

Images of the brain refute a theory of the 1960s on the domain of language

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In 1968, when there were no techniques to observe how the brain worked in vivo, the neurologist Norman Geschwind discovered that a region of the temporal lobe in deceased persons, the planum temporale, was larger in the left than in the right hemisphere. As in most of the

population, language processing is located in that hemisphere, so the neurologist proposed that asymmetry was an indicator of the lateralization of that function.

Almost 50 years later, a team of researchers from the European MULTI-LATERAL project has used [magnetic resonance imaging](#) to study brain areas in vivo and has refuted that theory. The anatomical [asymmetry](#) of the planum temporale that hosts auditory functions is not a marker of the lateralization in the left hemisphere of [language functions](#).

In the research, published in *Brain Structure & Function*, 287 adults, right-handed and left-handed, participated. "It is the first study with such a large sample of individuals and includes the entire range of language variability implemented in the brain," explains Nathalie Tzourio-Mazoyer, head of the Neurofunctional Imaging Group at the Institute of Neurodegenerative Diseases of the University of Bordeaux (France) and principal author of the work.

In most of the participants, the left hemisphere was specialized in [language processing](#), but the opposite was true in a minority, in whom the right side was in charge of these functions. They all performed several tasks while the researchers analyzed their brain activity—describing an image with a sentence and listening to phrases and lists of words. No evidence showed that this region of the [left hemisphere](#) was a marker of tasks related to language, but there was a local correlation between the anatomical asymmetry and the functional asymmetry during the auditory processing of speech.

"This study shows that the largest leftward asymmetry of the [brain](#) is not a marker of the leftward lateralization of language functions in humans," says the researcher.

In the few participants who processed language with the [right](#)

[hemisphere](#), the results were the same, not inverted as might be expected, which reinforces the hypothesis of the researchers. "The results of the study show that the planum temporale does not explain the rare but strong individual variability of the language domain that exists in humans and, therefore, cannot be considered as a marker of language asymmetry at individual level," they write.

The European MULTI-LATERAL project in which the study is framed tries to give answers to these and other questions related to the lateralization of [language](#), a process that develops up to eleven years.

"MULTI-LATERAL has been in operation for about 18 months and for most of the time, different teams in Spain, France and the Netherlands have been collecting and processing data sets," explains Clyde Francks head of the Human Neurogenetic Group of the Max Planck Institute of Psycholinguistics and project coordinator to Sinc.

More information: Nathalie Tzourio-Mazoyer et al. Is the planum temporale surface area a marker of hemispheric or regional language lateralization?, *Brain Structure and Function* (2017). [DOI: 10.1007/s00429-017-1551-7](#)

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