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Evidence of community structure in phonological networks of various languages

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Abstract

Thousands of phonological word-forms known to a speaker can be organized as a lexical network using the tools of network science. In these networks, nodes represent words and edges are placed between phonological neighbors. Previous work has shown that phonological networks of various languages have similar macro-level network properties. The present study investigated if phonological networks of different languages also have similar meso-level properties, specifically, the presence of robust community structure. Community detection analyses conducted on English, French, German, Dutch, and Spanish networks indicate that all networks showed strong evidence of community structure - meso-level clustering of word-forms whereby larger communities tended to contain shorter, frequent words with many phonological neighbors. Words of the same community tended to share similar phonotactic structures. Results suggest that the organization of phonological word-forms in language are governed by similar principles that could have important implications for lexical processing.