

How the Brain Learns Language: an Exploration of The Brain Areas Involved in Statistical Language Learning

Imme Lammertink

University of Amsterdam, Amsterdam Center for Language and Communication (ACLCL), Amsterdam, Netherlands

Gillian Clark

Deakin University, School of Psychology, Cognitive Neuroscience Unit, Melbourne, Australia

Judith Rispens

University of Amsterdam, Amsterdam Center for Language and Communication (ACLCL), Amsterdam, Netherlands

Jarrad Lum

Deakin University, School of Psychology, Cognitive Neuroscience Unit, Melbourne, Australia

Abstract

It has been suggested that the detection of statistical regularities in language a skill fundamental to language acquisition is supported by brain areas that are also involved in implicit motor skill learning. The present study is one of the first to explore this claim in an artificial language learning experiment. We used continuous theta-burst transcranial magnetic stimulation (cTBS) to temporarily inhibit functioning of the left dorsolateral prefrontal cortex (DLPFC) or the primary motor cortex (M1) in healthy adults. We hypothesized that the left DLPFC plays a role in adults detection of nonadjacent dependencies (NADs) and therefore that learning should be disrupted in the group of adults receiving cTBS to this area. Our results provide no evidence for (or against) this claim, however. An interesting exploratory result is that learning of NADs may be enhanced in adults who received cTBS to the M1 as compared to participants who received sham cTBS.