A musician friend prefers listening to music on vinyl or CD through his premium speakers or headphones, eschewing the low fidelity, compressed files of music conveniently available on his smartphone. A swing dance friend with a musical background hears and anticipates a “break” in a particular song—and plays with the music. Musician brains are more attuned to the rhythms, beats and intervals of music—the nuances of sound that often escape me. Why is that? Are they just more naturally talented or has playing a musical instrument tweaked their brain’s auditory responses?

Why do I feel happy when I sing “Sweet Caroline” and belt out “so good, so good, so good?” Why does a powerful love song bring tears to my eyes? Why do dementia patients who struggle to converse in everyday conversations, frequently remember lyrics and associated memories when they listen to music?

These questions, and many others about how our brains process sound, are the focus of Nina Kraus’ new book, Of Sound Mind—How Our Brain Constructs a Meaningful Sonic World. Kraus is a neuroscientist and professor at Northwestern University who founded the Brainvolts Laboratory some 30 years ago to research the biological foundations of sound. There she has explored the amazing connections between sound signals and our brain’s processing—making sense of what we hear.

The sound mind of musicians gets top billing in her book, in part because it has a tremendous effect on our speech and language development. In a chapter titled, “Music is the Jackpot,” she writes:

“Making music is arguably one of the best ways to foster cognitive strengths such as attention, working memory, and creativity. Remarkably these strengths are not just musical, but transfer to other activities, most notably speech… Music activates the reward circuitry of the brain… Musicians have stronger cortical responses to musical sounds than nonmusicians. Musicians’ brains more readily register a change in a sound pattern or dissonant or mistuned chords.”

Kraus maintains that taking up an instrument even in our later lives can improve our sound minds—though it won’t rival the sound minds of those who have played an instrument their entire lives, but still, it makes a difference.

She devotes a chapter on rhythm, stating that, “it connects us to the world. It plays a role in listening, in language, in understanding speech in noisy places and even in our feelings toward one another.”

Those who speak another language, and athletes typically have better “sound minds,” too, and outperform monolinguals and nonathletes in speech in noise tests. Kraus’ research has shown that “bilinguals excel at suppressing impulsivity, which is key to being able to avoid distractions and pay attention to what’s important.”

And Brainvolts researchers looked at the response to sound relative to background neural noise in 500 athletes at Northwestern University, and at the response in 500 nonathletes. They found that the “sound to noise” ratio was larger in the athletes—suggesting that athletes have a quieter brain with keen sound minds that do a better job of blocking out background noise.”

Her research has shown that an improved sound signal leads to better reading skills. Brainvolts conducted an experiment that provided assistive listening devices to children for an entire school year. “Children with the listening aids showed greater improvements in their reading ability and phonological awareness (the ability to identify and manipulate the sounds of English) compared with children who had not worn the devices.” The devices provided improved sound to children with reading deficits.

Kraus also devotes sections of her book to her research on autism and the sound mind; to using sound...
to diagnose concussions; to tinnitus; to the noisy world
that surrounds us in the 21st century; to auditory training
for older adults; to the sound mind in dementia patients;
and even to birdsong—and she does so with a scientific
curiosity and a humble recognition of how much we
don’t know.

I had to read her chapters on sound ingredients
several times—as I am a nonmusician and I find under-
standing sound a bit too theoretical. Similarly, her chapter
on the auditory pathway in the brain is a bit daunting
for the lay person and has a textbook feel to it at times.
But she does clearly show that the auditory system is
not a straight hierarchical pathway, but one that engages
the feeling, thinking, moving and sensing regions of the
brain. She breaks down sound components and explains
how the movement of molecules is received by the ear
and eventually transduced into a series of electrical
impulses. Her metaphor of the brain as a giant mixing
board automatically adjusting faders to make sense
of sound in mind boggling speed (microseconds and
milliseconds) was helpful.

I have a newfound appreciation for speech patholo-
gists, audiologists and neuroscientists—and for musicians,
bilinguals and athletes—and for the power of “sound”
in our lives. It’s no surprise that Kraus advocates for
initiatives in music, foreign language, and physical educa-
tion in our schools. As Kraus contends, “we have abun-
dant evidence to trust that sound is a force shaping
our minds.”

It’s time for me to sign up for guitar or piano
lessons. I need to improve my sound mind so I can hit
those breaks when I am swing dancing. I also need to
buy a turntable and get my old LPs out of the attic. HL

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people just like you, who
are learning how to best
cope with their hearing
problems.