Thursday, October 22, 19:30 CEST Set Timezone

< Posters

Towards a tailored approach to neuroplasticity enhancement based on brain and behavioral predictors of language learning success

Poster C23 **View Poster PDF** Download

Visit me at Gather.Town in the Broca room during Poster Session C.

Diana Lopez-Barroso[1,2,3], María José Torres-Prioris[1,2,3], Jessica Aloisi[1,4], Lisa Edelkraut[1,2,3], Guadalupe Dávila[1,2,3], Marcelo L. Berthier[1,2]; [1]Cognitive Neurology and Aphasia Unit, Centro de Investigaciones Medico-Sanitarias, University of Malaga, Malaga, Spain, [2]Instituto de Investigacion Biomedica de Malaga - IBIMA, Malaga, Spain, [3]Department of Psychobiology and Methodology of Behavioural Sciences, Faculty of Psychology and Speech Therapy, University of Malaga, Malaga, Spain, [4]Universita di Parma, Parma, Italy

Individual differences in the functional and morphological architecture of the dorsal and ventral language pathways may explain part of the variability observed in the ability to learn new words in healthy population and in language recovery of persons with aphasia (PWA). Aphasia is characterized by an impairment or loss of linguistic skills (comprehension and/or production) that arises as a consequence of acquired brain damage, most often a stroke involving the left hemisphere. The traditional gold-standard of aphasia rehabilitation is speech and language therapy (SLT), yet in many cases its effectiveness is limited and aphasic subjects are left with enduring deficits. More recent studies suggest that benefits of SLT can be boosted by the use of additional therapeutic approaches that potentiate brain plasticity such as cognitive-enhancing drugs or non-invasive-brain stimulation (transcranial direct current stimulation, tDCS). Despite promising results, the use of tDCS is still limited in clinical settings, among other causes due to the great heterogeneity in the results obtained in previous studies. Currently, there are no well-defined biological or behavioral markers to identify the optimal brain regions that can assume the lost function in a given person and therefore, it is unclear which areas of the brain should be modulated with therapeutic interventions (e.g.,tDCS, SLT). To bridge this gap, the present project seeks to identify brain, linguistics and cognitive predictors of treatment response that guide the choice of the language pathway (i.e. dorsal or ventral) and hemisphere (left or right) that must be potentiated to maximize individual benefits. For this, the implication of the dorsal and ventral pathways will be modulated with two validated word-learning tasks: phonological word-learning task (relying on the activity of the dorsal stream) and contextual word-learning task (relying on the activity of the ventral stream). Further, the activity of the left or right cerebral hemispheres will be modulated by using three different tDCS conditions. This project will be implemented through two studies in two different samples: (i) thirty healthy adults, and (ii) ten PWA, which will allow not only the identification of brain predictors but also exploring if such predictors can be translated from healthy to brain-damaged subjects. Both studies will follow the same within-subject design. Each subject will participate in 3 sessions separated by a week. In each session, subjects will receive a different tDCS stimulation condition (left anodal stimulation, right anodal stimulation, and sham) and will be required to perform the two learning tasks. Three different versions of each task will be created to prevent learning across sessions. A brain magnetic resonance imaging session will be acquired at baseline to obtain structural and functional information. In addition, several

tests aimed to measure attention, memory and working memory will be performed to explore potential cognitive predictors. The results of this project will further illuminate theories on variability of language performance in the healthy brain and will provide helpful hints for making decision in the selection of therapeutic algorithms for tDCS as well as for the selection of tailor-made SLT for a given aphasic individual.

Topic Areas: Language Therapy, Meaning: Lexical Semantics

< Posters