Big picture

Three related questions in acquisition research

1. What abilities or skills are required to learn a language?
2. When do these abilities emerge? What specific stages are there in language development?
3. What other cognitive abilities, if any, do these abilities depend on?

Raises the all important question

What constitutes a knowledge of language?

What kind of knowledge does a native speaker have about his or her language?
(1) Thisisanaverageexampleofaspeechstream.

Segmentation problem
There are rarely definitive pauses between words in a speech stream. How can the child learn how to recognize word boundaries?
Segmentation problem

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<th>Uttered</th>
<th>Target</th>
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<tbody>
<tr>
<td>2</td>
<td>a. Two dults</td>
<td>Two adults</td>
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<tr>
<td></td>
<td>b. I don’t want to go to your ami</td>
<td>I don’t want to go to your Miami</td>
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<tr>
<td>3</td>
<td>a. I am being have!</td>
<td>I am being have!</td>
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Phonological bootstrapping

Children use statistical regularities to determine likely word boundaries.

- Infants can’t use top-down knowledge to infer words
- Must make the most of the input
- Saffran et al. (1996) proposed that infants use *transitional probability* measures to infer boundaries.

Transitional probabilities

The probability of one sound X given another Y:

$$P(Y|X) = \frac{P(XY)}{P(X)} \approx \frac{\text{freq}(XY)}{\text{freq}(X)}$$

- Languages regulate what sounds can go together within a word, but not so much at a word boundary.

  Within word: High transitional probabilities
  Between word: Low transitional probabilities

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<td>5</td>
<td>pretty# baby</td>
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Plausibly elements of both!

Nature vs. Nuture

**Nature**

*Child’s acquisition of language is achieved primarily through innate knowledge.*

- Universality in grammar
- Specialized learning device
- Inborn biases and defaults
- Similar development

**Nuture**

*Child’s acquisition of language is achieved primarily through exposure.*

- Statistical regularities
- Model learning with limited memory
- Child directed speech
Nuture

The extreme case of behaviorism:

Simple set of reward-based general learning principles that child uses to learn language. No previous knowledge or expectations.

Question

Does this view seem reasonable? What might be some intuitive concerns about such a view?

Nature

Impossible!

1. Too many possible responses given stimuli
2. Ignores complexity and creativity of language structures
3. Too little exposure to develop rich knowledge through imitation.

Nature vs. Nuture

Poverty of the stimulus argument

The language that children acquire goes beyond the input that they receive. Language is unlearnable from exposure alone.

In support

- Limited negative evidence
- Children seem unresponsive to correction
- Grammatical judgments for novel forms
- Relative uniformity in development

Nature

Instead, children acquire language by using an innate knowledge of language, along with very powerful language specific learning biases.

Innate knowledge of language is abstract, and known as Universal Grammar (UG).
Child  My teacher held the rabbits and we patted them.
Adult  Did you say the teacher held the baby rabbits?
Child  Yes.
Adult  What did you say she did?
Child  She held the baby rabbits and we patted them.
Adult  Did you say she held them tightly?
Child  No, she held them loosely.

Jean Berko
http://www.onbeing.org/program/unfolding-language-unfolding-life/256

Nature vs. Nuture

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Wug test
Nature vs. Nuture

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Counterclaims

- Underestimates negative evidence
- Children learn language piecemeal according to cognitive limitations
- Unclear how a rich UG would be innately encoded

Critical period

Developmental limitations

Acquiring a language requires that the child be exposed to sufficient language input within a developmental time window.

- Estimates vary: 5 years – puberty
- Period of neural plasticity
- Bilingualism
- Profeciency
- Failure to develop language
- Critical period observed in other species
Critical period

- Severely abused and isolated
- Discovered at age 13 without having acquired speech
- Eventually able to acquire a limited vocabulary, but never a fully complex linguistic system.
  1. Few grammatical words
  2. No auxiliaries
  3. Improper verbal and nominal inflection
  4. No passives
  5. Negation limited