Music lessons give kids' brains a workout

NORTHWESTERN (US)—Children who take part in musical training have an advantage in learning that spills over to skills that include language, speech, memory, attention, and even vocal emotion.

Research on the effects of music training on the nervous system has strong implications for education, says Nina Kraus, the Hugh Knowles Professor of Communication Sciences and Neurobiology at Northwestern University and director of the Auditory Neuroscience Laboratory.

Scientists use the term neuroplasticity to describe the brain's ability to adapt and change as a result of training and experience over the course of a person's life, Kraus says.

Research suggests the neural connections made during musical training also prime the brain for other aspects of human communication.

An active engagement with musical sounds not only enhances neuroplasticity, she says, but also enables the nervous system to provide the stable scaffolding of meaningful patterns so important to learning.

"The brain is unable to process all of the available sensory information from second to second, and thus must selectively enhance what is relevant," says Kraus.

Playing an instrument primes the brain to choose what is relevant in a complex process that may involve reading or remembering a score, timing issues, and coordination with other musicians."A musician's brain selectively enhances information-bearing elements in sound," Kraus says.

“In a beautiful interrelationship between sensory and cognitive processes, the nervous system makes associations between complex sounds and what they mean.” The efficient sound-to-meaning connections are important not only for music but for other aspects of communication.

Details of the research appear in the July 20 Nature Reviews Neuroscience.

Musicians are more successful than non-musicians in learning to incorporate sound patterns for a new language into words. Children who are musically trained show stronger neural activation to pitch changes in speech and have a better vocabulary and reading ability than children who did not receive music training.

Musicians trained to hear sounds embedded in a rich network of melodies and harmonies are primed to understand speech in a noisy background and exhibit both enhanced cognitive and sensory abilities that give them a distinct advantage for processing speech in challenging listening environments compared with non-musicians.

Children with learning disorders are particularly vulnerable to the deleterious effects of background noise

“Music training seems to strengthen the same neural processes that often are deficient in individuals with developmental dyslexia or who have difficulty hearing speech in noise.”

What is currently known about the benefits of music training on sensory processing beyond that involved in musical performance is largely derived from studying those who can afford such training, Kraus says.

Serious investing of resources in music training in schools is needed, the researchers say, accompanied with rigorous examinations of the effects of such instruction on listening, learning, memory, attention and literacy skills.

“The effect of music training suggests that, akin to physical exercise and its impact on body fitness, music is a resource that tones the brain for auditory fitness and thus requires society to re-examine the role of music in shaping individual development,” the researchers conclude.

http://www.futurity.org/top-stories/music-lessons-give-kids-brains-a-workout/
More news from Northwestern University: http://www.northwestern.edu/newscenter/