://www.deconstruction-in-music.com/intro/deconstruction-in-music/001. Losseff and Doctor also write of the paradoxical use of music to evoke spiritual or cognitive "silence," as in Japanese composer Tōru Takemitsu's *Confronting Silence* and French composer Olivier Messiaen's "Regard du Silence," and in the convention of using non-diegetic music as "silence" in film: Losseff and Doctor, "Introduction," 4, 2.

21. William Brooks, "Pragmatics of Silence," in Losseff and Doctor, *Silence, Music, Silent Music*, 99.

22. Hagood, "Cage's Echoes," 76.

23. Cage, "Experimental Music: Doctrine," 8 and 13.

24. Cage's visit to the anechoic chamber "is among the most oft-told tales in Cagean lore," as Hagood put it, and indeed, scholars have long cast doubt on the physiological and acoustic veracity of the composer's account; Hagood, "Cage's Echoes," 75; and Cage, "Experimental Music: Doctrine," 8.

25. Jael Kraut, "John Cage and the Mystification of Musical Silence," in *Powers: Religion as a Social and Spiritual Force*, edited by Meerten B. ter Borg and Jan Willem van Henten (Fordham University Press, 2010), 272.

26. Ochoa Gautier, "Silence," 184.

27. Losseff and Doctor, "Introduction," 9.

28. Marcel Cobussen, "Ethics and/in/as Silence," *Ephemera* 3/4 (2003): 285.

29. See abstract for Tracy McMullen, "Subject, Object, Improv: John Cage, Pauline Oliveros, and Eastern (Western) Philosophy in Music," *Critical Studies in Improvisation* 6/2 (2010): 1.

30. Pauline Oliveros, "V (Native)," in *Sonic Meditations* (Smith Publications, 1974).

31. Oliveros, "V (Native)."

32. Schafer, "Lecture Two: Silence," 7.

33. On the differences between Cage's and Oliveros's respective interpretations and musical applications of Zen Buddhism relative to the mind/body split, see

McMullen, "Subject, Object, Improv."

34. Losseff and Doctor, "Introduction," 9.

35. See Kraut, "John Cage and Mystification," 265–74; and David Ingram, "'The Clutter of the Unkempt Forest': John Cage, Music and American Environmental Thought," *American Studies* 51/4 (2006): 567–79.

Robinson has characterized Schafer's iconic soundscape compositions, his appropriation of indigenous Canadian music, and overarching acoustic ecology as reflective of a settler colonial form of sensory perception—or "civilizing sensory paradigm"—that he terms *hungry listening*, a paradigm encompassing both "subtle and significant gradations of normativity" that was ultimately "imposed" on many indigenous people: Robinson, *Hungry Listening*, 4.

36. See Corbett, "Experimental Oriental."

37. Whitesell argues furthermore that the avant-garde preoccupation with negation—made known through impersonality, absence, nothingness, *silence*, and the like—as a way to "jettison" the dominant musical styles of the past reflects an unmarked white racial identity. He explains that this is evident through rhetorical appeals to visual analogies like the proverbial unmediated tabula rasa (i.e., blank slate), where "the color white often stands in for emptiness and colorlessness; thus it is a recurrent symbol in the avant-garde discourse of negation. . . . That is, the blank page comes to serve as a medium of white self-representation." Whitesell offers minimalist composer Steve Reich's early tape pieces as an example of this phenomenon at work, wherein recorded Black voices are initially foregrounded, only to be slowly subjected to semantic distortion through gradual phase-shifting processes that seemingly guarantee the white composer's objectivity and the negation of his will, while ultimately reducing the once prominent Black voices to colorless (read *white*) background noise: see Lloyd Whitesell, "White Noise: Race and Erasure in the Cultural Avant-Garde," *American Music* 19/2 (2001): 168–89.

38. Michael Gallope, *The Musician as Philosopher: New York's Vernacular Avant-Garde, 1958–1978* (University of Chicago Press, 2024), 8.

39. Kraut, "John Cage and Mystification," 265.

40. R. Murray Schafer, *The Soundscape: Our Sonic Environment and the Tuning of the World* (Destiny Books, 1977), 258, 257.

41. "The World Soundscape Project," WSP website, accessed October 16, 2025, https://www.sfu.ca/sonic-studio-webdav/WSP/index.html

42. Cage, "Experimental Music: Doctrine," 17.

43. Cage, "Experimental Music: Doctrine," 216–17.

44. Ochoa Gautier, "Silence," 185.

45. "Heiligenstädter Testament," University of Hamburg Library (catalogue record), 1888.1389, in Piero Weiss, ed., *Letters of Composers Through Six Centuries* (Chilton Books, 1967), 167–69.

46. Kraut, "John Cage and Mystification," 270.

47. Schafer, *The Soundscape*, 3.

48. Bell, *Memoir upon the Formation*, 41.

49. R. Murray Schafer, *The Book of Noise* (Price Milburne, 1970),

50. Schafer, "Lecture Two: Silence," 7.

51. Cage, *Silence*, 185.

52. Alice Alonso Limongi, "Contradictions in Metal: A Comparative Analysis of Sound of Metal (2019)," *Film Matters* 15/3 (2024): 9. See also Rodrigo Carreiro, Débora Opolski, and Rodrigo Meirelles, "*Sound of Metal*: An Immersive Analysis," *Music, Sound, and the Moving Image* 17/2 (2023): 111–35.

53. Hagood, "Cage's Echoes," 76.

54. Becker and Marder in Mazin Akar, "Love, Loss and the 'Sound of Metal,'" *Medium*, January 30, 2021, accessed November 20, 2024, https://mazinakar.medium.com/love-loss-and-the-sound-of-metal-4a81ce24dd0b

55. Matt Grobar, "Sound Designer Nicolas Backer Gets Inside Experience of Deaf Drummer of 'Sound of Metal,'" *Deadline*, January 7, 2021, https://deadline.com/2021/01/sound-of-metal-sound-designer-nicolas-becker-amazon-studios-interview-news-1234663056/; and Becker in Thomas Page, "How 'Sound of Metal' Got in Tune with Deafness," *CNN*, April 19, 2021, accessed November 19, 2024, https://edition.cnn.com/style/article/sound-of-metal-nicolas-becker-mikkel-nielsen-sound-design-spc-intl/index.html

56. Becker in Page, "Sound of Metal."

57. Becker in Akar, "Love, Loss."

58. Carreiro et al., "*Sound of Metal*," 117–18.

59. Page, "Sound of Metal."

60. Arielle Silverman, "Disability Simulations: What Does the Research Say?," *Braille Monitor*, June 2017, https://nfb.org/images/nfb/publications/bm/bm17/bm1706/bm170602.htm

61. Hagood, "Cage's Echoes," 78.

62. Bryan in Purcell, "Sound of Metal."

63. Bryan in Purcell, "Sound of Metal."

64. Limongi, "Contradictions in Metal," 14.

65. @maffieduran, @MichaelMichael-us6wq, and @lisanidog8178 in JoBlo Movie Clips, "SOUND OF METAL Clip—'Can't Hear Anything' (2020) Riz Ahmed," YouTube, 4:16, November 24, 2020, accessed August 27, 2022, https://www.youtube.com/watch?v=Enr0QURZQT4

66. See "Sound of Metal: An Audiologist's Perspective," Keystone Audiology website, accessed October 16, 2025, https://keystoneaudiology.com/blog/sound-of-metal-an-audiologists-perspective

67. Many music scholars have discussed the glorification of hypermasculine power in metal. See, for example, Robert Walser, "Forging Masculinity: Heavy Metal Sounds and Images of Gender," in *Running with the Devil: Power, Gender, and Madness in Heavy Metal Music* (Wesleyan University Press, 1993), 108–36.

68. On the symbolic links between disability and gender, see McRuer's discussion of masculinity within the context of so-called compulsory able-bodiedness and compulsory heterosexuality in *Crip Theory*, 1–32.

69. See Krentz, "Duncan Campbell."

70. Carreiro et al., "*Sound of Metal*," 131.

71. Mikkel Nielsen in Page, "Sound of Metal."

72. Carreiro et al., "*Sound of Metal*," 133.

73. "'Green,' Closing Theme to Darius Marder's Film 'Sound of Metal,' Out Now on Nonesuch; Song Written and Performed by Abraham Marder," Nonesuch Records website, February 12, 2021, accessed October 16, 2025, https://www.nonesuch.com/journal/green-closing-theme-darius-marder-film-sound-metal-out-now-nonesuch-abraham-marder-2021-02-12

74. Mills, "Deafness," 53.

75. The expression "left on read" (not to be confused with "left unread") refers to the lack of an acknowledgment and response on the part of the message recipient, despite their phone having automatically generated a time-stamped "read receipt" in the message thread, thereby signaling to the sender that their message has been read and has gone unacknowledged. "Christine Sun Kim: Ghost(ed) Notes," Henry Art Gallery website, accessed October 3, 2025, https://henryart.org/exhibitions/christine-sun-kim

76. Christine Sun Kim in Whitney Museum of American Art, "Christine Sun Kim Mobile Guide: 801 Ghosted Notes," YouTube video, 3:07, January 30, 2025, accessed October 3, 2025, https://www.youtube.com/watch?v=3KlLCcCW-nE. See also Xintian Tina Wang, "Of Sound and Identity: Christine Sun Kim," *Artasia Pacific*, July 14, 2025, accessed October 3, 2025, https://www.artasiapacific.com/issue/of-sound-and-identity-christine-sun-kim/

77. "Christine Sun Kim: Ghost(ed) Notes, June 2024-January 2026," Henry Art Gallery website, accessed October 3, 2025, https://henryart.org/press/christine-sun-kim

78. "Calvin Klein 2023 International Women's Day Campaign Film (Christine Ver.)," Mushudy website, accessed October 16, 2025, https://mushudy.com/Calvin-Klein-2023-International-Women-s-Day-Campaign-Film-Christine

79. Christine Sun Kim, "The Enchanting Music of Sign Language," TED Talk, August 2015, accessed October 4, 2025, https://www.ted.com/talks/christine_sun_kim_the_enchanting_music_of_sign_language/transcript

80. Todd Selby, "Christine Sun Kim," YouTube video, 10:15, November 9, 2011, accessed July 6, 2020, https://www.youtube.com/watch?v=mqJA0SZm9zI&t=334s

81. Roshanak Kheshti, "Toward a Rupture in the *Sensus Communis*: On Sound Studies and the Politics of Knowledge," *Current Musicology* 99–100 (Spring 2017): 7.

82. Kim, "Enchanting Music."

83. Ian MacMillen, Darci Sprengel, Benjamin Tausig, and Yun Emily Wang, "Proposal and Introduction," in *Quiet Relations: A Minor Volume* (Duke University Press, forthcoming), 1.

84. MacMillen et al., "Proposal and Introduction," 20–21.

85. Lane, *The Mask of Benevolence*, 43.

86. See Hong, *Minor Feelings*.

87. See Christine Sun Kim in "*Ghosted in the Shell*, 2024: Christine Sun Kim in Conversation with Johanna Hedva," *Mousse*, March 17, 2025, accessed October 4, 2025, https://www.moussemagazine.it/magazine/ghosted-in-the-shell-2025/

88. See Friedner, *Sensory Futures*; Kusters et al., "Beyond Languages, Beyond Modalities"; and Kusters, "Introduction: The Semiotic Repertoire."

89. Julia Silvestri in conversation with Ian MacMillen, quoted and cited in MacMillen et al., "Proposal and Introduction," 23–24.

90. Patti Duncan, *Tell This Silence: Asian American Women Writers and the Politics of Speech* (University of Iowa Press, 2004), viii.

91. Duncan, *Tell This Silence*, viii.

92. Duncan, *Tell This Silence*, 23.

93. Hong, "Bad English," 97.

94. Christine Sun Kim in "Gallery: Beautiful Drawings Show the Music of Sign Language," Ted website, December 11, 2015, accessed October 4, 2025, https://ideas.ted.com/gallery-beautiful-drawings-show-the-music-of-sign-language/

95. Kim, "Enchanting Music."

96. Kim, "Enchanting Music."

97. Kim in "Gallery."

98. Chae-Lin Kim, "The Deaf Body Beyond Music: Music Notation by Christine Sun Kim," in *Material Cultures of Music Notation: New Perspectives on Musical Inscription*, edited by Floris Schuiling and Emily Payne (Routledge, 2022), 68.

99. Kim, "Deaf Body Beyond Music," 71.

100. Kim, "Deaf Body Beyond Music," 71.

101. Kim applied these same principles in "The Sound of Temperature Rising Forever," a billboard installed along one of the freeways in downtown LA amid the Bobcat forest fires in 2020 as part of the TED Countdown campaign to fight climate change. See Lisa Goldapple, "The Sound of Temperature Rising: Christine Sun Kim's Heated Soundscape Focuses on Climate Change," *Topia*, February 1, 2023, accessed March 17, 2023, https://goldapple.studio/topiamagazine/christine-sun-kim-artist-interview/

102. See Meeri Kim, "'Asian Glow' from Alcohol Isn't Just a Discomfort. It's a Severe Warning," *Washington Post*, August 15, 2023, accessed September 2, 2023, https://www.washingtonpost.com/wellness/2023/08/15/asian-glow-alcohol-gene-mutation-cancer-risk/

103. Kim, "Deaf Body Beyond Music," 72.

104. Kim in Kim, "Deaf Body Beyond Music," 71.

105. Oliveros, "Introduction I," in *Sonic Meditations*.

106. Oliveros, "V Native."

107. "Messages for the City," April 17, 2020, accessed July 8, 2020, http://arts.timessquarenyc.org/times-square-arts/projects/at-the-crossroads/messages-for-the-city/index.aspx

108. Maler, *Seeing Voices*, 106.

109. Karen Frances Eng, "I Am a Deaf Artist Redefining 'Sound,'" *TED Fellows*

(blog), February 26, 2015, accessed July 25, 2023, https://fellowsblog.ted.com/i-am-a-deaf-artist-redefining-sound-4437f20297a3

110. See Susan D. Fischer and Harry van der Hulst, "Sign Language Structures," in Marschark and Spencer, *Handbook of Deaf Studies*, 319–31. Maler further identifies the basic elements of the signing voice in terms of prosody (i.e., pacing and flow of delivery), facial expression, mouth morphemes, eye gaze and movements, body movement, and communality: See Maler, *Seeing Voices*, 112.

111. MacIntyre, "Signification of Signed Voice," 168.

112. Nina Sun Eidsheim and Annette Schlichter, "Introduction: Voice Matters," *Postmodern Culture* 24/3 (2014): https://www.pomoculture.org/2017/09/09/introduction-voice-matters/

113. Christine Sun Kim in Christine Sun Kim and Jessica Holmes, "Performance Notes: *Face Opera II*," 2014.

114. Kim in Kim and Holmes, "Performance Notes."

115. See Maler, *Seeing Voices*, 9. See also Maler, chapter 3, "The Signing Singing Voice," *Seeing Voices*, 98–119. I would argue that *Face Opera*'s explicit ties to semantic cues in ASL and connection to visual-spatial expression in opera are among the things that make it music and decidedly *not* dance, a piece Kim deliberately conceived, framed, and performed as musical singing (and not dance), though crucially outside of an auditory context. I am also reluctant to characterize it as "dance," given that many deaf critics bemoan the frequent reception of live sign language interpretation as a form of mesmerizing choreographic spectacle in that it undermines the semantic value of ASL, and the function of sign language as a point of access for deaf concertgoers and viewers. See Sara Nović, "'WAP' and the Fetishization of ASL," *Medium*, October 16, 2020, accessed March 2, 2023, https://medium.com/@NovicSara/wap-and-the-fetishization-of-asl-7c9e10fb60f5; Emily Howlett, "We Need Cultural Appreciation, Not Cultural Appropriation," *The Limping Chicken* (blog), March 11, 2021, accessed March 2, 2023, https://limpingchicken.com/2021/03/11/emily-howlett-we-need-cultural-appreciation-not-cultural-appropriation/; Rebecca Reid, "We Need to Talk About the Cultural Appropriation of Sign Language," *Metro*, August 11, 2017, accessed March 2, 2023, https://metro.co.uk/2017/08/11/we-need-to-talk-about-the-cultural-appropriation-of-sign-language-6845467/

116. Nina Sun Eidsheim, *Sensing Sound: Singing & Listening as Vibrational Practice* (Duke University Press, 2015), 111. See also Eidsheim, "Sensing Voice: Materiality and the Lived Body in Singing and Listening," *Senses & Society* 6/2 (2011): 133–55.

Katherine Meizel writes that the concept of *vocality* "goes beyond qualities like timbre and practice, and encourages us to consider everything that is being vocalized—sounded and heard as vocal—and offers a way to talk about a voice beyond simply the words it imparts or its color or production techniques. Instead it encapsulates the entire experience of the speaker or singer and of the listener, all of the physiological, psychoacoustic, and socio-political dynamics that impact our perception of ourselves and each other": Meizel, "A Powerful Voice: Investigating

Vocality and Identity," *Voice and Speech Review* 7/1 (2013): 267.

117. Maler, *Seeing Voices*, 104.

118. Insofar as it musicalizes silent embodied gesture, Kim's opera arguably finds some common ground with Karlheinz Stockhausen's *Inori*, "adorations for one or two soloists and orchestra" (1973–74), wherein the soloist(s), referred to in the score as "dancer/mimes," perform a series of silent prayer gestures compiled from religious prayer traditions from around the globe, though the corresponding orchestral accompaniment ensures that the prayers are sounded. *Inori* takes its name from the Japanese word for "prayer," "invocation," and "adoration," and indeed, critics have described it as a "mystical" and "meditative" work precisely because of its integration of music and silent gesture; see "Vortrag über Hu / Lecture on Hu: Musical Analysis of INORI (2003)," Internet Archive website, September 11, 2018, accessed September 14, 2022, https://archive.org/details/VortragUberHu

119. Maler, *Seeing Voices*, 103.

120. MacIntyre, "Signification of Signed Voice," 169.

121. MacIntyre, "Signification of Signed Voice," 174.

122. For a discussion of the concept of "vocal dysfluency" and the cultural construction of nonnormative speech vis-à-vis relevant concepts in disability studies, see Joshua St. Pierre, "The Construction of the Disabled Speaker: Locating Stuttering in Disability Studies," *Canadian Journal of Disability Studies* 1/3 (2012): 1–21; Christopher Eagle, ed., *Literature, Speech Disorders, and Disability: Talking Normal* (Taylor & Francis, 2013); and Jessica A. Holmes, "'The Manic Pixie Dream Girl of the Synth-Pop World' and Her 'Baby Doll Lisp': Grimes and the Disabling Logics of the Feminization and Infantilization of Lisping," *Journal of Popular Music Studies* 31/1 (2019): 131–56.

123. See Elisabetta Fava, ed., *Clinical Linguistics: Theory and Applications in Speech Pathology and Therapy* (John Benjamins, 2002).

124. See Arden Neisser, *The Other Side of Silence: Sign Language and the Deaf Community in America* (Gallaudet University Press, 1983).

125. Maler has detailed some of the violent experiments and pedagogical tactics used on deaf children in the nineteenth century among oralists and elocutionists, and the continuation of those sentiments through the physical and emotional abuse that certain deaf people have endured at the hands of SLP in the present day; see Maler, *Seeing Voices*, 107–8. In cases of deafblindness, what was called the Tadoma method entailed a form of "tactile lipreading," involving placing the student's hand on the mouth of the speaker; see Martin C. Schultz et al., "Analytic Study of the Tadoma Method: Effects and Hand Positions on Segmental Speech Perception," *Journal of Speech and Hearing Research* 32/4 (1989): 921–29.

126. Joshua St. Pierre and Charis St. Pierre, "Governing the Voice: A Critical History of Speech-Language Pathology," *Foucault Studies* 24 (June 2018): 151.

127. St. Pierre and St. Pierre, "Governing the Voice," 152. They write furthermore that the success of SLP was rooted in the widespread links between speech and mental capacity, such that speech dysfluency was not simply regarded as a mark of innate mental incapacity, but that it could lead to mental deficiencies if left

uncorrected. See 162–63.

128. Maler, *Seeing Voices*, 109.

129. Maler, *Seeing Voices*, 109.

130. Kim in Kim and Holmes, "Performance Notes." See also Bauman, "Introduction: Listening to Deaf Studies"; and Bauman, "Listening to Phonocentrism with Deaf Eyes," *Essays in Philosophy* 9/1 (2008): 41-54.

131. Profoundly deaf professional opera singer Janine Roebuck recounts that as her hearing loss progressed, she encountered increasing discrimination within the music industry to this effect; she was "petrified of singing out of tune," especially following her music professor's grim prognosis: "Sing while you can . . . because you'll never have a career in music"; see Janine Roebuck, "I Am a Deaf Opera Singer," *The Guardian*, September 29, 2007, accessed September 27, 2025, http://www.theguardian.com/theguardian/2007/sep/29/weekend7.weekend2

The reception of deaf American jazz singer and song signer Amanda Harvey likewise evinces a preoccupation with pitch accuracy. One headline in the *Los Angeles Times* proclaims, "Colorado Jazz Singer Hits the Right Notes, Even Though She Can't Hear Them"; see Jenny Deam's article in *Los Angeles Times*, January 12, 2014, accessed September 27, 2025, http://www.latimes.com/nation/la-na-deaf-jazz-singer-20150112-story.html#page=1

132. Kim in Kim and Holmes, "Performance Notes."

133. Albert Ballin, *The Deaf Mute Howls* (Gallaudet University Press, 1998), 1–2. Ballin argued that the "remedy" for these prejudices and injustices lay in simply teaching both deaf and hearing people to sign.

134. Kim in Whitney Museum of American Art, "Christine Sun Kim Mobile Guide."

135. Kim in Whitney Museum of American Art, "Christine Sun Kim Mobile Guide."

136. Kim, "Enchanting Music."

Chapter 3

1. Glennie, "Hearing Essay."

2. Shelley Trower, *Senses of Vibration: A History of the Pleasure and Pain of Sound* (Bloomsbury, 2012), 1.

3. Jérôme Sueur, *Natural History of Silence*, translated by Helen Morrison (Polity Press, 2025).

4. Hua Hsu, "One Last Rave: Jamie xx's Homage to Club Culture," *New Yorker*, May 4, 2015, accessed August 14, 2021, https://www.newyorker.com/magazine/2015/05/11/one-last-rave. The label was formerly known as "Young Turks."

5. Mark Richardson, "Jamie xx's *In Colour*," Pitchfork, June 1, 2015, accessed August 14, 2021, https://pitchfork.com/reviews/albums/20458-in-colour/

6. Spencer Kornhaber, "Jamie xx's *In Colour* Transcends the Past," *The Atlantic*, June 2, 2015.

7. Richardson, "Jamie xx's *In Colour*."

8. See opening remarks in "Jamie xx: Sleep Sound," *Nowness Productions*, video, 7:50, accessed February 3, 2019, https://www.nowness.com/story/jamie-xx-sleep-sound

9. Opening remarks in "Jamie xx."

10. Jamie xx, "Jamie xx—Sleep Sound (Music Video)," YouTube video, 7:50, May 12, 2014, accessed August 20, 2021, https://www.youtube.com/watch?v=X_Gx2-yeNlk

11. "Jamie xx: Sleep Sound," *Nowness Productions*.

12. "Jamie xx: Sleep Sound."

13. Jimmy Brown, "Jamie xx 'Sleep Sound' by Sofia Mattioli & Cherise Payne," PromoNews, April 17, 2014, accessed August 14, 2021, http://www.promonews.tv/videos/2014/04/17/jamie-xx-sleep-sound-sofia-mattioli-cherise-payne

14. Constance Bloch, "Des danseurs sourds dans la poignante video de 'Sleep Sound' de Jamie xx," *Konbini*, accessed August 14, 2021, http://www.konbini.com/fr/entertainment-2/des-danseurs-sourds-jamie-xx-video/

15. Drop. Anchors in "Jamie xx: Sleep Sound," *Nowness Productions*.

16. Purpdogg, Stefanija Anasstasija, ailbhe jagodic, and Gilles matheron in Jamie xx, "Jamie xx—Sleep Sound (Music Video)," YouTube video, 7:50, May 12, 2014, accessed August 14, 2021, https://www.youtube.com/watch?v=X_Gx2-yeNlk

17. Tomasz Jeliński and Boqpod in "Jamie xx—Sleep Sound (Music Video)."

18. Yolanda Mayer in "Jamie xx—Sleep Sound (Music Video)."

19. "The 50 Best Videos of the Decade So Far," *Pitchfork*, August 2014, accessed October 17, 2025, https://pitchfork.com/features/lists-and-guides/9482-the-50-best-music-videos-of-the-decade-so-far-2010-2014/?page=3

20. Christine Sun Kim, tweet, October 11, 2014, accessed October 17, 2025, https://twitter.com/chrisunkim/status/521036517045977090

21. spewaysealat in "Jamie xx—Sleep Sound (Music Video)."

22. See Maler, "Music and Deafness."

23. Martin Norden, *The Cinema of Isolation: A History of Physical Disability in the Movies* (Rutgers University Press, 1994), 33.

24. William Cheng, "Staging Overcoming: Narratives of Disability and Meritocracy in Reality Singing Competitions," *Journal of the Society for American Music* 11/2 (2017): 200.

25. Schalk poignantly argues that "race can impact the framing and reception of content that can be used as inspiration porn," particularly in light of "histories of justifying of racism via discourses of disability, which position all Black people as inherently disabled in comparison to whites": Sami Schalk, "Black Disability Gone Viral: A Critical Race Approach to Inspiration Porn," *College Language Association Journal* 64/1 (2021): 108.

26. Garcia-Mispireta, "Beats, Flesh, and Grain."

27. Trower, *Senses of Vibration*, 2.

28. To be sure, since the inception of digital hearing aid technology in the 1990s, new hearing aids typically use wide dynamic range compression to boost

speech sounds, adjusting the speech signal input range by automatically applying more gain for quieter sounds and less gain for louder sounds. See Robert Fulford, Jane Ginsborg, and Alinka Greasley, "Hearing Aids and Music: The Experiences of D/deaf Musicians," Paper presented at the Ninth Triennial Meeting of the European Society for the Cognitive Sciences of Music, Manchester, UK, August 17–22, 2013, https://www.academia.edu/15072626/Hearing_aids_and_music_the_experiences_of_D_deaf_musicians, 2. See also Fulford, Ginsborg, and Juliet Goldbart, "Learning Not to Listen: The Experiences of Musicians with Hearing Impairments," *Music Education Research* 13 (2011): 447–64, https://doi.org/10.1080/14613808.2011.632086; Naomi B. H. Croghan, Kathryn H. Arehart, and James M. Kates, "Music Preferences with Hearing Aids: Effects of Signal Properties, Compression Settings, and Listener Characteristics," *Ear and Hearing* 35 (2014): 170–84; Marshall Chasin and Neil S. Hockley, "Some Characteristics of Amplified Music Through Hearing Aids," *Hearing Research* 308 (February 2014): 2–12; and Chasin, "Why Are Audiologists Afraid of Musicians? Part 1," *Hearing Health & Technology Matters* (blog), August 20, 2013, accessed January 29, 2026, https://hearinghealthmatters.org/hear-the-music/2013/why-are-audiologists-afraid-of-musicians-part-1/

29. For instance, well-known British deaf dancer Chris Fonseca dances *with* his cochlear implant in so that he can *hear* aspects of the music as a supplement to the underlying beat. Self-identifying cyborg Michael Chorost even uses music as a frame of reference whenever his cochlear implant software is upgraded, listening particularly to how the sound quality changes across pre-identified rhythmic cycles and melodic contours within a given piece of music so as to make any necessary manual adjustments to his device. See Chorost, "Helping the Deaf Hear Music," *MIT Technology Review* website, February 26, 2008. See also Chorost, "My Bionic Quest for Boléro," *Wired* online, November 1, 2005; and Chorost, *Rebuilt*; Mills, "Do Signals Have Politics?"; and Mara Mills, "Hearing Aids and the History of Electronics Miniaturization," *IEEE Annals of the History of Computing* 33/2 (2011): 24–45.

Responses to a 2015 query on the *Alldeaf* forum about cochlear implant recipients' impressions of music range drastically, though discussion centers primarily on the advantages and drawbacks of different models and makes. See "CIs and Music," *Alldeaf Forum*, October 26, 2015, accessed January 29, 2026, http://www.alldeaf.com/threads/cis-and-music.125816/#post-2447301

30. Dorien Merckx in Red Bull Elektropedia, "The Sound of Bass: How Do Deaf People Experience a Party?," YouTube video, 2:46, February 18, 2020, accessed October 2, 2022, https://www.youtube.com/watch?v=D_7RrfYtNa4

31. For a robust study on the effects of vibration on human perception, see Mark Griffin, *Handbook of Human Vibration* (Academic Press, 1990).

32. Chris Fonseca, "Chris Fonseca x Strictly Come Dancing: It Takes Twos," YouTube video, 3:08, January 28, 2022, accessed October 2, 2022, https://www.youtube.com/watch?v=1kOuIU1rTfU

33. Jones, "Imagined Hearing," 70 n. 17.

34. Jones, "Imagined Hearing," 62.

35. Cassandra Loeser and Vicki Crowley, "A Natural Ear for Music? Hearing (Dis)abled Masculinities," *Popular Music* 28/3 (2009): 411–13.

36. Griffin, *Handbook of Human Vibration*, 1.

37. My criticism of Mattioli's flattening of deaf musicking and the agency of her dance partners from her privileged position as a white hearing woman is not unlike the way critics objected to Jamie xx's flattening of the diverse subcultural and political significance of his myriad samples from early 1990s UK rave culture on *In Colour* from his privileged position as what *Boomkat* called a white "posh soul boy"; see Boomkat Radio 1, quoted in Sam Wolfson, "Is Jamie xx the Sam Smith of Dance Music," *The Guardian*, June 4, 2014, accessed October 10, 2021, https://www.theguardian.com/music/musicblog/2015/jun/04/jamie-xx-in-colour-sam-smith-dance-music-snobbery

38. Sueur, *Natural History of Silence*, 5.

39. Trower, *Senses of Vibration*, 5.

40. Moving beyond the realm of sound, philosopher Erin Manning gets at the same potential for touch to qualitatively alter the subjectivity of a body when she collapses touch with movement and vibration, but argues that the senses are synesthetic and relational, and thus "foreground a processual body," a "body-in-movement," that "emerges through and alongside other bodies, be they political bodies, gendered bodies, raced bodies": Erin Manning, *Politics of Touch: Sense, Movement, Sovereignty* (University of Minnesota Press, 2007), xiii.

41. Delaney Jane Rezz, *The Silence Is Deafening* (EP), January 21, 2106, accessed September 4, 2021, https://www.beatport.com/release/the-silence-is-deafening-ep/1688918

42. "31 JAN Orlando Invasion: Ball-Drop or Bass-Drop? [Festival Review]," EDM World Magazine, accessed October 17, 2025, https://edmworldmagazine.com/orlando-invasion-festival-review/; and John Cameron, "Excision Drops Phaseone Collab at the Thunderdome [Watch]," *Edm.com* (blog), February 20, 2020, accessed January 29, 2026, https://edm.com/music-releases/excision-phaseone-thunderdome-collab/

43. Jayce Ullah-Blocks, "Ravenscoon Delivers Interdimensional 'Revolve' EP," EDM Identity, July 16, 2021, accessed October 17, 2025, https://edmidentity.com/2021/07/16/ravenscoon-revolve-ep-wakaan/

44. Ullah-Blocks, "Ravenscoon."

45. "Electric Holiday: Making EDM Magic with Medalla," PixMob, January 5, 2015, accessed October 17, 2025, https://www.pixmob.com/blog/detail/electric-holiday-making-edm-magic-with-medalla

46. Jennifer Lucy Allan, "Mika Vainio's Quiet Influence on Electronic Dance Music was Deafening," *The Guardian*, April 18, 2017, accessed October 17, 2025, https://www.theguardian.com/music/musicblog/2017/apr/18/mika-vainios-quiet-influence-on-electronic-music-was-deafening

47. Stephen F. O'Malley (@IdeologicOrgan), Twitter post, June 11, 2016, 3:21 p.m., accessed August 13, 2013, https://twitter.com/ideologicorgan/status/741757

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48. See Greg Kennelty, "Go Deaf with This Stream of Sunn O)))'s New Record *Kannon*," *Metal Injection*, December 15, 2015, accessed October 17, 2025, https://metalinjection.net/av/go-deaf-with-this-stream-of-sunn-os-new-record-kannon; and Jennifer Maerz, "Low and Loud: The Strange Science Behind Sunn OO)))'s Bone-Rattling Power," KQED, May 5, 2016, accessed October 27, 2025, https://www.kqed.org/arts/11551712/low-and-loud-the-strange-science-behind-sunn-os-bone-rattling-power

49. Demers, *Listening Through Noise*, 105–6.

50. Wallmark, "The Sound of Evil," 67.

51. Wallmark, "The Sound of Evil," 67.

52. Fink, "Below 100 Hz," 89.

53. Sterne, *Diminished Faculties*, 136, 137, and 138.

54. Sterne and McKay have both revealed that in certain heavy metal, hard rock, and industrial workplaces, sound-induced hearing loss is regarded as a badge of honor and cultural insider status available to a person with formerly intact hearing. See Sterne, *Diminished Faculties*; McKay, *Shakin' All Over*; Holmes, "Expert Listening"; and Tron V. Tronstad and Femke B. Gelderblom, "Sound Exposure During Outdoor Music Festivals," *Noise & Health* 18/83 (2016): 220–28.

55. Bates, "Super Powers"; "Deaf People Hear Touch?"; Neary, "Brains of Deaf People"; Klarreich, "Feel the Music"; "Deaf People 'Develop Super-Vision to Compensate'"; and Bryner, "Deaf People Feel Touch." See "Mythical Brain"; North, "Dangers of Brain-Speak"; Mehr, "Miscommunication of Science"; Moore, "Bad Science"; Ransohoff and Ransohoff, "Sensationalism in the Media"; and Broks, *Understanding Popular Science*.

56. Sacks, *Musicophilia*, x.

57. Sacks, *An Anthropologist on Mars*, xii.

58. Sacks, *Musicophilia*, 95 n. 3.

59. Lehmann et al., *Psychology for Musicians*, 30.

60. For work that further examines human evolutionary propensity to music, see, for example, Mithen, *The Singing Neanderthals*; Patel, *Music, Language*; and Ball, *The Music Instinct*.

61. M. Alex Meredith, James Kryklywy, Amee J. McMillan, Shveta Malhotra, Ryan Lum-Tai, and Stephen G. Lomber, "Crossmodal Reorganization in the Early Deaf Switches Sensory, but Not Behavioral Roles of Auditory Cortex," *Proceedings of the National Academy of Sciences of the United States of America* 108 (2011): 8856. Scientists make clear that, as in the case of visual acuity, "enhanced tactile sensitivity in the deaf probably reflects both neural plasticity and increased attention directed to the stimuli": Levänen and Hamdorf, "Feeling Vibrations," 75.

62. As argued, for example by Linton, "The idea that someone can *overcome* a disability has not been generated within the community; it is a wish fulfillment generated from the outside": Linton, "Reassigning Meaning," 165.

63. For a discussion of the "supercrip" trope, see Clogston, "Disability Cover-

age," 45–48.

64. Quoted in Tanya Lewis, "Do Deaf People Really Have Superhuman Vision?," Live Science, November 26, 2013, accessed October 17, 2025, http://www.livescience.com/41521-deaf-people-superhuman-senses.html

65. See Siebers, *Disability Theory*, 7–11.

66. McRuer, *Crip Theory*, 9.

67. Manning, *Politics of Touch*, xii; Levitin, *This Is Your Brain*, 257.

68. See Suzanne Cusick, "Feminist Theory, Music Theory, and the Mind/Body Problem," *Perspectives of New Music*, Winter 1994, 8–27; Susan McClary, *Feminine Endings: Music, Gender, and Sexuality* (University of Minnesota Press, 1991); and Kofi Agawu, "The Invention of African Rhythm," *Journal of the American Musicological Society* 48/3 (1995): 380–95.

69. Tom Perchard, "New Riffs on the Old Mind-Body Blues: 'Black Rhythm,' 'White Logic,' and Music Theory in the Twenty-First Century," *Journal of the Society for American Music* 9/3 (2015): 323.

70. Agawu, "Invention of African Rhythm," 380.

71. Drop. Anchors in "Jamie xx: Sleep Sound," *Nowness Productions*; and Joyce, "Watch Deaf Dancers Move to Jamie XX's 'Sleep Sound.'"

72. Trower, *Senses of Vibration*, 3–4.

73. Curtin, "Vibration, Percussion and Primitivism," 228.

74. Kheshti, "Touching Listening," 716.

75. Fink, "Below 100 Hz," 89.

76. Once again, my motivations and perspective align with those of Friedner and Helmreich, who caution against the idealization of vibration as a common sensory experience that cuts across hearing and deafness: "vibration is rather always already itself a kind of mediation. It may produce shared experience, but it does not therefore produce identical experience; even within 'one' individual, sense ratios and relations may shift and mix synesthetically. Phenomenologies of vibration are not singular." Friedner and Helmreich, "Sound Studies," 77.

77. Lee proudly self-identifies as "Hackney born and bred" and a product of its "multicultural environment." Hackney is an inner borough of London known for its racial and ethnic diversity. See Edmund West, "Deaf Rave: Interview with Troi Lee," *British Deaf News*, March 11, 2019, accessed October 17, 2025, https://www.britishdeafnews.co.uk/deaf-rave-interview/

78. "The Difference Between BSL & SSE," British Deaf Association, accessed October 17, 2025, https://bda.org.uk/the-difference-between-bsl-sse/

79. West, "Deaf Rave."

80. Lee in West, "Deaf Rave."

81. Troi Lee, "Role Model of the Month: Troi Lee—DJ Chinaman," Deaf Unity website, March 30, 2021, accessed October 17, 2025, https://deafunity.org/article_interview/role-model-of-the-month-troi-lee-dj-chinaman/

82. Lee, "Role Model."

83. Lee, "Role Model."

84. Lee, "Role Model"; and Deaf Rave, "About Us," accessed October 17, 2025,

https://www.deafrave.com

85. Benjamin Bruel, "Deaf Rave: Living Music Without Hearing It," We Are Europe, August 3, 2021, accessed October 17, 2025, https://weare-europe.eu/deaf-rave-living-music-without-hearing-it/

86. Lee in Bruel, "Deaf Rave."

87. McIlroy and Storbeck, "Development of Deaf Identity."

88. Lee in West, "Deaf Rave."

89. Lee, "Deaf Rave Deaf People Face Barriers All the Time," UK Disability History Month, November 8, 2018, accessed October 17, 2025, https://ukdhm.org/deaf-rave-deaf-people-face-barriers-all-the-time-troi-lee/

90. Fink, "Below 100 Hz," 92.

91. Fink, "Below 100 Hz," 94.

92. Fink, "Below 100 Hz," 89.

93. "What Is SUBPAC?," Subpac website, accessed October 17, 2025, https://subpac.com/what-is-the-subpac/; See also, "The SUBPAC Vest is Headphones for your Body," Mako (website), April 29, 2025, accessed January 29, 2026, https://www.makodesign.com/blog/subpac-headphones-for-your-body/

94. "What Is SUBPAC?"

95. Fink, "Below 100 Hz," 94.

96. See Padden and Humphries, *Inside Deaf Culture*; and Napoli, "Magic Touch."

97. In Deaf culture, "touching is a way of 'being in touch,'" notes Blaine Goss; "it is expected that you will touch and be touched": Goss, "Hearing from the Deaf Culture," *Intercultural Communication Studies* 12/2 (2003): 11.

98. See Lane, Pillard, and Hedberg, *The People of the Eye*.

99. Katelyn Best, "'We Still Have a Dream': The Deaf Hip Hop Movement and the Struggle Against the Socio-Cultural Marginalization of Deaf People," *Lied und popülare Kulture / Song and Popular Culture* 60–61 (2015–16): 71. See also Maler and Komaniecki, "Rhythmic Techniques."

100. Maler and Komaniecki, "Rhythmic Techniques."

101. "Dance Techniques for Deaf and Hard of Hearing Dancers," Gallaudet University website, October 17, 2025, http://www.gallaudet.edu/act/gallaudet-dance-company/techniques.html

102. "Dance Techniques."

103. Quoted in Melissa Locker, "Nyle DiMarco Is a Frontrunner on *Dancing with the Stars*—Even Though He Can't Hear the Music," *Time*, April 25, 2016, accessed October 17, 2025, http://time.com/4301926/dancing-with-the-stars-nyle-dimarco/

104. Williamson, "Access," 14.

105. Glennie, "I Have Seen and Touched the Sound," Evelyn Glennie website, March 6, 2012, accessed October 17, 2025, https://www.evelyn.co.uk/i-have-seen-and-touched-the-sound/

106. Glennie, "Hearing Essay."

107. Glennie, "Hearing Essay."

108. See Holmes, "Expert Listening."

109. Drphil, May 13, 2012, comment on "What Role Does Music Play in Your Life?," Alldeaf forum, May 11, 2012, accessed October 17, 2025, http://www.alldeaf.com/threads/what-role-does-music-play-in-your-life.100971/

110. "What Role Does Music Play in Your Life?"

111. "What Role Does Music Play in Your Life?"

112. Evelyn Glennie, *Good Vibrations: My Autobiography* (Hutchison, 1990), 45.

113. With respect to her decision to stop using her hearing aids she writes, "To my delight, not only was I no longer distracted by unidentifiable noise, I began to understand how to compensate for being deaf": Glennie, *Good Vibrations*, 44.

114. Glennie, "I Have Seen."

115. Glennie, "Hearing Essay."

116. Straus, *Extraordinary Measures*, 170. For Straus's full discussion of "deaf hearing," see 167–70. "Deaf hearing" figures as one of several modes belonging to Straus's larger category of "disablist hearing," which he explains encompasses "the ways that people whose bodily, psychological, or cognitive abilities are different from the prevailing norm might make sense of music": Straus, 150.

117. "Our Mission Statement," Evelyn Glennie website, accessed August 3, 2016, https://www.evelyn.co.uk/mission-statement/

118. Kheshti, "Touching Listening," 713.

119. While accounting for a connection is beyond the scope of this chapter, Glennie's listening practice resonates with the core phenomenological principles of embodied cognition, which asserts that "all cognition is embodied and interactive and embedded in dynamically changing environments" in ways that challenge the traditional Cartesian mind-body dualism: see, s.v. "Embodied Cognition," *Stanford Encyclopedia of Philosophy*, June 25, 2021, accessed October 14, 2022, https://plato.stanford.edu/entries/embodied-cognition/

120. Glennie, "How to Truly Listen," TED Talk, February 2003, accessed September 2, 2023, https://www.ted.com/talks/evelyn_glennie_how_to_truly_listen

121. Monson, "Hearing, Seeing," S37, S52.

122. Monson, "Hearing, Seeing," S38.

123. Glennie, "Hearing Essay"; and Glennie in *Touch the Sound*.

124. Wallace, *Hearing Beethoven*, 33.

125. See *Inside the Hearing Machine* (film).

126. Wallace, *Hearing Beethoven*, 33.

127. Glennie in *Touch the Sound*.

Chapter 4

1. Sunlight.exe, Instagram story, July 30, 2025.
2. Jon Ehlers in "Jon Ehlers Email to Jessica Holmes," August 20, 2025.
3. Sterne, *The Audible Past*, 10.
4. Wright, "Discourses of Musical Talent," 7.
5. Wright, "Discourses of Musical Talent," 4.

6. Sterne, *The Audible Past*, 274.

7. Stephanie Lloyd and Alexandre Tremblay, "No Hearing Without Signals: Imagining and Reimagining Transductions Through the History of the Cochlear Implant," *Senses and Society* 16/3 (2021): 270.

8. Lloyd and Tremblay, "No Hearing Without Signals," 271.

9. Friedner, *Sensory Futures*, 7; Michele Friedner, "From Hoping to Expecting: Cochlear Implantation and Habilitation in India," *Cultural Anthropology* 37/1 (2022): 125–49; and Lloyd and Bonventre, "Habilitation," 338.

10. Wright's typology of musical talent includes five overlapping and conflicting discursive constructions including the notion that musicality is an innate *gift* that is bestowed and possessed; that it is a *hereditary* trait; that talent can be perceived as latent *potentiality* that is not yet fully actualized; that talent derives from an individual's *passion*, love, and perseverance; that it is rooted first and foremost in skill (without regard for biological and environmental causes); and finally, that talent can be measured according to its affective *impact* on an audience: See Lindsay J. Wright, "Defining Talent: A Typology of Meanings," in "Discourses of Musical Talent," 21–70.

11. See Wright, "Defining Talent," 56–59.

12. Robert J. Zatorre, "Absolute Pitch: A Model for Understanding the Influence of Genes and Development on Neural and Cognitive Function," *Nature Neuroscience* 6/7 (2003): 692.

13. Mark A. Jobling, "The Music of the Genes," *Investigative Genetics* 5/2 (2014): 1.

14. Sacks, *Musicophilia*, 127; see also Krzysztof Szyfter and Michał P. Witt, "How Far Musicality and Perfect Pitch Are Derived from Genetic Factors," *Journal of Applied Genetics* 61 (2020): 407–14; Psyche Loui, "Absolute Pitch," in *The Oxford Handbook of Music Psychology*, 2nd ed., edited by Susan Hallam et al. (Oxford University Press, 2014), 81–94, 82 in particular; and E. Glenn Schellenberg and Sandra Trehub, "Is There an Asian Advantage for Pitch Memory," *Music Perception* 25/3 (2008): 241–52.

15. Anders Dohn et al., "Do Musicians with Perfect Pitch Have More Autism Traits Than Musicians Without Perfect Pitch? An Empirical Study," *PLOS One* 7/5 (2012): 1–8.

16. Loui, "Absolute Pitch," 82.

17. J. M. S. Pearce, "Selected Observations on Amusia," *European Neurology* 54 (2005): 145; and Krzysztof Szyfter and Jadwiga Wigowska-Sowińska, "Congenital Amusia: Pathology of a Musical Disorder," *Journal of Applied Genetics* 63/1 (2022): 127, 128.

18. Pearce, "Selected Observations," 145; and Szyfter and Wigowska-Sowińska, "Congenital Amusia," 127.

19. Sacks, *Musicophilia*, 100.

20. Jobling, "Music of the Genes," 1.

21. Sacks, *Musicophilia*, 126.

22. See Ken'ichi Miyazaki, "Absolute Pitch as an Inability: Identification of

Musical Intervals in a Tonal Context," *Music Perception* 2/1 (1993): 55–71.

23. Zatorre, "Absolute Pitch."

24. Ken'ichi Miyazaki et al., "Absolute Pitch and Relative Pitch in Music Studies in the East and West: Implications for Aural-Skills Education," *Music Perception* 36/2 (2018): 135–55.

25. See Wright, "Discourses of Musical Talent," 67–68, 242, and Wright's discussion of Bruno Nettl, *The Study of Ethnomusicology: Thirty-One Issues and Concepts* (University of Illinois Press, 2005), 13.

26. Wright, "Discourses of Musical Talent," 22–23.

27. Dina Kirnarskaya, *The Natural Musician: On Abilities, Giftedness, and Talent*, translated by Mark H. Teeter (Oxford University Press, 2009), vii.

28. In Kirnarskaya's framework, so-called abilities, giftedness, intelligence, and creativity are all preconditions for musical talent—or musicality—which she insists is both *inborn* (though not hereditary) and *multiplicative*, meaning that "even if one necessary component of talent in fact amounts to zero, then all other attendant qualities, when multiplied by it, inevitably lose all their value" and "the entire talent structure zeroes out": Kirnarskaya, *The Natural Musician*, 15.

29. Kirnarskaya, *The Natural Musician*, vii.

30. Kirnarskaya, *The Natural Musician*, 51. The author was involved in designing and administering a musical communicative archetype test, where high test results across diverse social groups, along with low test scores among music teachers compared with high test scores among renowned musicians, confirmed her hypothesis that musical talent is not simply distinct from musicianship, but genetic; see Kirnarskaya, 70.

31. Kirnarskaya, *The Natural Musician*, vii–viii.

32. She also maintains that "only those musicians who wish to conquer the world and look onto the rest of the humanity from TV screens and newspaper photos will do a good job for themselves if they think twice whether they really have enough natural gifts and perseverance to make their dreams come true": Kirnarskaya, *The Natural Musician*, 25.

33. Kirnarskaya, *The Natural Musician*, 25. It should come as no surprise that tone deafness does not meet the criteria for ordinary musical belonging that Kirnarskaya affords all other humans. Like Sacks, she insists, however, that deaf people perceive rhythm through cutaneous penetration and muscular sensations, but that "it is sad to note that invalids with disrupted motor abilities are mostly unmusical because their sense of rhythm is underdeveloped": Kirnarskaya, 85.

34. Wright, "Discourses of Musical Talent," 25.

35. Wright, "Discourses of Musical Talent," 11. See also Scott Barry Kaufman, ed., *The Complexity of Greatness: Beyond Talent or Practice* (Oxford University Press, 2013); David S. Moore, *The Dependent Gene: The Fallacy of "Nature vs. Nurture"* (Macmillan, 2003); Angela L. Duckworth and Scott Barry Kaufman, "World-Class Expertise: A Developmental Model," *Wiley Interdisciplinary Reviews: Cognitive Science*, 2015, https://doi.org/10.1002/wcs.1365

36. Wright clarifies that there are a small number of non-Euro-American eth-

nomusicological studies that have suggested that natural musical talent is a cultural construct and an extension of the cultural imperialism of Western music in ways that reinforce its attendant power inequalities, including the following: Alan P. Merriam, *The Anthropology of Music* (Northwestern University Press, 1964); John Blacking, *How Musical Is Man?* (University of Washington Press, 1973); Timothy Rice, *May It Fill Your Soul: Experiencing Bulgarian Music* (University of Chicago Press, 1994); Timothy Rice, *Ethnomusicology: A Very Short Introduction* (Oxford University Press, 2014); Anthony Seeger, *Why Suyá Sing: A Musical Anthropology of an Amazonian People* (University of Illinois Press, 2004); and Kofi Agawu, *African Rhythm Hardback with Accompanying CD: A Northern Ewe Perspective* (CUP Archive, 1995).

37. As exceptions, she cites Henry Kingsbury's 1988 book, *Music, Talent, and Performance: A Conservatory Cultural System*; Bruno Nettl's *Heartland Excursions: Ethnomusicological Reflections on Schools of Music* (University of Illinois Press, 1995); and Stephen Cottrell's *Professional Music-Making in London: Ethnography and Experience* (Ashgate, 2004).

38. See Wright, "Discourses of Musical Talent," 8–17.

39. Wright, "Black Musicality," 35.

40. Wright, "Black Musicality," 37.

41. Wright, "Black Musicality," 39, 42–43, 48.

42. Wright, "Black Musicality," 45.

43. Joseph Straus, "Idiots Savants, Retarded Savants, Talented Aments, Mono-Savants, Autistic Savants, Just Plain Savants, People with Savant Syndrome, and Autistic People Who Are Good at Things: A View from Disability Studies," *Disability Studies Quarterly* 34/3 (2014): online.

44. Straus, "Idiots Savants."

45. See Anabel Maler, "Music and Deafness in America, 1820–1965," in *Seeing Voices*, 17–42.

46. Wright, "Black Musicality," 35.

47. Koza, *Destined to Fail*, 75, and 74–76.

48. Carl E. Seashore, "The Measurement of Musical Talent," *Musical Quarterly* 1/1 (1915): 130.

49. Koza, *Destined to Fail*, 75. See also Seashore, "Measurement of Musical Talent," 129–48.

50. Wright, "Discourses of Musical Talent," 105.

51. Seashore, "Measurement of Musical Talent," 136.

52. Seashore, "Measurement of Musical Talent," 139.

53. Seashore, "Measurement of Musical Talent," 147–48.

54. Koza, *Destined to Fail*, 75.

55. Koza, *Destined to Fail*, 67.

56. Robert Fink, *Repeating Ourselves: American Minimal Music as Cultural Practice* (University of California Press, 2005), 214; and Suzuki's 1963 address to the International Society for Music Education; in Evelyn Hermann, *Shinichi Suzuki: The Man and His Philosophy* (Summy-Birchard Music, 1981), 136.

57. "The Mother-Tongue Method," Deutsche Suzuki Gesselschaft, Interna-

tional Music Exchange, accessed August 7, 2025, https://germansuzuki.de/wp-content/uploads/2010/05/Muttersprache_eng.pdf. Suzuki wrote, "Dear parents, your child learned to speak because you provided him the opportunity. If a child is surrounded after birth by musical sounds and stimulation, is later encouraged to actively participate in music and to learn to play an instrument, and smallest successes are rewarded with praise and enjoyment, then pleasure in music, self-confidence, and a zest for learning will be the result"; quoted in "The Mother-Tongue Method."

58. Kirnarskaya, *The Natural Musician*, 16; and Suzuki's 1963 address to the International Society for Music Education; in Hermann, *Shinichi Suzuki*, 136.

59. Wright, "Discourses of Musical Talent," 206, 205. As Wright argues, teaching methods "might be described as a way of inculcating students into a particular ideological-discursive formation that reproduces the social norms and values of the method's architect": Wright, 201.

60. Wright, "Discourses of Musical Talent," 207, and Suzuki quoted in Wright, 208, from Shinichi Suzuki, *Nurtured by Love: The Classic Approach to Talent Education*, translated by Waltraud Suzuki (Alfred Music, 1983), 66.

61. Fink, *Repeating Ourselves*, 217, 218.

62. Fink, *Repeating Ourselves*, 218, quoting from "Invasion from the Orient," *Time*, November 3, 1967, 32.

63. Fink, *Repeating Ourselves*, 218, 219.

64. Wright, "Black Musicality," 37.

65. Zhuqing (Lester) S. Hu, "Chinese Ears, Delicate or Dull? Toward a Decolonial Comparativism," *Journal of the American Musicological Society* 74/3 (2021): 501–69.

66. Hu, "Chinese Ears," 504.

67. Hu, "Chinese Ears," 506, 508.

68. Drawing a similar parallel was Hegel, who took aim at the nonphonetic nature of Chinese writing, what he claimed was rooted in a primitive pictorial form of communication analogous to the gestural dimensions of sign language. Neither communication system was connected to sounds and thus necessarily bound by a "deafness and dumbness," doubly negating "the voice's sonorous body": Hu, "Chinese Ears," 519.

69. R. Murray Schafer's description of Inuit throat singing, an example Dylan Robinson provides in the opening of his field-changing book *Hungry Listening*, makes this logic painfully clear: "The Eskimos are such an astonishingly unmusical race that the composer really has to wring his material to make it musically presentable. There is a marked similarity between an Eskimo singing and Sir Winston Churchill clearing his throat": R. Murray Schafer, "On the Limits of Nationalism in Canadian Music" (1961) quoted in Robinson, *Hungry Listening*, 1.

70. See Maler, *Seeing Voices*, 35–42.

71. See Maler, *Seeing Voices*, 40–48.

72. See Mills, "Hearing Aids."

73. Stephanie Lloyd and Chani Bonventre, "When the Artificial Is Natural: Reconsidering What Bionics and Sensoria Do," *Ethos* 48/3 (2021): 296.

74. Doctor Cliff, Aud, "The Search for NATURAL Sound Quality: Widex

Moment Hearing Aids," YouTube video, 7:00, August 14, 2000, accessed September 9, 2025, https://www.youtube.com/watch?v=XacTfwQJ2KI&t=53s

75. Lloyd and Bonventre, "When the Artificial Is Natural," 298.

76. See Mills, "Hearing Aids."

77. Antenna, "Redesigning Hearing Aids with Katie Brown," YouTube video, November 20, 2019, accessed September 7, 2025, https://www.youtube.com/watch?v=p2GHGm22I1M; and Jaipreet Virdi, "Deaf Futurity: Designing and Innovating Hearing Aids," *Medical Humanities* 50 (2024): 678–84.

78. Virdi, "Deaf Futurity," 678. Ashley Shew defines technoableism as the phenomenon whereby "disability is appealed to as a justification for technological development and a moral imperative toward investment in technological research"; Shew in "Symposium Introduction: Addressing Technoableism: Reforming Infrastructure and Disability Representation," *Bill of Health* (blog), September 25, 2023, accessed September 7, 2025, https://petrieflom.law.harvard.edu/2023/09/25/technoableism-disability-ashley-shew/. See also Ashley Shew, *Against Technoableism: Rethinking Who Needs Improvement* (Norton, 2023).

79. See, for example, Chorost, "Helping the Deaf Hear Music," *MIT Technology Review* website. See also Chorost, "My Bionic Quest for Boléro," *Wired* online; and Chorost, *Rebuilt*.

80. Lloyd and Bonventre, "Habilitation," 349.

81. Sarah Jain, "The Prosthetic Imagination: Enabling and Disabling the Prosthesis Trope," *Science, Technology, & Human Values* 24/1 (1999): 49.

82. Virdi, "Deaf Futurity," 681.

83. Doctor Cliff, Aud, "NATURAL Sound Quality."

84. Doctor Cliff, Aud, "NATURAL Sound Quality."

85. Doctor Cliff, Aud, "NATURAL Sound Quality."

86. Jan Ziegler, Laura Balling, and Dana Helmink, "The Importance of Natural Sound for Hearing Aid Users and Clinicians," *Hearing Review*, June 12, 2024, accessed September 7, 2024, https://hearingreview.com/hearing-products/hearing-aids/the-importance-of-natural-sound-for-hearing-aid-users-and-clinicians

87. "Behind-the-Scenes at Widex: Manipulating Less for a Natural Hearing Experience," *Widex* (blog), February 29, 2024, accessed September 8, 2025, https://www.widex.com/en/blog/global/2024-02-widex-sound-philosophy/

88. "Starkey Hearing Technologies," Direct Hearing website, accessed August 27, 2025, https://directhearing.com/collections/starkey?gc_id=17999086000&g_special_campaign=true&gad_source=1&gad_campaignid=21202238561&gbraid=0AAAACd0-0G5CbS7dQOaUlJcWnCRU9HZR&gclid=CjwKCAjw2brFBhBOEiwAVJX5GMAwhULli0hIXE0biTyKzWtzOe0Bf5i4BYJT6f7YIDHBWYwoLdrGNRoC6lAQAvD_BwE

89. "Evolv AI," Starkey website, accessed September 7, 2025, https://www.starkeypro.com/products/hearing-aids/evolv-ai

90. Sterne, *The Audible Past*, 274.

91. Antrobus, "Echo (a Deaf Sequence)."

92. "The Importance of Acclimatization When Learning to Wear Hearing

Aids," Lexie Hearing website, March 6, 2024, last updated November 6, 2024, accessed September 7, 2025, https://lexiehearing.com/us/library/the-importance-of-acclimatization-when-learning-to-wear-hearing-aids; and Kristy Lowery, "What Is Hearing Aid Acclimatization?," Audibel website, May 15, 2025, accessed September 7, 2025, https://www.audibel.com/hearing-loss-treatment/hearing-aid-acclimatization-overview/

93. Virdi, "Deaf Futurity," 680.

94. Beate Ochsner, "Negotiating Contingency: Between Personalisation and Customisation in Digital Hearing Systems," *Sound Studies* 11/2 (2025): 291.

95. "Real-Ear Measurements: A Step-by-Step Guide," Interacoustics website, March 31, 2023, accessed September 9, 2025, https://www.interacoustics.com/academy/hearing-aid-fitting-training/rem/real-ear-measurement-steps

96. Lindsey E. Jorgensen, "Verification and Validation of Hearing Aids: Opportunity Not an Obstacle," *Journal of Otology* 11/2 (2016): 58.

97. Jorgensen, "Verification and Validation," 61.

98. Jorgensen, "Verification and Validation," 60.

99. Jorgensen, "Verification and Validation," 60.

100. Sara Mamo and Tomma Henckel, "A Holistic Approach to Addressing Post-Fitting Needs in the Short and Long Term for New Hearing Aid Users," *Seminars in Hearing* 48/2 (2022): 126.

101. Mamo and Henckel, "Post-Fitting Needs," 124.

102. Mamo and Henckel, "Post-Fitting Needs," 126.

103. Ochsner, "Negotiating Contingency," 1.

104. Ochsner, "Negotiating Contingency," 2–3.

105. See Laura Balling et al., "The Collaboration Between Hearing Aid Users and Artificial Intelligence to Optimize Sound," *Seminars in Hearing* 42/3 (2021): 282–94.

106. Ochsner, "Negotiating Contingency," 5.

107. Ochsner, "Negotiating Contingency," 4.

108. Olivia Ting, "Between *Piano* and *Forte*: Hearing with Aids," *Leonardo* 57/2 (2024): 154.

109. Ehlers, "Email to Jessica Holmes."

110. Ehlers, "Email to Jessica Holmes."

111. Ehlers, "Email to Jessica Holmes."

112. Lloyd and Bonventre, "When the Artificial Is Natural," 298–99.

113. Lloyd and Bonventre, "Habilitation," 343. See also Brett Swanson, Pam Dawson, and Hugh McDermott, "Investigating Cochlear Implant Place-Pitch Perception in the Modified Melodies Test," *Cochlear Implants International* 10/S1: 100–104; and Talar Hopyan, Francis A. M. Manno II, Blake C. Papsin, and Karen A. Gordon, "Sad and Happy Emotion Discrimination in Music by Children with Cochlear Implants," *Child Neuropsychology* 22/3 (2016): 366–80.

114. See Alison Kafer, *Feminist, Queer, Crip* (Indiana University Press, 2013); and Virdi, "Deaf Futurity," 682.

115. See Michele Friedner, "Sign Language as Virus: Stigma and Relationality in Urban India," *Medical Anthropology* 37/5 (2018): 359–72.

116. Maler, *Seeing Voices*, 46.

117. Maler, *Seeing Voices*, 47, 48.

118. See McKay, "Johnnie-Be-Deaf."

119. Ehlers, "Email to Jessica Holmes."

120. Tom Scheller and Kelly Fitz, "Designed for Music Listening," Starkey Hearing Technologies, 2016, accessed September 7, 2025, https://order.starkeypro.com/pdfs/technical-papers/Designed_for_Music_Listening.pdf

121. Scheller and Fitz, "Designed for Music Listening."

122. Ehlers, in "2025 Interview with Jon Ehlers by Jessica Holmes," August 20, 2025.

123. Alinka Greasley, "Diverse Music Listening Experiences: Insights from the Hearing Aids for Music Project," in *Aural Diversity*, 134.

124. Greasley, "Diverse Music Listening Experiences," 134.

125. Greasley, "Diverse Music Listening Experiences," 134.

126. Greasley, "Diverse Music Listening Experiences," 134.

127. Kimberley Bradshaw, "Exploring Hearing Loss and Hearing Aids for Musicians," Hearing Aid UK website, July 29, 2025, accessed September 7, 2025, https://www.hearingaid.org.uk/hearing-aid-technology/hearing-aids-for-musicians

128. Bradshaw, "Exploring Hearing Loss."

129. Scheller and Fitz, "Designed for Music Listening."

130. "Hearing Aids for Music Project," Hearing Aids for Music website, accessed September 7, 2025, https://musicandhearingaids.org

131. H. Crook, A. V. Beeston, and A. E. Greasley, *Starting Out with a Music Program: Quickstart Clinic Guide*, v. 1.1, September 24, 2018, accessed September 9, 2025, https://musicandhearingaids.org/wp-content/uploads/sites/35/2018/10/Starting-out-with-a-music-program-Version-1.1-24-Sept-2018.pdf

132. Ehlers in "Email to Jessica Holmes."

133. Lloyd and Tremblay, "No Hearing Without Signals," 270.

134. Lotte Rømer, "2023 Interview with Lotte Rømer by Jessica Holmes," October 11, 2023.

135. Rømer, "2023 Interview with Lotte Rømer."

136. Lotte Rømer, *Say What?!*, unpublished translation by Steve Schein (2006), 19.

137. Rømer, *Say What?!*, 21.

138. Rømer, *Say What?!*, 49.

139. Rømer, *Say What?!*, 20.

140. Rømer, *Say What?!*, 7.

141. Rømer, *Say What?!*, 11.

142. Rømer, *Say What?!*, 26.

143. Rømer, *Say What?!*, 9.

144. Rømer, "2023 Interview by Jessica Holmes."

145. Rømer, *Say What?!*, 9.

146. Rømer, "2025 Interview with Lotte Rømer by Jessica Holmes," October 14, 2025.

147. Rømer, *Say What?!*, 12.

148. Rømer, *Say What?!*, 9.

149. Rømer in "2023 Interview by Jessica Holmes."
150. Rømer, *Say What?!*, 11.
151. Rømer, *Say What?!*, 51.
152. Rømer, "2023 Interview by Jessica Holmes."
153. Rømer, "2023 Interview by Jessica Holmes."
154. Rømer, *Say What?!* 11.
155. Rømer in "2023 Interview by Jessica Holmes."
156. Rømer, *Say What?!*, 13.
157. Rømer, "2025 Interview by Jessica Holmes."
158. Rømer, "2025 Interview by Jessica Holmes."
159. Rømer, "2025 Interview by Jessica Holmes."
160. Rømer, *Say What?!*, 15.
161. Rømer, *Say What?!*, 98.
162. Rømer, *Say What?!*, 98.
163. Rømer, *Say What?!*, 98.
164. She also uses a Widex Sound Assist, a portable partner or table microphone equipped with noise cancellation features, that she connects to her HA via Bluetooth. She uses her Sound Assist in noisier environments and public spaces, where she can place it in the center of a restaurant table, or on car trips, where she will have a passenger wear it around their neck when she is driving with her eyes on the road and unable to read their lips.
165. Ting, "Between *Piano* and *Forte*," 154.
166. Mark W, "EP Review: Bangladeafy—Ribboncutter," *Moshville Times*, September 23, 2018, accessed January 13, 2025, https://www.moshville.co.uk/reviews/album-review/2018/09/ep-review-bangladeafy-ribboncutter/
167. Matt Cook, "Album Review: Bangladeafy—Vulture—Nefarious Industries," *Ghost Cult Magazine*, June 20, 2024, accessed January 13, 2024, https://ghostcultmag.com/album-review-bangladeafy-vulture-nefarious-industries/; and Darryl Sterdan, "Albums of the Week: Bangladeafy—Vulture," *Tinnitist*, June 21, 2024, accessed January 13, 2025, https://tinnitist.com/2024/06/21/albums-of-the-week-bangladeafy-vulture/
168. Alex Deller writes, "Drummer Atif Haq's Bangladeshi roots and bass/synth player Jon Ehlers' sensoriuneural hearing loss mean the band are a veritable twofer in terms of underrepresentation. While race has been an ongoing (though shamefully unresolved) topic in rock circles for many moons, disability remains a topic that's all too rarely discussed, which makes a band like Bangladeafy all the more crucial": see Deller, "Bangladeafy's Jon Ehlers Is Doomed to Play Rock Music, Hearing Disability Be Damned," *Noisey*, August 19, 2015, accessed January 9, 2024, https://www.vice.com/en/article/bangladeafy-interview-premiere/
169. See "Tuning Forks," Rudolf Riester GmbH, 2025, accessed October 18, 2025, https://riester.de/products/other-devices/tuning-forks
170. All excerpts from "2019 Interview with Jon Ehlers by Jessica Holmes," November 18, 2019.
171. Ehlers in "2025 Interview by Jessica Holmes."
172. Ehlers in "2025 Interview by Jessica Holmes."

173. Ehlers in "2019 Interview by Jessica Holmes."
174. Ehlers in "2019 Interview by Jessica Holmes."
175. Ehlers in "2019 Interview by Jessica Holmes."
176. Ehlers in "2019 Interview by Jessica Holmes."
177. Ehlers in "2019 Interview by Jessica Holmes."
178. Ehlers in "2025 Interview by Jessica Holmes."
179. Ehlers in "2025 Interview by Jessica Holmes."
180. Ehlers in "2019 Interview by Jessica Holmes."
181. Ehlers in "2019 Interview by Jessica Holmes."
182. Ehlers in "2019 Interview by Jessica Holmes."
183. Sterne, *Diminished Faculties*, 119.
184. TCat, "Bangladeafy Reviews: *Housefly*, Bangladeafy," Prog Archives website, November 20, 2020, accessed January 13, 2025, https://www.progarchives.com/artist.asp?id=8640#:~:text=Those%20that%20appreciate%20noisy%20industrial,through%20any%20future%20lock%20downs
185. @st1mul4nt55 in Nefarious Industries, "BANGLADEAFY—Housefly—'Tar' Official Video," YouTube video, September 10, 2020, accessed January 13, 2025, https://www.youtube.com/watch?v=RVfeSvEhyag
186. Jeff Terich, "Best New Releases, June 21: Sumac, Alcest, and More," *Treble*, June 21, 2024, accessed January 14, 2025, https://www.treblezine.com/best-new-releases-june-21-sumac-alcest-and-more/
187. Ochsner, "Negotiating Contingency," 5.

Chapter 5

1. The 2018 version is a third remake of the original 1937 version and two film musicals from 1954 and 1976 respectively. See "A Star Is Born," IMDB, https://www.imdb.com/title/tt1517451/
2. The high-pitched tinnital ring is an established cinematic trope and not necessarily tied to tinnitus, but simply "initiated by and then fades following a traumatic encounter—manifest as either physical harm or psychic distress," as Marie Thompson explains, "Listening with Tinnitus," 32.
3. Throughout *A Star Is Born*, Jackson's masculinity is inextricably bound to a false conception of his own musical authenticity relative to the presumed artificiality and inauthenticity of pop that his tinnitus threatens to undo. For instance, upon watching Ally's performance of a song featuring the poppy lyric "Why [do] you come around me with an ass like that," Jackson drunkenly confesses to Ally, "You're embarrassing," as if to suggest that she has sold out.
4. See James Deaville, "The Moaning of (Un-)life: Animacy, Muteness and Eugenics in Cinematic and Televisual Representation," *Journal of Interdisciplinary Voice Studies* 4/2 (2019): 225–46; see also Mitchell and Snyder, *Narrative Prosthesis*.
5. "'A Star Is Born' and the Real Torture of Suffering from Tinnitus," *Mundo Tinnitus* website, March 18, 2019, accessed October 19, 2022, https://mundotinnitus.com/en/a-star-is-born-and-the-real-torture-of-suffering-from-tinnitus/#
6. Matt Grobar, "Sound Designer Julian Slater on His 'Lightning in a Bottle'

Moment with Sound-Centric 'Baby Driver,'" *Deadline*, February 20, 2018, https://deadline.com/2018/02/baby-driver-sound-design-julian-slater-interview-oscars-1202291744/

7. Hagood writes that "tinnitus sufferers use electronic media such as iPods, sound machines, and hearing aids as *technologies of the self*, shoring up the self in order to restore freedom of choice and control of their own subjectivity," in an effort to counter what is a "fearsome phenomenological experience": Hagood, *Hush*, 52.

8. Hagood, *Hush*, 52.

9. A 2019 study conducted by the Manchester Center for Audiology and Deafness reported that "music industry workers" across "all genres of music" were almost "twice as likely to report tinnitus compared with people working in the finance industry": in Samuel Couth, "Tinnitus: Scale of Hearing Damage for Music Industry Workers Revealed," University of Manchester website, November 21, 2019, accessed July 26, 2021, https://www.manchester.ac.uk/discover/news/tinnitus-scale-of-hearing-damage-for-music-industry-workers-revealed/

10. Drever and Hugill, "General Introduction," 9.

11. Baguley, "Aural Diversity," 14.

12. Janet Horvath, "A Musician Afraid of Sound," *The Atlantic*, October 20, 2015, accessed January 30, 2023, https://www.theatlantic.com/health/archive/2015/10/a-musician-afraid-of-sound/411367/

13. Horvath, "Musician Afraid of Sound."

14. Horvath, "Musician Afraid of Sound."

15. Horvath, "Musician Afraid of Sound."

16. Bedřich Smetana, *Bedřich Smetana: Letters and Reminiscences*, edited by František Bartoš (Artia, 1955), 212–13. Smetana's account was reported second-hand by Smetana's friend Eliška Krásnohorská.

17. Sixesfullofnines, "Barbra Streisand Talks About Her Tinnitus—1985," YouTube video, 1:43, January 10, 2014, accessed July 30, 2021, https://www.youtube.com/watch?v=GKZHPvuffP8. The conversation then shifts into the topic of visualizing film as the women speak about Streisand's motion picture film *Yentl* (1983).

18. See Krentz, "Duncan Campbell," 41. These historical characterizations align with the overcoming narrative, and contemporary accounts of deafness as bestowing suprasensory abilities.

19. Schalk, *Bodyminds Reimagined*; Clare, *Brilliant Imperfection*; and Price, "Bodymind Problem."

20. Katherine Bouton, "Tinnitus Can Literally Drive You Crazy," *Psychology Today*, October 28, 2013, accessed August 25, 2023, https://www.psychologytoday.com/intl/blog/what-i-hear/201310/tinnitus-can-literally-drive-you-crazy

21. Pawel Jastreboff and Margaret Jastreboff, "Decreased Sound Tolerance: Hyperacusis, Misophonia, Diplacousis, and Polyacousis," in *Handbook of Clinical Neurology*, vol. 129 (3rd series), *The Human Auditory System*, edited by G. G. Celesia and G. Hickok (Elsevier, 2015), 375. See also D. Baguley and G. Andersson, *Hyperacusis: Mechanisms, Diagnosis, and Therapies* (Plural, 2007).

22. For information on tinnitus classification and subtypes, which include tonal

tinnitus (commonly associated with subjective tinnitus), pulsatile tinnitus (most often associated with objective tinnitus), and musical tinnitus, see C. R. Cederroth et al., "Editorial: Towards an Understanding of Tinnitus Heterogeneity," *Frontiers in Aging Neuroscience* 11/53 (2019): 10.3389/fnagi.2019.00053; and Claudia Barros Coelho, Roberto Santos, Kadja Ferraz Campara, and Richard Tyler, "Classification of Tinnitus: Multiple Causes with the Same Name," *Otolaryngolic Clinics North America* 53/4 (2020): 515–29. See also "Risk Factors for Tinnitus," Salus University, Pennsylvania Ear Institute, April 2, 2020, accessed August 10, 2021, https://www.salusuhealth.com/Pennsylvania-Ear-Institute/Events/News-Stories/Risk-Factors-for-Tinnitus.aspx

23. Marie Thompson in Thompson and Hagood, "Tinnitus, Exclusion, Relationality," 67.

24. Jacqueline Sheldrake et al., "Audiometric Characteristics of Hyperacusis Patients," *Frontiers in Neurology* 6 (2015): https://doi.org/10.3389/fneur.2015.00105. Hearing conditions of all kinds—including tinnitus, hyperacusis, diplacousis (i.e., perceiving a discrepancy in pitch between each ear), audio distortion, etc.—are indeed highly common, whether as symptoms of hearing loss or as isolated phenomena.

25. Baguley and Andersson, *Hyperacusis*, 376. See also Gus Mueller, "20Q: Current Perspectives on Hyperacusis. David Baguley, PhD," *AudiologyOnline*, October 9, 2017, accessed August 2, 2021, https://www.audiologyonline.com/articles/20q-perspectives-hyperacusis-21351. In this way, hyperacusis is different from "misophonia," what is "an abnormally strong reaction to a sound with a *specific* pattern and meaning to a given subject," such as an *emotional* aversion to the sound of nails on a chalkboard, a chainsaw, nail biting, the sound of other people chewing, breathing, etc.

26. Baguley and Andersson, *Hyperacusis*, 376.

27. Hagood, *Hush*, 44.

28. Hagood, *Hush*, 43.

29. Tanu Thakur and Vikas Gupta, "Auditory Hallucinations," *StatPearls* [Internet] (StatPearls Publishing, 2025), last updated February 13, 2023, accessed October 22, 2025, https://www.ncbi.nlm.nih.gov/books/NBK557633/

30. Thakur and Gupta, "Auditory Hallucinations."

31. Fan-Gang Zeng, "Tinnitus and Hyperacusis: Central Noise, Gain and Variance," *Current Opinion in Physiology* 18 (December 2020): 124.

32. Thakur and Gupta, "Auditory Hallucinations."

33. Matthew Tomkinson, "Notes on Mad Listening," *Capacious: Journal for Emerging Affect Inquiry* 3/1 (2023): 17, 18.

34. Tomkinson, "Notes on Mad Listening."

35. Tomkinson, "Notes on Mad Listening," 26–27.

36. Tomkinson, "Notes on Mad Listening," 19.

37. Tomkinson, "Notes on Mad Listening," 29.

38. Tomkinson, "Notes on Mad Listening," 19.

39. Thompson, "Listening with Tinnitus," 38.

40. Hagood, *Hush*, 7.

41. Hagood in Thompson and Hagood, "Tinnitus, Exclusion, Relationality," 69.

42. Thompson in Thompson and Hagood, "Tinnitus, Exclusion, Relationality," 68.

43. Sterne, *Diminished Faculties*, 122. McKay writes that bands like The Who, Slade, and Kiss framed physical tolerance for their deafening volumes and the resulting hearing loss as part of their music's joint pleasure/pain imperative and hypermasculinist grit; physical intolerance, by comparison, was assumed to reflect primarily on old age and a general lack of hipness: See McKay, *Shakin' All Over*, 138.

44. Dokumaci, *Activist Affordances*, 7.

45. Hagood, *Hush*, 3; and Dokumaci, *Activist Affordances*, 7.

46. See Todd F. Heatherton, "Neuroscience of Self and Self-Regulation," *Annual Review of Psychology* 62 (2011): 363–90.

47. Heatherton, "Neuroscience of Self," 364.

48. Tammy Sonnentag and Mark A. Barnett, "Emotional Self-Regulation," in *Encyclopedia of Child Behavior and Development*, edited by S. Goldstein and J. A. Naglieri (Springer, 2011), 577.

49. Sonnentag and Barnett, "Emotional Self-Regulation," 578.

50. Tinnitus's diverse manifestations constitute "a complex puzzle that challenges both researchers and clinicians in their understanding of the pathophysiology of tinnitus and in the development of new treatments," as Jorge Simoes et al. write in "Toward Personalized Tinnitus Treatment: An Exploratory Study Based on Internet Crowdsensing," *Frontiers in Public Health*, June 25, 2019, https://doi.org/10.3389/fpubh.2019.00157

51. See Siebers, *Disability Theory*, 103. See also Brune and Wilson, eds., *Disability and Passing*.

52. It is "not feasible to univocally conclude on the co-incidence of tinnitus and suicide," due in no small part to the heterogeneity of tinnitus and its co-occurrence with other preexisting psychological issues, as Annett Szibor, Antti Mäkitie, and Antti A. Aarnisalo urgently argue in "Tinnitus and Suicide: An Unresolved Relation," *Audiology Research* 9/1 (2019): 10–13; and see Adeyi A. Adoga and Taiwo J. Obindo, "The Association Between Tinnitus and Mental Illness," in *Mental Disorders—Theoretical and Empirical Perspectives*, edited by Robert Wollfolk and Lesley Allen (InTech, 2013): https://doi.org/10.5772/52755

53. Hagood in Thompson and Hagood, "Tinnitus, Exclusion, Relationality," 78.

54. Stephen (Steve) Harrison in "2021 Interview with Stephen Harrison by Jessica Holmes," August 22, 2021.

55. Harrison, "2021 Interview by Jessica Holmes."

56. Stephen Harrison, "Sounds That Soothe," *Tinnitus Today (magazine)*, American Tinnitus Association (Spring 2012): 20.

57. Harrison, "2021 Interview by Jessica Holmes."

58. "We're Patients & Researchers," Tinnitus Hub website, accessed July 21, 2021, https://www.tinnitushub.com

59. Harrison in "2021 Interview by Jessica Holmes."

60. Tinnitus Hub's rhetoric "by and for patients" is politically analogous to the National Association of the Deaf's rhetoric in that both communities seek self-determination, albeit with vastly different positions on medical intervention and the search for a "cure."

61. Harrison in "2021 Interview by Jessica Holmes."

62. Harrison in "2021 Interview by Jessica Holmes."

63. Jeffrey Freymann-Weyr, "Composing Music for 'Tin' Ears," NPR *All Things Considered* (podcast), transcript, November 19, 2005, accessed August 4, 2021, https://www.npr.org/templates/story/story.php?storyId=5020435&t=1628098443018

64. "All Things Fall, 2014," Mat Collishaw website, accessed October 15, 2025, https://matcollishaw.com/works/all-things-fall/

65. Harrison in "2021 Interview by Jessica Holmes."

66. Harrison in "2021 Interview by Jessica Holmes."

67. Harrison in "2021 Interview by Jessica Holmes."

68. Harrison in "2021 Interview by Jessica Holmes."

69. Harrison in "2021 Interview by Jessica Holmes."

70. Tinnitus Works, "About," YouTube channel, accessed March 17, 2023, https://www.youtube.com/@TinnitusWorks/about; Tinnitus Works, Spotify channel, accessed Friday March, 17, 2023, https://open.spotify.com/artist/6hGPHRiWMzZnRZkQZeqDZd?si=6zEdHxLISXm9O0anAq-MKA&dl_branch=1

71. Tinnitus Works, "About Me—Tinnitus Works," YouTube video, 3:34, April 27, 2021, accessed July 18, 2021, https://www.youtube.com/watch?v=PZ2XP2IP3gk

72. Harrison, "Sounds That Soothe," 20.

73. Harrison, "Sounds That Soothe."

74. Tinnitus Works, "Sounds to Soothe (tinnitus)," YouTube video, 1:12:40, December 19, 2014, accessed February 2, 2026, https://www.youtube.com/watch?v=nTnu8ee7zXU

75. Patrick Neff et al., "10 Hz Amplitude Modulated Sounds Induce Short-Term Tinnitus Suppression," *Frontiers in Aging Neuroscience*, May 2017, https://doi.org/10.3389/fnagi.2017.00130

76. In other contexts, these might be construed as sonic markers of a generic non-Western exoticism characteristic of so-called "new age" and "world music." See Roshanak Kheshti, *Modernity's Ear: Listening to Race and Gender in World Music* (NYU Press, 2015).

77. Harrison in "2021 Interview by Jessica Holmes."

78. Harrison in "2021 Interview by Jessica Holmes."

79. See "alpha state," *APA Dictionary of Psychology*, American Psychological Association website, accessed July 19, 2021, https://dictionary.apa.org/alpha-state

80. On music's impact on neural oscillations, see Domanté Kučikienė and Rūta

Praninskienė, "The Impact of Music on the Bioelectrical Oscillations of the Brain," *Acta Medica Lituanica* 25/2 (2018): 101–6. Not surprisingly, the alpha state (and brainwaves more generally) hold significant appeal beyond the domain of empirical neuroscience research and psychology, particularly within new age therapy and non-Western spirituality and health. Its mystique in popular culture has led many lay people to falsely prescribe ways of inducing the alpha state or increasing alpha power without any empirically grounded evidence that the method in question works, from meditation, to yoga, to different types of music. One website offers a series of relatively innocuous alpha state "hacks" including drinking specific types of theanine-rich tea, morning aerobic exercise, and relaxing while drinking alcohol. See Andrew Merle, "How to Hack into the Alpha Brain Wave State," March 26, 2019, accessed July 19, 2021, https://andrewmerle.medium.com/how-to-hack-into-the-alpha-brain-wave-state-20508f81b7e0

81. This suspicion aligns with the conclusions of current research on amplitude modulation and tinnitus. Neff et al., "10 Hz Amplitude."

82. Neff et al., "10 Hz Amplitude."

83. Harrison in "2021 Interview by Jessica Holmes."

84. Harrison in "2021 Interview by Jessica Holmes."

85. Harrison in "2021 Interview by Jessica Holmes."

86. See comments for Tinnitus Works, "Sounds to Soothe (Tinnitus)," YouTube video, 1:12:40, December 19, 2014, accessed August 28, 2019, https://www.youtube.com/watch?v=nTnu8ee7zXU&t=2437s

87. See comments for Tinnitus Works, "Acoustic Neuromodulation on a Musical Scale," YouTube video, July 10, 2013, accessed August 28, 2023, https://www.youtube.com/watch?v=BHO_6nIDePU&t=22s

88. Tinnitus Works, "Acoustic Neuromodulation."

89. @naomiboswell3322 in Tinnitus Works, "Zen Pulses—Tinnitus Relief," February 3, 2019, accessed August 28, 2023, https://www.youtube.com/watch?v=scMoH_39NwU&t=1223s

90. See comments for Tinnitus Works, "Acoustic Neuromodulation."

91. Thompson, "Listening with Tinnitus," 34.

92. @8nakata8 in Tinnitus Works, "Bell Melody for Tinnitus—Random Background Noise," YouTube, May 6, 2013, accessed August 28, 2023, https://www.youtube.com/watch?v=a_LRAI3GkOs

93. Thompson, "Listening with Tinnitus," 34.

94. Schafer, *Ear Cleaning*, 8.

95. Corinna da Fonseca-Wollheim, "Monica Germino Puts Electronics and Violin Together, and Myriad Sounds Ensue," *New York Times*, June 16, 2013, accessed February 2, 2026, https://www.nytimes.com/2013/06/17/arts/music/monica-germino-melds-violin-and-electronics.html

96. Monica Germino in "2021 Interview with Monica Germino by Jessica Holmes," April 11, 2021.

97. Sheldrake et al., "Audiometric Characteristics."

98. "What Is Hyperacusis?," Hyperacusis Network website, accessed August

2, 2021, https://hyperacusis.net/what-is-hyperacusis/. The Hyperacusis Network is an international self-help organization and patient-led advocacy group, much like Tinnitus Hub.

99. Johnson is founder of Violectra, maker of "a range of made-to-customer-order skeletal-frame, electric violins, violas, cellos & vio-basses," all designed and crafted by Johnson at the Moseley Violins workshop in Birmingham, UK. See "Welcome to Violectra™ Electric Violins, Birmingham, UK," Violectra website, accessed October 13, 2025, https://www.violectra.co.uk

100. "What Is Hyperacusis?," Hyperacusis Network.

101. Dan Malcore, "About Us," Hyperacusis Network website, accessed August 2, 2021, https://hyperacusis.net/who-we-are/

102. Aleander Varty, "Diagnosis Sends Violin Star Monica Germino in Search of Softer Sounds at Push Fest," *The Georgia Straight*, January 24, 2019, accessed May 18, 2026, https://www.monicagermino.com/tagged/marcel-wanders

103. Persis Bekkering, "Violinist Monica Germino Can," *De Volkskrant*, June 6, 2018, accessed August 4, 2021, https://www.monicagermino.com/tagged/marcel-wanders

104. Bekkering, "Violinist Monica Germino Can."

105. Germino in Bekkering, "Violinist Monica Germino Can."

106. The *BBC*'s 2011 "Musicians' Guide to Noise and Hearing," a guide that "aims to facilitate dialogue and empower all musicians and managers" around noise regulations, recommends that employers provide musicians and stage managers with acoustic screens and treatments when necessary and allow sufficient acoustical rest periods: See "Musicians' Guide to Noise and Hearing—Part II: Toolkit for Managers," *BBC* online, 2011, accessed October 15, 2025, https://downloads.bbc.co.uk/safety/documents/safety-guides/audio-and-music/Safety-Musician_noise_guide_Part_II.pdf

The Musicians' Union also has a robust set of online resources with strategies for safeguarding against hearing damage; literature on hearing self-surveillance, types of hearing loss, and claims to deafness; and comprehensive information on employee rights surrounding noise regulations. See also "Musicians' Hearing Health Scheme," Musicians' Union website, August 1, 2023, accessed August 23, 2023, https://musiciansunion.org.uk/membership-benefits/musicians-hearing-health-scheme

107. This is evident from violist Christopher Goldscheider's landmark lawsuit against the Royal Opera House for hearing damage he alleges resulted from being in close proximity to the trumpet at a rehearsal for Wagner's *Die Walküre* without proper hearing safeguards in place. The ROH's appeal made the case that "the artistic value of the music produced by the orchestra meant that some hearing damage to its players was inevitable and justifiable," an appeal that was ultimately struck down by the court: See "Royal Opera House Loses Appeal over Viola Player's Hearing," *BBC News*, April 17, 2019, accessed October 15, 2025, https://www.bbc.com/news/entertainment-arts-47965734#.

While recommended exposure limits (REL) are set at 85 decibels over an eight-

hour daily average, "for each 3-dB increase in noise exposure levels, the duration of the exposure should be cut in half": See "Reducing the Risk of Hearing Disorders Among Musicians," Workplace Solutions from the National Institute for Occupational Health and Safety, 2012, accessed October 15, 2025, https://www.cdc.gov/niosh/docs/wp-solutions/2015-184/pdfs/2015-184.pdf

In the popular sphere, there is an increasing public awareness of the risks associated with exposure to loud music and newfound acceptability around hearing protection in EDM and heavy metal circles, which encourage concertgoers to practice "hearing safety" through wearing high-fidelity earplugs and self-monitoring physiological symptoms of sound exposure. See Edmfestivalinsider, "Your Ultimate Guide: The Best Earplugs for EDM Festivals," EDM Festival Insider, accessed October 15, 2025, https://www.edmfestivalinsider.com/your-ultimate-guide-the-best-earplugs-for-edm-festivals/

108. Germino in Varty, "Diagnosis."

109. "Marcel Wanders Designs the Whisperviolin," If it's hip, it's here website, accessed October 15, 2025, https://www.ifitshipitshere.com/marcel-wanders-whisperviolin/

110. Mary Remnant, s.v., "Kit," *Grove Music Online*, January 20, 2021, accessed August 4, 2021, https://doi.org/10.1093/gmo/9781561592630.article.15075

111. Marcel Wanders, "Marcel Wanders on Designing a Violin for a Hearing-Challenged Musician," *Metropolis*, December 5, 2017, accessed October 15, 2025, https://www.metropolismag.com/design/marcel-wanders-violin/

112. Germino in Varty, "Diagnosis."

113. Germino and Pay in Music on Main, "David Pay and Monica Germino discuss MUTED," YouTube video, 3:30, November 19, 2018, accessed October 15, 2025, https://www.youtube.com/watch?v=exKO_BZVF48

114. Charles Passy, "Philharmonic Dials Down Music to a 'Whisper,'" *Wall Street Journal*, October 6, 2018, accessed October 15, 2025, https://www.wsj.com/articles/philharmonic-dials-down-music-to-a-whisper-1538838000

115. Germino in "2021 Interview by Jessica Holmes."

116. Germino in "2021 Interview by Jessica Holmes."

117. Anthony Tommasini, "The Philharmonic Takes New Music Beyond Geffen Hall," *New York Times*, October 9, 2018, accessed August 4, 2021, https://www.nytimes.com/2018/10/09/arts/music/new-york-philharmonic-sound-on-nightcap.html

Bibliography

Abbate, Carolyn. *Unsung Voices: Opera and Musical Narrative in the Nineteenth Century*. Princeton University Press, 1991.

"About ALDA." Association of Late Deafened Adults (ALDA) website. Accessed October 16, 2025. https://alda.org/about-alda/

Accinno, Michael. "Helen Keller, Music, and the Limits of Oralism." *Journal of Interdisciplinary Voice Studies* 4/2 (2019): 139–56.

Accinno, Michael. "John Sullivan Dwight, Blindness, and Music Education." *American Music* 39/1 (2021): 89–118.

Acevedo, Sara. "Praxis-Oriented Research Toward a Liberatory Disability Politics: A Contemplative Inquiry Approach." *Cultural Studies* 22/6 (2022): 593–604.

Adams, Rachel, Benjamin Reiss, and David Serlin, eds. *Keywords for Disability Studies*. NYU Press, 2015.

Adoga, Adeyi A., and Taiwo J. Obindo. "The Association Between Tinnitus and Mental Illness." In *Mental Disorders: Theoretical and Empirical Perspectives*, edited by Robert Wollfolk and Lesley Allen. InTech, 2013. https://doi.org/10.5772/52755

Adorno, Theodor. *Essays on Music*. Translated by Susan H. Gillespie. University of California Press, 2002.

Agawu, Kofi. "The Invention of African Rhythm." *Journal of the American Musicological Society* 48/3 (1995): 380–95.

American Speech-Language-Hearing Association. "Type, Degree, and Configuration of Hearing Loss." Audiology Information Series, 2023. Accessed October 16, 2025. https://www.asha.org/siteassets/ais/ais-type-degree-and-configuration-of-hearing-loss.pdf

Antrobus, Raymond. "Echo (a Deaf Sequence)." *Poetry Magazine*, March 9, 2017. Accessed October 16, 2025. https://www.poetryfoundation.org/harriet-books/2017/03/echo-a-deaf-sequence

"Are You Losing Your Hearing at EDM Shows?" *Magnetic Magazine*, November 16, 2015. Accessed May 24, 2016. http://www.magneticmag.com/2015/11/are-you-losing-your-hearing-at-edm-shows/

Antenna. "Redesigning Hearing Aids with Katie Brown." YouTube video, November 20, 2019. Accessed September 7, 2025. https://www.youtube.com/watch?v=p2GHGm22I1M

Armstrong, David F. *Show of Hands: A Natural History of Sign Language*. Gallaudet University Press, 2011.

Association of Adult Musicians with Hearing Loss. "About Our Association." Last modified 2016. Accessed May 22, 2016. http://www.musicianswithhearingloss.org/wp/about-our-association/

"The Audiogram." American Speech-Language-Hearing Association website. Accessed August 29, 2016. http://www.asha.org/public/hearing/Audiogram/

Back, Les. *The Art of Listening*. Bloomsbury, 2007.

Baguley, David M. "Aural Diversity: A Clinical Perspective." In *Aural Diversity*, edited by John Drever and Andrew Hugill, 13–23. Taylor & Francis, 2023.

Baguley, David M., and G. Andersson. *Hyperacusis: Mechanisms, Diagnosis, and Therapies*. Plural, 2007.

Bahan, Benjamin. "Face-to-Face Tradition in the American Deaf Community: Dynamics of the Teller, the Tale, and the Audience." In *Signing the Body Poetic: Essays on American Sign Language Literature*, edited by H-Dirksen L. Bauman, Jennifer L. Nelson, and Heidi M. Rose, 21–50. University of California Press, 2006.

Bahan, Benjamin. "Upon the Formation of a Visual Variety of the Human Race." In *Open Your Eyes: Deaf Studies Talking*, edited by H-Dirksen L. Bauman, 83–99. University of Minnesota Press, 2008.

Ball, Philip. *The Music Instinct: How Music Works and Why We Can't Do Without It*. Oxford University Press, 2010.

Ballin, Albert. *The Deaf Mute Howls*. Gallaudet University Press, 1998.

Balling, Laura, et al. "The Collaboration Between Hearing Aid Users and Artificial Intelligence to Optimize Sound." *Seminars in Hearing* 42/3 (2021): 282–94.

Barrett, Margaret. "Music Literacy: I Hear What You Mean. Music Literacy in the Information Technology Age." In *More Than Words Can Say: A View of Literacy through the Arts*, edited by Joan Livermore, 33–42. University of Canberra–Melbourne, 1997.

Bates, Mary. "Super Powers for the Blind and Deaf." *Scientific American*, September 18, 2012. Accessed April 16, 2016. http://www.scientificamerican.com/article/superpowers-for-the-blind-and-deaf/

Bauman, H-Dirksen L. "Introduction: Listening to Deaf Studies." In *Open Your Eyes: Deaf Studies Talking*, edited by H-Dirksen L. Bauman, 1–32. University of Minnesota Press, 2008.

Bauman, H-Dirksen L. "Listening to Phonocentrism with Deaf Eyes." *Essays in Philosophy* 9/1 (2008): 41–54.

Bauman, H-Dirksen L., and Joseph J. Murray, eds. *Deaf Gain: Raising the Stakes for Human Diversity*. University of Minnesota Press, 2014.

Baynton, Douglas C. "Beyond Culture: Deaf Studies and the Deaf Body." In *Open Your Eyes: Deaf Studies Talking*, edited by H-Dirksen L. Bauman, 293–313. University of Minnesota Press, 2008.

Baynton, Douglas C. *Forbidden Signs: American Culture and the Campaign Against Sign Language*. University of Chicago Press, 1996.

Beghin, Tom. "Beethoven's Broadwood, Stein's Hearing Machine, and a Trilogy of Sonatas." In Tom Beghin, *Inside the Hearing Machine: Beethoven on His Broadwood—Sonatas Opus 109, 110, and 111*, 25–57. CD booklet. Evil Penguin Records Classic, 2017.

Beghin, Tom. "Deafly Performing Beethoven's Last Three Piano Sonatas." *Beethoven Studies* 4 (2020): 209–38.

"Behind-the-Scenes at Widex: Manipulating Less for a Natural Hearing Experience." *Widex* (blog), February 29, 2024. Accessed September 8, 2025. https://www.widex.com/en/blog/global/2024-02-widex-sound-philosophy/

Bell, Alexander Graham. *Memoir upon the Formation of a Deaf Variety of the Human Race*. National Academy of Sciences, [1884].

Bell, Bethany. "Eurovision Song Contest Will Be Signed for the First Time." *BBC News*, May 20, 2015. Accessed April 15, 2016. http://www.bbc.com/news/entertainment-arts-32812385

Berkeley, Michael. "My Beethoven Moment." *The Guardian*, September 7, 2010. Accessed April 16, 2016. http://www.theguardian.com/music/2010/sep/07/beethoven-deafness-music-composition

Berson, Jessica. "Performing Deaf Identity: Toward a Continuum of Deaf Performance." In *Bodies in Commotion: Disability & Performance*, edited by Carrie Sandahl and Philip Auslander, 42–55. University of Michigan Press, 2005.

Best, Katelyn. "'We Still Have a Dream': The Deaf Hip Hop Movement and the Struggle Against the Socio-Cultural Marginalization of Deaf People." *Lied und popülare Kulture / Song and Popular Culture* 60–61 (2015–16): 61–86.

Björk. *Telegram*. 1996. Mother Records MUMCD9605. Compact disc.

Born, Georgina. "For a Relational Musicology: Music and Interdisciplinarity, Beyond the Practice Turn. The 2007 Dent Medal Address." *Journal of the Royal Musical Association* 135 (2010): 205–43.

Born, Georgina. "On Musical Mediation: Ontology, Technology and Creativity." *Twentieth Century Music* 2 (2005): 7–36.

Bradshaw, Kimberley. "Exploring Hearing Loss and Hearing Aids for Musicians." Hearing Aid UK, July 29, 2025. Accessed September 7, 2025. https://www.hearingaid.org.uk/hearing-aid-technology/hearing-aids-for-musicians

Broks, Peter. *Understanding Popular Science*. Open University Press, 2006.

Brooks, William. "Pragmatics of Silence." In *Silence, Music, Silent Music*, edited by Nicky Losseff and Jenny Doctor, 77–126. Ashgate, 2007.

Broomhead, Paul. *What is Music Literacy?* Routledge, 2019.

Brown, Matt. "The Spectacle of Sign Language Interpreting." *Terpatron 9000* (blog), February 24, 2015. Accessed April 15, 2016. http://terpatron9000.com/the-spectacle-of-sign-language-interpreting/

Brueggemann, Brenda. *Lend Me Your Ear: Rhetorical Constructions of Deafness*. Gallaudet University Press, 1999.

Brune, Jeffrey A., and Daniel J. Wilson, eds. *Disability and Passing: Blurring the Lines of Identity*. Temple University Press, 2013.

Bryner, Jeanna. "Deaf People 'Feel Touch' with Hearing Part of Brain." LiveScience, July 10, 2012. Accessed April 16, 2016. http://www.livescience.com/21509-deaf-people-brain-touch.html

Buchalter, Gail. "I Hear the Notes in My Head." *Parade*, February 13, 1994, 8–11. Accessed April 14, 2016. https://news.google.com/newspapers?nid=1696&dat=19940213&id=sAobAAAAIBAJ&sjid=LEgEAAAAIBAJ&pg=5429,1596562&hl=en

Burch, Susan, and Alison Kafer, eds. *Deaf and Disability Studies: Interdisciplinary Perspectives*. Gallaudet University Press, 2010.

Cage, John. *Silence: Lectures and Writings by John Cage*. Wesleyan University Press, 1961.

Calton, Cindee. "What We Learned from Sign Languages When We Stopped Having to Defend Them." In *Deaf Gain: Raising the Stakes for Human Diversity*, edited by H-Dirksen L. Bauman and Joseph J. Murray, 112–29. University of Minnesota Press, 2014.

Cameron, John. "Excision Drops Phaseone Collab at the Thunderdome [Watch]." Edm.com (blog), February 20, 2020. Accessed January 29, 2026. https://edm.com/music-releases/excision-phaseone-thunderdome-collab/

Carreiro, Rodrigo, Débora Opolski, and Rodrigo Meirelles. "*Sound of Metal*: An Immersive Analysis." *Music, Sound, and the Moving Image* 17/2 (2023): 111–35.

Cederroth, C. R., et al. "Editorial: Towards an Understanding of Tinnitus Heterogeneity." *Frontiers in Aging Neuroscience* 11/53 (2019): 10.3389/fnagi.2019.00053

Ceraso, Steph. "(Re)Educating the Senses: Multimodal Listening, Bodily Learning, and the Composition of Sonic Experiences." *College English* 77 (2014): 102–23.

Charlton, James I. *Nothing About Us Without Us: Disability Oppression and Empowerment*. University of California Press, 1998.

Chasin, Marshall. "Why Are Audiologists Afraid of Musicians? Part 1" *Hearing Health & Technology Matters* (blog), August 20, 2013. Accessed January 29, 2026. https://hearinghealthmatters.org/hear-the-music/2013/why-are-audiologists-afraid-of-musicians-part-1/

Chasin, Marshall, and Neil S. Hockley. "Some Characteristics of Amplified Music Through Hearing Aids." *Hearing Research* 308 (February 2014): 2–12.

Chen, Mel Y., Alison Kafer, Eunjung Kim, and Julie Avril Minich, eds. *Crip Genealogies*. Duke University Press, 2023.

Cheng, William. "Staging Overcoming: Narratives of Disability and Meritocracy in Reality Singing Competitions." *Journal of the Society for American Music* 11/2 (2017): 184–214.

Childress, Tina. "Confessions of a Late-Deafened Adult." *See Hear Communication Matters* (blog), September 10, 2018. Accessed October 16, 2025. https://tinachildressaud.com/2018/09/10/confessions-of-a-late-deafened-adult/

Chorost, Michael. "Helping the Deaf Hear Music: A New Test Measures Music Perception in Cochlear-Implant Users." *MIT Technology Review*, February 26, 2008. Accessed April 16, 2016. https://www.technologyreview.com/s/409666/helping-the-deaf-hear-music/

Chorost, Michael. "My Bionic Quest for Boléro." *Wired*, November 1, 2005. Accessed April 16, 2016. http://www.wired.com/2005/11/bolero/

Chorost, Michael. *Rebuilt: How Becoming Part Computer Made Me More Human*. Houghton Mifflin, 2005.

Clare, Eli. *Brilliant Imperfection: Grappling with Cure*. Duke University Press, 2017.

Clarke, Eric. *Ways of Listening: An Ecological Approach to the Perception of Musical Meaning*. Oxford University Press, 2005.

Clarke, Victoria Mary. "Dame Evelyn Glennie Interview." *Victoria Mary Clarke—Journalism* (blog), July 27, 2012. Accessed April 14, 2016. https://vmcjournalism.wordpress.com/2012/07/27/dame-evelyn-glennie-interview/

Clogston, John S. "Disability Coverage in American Newspapers." In *The Disabled, the Media, and the Information Age*, edited by Jack A. Nelson, 45–57. Greenwood, 1994.

Cobussen, Marcel. "Deconstruction in Music." PhD dissertation. Erasmus University Rotterdam, 2002.

Cobussen, Marcel. "Ethics and/in/as Silence." *Ephemera* 3–4 (2003): 277–85.

Coelho, Claudia Barros. "Classification of Tinnitus: Multiple Causes with the Same Name." *Otolaryngolic Clinics North America* 53/4 (2020): 515–29.

Coleman, Clive. "Musician Sues Royal Opera House over Ruined Hearing." *BBC News*, April 1, 2016. Accessed May 21, 2016. http://www.bbc.com/news/entertainment-arts-35938704

Connor, Steven. "Edison's Teeth: Touching Hearing." In *Hearing Cultures: Essays on Sound, Listening, and Modernity*, edited by Veit Erlmann, 153–72. Routledge, 2004.

Cooper, Geraldine. "Eurovision Sign Language Interpreter's Fantastic Electro Velvet Dance Routine." *The Telegraph*, May 25, 2015. Accessed May 20, 2016. http://www.telegraph.co.uk/culture/tvandradio/eurovision/11628136/Eurovision-sign-language-interpreters-fantastic-Electro-Velvet-dance-routine.html

Corbett, John. "Experimental Oriental: New Music and Other Others." In *Western Music and Its Others: Difference, Representation, and Appropriation in Music*, edited by Georgina Born and David Hesmondhalgh, 163–86. University of California Press, 2000.

Couth, Samuel. "Tinnitus: Scale of Hearing Damage for Music Industry Workers Revealed." University of Manchester, November 21, 2019. Accessed July 26, 2021. https://www.manchester.ac.uk/discover/news/tinnitus-scale-of-hearing-damage-for-music-industry-workers-revealed/

Creighton, Nancy. "What Is Wrong with the Use of the Terms: 'Deaf-Mute,' 'Deaf and Dumb,' or 'Hearing-Impaired." National Association of the Deaf, archived April 4, 2018. Accessed September 28, 2025. https://web.archive.org/web/20180404052948/http://www.eamo.org/assets/spdeafterminology.pdf

Croghan, Naomi B. H., Kathryn H. Arehart, and James M. Kates. "Music Preferences with Hearing Aids: Effects of Signal Properties, Compression Settings, and Listener Characteristics." *Ear and Hearing* 35 (2014): 170–84.

Crook, H., A. V. Beeston, and A. E. Greasley. *Starting Out with a Music Program: Quickstart Clinic Guide*, vol. 1.1, September 24, 2018. Accessed September 9, 2025. https://musicandhearingaids.org/wp-content/uploads/sites/35/2018/10/Starting-out-with-a-music-program-Version-1.1-24-Sept-2018.pdf

Curtin, Adrian. "Vibration, Percussion and Primitivism in Avant-Garde Performance." In *Vibratory Modernism*, edited by Shelley Trower and Anthony Enns, 227–47. Palgrave Macmillan, 2013.

Cusick, Suzanne. "Feminist Theory, Music Theory, and the Mind/Body Problem." *Perspectives of New Music*, Winter 1994, 8–27.

Dahlin, Emma. "Email Interviews: A Guide to Research Design and Implementation." *International Journal of Qualitative Methods* 20 (2021): https://doi.org/10.1177/16094069211025453

Davis, Lennard J. "Crips Strike Back: The Rise of Disability Studies." *American Literary History* 11/3 (1999): 500–512.

Davis, Lennard J. *Enforcing Normalcy: Disability, Deafness, and the Body*. Verso, 1995.

Davis, Lennard J. "Postdeafness." In *Open Your Eyes: Deaf Studies Talking*, edited by H-Dirksen L. Bauman, 314–25. University of Minnesota Press, 2008.

"Deaf Culture." World Federation of the Deaf. Accessed July 27, 2016. https://wfdeaf.org/our-work/focus-areas/deaf-culture

"Deaf or Hard of Hearing." Disabilities, Opportunities, Internetworking, and Technology. University of Washington. Accessed April 12, 2016. http://www.washington.edu/doit/deaf-or-hard-hearing

"Deaf People 'Develop Super-Vision to Compensate.'" *Daily Mail*, October 11, 2010. Accessed April 16, 2016. http://www.dailymail.co.uk/health/article-1319480/Deaf-people-develop-super-vision-compensate.html

"Deaf People Hear Touch?" SourceFed channel. YouTube video, 2:12, July 12, 2012. Accessed October 3, 2016. https://www.youtube.com/watch?v=Q6sXPuvIJeA

"Deaf Rave Held for Liverpool International Music Festival." *BBC News*, August 23, 2013. Accessed April 20, 2016. http://www.bbc.com/news/uk-england-merseyside-23815103

Deaville, James. "The Moaning of (Un-)life: Animacy, Muteness and Eugenics in Cinematic and Televisual Representation." *Journal of Interdisciplinary Voice Studies* 4/2 (2019): 225–46.

Dell'Antonio, Andrew. Introduction to *Beyond Structural Listening? Postmodern Modes of Hearing*, edited by Andrew Dell'Antonio, 1–12. University of California Press, 2004.

Demers, Joanna. *Listening Through Noise: The Aesthetics of Experimental Electronic Music*. Oxford University Press, 2010.

"The Difference Between d/Deaf and Hard-of-Hearing." *Ai Media and Captioning* (blog). Accessed October 15, 2025. https://www.ai-media.tv/ai-media-blog/the-difference-between-d-deaf-and-hard-of-hearing-2/

Doctor Cliff, Aud. "The Search for Natural Sound Quality: Widex Moment Hearing Aids." YouTube video, 7:00, August 14, 2000. Accessed September 9, 2025. https://www.youtube.com/watch?v=XacTfwQJ2KI&t=53s

Dohn, Anders, et al. "Do Musicians with Perfect Pitch Have More Autism Traits Than Musicians Without Perfect Pitch? An Empirical Study." *PLOS One* 7/5 (2012): 1–8.

Dokumaci, Arseli. *Activist Affordances: How Disabled People Improvise More Habitable Worlds*. Duke University Press, 2023.

Drever, John Levack. "'Primacy of the Ear'—but Whose Ear?': The Case for Aural-diversity in Sonic Arts Practice and Discourse." *Organised Sound* 24/1 (2019): 85–95.

Drever, John Levack, and Andrew Hugill, eds. *Aural Diversity*. Routledge, 2022.

Duckworth, Angela L., and Scott Barry Kaufman. "World-Class Expertise: A Developmental Model." *Wiley Interdisciplinary Reviews: Cognitive Science*, 2015. Accessed December 8, 2025. https://doi.org/10.1002/wcs.1365

Duffie, Bruce. "Percussionist Evelyn Glennie: A Conversation with Bruce Duffie." Originally recorded for WNIB, Classical 97 Radio, February 21, 1994. Transcription posted to the Bruce Duffie website, September 2008. Accessed April 15, 2016. http://www.bruceduffie.com/glennie.html

Duncan, Patti. *Tell This Silence: Asian American Women Writers and the Politics of Speech*. University of Iowa Press, 2004.

Dyson, Frances. *Sounding New Media: Immersion and Embodiment in the Arts and Culture*. University of California Press, 2009.

Eagle, Christopher, ed. *Literature, Speech Disorders, and Disability: Talking Normal*. Taylor & Francis, 2013.

Edwards, Rebecca. *Words Made Flesh: Nineteenth-Century Deaf Education and the Growth of Deaf Culture*. New York University Press, 2012.

Efron, Amy Cohen. "Interview with Stephen Torrence (CaptainValor)." *Deaf World as Eye See It* (blog), October 3, 2014. Accessed April 16, 2016. http://www.deafeyeseeit.com/2014/10/03/interview-with-stephen-torrence-captainvalor/

Eidsheim, Nina Sun. *The Race of Sound: Listening, Timbre, and Vocality in African American Music*. Duke University Press, 2019.

Eidsheim, Nina Sun. *Sensing Sound: Singing & Listening as Vibrational Practice*. Duke University Press, 2015.

Eidsheim, Nina Sun, and Annette Schlichter. "Introduction: Voice Matters." *Postmodern Culture* 24/3 (2014): https://www.pomoculture.org/2017/09/09/introduction-voice-matters/

Ellcessor, Elizabeth. "Captions on, off, on TV, Online: Accessibility and Search Engine Optimization in Online Closed Captioning." *Television & New Media* 13 (2012): 329–52.

Emery, Steven D. "A Deaf Diaspora? Imagining Deaf Worlds Across and Beyond Nations?" In *It's a Small World: International Deaf Spaces and Encounters*, edited by Annelies Kusters and Michele Frieder, 187–98. Gallaudet University Press, 2015.

Eng, Karen. "Playing with Sound in Silence: Fellows Friday with Christine Sun Kim." *TEDBlog*, March 29, 2013. Accessed October 17, 2025. http://blog.ted.com/playing-with-sound-in-silence-fellows-friday-with-christine-sun-kim/

Enns, Anthony, and Shelley Trower, eds. *Vibratory Modernism*. Palgrave Macmillan, 2013.

"Evelyn Glennie Biography." Evelyn Glennie website. Last updated March 2015. Accessed October 17, 2025. https://www.evelyn.co.uk/biography/

"Evelyn Glennie Feels the Sound of Silence." audioBoom. Accessed October 9, 2016. https://audioboom.com/boos/1524778-evelyn-glennie-feels-the-sound-of-silence

"Evelyn Glennie Review." DaDaFest channel. YouTube video, 10:06, August 22, 2012. Accessed May 24, 2016. https://www.youtube.com/watch?v=50XVdx9rMfg

Everett-Green, Robert. "Dame Evelyn Glennie, the Deaf Percussionist Who Listens with Her Whole Body." *Globe and Mail*, March 1, 2011. Accessed April 14, 2016. http://www.theglobeandmail.com/arts/music/dame-evelyn-glennie-the-deaf-percussionist-who-listens-with-her-whole-body/article568725/

"Evolv AI." Starkey. Accessed September 7, 2025. https://www.starkeypro.com/products/hearing-aids/evolv-ai

Fava, Elisabetta, ed. *Clinical Linguistics: Theory and Applications in Speech Pathology and Therapy*. John Benjamins, 2002.

Fink, Robert. "Below 100 Hz: Toward a Musicology of Bass Culture." In *The Relentless Pursuit of Tone: Timbre in Popular Music*, edited by Robert Fink, Melinda Latour, and Zachary Wallmark, 88–116. Oxford University Press, 2018.

Fink, Robert. *Repeating Ourselves: American Minimal Music as Cultural Practice*. University of California Press, 2005.

Fischer, Susan D., and Harry van der Hulst. "Sign Language Structures." In *The Oxford Handbook of Deaf Studies, Language, and Education*, edited by Marc Marschark and Patricia Elizabeth Spencer, 319–31. Oxford University Press, 2010.

Fricker, Miranda. *Epistemic Injustice: Power and the Ethics of Knowing*. Oxford University Press, 2007.

Friedner, Michele Ilana. "Biopower, Biosociality, and Community Formation: How Biopower Is Constitutive of the Deaf Community." *Sign Language Studies* 10/3 (2010): 336–47.

Friedner, Michele Ilana. "From Hoping to Expecting: Cochlear Implantation and Habilitation in India." *Cultural Anthropology* 37/1 (2022): 125–49.

Friedner, Michele Ilana. *Sensory Futures: Deafness and Cochlear Implant Infrastructures in India*. University of Minnesota Press, 2022.

Friedner, Michele Ilana. "Sign Language as Virus: Stigma and Relationality in Urban India." *Medical Anthropology* 37/5 (2018): 359–72.

Friedner, Michele Ilana. *Valuing Deaf Worlds in Urban India*. Rutgers University Press, 2015.

Friedner, Michele Ilana, and Stefan Helmreich. "Sound Studies Meets Deaf Studies." *Senses and Society* 7 (2012): 72–86.

Friedner, Michele Ilana, and Annelies Kusters. "Deaf Anthropology." *Annual Review of Anthropology* 49 (2020): 31–47.

Friedner, Michele Ilana, and Annelies Kusters, eds. *It's a Small World: International Deaf Spaces and Encounters*. Gallaudet University Press, 2015.

Frommer, Frederic J. "Music Professor Sues Band for Hearing Loss." *Princeton Alumni Weekly*, April 21, 1999. Accessed August 21, 2016. https://books.google.ca/books?id=3SFbAAAAYAAJ&lpg=RA4-PA46&ots=iH5noRy7Rn&pg=RA4-PA46&redir_esc=y#v=onepage&q&f=false

Fulford, Robert. "Dr Paul Whittaker OBE—'My Hearing Aids and Music.'" Hear-

ing Aids for Music, December 2, 2015. Accessed April 16, 2016. http://musicandhearingaids.org/dr-paul-whittaker-obe-my-hearing-aids-and-music

Fulford, Robert. "Hearing Impairment and the Enjoyment and Performance of Music." Hearing Aids for Music, August 10, 2015. Accessed April 16, 2016. http://musicandhearingaids.org/hearing-impairment-and-the-enjoyment-and-performance-of-music-a-conference-by-the-institute-of-acoustics-kingston-university-9-july-2015/

Fulford, Robert, Jane Ginsborg, and Juliet Goldbart "Learning Not to Listen: The Experiences of Musicians with Hearing Impairments." *Music Education Research* 13 (2011): 447–64. https://doi.org/10.1080/14613808.2011.632086

Fulford, Robert, Jane Ginsborg, and Alinka Greasley. "Hearing Aids and Music: The Experiences of D/deaf Musicians." Paper presented at the Ninth Triennial Meeting of the European Society for the Cognitive Sciences of Music, Manchester, UK, August 17–22, 2013. https://www.academia.edu/15072626/Hearing_aids_and_music_the_experiences_of_D_deaf_musicians

Gallope, Michael. *The Musician as Philosopher: New York's Vernacular Avant-Garde, 1958–1978*. University of Chicago Press, 2024.

García-Fernández, Carla. "Intersectionality and Autoethnography: Deafblind, Deafdisabled, Deaf and Hard of Hearing-Latinx Children Are the Future." *Journal Committed to Social Change on Race and Ethnicity* 6/1 (2020): 41–67.

Garcia-Mispireta, Luis-Manuel. "Beats, Flesh, and Grain: Sonic Tactility and Affect in Electronic Dance Music." *Sound Studies* 1/1 (2015): 59–76.

Garland-Thomson, Rosemarie. "Eugenic World Building and Disability: The Strange World of Kazuo Ishiguro's *Never Let Me Go.*" *Journal of Medical Humanities* 38 (2017): 133–45.

Garland-Thomson, Rosemarie. *Extraordinary Bodies: Figuring Physical Disability in American Culture and Literature*. Columbia University Press, 1997.

Garland-Thomson, Rosemarie. "Welcoming the Unexpected." In *Human Flourishing in the Age of Gene Editing*, edited by Erik Parens and Josephine Johnston, 15–26. Oxford University Press, 2019.

Gfeller, Kate. "Music Enjoyment and Cochlear Implant Recipients: Overcoming Obstacles and Harnessing Capabilities." *Listening and Spoken Language Center* (blog). Alexander Graham Bell Foundation for the Deaf and Hard of Hearing. Accessed April 16, 2016. http://www.agbell.org/MusicEnjoymentandCochlearImplants/

Glennie, Evelyn. *Evelyn Glennie, Her Greatest Hits*. 1997. RCA Victor 74321-47629-2. Compact disc.

Glennie, Evelyn. "Evelyn Glennie: How to Truly Listen." TED Talk video, 32:09, February 2003. Accessed April 14, 2016. https://www.ted.com/talks/evelyn_glennie_shows_how_to_listen?language=en

Glennie, Evelyn. "Evelyn Glennie: How to Truly Listen." TEDTalks channel. YouTube video, 34:06, May 14, 2007. Accessed April 14, 2016. https://www.youtube.com/watch?v=IU3V6zNER4g

Glennie, Evelyn. *Good Vibrations: My Autobiography*. Hutchison, 1990.

Glennie, Evelyn. "Hearing Essay." Evelyn Glennie website. Last modified January 1, 2015. Accessed May 24, 2016. https://www.evelyn.co.uk/hearing-essay/

Glennie, Evelyn. "What Makes Us Human?" Evelyn Glennie website. Last modified January 1, 2015. Accessed April 18, 2016. https://www.evelyn.co.uk/what-makes-us-human/

Glennie, Evelyn, and Fred Frith. *Sugar Factory*. 2007. Tzadik Records US. TZ 7623. Compact disc.

Goss, Blaine. "Hearing from the Deaf Culture." *Intercultural Communication Studies* 12/2 (2003): 1–17.

Greasley, Alinka. "Diverse Music Listening Experiences: Insights from the Hearing Aids for Music Project." In *Aural Diversity*, edited by John Drever and Andrew Hugill, 134–42. Taylor & Francis, 2023.

Griffin, Mark. *Handbook of Human Vibration*. Academic Press, 1990.

Hagood, Mack. "Cage's Echoes of the Anechoic." *Australian Humanities Review* 70 (November 2022): 75–79.

Hagood, Mack. *Hush: Media and Sonic Self-Control*. Duke University Press, 2019.

Haller, Beth A. "The Changing Landscape of Disability News: Blogging and Social Media Lead to More Diverse Sources of Information." In *Representing Disability in an Ableist World: Essays on Mass Media*, 1–24. Advocado Press, 2010.

Hamilton, Jon. "Deaf Jam: Experiencing Music Through a Cochlear Implant." *NPR Morning Edition*, May 18, 2015. Accessed April 16, 2016. http://www.npr.org/sections/health-shots/2015/05/18/406838781/deaf-jam-experiencing-music-through-a-cochlear-implant

Harris, Ellen T. "Letter from AMS President Ellen T. Harris: Moving Forward Concerning Issues of Racial Diversity." American Musicological Society, June 23, 2016. Accessed August 8, 2016. http://www.ams-net.org/HarrisLetterJune2016.php

Harrison, Stephen. "Sounds That Soothe." *Tinnitus Today*. American Tinnitus Association (Spring 2012): 20.

Hartblay, Cassandra. "Disability Expertise: Claiming Disability Anthropology." *Current Anthropology* 61/S21 (2020): S26–S36.

"Health and Therapy." American Federation of Musicians. Accessed May 22, 2016. http://www.afm.org/resources/health-and-therapy

"Hearing Aids for Music Project." Hearing Aids for Music. Accessed September 7, 2025. https://musicandhearingaids.org

"The Hearing Loss Lexicon." Canadian Hard of Hearing Association. Accessed April 12, 2016. http://www.chha.ca/chha/publications-lexicon.php

Heatherton, Todd F. "Neuroscience of Self and Self-Regulation." *Annual Review of Psychology* 62 (2011): 363–90.

Hendren, Sara. *What Can a Body Do? How We Meet the Built World*. Riverhead Books, 2020.

Henry, Freeman G. "Introduction" to Ferdinand Berthier, *Forging Deaf Education in Nineteenth-Century France: Biographical Sketches of Bébian, Sicard, Massieu, and Clerc*, edited and translated by Freeman G. Henry, xv–xxxvii. Gallaudet University Press, 2009.

Hermann, Evelyn. *Shinichi Suzuki: The Man and His Philosophy*. Summy-Birchard Music, 1981.

Higgins, Kathleen Marie. *The Music Between Us: Is Music a Universal Language?* University of Chicago Press, 2012.

Holmes, Jessica A. "Beats, Tactility, and the Politics of Deaf Representation in EDM." In *The Oxford Handbook of Electronic Dance Music*, edited by Robin James and Luis-Manuel Garcia-Mispireta. Oxford University Press, 2025. https://doi.org/10.1093/oxfordhb/9780190093723.013.19

Holmes, Jessica A. "Expert Listening Beyond the Limits of Hearing: Music and Deafness." *Journal of the American Musicological Society* 70/1 (2017): 171–220. https://doi.org/10.1525/jams.2017.70.1.171

Holmes, Jessica A. "'The Manic Pixie Dream Girl of the Synth-Pop World' and Her 'Baby Doll Lisp': Grimes, and the Disabling Logics of the Feminization and Infantilization of Lisping." *Journal of Popular Music Studies* 31/1 (2019): 131–56. https://doi.org/10.1525/jpms.2019.311011

Holmes, Jessica A. "Singing Beyond Hearing." In "Colloquy: On the Disability Aesthetics of Music." *Journal of the American Musicological Society* 69/2 (2016): 542–48.

Hong, Cathy Park. *Minor Feelings: A Reckoning on Race and the Asian Condition*. Profile Books, 2020.

Hopyan, Talar, Francis A. M. Manno III, Blake C. Papsin, and Karen A. Gordon. "Sad and Happy Emotion Discrimination in Music by Children with Cochlear Implants." *Child Neuropsychology* 22/3 (2016): 366–80.

Horvath, Janet. "A Musician Afraid of Sound: How a Professional Cellist Learned to Live with a Career-Ending Ear Injury." *The Atlantic*, October 20, 2015. Accessed April 16, 2016. http://www.theatlantic.com/health/archive/2015/10/a-musician-afraid-of-sound/411367/

"How Do We Listen When We're Unable to Hear?" *TED Radio Hour*, NPR, June 5, 2015. Accessed April 15, 2016. http://www.npr.org/2015/06/05/411730683/how-do-we-listen-when-we-re-unable-to-hear

Howe, Blake. "Disabling Music Performance." In *The Oxford Handbook of Music and Disability Studies*, edited by Blake Howe, Stephanie Jensen-Moulton, Neil Lerner, and Joseph N. Straus, 191–209. Oxford University Press, 2016.

Howe, Blake. "Music and Disability Studies." *Music Research Annual* 1 (2020): 1–29.

Howe, Blake. "Paul Wittgenstein and the Performance of Disability." *Journal of Musicology* 27/2 (2010): 135–80.

Howes, David. "Cross-Talk Between the Senses." *Senses & Society* 1/3 (2006): 381–90.

Howes, David, and Constance Classen. *Ways of Sensing: Understanding the Senses in Society*. Routledge, 2013.

Hu, Zhuqing (Lester) S. "Chinese Ears, Delicate or Dull? Toward a Decolonial Comparativism." *Journal of the American Musicological Society* 74/3 (2021): 501–69.

Hughes, Alice. "Unlearning Sound: Christine Sun Kim." *Rooms Magazine*, August 14, 2014. Accessed August 13, 2016. http://www.carrollfletcher.com/usr/library/documents/christine-sun-kim-press/alice-hughes-unlearning-sound-christine-sun-kim-rooms-magazine-14-august-2014.pdf

"The Importance of Acclimatization When Learning to Wear Hearing Aids." Lexie Hearing, March 6, 2024, last updated November 6, 2024. Accessed September 7, 2025. https://lexiehearing.com/us/library/the-importance-of-acclimatization-when-learning-to-wear-hearing-aids

Ingram, David. "'The Clutter of the Unkempt Forest': John Cage, Music and American Environmental Thought." *American Studies* 51/4 (2006): 567–79.

Inside the Hearing Machine. Documentary film. Directed by Steven Maes. Featuring Tom Beghin, Chris Maene, Robin Wallace, Thomas Wulfrank, and Martha de Francisco. Orpheus Institute, 2017. Accessed October 15, 2025. https://www.insidethehearingmachine.com/documentary

"ISO 226: 2023 (en) Acoustics—Normal Equal-Loudness-Level Contours." *International Organization for Standardization* (ISO). Accessed September 25, 2025. https://www.iso.org/obp/ui/en/#iso:std:iso:226:ed-3:v1:en

Jaeger, Paul T. *Disability and the Internet: Confronting a Digital Divide*. Lynne Rienner Publishers, 2012.

Jain, Sarah. "The Prosthetic Imagination: Enabling and Disabling the Prosthesis Trope." *Science, Technology, & Human Values* 24/1 (1999): 31–54.

Jastreboff, Pawel, and Margaret Jastreboff. "Decreased Sound Tolerance: Hyperacusis, Misophonia, Diplacousis, and Polyacousis." In *Handbook of Clinical Neurology*, vol. 129 (3rd series), *The Human Auditory System*, edited by G. G. Celesia and G. Hickok, 375–87. Elsevier, 2015.

Jensen-Moulton, Stephanie. "Finding Autism in the Compositions of a 19th Century Prodigy: Reconsidering 'Blind Tom' Wiggins." In *Sounding Off: Theorizing Disability in Music*, edited by Neil Lerner and Joseph N. Straus, 199–215. Routledge, 2006.

Jerger, James. "The Quest for Audiometric Zero." *Hearing Review*, June 20, 2019. Accessed September 25, 2025. https://hearingreview.com/resource-center/expert-insight/quest-audiometric-zero

Jobling, Mark A. "The Music of the Genes." *Investigative Genetics* 5/2 (2014): 1–2.

Jones, Jeannette Di Bernardo. "Imagined Hearing: Music-Making in Deaf Culture." In *The Oxford Handbook of Music and Disability Studies*, edited by Blake Howe, Stephanie Jensen-Moulton, Neil Lerner, and Joseph N. Straus, 54–72. Oxford University Press, 2016.

Jorgensen, Lindsey E. "Verification and Validation of Hearing Aids: Opportunity Not an Obstacle." *Journal of Otology* 11/2 (2016): 57–62.

Jurgensen, John. "'Deafheads' Marked a Milestone of Their Own at Final Grateful Dead Shows." *Wall Street Journal*, July 8, 2015. Accessed May 21, 2016. http://blogs.wsj.com/speakeasy/2015/07/08/deafheads-marked-a-milestone-of-their-own-at-final-grateful-dead-shows/

Kafer, Alison. *Feminist, Queer, Crip*. Indiana University Press, 2013.

Kambhampaty, Anna P. "The A.S.L. Interpretation of 'WAP' Was TikTok Gold. It's Also a Problem." *New York Times*, August 14, 2021. Accessed October 22, 2022. https://www.nytimes.com/2021/08/14/style/asl-wap-tiktok.html

Kassabian, Anahid. *Ubiquitous Listening: Affect, Attention and Distributed Subjectivity*. University of California Press, 2013.

Kaufman, Scott Barry, ed. *The Complexity of Greatness: Beyond Talent or Practice*. Oxford University Press, 2013.

Kerschbaum, Stephanie L. *Signs of Disability*. NYU Press, 2022.

Kheshti, Roshanak. "Touching Listening: The Aural Imaginary in the World Music Culture Industry." *American Quarterly* 63/3 (2011): 711–31.

Kim, Chae-Lin. "The Deaf Body Beyond Music: Music Notation by Christine Sun Kim." In *Material Cultures of Music Notation: New Perspectives on Musical Inscription*, edited by Floris Schuiling and Emily Payne, 67–78. Routledge, 2022.

Kim, Christine Sun. "The Enchanting Music of Sign Language." TED Talk, August 2015. Accessed October 4, 2025. https://www.ted.com/talks/christine_sun_kim_the_enchanting_music_of_sign_language/transcript

Kirnarskaya, Dina. *The Natural Musician: On Abilities, Giftedness, and Talent*. Translated by Mark H. Teeter. Oxford University Press, 2009.

Kittay, Eva Feder. "The Ethics of Care, Dependence, and Disability." *Ratio Juris* 24/1 (2011): 49–58.

Klarreich, Erica. "Feel the Music: Deaf People Use 'Mind's Ear' to Process Vibrations." *Nature*, November 27, 2001. Accessed April 16, 2016. http://www.nature.com/news/2001/011127/full/news011129-10.html

Kleege, Georgina. "Blindness and Visual Culture: An Eyewitness Account." *Journal of Visual Culture* 4/2 (2005): 179–90.

Kleinman, Judith, and Peter Buckoke. *The Alexander Technique for Musicians*. Methuen Drama, 2013.

Koosed, Jennifer L., and Darla Schumm. "Out of Darkness: Examining the Rhetoric of Blindness in the Gospel of John." *Disability Studies Quarterly* 25/1 (2005): https://doi.org/10.1057/9780230339491_5

Koza, Julia. *"Destined to Fail": Carl Seashore's World of Eugenics, Psychology, Education, and Music*. University of Michigan Press, 2021.

Kraut, Jael. "John Cage and the Mystification of Musical Silence." In *Powers: Religion as a Social and Spiritual Force*, edited by Meerten B. ter Borg and Jan Willem van Henten, 265–74, 320–21. Fordham University Press, 2010. https://doi.org/10.5422/fso/9780823231560.003.0016

Krentz, Christopher. "Duncan Campbell and the Discourses of Deafness." *History, Theory, Criticism* 27/1 (2005): 39–52.

Krentz, Christopher. *Writing Deafness: The Hearing Line in Nineteenth-Century American Literature*. University of North Carolina Press, 2007.

Krhutová, Lenka. "Personal Autonomy and Disability." *Review of Disability Studies* 13/1 (2017): 1–12.

Kučikienė, Domanté, and Rūta Praninskienė. "The Impact of Music on the Bioelectrical Oscillations of the Brain." *Acta Medica Lituanica* 25/2 (2018): 101–6.

Kusters, Annelies. *Deaf Space in Adamorobe: An Ethnographic Study of a Village in Ghana*. Gallaudet University Press, 2017.

Kusters, Annelies. "Introduction: The Semiotic Repertoire Assemblages and Evaluation of Resources." *International Journal of Multilingualism* 18/2 (2021): 183–89.

Kusters, Annelies, and Maartje De Meulder. "Understanding Deafhood: In Search of Its Meanings." *American Annals of the Deaf* 157/5 (2013): 428–38.

Kusters, Annelies, Maartje De Meulder, and Dai O'Brien, eds. *Innovations in Deaf Studies: The Role of Deaf Scholars*. Oxford University Press, 2017.

Kusters, Annelies, Massimiliano Spotti, Ruth Swanwick, and Elina Tapio. "Beyond Languages, Beyond Modalities: Transforming the Study of Semiotic Repertoires." *International Journal of Multilingualism* 14/3 (2017): 219–32.

Ladd, Paddy. *Understanding Deaf Culture: In Search of Deafhood*. Multilingual Matters, 2003.

Lane, Harlan. "Do Deaf People Have a Disability?" In *Open Your Eyes: Deaf Studies Talking*, edited by H-Dirksen L. Bauman, 277–92. University of Minnesota Press, 2008.

Lane, Harlan. *The Mask of Benevolence: Disabling the Deaf Community*. Alfred A. Knopf, 1992.

Lane, Harlan. *When the Mind Hears: A History of the Deaf*. Random House, 1984.

Lane, Harlan, Robert Hoffmeister, and Benjamin J. Bahan. *A Journey into the Deaf-World*. Dawn Sign Press, 1996.

Lane, Harlan, Richard C. Pillard, and Ulf Hedberg, eds. *The People of the Eye: Deaf Ethnicity and Ancestry*. Oxford University Press, 2011.

Lang, Harry G. "Perspectives on the History of Deaf Education." In *The Oxford Handbook of Deaf Studies, Language, and Education*, edited by Marc Marschark and Patricia Spencer, 9–20. Oxford University Press, 2003.

Lawless, Elaine J. *Reciprocal Ethnography and the Power of Women's Narratives*. Indiana University Press, 2019.

Lehmann, Andreas C., John A. Sloboda, and Robert H. Woody. *Psychology for Musicians: Understanding and Acquiring the Skills*. Oxford University Press, 2007.

Lerner, Neil, and Joseph Straus, eds. *Sounding Off: Theorizing Disability in Music*. Routledge 2006.

"Letter No, 089, 'The Heiligenstadt Testament,' Ludwig van Beethoven to His Brothers, October 6th, 1802." In *Letters of Note: Correspondence Deserving of a Wider Audience*, compiled by Shaun Usher, 324–26. Canongate Books, 2021.

Levänen, Sari, and Dorothea Hamdorf. "Feeling Vibrations: Enhanced Tactile Sensitivity in Congenitally Deaf Humans." *Neuroscience Letters* 301 (2001): 75–77.

Levitin, Daniel J. *This Is Your Brain on Music: The Science of a Human Obsession*. Dutton, 2006.

Lewis, J. Parrish. "Why I Love Music Even Though I'm Deaf." *MunkyMind* (blog), December 5, 2015. Accessed April 15, 2016. http://www.munkymind.com/blog/2015/12/05/why-i-love-music-even-though-im-deaf/

Lewis, Tanya. "Do Deaf People Really Have Superhuman Vision?" *LiveScience*, November 26, 2013. Accessed April 16, 2016. http://www.livescience.com/41521-deaf-people-superhuman-senses.html

Limongi, Alice Alonso. "Contradictions in Metal: A Comparative Analysis of Sound of Metal (2019)." *Film Matters* 15/3 (2024): 7–19.

Linton, Simi. "Reassigning Meaning." In *The Disability Studies Reader*, 2nd ed., edited by Lennard J. Davis, 161–72. Routledge, 2006.

Lloyd, Stephanie, and Chani Bonventre. "Habilitation Beyond the Bionic Metaphor: Producing Deafness of the Future." *Science, Technology, & Human Values* 50/2 (2023): 336–63.

Lloyd, Stephanie, and Chani Bonventre. "When the Artificial Is Natural: Reconsidering What Bionics and Sensoria Do." *Ethos* 48/3 (2021): 295–316.

Lloyd, Stephanie, and Alexandre Tremblay. "No Hearing Without Signals: Imagining and Reimagining Transductions Through the History of the Cochlear Implant." *Senses and Society* 16/3 (2021): 259–77.

Locker, Melissa. "Nyle DiMarco Is a Frontrunner on *Dancing with the Stars*—Even Though He Can't Hear the Music." *Time*, April 25, 2016. Accessed April 29, 2016. http://time.com/4301926/dancing-with-the-stars-nyle-dimarco/

Loeser, Cassandra, and Vicki Crowley. "A Natural Ear for Music? Hearing (Dis) abled Masculinities." *Popular Music* 28/3 (2009): 411–23.

Losseff, Nicky, and Jenny Doctor, eds. *Silence, Music, Silent Music*. Ashgate, 2007.

Loui, Psyche. "Absolute Pitch." In *The Oxford Handbook of Music Psychology*, 2nd ed., edited by Susan Hallam et al., 81–94. Oxford University Press, 2014.

Lowery, Kristy. "What Is Hearing Aid Acclimatization?" Audibel, May 15, 2025. Accessed September 7, 2025. https://www.audibel.com/hearing-loss-treatment/hearing-aid-acclimatization-overview/

Ma, Michelle. "New Strategy Lets Cochlear Implant Users Hear Music." *UWToday*, October 9, 2013. Accessed April 16, 2016. http://www.washington.edu/news/2013/10/09/new-strategy-lets-cochlear-implant-users-hear-music/

Macaskill, Mark. "Evelyn Glennie to Learn Sign Language at Age 42." *Sunday Times*, July 13, 2008. Accessed August 12, 2016. http://www.thesundaytimes.co.uk/sto/news/uk_news/article105638.ece

MacIntyre, Alexis Deighton. "The Signification of the Signed Voice." *Journal of Interdisciplinary Voice Studies* 3/2 (2018): 167–83.

MacMillen, Ian, Darci Sprengel, Benjamin Tausig, and Yun Emily Wang. "Proposal and Introduction." In *Quiet Relations: A Minor Volume*, edited by Ian MacMillen, Darci Sprengel, Benjamin Tausig, and Yun Emily Wang, 1–15. Duke University Press, forthcoming.

Maler, Anabel. "Music and Deafness in the Nineteenth-Century U.S. Imagination." *Journal of the Society for American Music* 16/2 (2022): 184–205.

Maler, Anabel. "Musical Expression Among Deaf and Hearing Song Signers." In *The Oxford Handbook of Music and Disability Studies*, edited by Blake Howe, Stephanie Jensen-Moulton, Neil Lerner, and Joseph N. Straus, 73–91. Oxford University Press, 2016.

Maler, Anabel. *Seeing Voices: Analyzing Sign Language Music*. Oxford University Press, 2024.

Maler, Anabel. "Songs for Hands: Analyzing Interactions of Sign Language and Music." *Music Theory Online* 19/1 (2013): http://www.mtosmt.org/issues/mto.13.19.1/mto.13.19.1.maler.html

Maler, Anabel, and Robert Komaniecki. "Rhythmic Techniques in Deaf Hip Hop." *Music Theory Online* 27/1 (2021): https://mtosmt.org/issues/mto.21.27.1/mto.21.27.1.maler.html#best_2015-2016

Mamo, Sara, and Tomma Henckel. "A Holistic Approach to Addressing Post-Fitting Needs in the Short and Long Term for New Hearing Aid Users." *Seminars in Hearing* 48/2 (2022): 57–62.

Manning, Eric. *Politics of Touch: Sense, Movement, Sovereignty*. University of Minnesota Press, 2007.

Marschark, Marc, Gladys Tang, and Harry Knoors, eds. *Bilingualism and Bilingual Deaf Education*. Oxford University Press, 2014.

Matamala, Anna, and Pilar Orero, eds. *Listening to Subtitles: Subtitles for the Deaf and Hard of Hearing*. Peter Lang, 2010.

Maus, Fred Everett. "The Disciplined Subject of Musical Analysis." In *Beyond Structural Listening? Postmodern Modes of Hearing*, edited by Andrew Dell'Antonio, 13–43. University of California Press, 2004.

McClary, Susan. *Feminine Endings: Music, Gender, and Sexuality*. University of Minnesota Press, 1991.

McIlroy, Guy, and Claudine Storbeck. "Development of Deaf Identity: An Ethnographic Study." *Journal of Deaf Studies and Deaf Education* 16/4 (2011): https://doi.org/10.1093/deafed/enr017

McKay, George. "Johnnie-Be-Deaf: *One* Hearing-Impaired Star, and Popular Music as a Disabling (Deafening) Culture." In *Shakin' All Over: Popular Music and Disability*, 120–49. University of Michigan Press, 2013.

McKerrell, Simon, and Lyndon C. S. Way, eds. *Music as Multimodal Discourse: Semiotics, Power, and Protest*. Bloomsbury Academic, 2017.

McMullen, Tracy. "Subject, Object, Improv: John Cage, Pauline Oliveros, and Eastern (Western) Philosophy in Music." *Critical Studies in Improvisation* 6/2 (2010): 1–13.

McRuer, Robert. *Crip Theory: Cultural Signs of Queerness and Disability*. NYU Press, 2006.

Medeiros, Kristie, Devonta Thomas, and Andrea Wohl. "Deaf BIPOC: Unpacking the Needs in the Community." Learning Center for the Deaf, July 6, 2020. Accessed October 16, 2025. https://www.tlcdeaf.org/about/news/deaf-bipoc-unpacking-needs-community

Mehr, Samuel A. "Miscommunication of Science: Music Cognition Research in the Popular Press." *Frontiers in Psychology* 6 (2015): 988. https://doi.org/10.3389/fpsyg.2015.00988

Meizel, Katherine. *Multivocality: Singing on the Borders of Identity*. Oxford University Press, 2020.

Meizel, Katherine. "A Powerful Voice: Investigating Vocality and Identity." *Voice and Speech Review* 7/1 (2013): 267–74.

Meredith, M. Alex, James Kryklywy, Amee J. McMillan, Shveta Malhotra, Ryan Lum-Tai, and Stephen G. Lomber. "Crossmodal Reorganization in the Early Deaf Switches Sensory, but Not Behavioral Roles of Auditory Cortex." *Proceedings of the National Academy of Sciences of the United States of America* 108 (2011): 8856–61.

Mills, Mara. "Deafness." In *Keywords in Sound*, edited by David Novak and Matt Sakakeeny, 45–54. Duke University Press, 2015.

Mills, Mara. "Do Signals Have Politics? Inscribing Abilities in Cochlear Implants." In *The Oxford Handbook of Sound Studies*, edited by T. J. Pinch and Karin Bijsterveld, 320–46. Oxford University Press, 2012.

Mills, Mara. "Hearing Aids and the History of Electronics Miniaturization." *IEEE Annals of the History of Computing* 33/2 (2011): 24–45.

Mitchell, David T., and Sharon L. Snyder. *Narrative Prosthesis: Disability and the Dependencies of Discourse*. University of Michigan Press, 2000.

Mithen, Steven. *The Singing Neanderthals: The Origins of Music, Language, Mind, and Body*. Harvard University Press, 2007.

Miyazaki, Ken'ichi. "Absolute Pitch as an Inability: Identification of Musical Intervals in a Tonal Context." *Music Perception* 2/1 (1993): 55–71.

Miyazaki, Ken'ichi, et al. "Absolute Pitch and Relative Pitch in Music Studies in the East and West: Implications for Aural-Skills Education." *Music Perception* 36/2 (2018): 135–55.

Mockus, Martha. *Sounding Out: Pauline Oliveros and Lesbian Musicality*. Routledge, 2008.

Moges, Rezenet Tsegay. "'From White Deaf People's Adversity to Black Deaf Gain': A Proposal for a New Lens of Black Deaf Educational History." *Journal Committed to Social Change on Race and Ethnicity* 6/1 (2020): 69–99.

Mollow, Anna. "Identity Politics and Disability Studies: A Critique of Recent Theory." *Michigan Quarterly Review* 43, no. 2 (2004): http://hdl.handle.net/2027/spo.act2080.0043.218

Monaghan, Leila. "A World's Eye View: Deaf Cultures in Global Perspective." In *Many Ways to Be Deaf: International Variation in Deaf Communities*, edited by Leila Monaghan, Constanze Schmaling, Karen Nakamura, and Graham Turner, 1–24. Gallaudet University Press, 2003.

Monson, Ingrid. "Hearing, Seeing, and Perceptual Agency." *Critical Inquiry* 34/S2 (2008): S36–S58.

Moore, Andrew. "Bad Science in the Headlines: Who Takes Responsibility When Science Is Distorted in the Mass Media?" *EMBO Reports* 7 (2006): 1193–96.

Moore, David S. *The Dependent Gene: The Fallacy of "Nature vs. Nurture"*. Macmillan, 2003.

Moriarty Harrelson, Erin. "Authenticating Ownership: Claims to Deaf Ontologies in the Global South." In *Innovations in Deaf Studies: The Role of Deaf Scholar*, edited by Annelies Kusters, Maartje De Meulder, and Dai O'Brien, 361–84. Oxford University Press, 2017.

"The Mother-Tongue Method." Deutsche Suzuki Gesselschaft, International Music Exchange. Accessed August 7, 2025. https://germansuzuki.de/wp-content/uploads/2010/05/Muttersprache_eng.pdf

Mullender, Richard. *Dispelling the Myths and Rediscovering the Lost Art of Listening (Communication Secrets of a Hostage Negotiator)*. Griffin, 2012.

"Muscular and Skeletal Problems." Musicianhealth.com. Accessed May 22, 2016. http://www.musicianshealth.com/musculoskeletaldisorders.htm

"Musicians and the Alexander Technique." In *The Complete Guide to the Alexander Technique*. Accessed May 22, 2016. http://www.alexandertechnique.com/musicians.htm

"Musicians' Guide to Noise and Hearing—Part II: Toolkit for Managers." *BBC*, 2012. Accessed April 16, 2016. http://downloads.bbc.co.uk/safety/documents/safety-guides/audio-and-music/Safety-Musician_noise_guide_Part_II.pdf

"The Mythical Brain." Editorial in *Nature Neuroscience* 17 (2014): 1137. https://doi.org/10.1038/nn.3802

Nakamura, Karen. *Deaf in Japan: Signing and the Politics of Identity*. Cornell University Press, 2006.

Napoli, Donna Jo. "A Magic Touch: Deaf Gain and the Benefits of Tactile Sensation." In *Deaf Gain: Raising the Stakes for Human Diversity*, edited by H-Dirksen L. Bauman and Joseph J. Murray, 211–32. University of Minnesota Press, 2014.

Neary, Walter. "Brains of Deaf People Rewire to 'Hear' Music." *UWToday*, November 27, 2001. Accessed April 16, 2016. http://www.washington.edu/news/2001/11/27/brains-of-deaf-people-rewire-to-hear-music/

Neff, Patrick, et al. "10 Hz Amplitude Modulated Sounds Induce Short-Term Tinnitus Suppression." *Frontiers in Aging Neuroscience*, May 2017: https://doi.org/10.3389/fnagi.2017.00130

Neisser, Arden. *The Other Side of Silence: Sign Language and the Deaf Community in America*. Gallaudet University Press, 1983.

Norden, Martin. *The Cinema of Isolation: A History of Physical Disability in the Movies*. Rutgers University Press, 1994.

Norman, Katharine. "Real-World Music as Composed Listening." *Contemporary Music Review* 15/1 (1996): 1–27.

North, Anna. "The Dangers of 'Brain'-Speak." *New York Times*, June 5, 2014. Accessed May 21, 2016. http://op-talk.blogs.nytimes.com/2014/06/05/the-dangers-of-brain-speak/?_r=0

Novak, David. "Playing Off-Site: The Untranslation of *Onkyô*." *Asian Music* 41/1 (2010): 36–59.

Novak, David, and Matt Sakakeeny, eds. *Keywords in Sound*. Duke University Press, 2015.

Ochoa Gautier, Ana María. "Silence." In *Keywords in Sound*, edited by David Novak and Matt Sakakeeny, 183–92. Duke University Press, 2015.

Ochsner, Beate. "Negotiating Contingency: Between Personalisation and Customisation in Digital Hearing Systems." *Sound Studies* 11/2 (2025): 290–313.

Oliveros, Pauline. *Deep Listening: A Composer's Sound Practice*. iUniverse, 2005.

Oliveros, Pauline. *Sonic Meditations*. Smith Publications, 1971.

"Our Mission Statement." Evelyn Glennie website. Accessed August 3, 2016. https://www.evelyn.co.uk/mission-statement/

Padden, Carol, and Tom Humphries. *Deaf in America: Voices from a Culture*. Harvard University Press, 1988.

Padden, Carol, and Tom Humphries. *Inside Deaf Culture*. Harvard University Press, 2005.

Parisot, Anne-Marie, Julie Rinfret, Suzanne Villeneuve, and Amélie Voghel. "Quebec Sign Language." In *Sign Languages of the World: A Comparative Handbook*, edited by Julie Bakken Jepsen, Goedele De Clerck, Sam Lutalo-Kiingi, and William B. McGregor, 701–28. Walter de Gruyter, 2015.

Patel, Aniruddh D. *Music, Language, and the Brain*. Oxford University Press, 2008.
Pearce, J. M. S. "Selected Observations on Amusia." *European Neurology* 54 (2005): 145–48.
Perchard, Tom. "New Riffs on the Old Mind-Body Blues: 'Black Rhythm,' 'White Logic,' and Music Theory in the Twenty-First Century." *Journal of the Society for American Music* 9/3 (2015): 321–48.
Perlmutter, David. "What Is Sign Language?" Linguistic Society of America. Accessed August 21, 2016. http://www.linguisticsociety.org/sites/default/files/Sign_Language.pdf
Pohlhaus, Gaile, Jr. "Relational Knowing and Epistemic Injustice: Toward a Theory of *Willful Hermeneutical Ignorance*." *Hypatia* 27/4 (2012): 715–35.
"Position Statement on Schools for the Deaf." National Association of the Deaf. Accessed October 16, 2025. https://www.nad.org/about-us/position-statements/position-statement-on-schools-for-the-deaf/
Price, Margaret. "The Bodymind Problem and the Price of Pain." *Hypatia* 30/1 (2014): 268–84.
"Protect Your Hearing: Musicians' Hearing Health Scheme." Musicians' Union. Last modified 2016. Accessed May 22, 2016. http://www.musiciansunion.org.uk/Home/Advice/Your-Career/Health-and-Safety/Protecting-Your-Hearing-(Including-Noise-Hearing-P
Pullin, Graham. *Design Meets Disability*. MIT Press, 2009.
Ramsey, Guthrie. "Who Hears Here? Black Music, Critical Bias, and the Musicological Skin." *Musical Quarterly* 85/1 (2001): 1–52.
Ransohoff, David F., and Richard M. Ransohoff. "Sensationalism in the Media: When Scientists and Journalists May Be Complicit Collaborators." *Effective Clinical Practice* 4 (July–August 2001): 185–88.
"Real-Ear Measurements: A Step-by-Step Guide." Interacoustics, March 31, 2023. Accessed September 9, 2025. https://www.interacoustics.com/academy/hearing-aid-fitting-training/rem/real-ear-measurement-steps
Rée, Jonathan. *I See a Voice: Deafness, Language, and the Senses—a Philosophical History*. Metropolitan Books, 1999.
Renzetti, Elizabeth. "At This Rave, Deaf Is Def." *Globe and Mail*, January 6, 2007. Last updated March 13, 2009. Accessed April 20, 2016. http://www.theglobeandmail.com/arts/at-this-rave-deaf-is-def/article17989037/
Robbins, Martin. "The Trouble with TED Talks." *New Statesman*, September 10, 2012. Accessed August 2, 2016. http://www.newstatesman.com/martin-robbins/2012/09/trouble-ted-talks
Robinson, Dylan. *Hungry Listening: Resonant Theory for Indigenous Sound Studies*. University of Minnesota Press, 2020.
Robinson, Geoffrey D. "The Motif of Deafness and Blindness in Isaiah 6:9–10: A Contextual, Literary, and Theological Analysis." *Bulletin for Biblical Research* 8 (1998): 167–86.
Rømer, Lotte. *Hva' Så? Om Hørepsykologi og Høretaktik*. Lindhardt og Ringhof Forland, 2006.
Rømer, Lotte. *Say What?!* Unpublished translation by Steve Schein. 2006.

Rowden, Terry. *The Songs of Blind Folk: African American Musicians and the Cultures of Blindness*. University of Michigan Press, 2009.
Sacks, Oliver. *An Anthropologist on Mars: Seven Paradoxical Tales*. Picador, 1995.
Sacks, Oliver. *Musicophilia: Tales of Music and the Brain*. Alfred A. Knopf, 2007.
Sanchez, Rebecca. "Deafness and Sound." In *Sound and Literature*, edited by Anna Snaith, 272–86. Cambridge University Press, 2020.
Schafer, R. Murray. *The Book of Noise*. Price Milburne, 1970.
Schafer, R. Murray. *Ear Cleaning: Notes for an Experimental Music Course*. BMI Canada, 1967.
Schafer, R. Murray. *The Soundscape: Our Sonic Environment and the Tuning of the World*. Destiny Books, 1977.
Schalk, Sami. "Black Disability Gone Viral: A Critical Race Approach to Inspiration Porn." *College Language Association Journal* 64/1 (2021): 100–120.
Schalk, Sami. *Bodyminds Reimagined: (Dis)ability, Race, and Gender in Black Women's Speculative Fiction*. Duke University Press, 2018.
Schellenberg, E. Glenn, and Sandra Trehub. "Is There an Asian Advantage for Pitch Memory." *Music Perception* 25/3 (2008): 241–52.
Scheller, Tom, and Kelly Fitz. "Designed for Music Listening." Starkey Hearing Technologies, 2016. Accessed September 7, 2025. https://order.starkeypro.com/pdfs/technical-papers/Designed_for_Music_Listening.pdf
Schriempf, Alexa. "Hearing Deafness: Subjectness, Articulateness and Communicability." In *Embodied Selves*, edited by Stella Gonzalez-Arnal, Gill Jagger, and Kathleen Lennon, 160–79. Palgrave Macmillan, 2012.
Schultz, Martin C., et al. "Analytic Study of the Tadoma Method: Effects and Hand Positions on Segmental Speech Perception." *Journal of Speech and Hearing Research* 32/4 (1989): 921–29.
Seashore, Carl E. "The Measurement of Musical Talent." *Musical Quarterly* 1/1 (1915): 129–48.
Selby, Todd. "Todd Selby x Christine Sun Kim." Nowness Productions video, 10:15, November 9, 2011. Accessed May 27, 2016. https://www.nowness.com/story/todd-selby-x-christine-sun-kim
Sheldrake, Jacqueline, et al. "Audiometric Characteristics of Hyperacusis Patients." *Frontiers in Neurology* 6 (May 2015): https://doi.org/10.3389/fneur.2015.00105
Sherman, Bernard D. "Losing Your Ears to Music: The Hearing Loss Epidemic and Musicians." Bernard D. Sherman website. Reprinted from *Early Music America* (Spring 2000). Accessed August 21, 2016. http://www.bsherman.net/hearingloss.htm
Shew, Ashley. *Against Technoableism: Rethinking Who Needs Improvement*. Norton, 2023.
Shildrick, Margrit. *Leaky Bodies and Boundaries: Feminism, Postmodernism, and (Bio)ethics*. Routledge, 1997.
Siebers, Tobin. *Disability Aesthetics*. University of Michigan Press, 2010.
Siebers, Tobin. *Disability Theory*. University of Michigan Press, 2008.

Silverman, Arielle. "Disability Simulations: What Does the Research Say?" *Braille Monitor*, June 2017: https://nfb.org/images/nfb/publications/bm/bm17/bm1706/bm170602.htm

Simoes, Jorge, et al. "Toward Personalized Tinnitus Treatment: An Exploratory Study Based on Internet Crowdsensing." *Frontiers in Public Health*, June 25, 2019: https://doi.org/10.3389/fpubh.2019.00157

Simpson, Benjamin. "Music for People of the Eye." Deaf Topics: Music and the Deaf. *ASL University* (blog), July 12, 2013. Lifeprint.com. Accessed April 15, 2016. http://www.lifeprint.com/asl101/topics/music-and-the-deaf-3.htm

Skyer, Michael E. "Deaf Ecologies." *Journal of Deaf Studies and Deaf Education* 21/2 (2016): 234.

Small, Christopher. *Musicking: The Meanings of Performing and Listening*. University Press of New England, 1998.

Smalley, Denis. "The Listening Imagination: Listening in the Electroacoustic Era." In *Companion to Contemporary Musical Thought*, vol. 1, edited by John Paynter et al., 514–54. Routledge, 1993.

Smetana, Bedřich. *Bedřich Smetana: Letters and Reminiscences*. Edited by František Bartoš. Artia, 1955.

Sonnentag, Tammy, and Mark A. Barnett. "Emotional Self-Regulation." In *Encyclopedia of Child Behavior and Development*, edited by S. Goldstein and J. A. Naglieri, 577–78. Springer, 2011.

"Sound Advice Note 2." Sound Advice. Last modified 2007. Accessed May 22, 2016. http://www.soundadvice.info/thewholestory/san2.htm

Spillane, Damien. "Misconceptions: Speech-Language Pathology." YouTube video, 11:35, October 29, 2013. Accessed August 3, 2016. https://www.youtube.com/watch?v=HRdzrr2oKwo

St. Pierre, Joshua. "The Construction of the Disabled Speaker: Locating Stuttering in Disability Studies." *Canadian Journal of Disability Studies* 1/3 (2012): 1–21.

St. Pierre, Joshua, and Charis St. Pierre. "Governing the Voice: A Critical History of Speech-Language Pathology." *Foucault Studies* 24 (June 2018): 151–84.

Stenross, Barbara. *Missed Connections: Hard of Hearing in a Hearing World*. Temple University Press, 1999.

Sterne, Jonathan. *The Audible Past: Cultural Origins of Sound Reproduction*. Duke University Press, 2003.

Sterne, Jonathan. *Diminished Faculties: A Political Phenomenology of Impairment*. Duke University Press, 2021.

Sterne, Jonathan. *MP3: The Meaning of a Format*. Duke University Press, 2012.

Stone, Alex. "Deaf Rapper Sean Forbes Makes Himself Joyfully Heard on the Hip-Hop Scene." *Washington Post*, January 25, 2015. Accessed April 15, 2016. https://www.washingtonpost.com/entertainment/music/deaf-rapper-sean-forbes-makes-himself-joyfully-heard-on-the-hip-hop-scene/2015/01/25/15943fdc-a0f4-11e4-9f89-561284a573f8_story.html

Straus, Joseph N. *Extraordinary Measures: Disability in Music*. Oxford University Press, 2011.

Straus, Joseph N. "Idiots Savants, Retarded Savants, Talented Aments, Mono-Savants, Autistic Savants, Just Plain Savants, People with Savant Syndrome, and Autistic People Who Are Good at Things: A View from Disability Studies." *Disability Studies Quarterly* 34/3 (2014). https://dsq-sds.org/article/id/55/

Sueur, Jérôme. *Natural History of Silence*. Translated by Helen Morrison. Polity Press, 2025.

Suzuki, Shinichi. *Nurtured by Love: The Classic Approach to Talent Education*. Translated by Waltraud Suzuki. Alfred Music, 1983.

Swinbourne, Charlie. "Deaf Voices Are Natural, So Why Are They Still Mocked?" *The Guardian*, November 11, 2012. Accessed May 26, 2016. http://www.theguardian.com/commentisfree/2012/nov/11/deaf-voices-mocked

Szibor, Annett, Antti Mäkitie, and Antti A. Aarnisalo. "Tinnitus and Suicide: An Unresolved Relation." *Audiology Research* 9/1 (2019): 10–13.

Szyfter, Krzysztof, and Jadwiga Wigowska-Sowińska. "Congenital Amusia: Pathology of a Musical Disorder." *Journal of Applied Genetics* 63/1 (2022): 121–31.

Szyfter, Krzysztof, and Michał P. Witt. "How Far Musicality and Perfect Pitch Are Derived from Genetic Factors." *Journal of Applied Genetics* 61 (2020): 407–14.

Taylor, Charles. *Modern Social Imaginaries*. Duke University Press, 2004.

Thakur, Tanu, and Vikas Gupta. "Auditory Hallucinations." In *StatPearls*. StatPearls Publishing, 2025. Last updated February 13, 2023. Accessed October 22, 2025. https://www.ncbi.nlm.nih.gov/books/NBK557633/

Thomas, Jan Peter, et al. "Aetiology of Ludwig van Beethoven's Hearing Impairment: Hypotheses over the Past 100 Years—a Systematic Review." *European Archives of Oto-Rhino-Laryngology* 278/8 (2021): 2703–12.

Thompson, Marie. "Listening with Tinnitus." *FKW Zeitschrifft für Geschlechterforschung und Visuelle Kultur* 69 (April 2021): 30–40.

Thompson, Marie, and Mack Hagood. "Tinnitus, Exclusion, Relationality (Beyond Normate Phenomenology)." *Capacious: Journal for Emerging Affect Inquiry* 2/3 (2021): 66–80.

Ting, Olivia. "Between *Piano* and *Forte*: Hearing with Aids." *Leonardo* 57/2 (2024): 153–61.

Tomkinson, Matthew. "Notes on Mad Listening." *Capacious: Journal for Emerging Affect Inquiry* 3/1 (2023): 17–39.

Torrence, Stephen. "On the Ethics of 'My' Art." *Torrentsofthought* (blog), September 20, 2014. Accessed April 16, 2016. http://www.torrentsofthought.com/on-the-ethics-of-my-art/

Touch the Sound: A Sound Journey with Evelyn Glennie. DVD. Directed by Thomas Riedelsheimer. Filmquadrat, 2004.

Tronstad, Tron V., and Femke B. Gelderblom. "Sound Exposure During Outdoor Music Festivals." *Noise & Health* 18/83 (2016): 220–28.

Trower, Shelley. *Senses of Vibration: A History of the Pleasure and Pain of Sound*. Continuum, 2012.

Truax, Barry. *Acoustic Communication*. 2nd ed. Greenwood Press, 2001.

Tucker, Sherrie, and Ray Mizumura-Pence. "Introduction" to *Improvising Across Abilities: Pauline Oliveros and the Adaptive Use Musical Instrument*, edited by Thomas Ciufo et al., 1–14. University of Michigan Press, 2024.

"Type, Degree, and Configuration of Hearing Loss." Audiology Information Series. American Speech-Language-Hearing Association. Accessed April 12, 2016. http://www.asha.org/uploadedFiles/AIS-Hearing-Loss-Types-Degree-Configuration.pdf

Valente, Michael, Elizabeth Fernandez, and Heather Monroe. *Audiology Answers for Otolaryngologists: A High-Yield Pocket Guide*. Thieme Medical Publishers, 2011.

Veditz, George. "The President's Message." In *Proceedings of the Ninth Convention of the National Association of the Deaf and the Third World's Congress of the Deaf, 1910*, 22–31. Philocophus Press, 1912.

Virdi, Jaipreet. "Deaf Futurity: Designing and Innovating Hearing Aids." *Medical Humanities* 50 (2024): 678–84.

Virdi, Jaipreet. *Hearing Happiness: Deafness Cures in History*. University of Chicago Press, 2020.

Wallace, Robin. *Hearing Beethoven: A Story of Musical Loss and Discovery*. University of Chicago Press, 2018.

Wallmark, Zachary. "The Sound of Evil: Timbre, Body, and Sacred Violence in Death Metal." In *The Relentless Pursuit of Tone: Timbre in Popular Music*, edited by Robert Fink, Melinda Latour, and Zachary Wallmark, 65–87. Oxford University Press, 2018.

Walser, Robert. *Running with the Devil: Power, Gender, and Madness in Heavy Metal Music*. Wesleyan University Press, 1993.

Weisblum, Vida. "How We Listen Determines What We Hear: Christine Sun Kim on Her Recent Sound Works, Working with Blood Orange." *ArtNews*, September 28, 2015. Accessed October 9, 2016. http://www.artnews.com/2015/09/28/how-we-listen-determines-what-we-hear-christine-kim-on-her-recent-sound-works-teaming-with-blood-orange/

Weiss, Piero, ed. *Letters of Composers Through Six Centuries*. Chilton Books, 1967.

Wendell, Susan. *The Rejected Body: Feminist Philosophical Reflections on Disability*. Routledge, 1996.

Westoll, Nick. "Toronto School Breaking Down Barriers to Dance." *Toronto Star*, January 25, 2015. Accessed April 20, 2016. http://www.thestar.com/yourtoronto/education/2015/01/25/toronto-school-breaking-down-barriers-to-dance.html

"What Does a Deaf Rave Sound Like?" *BBC News*, April 13, 2004. Accessed April 20, 2016. http://news.bbc.co.uk/2/hi/uk_news/magazine/3621529.stm

Whitesell, Lloyd. "White Noise: Race and Erasure in the Cultural Avant-Garde." *American Music* 19/2 (2001): 168–89.

Whittaker, Paul, Robert Fulford, Nigel Osborne, and Lloyd Coleman. "The Role of Art in Coping with Sensory Impairment." Introduction by Michael Trimble. Panel presented at the Annual Conference of the Musical Brain Charity, "The

Beethoven Question: Can Art Make Life Worth Living?" Southbank Centre, London, October 27–28, 2012. Proceedings accessed August 29, 2016. http://www.themusicalbrain.org/Day_1_-_PW.pdf

Williamson, Bess. "Access." In *Keywords for Disability Studies*, edited by Rachel Adams, Benjamin Reiss, and David Serlin, 14–18. NYU Press, 2015.

Williamson, Bess. *Accessible America: A History of Disability and Design*. NYU Press, 2019.

"'Who's Handicapped Now, Mother****ers!?'—Meet Shawn Vriezen, Deaf Metalhead." *The Toilet OV Hell* (blog), December 3, 2014. Accessed August 4, 2016. http://www.toiletovhell.com/whos-handicapped-now-motherfckers/

Woll, Bencie, and Paddy Ladd. "Deaf Communities." In *The Oxford Handbook of Deaf Studies, Language, and Education*, edited by Marc Marschark and Patricia Spencer, 151–63. Oxford University Press, 2003.

Wood, Elizabeth. "On Deafness and Musical Creativity: The Case of Ethel Smyth." *Musical Quarterly* 92 (2009): 33–69.

Woodland, Les. "Evelyn Glennie: Sound in Silence." *Drum! Play Better Faster*, July 19, 2012. Accessed April 15, 2016. http://www.drummagazine.com/hand-drum/post/evelyn-glennie-sound-in-silence/

Woodward, James, and Thomas P. Horejes. "d/Deaf: Origins and Usage." In *The Sage Deaf Studies Encyclopedia*, edited by Genie Gertz and Patrick Boudreault, 285–87. Sage, 2016.

"The World Soundscape Project." WSP. Accessed October 16, 2025. https://www.sfu.ca/sonic-studio-webdav/WSP/index.html

Wray, John. "Heady Metal." *New York Times Magazine*, May 28, 2006. Accessed August 4, 2016. http://www.nytimes.com/2006/05/28/magazine/28artmetal.html?pagewanted=all&_r=0

Wright, Lindsay J. "Black Musicality and the Invention of Talent: The Case of Thomas Wiggins." *19th Century Music* 47/1 (2023): 33–52.

Wright, Lindsay J. "Discourses of Musical Talent in American Culture." PhD dissertation, University of Chicago, 2018.

Wright, S. J., Gloshanda Lawyer, and E. H. Bart. "Decision-Making in the Era of Postmodern Audism." In *Who Decides? Power, Disability, and Educational Leadership*, edited by Catherine O'Brien, William R. Black, and Arnold B. Danzig, 91–121. Information Age Publishing, 2022.

Yergeau, Remi. *Authoring Autism: On Rhetoric and Neurological Queerness*. Duke University Press, 2017.

Young, Stella. "I'm Not Your Inspiration, Thank You Very Much." Transcript, *TedTalk Conferences LLC*, June 2014. Accessed July 9, 2016. https://www.ted.com/talks/stella_young_i_m_not_your_inspiration_thank_you_very_much/transcript?language=en

Young, Stella. "We're Not Here for Your Inspiration." *Ramp Up: Disability. Discussion. Debate*. (blog), July 2, 2012. Accessed July 9, 2016. http://www.abc.net.au/rampup/articles/2012/07/02/3537035.htm

Zatorre, Robert J. "Absolute Pitch: A Model for Understanding the Influence of Genes and Development on Neural and Cognitive Function." *Nature Neuroscience* 6/7 (2003): 692–95.

Zeng, Fan-Gang. "Tinnitus and Hyperacusis: Central Noise, Gain and Variance." *Current Opinion in Physiology* 18 (December 2020): 123–29.

Ziegler, Jan, Laura Balling, and Dana Helmink. "The Importance of Natural Sound for Hearing Aid Users and Clinicians." *Hearing Review*, June 12, 2024. Accessed September 7, 2024. https://hearingreview.com/hearing-products/hearing-aids/the-importance-of-natural-sound-for-hearing-aid-users-and-clinicians

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