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International Adoption as a Natural Language Experiment (and other things)
Qualitative shifts in early acquisition

- **Composition of lexicon** changes 12 - 30 months
  - Nouns and social words dominate early lexicon
  - Verbs and closed class words increase later
- **Syntactic complexity** of speech increases ~18-30 months
  - Shift from single words to word combinations
  - Appearance of grammatical morphemes
- Both changes are associated with vocabulary size
  (Bates, Dale & Thal, 1995)
What causes these qualitative shifts?

- **Maturation or cognitive development**

  - Conceptual changes $\rightarrow$ lexical diversity
  - Development of motor planning & memory $\rightarrow$ multiword utterances
  - Maturation $\rightarrow$ greater complexity in utterances
What causes these qualitative shifts?

- **Language learning contingencies**
  (Gillette, Gleitman, Gleitman & Lederer, 1999; Bates & Goodman, 1997)
  
  - Nouns can be learned from observing scene
  - To learn verbs, closed class words, and function morphemes linguistic cues are needed
  - Changing representation of input leads to lexical diversity
  - Lexical development prerequisite for syntactic development
International Adoption as a Natural Experiment

• In infants maturation and language learning are confounded

• Adoptees face the same learning problem as infants but are more mature

• If they go through the same stages, it suggests that these stages are not driven by maturation.
Our Study

• Children adopted from China
  – 2;6 to 6yrs at arrival (M = 4;2)
  – 3-15 months after arrival (M = 9)

• Controls: toddlers acquiring English
  – 18 – 30m
  – Matched for vocabulary size

• Method
  – Parental report (MCDI)
  – Videotaped play session
Like infants, preschool adoptees have early vocabularies dominated by nouns.

No difference between groups (p > .9)
Proportion of verbs increases with vocabulary size

![Graph showing the relationship between MCDI vocabulary size and proportion of verbs as a proportion of all words for Chinese Adoptees and Infant Learners. The graph includes data points and regression lines.]

- **Chinese Adoptees**: $R^2 = 0.3825$
- **Infant Learners**: $R^2 = 0.42$

No difference between groups $(p > .2)$
Proportion of function words increases with vocabulary size

- Chinese Adoptees: $R^2 = 0.7545$
- Infant Learners: $R^2 = 0.6544$

No difference between groups ($p > .4$)
Syntactic development correlated with vocabulary size

Chinese Adoptees
Infant Learners

No difference between groups (p > .3)
Early vocabulary growth is accelerated in adopted preschoolers

*Onset of word learning set at 12m for MCDI median & time of arrival for adoptees
M: Would you like a cookie?
C: A cookie
M: Here. Here’s a cookie.
C: Ehh? (eating noises)
C: Yummy!
M: Is it yummy?
C: Tha(t) yummy cook(ie)
C: Wow! (eating noises)
M: What are you eating?
C: Mama cookie
M: Is that a cookie?
C: Mama me a cookie

C: Mommy (l)ook helicopter
M: You wanna make a helicopter? That might be a little harder.
C: Wanna helicopter
C: My helicopter
M: How many rotors does it have?
C: Mama, helicopter!
M: Oh is that a helicopter? OK.
C: Boop! Boop!
C: Mama me a helicopter.
FAQs

• Are parental reports valid for this population?
  – Correlate with measures from spontaneous speech samples

• Have these children actually passed the relevant cognitive milestones?
  – Parental reports of nonverbal milestones show substantial difference between adoptees and controls

• Are these patterns attributable to the child’s birth language?
  – Similar results for Eastern European Adoptees
Current Projects

Word Learning

Early Syntactic Development

Online Sentence Comprehension
Word Learning

• Semantics of cardinal numbers
  – Yi Ting Huang and Liz Spelke
  – Exact semantics from the initial acquisition through adulthood

• Semantics of mass-count distinction
  – Dave Barner
  – Count nouns individuate but mass nouns can too

• Development of verb lexicalization biases
  – Catherine Havasi, Bob Berwick
  – Biases are generalizations over known words
  – Manner-path bias remains plastic into adulthood
Syntactic Development

• Learners combine situational and syntactic cues to verb meaning
  – Carissa Kemp, Catherine Havasi & Bob Berwick

• Structural cues guide toddlers’ interpretation of novel verbs
  – Cynthia Fisher & Sylvia Yuan

• Is there a disassociation between lexical and grammatical development in kids with cochlear implants?
  – Joy Geren

• Do infants have lexical categories?
  – Dave Barner
Online Sentence Processing

• Cren and adults rapidly use lexical and prosodic cues in online parsing
  – John Trueswell & Sylvia Yuan
• Are “lexical bias” effect in parsing based on verb meaning or co-occurrence information?
  – Sylvia Yuan
• Do preschoolers show syntactic priming in online comprehension?
  – Malathi Thothathiri
• Bilingual language processing: how deep is the activation of the nontarget lexicon?
  – Yi Ting Huang