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Can non-invasive neurostimulation enhance language abilities in aphasic patients?

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Non-invasive brain stimulation including TMS and tDCS has been used as a potential therapy tool in various pathological conditions including aphasia. Despite a large number of studies on post-stroke aphasia and on degenerative language diseases such as primary progressive aphasia (PPA) stimulation results remain inconclusive because of methodological limitations. Here, I will discuss why post-stroke aphasia is a fragile lesion model for exploring potential therapeutic efficiency of non-invasive stimulation and how research in this filed could be improved by using PPA applying a rigorous methodological approach. More specifically, I will present recent data from a pre-therapeutic double-blind sham-controlled tDCS study in a relatively large and homogenous cohort of semantic variant PPA patients. The findings of this study demonstrate that a methodologically stringent application of non-invasive neurostimulation leads to efficient modulation of the targeted language system generating highly specific intra-semantic effects. These results provide 'proof of concept' for future applications of tDCS in therapeutic multi-day regimes, potentially driving sustained improvement of language processing, promoted by mechanisms of neuroplasticity. In addition, such rigorously controlled studies also provide insight in the functional and anatomical organization of the language/semantic system.

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