

CHILD LANGUAGE

Acquisition and Growth

Barbara Lust

Human Development
CCE Research Update

- May 29, 2008
- Ithaca, New York

Why study language acquisition?

“There is no step more uplifting, more explosive, more momentous in the history of mind design than the invention of language. When Homo Sapiens became the beneficiary of this invention, the species stepped into a slingshot that has launched it far beyond all other earthly species in the power to look ahead and reflect...”

Why study language acquisition?

“Language learning is doubtless the greatest intellectual feat any of us is ever required to perform...”
(Bloomfield, 1933)

Tweetle Beetles

What do you know about tweetle beetles? Well...

When tweetle beetles fight, it's called a tweetle beetle battle, **and** when they battle in a puddle, it's a tweetle beetle puddle battle. **And** when tweetle beetles battle with paddles in a puddle, they call it a tweetle beetle puddle paddle battle. **AND....**

“Fox in Socks” by Dr. Seuss (1965)

Levels of Representation



- Phonology - Sounds
- Syntax - Sentences
- Semantics - Meaning

- Language and Thought

More than one language at once

6

- childhood bilingualism/multilingualism
- By 2015, 30% of preschoolers in US
- will not have English as home language
- (Fix and Passel 2003)

Leading Questions:



- How much is built in?
- How much is due to learning?
- When does it begin?
- How does it happen?
- Does acquiring more than one language at once hinder?

How can one study it?

- The difficulties:
 - Tacit knowledge
 - Nothing tangible
 - Acquire before 3+ years of age

How can one study it?

- An interdisciplinary field
 - ▣ Linguistics
 - ▣ Developmental Psychology
 - ▣ Experimental Psychology
 - ▣ Neuroscience

- ▣ i.e., **COGNITIVE SCIENCE**

What Book Attempts

- Field exploding with research:
 - Cull that research: Scientific Methodology
- All levels of representation
- Assess the state of the art with regard to leading questions
- Interdisciplinary

Today

11

- What are some basic discoveries?
- Exemplify some active research
- Some recommendations for education in the future

Some recent new discoveries

12

- Neonates distinguish languages
- Neonates distinguish sounds
- 4 month olds distinguish well formed clause structure
- 6–8 month olds pick out words
- 12 months:
 - ▣ first words produced
 - ▣ sound distinctions related to native language
 - ▣ Already know a lot about their language (s)

Examples of language acquisition data: active research

1. Syntax and Semantics
2. Early word learning
3. Studies of developing bilingualism

Method

14

- Work with 2–6 year olds
 - In Cornell's Early Child Care Center
 - in collaboration with Elizabeth Stilwell, director, and teachers
 - with local nursery and other schools
 - or in child's home
-
- Work with Cornell students, graduate and undergraduate

Acquisition of Syntax and Semantics

- An experimental study (Foley et al 1997, 2003)
- “Sloppy Identity”

Acquisition of Syntax and Semantics

- Ernie touches the ground and Big Bird does too
- [Ernie [touches the ground]] and [BB [does [Ø]] too]

(Foley, Nuñez del Prado, Barbier, & Lust 1997, 2003)

Acquisition of Syntax and Semantics

1. Ernie [[touches] the ground] and Big Bird [[does] \emptyset] too
2. [NP₁ VP₁] and [NP₂ VP₂] too

Reconstruction:

Ernie touches the ground and
Big Bird touches the ground

Acquisition of Syntax and Semantics

Given the sentence:

“Oscar bites his banana and Bert does too”

What does the sentence mean?

What does each one bite?

Acquisition of Syntax and Semantics

Four Possible Interpretations of:

“Oscar bites his banana and Bert does too.”

- a. O bites O's banana and B bites B's banana
ii jj
- b. O bites O's banana and B bites O's banana
ii ji
- c. O bites B's banana and B bites B's banana
ij jj
- d. O bites E's banana and B bites E's banana
ik jk

Acquisition of Syntax and Semantics

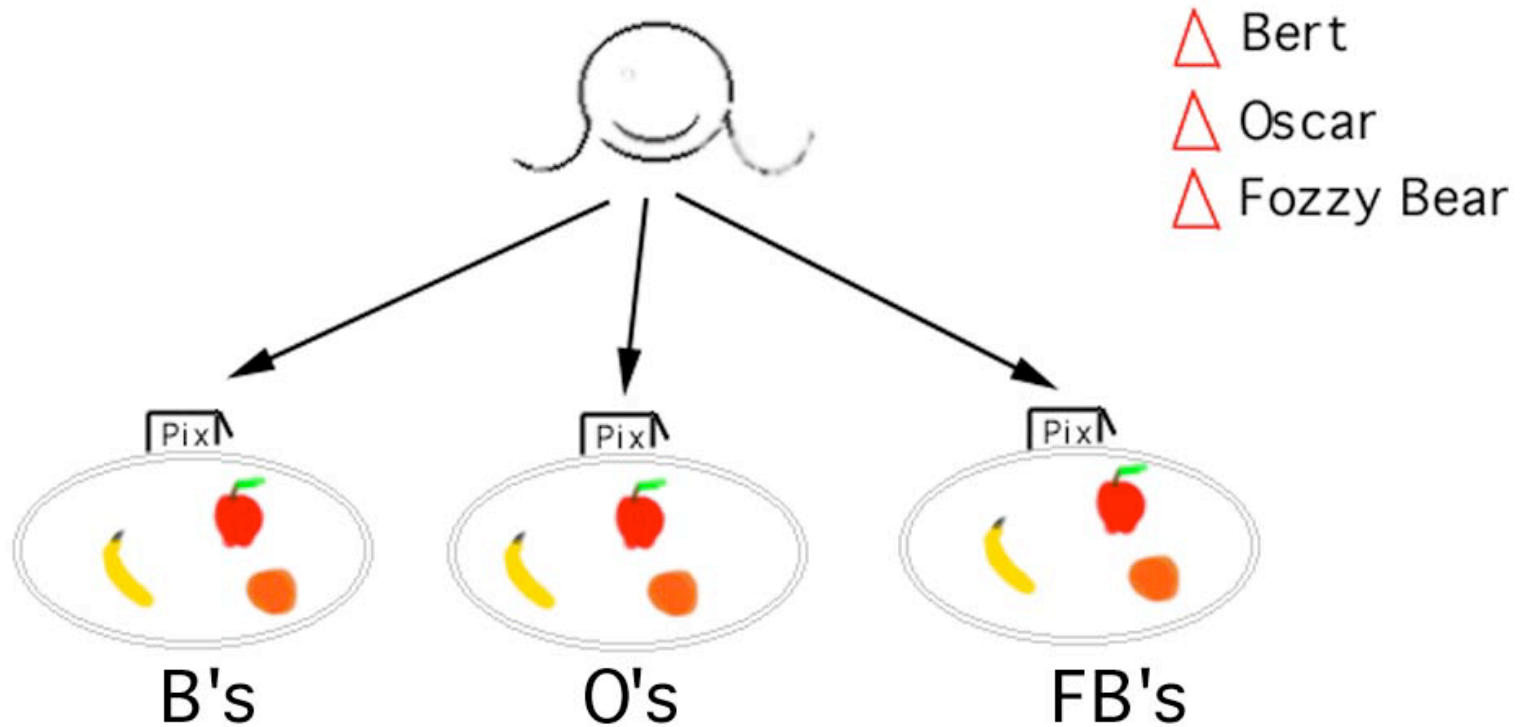
Impossible Interpretations:

- ▣ *O bites O's banana and B bites E's banana (ii jk)
- f. *O bites B's banana and B bites O's banana (ij ji)
- g. *O bites B's banana and B bites E's banana (ij jk)
- h. *O bites E's banana and B bites O's banana (ik ji)
- i. *O bites E's banana and B bites B's banana (ik jj)

Acquisition of Syntax and Semantics

- O [bites [his (own) [banana]]] and B [does [too]]
- O [λx [x bites [x [banana]]]] and B [λx [x bites [x [banana]]]]

Experimental Set-Up: Act-Out Task



Acquisition of Syntax and Semantics



ii jj = Sloppy interpretation: Bound Variable

Acquisition of Syntax and Semantics



ii ji = Strict interpretation

What this example shows:

- Child has extremely complex syntactic and semantic knowledge even before age of 3
- Child can deal with ambiguity: Mapping from one form to multiple possible meanings
- Child knowledge is grammatically constrained

Acquisition of Syntax and Semantics

These characteristics hold for all languages:
For Example, Chinese



Early Word Learning



- Rate of acquisition:
 - ▣ Many new words each day, e.g. 6-8 a day at first, then 45 a day

Acquisition of Words

- 12 months
 - ▣ E.g., Lois Bloom's Allison:
 - 16 mos – 29 words
 - 19 mos – 61 words
 - 20 mos – 103 words
- 24-36 months 1000
- 5 years 10000
- 6 years 14000
- Adult 50000-300000
(uncountable)

EARLY WORD LEARNING

- The “over-extension” phenomenon



It's an Apple

BG21097
Age:1,9,15



It's not an Apple!

BG21097
Age:4,1,26

31



What this shows:

- Child creative
- Child abstract
- Child categorizing
- Child not simply copying
- But some form of experience necessary

These are all crucial factors in development

Summary of Major Discoveries

- Language Acquisition begins at birth, even before first word
- Major accomplishments by 12 months
- Basic accomplishment of full system by three years
- All levels of representation being acquired at once

Conclusions

- Cannot explain early complex syntactic and semantic knowledge without some biological programming in a Language Faculty

Conclusions

- Yet child must acquire a specific language; to do so must integrate learning
- Child using experience from birth, even before, to build their theory of how language works

Conclusions

- Learning is constrained, guided linguistically
- Child creative and constructive in use of experience
- Not just copying

Regarding bilingualism or multilingualism

37

- Is bilingualism/multilingualism beneficial to cognitive development?
- How does the young child manage to acquire more than one language at once?
- Project Led by: Sujin Yang

Test for Bilingual Cognitive Advantages: Sujin Yang et al

38

- **Executive Attention**
- Ability to ‘manage cognitive processes’
- to work in the face of distraction
- inhibit certain distractions
- focus on others
- cognitive flexibility: deal with change

Early Childhood Bilingualism

(Yang; 2007; Yang & Lust, in preparation)

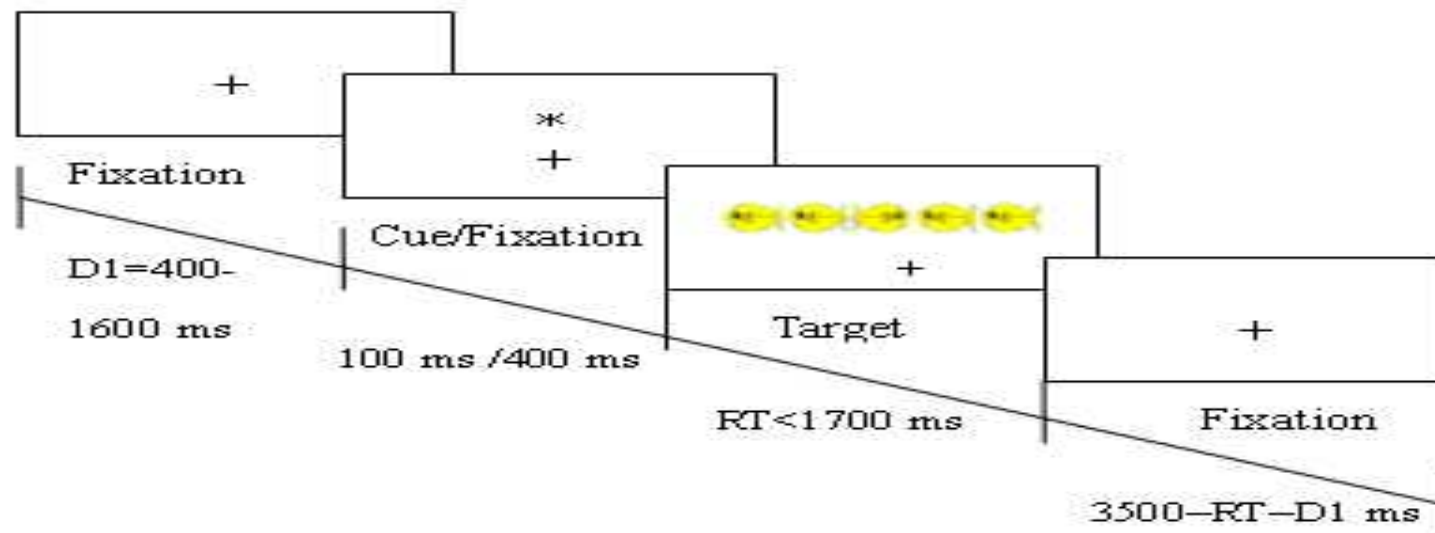
Research Question

How do attention networks mature over the early childhood period and would bilinguals be different from monolinguals in a long-term development?

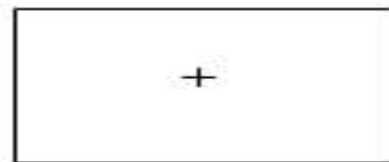
Sample

- ▶ 129 children; 4, 5, & 6 year olds
- ▶ Balanced Korean bilinguals/ English monolinguals

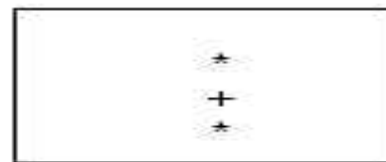
The Attention Network Test (ANT)



4 Warning Cue Types



No Cue



Double Cue



Central Cue



Spatial Cue

3 Flanker Types



Neutral



Congruent



Incongruent

ANT Performance

Significant bilingualism/age effects in accuracy & RT, $p_s < .001$

Accuracy (%)

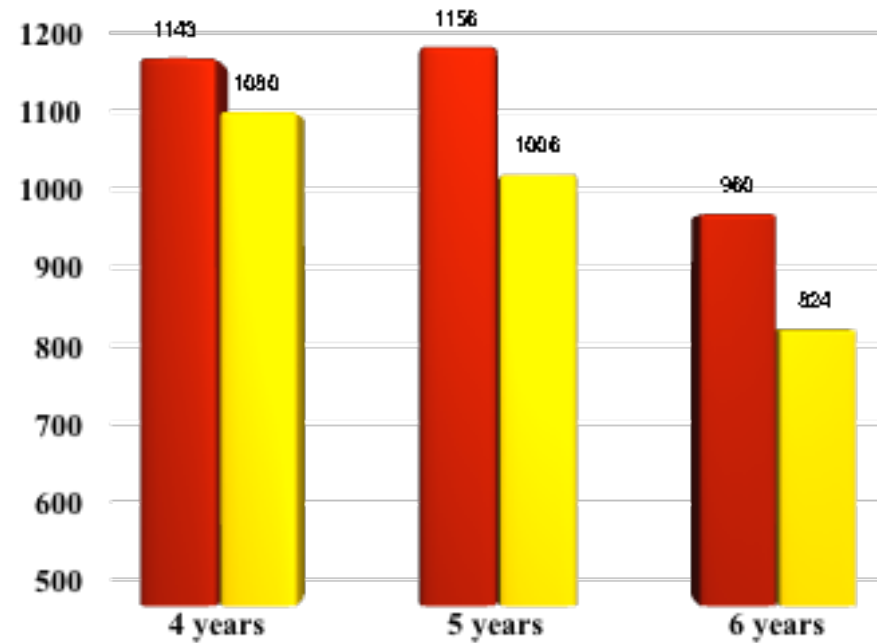
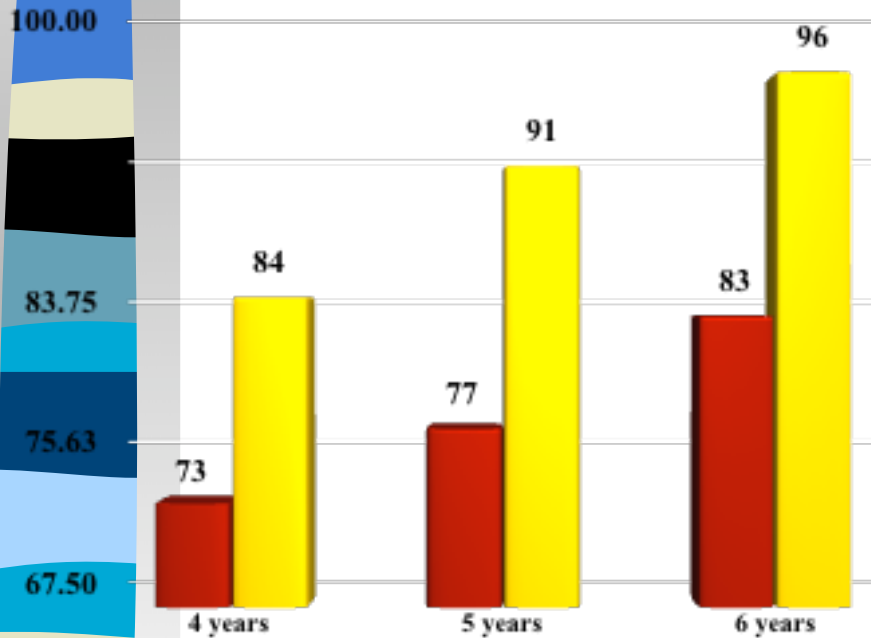
RT (ms)

■ Monolinguals ■ Bilinguals

■ Monolinguals ■ Bilinguals

**

**



NOTE: * $p < .05$; ** $p < .001$

How does the child acquire more than one language?

42

- e.g., case studies
- e.g., young Hebrew–English case
- Young Israeli child brought to Cornell's ECC (NG081803)
- Hebrew at home; English at ECC
- Studied over 40 interviews (home and ECC)
- Age: 3.00.25–3.08 (years, months, days)
- Project led by: Yarden Kedar
 - with ECC director Elizabeth Stilwell and teachers; and undergraduates: Kristen Pallonetti, Brian Druyan, Julia Rosenberg, Erica Shreck

Now she is here

NG081803_1 Age: 3.0.25

43



Now I am Playing

NG081803-1 Age: 3.0.25

44



Barnie is Hebrew

NG 081803-1 Age: 3.0.25

45



Eight Months Later at home: NG081803-38 Age:3.08.12

46



Because it's Mine

NG081803_38 Age: 3.08.12

47



Hebrew for Grandma: Switch

NG081803_37 Age: 3.08.12

48



Language Translation

NG081803_37

Age: 3.08.12

49



Now I'm bilingual in school

NG081803_37 Age:3.08.09

50



I Can Speak Both

NG081803_37 Age: 3.08.09

51



Bilingualism: conclusions

52

- Any child can learn more than one language
- Will do so naturally if surrounded by the languages

- Earlier the better
- Children benefit cognitively from learning more than one language
- No evidence it hinders acquisition of first language

How can educational contexts help?

53

- Surround child with as much rich language and language exchange as possible
- Surround with language through literacy
- Surround with more than one language
- Maintain home language

Conclusions

54

- With language acquisition,
- the child teaches us
- we don't teach the child

Conclusions



- The Mystery remains

References

56


- Diamond, A. et al. 2007. Preschool Program Improves Cognitive Control. Science. vol 318.1387–1388.
- Espinosa, L. 2008. Challenging Common Myths about Young English Language Learners. FCD Policy Brief. Advancing PK–3. No.8.
- Golinkoff, R.M. and K. Hirsh–Pasek, 1999. How Babies Talk. Penguin Books.
- Lust, B. 2006. Child Language. Acquisition and Growth. Cambridge Univ Press.
- Pearson, B.Z.2008. Raising a Bilingual Child. Random House.

Toward the Future



- Virtual Center for Language Acquisition
- www.clal.cornell.edu/vcla

Partnership with the Library



VCLA - The Virtual Center for Language Acquisition

http://www.clal.cornell.edu/vcla/index.html

Apple Amazon Bus schedule



The Virtual Center for Language Acquisition

Our Mission Statement:

The mission of the newly formed Virtual Center for the Study of Language Acquisition is to foster collaborative work among researchers in the area of language acquisition, collaborations which are potentially interdisciplinary, which may be at a distance geographically and which may involve the comparative study of multiple languages, interactions on shared data, and a variety of experimental methods.

The VCLA includes:

- Researchers in several disciplines (among them developmental psychology, linguistics and neuroscience), and their associated labs.
- Different approaches and methods in the study of language acquisition, e.g. experimental or naturalistic, theoretical, behavioral or neuroscientific (brain imaging).
- Different areas of study: e.g. first language acquisition or multilingualism in the child, second language acquisition and multilingualism in the adult, as well as literacy and neuroscience.
- Various languages of study, ranging from English to Spanish to South Asian languages such as Sinhala and Tamil.
- Researchers from various countries collaborate internationally on the study of language acquisition.
- Researchers are linked in their motivation to cultivate research collaboration and to build materials and methods necessary for such collaboration, which can be shared widely in the field through the VCLA, including internationally.
- Researchers are linked in their assumption that the most fundamental questions of language acquisition now require interdisciplinary collaboration, both theoretical and empirical methods, and a cross-linguistic approach.

A Virtual Center for the Study of Language Acquisition (VCLA) has now been initiated through a Planning Grant Award from the NSF Development and Learning Sciences Program and their Children's Research Initiative (NSF BCS-0136546); award date: 9/25/01. Founding members:

VCLA Home

VCLA Members

Advisory Board

Principles

The VLL

Events

Areas of Study

Apply for Membership

Contact Us

CLAL

Maintained by Paul Chacko, paulc3@cornell.edu



MANN LIBRARY

Home • About • Reference • Services • Circulation • Computing • Collections

Truly International and Intercultural



On- and Offsite Collaboration

The Elicited Imitation Task

The researcher repeats the model sentence once more.



*Elmo licks the ice cream.
Elmo icks, licks the ice cream.
Bugs Bunny rolls the peach.*

Subject: J04099 Age: 1;06.03 Researcher: GB Project: Sassy-Sally

narrative context transcript input video



Research and Education Merge



Acknowledgements

62

- James Gair
- Elizabeth Stilwell

Acknowledgements:

- Claire Foley
- Suzanne Flynn
- Zelmira Nuñez del Prado
- Isabella Barbier
- Fang Fang Guo
- Yu Chin Chien
- Chi-Pang Chiang
- Matt Klein
- Maria Blume
- Cliff Crawford
- Katerina Boser
- Jung Hoon Son
- and.....
- The Cornell Language Acquisition Lab

Grants

- National Science Foundation. Planning Grant: A Virtual Center for Child Language Acquisition Research (BCS-0126546, Barbara Lust and Founding Members). BCS-0535569 NSF Developmental and Learning Sciences Program
- National Science Foundation. IIS-0437603 Small Grant for Exploratory Research: Planning Information Infrastructure through a New Library-Research Partnership (Janet McCue, director of Cornell Albert Mann Library and Barbara Lust). NSF Science and Engineering Information Integration and Informatics

Acknowledgements- Grants

- Cornell:
 - CISER Seed Grant: Building an Interdisciplinary Infrastructure to Foster Collaboration among Research Scientists in the Language Sciences: Proposal to Create Instrument-based Virtual Linguistics Laboratory for the International Study of Language Acquisition and Neural Plasticity.
 - FABIT (Faculty Innovation in Teaching) Awards. "Integrating Digital Multimedia resources in two interdisciplinary language development courses" and "A VRE (Virtual Research Environment) for Language Acquisition and Cognitive Science. "
 - New York State Hatch grant. "Cornell Language Acquisition Lab: Building an Electronic Library of Words of the World's Children".

Seed Grant from Cornell Einaudi Center for International Studies

- Exploring Activation of an International component in a Virtual Center for the Study of Language Acquisition

PI: Barbara Lust, Professor,
Department of Human Development
co-PI: Sujin Yang



- Today, in this digital age, the possibilities for international collaboration have expanded exponentially. By incorporating the possibilities of cyberinfrastructure which have become available to the sciences, research and education can now exploit an international dimension in ways not possible before. At this time, the Cornell Language Acquisition Lab has begun to build a Virtual Center for Language Acquisition (VCLA:www.clal.cornell.edu/vcla) in order to begin to exploit these new possibilities.