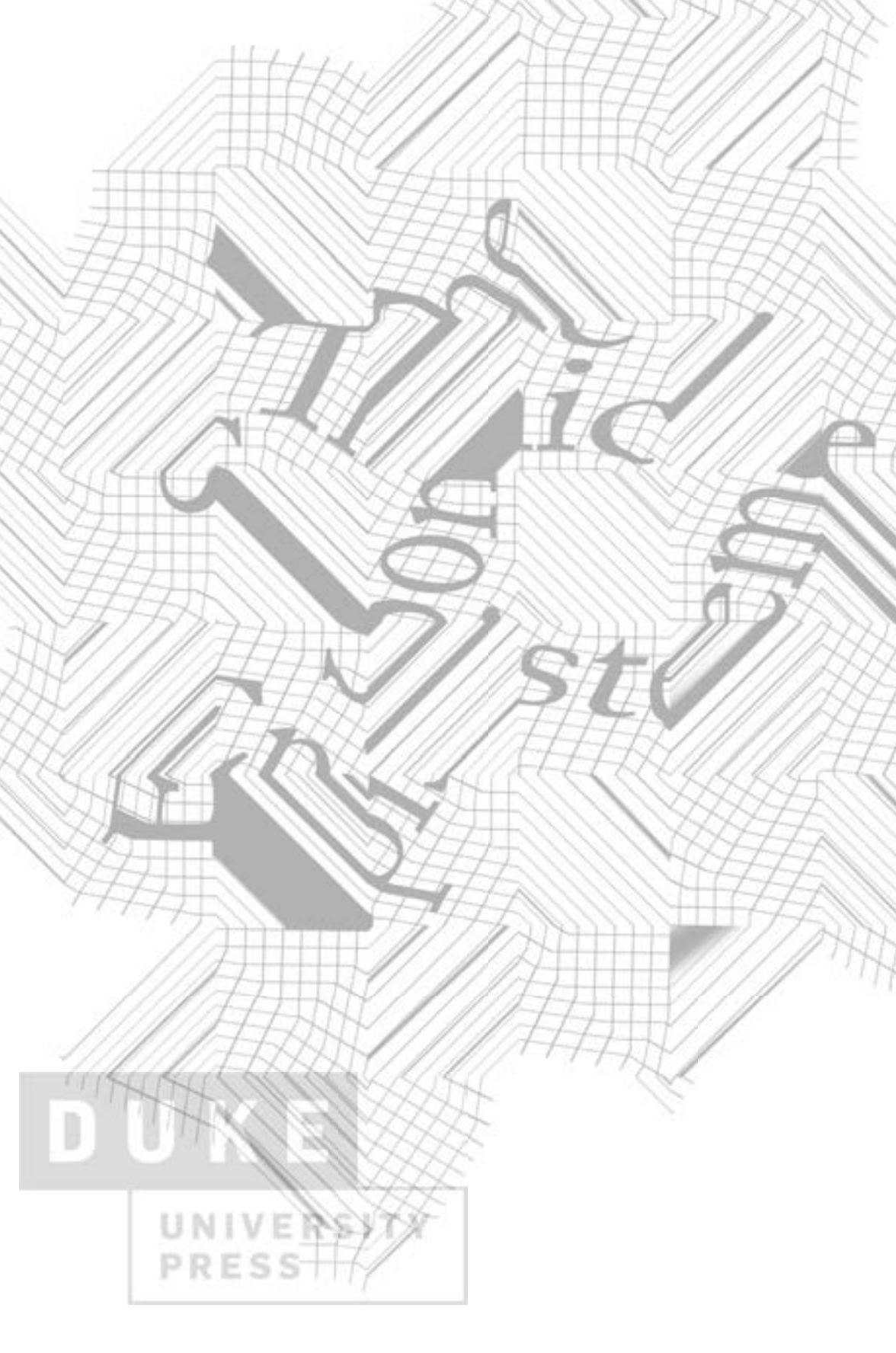
THE SONIC EPISTEME

ACOUSTIC RESONANCE, NEOLIBERALISM, AND BIOPOLITICS

ROBIN JAMES



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I started working on this book in 2011, when I was rereading Jacques Attali's *Noise* after having just taught Foucault's lectures on neoliberalism. My 2012 *New Inquiry* piece on Attali and Foucault was the germ that sprouted into both this book and *Resilience and Melancholy*, which began, in my head, as the same project. I would like to thank Rob Horning, my editor at *The New Inquiry*, for helping this project get its start. This book also began as my first *Sounding Out!* article on sound and biopolitics. Thanks to Jennifer Stoever and Liana Silva for their work on this and for what has become a long and productive working relationship; I hired Liana as a developmental editor to help me with the final round of manuscript revisions. Everything in this book began as seeds of ideas I shared with my husband, Christian Ryan, over drinks or while walking the dogs. He helped me shape these rough ideas into terms accessible to nonexperts and lent me his college acoustics textbooks so I could double-check and make sure I had the science right. He also took care of all our dogs, plants, and all the housework while I was away giving conference papers and invited talks that would eventually become part of this book. The conditions of capitalism are such that everyone basically needs a "wife," and I am grateful that I have someone who will help me share the reproductive labor it takes just to live, because that's what makes it possible for me to have the time to think and write.

I have shared earlier versions of the work in this book all over the world. Some of the material in the introduction was delivered as talks at the Society for Phenomenology and Existential Philosophy in 2017 and 2018; the 2017 talk was published in the SPEP special issue of the *Journal of Speculative Philosophy*. I lectured on versions of chapter 1 at UCLA's Musicology Colloquium and the Harvard Graduate Music Forum. Versions of the discussion of Rihanna's "BBHMM" in chapter 2 were delivered as lectures at LaSalle University's Philosophy Colloquium, the APA Eastern Division Annual Meeting, Ithaca College's Music Department Colloquium, and the College of Charleston's Aesthetics Working Group. Various parts of chapter 3 were delivered as lectures at the AMS Music and Philosophy Study Group, the University of Virginia Music Department Colloquium, and the SPEP. Versions of chap-

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INTRODUCTION

Music . . . first connected the senses to the invisible realm of mathematical theory. . . . Music harmonized experience with mathematics.

— Peter Pesic, *Music and the Making of Modern Science*

I. The Sonic Episteme

People use the term "symphony" to explain and put a positive spin on data analytics so frequently that it's on the fast track to becoming a cliché. Symphony and Symphony Solutions are software companies focused on digital communication and data analytics. Symphony Health and Symphony Corporation are data analytics firms serving the healthcare industry. Symphony Retail uses artificial intelligence for retail applications like marketing and logistics. Data scientists working at these (and other) companies commonly use ideas of *symphonia* (συμφωνία)—the ancient Greek word for pleasing harmony—to describe the nuts and bolts of what they do. On data science firm dunnhumby's corporate blog, David Castro-Gavino's post titled "Creating a Symphony from the Noise of Customer Data" uses the idea of symphony to explain how data scientists discover useful, meaningful relationships among individual data points: patterns in the frequency of consumer behaviors interact to form actionable information just as patterns in the frequency of sound waves interact to form pleasing resonances.[1] Capitalizing on mathematical similarities between the physics of sound and the metaphysics of predictive analytics, this comparison appeals to laypeople's musical understanding of sound to translate the complex math behind data analytics into familiar and accessible nonquantitative terms.[2]

As the epigraph suggests, Western culture commonly uses music to translate math into qualitative terms. But in the late twentieth and early twenty-first centuries, the neoliberal, biopolitical push to quantify every last bit of reality has elevated a specific kind of math—probabilistic statistics—from a

mere tool for describing things to the fundamental structure of reality and knowledge themselves. As philosopher Mary Beth Mader explains, the use of probabilistic statistics to study and govern people has led to "a radical shift in ontological register" from the social to the mathematical. Statistics do not describe relations among people but "a relation between numbers or quantities alone."[3] For example, the Centers for Disease Control reported that the suicide rate in North Carolina from 2014 to 2016 was 15.3 out of 100,000 people. This figure expresses the frequency of one average number (suicides) in relation to another average number (population); it does not represent a count of actual suicides or living people.[4] In addition to showing how this statistic expresses a relation among numbers rather than people, this example highlights that probabilistic statistics reimagine the world as a specific type of mathematical relationship: a frequency ratio. In the "ontological shift" from people to frequency ratios, the rules and principles behind this math come to be taken as the basic rules and principles behind reality itself. Because sound is commonly understood to be a kind of frequency, it is easy to use people's practical knowledge and experience of music to translate that math into down-to-earth terms.

These appeals to music and sound don't just dumb down math for nonexperts; they also capture aspects of reality mathematics cannot. As much as states, corporations, and even artistic and academic practices try to quantify everything, people will continue to experience things in qualitative ways, like with their senses or their emotions.[5] And as processes of quantification surpass the grasp of both nonexperts and individual human brains, these qualitative registers of experience may be the most efficient medium in which to perform the ontological shift from people to frequencies in a way that people can easily understand and adapt to. This is where the old music/math trope comes in handy, except here sound isn't just a metaphor for math.

Metaphors draw figurative, counterfactual relationships between things that *aren't actually the same*. However, the introductory examples use "symphony" to translate *the same structure or relationship* from a quantitative medium into a qualitative one. Acoustic resonance (i.e., sound as a frequency or oscillating pattern of variable intensity) and neoliberal, biopolitical statistics are different ways of expressing relationships among frequency ratios: one quantitatively, as a rate; the other qualitatively, as resonant sound. In these cases, acoustically resonant sound and math are two different ways of expressing the same kinds of relationships, two sides of the same coin.

Scholars refer to the quantitative side of this coin as a "neoliberal epis-

teme."[6] For example, philosopher Shannon Winnubst argues that "neoliberalism repeats the themes of liberalism in a different voice"[7] because it articulates liberalism's basic commitments—such as individualism and white supremacy—in terms that are "calculative" rather than "juridical."[8] This rearticulation sets in motion "the fundamental changes in rationality itself that come to dominate the neoliberal iteration of the modern episteme."[9] Though it preserves classical liberalism's fundamental values, it uses different tools and techniques to act on and realize those values—calculative rather than juridical ones. That's why it forms a new type or subtype of episteme. Episteme is Michel Foucault's term for a group of intellectual, economic, and political practices that are tied together by common behind-the-scenes methods, logics, and values. As he explains, "unknown to themselves," the practitioners of a particular episteme "employed the same rules to define the objects proper to their own study, to form their concepts, to build their theories."[10] These "rules" are methods of abstraction, parameters for translating or compressing rich sensory data into words, numbers, images, and other kinds of information. In the neoliberal episteme, probabilistic statistics are the rules used to define objects of knowledge, form concepts, and build theories. That's why Winnubst defines the neoliberal episteme as a calculative rationality.

This book is about the neoliberal episteme's complementary qualitative episteme, which I call the sonic episteme. The sonic episteme creates qualitative versions of the same relationships that the neoliberal episteme crafts quantitatively, bringing nonquantitative phenomena in line with the same upgrades to classical liberalism that the neoliberal episteme performs quantitatively. Each of the book's five chapters demonstrates how a specific field or practice (which I call "constituents" of the sonic episteme) uses concepts of acoustic resonance to create qualitative versions of the same updated relations of domination and subordination, and the same mechanisms for policing them, that neoliberalism and biopolitics use probabilistic statistics to make and monitor. In the sonic episteme, those upgrades appear not as the shift from juridical to calculative rationality but as a shift from verbal or visual representation to sound and resonance. Like earlier versions of what sound studies scholar Jonathan Sterne calls "the audiovisual litany,"[11] the sonic episteme misrepresents sociohistorically specific concepts of sound and vision as their universal, "natural" character and uses sound's purported difference from vision to mark its departure from what it deems the West's ocular- and text-centric status quo. Whereas earlier versions of the litany claim sound embodies an originary metaphysical immediacy or "presence" that words and images deny, the sonic episteme

claims sound embodies *material* immediacy and the metaphysics of a probabilistic universe, which modernity's commitments to representationalist abstraction and certainty supposedly occlude.[12]

Appealing to assumptions about sound and music's "minoritarian"[13] position in Western culture and sound's inherent wholesomeness,[14] the constituents of the sonic episteme I study here claim their use of sound is both revolutionary (turning Western modernity on its head) and recuperative (recovering what it excluded).[15] In this way, they misrepresent their difference from the Western modern status quo as progress past it. Although the sonic episteme presents these upgrades as fixes for modernity's bugs, especially bugs related to identity-based inequality, it actually repeats these bugs in a voice that makes those bugs sound and feel like features. Thus, though the sonic episteme's appeal to sound may appear revolutionary because it frees us from the conceptual and political baggage we've inherited from Western modernity, it just remakes and renaturalizes all that political baggage in forms more compatible with twenty-first-century technologies and ideologies—which is exactly what the neoliberal episteme does with its calculative rationality.

According to Foucault, an episteme's "rules of formation . . . are to be found only in widely differing theories, concepts, and objects of study."[16] In order to give a sense of the breadth of the sonic episteme while still staying within my areas of academic expertise, I focus on some of the constituents of the sonic episteme found in philosophy (i.e., "theories") and pop culture (i.e., "objects of study"). These constituents use concepts of acoustic resonance to define objects of knowledge, form concepts, build theories, and abstract from concrete reality to human expression and ideas.

Sometimes their appeal to acoustic resonance is explicit, and sometimes it's implicit but easy to infer. Jacques Attali's claim that "the laws of acoustics . . . displa[y] all of the characteristics of the technocracy managing the great machines of the repetitive [i.e., neoliberal] economy"[17] is one example of an explicit appeal that directly mentions acoustics. Implicit appeals mention features of acoustic resonance without directly calling them that, such as when neoliberal economist Milton Friedman implicitly makes the same claim Attali does, arguing that the deregulated, entrepreneurial market is "a system of proportional representation"[18] that expresses human behavior in statistically calculated ratios such as probabilities and cost/benefit calculus. Friedman's proportions are ratios that express the average or normal frequency of a variable, and they are grounded in the same basic mathematical principle we use to measure sound waves: frequency ratios. This same system of proportional representation—in particular, the proportional representation of public opin-

ion proffered by polling and, more contemporarily, big data—is the foundation of the "postdemocratic" political ontology philosopher Jacques Rancière critiques in his book *Disagreement*. That's why he calls postdemocracy "the perfect realization of the empty virtue Plato called *sophrosune*"[19] and explicitly—at least for the expert reader—uses sound to translate statistics into nonquantitative terms (in this case, ethics). Plato models *sophrosyne* (generally translated as moderation) on contemporary-to-him understandings of musical harmony as geometric proportion. Rancière uses sophrosyne to describe a society organized by statistically calculated frequency ratios, probabilities, and forecasts, updating Plato's original idea of sophrosyne with twentieth- and twenty-first-century math, which brings us back to Attali's claim that the laws of acoustics look a lot like the principles of neoliberal social order and political ontology.

As I discuss in chapter 4, this same concept of sophrosyne appears in pop culture as an ethical ideal for individuals, corporations, and the state, often implicitly as narratives about personal responsibility. Comparing quantum strings to the strings on a musical instrument, popular science writing about string theory figures such as Brian Greene and Stephon Alexander likewise uses the slippage between ancient Greek concepts of musical harmony and acoustic resonance to translate the math behind its probabilistic models of the universe into terms laypeople can understand. New materialist theorist Karen Barad uses the basic principles of quantum physics as a model for philosophical abstraction and frequently appeals to concepts of "resonance" and "dissonance" to translate the physicists' mathematical models into philosophical concepts and methods.[20] Similarly, Elizabeth Grosz's Deleuzo-Darwinian ontology treats "vibrations, waves, oscillations, resonances" as the fundamental elements of existence.[21]

From neoliberalism to new materialism and beyond, acoustically resonant sound is the "rule" these otherwise divergent practices use "to define the objects proper to their own study, to form their concepts, to build their theories."[22] Because this rule is the qualitative version of the quantitative rules neoliberal market logics and biopolitical statistics use to organize society, the sonic episteme is, in the terms of the well-known Adorno/Foucault meme, possibly bad and definitely dangerous.[23]

The sonic episteme is dangerous, but thankfully it's not the only way to think with and through sound—i.e., to use sound to define concepts and other objects of knowledge, build theories, and abstract from sensory reality to human expressions. Sound, and even resonance, can be a productive model for theorizing if and only if it models intellectual and social practices that are

designed to avoid and/or oppose the systemic relations of domination that classical liberalism and neoliberalism create. This is easy to do if we look to the way people oppressed by those systems of domination think about and use sound. Looking to both theories of sound and resonance in black studies and musical practices by black women artists, I show that it's possible to use sound to think about political ontology, vibratory resonance, subjectivity, and even math without appealing to the sonic episteme and the neoliberalism and biopolitics that come with it. Building on Alexander Weheliye's use of the term, I call these practices "phonographies." As I show in chapters 2–5, phonographies study patterns of living that model what Weheliye calls "habeas viscus," Devonya Havis calls "sounding," Katherine McKittrick calls "demonic calculus," Ashon Crawley calls "choreosonics," and Christina Sharpe calls "wake." These all refer to phenomena that behave like acoustic resonance (e.g., they're rhythmic, oscillatory patterns) and/or the math it models, but they are calibrated to the epistemic, ontological, aesthetic, and political practices black people have used to build alternative realities amid white supremacist patriarchal domination.

The sonic episteme upgrades qualitative phenomena to work more efficiently under neoliberalism and biopolitics, and phonographies do the opposite of that. Whereas the sonic episteme takes what Western modernity traditionally disposes of—resonance—and uses it to reinvest and revive white Western culture so it can succeed in neoliberal, biopolitical institutions, phonographies do not reappropriate that discarded material. Phonographies articulate ideas, aesthetics, and relationships that exist in the frequencies perceptually coded out of the sonic episteme's spectrum because the cost of laboring to domesticate them into something that contributes to elite status isn't worth the benefit. To use Tricia Rose's term, phonographies work "in the red."[24] Rose coins this phrase to describe the ways "rap producers . . . pus[h] on established boundaries of music engineering" to create sounds that align with "Afrodiasporic musical priorities."[25] These established boundaries reflected white Western aesthetic priorities (e.g., about pitch or the correct level of bass), which are coded into music technologies like mixers and speakers. Because Afrodiasporic sonic priorities were coded out of these technologies, hip-hop artists had to misuse them and break the boundaries coded into them to achieve the sounds they wanted. "In the red" refers to the way music technologies represent one such broken boundary: the threshold at which increasing a mix's volume or gain distorts the frequencies in the mix. The gain or volume meter on mixing equipment uses green lights to indicate when the mix is below that threshold and red lights to indicate when that threshold is crossed. In-the-red

frequencies are outside the spectrum of frequencies that accurately reproduce and transmit white aesthetic values. Focusing our attention on dimensions of verbal, visual, and musical practices that conventional methods of abstraction dispose of, phonographies are "nondisciplinary"[26] or "undisciplined"[27] practices that avoid reinvesting in white supremacist patriarchal models for transmitting knowledge, privilege, personhood, and property, such as the academic discipline. To use sound as a tool for theorizing and realizing a more just world, we can't just reform Western (post)modernity but must do something else entirely. Phonography is one model for this something else; certainly there are others.

II. Basic Concepts and Method

Acoustic resonance, neoliberalism, and biopolitics are the main concepts that run through every chapter, so before I get into the thick of that analysis, I will define what I mean by these terms, explain how they are connected, and identify some of their component parts. Following the conceptual discussion, I'll present my method.

1. Acoustic Resonance

The sonic episteme adopts a sociohistorically specific concept of what sound is, physically, and how it works, mechanically. That concept is what I call acoustic resonance.[28] "Resonance" generally means "vibratory motion"[29]; that's how Hermann von Helmholtz defined it in 1863. Helmholtz thought vibrating bodies transferred their vibratory motion to their surrounding environment, thus generating what he called sympathetic resonances. Whereas sympathetic resonance refers to contagious patterns of vibratory back-and-forth motion, acoustic resonance refers to patterns of high and low pressure, intensity, or energy. From the perspective of acoustics, "a sound wave consist[s] of a condensation or high-pressure pulse followed by rarefaction or low-pressure pulse."[30] This pattern of higher and lower intensity is generally visualized as a waveform, with the upper peak describing that highest intensity and the lower valley describing the lowest intensity. This visualization commonly misleads people into thinking sound waves work like vibrating strings, moving up and down or back and forth; but that's incorrect: sound waves are alternating patterns of pressure, intensity, or energy.[31] These patterns are described as ratios: for example, mHz for pitch or frequency is the ratio of cycles per second. In contemporary physics, acoustic resonance refers to interaction of these kinds of patterns: resonance occurs when frequency patterns align and amplify one another rather than clash and dampen or mask one another.[32]

Resonance, in other words, is a phase relationship. When patterns are in phase, they align at regular intervals; an example of this would be a song sung in "in the round." Composer Steve Reich describes these type of phase relationships as "rational": they align at intervals we are habituated to recognizing, like 1/2, 1/4, 1/3, 2/3, 180 degrees, 90 degrees, etc.[33] Patterns that do not align at regular intervals are "irrational" and out of phase. In Western music theory, overtones that are integer (whole-number) multiples of the fundamental frequency (the main pitch we hear) are called "harmonics," whereas overtones that are noninteger (i.e., fractions) multiples of the fundamental frequency are called "inharmonics" because harmonic frequencies fall in phase with the fundamental frequency and inharmonic ones don't.[34] In this sense, "rational" relationships among patterns are rational when they are proportional and thus expressible as ratios; such relationships are "irrational" when they aren't consistently proportional enough to be expressible as a ratio.

The sonic episteme thinks sound *is* acoustic resonance—the patterned intensity of a flow, expressed as a rate or a frequency ratio. And it's this ratio that makes acoustic resonance a qualitative corollary for the math behind neoliberalism and biopolitics.

2. Neoliberalism and Biopolitics

a. As Practices of Quantification

In general, "biopolitics" refers to a style of governing focused on life: life is the object of governance and site of power's investment (or divestment), and killing off internal threats is a common and justifiable way of fostering that life (e.g., eugenics). Neoliberalism is a more contested term, but scholars of neoliberalism agree that it is "the general idea that society works best when people and the institutions within it are shaped to work according to market principles."[35] There are different varieties of both biopolitics and neoliberalism.[36] In this book, I focus on the neoliberalisms and biopolitics that reduce everything to probabilities (such as cost/benefit calculus) and normalized distributions (like Gaussian models).[37]

For example, in a 1983 interview, economist and social theorist Jacques Attali describes neoliberalism as "a more properly statistical vision of reality, a macrostatistical and global, aleatory view, in terms of probabilities and statistical groups."[38] Taking its idea of the market as a model for reality itself, probabilistic statistics are the lenses through which this variety of neoliberalism views the world. Similarly, Foucauldian theories of biopolitics study "aleatory events that occur within a population that exists over a period of time"[39] and use statistics to identify patterns among these aleatory events, thus

making them relatively predictable and manageable. Though these are not the newest iterations of either neoliberalism or biopolitics, they are still commonly practiced varieties. Michelle Murphy has shown that over the course of the late twentieth and early twenty-first centuries, the very concept of "population" has been remade in primarily economic terms—first national GDP, then human capital. Modeling population on human capital, this type of neoliberal biopolitics uses the same probabilistic models to imagine life and the market (human capital is the microcosm of the macrocosmic market). These probabilistic models are grounded in the same fundamental mathematical relationship: the frequency ratio. As Shannon Winnubst explains, "the statistic exemplifies the ratio-calculative normativity that Foucault locates in neoliberal theorists," which in turn treats "the norm as number, and especially as ratio."[40] As neoliberalism and biopolitics quantify everything, they treat the frequency ratio as the basic unit of reality.

Because these practices of quantification do not govern relations among people, words/laws, or God but relations among numbers, neoliberalism and biopolitics operate at a different ontological register than other technologies of government (like disciplinary normation, sovereign law, etc.).[41] As Mary Beth Mader explains, "when expressed as ratios, the actual social relations between groups of people are masked in these figural expressions that employ the specific features of mathematical objects to characterize people and groups of people . . . endogenous mathematical traits that are superimposed on the social objects studied, rather than discovered in them."[42]

There are two parts to her claim: (1) social relations—both the concrete relations among people and the abstractions about how we do and should relate—are conceived and remade in terms of mathematical relations among numbers; and (2) because statistics are the mathematical instrument used to measure, manage, and enforce those relations, society is made to embody the specific kind of mathematical relationship statistical norms express—a frequency ratio (i.e., ratios expressing the frequency of a given variable in a population). Mader clarifies: "with the spread of the statistics of population and their role in the constitution of subjects, then, social relations literally become rationalized, or more precisely, *ratio-ized*."[43]

But Plato's *Republic* also rationalizes social relations: the organization of the ideally just city reflects the same proportions or ratios found in Plato's divided line. "A line divided into two unequal sections . . . as an expression of the ratio of their comparative clearness and obscurity," the divided line expresses the relative reality of ideas and physical things: ideas are more real than physical things, so the part of the line that represents ideas is bigger than the

part that represents physical things.[44] So the issue here isn't just the transformation of social relations into ratios but the specific way those ratios are calculated. Plato's ratios are geometric; they compare relative size or reality (e.g., the length of segments on the divided line is proportional to the "reality" of what that line represents: thoughts, Forms, images, etc.). The biopolitical ratios Mader describes above are frequential: they compare the relative frequency of a phenomenon in a group. For example, the normal curve (the "bell curve") "is a graphic representation of the distribution of frequencies of values for a given measured property, with the most frequent values being those in the distribution that cluster around a mean or average in a single peak."[45] Normal curves measure a property's pattern of intensity within a given population—this is what infant height/weight charts do, as do percentile scores on standardized tests. Statistical norms are ratios of ratios: they take individual measurements of the rate at which a given property *x* appears in a population (this is the first set of ratios) and then aggregates these and finds the most common or "normal" rate, the average rate *y* at which *x* rate occurs—again, this is measuring a pattern of intensity. "The ratio" is one of "the basic conceptual components of the notion of the normal curve"[46] and of normalization as a technique or technology. It is also the same basic conceptual component behind the notion of acoustic resonance. So, though they may express this DNA slightly differently, both acoustic resonance and neoliberal biopolitics share a common gene or element: the frequency ratio.

Neoliberalism and biopolitics organize this DNA to create mathematical relations that reflect and support their underlying values and commitments (e.g., to white supremacy). Normalization is the mode of governmentality Foucault attributes to biopolitics: it's not the juridical punishment of offenders (i.e., taking something away from those who transgress), nor is it the disciplinary normation of subjects (compelling adherence to a prescribed archetype, rendering docile); rather, it's the *normalization of frequencies* (remember: the object of this kind of power isn't people or groups but numbers). Normalization involves (1) determining the range of "normal" distribution of *x*, and then (2) bringing frequencies outside that normal distribution back in line with it. As Mader explains, citing Foucault's *Security, Territory, Population*, "the various normal curves are collected and compared. Then, 'certain distributions' are 'considered *more normal than others* or in any case more advantageous than the others. It is these distributions that will serve as norms.' . . . The technique then will be to attempt to reduce all of the most deviant of these normal curves to the level of the general normal distribution."[47] Normalized statistical distributions determine both the range of frequencies of variable *x*

that a population must exhibit in order to optimize specific values and commitments and a range of tolerable and intolerable deviance.

As a technique or a technology, this type of normalization is analogous to the technique audio engineers use to compress audio signal.[48] Compression brings the distribution of amplitudes within a "normalized" (in Foucault's sense) range. "Compressors . . . reduce dynamic range—the span between the softest and loudest sounds."[49] In the twenty-first century, compression is generally an automated process performed within a DAW (digital audio workstation). Users decide what the upper limit of gain (i.e., volume) should be, and "a compressor 'turns down' the audio when the level exceeds a threshold set by the user. The amount by which the gain is turned down depends on the ratio of the compressor—for example, if a ratio of 5:1 is set, an input signal exceeding the threshold by 5dB will be output with a level of only 1dB over the threshold. Once the signal falls back below the threshold level, the gain returns to normal."[50]

Compressors bring deviant signal back within, or at least proportionally closer to, "normal" gain range. The primary unit or tool here is the ratio: signals aren't just brought in line with the norm but are brought in *relative proportion* to the normal range. Similarly, in biopolitical normalization, the cases that can't be brought into adequately relative proportion to the normal range get quarantined to preserve the health of those in the normal range and, more importantly, to preserve a specific range of the spectrum *as* normal. Robert Kerr explains the connection between these audio compression and statistical normalization: "If something decides to cross the set threshold . . . it is forced to back down in order to fit within the general wall of sound. If such singular entities are not complicit with this process then they are edited out as nondesirables."[51]

Designed to optimize the enclosure of signal bandwidth, perceptual coding is a kind of compression that uses normalization for explicitly capitalist purposes and highlights the role of white supremacist patriarchal property relations in determining the range of what counts as normal. According to Jonathan Sterne, perceptual coding "descends from Bell [Lab]'s initial quest to squeeze more profit out of its infrastructure."[52] In order to eliminate frequencies that impede the efficiency of signal transmission, perceptual coding "use[s] a mathematical model of human hearing to actively remove sound in the audible part of the spectrum under the assumption that it will not be heard."[53] Editing out superfluous frequencies allows you to transmit more signals over the same bandwidth, thus making this bandwidth capital more profitable. Biopolitical normalization uses a mathematical model of human

life to actively remove abnormal people from the spectrum of humanity on the assumption that their dysgenic rates or frequencies ought not be "heard." Because these abnormal frequencies impede the efficient transmission and reproduction of "normal" signals, they are perceptually coded out of hegemonic institutions and the population whose lives those institutions are designed to foster. This process of producing and quarantining abnormals is how this configuration of neoliberalism and biopolitics upgrades classically liberal forms of social exclusion so that they can work without explicitly relying on social identities, so that they can be, in other words, post-identity.

b. As Practices of Domination

What makes statistical normalization suited to the way neoliberalism and biopolitics manage social inequity?

Neoliberalism manages identity-based difference differently than classical, contractarian liberalism does. Classical liberalism asserts that we're all equal because we're universally human, abstract individuals without relevant differences (because differences are only relevant in the private sphere). Neoliberalism asserts that we're all equal because all (formerly private) differences are included and valued.[54] Instead of strictly regulating purity (which takes a lot of resources), laws and institutions include deregulated differences, often under the banner of "diversity." I call this move *the domestication of noise* because it turns what was formerly a problem (in the Du Boisian "how does it feel to be a problem?" sense) into a resource. Just as statistical distributions can reveal predictable patterns in what otherwise appear like chance occurrences, the domestication of noise finds order in what traditionally seems like irrational or unruly behavior.

By including formerly excluded unruliness, neoliberalism purports to be post-identity. Post-identity is an umbrella term that describes views like "post-feminism" or "postracial." These views assert that classically liberal identity-based social exclusion (sexism, racism) no longer exist: such exclusion certainly happened in the past, but we have overcome it today. For example, as Angela McRobbie explains, "post-feminism positively draws on and invokes feminism as that which can be taken into account, to suggest that equality is achieved, in order to install a whole repertoire of new meanings which emphasise that it is no longer needed, it is a spent force."[55] This isn't the "backlash" of the 1990s, but the idea that people and institutions *already* value and practice diversity so that white women and people of color really can and do have equal access to political participation and economic success.

The ontology of statistical measurement lets the claim that we've over-

come sexism and racism and everyone is equal now seem plausible. Unlike the classical social contract, which posits an ontological divide between "humans" and "sub-" or "nonhumans,"[56] biopolitical normalization posits a flat social ontology, in particular, the flat ontology of mathematics in which everything is a number and thus commutable. As Mader argues, "it is the continuity of number itself that renders both the individuals counted and the ratio of group to group comparable objects to which basic and sophisticated mathematical operations can be applied. . . . Social discontinuities are homogenized in the continuity of quantum."[57]

For example, the discontinuities produced by patriarchy as a political system are re-aggregated as gender becomes one variable in a multifactor statistical model. As variables, gender and race are disarticulated from the power relationships (patriarchy and white supremacy) that produce social discontinuities. As Mader puts it, "a gradational ontology replaces one of opposition."[58] The continuity among statistical variables or groups is what lets post-identity thinking happen: there are no different social orders for humans and subhumans; we're all on the same human spectrum. This continuum from normal to abnormal *does* in fact put everyone on the same playing field. It's the neoliberal version of classically liberal notions of formal equality before the law or "political emancipation": treating everyone as though they're on the same continuum obscures the fact that we still recognize a difference between good abnormal—"disruptors," geniuses—and bad abnormal—terrorists, thugs. Structural barriers haven't gone away; they've just been remade with different tools and layered on top of the old ones. These new structural barriers are what I call a politics of exception.

The politics of exception is the outcome of neoliberal/biopolitical applications of the ontology of statistical normalization to worlds deeply shaped by centuries of material inequality and domination. This ontology reworks modernity's inclusion/exclusion binary into a spectrum of flexibility and dynamism.[59] In the former case, domination contracts create social identities (races, genders) as tools to disaggregate and purify society by excluding white women and nonwhites from political, moral, and legal personhood. This model excludes by creating discontinuities, such as the discontinuity between noise and signal. However, over the course of the twentieth and twenty-first centuries, it's not just audio engineers that domesticate noise, "using and manipulating noise (rather than eliminating it)."[60] Neoliberalism and biopolitics domesticate noise, excluding people from personhood by using and manipulating them via statistical and ideological *continuities* that incorporate their noise into the big social spectrum. When everyone is on the same statistical

continuum or spectrum, everyone seems to have the chance to be or become normal; so, if you're deficiently normal, it must be due to your lack of effort or inherent pathology. This is where the hidden structural barriers factor in: individuals' placement on the normal curve isn't the outcome of just their choices and behaviors but also of the way structural barriers foreclose or facilitate the kinds of choices available to them and the opportunity costs of those choices. Neoliberalism and biopolitics cook the books (the background conditions) so that foreground equity always produces differential levels of success. This process of production is what I call, following Lester Spence's use of the term, the politics of exception.

According to Spence, "neoliberalism relies on three populations, institutions, and spaces: those perfectly formed according to market logic, those able to be re-formed according to that logic, and the exceptions unable to be re-formed."[61] These populations are all situated on the same spectrum—the market—but ongoing structural barriers (like, say, rape culture and the criminalization of blackness) make it more difficult and costly for oppressed people to successfully adapt to neoliberal market logic and inhabit "normal" parts of that spectrum. (And even when they do adapt to these norms, biases prevent them from being seen as successful.)[62] Some traditionally oppressed groups can, with adequate investment, be brought into a relatively normal range of conformity to neoliberal market logics; this is the idea behind campaigns like "black girls code" or Sheryl Sandberg's infamous "Lean In" feminism. Other groups, however, don't bring adequate returns on that investment; they cannot efficiently be reformed to neoliberal market logics. They thus appear static, recalcitrant, and inflexible. These are the exception.

The early twenty-first-century U.S. education program No Child Left Behind is another example of the politics of exception. Instead of segregating public schools explicitly on the basis of race and policing the purity of white schools, NCLB uses nominally inclusive performance-based measures like test scores to dole out both resources and penalties on what are effectively racial lines.[63] Including everyone on the same quantitative, statistically measured spectrum kills two birds with one stone: (1) it serves as evidence that identity-based social exclusion is over, obsolete, a thing we "neo-"s are "post-" because we're all on the same playing field, and (2) it provides the mechanism for producing white supremacist patriarchy without relying explicitly on identity-based social exclusion.

Similarly, the editorial choices in the Hollaback! Project's 2014 video "10 Hours of Walking in NYC as a Woman" render black and Latino men exceptions to postfeminist society. The video claims to document the exten-

sive but mundane nature of misogynist street harassment that (white) women face. However, as many critics noted, the video does not depict any white men as perpetrators.[64] Building on the increasingly prominent trope where "black identity appears as an antiquated state of confinement from which the 'multiracial imagined community' must be delivered,"[65] the video presents men of color as solely responsible for (white) women's street harassment, as embodying a "backwards" masculinity that is out of sync with postfeminist society. The same logic informs the production on Usher featuring Juicy J's 2014 single "I Don't Mind." Playing up Juicy J's association with strip club anthems like his 2012 hit "Bandz a Make Her Dance," the song contrasts R&B-singing Usher's respectable, nominally feminist black masculinity with rapping Juicy J's seemingly pre-feminist objectification of sex workers. Like a good woke boyfriend, Usher sings that he "doesn't mind" that his girlfriend is a stripper because she remains monogamous with him and, perhaps more importantly, makes a lot of money. Juicy J, on the other hand, likes the fact that other men look at, admire, and objectify his stripper girlfriend and has no qualms about being in it for the sex, not the love or long-term relationship. Though the lyrics give space to both styles of black masculinity, the production endorses Usher's performance over Juicy J's. The "booty clap" synth is common in hip-hop of that time; it is a handclap synth sound that mimics the "booty clap" move in hip-hop dance. Like many other trap songs of this era, Juicy J's "Bandz" features this synth on every beat (i.e., quarter notes at 4/4). "I Don't Mind," however, puts these synths only on 2 and 4, transforming trap ratchetness into a more traditional and respectable R&B sound. In this way, the song's sounds exhibit the nominally feminist reform expected of neoliberal subjects and present Juicy J, both in his vocal performance on this track and in his other songs, as an exception incapable of such reform. Unlike the Hollaback! video, which holds men of color in general responsible for all ongoing sexism, the sounds on "I Don't Mind" mark a break in the spectrum of black masculinities between Usher (who, like the booty clap rhythms, is reformed) and unreformed, incorrigibly sexist Juicy J. This break redraws old class- and sexuality-based hierarchies among African Americans in terms that aren't, at least on the surface, about class or sexuality.[66] Confirming Spence's claim that "African Americans constitute the exception,"[67] these examples illustrate how the politics of exception mobilizes the claim that identity-based exclusion has been or should be overcome to mark the same status differences that identities did.

Creating exceptional cases and classes is one component of the politics of exception. Quarantining exceptions is the other key component. From a biopolitical perspective, signals or voices that don't resonate harmoniously,

that don't embody the predictable, probabilistic ratios of the neoliberal market (i.e., as I discuss in chapter 4, that don't exhibit sophrosyne), may be legitimately muted, masked, or silenced. The politics of exception don't purify the social body so much as compress it in order to manage away frequency ratios that reduce society's overall efficiency. Compression helps signals circulate efficiently and profitably by "discard[ing] the parts of the audio signal that are unlikely to be audible."[68] Neoliberalism and biopolitics help white supremacist patriarchy operate most efficiently by discarding parts of the population that are least likely to register a positive impact on dominant metrics of social and economic value, like profitability or health. In this way, it resembles Sterne's perceptual coding; I discuss this comparison in chapters 2–5.

In sum, the kinds of neoliberalism and biopolitics I study in this book rewrite social relations as specific kinds of mathematical relations: frequency ratios and normalized statistical distributions. This ontological shift from people to numbers also restructures systematic relations of domination and subordination, remaking formal equality before the law into statistical continuities and the politics of exception. Because acoustic resonance is a qualitative version of the same basic mathematical principles behind this type of neoliberal biopolitics (i.e., frequency ratios), taking it as a normative model (a model for how things *ought* to be) for the economy, ontology, society, personhood, or anything else brings whatever you are modeling in accord with the tools and techniques neoliberalism and biopolitics use to maintain structures of domination and subordination. Each of this book's chapters shows how different constituents of the sonic episteme use acoustic resonance to do just that.

There is a growing literature on sound, music, and biopolitics. Naomi Waltham-Smith's *The Sound of Biopolitics* and Jeffrey Nealon's *I'm Not Like Everybody Else: Biopolitics, Neoliberalism, and American Popular Music* are two recent examples. Nealon is concerned with the impact of biopolitics on Anglophone popular music listening practices; Waltham-Smith pays attention to the role of sound in Nancy, Derrida, and Agamben to think about the sonic dimensions of biopolitics as defined by the latter (which is less focused on the role of math and statistics than Foucault's account). *The Sonic Episteme* contributes to this growing body of literature by showing how sonic discourses are marshaled to produce qualitative versions of the same relationships that neoliberalism and biopolitics produce quantitatively. Because those relationships are designed to intensify white supremacist capitalist patriarchy, this book clarifies how sound and resonance contribute to the gendered, sexualized, and racial project at the heart of biopolitics—marking the line between

who must live and who is let to die. And finally, studying phonographic approaches to sound in black studies and African American philosophy, the book points to existing alternatives to the sonic episteme's white supremacist capitalist patriarchal project.

3. Method

The method I use to make this argument is just as important as what my argument is. As I argue throughout this book, the sonic episteme is a type of ideal theory. According to Charles Mills, ideal theory is defined by its approach to its object of study: it begins from how things *ought* to work in ideal (i.e., perfect) conditions, not from how things work in manifestly nonideal and imperfect daily existence.[69] The problem with ideal theory is that it naturalizes those existing imperfections and reinforces them rather than fixes them. Liberal approaches to equality are a classic example of this: treating everyone as already equal—because in the end everyone *should* be equal—reinforces existing inequalities rather than ameliorating them. Similarly, the sonic episteme uses an idealized concept of "sound" to pass off reinvestments in dominant institutions (the academy, white supremacy, etc.) as revolutions that overcome them. By situating my analysis of both scholarly and pop culture texts in the context of a nonideal and imperfect world structured by ongoing relations of domination and subordination, I use *a nonideal approach to theorizing sound and music*.

I am also indebted to the "phonographic" method of "thinking sound/sound thinking" Alexander Weheliye thematizes in his work on sonic Afromodernity. I discuss this method extensively in chapters 2–5, so I will briefly define it here. Just as DJs mix and crossfade between two tracks, phonographic analysis mixes and crossfades between disciplines, genres, and media. For example, Weheliye describes his project as "establish[ing] a dialogue between literary texts and popular culture . . . [that] eschews a strict opposition between popular culture and canonical forms of cultural expression . . . [and] involves using the insights of each field to critically reconfigure the other."[70] Like Weheliye, I use popular music studies and sound studies *as* methods for doing theory or philosophy. Beyoncé's and Rihanna's work aren't just examples of some theory or another; their works are theoretical texts, texts that let us theorize in ways that traditionally "philosophical" texts do not accommodate.[71] As someone trained in philosophy and speaking at least partially to philosophers, I aim in part to model a theoretical practice that is in genuine dialogue with popular music, popular music studies, and sound studies—fields with which philosophy has had little interaction as of this writing. Theoretical work

on sound and music must be nonideal and phonographic if it is to have any positive effect on social justice. I use this phonographic method in *The Sonic Episteme* because it allows me to theorize with and through specific sounds situated in sociohistorically local contexts and avoid idealized models of both sound and society.

My method is also grounded in Foucault's concept of epistemes, which I explained earlier. To argue that the sonic episteme exists, I need to show that widely differing theories, concepts, and objects of study manifest, embody, or otherwise exhibit common rules of formation, and that these rules have something to do with sound as acoustic resonance. Each of the chapters traces work by philosophers, economists, literary theorists, astrophysicists, data scientists, journalists, and others to prove that the objects of their study, the concepts they create, and the theories they build are unified by a common set of unthematized rules or principles, and that these rules or principles can be accurately thematized under the rubric of acoustic resonance.

Overall, I aim for a method that is "undisciplined" in Christina Sharpe's sense.[72] My study spans philosophy, feminist theory, critical race theory, black studies, popular music studies, and sound studies in order to build a project that speaks to audiences from all these fields but ultimately avoids discussions of "how is this paper philosophy?" I'll address why that avoidance is important in chapter 3.

III. Overview of Chapters

I cannot give a comprehensive account of the sonic episteme in this book—that would make a very unwieldy volume. I have chosen to focus on constituents of the sonic episteme that both use acoustic resonance to model a central aspect of social or natural/material existence and have had significant impact across various academic disciplines or popular culture. Each of *The Sonic Episteme*'s chapters studies a different object to which acoustic resonance is applied: the market, political reality, material reality, subjectivity and personhood, and social and theoretical physics. All five chapters also examine alternatives to the chapter's respective dimension of the sonic episteme; the last four focus on phonographic approaches that model political reality, material reality, subjectivity and personhood, and the math behind social and theoretical physics on a concept of sound rooted in black feminist theory. These phonographic alternatives to the sonic episteme both prove that and suggest how people can theorize with and through sound without running into all the problems I identify with the sonic episteme.

The first chapter argues that Jacques Attali's 1977 book *Noise* uses acous-

tic resonance to model the math behind both the neoliberal market and the biopolitical concept of life in qualitative terms.[73] I unpack Attali's claim that the "laws of acoustics"[74] have the same underlying principle as neoliberal theories of the market and explain how this informs his book's (in)famous premise that music heralds the future. I then use Attali's theories of repetition and competition to explain the sonic episteme's characteristic methods of social exclusion: the domestication of noise and the politics of exception. Finally, I argue that Attali's concept of composition is an instance of the "the biopolitics of cool"[75] and consider "uncool" as a possible method of resistance to it. Taking Spandau Ballet's 1983 hit "True" and Taylor Swift's 2014 single "Shake It Off" as instances of "uncool," I show that biopolitical uncoolness is a form of inflexibility and nonadaptability. Though this inflexibility and nonadaptability read as uncool when white people perform them, they can also read as toxic and pathological attributes of nonwhite populations or non-liberal-democratic societies. I call these populations "exceptional" populations.

Moving from neoliberal political economy to neoliberal political ontology, chapter 2 studies theories and practices that adopt acoustic resonance as the basic unit of social reality and that use the purported difference between sound and text to mark their departure from classically liberal political ontologies. I focus on Jacques Rancière's account of postdemocratic consensus and Adriana Cavarero's and Fred Evans's theories of "vocal" politics because they all illustrate how notions of voice and universal envoicement can be used to create qualitative versions of the same relations of domination that neoliberalism creates quantitatively. According to Rancière, "postdemocratic" regimes use probabilistic statistics to model society and then translate that math into nonquantitative terms through ideas of harmony or moderation. Cavarero's and Evans's phenomenological approaches directly model society on acoustic resonance. Though all of these projects claim to overcome liberalism's use of social identities to exclude people from full personhood and give everyone equal access to "voice," they use the fact of (supposedly) universal inclusion as the foundation of a different kind of exclusion: the politics of exception. Building on Jonathan Sterne's theory of perceptual coding, I argue that political ontologies modeled on acoustic resonance adopt a type of perceptual coding:[76] they compress away frequencies that impede the efficient transmission of white supremacist capitalist patriarchy into the future. Rancière makes a similar claim in his critique of postdemocracy; I argue that his critique applies to all constituents of the sonic episteme. The second part of the chapter studies political ontologies that tune in to some of the frequencies the sonic episteme codes out of philosophers' "listening ears."[77] Building on philoso-

pher Devonya Havis's concept of "sounding," I identify a common move in black feminist thought: a code-switch that opens up possibilities masked by the original, hegemonic code.[78] Reading Rihanna's 2015 single "BBHMM" as an instance of sounding, I argue that sounding models dimensions of existence perceptually coded out of both classical and neoliberal concepts of personhood due to their association with black femininity. Sounding thus exhibits two key features of phonographic approaches to sound: the code-switch and the attunement to in-the-red frequencies.

Shifting focus from political ontology to new materialist ontologies, the third chapter considers cases where theorists in this tradition appeal to concepts of music, sound, and vibration to explain what matter is and how bits of matter interact. The work of Elizabeth Grosz, Jane Bennett, and Karen Barad is foundational to feminist new materialism.[79] Each of their projects uses acoustic resonance—framed as music (Grosz), vibration (Bennett), or diffraction (Barad)—as both a model for the basic unit of material reality (like an atom or subatomic particle) and a method of abstracting from that reality to philosophical concepts. Though they think these resonant abstractions liberate us from the problems baked into Western philosophy's traditional representationalist abstractions, such as identity-based social hierarchies, I will show that they use resonance to create qualitative versions of the same relations of domination and subordination that neoliberalism creates quantitatively. Building on Sara Ahmed's critique of new materialism's "founding gesture"[80] and critiques by women of color feminists such as Diana Leong and Zakkiyah Iman Jackson, I show how new materialism creates the same relations among philosophers and their theories that neoliberalism and biopolitics create in society—a politics of exception in which black people are the exceptional class. The last section of this chapter focuses on phonographic approaches to vibratory resonance. Cristiana Sharpe's theory of the wake, Ashon Crawley's notion of choreosonics, and the choreosonic sounds in Beyoncé's 2016 single "Hold Up" all develop ideas similar to new materialist concepts of vibratory resonance. For example, wake, like resonance or diffraction, is a pattern of pressure in a fluid. However, these phonographic approaches to vibratory resonance model a specific kind of materiality: the kinds that can't be efficiently transformed into private property that can legibly be "owned" by the discipline of philosophy. These are the same in-the-red frequencies that sounding's code-switch tunes into. Whereas new materialism uses acoustic resonance to hide the relations of domination that structure philosophy as a discipline behind claims of reform, these phonographic approaches to vibratory resonance, like Havis's concept of sounding, identify methods of abstraction

that are and will continue to be perceptually coded out of capital-P Philosophy because they don't efficiently reproduce those relations of domination.

Chapter 4 studies the sonic episteme's theory of selfhood and personhood.[81] Plato's concept of sophrosyne uses a music-math analogy to translate the geometric structure of the True[82] into nonquantitative terms people could put into practice in their everyday lives. In the twenty-first century, both academic and popular authors use an updated version of the ancient Greek concept of sophrosyne to translate statistical normalization into a qualitative concept of selfhood and personhood. And just as Plato's sophrosyne expresses a relation of subordination, neoliberal sophrosyne also enforces a relation of subordination: it grants personhood only to people whose contributions are consonant with and amplify overall distributions of personhood, property, and privilege. This is especially clear in attitudes about women's feminist voices. Updating Ann Carson's account of feminine sophrosyne in classical Greek literature, I argue that postfeminist patriarchy uses this updated concept of sophrosyne to police women. Women are expected to be loud and noisy, because this proves that patriarchy isn't silencing them anymore. However, voices that don't subordinate themselves to the myth of postfeminist inclusion (e.g., by pointing out ongoing sexism and racism) are condemned as immoderate and attributed the same flaws audio engineers attribute to overcompressed music. The final part of the chapter argues that Katherine McKittrick's concept of "demonic calculus" uses a music-math analogy grounded in a numeracy that doesn't subordinate itself to white supremacist patriarchal concepts of personhood and thus tunes in to the frequencies that neoliberal sophrosyne perceptually codes into the red. Identifying instances of demonic calculus in Beyoncé's 2016 visual album *Lemonade*, I explain how the music part of demonic calculus's music-math analogy works and show how *Lemonade* uses that music to articulate a concept of personhood that doesn't hinge on black women's subordination.

For Plato, sophrosyne didn't just apply to individuals; it also governed the city and the cosmos. Chapter 5 examines these aspects of the sonic episteme. Popular science accounts of social and cosmic harmony use updated versions of Plato's music-math analogy to translate the math data scientists use to model society and theoretical physicists use to model the universe into layperson terms. For example, when data scientist Alex Pentland says that the tools of big data can help governments and corporations "design for harmony,"[83] he's using concepts of acoustic resonance to translate the math data scientists use to measure and manipulate people's behaviors—the "rhythm[s] of [people's] daily habits" or "the rhythms of a city"—into nonquantita-

tive terms.[84] Pop science accounts of string theory use the same music-math analogy. String theory blends macrocosmic theories of general relativity with microcosmic theories of quantum mechanics; it's a comprehensive cosmology, a "theory of everything" in the universe. It claims that the fundamental unit of existence is a one-dimensional, looped, vibrating string. Scientists use probabilistic equations to describe strings' vibrations. In order to translate that math into terms a lay audience can understand, writers such as Brian Greene and Stephon Alexander turn to musical analogies. However, because they explicitly refer to Pythagorean accounts of cosmic harmony, their central analogy is actually a *dis*analogy between two different kinds of mathematical relationships—Pythagorean ratios and probabilities. These pop science accounts of social and cosmic harmony adopt acoustic resonance as an analogy for the math neoliberalism and biopolitics use to create social inequalities. Whereas Pentland is explicit that he's using that math to manipulate people so their behaviors fit within the norms established by corporations or states, string theory seems entirely apolitical. However, it presents the mathematical relationships neoliberal biopolitics uses to structure society as facts about the fundamental structure of the universe, thus naturalizing the tools and techniques Pentland and others use to create unequal social relations. The final section of the chapter addresses a phonographic approach to this same music-math analogy. Building on earlier analyses of McKittrick and Weheliye, I show that their coauthored analysis of the TR-808 uses the choreosonic dimensions of twentieth- and twenty-first-century hip-hop and R&B as models for maths that count the mathematical relationships in Pentlandian idea flow (and neoliberal biopolitics more generally) out differently. Their work is evidence that the problem with the sonic episteme isn't that it uses sound to translate math into qualitative terms but rather with the specific kind of mathematical relationships acoustic resonance translates.

In the end, this book is about better and worse ways of using sound as the kind of rule or principle that organizes an episteme. At its worst, it's a misapprehension or sleight that underwrites the functioning of a particular mode of systemic social inequity; at its best it centers the modes of abstraction people have developed as practices for living under and in response to systemic oppression. The sonic episteme is an instance of the former; the phonographies I track from chapters 2–5 are instances of the latter.

NOTES

Introduction

Epigraph: Pesic, *Music and the Making of Modern Science*, 284.

1 David Castro-Gavino, "Creating a Symphony from the Noise of Customer Data," *dunnhumby* (blog), April 27, 2018, https://www.dunnhumby.com/resources/blog/creating-symphony-from-customer-data-noise.

2 To clarify: by "musical understanding of sound" I mean an understanding of sounds shaped by sociohistorically local conventions. For example, as I discuss in chapters 2 and 4, ancient Greek concepts of musical harmony are completely different than the more familiar ones grounded in seventeenth- to nineteenth-century European music theory. Different cultures have different sets of musical conventions that shape how listeners parse signal from noise, consonance from dissonance.

3 Mader, *Sleights of Reason*, 56.

4 Supplementary Table: Trends in Suicide Rates among Persons ≥ 10 Years of Age, by State and Sex, National Vital Statistics System, 1999–2016, in "Vital Signs: Trends in Suicide Rates and Circumstances Contributing to Suicide—United States, 1999–2016 and 27 States, 2015," *mmwr: Morbidity and Mortality Weekly Report* 67, no. 22 (2018): 617–24, https://stacks.cdc.gov/view/cdc/53785.

5 As Dale Chapman emphasizes in his book on jazz metaphors in neoliberalism, economists such as Frank Knight realized as early as 1921 that probabilistic quantification often relies on qualitative judgments by mathematicians. As Chapman explains, distinguishing "risk," a situation where all the variables are known and defined, from "uncertainty," a situation where one can't appeal to clearly defined variables, economists identified a role for qualitative judgments in mathematical calculation: "situations of 'uncertainty' require the analyst to engage in a qualitative and intuitive judgment about the range of possible outcomes, before any probability can be calculated for each one." Chapman, *Jazz Bubble*, 37.

6 See for example Vinodh Venkatesh, "Malaysia 'Boleh'? Carles Casajuana and the Demythification of Neoliberal Space," *Romance Notes* 54, no. 1 (2014): 67–73; Luca Mavelli, "Widening Participation, the Instrumentalization of Knowledge and the Reproduction of Inequality," *Teaching in Higher Education* 19, no. 8 (2014): 860–69; Kate Hughes, "Transition Pedagogies and the Neo-

liberal Episteme: What Do Academics Think?," *Student Success* 8, no. 2 (July 2017): 21–30.

7 Winnubst, *Way Too Cool*, 32.

8 Winnubst, *Way Too Cool*, 34. Classical liberalism's commitments to white supremacy, patriarchy, and the like are juridical because they hinge on the idea of formal equality before the law, or what Marx calls mere political emancipation in *On the Jewish Question*. Treating materially unequal people as political equals naturalizes that inequality rather than fixing it.

9 Winnubst, *Way Too Cool*, 34.

10 Foucault, *Order of Things*, ix.

11 Sterne, *Audible Past*, 15.

12 According to Sterne, the audiovisual litany is traditionally part of the "metaphysics of presence" that we get from Plato and Christianity (*Audible Past*, 16): sound and speech offer the fullness and immediacy that vision and words deny. However, contemporary versions of the litany appeal to a different metaphysics. As Marie Thompson explains, "Against the 'staleness' of social theory, discourses of signification and representation, textual analysis and cultural critique, the ontological turn, in its abolition of the Kantian shadow over philosophy, promises a vibrant new line of flight" ("Whiteness and the Ontological Turn," 267). Flipping the conventional script, these versions of the litany associate sight and vision with the metaphysics of presence and its essentialisms and associate sound with dynamic, generative, relational processes that refuse essentialism. For example, Cavarero argues that privileging vision over sound is the foundation of the metaphysics of presence (*For More Than One Voice*, 57). For more on the sonic episteme and the audiovisual litany, see chapter 3.

13 For example, they argue that "the properly musical content is plied by becomings-woman" (Deleuze and Guattari, *Thousand Plateaus*, 248) and that "musical expression is inseparable from a becoming-woman" (299). "Woman" is their quintessential example of a minoritarian status: "It is perhaps the special situation of women in relation to the man-standard that accounts for the fact that becomings, being minoritarian, always pass through a becoming-woman" (291). To say that music is a becoming-woman thus means that music occupies the same status with respect to traditional European philosophy that women occupy in patriarchy.

14 See Sterne, *Audible Past*, 16–18. Thompson addresses this in a work in progress that she tweets about here: https://twitter.com/DrMarieThompson/status/1001400206506774528.

15 The desire to appear other than modernity (which is visual, linguistic, representational, etc.), to both revolutionize it and recuperate its minoritarian discourses, is why theorists don't offer revised version of the visual or language but instead pick sound (or, often, affect). As Deleuze and Guattari suggest in *A Thousand Plateaus*, music's otherness to modernity is isomorphic with femininity's otherness to modernist patriarchy. (I develop this point in chapter 3.) So the turn to sound is motivated primarily by sound's minoritarian status in

modernity; any number of senses, including vision, could be understood to work as neoliberalism understands sound to work.

16 Foucault, *Order of Things*, xii.

17 Attali, *Noise*, 113.

18 Friedman and Friedman, *Capitalism and Freedom*, 15.

19 Rancière, *Disagreement*, 106.

20 Barad, *Meeting the Universe Halfway*, 195.

21 Grosz, *Chaos, Territory, Art*, 33.

22 Foucault, *Order of Things*, ix.

23 This meme juxtaposes a picture of Foucault, captioned "I'm not saying everything is bad, I'm saying everything is dangerous," with a picture of Adorno, captioned "I AM saying everything is bad." An example can be found here: https://imgur.com/gallery/ouZXy, accessed February 8, 2019.

24 Rose, *Black Noise*, 74.

25 Rose, *Black Noise*, 75.

26 Weheliye, *Phonographies*, 200.

27 Sharpe, *In the Wake*, 13.

28 This is what distinguishes it from ancient Greek theories of cosmic harmony, which use a different concept of sound. I explain the differences in more detail in chapters 2 and 4.

29 Helmholtz, *Sensation of Tone*, 3.

30 Olson, *Music, Physics, and Engineering*, 4.

31 As the website *Physics Classroom* explains, "The representation of sound by a sine wave is merely an attempt to illustrate the sinusoidal nature of the pressure-time fluctuations. Do not conclude that sound is a transverse wave that has crests and troughs. Sound waves traveling through air are indeed longitudinal waves with compressions and rarefactions. As sound passes through air (or any fluid medium), the particles of air do not vibrate in a transverse manner. Do not be misled—sound waves traveling through air are longitudinal waves." *Physics Classroom*, "Sound Is a Pressure Wave," http://www.physicsclassroom.com/class/sound/Lesson-1/Sound-is-a-Pressure-Wave, accessed February 8, 2019.

32 Audiopedia, "What Is Acoustic Resonance," *YouTube*, December 21, 2016, https://www.youtube.com/watch?v=5nhZf13Wq_w.

33 *The South Bank Show*, season 30, episode 12, "Steve Reich," directed by Matthew Tucker, Sky Arts, aired December 10, 2016.

34 Dissonance or out-of-tune-ness is how we humans perceive out-of-phase sound waves, and consonance is how we perceive sound waves that are in phase. This out-of-phaseness is sometimes described as "roughness" or "beating"; these metaphors imply that dissonance is the perception of clashing, incongruent phase patterns.

35 Spence, *Knocking the Hustle*, 3.

36 For example, Foucault distinguishes among German ordoliberalism, French neoliberalism, and American neoliberalism in *Birth of Biopolitics*. Simi-

larly, scholars such as Craig Willse and Melinda Cooper distinguish between welfare-state biopolitics and neoliberal biopolitics.

37 This neoliberalism-biopolitics conjunction is different from the neoliberal biopolitics that Melinda Cooper studies in *Life as Surplus*, in part because those neoliberalisms and biopolitics use slightly different though still overlapping math (e.g., tranching instead of Gaussian distributions of risk). Cooper distinguishes between a "state biopolitics [which] speaks the language of Gaussian curves and normalizable risk" and neoliberalism-biopolitics, which is "more likely to be interested in the non-normalizable accident and the fractal curve" (*Family Values*, 10). Cooper and I examine different varieties of neoliberalism and biopolitics: Cooper studies neoliberalisms that begin after those Foucault studies in *Birth of Biopolitics*, whereas I am primarily focused on the Chicago-school-influenced neoliberalism he addresses toward the end of the book and the French neoliberalisms that Attali was referring to in his work from the late 1970s and early 1980s. It is also a different biopolitics than the one Naomi Waltham-Smith discusses in her forthcoming book *The Sound of Biopolitics*. She relies primarily on Giorgio Agamben and the relationship between his account of biopolitics and Derridean deconstruction, whereas I rely primarily on Foucault and the relationship between his account of biopolitics and the neoliberalisms that appeal to the same probabilistic methods of quantification. Similarly, Huw Hallam's work on sound, music, and biopolitics foregrounds the Agambean notion of bare life, whereas I foreground the Foucauldian idea of normalization. See Huw Hallam, "The Production of Listening: On Biopolitical Sound and the Commonplaces of Aurality," *Journal of Sonic Studies* 2, no. 1 (May 2012), https://www.researchcatalogue.net/view/227912/227913.

38 Attali, "Interview with Jacques Attali," 11.

39 Foucault, *Society Must Be Defended*, 246.

40 Winnubst, *Way Too Cool*, 102, 101.

41 Mader, *Sleights of Reason*, 56.

42 Mader, *Sleights of Reason*, 65.

43 Mader, *Sleights of Reason*, 45.

44 Plato, *Republic* 509d.

45 Mader, *Sleights of Reason*, 45.

46 Mader, *Sleights of Reason*, 44.

47 Mader, *Sleights of Reason*, 52.

48 Because audio normalization means something else than what Foucault means by normalization, whenever I say normalization here I mean it in Foucault's sense, not in the sense commonly used in audio engineering.

49 Hicks, "Audio Compression Basics."

50 White, "Advanced Compression Techniques."

51 Kerr, "Compression and Oppression."

52 Sterne, *mp3*, loc. 775 of 8252.

53 Sterne, *mp3*, loc. 558 of 8252.

54 See Winnubst, *Way Too Cool*; Rancière, *Disagreement*.

55 McRobbie, "Post-Feminism and Popular Culture," 256.

56 See Mills and Pateman, *Contract and Domination*.
57 Mader, *Sleights of Reason*, 58.
58 Mader, *Sleights of Reason*, 46.
59 According to Mader, "Foucault contrasts two forms of social control in the West, one that works by exclusion and another that works by inclusion" (*Sleights of Reason*, 46).
60 Sterne, *mp3*, loc. 575 out of 8252.
61 Spence, *Stare in the Darkness*, 15.
62 James, *Resilience and Melancholy*.
63 See Darling-Hammond, "Race, Inequality and Educational Accountability."
64 Chow, "Video Calls Out Catcallers."
65 Sexton, *Amalgamation Schemes*, 6.
66 I discuss this song more extensively in James, "Listening to Sounds."
67 Spence, *Stare in the Darkness*, 15.
68 Sterne, *mp3*, loc. 165 of 8252. MP3s, the object of Sterne's study, are also frequency ratios. "MP3s are measured in terms of the bandwidth they require when played back, which is kilobits per second (kbps)" (Sterne, *mp3*). To clarify: I'm not, as Sterne cautions against, "replac[ing] a grand narrative of ever-increasing fidelity with a grand narrative of ever-increasing compression" (*mp3*). My claim here is that the same technique manifests in one sphere as signal compression and in another sphere as biopolitical normalization. The idea of the sonic episteme lets us talk about how this technique manifests as a logic that structures heterogeneous practices, ideas, and values. An episteme isn't a grand narrative—it's a specific bundle of techniques with common conceptual roots.
69 Mills, "Ideal Theory as Ideology."
70 Weheliye, *Phonographies*, 8.
71 I refer to pop musicians by the name under which they release music. As scholars such as Steven Shaviro have argued, the pop star persona—"Rihanna" or "Madonna" or "Grace Jones"—is the effect of a collective creative project: it involves producers, songwriters, graphic designers, stylists, video directors, dancers, studio musicians, PR and marketing professionals, and lots of other collaborators. The pop star persona is basically a corporate person. Robyn Fenty certainly contributes the majority of work that goes into creating Rihanna, but Fenty is not identical to Rihanna. Fenty is like the CEO of the corporate person that is Rihanna, and I'm talking about that corporation, not its CEO. Thus, when artists release music under just a single name, I will refer to that artist by that stage name to clarify the distinction between persona as corporation and artist as CEO. This is not designed to devalue black women artists by referring to them by first name but everyone else by last name; rather, it is to be precise about exactly to whom I am referring.
72 Sharpe, *In the Wake*, 13.
73 This chapter significantly reworks and expands my *Culture, Theory and Critique* article in which I reread Jacques Attali's 1977 book *Noise: The Political Economy of Music* through Michel Foucault's lectures on neoliberalism and biopolitics.
74 For example, I argue that Attali claims that "a more properly statistical vision of

reality, a macrostatistical and global, aleatory view, in terms of probabilities and statistical groups," that we see in "the kind of theorizing one finds in macroeconomics" is "organically related to that whole dimension of non-harmonic music . . . which involves the introduction of new rules and in particular those of chance" ("Interview with Jacques Attali," 11).

75 Winnubst, "Queer Thing," 96.

76 Sterne, *mp3*, loc. 562 of 8252.

77 Stoever, *Sonic Color Line*, 7.

78 Code-switching is the practice of strategically shifting cultural communication styles, often between a hegemonic style (such as standard white American English) and a subaltern style, such as African American Vernacular English (AAVE). For example, President Obama addressed white audiences differently than he did predominantly African American audiences: he used a different tone of voice, pattern of diction, vocabulary, and body language. For more on the history of African American women and code-switching, see Lorna Williamson Nelson, "Code-Switching in the Oral Life Narratives of African American Women," *Journal of Education* 172, no. 3 (1990): 142–55.

79 Feminist new materialism is a reaction to the perceived overemphasis on language and linguistic analysis in feminist theory in the late twentieth century; it argues that feminists ought to focus less on words and more on concrete, often biological and physiological matter, and that all matter is fundamentally equal or "univocal." Rosi Braidotti defines new materialism thusly: "Thus "neo-materialism" emerges as a method, a conceptual frame and a political stand, which refuses the linguistic paradigm, stressing instead the concrete yet complex materiality of bodies immersed in social relations of power." "Interview with Rosi Braidotti," in Rick Dolphijn and Iris Van Der Tuin, *New Materialism: Interviews and Cartographies* (Ann Arbor, MI: Open Humanities, 2012), 21.

80 Ahmed, "Some Preliminary Remarks," 23.

81 By "personhood" I mean full civil and political status. Persons are granted the full protection of the laws and institutions that govern them, whereas sub- and nonpersons are seen as unworthy or undeserving of such protections. For example, so-called terrorists are often represented as undeserving of basic rights to due process.

82 The theory of the divided line in the *Republic* expresses this structure. Though the True itself isn't knowable or perceptible to living humans, we can know and perceive articulations of its structure: Forms, thoughts, physical things, and images (these are the four categories of things on the line in descending order from most to least real). The line is first divided to reflect the reality of ideas as compared to material things, and then each section is again divided by the same ratio, such that intelligible : visible :: forms : thoughts or things : images.

83 Pentland, *Social Physics*, 193.

84 Pentland, *Social Physics*, 142, 144.