An incremental model of syntactic bootstrapping

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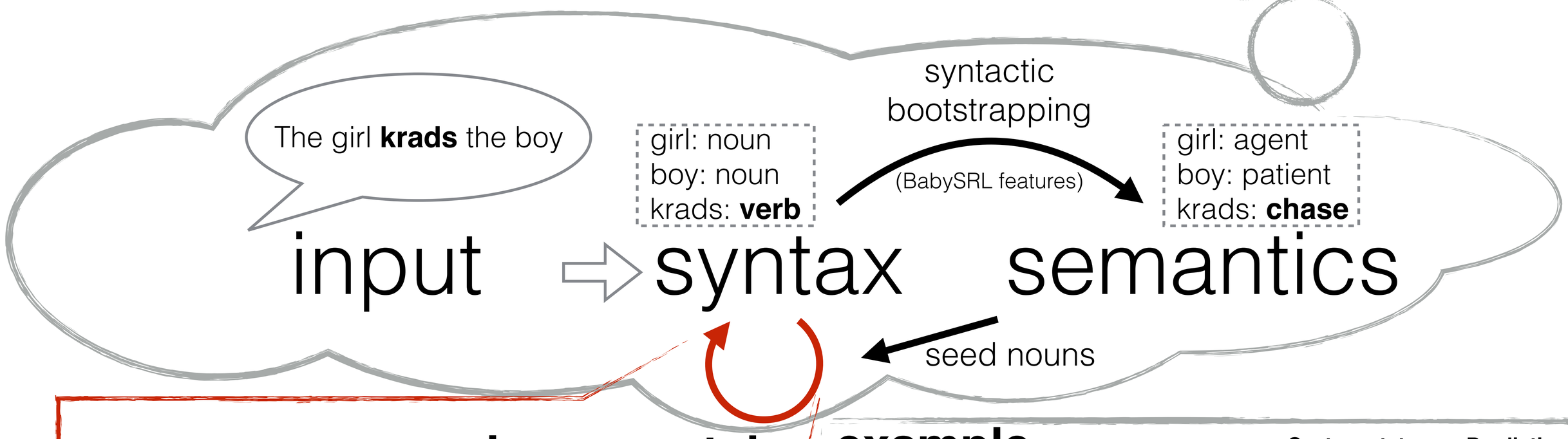
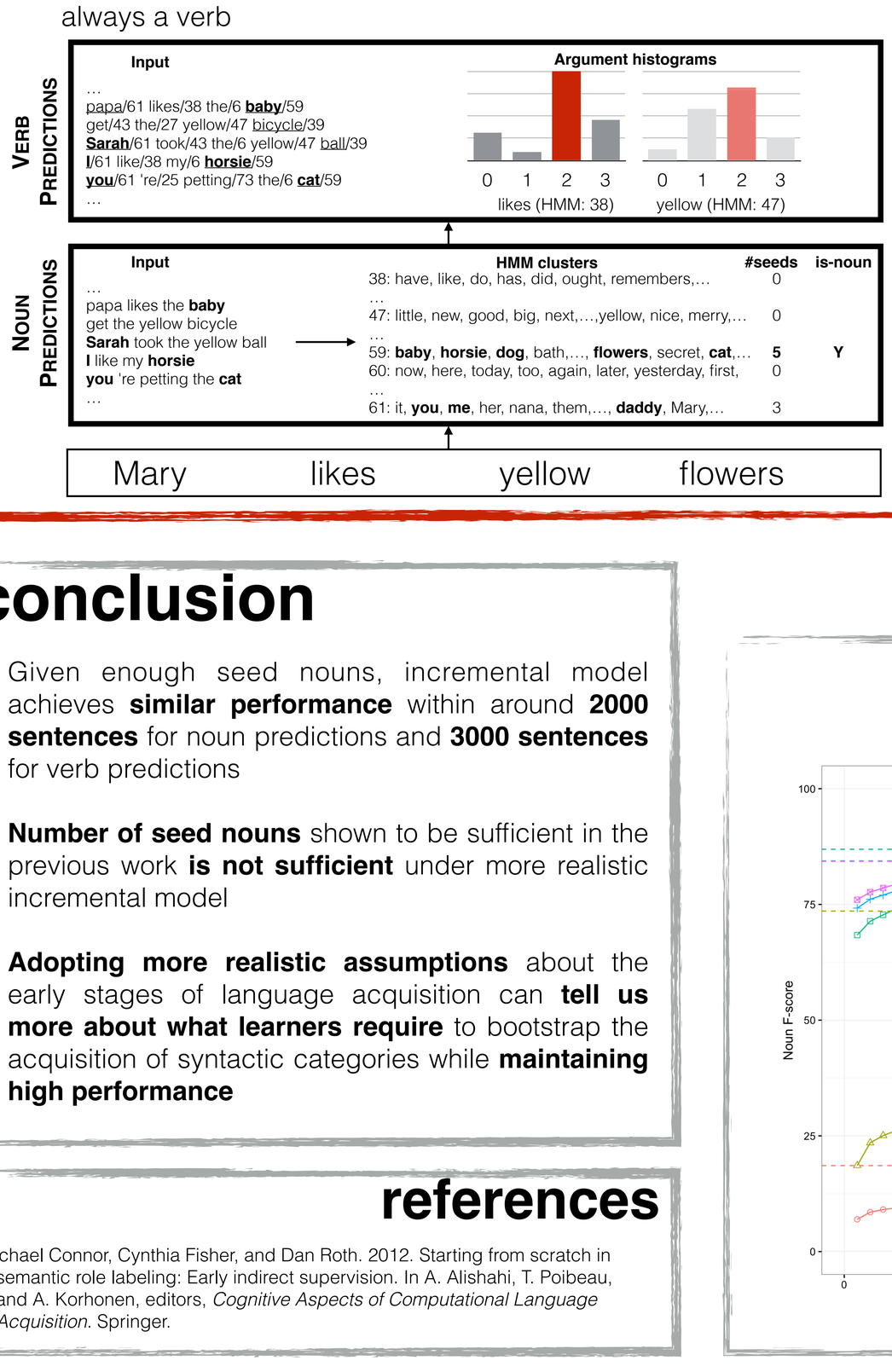
introduction

- Language learners must map lexical units to underlying semantic representations
- **Syntactic bootstrapping:** learners use syntactic structure to acquire the meanings of novel verbs
- **Structure Mapping:**
  - children have an innate one-to-one mapping between nouns and semantic arguments
  - they use this information to identify verbs and assign semantic roles to their arguments
- Connor et al. (2012): computational model of syntactic bootstrapping via structure mapping
- Current work: two improvements
  - **Incremental learning**: predictions are made as soon as the learner receives input
  - **Aggregated verb predictions**: distributional clusters behave in a grammatically consistent fashion

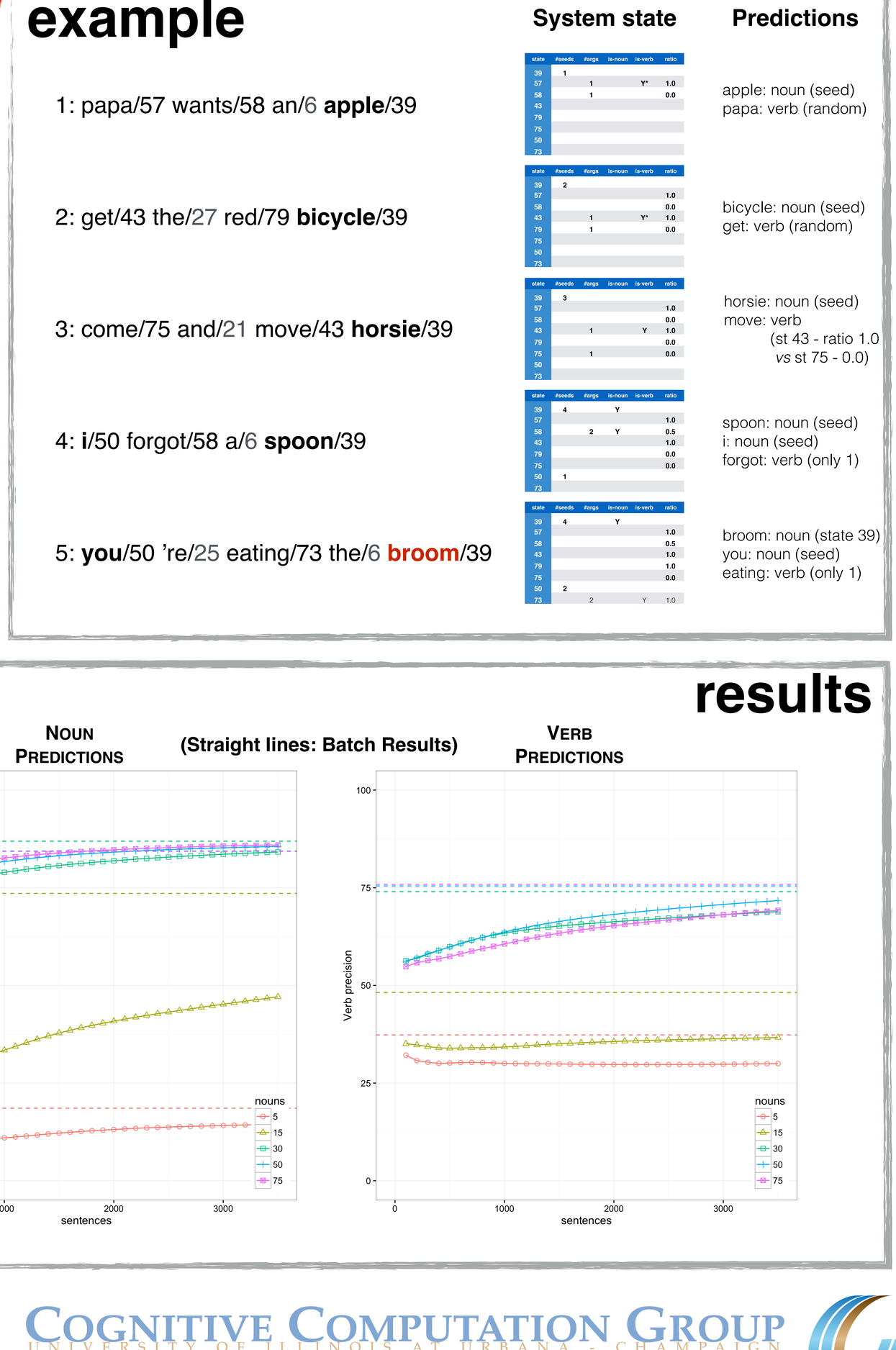


incremental heuristics

Assumptions:
1) there exist verbs
2) nouns are not verbs
3) once a verb, always a verb



example



conclusion

- Given enough seed nouns, incremental model achieves **similar performance** within around **2000 sentences** for noun predictions and **3000 sentences** for verb predictions
- **Number of seed nouns** shown to be sufficient in the previous work **is not sufficient** under more realistic incremental model
- **Adopting more realistic assumptions** about the early stages of language acquisition can **tell us more about what learners require** to bootstrap the acquisition of syntactic categories while **maintaining high performance**

results

references

Michael Connor, Cynthia Fisher, and Dan Roth. 2012. Starting from scratch in semantic role labeling: Early indirect supervision. In A. Alishahi, T. Poibeau, and A. Korhonen, editors, *Cognitive Aspects of Computational Language Acquisition*. Springer.

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