Wernicke-Lichtheim-Geschwind model

The classical Wernicke-Lichtheim-Geschwind model of the neurobiology of language. In this model Broca's area is crucial for language production, Wernicke's area subserves language comprehension, and the necessary information exchange between these areas (such as in reading aloud) is done via the arcuate fasciculus, a major fiber bundle connecting the language areas in temporal cortex (Wernicke's area) and frontal cortex (Broca's area). The language areas are bordering one of the major fissures in the brain, the so-called Sylvian fissure. Collectively, this part of the brain is often referred to as perisylvian cortex.

Recent studies demonstrated that key language regions exist outside the classical "Wernicke-Lichtheim-Geschwind model," but sensitive tasks must take place in order to be revealed. On top of that, the tasks should be in the mother tongue for appropriate language mapping to be possible.

For that reason, in a study, Gkiatis et al. adopted an English protocol that can reveal six language critical regions even in clinical setups and they translated it into Greek to prove its efficacy in a Greek population. Twenty healthy right-handed volunteers were recruited and performed the fMRI acquisition in a standardized manner.

Results demonstrated that all six language critical regions were activated in all subjects as well as the group mean map. Furthermore, activations were found in the thalamus, the caudate, and the contralateral cerebellum.

Gkiatis et al. standardized an fMRI protocol in Greek and proved that it can reliably activate six critical language regions. They validated its efficacy for presurgical language mapping in Greek patients capable to be adopted in clinical setup ¹⁾.

1)

Gkiatis K, Garganis K, Benjamin CF, Karanasiou I, Kondylidis N, Harushukuri J, Matsopoulos GK. Standardization of presurgical language fMRI in Greek population: Mapping of six critical regions. Brain Behav. 2022 May 19:e2609. doi: 10.1002/brb3.2609. Epub ahead of print. PMID: 35587046.

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