

## Phonological Networks and Systematicity in Early Lexical Acquisition

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### Author Note

All code and associated data for this manuscript can be found at <https://github.com/cathelaing/PhonologicalNetworks>. This study was not pre-registered.

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## Abstract

Infants' early words tend to be phonologically similar. This may reflect a systematic approach to early production, as they adapt newly-acquired forms to fit familiar structures in the output. This 'rich-get-richer' approach to phonological acquisition, known as *preferential attachment* in network science, proposes that new words cluster together with existing phonologically-similar words in the lexicon (or network). This contrasts with recent work (e.g. Fourtassi et al., 2020) showing that the learning environment is the key predictor in learning (*preferential acquisition*). This study expands on previous analyses of vocabulary norm data to analyse naturalistic data, namely phonetic transcriptions of nine infants' word productions, from word onset to age 2;6. Network growth models test whether 1) acquisition is best modelled through preferential attachment or preferential acquisition, 2) the trajectory of network growth changes over time, and 3) there are any differences in network growth of adult target forms vs. infants' actual productions. Results show that preferential attachment predicts acquisition of new words more convincingly than preferential acquisition: newly-acquired words are phonologically similar to existing words in the network. Furthermore, systematicity becomes increasingly apparent over the course of acquisition, and infants produce their early words more systematically than we would expect from looking at target forms alone.

*Keywords:* systematicity, phonological development, preferential attachment, networks analysis

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