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Nonuniversal foraging behavior in semantic networks

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Abstract

To what degree does semantic foraging probe semantic network structure? We use a combination of foraging experiments (animals, concrete nouns) and simulations on networks based on nine approaches to semantic similarity to address this question. In data and simulations, we find a significant bias towards naming semantically similar items, and significant correlations between inter-naming time and semantic distance. In previous foraging experiments, a roughly power law distribution with a Lévy range exponent was found in the distribution of inter-naming intervals. We find the value of this exponent is not universal but is sensitive to the search space size in that the exponent decreases (moving further into the Lévy range) as the number of nameable items is exhausted. Moreover, these exponents are not unique to semantic networks but appear in censored random walks on other graphs. Our combined experimental results and simulations provide insights into the topology of semantic memory.