Music Training: An Antidote for Aging?

By Nina Kraus, PhD, & Samira Anderson, AuD, PhD

One of the most pervasive effects of aging is the reduction in processing speed, affecting sensory, cognitive, and motor systems. In the January issue of The Hearing Journal, we discussed how aging influences central auditory processing (see http://bit.ly/AudAging, or p. 36 of that issue). The effects of aging on temporal processing likely play a role in the older adult’s difficulty understanding speech in challenging listening environments (Psychol Aging 1999;14[3]:380; Int J Audiol 2003;42[S2]:26).

So what options can a clinician offer an older patient who continues to struggle with hearing after being fit with amplification? Research has demonstrated that both short-term auditory training and lifelong experience can not only lead to better hearing in noise, but also fundamentally alter the brain’s representation of speech and other sounds.

Musicianship is an example of long-term training that can result in the development of superior auditory skills extending beyond the music domain to speech-in-noise perception and auditory cognitive abilities, such as memory and attention (Nat Rev Neurosci 2010;11[8]:599). Aniruddh D. Patel, PhD, proposed the OPERA hypothesis to explain the heightened auditory skills of musicians (Front Psychol 2011;2:142).

- **Overlap:** There is an overlap in the anatomy and physiology of the auditory system for speech and music.
- **Precision:** More precision is required for music processing than for speech.
- **Emotions:** The strong emotions often elicited by music may induce plasticity through activation of the brain’s reward centers.
- **Repetition:** Extensive practice tunes the auditory system.
- **Attention:** Focused attention to details of sound is required when playing an instrument.

These aspects of music training lead to better processing of speech in the auditory brainstem and cortex and to better understanding of speech in noise across age groups, including school-age children (Brain Lang 2012;123[3]:191), young adults (J Neurosci 2009;29[45]:14100; Brain Res 2010;1355:112), and older adults (Front Aging Neurosci 2012;4:30). In fact, older musicians do not have the same brainstem timing delays in their speech-evoked responses that older nonmusicians do (Neurbiol Aging 2012;33[7]:1483.e1).

Obviously, we can’t all become professional musicians. However, young adults with even a limited period of music training in the form of lessons or participation in music activities at school have more robust brainstem responses to complex sounds than young adults who haven’t had any musical experience (J Neurosci 2012;32[34]:11507).

Moreover, there is evidence that the effects of a modest amount of music training may be seen after as little as six months in infants. Babies who participated in active music classes for that length of time had better communication skills than babies who participated in passive music classes (Dev Sci 2012;15[3]:398). These studies provide the kind of evidence needed for continued support of music education in our schools.

When it comes to your older patient who hasn’t had any music training, there may be benefits from starting such instruction later in life. Adults age 60 to 85 without previous musical experience exhibited improved processing speed and memory after just three months of weekly 30-minute piano lessons and three hours a week of practice, whereas the control group showed no changes in these abilities (Aging Ment Health 2007;11[4]:464). Given this evidence, music training may prove to be an effective rehabilitation strategy for older adults who would like to hear better in noise. More work is needed to document its benefits.

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