Implicit learning of purely non-linguistic sequences: the role of Brocas area

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

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

Lana Ruck
Indiana University, Bloomington, Indiana, United States

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

Lauren Weed
Indiana University, Bloomington, Indiana, United States

Abstract

The relevance of Broca's area to both language and non-linguistic sequence processing is well established. However, many of the previous fMRI studies on artificial grammar learning use letter sequences as their non-linguistic stimuli. Since the letters are linguistic in nature, these may inadvertently activate language circuits independent of the artificial grammar. In addition, participants have been explicitly told before testing that they needed to classify sentences as either grammatical or ungrammatical. Thus, it is possible that part or all of the activation of Broca's reported in these studies is an artifact of these manipulations. In our current study, we used sequences of human faces instead of letters, and tested participants in such a way that they were never aware they were even being tested. Nevertheless, most participants still showed evidence of learning the non-linguistic artificial grammar, and their Broca's area was also differentially active for 'grammatical' vs. 'ungrammatical' sequences.