

Profound reorganization in brains of adults who stutter

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Hearing Beethoven while reciting Shakespeare can suppress even a King's stutter, as recently illustrated in the movie "The King's Speech". This dramatic but short-lived effect of hiding the sound of one's own speech indicates that the integration of hearing and motor functions plays some role in the fluency (or dysfluency) of speech. New research has shown that in adults who have stuttered since childhood the processes of auditory-motor integration are indeed located in a different part of the brain to those in adults who do not stutter. The findings are reported in the September 2011 issue of Elsevier's *Cortex*.

Dr. Nicole Neef and Dr. Martin Sommer from the University of Goettingen, together with Dr. Bettina Pollok from the University of Duesseldorf, studied the performance of a group of adults who stutter, as well as a control group of adults who do not stutter, in a finger tapping exercise. They used Transcranial [Magnetic Stimulation](#) (TMS) to interfere temporarily with [brain activity](#) in the dorsolateral premotor cortex while the participants tapped their fingers in time with the clicks of a metronome. In control subjects, disturbing the left premotor cortex impaired the finger tapping, but disturbing the right premotor cortex had no effect. In stuttering adults, the pattern was reversed: the accuracy of finger tapping was affected by disturbing the right hemisphere, and unaffected when disturbing the left.

Previous research has already linked stuttering with a right-shifted [cerebral blood flow](#) in the motor and premotor areas during speech. In this new study, a shift of auditory-motor integration to the right side of

the brain occurred even in a task not directly involving speech. Thus, in the brains of adults who stutter there appears to be a profound reorganization possibly compensating for subtle white matter disturbances in other parts of the brain - the left inferior frontal regions. These findings shed light on the extent of the reorganization of brain functions in persistent developmental stuttering.

More information: The article is "Right-shift for non-speech motor processing in adults who stutter" by Nicole E. Neef, Kristina Jung, Holger Rothkegel, Bettina Pollok, Alexander Wolff von Gudenberg, Walter Paulus, Martin Sommer, and appears in *Cortex*, Volume 47, Issue 8 (September 2011).

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