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Proceedings of the Annual Meeting of the Cognitive Science Society

Title

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Permalink

Journal

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Publication Date

2020

Peer reviewed

A naturalistic fMRI investigation into the possible co-evolution of language and technology

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Abstract

Recent findings of activation of language networks in the brain during stone tool manufacture support hypotheses about the co-evolution of language and technology. Our study replicates these findings and demonstrates that distinct toolmaking behaviors and levels of expertise affect how reliably these networks are activated. Subjects, including expert toolmakers (n = 7) and untrained participants (n = 10), watched naturalistic videos of an expert toolmaker making three technologies and imagined themselves performing the same actions as the toolmaker while being scanned. We performed event-related GLM analyses on our data, focusing on activation during observation and flaking. All technologies recruited networks involved in language production and comprehension, including IFG, vPMC, dPMC, SPL, IPL, and pMTG. Flaking engaged language networks more reliably than observation. Our study considers whether expertise is required for Oldowan, Acheulean, and Levallois comprehension by exploring the extent to which activation in language networks increases with tool complexity.