Evaluating models of productivity in language acquisition

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Abstract

One of the challenges facing a child learning language is when to generalize over their input and infer productive rules. Two mathematically precise models of this problem have been proposed recently: Fragment Grammars (ODonnell, 2015) and the Tolerance Principle (Yang, 2016). Both are based on the learner optimizing computation costs: Fragment Grammars balance the costs of storing forms whole and decomposing them into parts, while the Tolerance Principle reflects a trade-off between the processing time of serial search over all forms or only irregular forms. We implement versions of these models that are directly comparable and perform a series of analyses that show that the models make systematically differing predictions in some domains and parameter regimes. We then compare these predictions to the empirical literature on the emergence of productivity over development and evaluate which model under what assumptions provides a more accurate account of childrens learning.