

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 50 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 takes 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

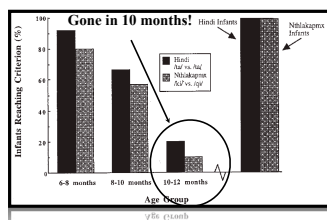
Today, I will show how these procedures help us to know what infants know

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!



NEWSFLASH: Early exposure is better!

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



Helping Phonology

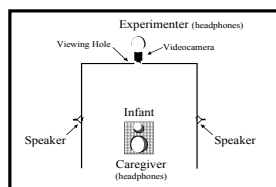
- Nursery Rhymes
- Alliteration
- Exposure to foreign language



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



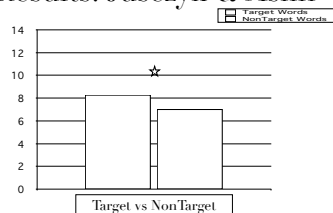
Sample Passage.

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



Speech Segmentation

- 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!

Stress Cues

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

Statistical 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 ro pi go la bi ku ti bu do pa...
 - Infants recognized their words.
 - Tudaro, pigola, bikuti, budopa.

Infant-Directed Speech

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

Helping Segmentation

- 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



"Where's Mommy?"



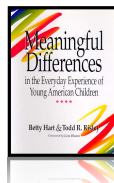
6-month-olds looked longer at mommy when asked for mommy and longer at daddy when asked for daddy.
Although most children's first words aren't until 12-months.

What difference does Frequency make?

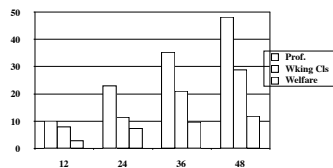
Hearing the same word used in many different contexts helps infant learn what words "really" mean.

more words = more opportunity to learn.

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



Frequency of Words



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?



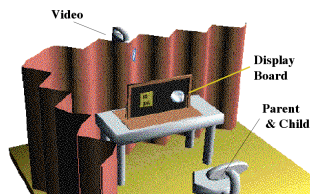
Children could

- *Overgeneralize*
 - Call a cat a dog.
- *Undergeneralize.*
 - Fail to call Garfield a Cat.
- Frequency gives them time and opportunity to figure this out.

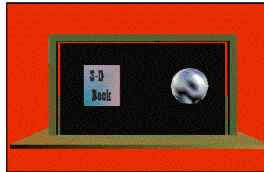
Are social cues important?

- 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

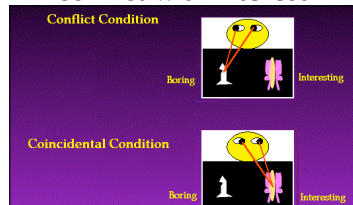


Display Board



"Do you see the ball? Look at the Ball."

Putting eye gaze in conflict with interest



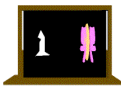
Procedure (Part 1)

Exploration (26 sec):  (plays with interesting toy)

Exploration (26 sec):  (plays with boring toy)

Saliency (6 sec):

"Eve, look on the board!"
"What is that?"
"What do you see?"



Procedure (Part 2)

Training (=1.5sec):

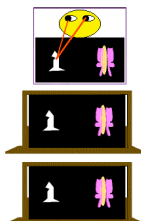
"Eve, look at the MODI."
It's a MODI, a MODI."
"Eve, look at the MODI."

Testing (6 sec):

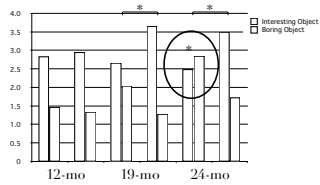
"Eve, where's the MODI?"
"Do you see the MODI?"
"Show me the MODI."

Testing (6 sec):

"Eve, where's the MODI?"
"Do you see the MODI?"
"Show me the MODI."



What were the results



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.

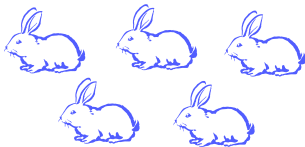
If this is **Blicking**?



Which is also Blick?



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

Acaredolo and Goodwyn (2000) found signing babies

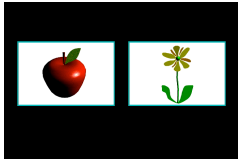
- understood more words
- had larger vocabularies
- more sophisticated play
- decreased frustration,
- increased communication
- enriched parent-infant bonding
- and increased interest in books
- still controversial

Neural mechanisms?

- Specific brain regions
- Species Specificity
 - Your pets don't learn grammar neither did Washoe or NimChimpsky 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.

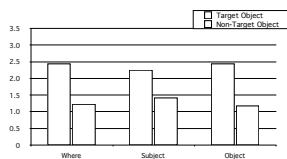


The answer is not in the question!

Subject-question: **“What hit the flower?”**

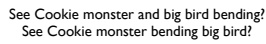
Object-question: **“What did the apple hit?”**

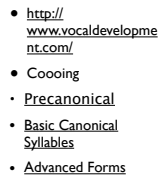
20-month-old Results



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.

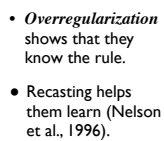




- 2-year-olds' speech is often **telegraphic**: just the important words.
- Elmo eats (agent + action).
- Big Cookie! (attribute + entity)
- My Cookie! (possessor + possession).
- Gimme Cookie (action + object)

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





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.