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Proceedings of the Annual Meeting of the Cognitive Science Society

Title

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Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 42(0)

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Publication Date

2020

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Peer reviewed

Exact number concepts depend on language

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Abstract

The ability to represent large exact numbers is unique to humans. On some proposals, this capacity depends crucially on language; learning the count list ("one", "two", "three", etc.) allows children to represent the exact cardinality of numbers larger than four. On alternative proposals, this ability depends not on language but on innate pre-verbal counting processes. Here, we conducted a non-verbal test of large exact number concepts in the Tsimane', an indigenous Amazonian culture in which adults vary widely in their knowledge of the verbal count list. Participants correctly matched the number of objects in a response set to the number in a sample set but only for cardinalities that were within their verbal count range. For larger cardinalities, they reproduced sets that were only approximately matched in number. The findings challenge accounts that posit pre-verbal number concepts and support the Whorfian view that language can enable new conceptual abilities.