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Neural Networks, Language Acquisition and Universal Grammar

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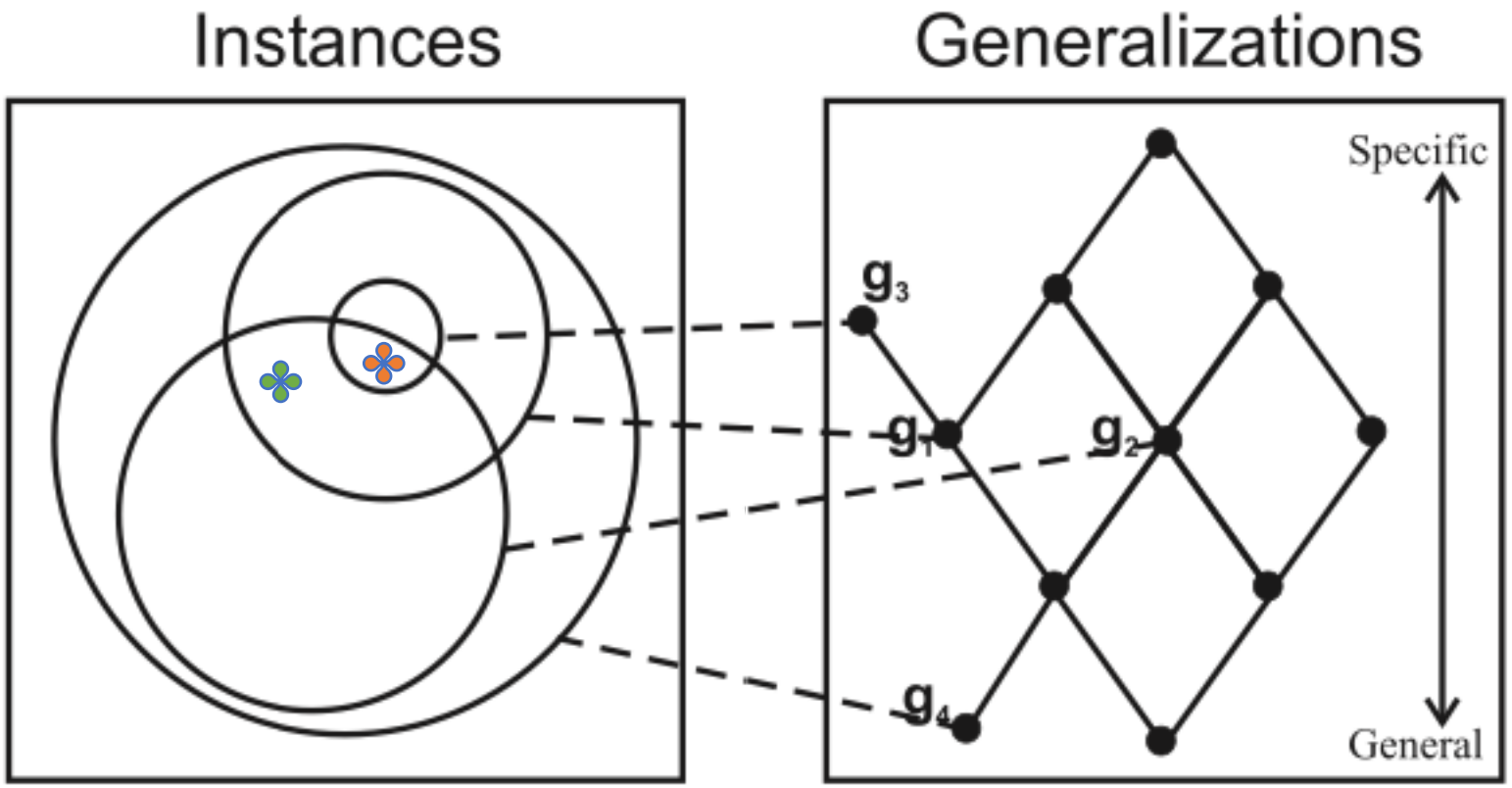
LING 380/780

Neural Network Models of Linguistic Structure

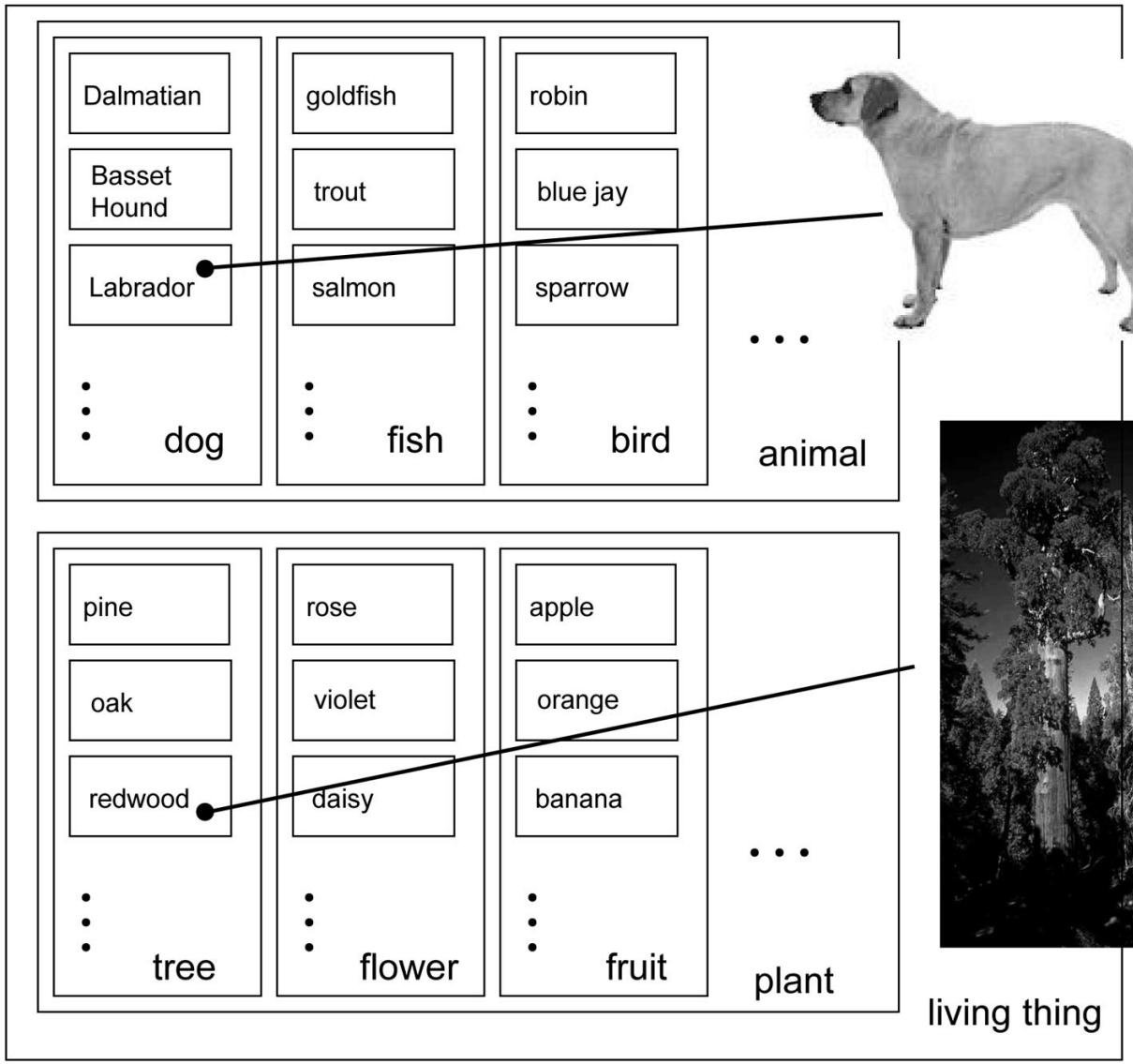
The problem of language learning

- Children learn language
  - without explicit instruction
  - quickly
  - in the face of noisy and incomplete data
  - in a uniform manner
    - within a language
    - across languages

Generalization and inductive bias



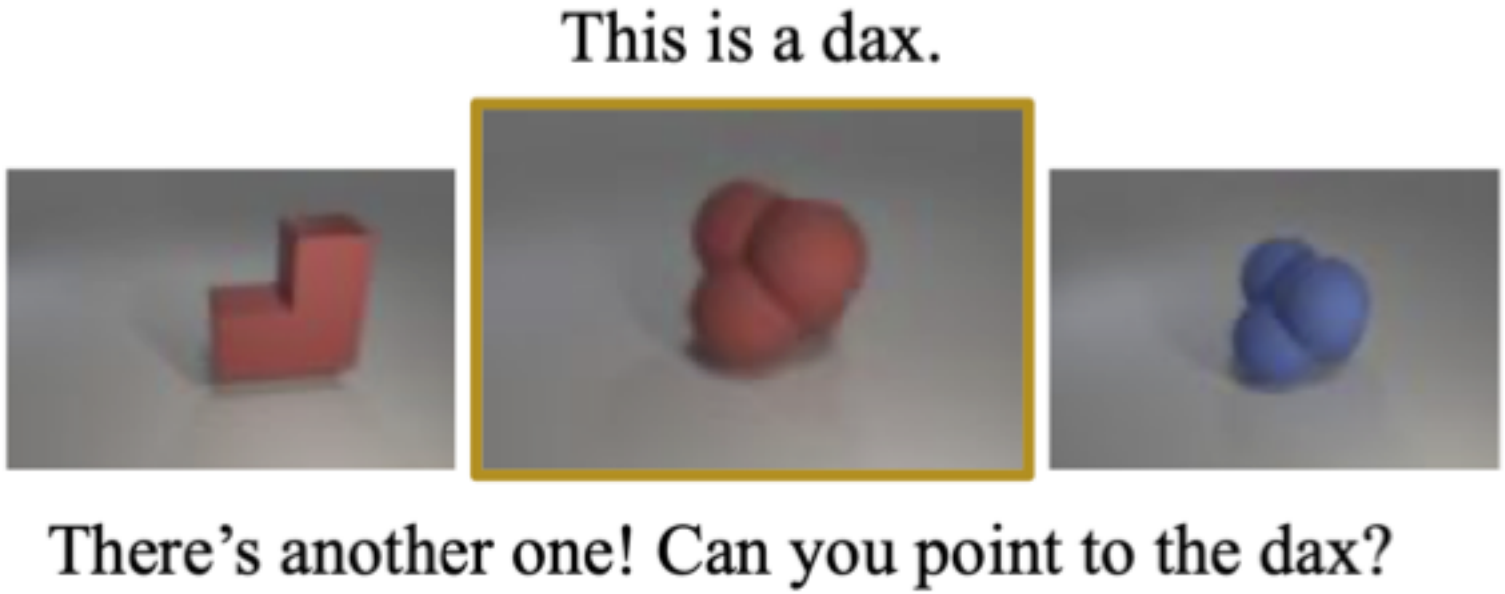
Inductive bias in word learning



Taxonomic bias:
preference for basic level categories

Mutual exclusion principle:
avoid synonymy

Inductive bias in word learning



Shape bias:
assume novel word (noun)
refers to shape

The genesis of inductive biases: innateness

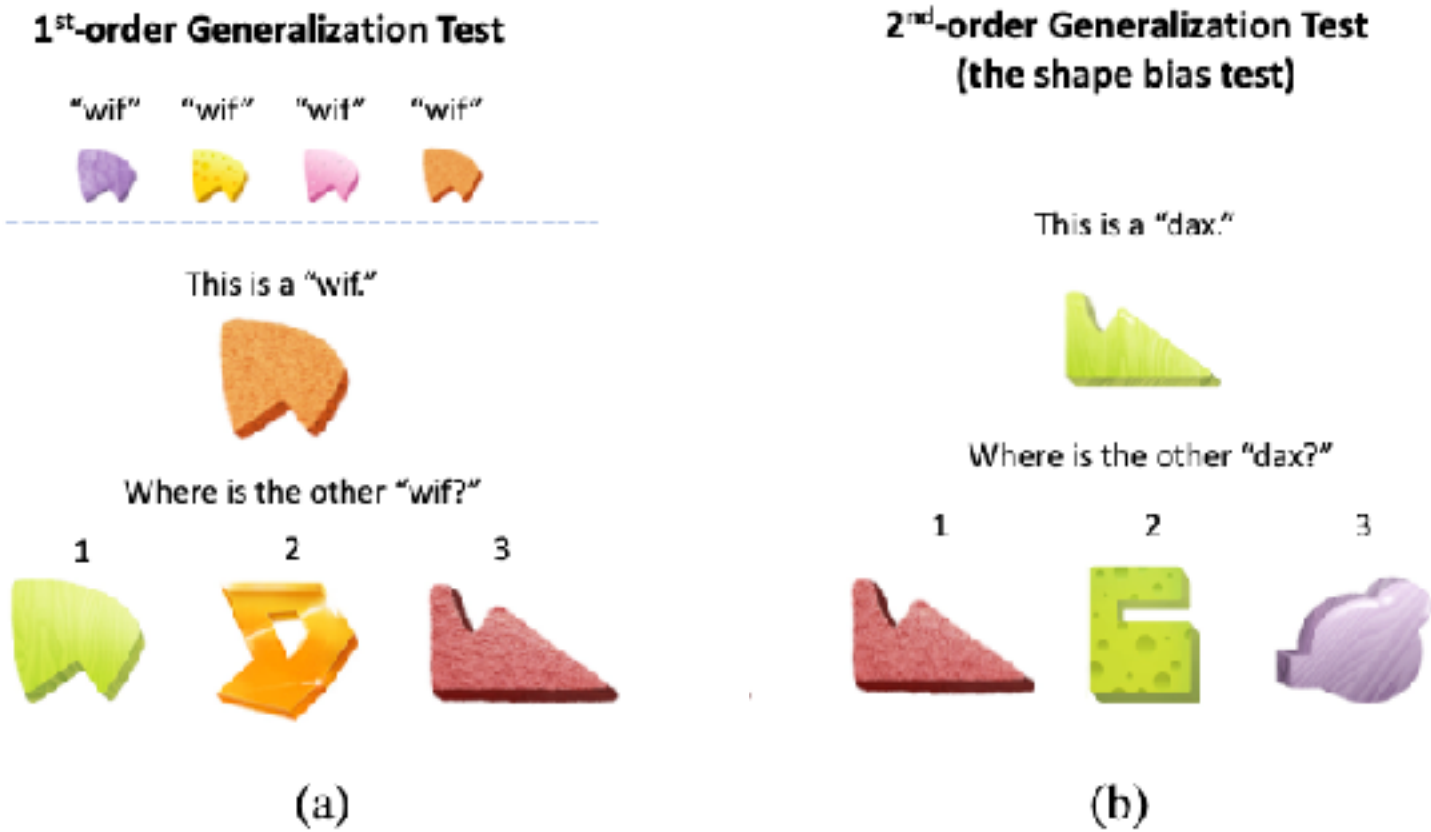
- Proposal: Children are born with the shape bias
  - Across languages, nouns show shape bias (Landau et al. 1988):

    This is a dax

  - Adjectives typically show substance/color bias, but there is some variation by language (Waxman et al. 1997):

    This is a daxy one

The genesis of inductive biases: learning



Feinman and Lake 2018

Nature of inductive bias

- Domain specific:
  - Property of linguistic system that predisposes learner toward certain generalizations
- Domain general:
  - Property of general learning mechanism that favors certain generalizations