

How music alters the teenage brain

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Music training, begun as late as high school, may help improve the teenage brain's responses to sound and sharpen hearing and language skills, suggests a new Northwestern University study.

The research, to be published the week of July 20 in the *Proceedings of the National Academy of Sciences (PNAS)*, indicates that music instruction helps enhance skills that are critical for academic success.

The gains were seen during group music classes included in the schools' curriculum, suggesting in-school training accelerates neurodevelopment.

"While music programs are often the first to be cut when the school budget is tight, these results highlight music's place in the high school curriculum," said Nina Kraus, senior study author and director of Northwestern's Auditory Neuroscience Laboratory at the School of Communication.

"Although learning to play music does not teach skills that seem directly relevant to most careers, the results suggest that music may engender what educators refer to as 'learning to learn,'" Kraus added.

Kraus and colleagues recruited 40 Chicago-area high school freshmen in a study that began shortly

before school started. They followed these children longitudinally until their senior year.

Nearly half the students had enrolled in band classes, which involved two to three hours a week of instrumental group music instruction in school. The rest had enrolled in junior Reserve Officers' Training Corps (ROTC), which emphasized fitness exercises during a comparable period. Both groups attended the same schools in low-income neighborhoods.

Electrode recordings at the start of the study and three years later revealed that the music group showed more rapid maturation in the brain's response to sound. Moreover, they demonstrated prolonged heightened brain sensitivity to sound details.

All participants improved in language skills tied to sound-structure awareness, but the improvement was greater for those in [music classes](#), compared with the ROTC group.

According to the authors, [high school](#) music training—increasingly disfavored due to funding shortfalls—might hone brain development and improve language skills.

The stable processing of sound details, important for language skills, is known to be diminished in children raised in poverty, raising the possibility that [music](#) education may offset this negative influence on sound processing.

"Our results support the notion that the adolescent brain remains receptive to training, underscoring the importance of enrichment during the teenage years," the authors wrote.

More information: *PNAS*
www.pnas.org/cgi/doi/10.1073/pnas.1505114112

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