Universal Grammar

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Theory and predictions for the development of morphology and syntax: A Universal Grammar + Statistics approach

1. Introduction

- Goal: “Make different **theoretical proposals** concrete enough to provide **testable predictions**.”
  - If **predictions** are borne out, the **proposal** is supported
  - If not, the **proposal** isn’t

→ **Computational cognitive modeling** provides a way to generate **testable predictions**

Why the focus on computational cognitive models?

→ “Because it’s often hard to pin down a specific **prediction** that a **UG+stats proposal** makes without a concrete model that uses the proposed **UG knowledge** and implements a specific learning strategy relying on the proposed **statistics**.”

- “When we have a **computational cognitive model**, **predictions** about children’s behavior can be generated that are precise enough to evaluate with empirical data that either already exist or can be obtained in the future.”

Computational Cognitive Modeling (cont)

- **UG+stats developmental theory** is typically “a theory of both:
  - The **linguistic representations** the child is learning = the **UG** part
  - The **acquisition process** the child undergoes = the **statistics** part”

→ The **computational model** then becomes a “proof of concept” for the developmental theory, as implemented by that model

Computational Cognitive Modeling (cont)

- Implementing a **computational cognitive model** involves:

"(i) Embedding the **relevant prior knowledge and learning mechanisms** proposed for the child in the model

(ii) Giving the modeled child realistic **input** to learn from

(iii) Generating **output predictions** from that modeled child that connect in some interpretable way to children's behavior."

→ Implementing **developmental theory** in a **computational cognitive model** is an effective way to evaluate it.

2. The UG part

- “A key motivation for UG has always been **developmental**: UG could help children **acquire the linguistic knowledge** that they do as quickly as they do from the data that’s available to them.”

2. The UG part

- Poverty of the Stimulus = “Where the **available data** often seem **inadequate** for pinpointing the right linguistic knowledge as efficiently as children seem to. So, without some **internal bias**, children wouldn’t succeed at language acquisition.”

→ UG is the proposal for what that **internal bias** could be that enables language to succeed.

2. The UG part

- “A UG proposal provide a way to structure the child’s **hypothesis space** with respect to a specific piece of linguistic knowledge”
  - “UG can help define what explicit linguistic hypotheses are considered, and what **building blocks** allow children to construct those explicit hypotheses for consideration.”

2. The UG part

- Example: Traditional **linguistic parameters** = **building blocks** children can construct their linguistic system from → A **language system** is described by a specific collection of **parameter values** for these **linguistic parameters** → Such parameter **building blocks** allow children to construct and consider explicit hypotheses about a **language's system** as they encounter data

“Generally, a working definition of UG is that it’s anything that is both innate and language specific.”