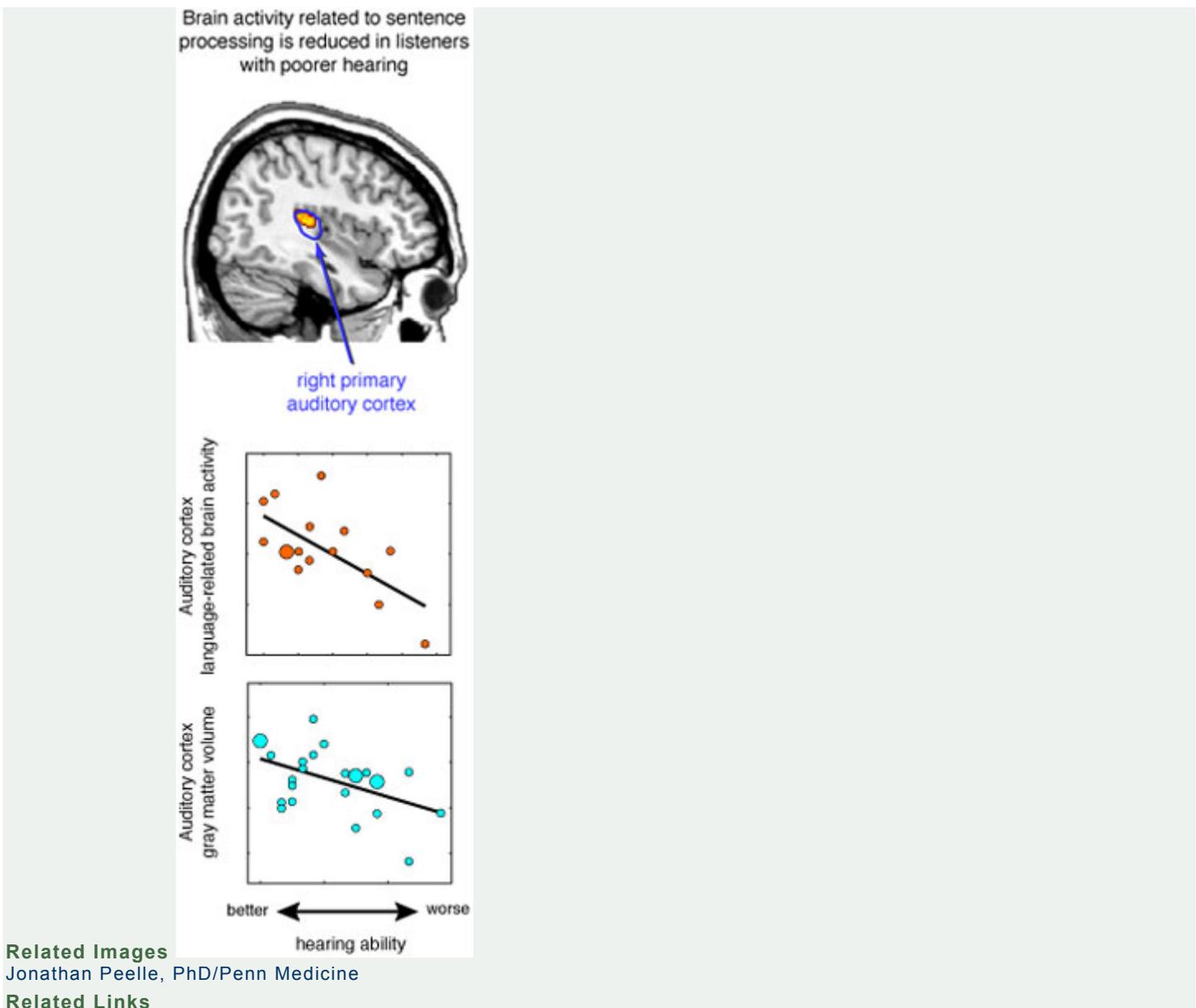


- **Mild Hearing Loss Linked to Brain Atrophy in Older Adults, Penn Study Shows**
- **Early Intervention Could Prevent Slide toward Speech Comprehension Difficulties**
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PHILADELPHIA — A new study by researchers from the **Perelman School of Medicine at the University of Pennsylvania** shows that declines in hearing ability may accelerate gray mater atrophy in auditory areas of the brain and increase the listening effort necessary for older adults to successfully comprehend speech.



When a sense (taste, smell, sight, hearing, touch) is altered, the brain reorganizes and adjusts. In the case of poor hearers, researchers found that the gray matter density of the auditory areas was lower in people with decreased hearing ability, suggesting a link between hearing ability and brain volume.

"As hearing ability declines with age, interventions such as hearing aids should be considered not only to improve hearing but to preserve the brain," said lead author **Jonathan Peelle, PhD**, research associate in the **Department of Neurology**. "People hear differently, and those with even moderate hearing loss may have to work harder to understand complex sentences."

In a pair of studies, researchers measured the relationship of hearing acuity to the brain, first measuring the brain's response to increasingly complex sentences and then measuring cortical brain volume in auditory cortex. Older adults (60-77 years of age) with normal hearing for their age were evaluated to determine whether normal variations in hearing ability impacted the structure or function of the network of areas in the brain supporting speech comprehension.

The studies found that people with hearing loss showed less brain activity on functional MRI scans when listening to complex sentences. Poorer hearers also had less gray matter in the auditory cortex, suggesting that areas of the brain related to auditory processing may show accelerated atrophy when hearing ability declines.

In general, research suggests that hearing sensitivity has cascading consequences for the neural processes supporting both perception and cognition. Although the research was conducted in older adults, the findings also have implications for younger adults, including those concerned about listening to music at loud volumes. "Your hearing ability directly affects how the brain processes sounds, including speech," says Dr. Peelle. "Preserving your hearing doesn't only protect your ears, but also helps your brain perform at its best."

The research appears in the latest edition of ***The Journal of Neuroscience*** and was funded by the National Institutes of Health.

Physicians should monitor hearing in patients as they age, noting that individuals who still fall within normal hearing ability may have increasing complaints of speech comprehension issues. Patients should talk to their physician or an audiologist if they are experiencing any difficulty hearing or understanding speech.

Why should people with hearing problems care about this study?

Simply put different specific parts of the brain are responsible for everyday functions. Each area of the brain has specific gray matter that is a physical part of the brain and is used to control specific functions.

Hearing, Vision, Verbal and Motor Skills are some of the more obvious examples.

Developing a specific portion of the brain for example related to motor skills is a main factor allowing one athlete to perform better than another.

Developing specific hearing skills can make one musician perform better than another.

Developing better visual skills can make one photographer better than another.

When anyone stops using a skill such a motor skill or hearing skill their performance can diminish over time and we can often see the effects in their day to day performance.

The term use it or lose it has been around for decades and now there proof this is true.

This study indicates that there is a physical loss or reduction in gray matter in the auditory area of the brain when a hearing loss occurs and the gray matter controls our day to day functions.

In other words when the brain does not receive information from the ear in begins to show a reduction in gray matter from not be stimulated or not being used properly.

A loss of hearing for example is often misinterpreted as not caring, ignoring, dementia, stupidity, ignorance, arrogance; unfriendliness and is in fact a combination of deterioration not only in the ear but also in the loss of gray matter in the auditory area of the brain.

From this study one could conclude that deterioration in gray matter could begin with a mild hearing change within the normal range but that remains to be proven.

It is not known if treating the hearing loss will reverse the deterioration in gray matter.

What we do know is people with high quality and properly fit hearing aids have less noticeable difficulties in their day to day communication and fewer abnormal behavioural reactions to their hearing change, so one could assume it does stop the deterioration and maybe allow other areas within the brain to be retrained.

Errol Davis Audiologist