

Did you take music lessons as a child? Although many of us may have protested weekly piano lessons, those lessons might have been building more than just a lingering resentment of classical music. Recent research suggests that studying music earlier in life may provide long-lasting benefits to our brains.

Dr. Nina Kraus is the principal investigator at the Auditory Neuroscience Laboratory at Northwestern University, where researchers study how our brains process sound. Her research has amassed a wealth of information exploring how the brain handles music and aging, and more recently, she and her colleagues have turned their attention to sound and the aging brain. Some of the hearing loss associated with aging is a consequence of the degeneration of hair cells in our cochlea—the part of the ear responsible for translating sound messages into a language our brains can process. However, Dr. Kraus’s lab has demonstrated that some amount of hearing challenges—particularly difficulties with deciphering speech in noisy background conditions—stem from “messier” early neural processing. In short, an auditory message is sent from our ears to our brains, where it undergoes several stages of processing. According to Dr. Kraus’s research, the aging brain begins to introduce distortion in the brain’s earliest stages of processing—before the auditory message has even arrived at the “auditory cortex,” the area of the brain typically associated with the processing of sounds. This distortion results in having a more difficult time with such tasks as understanding a conversation when you’re in a crowded room.

Such research might not paint a particularly optimistic picture of the aging brain, but the news is not all bad. Dr. Kraus’s research has shown that lifelong musicians do not show this degeneration of auditory processing—in fact, the brains of senior musicians processed sound just as efficiently as young adults. To demonstrate this, Dr. Kraus’s lab recorded the brain waves of

young adults, older adult non-musicians, and older adult musicians in response to a musical stimulus—for example, a musical scale (think “do-re-mi-fa-sol”). They then used special software to translate these brain waves into sound waves that could be played back on the computer. The brain waves generated by young adults and older adult musicians more closely replicated the sound of the musical stimulus, whereas the brain waves generated by older adult non-musicians sounded similar, but much more distorted.

Intriguingly, this pattern of results was not limited to lifelong musicians. More recently, Dr. Kraus’s lab has explored the same effects with older adults who took music lessons in their adolescence, but who have not played music since. Results showed that even after 40 to 50 years, the brains of older adults who took music lessons in early life still processed sound more efficiently than the brains of older adults who never had such an experience. (However, older adults who took musician lessons as adolescents were still outperformed by both younger adults and older adult lifelong musicians.) It appears that engaging in musical training at a young age teaches the brain to process sound more effectively and efficiently—and that this lesson lasts a lifetime. These findings have major implications for the importance of arts education, particularly in an era when such programs are among to be cut from struggling schools.

So if you suffered through painful piano lessons, boring band practices, or cringe-worthy choir rehearsals as a kid while your parents insisted it was good for you, take heart—it may or may not have built character, but it certainly seems to have built brain connections!

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