Language acquisition

11/18/11

Michael Frank
Department of Psychology
Tuned towards communication
Hierarchical organization of language

S

NP

VP

det N V

the dog snapped

\[\text{the dog snap}_{+[\text{past}]},\] morphological/lexical

\[\text{/de}\ \text{dog}\ \text{snæpt/},\] phonological

syntactic
Language development through YouTube

Babbling

1 year

“ga”

Single-word speech

1.5 years

“cheese!”

Telegraphic speech

2 years

“annie big shoes”

Multi-word speech with occasional morphology errors

3 years

“I no like mustard”
Language development through YouTube

Babbling

1 year

“ga”

Single-word speech

1.5 years

“cheese!”

Telegraphic speech

2 years

“annie big shoes”

Multi-word speech with occasional morphology errors

3 years

“I no like mustard”
Recognizing mom’s voice

Individual neonates’ preference for mother’s voice

Sucking preference

More for mom
Less for mom

DeCasper & Fifer (1980)
Mothers read “The Cat in the Hat” to their babies over the last 6 weeks of pregnancy, then the resulting newborns were tested on their preference for the target story. 

DeCasper & Spence (1986)
Categorical perception

Many phonemes differ only on some continuum.
- /b/ & /p/: voice onset time
- **Question**: /b/ & /d/ & /g/ differ on place of articulation.
  - Categorical?

Infant categorical perception

Eimas et al. (1971)
Kuhl et al. (1975)
Universal vs. specific

• /b/ vs. /p/ is close to universal
• But many sound contrasts are not
  – Any Hindi speakers here?

[Images of speakers with words: beat, lentil, branch, shield]
Conditioned head-turn procedure

a = one Hindi sound

b = another Hindi sound

“Control” trial

Test trial
Changes in speech perception

Werker & Tees (1984)
Language development through YouTube

Babbling

“ga”

1 year

Single-word speech

“cheese!”

1.5 years

Telegraphic speech

“annie big shoes”

2 years

Multi-word speech with occasional morphology errors

“I no like mustard”

3 years
# Baby’s first words

## Table 4

<table>
<thead>
<tr>
<th>Rank-Ordered Top 20 Words for Children Who Can Say 1–10 Words on CDI and Percentage of Children Producing Them, by Language</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>United States</strong> (n = 264)</td>
</tr>
<tr>
<td>Daddy (54)</td>
</tr>
<tr>
<td>Mommy (50)</td>
</tr>
<tr>
<td>BaaBaa (33)</td>
</tr>
<tr>
<td>Bye (25)</td>
</tr>
<tr>
<td>Hi (24)</td>
</tr>
<tr>
<td>UhOh (20)</td>
</tr>
<tr>
<td>Grr (16)</td>
</tr>
<tr>
<td>Bottle (13)</td>
</tr>
<tr>
<td>YumYum (13)</td>
</tr>
<tr>
<td>Dog (12)</td>
</tr>
<tr>
<td>No (12)</td>
</tr>
<tr>
<td>WoofWoof (11)</td>
</tr>
<tr>
<td>Vroom (11)</td>
</tr>
<tr>
<td>Kitty (10)</td>
</tr>
<tr>
<td>Ball (10)</td>
</tr>
<tr>
<td>Baby (7)</td>
</tr>
<tr>
<td>Duck (6)</td>
</tr>
<tr>
<td>Cat (5)</td>
</tr>
<tr>
<td>Ouch (5)</td>
</tr>
<tr>
<td>Banana (3)</td>
</tr>
</tbody>
</table>

First words are high frequency, grounded in social context and routine

Tardiff et al. (2008)
The meanings of the first words

**Underextensions**

“doggie” only means Fido

**Overextensions**

“ball” means anything round (ball, balloon, moon, apple, egg...)

![Doggie](image1.png) ![Ball](image2.png) ![Moon](image3.png)
Yet kids learn tons of words!

Fenson et al. (1994)
The importance of early experience

Total words heard

Total words known

Hart & Risley (1995)
Associative word learning

- Raise your left hand when you know what a **hiftam** is
- And your right when you know what a **gensim** is

Smith & Yu (2008)
**Intentions, not cues**

- **Coincide**: child looks at 1 after hearing 1’s name
- **Conflict**: child looks at 2 after hearing 1’s name

---

Children represent speakers’ intentions!

Baldwin (1993)
Language development through YouTube

**Babbling**

- 1 year: “ga”

**Single-word speech**

- 1.5 years: “cheese!”

**Telegraphic speech**

- 2 years: “annie big shoes”

**Multi-word speech with occasional morphology errors**

- 3 years: “I no like mustard”
English morphology

• English past tense
  – Mostly regular: walk -> walked
  – Occasionally (~100 forms) irregular: go -> went, run -> ran, sing -> sang

• English plural
  – Almost entirely regular: book -> books
  – Very few irregualrs (~10 forms): mice, geese, teeth, feet, cacti, children, men, etc.
Morphological generalization

The Wug Test

Lun
+/z/

Yesterday I ____

Tor

Today I gude.

Tass
+/əz/

Yesterday I ____

Gutch

Today I scride.

Yesterday I ____

Berko (1958)
Overregularization

Marcus et al. (1992)

1. Some irregulars learned by rote
   - Most irregulars tend to be very high frequency
2. Then over-generalization of predominant pattern
3. Finally, correct performance on regulars

Development of a “blocking rule”? Or consequence of gradually increasing evidence?

Marcus et al. (1992)
## Theoretical positions

### Principles and Parameters
- Principles of syntax are innately given
- A small set of parameters vary cross-linguistically
- Children determine these parameter settings from the input
- Developmental errors are caused by the course of maturation

### Item-based acquisition
- Syntax is learned piecemeal through individual words
- Cross-linguistic similarities caused by cognitive similarities
- Children learn and change all parts of languages
- Developmental errors are caused by mistakes in generalization
Transitive vs. intransitive

- Transitive takes an agent/subject and a patient/object
  - Pat ate snails.
  - Kim drew spirals.
  - Alex likes running.

- Intransitive just takes a subject
  - Pat ate.
  - Kim drew.
  - * Alex likes.

- Many verbs can move between the two but not all.
Gradual generalization of syntax

Here’s fudding! Look at fudding! Kiwi is fudding!

What is kiwi doing to the dough?

Kiwi is fudding it! (transitive)

Tomasello & Brooks, 1999
Early abstract knowledge

Duck is gorping bunny!

Success at 2 years, even younger for “the girl is gorping the boy.”

Gertner, Fisher, & Eisengart, 2006
Learning to sign without native input

T = transitive actor, I = intransitive actor, P = patient

You eat (I)
You eat [chocolate] (T)
[You] eat chocolate (P)
You eat chocolate (T P)

Young deaf children who were unable to acquire oral language naturally and had not been exposed to a conventional manual language were found to use spontaneously a gesture system that has some of the structural characteristics of early child language.

Goldin-Meadow & Mylander, 1983
Conclusions

• Early perceptual abilities
  – Learning rhythms, discriminating sounds

• Building a vocabulary through social word learning
  – Importance of input
  – And of mechanisms of learning

• Then gradual generalization of syntactic structure
  – Early comprehension, later production