

Finding syntactic regularity in the right brain

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Left hemisphere (LH) specialization for human syntactic ability has been considered a key example of functional lateralization. However, the role of the right hemisphere (RH) in syntactic processing and how the two hemispheres work together to process language structures remain poorly understood. In this talk, I will focus on syntactic regularity processing and present a series of studies designed to investigate factors that modulate the degree of lateralization in syntactic processing. With the visual half-field grammaticality judgment paradigm and monaural auditory statistical learning paradigm, we examined event-related potential (ERP) responses from the contralateral hemisphere along with behavioral measures, or in some studies, additional Diffusion Tensor Imaging (DTI) data. Findings from this series of studies showed that, at the group level, structural-based syntactic analysis (as indexed by the P600 grammaticality effects) is lateralized to the LH in young adults. Whereas larger LH P600 effects were associated with slower inter-hemispheric transmissions; smaller RH P600 effects were associated with more effective RH inhibition. Moreover, our findings from older native speakers and learners of a second or artificial language demonstrate that the association between RH syntactic response and lower syntactic performance can be due to the compensatory attempt from the RH when the language ability is not effective or is deteriorating. Together, these data demonstrated that, like the LH, the RH is capable of structural analysis. Different aspects of cross-hemispheric communications jointly influence the degree of syntactic lateralization. While RH syntactic responses may be masked through inter-hemispheric inhibition, the RH resources can be recruited to aid demanding syntactic processing. These findings suggest that functional lateralization of syntactic processing is a symphony orchestrated by multiple factors and is more dynamic than previously thought.