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BOOKSHELF

'Of Sound Mind' Review: Do You Hear What I Hear?

The science is clear but a sense of wonder remains—that somehow timing, timbre and pitch can become conversation, lyric and song.

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By Brandy Schillace
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Close your eyes. Listen to what surrounds you. At first, perhaps, the low hum of a space heater—a noise so constant that you only notice it when it stops. Then, a more distant sound—the *hiss, click, whoosh* of the heating system down the hall as it switches on. After a few moments, you untangle other, slighter sounds. The soft click of typing. Footfalls on an upper floor. The squawk of a blue jay outside. "Sound is all around us—inescapable and invisible," writes Nina Kraus in "Of Sound Mind: How Our Brain Constructs a Meaningful Sonic World." Our sense of hearing, she tells us, "is always 'on.' " We ignore it at our peril.

According to Ms. Kraus, a neuroscientist at Northwestern University and the founder of its Brainvolts auditory neuroscience laboratory, most people would choose sight over hearing—they would rather live in silence than in darkness. But, she reminds us, it is sound that provides us with our greatest means of communication. She quotes the author and activist Helen Keller: "Blindness disconnects us from things," but "deafness disconnects us from people." Sound is also a source of great nostalgic power. Ms. Kraus

writes: "The neighborhood birds, the sounds of leaves rustling, the distant church bell, the abrupt hiss-honk of the city bus's air brakes and the pick-up basketball game down the street. . . . These all impart a sense of place, a place of belonging."

We live with constant racket, but we have forgotten how to listen. And yet the part of our brain that is given over to sound—what Ms. Kraus calls the"hearing brain" or "sound mind"—is far bigger and more complex than any of our other sensory equipment. Hearing influences how we feel, how we see, how we move, how we think. It makes us who we are.

"At some point deep in our evolutionary past," Ms. Kraus explains, natural selection gave us the ability to sense pressure changes with our ears. We developed body parts that "turn the air movement caused by a vibrating guitar string or a spoken word" into something meaningful. Both our ability to move and our ability to hear were developed from similar sources: The deep thrum in our chests when we hear a drumbeat, the innate desire to move to a rhythmic tempo—these echo our earliest development. Sound is motion.

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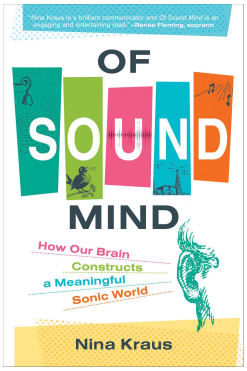
Of Sound Mind: How the Brain Constructs a Meaningful Sonic World

By Nina Kraus
MIT Press
368 pages



The way by which we convert sound waves into electrical brain signals is indeed unusual: Within the inner ear are tiny hairs in a fluid; when external vibrations enter the ear canal, they agitate the fluid and cause the hair cells to bob up and down. Microscopic projections that perch on top bump and bend, causing porelike channels to open. Chemicals rush into the cells, creating electrical signals that the auditory nerve carry to the brain. Ms. Kraus's descriptions of the process are rich in metaphorical imagery, giving us the sense that an ear is a cathedral with walls, roof and floor, with fountains of living (electrical) water. But while the science is clear, there remains a magical, awe-inspiring sense of wonder that somehow timing, timbre and pitch can become conversation, lyric and song.

Our comprehension of sound also works in the opposite direction, explains Ms. Kraus: not only from ear to brain, but from brain to ear. A few years ago, a meme on the internet featured someone pronouncing a word. Simple—except no one could agree on the word: It depended on your context. How could this be? Ms. Kraus describes a similar experiment wherein an audio "ba" sound is paired with a video of someone expressing a "fa" sound. Close your eyes, and you hear "ba." Watch the person in the video, and you hear "fa." What your brain tells you—in this case, from the sense of sight—influences what you hear. To use another of Ms. Kraus's examples: During one of her classes she often plays a recording of a sentence that has been so distorted that it sounds like "Darth Vader with a toothache doing a Cookie Monster impersonation during a thunderstorm." Her students will find the recording incomprehensible—that is, until she plays a clear version of the sentence. "When I play the garbled one again, lightbulbs go off all over the lecture hall. Suddenly that garbled mess is completely understandable to every student. Everyone is amazed at how obvious (in retrospect) the garbled sentence was and can't believe it was ever challenging. What we know has an enormous influence on what we hear."

But Ms. Kraus does not speak only of the hearing brain when it functions best. She also addresses what goes wrong and why. She has worked at length with children and adults suffering lost or impoverished hearing. Often these are the cases that teach us most about the auditory cortex—what we know and how much we have yet to learn.

The significance of this work is especially apparent to me. For years my mother has been slowly losing her hearing due to a degenerative nerve disorder. Her ear hears, but it does not communicate the sound to her brain, leaving her not with silence but with disambiguated white noise. With those losses, she has also complained of the slow retreat of comprehension and memory. The loss of hearing—according to Ms. Kraus, her study participants and my mother—creates a sense of isolation. In one of her final chapters, the author offers hope to those who find that they've begun to lose this precious gift. "The human sound mind continues to be shaped into old age," she writes, and there are still benefits possible for those who want to strengthen their hearing brain.

"Of Sound Mind" offers a deeply scientific yet often poetic look at the hearing brain and provides an in-depth narrative about why such explorations are important. The expertly rendered illustrations by Katie Shelly that accompany the text make complex processes easy to understand; their cartoonlike quality make science seem familiar, friendly, easy to access.

While the sense of hearing may not be any more important or privileged than sight, and while it is possible to live a rich life without it, "we have abundant evidence to trust that sound is a force shaping our minds." Ms. Kraus's greatest triumph is in making the invisible visible, in vividly rendering those vibrations of air through the medium of her words and reminding us to pause and listen.

Ms. Schillace is the editor in chief of the journal Medical Humanities. She is also the author of "Mr. Humble and Dr. Butcher" and the host of "The Peculiar Book Club."

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