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## What causes tone-deafness?

Posted by **TIFFANY SHARPLES** Wednesday, August 19, 2009 at 12:07 pm

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A new study from researchers at Beth Deaconess Medical Center and Harvard Medical School suggests that tone-deafness may be the result of a missing neural connection. By using a brain imaging technique that allows them to examine the links between the right temporal and frontal lobes, the scientists compared the neural connectivity of 10 tone-deaf subjects against 10 control participants. They found that, in the tone-deaf subjects, there was less connectivity of the *arcuate fasciculus* (AF), a white matter tract of fiber that serves as a "highway" between the temporal and front brain regions, and is known to be involved in linking language, music and vocal production.

The study, published this week in *The Journal of Neuroscience*, found that this stretch of fiber was both smaller and less dense in people who are tone-deaf, and that one branch of the neural pathway was in fact undetectable on the scans. The absence of evidence for that particular area of the AF led the researchers to speculate that it may be missing completely in people who are tone deaf, or possibly formed in a way that makes it unrecognizable on imaging tests. According to the study, that abnormality suggests that tone-deafness may have similarities to other speech disorders in which there is also an interrupted link between what people hear and what they are able to produce.

These latest findings add to previous research of tone-deafness that had identified the persistent disconnect between pitch perception and production. An estimated 17% of the population identify themselves as tone-deaf—broadly defined as the inability to sing in tune.

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