Study: 'Sound' differences between age groups

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By exploring differences in the way younger and older adults respond to sounds, Western neuroscientists have found that our brains become more sensitive to sounds as we age, likely leading to hearing challenges over a lifetime.

BrainsCAN Postdoctoral Scholar Björn Herrmann and Ingrid Johnsrude, Western Research Chair in Cognitive Neuroscience, examined the auditory cortex responses of participants in their 20s and 60s. What they found was differences in responses to soft and loud sounds. The findings were published in *Journal of Neuroscience*.

"We looked at younger and older individuals who have clinically normal hearing, and we looked at how the brain's ability to adjust its sensitivity to sound levels is affected by aging," said Herrmann, the study's lead writer. "What we observed is older individuals don't adapt as well to their sound environment."

The study revealed that when young adults are in a loud environment – such as a rock concert – their brains become less sensitive to relatively quiet sounds. This allows the listener to hear the relevant sounds (like a guitar riff) well, without being distracted by irrelevant sounds. However, as a person ages, researchers found that older listeners become over-sensitive to sounds, hearing both quiet and loud sounds without the ability to ignore or tune out irrelevant auditory information. Without the ability to reduce sensitivity to irrelevant sounds, the individual experiences hearing challenges.

"When the sound environment is loud, the brain activity in younger adults loses sensitivity to really quiet sounds because they're not that important," Herrmann said. "Whereas older individuals still stay sensitive to these relatively quiet sounds, even though they're not important at the time."

The study suggests that this over-sensitivity to sounds is one reason why older adults may find certain situations, like a loud restaurant, unpleasantly distracting. It may also explain why they may find some sounds more annoying.

"It's a fundamental property of the auditory system to be able to adjust really fast to any environment a person goes into. If you cannot do that anymore, then in each situation your auditory system might be a little off. This means older individuals may be easily distracted and overwhelmed by sounds, or find them too loud," Herrmann explained.

Hearing loss affects 40 per cent of people aged 50 years or older. Further BrainsCAN research is already underway to understand how over-sensitivity to sounds in the auditory cortex of older individuals affects neurophysiological changes in other regions of the brain.

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