Language Acquisition: Sebastien’s Story

- At twelve months, Sebastien said his first word.
- Eight months later he will be learning over nine new words a day and will be saying more than 10 words on a daily basis!
- He will be stringing words together in ways that make sense!

The Challenge

- Finding clever ways to test infants, who may understand much more than they say.
- To explain how it is that we can learn a language at all.

What does it take to learn a language?

- Phonology: Sounds of language.
- Segmentation: Finding units in fluent speech.
- Semantics: Connecting words to meaning.
- Grammar: The rules for combining units and expressing new meanings.
- Pragmatics: The ways we use language in practice, to efficiently communicate.

Because we lacked methodologies to allow us to “get into” babies’ heads!

Several methods have made all the difference in what we know about babies’ linguistic capabilities under age two:

- The sucking paradigm
- The headturn preference procedure
- The preferential looking paradigm

Today, I will show how these procedures help us to know what infants know.

What do infants know about Phonology?

- They suck! Literally!
- Ba, ba, ba, ba, … PA!
- Or Ba, ba ba, ba, … Ba!
- Even newborn get the diff!
- They can even hear phonemes they will never use!
Infants hear sounds we can’t!

Children exposed to a foreign language when young, learn it better! have no accent! learn two languages as fast as one!

NEWSFLASH: Early exposure is better!

Helping Phonology

- Nursery Rhymes
- Alliteration
- Exposure to foreign language

What do infants know about Segmentation?

Another of the phonological tasks faced by an infant is to discover the words in the speech stream.

Speech is not punctuated with spaces, commas, or periods.

Less than 7% of the speech directed at infants consists of isolated words.

Headturn Preference Procedure

Sample Passage.

Feet

The feet were all different sizes. This girl has very big feet. Even the toes on her feet are large. The shoes gave the man red feet. His feet get sore from standing all day. The doctor wants your feet to be clean.

Can infants pull the word feet from this passage?
Results: Jusczyk & Aslin

- Ability to segment speech seems to be in place by 7-10 months of age.
- How do they do this?
- Multiple Ways/Multiple Cues!
  - Stress cues!
  - Statistics!
  - Infant-directed speech!

Speech Segmentation

- Different Languages say words differently.
  - We say Paris, French say Pariis!
  - French say Baris, we say Barry :-(
  - All about where we accent words (A=SW).
- Jusczyk, Houston, and Newsome.
  - Hamlet
  - Guitar
  - Infants segmented out hamlet and taris!

Stress Cues

- Certain sounds follow others, certain other sounds stick together, and others never appear in certain places. (Bonus scrabble word: Phonotactics)
- Infants are sensitive to these regularities.
- Saffran, Aslin, and Newport made up a language.
  - Tu da no pi go la la la do po...
  - Infants recognized their words.
  - Tuba, pigola, bikuti, budopa.

Statistical Cues

- We talk funny to infants.
- Infant find this utterly fasinating, and...
- Infant-directed speech helps children segment. (Theissen, Hill, & Saffran, 2005).

Infant-Directed Speech

- Use Stress cues by speaking clearly and enunciating.
- Use Statistical Cues through Theme and Variation.
- Use Infant-Directed Speech by Singing.
How do children learn words?

- Frequency
- Social Cues
- Learned Heuristics

Preferential Looking
Tincoff & Jusczyk, 1999

6-month-olds looked longer at mommy when asked for mommy and longer at daddy when asked for daddy. Although most children’s first words aren’t until 12-months.

What difference does Frequency make?

Hearing the same word used in many different contexts helps infants learn what words “really” mean.

- more words = more opportunity to learn.

Children’s environments differ dramatically on how much language they hear.

What difference does it make?

Average IQ at age 3?
- Professional - 117
- Working Class - 107
- Welfare - 79

Recorded vocabulary size?
- Professional - 1,116
- Working Class - 749
- Welfare - 525

What do they make of this?

Children could
- Overgeneralize
- Call a cat a dog
- Undergeneralize
- Fail to call Garfield a Cat.
- Frequency gives them time and opportunity to figure this out.
Are social cues important?

- Children of deaf parents do not learn spoken language by watching TV.
- The more difficulty infants have following eye gaze (aka Autism), the harder it is to learn a spoken language.
- Tomasello finds that infants only learn a word if speaker intended to label it.

Setup

Display Board

“Do you see the ball? Look at the Ball.”

Putting eye gaze in conflict with interest

Procedure (Part 1)

Explanation (26 sec):
- [image of toy]

Explanation (26 sec):
- [image of another toy]

Salience (16 sec):
- "Eve, look at the board!"
- "What is that?"
- "What do you see?"

Procedure (Part 2)

Training (.15sec):
- "Eve, look at the MOOS!"
- "Eve, look at the MOOS!"
- "Eve, look at the MOOS!"

Training (6 sec):
- "Eve, where’s the MOOS?"
- "Do you see the MOOS?"
- "Show me the MOOS!"

Training (6 sec):
- "Eve, where’s the MOOS?"
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### What were the results

![Graph showing data for 12-mo, 19-mo, and 24-mo Control groups with interesting and boring objects.

### Specific Conclusions
- Infants at different ages weight cues differently.
- 12-month-olds learn words only when enough factors are in alignment.
- Only later in development do infants reliably know which factors to trust over others.
- Word learning is an emergent process.

### Constraints on Meaning
- Children develop heuristics (rules) to guess what new words might mean.
- Words generally label objects and their shape, not color.
- New words label new objects.
- Proper Names label one thing.
- Nouns label nouns, verbs/verbs, etc.

### Grammatical Morphology
- These are blickets OR These are blickish

### Helping Word Learning
- Talk to them alot!
- Get their eye gaze.
- Use every cue available!
Consider Signing

- understood more words
- had larger vocabularies
- more sophisticated play
- decreased frustration,

- increased communication
- enriched parent-infant bonding
- and increased interest in books
- still controversial

Neural mechanisms?

- Specific brain regions
- Species Specificity
  - Your pets don’t learn grammar neither did Washoe or NimChimp despite much training.
  - Although they might learn words and even phrases.
- Critical periods
  - Genie (age 13)
  - Second Language Acquisition (past puberty)

Some aspects of grammar ARE Learned

- The fact of the matter is that while our house pets certainly don’t learn English, neither do infants raised in a foreign country.
- Regardless of how much appears to be innate any good theory of language has to account for the parts that we learn, and when.

The answer is not in the question!

- Subject-question: “What hit the flower?”
- Object-question: “What did the apple hit?”

20-month-old Results

- 20-month-olds looked significantly longer to the target for all three question types;
- Not due to preference for one object.
- Not simply looking at object mentioned.
- These results suggest that infants are processing more than just the surface features of a question.
See Cookie monster and big bird bending? See Cookie monster bending big bird?

Babies Talking!

- http://www.nocolleveland.com
- Causing
- Precanonical
- Basic Canonical Syllables
- Advanced Forms

Telegraphic Speech: Getting the right order

- 2-year-olds' speech is often telegraphic: just the important words.
  - Elmo eats (agent + action).
  - Big Cookie! (attribute + entity)
  - My Cookie! (possessor + possession).
  - Gimme Cookie (action + object)

Morphemes

- Grammatical Morphemes: words or endings of words that make sentences grammatical.
  - I am jumping versus I am jumpl
- Easiest morphemes mastered first.
  - rule-based, not instance-by-instance.

Wait! I see a Mouse!!

- Overregularization shows that they know the rule.
- Recasting helps them learn (Nelson et al., 1996).
Helping Grammar

• Use complete sentences.
• Make sure to be clear about subtle distinctions such as "a" ball versus "the" ball.
• Help them learn the rules by recasting their statements.

Better living through Pragmatics

• If Grammar is the linguistic machine we live by, then Pragmatics is the grease on the wheels.
• Pragmatics: study of how people use language to communicate effectively.

Children often miss ambiguity and interpret literally.

Helping pragmatics

• Be patient.
• Explain unusual phrases.
• Give directions carefully.
• Set a good example by listening to them.

Moral of the Story

Talk to your children early and often.
Spend some quality one-on-one time.
Let them hear different languages, maybe even sign.