fMRI adaptation dissociates syntactic complexity dimensions

By ayeletb
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By ayeletb May 14, 2014


Abstract:

The current fMRI adaptation study sought to elucidate the dimensions of syntactic complexity and their underlying neural substrates. For the first time with fMRI, we investigated repetition suppression (i.e., fMRI adaptation) for two orthogonal dimensions of sentence complexity: embedding position (right-branching vs. center-embedding) and movement type (subject vs. object). Two novel results were obtained: First, we found syntactic adaptation in Broca's area and second, this adaptation was structured. Anterior Broca's area (BA 45) selectively adapted to movement type, while posterior Broca's area (BA 44) demonstrated adaptation to both movement type and embedding position (as did left posterior superior temporal gyrus and right inferior precentral sulcus). The functional distinction within Broca's area is critical not only to an understanding of the functional neuroanatomy of language, but also to theoretical accounts of syntactic complexity, demonstrating its multi-dimensional nature. These results implicate that during syntactic comprehension, a large network of areas is engaged, but that only anterior Broca's area is selective to syntactic movement.

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ATTACHMENTS

• santi_grodzinsky_adaptation__neuroimage_2010.pdf (687.16 KB)

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