Degree of learning of an artificial grammar correlates with differential fMRI activation of Broca's area

P. Thomas Schoenemann
Indiana University, Bloomington, Indiana, United States

Chung-Lin Martin Yang
University of Rochester, Rochester, New York, United States

Shelby Putt
Illinois State University, Normal, Illinois, United States

Abstract

The relevance of Broca's area to language grammar processing is well established. Its relevance to implicitly learned non-linguistic sequential rules has also been demonstrated. Previous work by our lab has shown this is true even if subjects are unaware they are being trained on, and tested for, sensitivity to these rules. We extend this work to show that the degree of differential activation in Broca's area for implicitly learned grammatical vs. ungrammatical sequences is correlated across subjects with behavioral evidence of their degree of learning of these rules (as assessed by reaction time differences). Broca's is among the three regions showing the highest association with degree of learning. This finding further underscores the relevance of Broca's for non-linguistic rule learning, and suggests that the original function of this area in our pre-human ancestors may have been the implicit learning of any kind of sequential patterns in the environment.

In M. Goldwater, F. K. Anggoro, B. K. Hayes, & D. C. Ong (Eds.), *Proceedings of the 45th Annual Conference of the Cognitive Science Society.*