

Science finding is music to the ears

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A study led by Canadian researchers has found the first evidence that lifelong musicians experience less age-related hearing problems than non-musicians.

While hearing studies have already shown that trained musicians have highly developed auditory abilities compared to non-musicians, this is the first study to examine hearing abilities in musicians and non-musicians across the age spectrum – from 18 to 91 years of age.

The study was led by Baycrest's Rotman Research Institute in Toronto and is published online today in the journal *Psychology and Aging*, ahead of print publication.

Investigators wanted to determine if lifelong musicianship protects against normal hearing decline in later years, specifically for central [auditory processing](#) associated with understanding speech. [Hearing problems](#) are prevalent in the elderly, who often report having difficulty understanding speech in the presence of background noise. Scientists describe this as the "cocktail party problem". Part of this difficulty is due to an age-related decrease in the ability to detect and discriminate acoustic information from the environment.

"What we found was that being a musician may contribute to better hearing in old age by delaying some of the age-related changes in central auditory processing. This advantage widened considerably for musicians as they got older when compared to similar-aged non-musicians," said lead investigator Benjamin Rich Zendel at Baycrest's Rotman Research

Institute. Zendel is completing his Ph.D. in Psychology at the University of Toronto and conducted the study with senior cognitive scientist and assistant director of the Rotman Research Institute, Dr. Claude Alain.

In the study, 74 musicians (ages 19-91) and 89 non-musicians (ages 18-86) participated in a series of auditory assessments. A musician was defined as someone who started musical training by the age of 16, continued practicing music until the day of testing, and had an equivalent of at least six years of formal music lessons. Non-musicians in the study did not play any musical instrument.

Wearing insert earphones, participants sat in a soundproof room and completed four auditory tasks that assessed pure tone thresholds (ability to detect sounds that grew increasingly quieter); gap detection (ability to detect a short silent gap in an otherwise continuous sound, which is important for perceiving common speech sounds such as the words that contain "aga" or "ata"); mistuned harmonic detection (ability to detect the relationship between different sound frequencies, which is important for separating sounds that are occurring simultaneously in a noisy environment); and speech-in-noise (ability to hear a spoken sentence in the presence of background noise).

Scientists found that being a musician did not offer any advantage in the pure-tone thresholds test, across the age span. However, in the three other auditory tasks – mistuned harmonic detection, gap detection and speech-in-noise – musicians showed a clear advantage over non-musicians and this advantage gap widened as both groups got older. By age 70, the average musician was able to understand speech in a noisy environment as well as an average 50 year old non-musician, suggesting that lifelong musicianship can delay this age-related decline by 20 years.

Most importantly, the three assessments where musicians demonstrated an advantage all rely on auditory processing in the brain, while pure-tone

thresholds do not. This suggests that lifelong musicianship mitigates age-related changes in the brains of musicians, which is probably due to [musicians](#) using their auditory systems at a high level on a regular basis. In other words, "use it or lose it".

Provided by Baycrest Centre for Geriatric Care

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