Syntactic universals in the lab: New methods and approaches

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Lecture 4: Role of children vs. adults in shaping typology

Opening question: Are typological universal brought about by children?

Overview

Are universals the result of child learning? Two big issues: (1) What is the main driver of language change? Inductive biases/constraints on acquisition? Adult learning and usage? (2) Do biases/constraints underlying universals get washed out by linguistic experience?

Innovation vs. spread. There is an important difference between what introduces variation (and thus the potential for change) into a system, and what mechanisms propagate (or don't) that variation.

Innovation: creation of a new form
Spread: increasing use of that form

"It may be argued that change in language is due ultimately to the deviations of individuals from the rigid system. But it appears that even here individual variations are ineffective; whole groups of speakers must, for some reason unknown to us, coincide in a deviation, if it is to result in a linguistic change."

L. Bloomfield, *Journal of English and Germanic Philology* **26**, 440 (1927)

- How is variation introduced?
  - Individual errors (e.g. over-regularization)
  - Functionally motivated innovations/changes (e.g., shortening of frequent words, neologisms)
  - Language contact
- How is variation spread?
  - Prestige (perceived or actual)[1] Example?
  - Accommodation/adaptation[2] To what/whom?
  - Regularization (once a critical mass of the variant is in use)
  - Substantive/functional biases (may determine *if* a change spreads)
  - Parametric change

[1] W. Labov, *Principles of language change, Vol. 1: internal factors* (Blackwell, New York, 1994)

[2] P. Auer, F. Hinskens, *Dialect Change* (2008), pp. 335–357

Children as agents of change

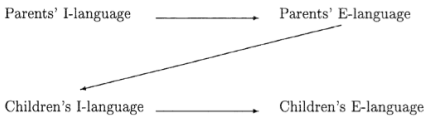

Figure 1: Connecting acquisition and change.

- Acquisition errors/mislearning
  - Explains why (same?) variants are *innovated*
  - Doesn't explain why they *spread*
  - Most acquisition errors don't appear to persist (at least obviously)[3]
- Parameter resetting/competition
  - Explains why variants *spread*
  - Doesn't explain why they are *innovated*
  - Issue of "catastrophic" vs. gradual change[4,5]

[3] J. Milroy, L. Milroy, *Journal of linguistics* **21**, 339 (1985)

[4] D. Lightfoot, *Lingua* **100**, 171 (1997)

[5] C. D. Yang, *Language variation and change* **12**, 231 (2000)

So why study children's biases?

- Once variation is introduced, learning biases may contribute to determining whether it is spread over generations (even if the biases are not detectable in a single generation!).
- If adults (also) contribute to spread of change, still want to know how their biases are affected by linguistic experience.

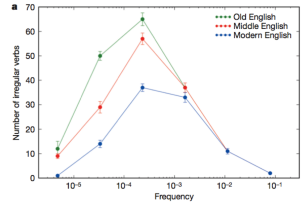

Figure 2: Regularization of irregular verbs over time...Who dunnit?

Regularization

Regularization in adults vs. children

- Regularization in non-linguistic probability learning tasks
  - *Finding:* More regularization (aka maximizing) by children than adults[6]

  → Children's learning of variation differs from adults'
- Regularization of late-learner input
  - *Finding:* late-learners of ASL have variable morphology, child acquiring ASL from this input does not reproduce variation[7]

  → Children repair unconditioned (random) variation
- Regularization in creolization
  - *Finding:* variation in pidgins/early creoles, not in creoles with native speakers[8]

  → Children do the regularizing (adults innovate)

Regularization in ALL, adults vs. children[9]

- **Research question**: do children regularize inconsistent (random) variation more than adults?
- Design of the language
  - Lexicon: 4 verbs, 12 nouns, 1 determiner (VSO order)
  - Stimuli: live (!) female speaker manipulating puppets
- Procedure: 7 sessions, 10-20 minutes each (9 days)
  - Training: 6 sessions, learn nouns, hear sentences (x24)
  - Testing: 1 session, vocab, sentence completion (x24), determiner judgment, general grammar
- Manipulation
  - Amount of complexity (=random variation in determiner chocie)
  - Age (children: 5-7yrs, adults: 20yrs)
- Participants: 30 native English-speaking children, 16 adults
- Results
  - Probability matching (roughly) by adults and children
  - Recoded in terms of "systematicity", meaning all or all but one production consistent with some system (e.g., always using noise determiner, using determiner with objects only, etc.)
  - Children more likely to exhibit consistent system

Table 1
Number of participants in each production sub-category by input group.

Input group	Production Type							
	Systematic user	Systematic non-user	Systematic noise user	Systematic other	Variable user	Scatter user	Systematic total	Unsystematic total
Children								
100%	4	2	0	1	1	0	7	1
60%	1	4	0	0	2	0	5	2
60% + 2ND	5	1	1	1	0	0	8	0
60% + 4ND	2	3	0	1	1	0	6	1
							Total 26	4
Adults								
100%	4	0	0	0	0	0	4	0
60%	0	2	0	0	2	0	2	2
60% + 2ND	0	0	0	0	0	4	0	4
60% + 4ND	0	0	0	0	0	4	0	4
							Total 6	10

[6] M. W. Weir, *Psychological Review* **71**, 473 (1964)

[7] J. L. Singleton, E. L. Newport, *Cognitive Psychology* **49**, 370 (2004)

[8] G. Sankoff, *The Genesis of Language*, K. C. Hill, ed. (Karoma Publishers, Ann Arbor, MI, 1979), pp. 23–47

[9] C. Hudson Kam, E. Newport, *Cognitive Psychology* **59**, 30 (2009)

Figure 3: Screen shot of Hudson Kam & Newport puppets.

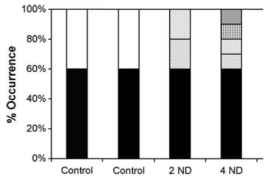

Figure 4: Determiner manipulation.

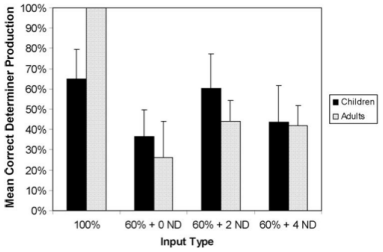

Figure 5: Production of main Det.

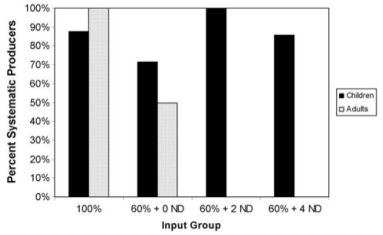

Figure 6: Proportion learners with consistent system.

Harmony & Universal 18

Harmony & Universal 18 adults vs. children

- Harmony in acquisition
  - Few errors in L1 production of modifier order[10]
  - Some evidence of errors in line with harmony in bilingual acquisition[11]
- Traces of Universal 18 in English[12,13]
  - Num-N-Adj vs. Adj-N-Num in English
  - Transfer? (cf. postnominal harmonic condition...)
  - Prediction: if learned, perhaps not present in young children

Harmony & Universal 18 in ALL, adults vs. children[14]

- Research question: Do children show stronger or distinct biases in nominal word order learning?
- Design of the language
  - Lexicon: 4 nouns, 3 adjectives, 3 numerals
  - Auditory stimuli: artificially generated
  - Visual stimuli: still images of novel objects
- Procedure: 2 sessions (30 minutes, consecutive days)
  - Day 1:
    - Learn nouns (3 tasks, x24 each)
    - See/listen to {N, Mod} phrases (x24)
    - Picture matching {N, Mod} phrases (x24)
    - Produce description of picture (x24)
  - Day 2:
    - Noun refresher (3 tasks, x24 each)
    - Alternating exposure, matching, production (x80 each)
- Manipulation
  - Pattern type, all with 75-25% variation
- Participants: 48 monolingual English-speaking children (6-7yrs)
- Results
  - No straightforward regularization
  - Better learning of harmonic patterns (esp. post-nominal!)
  - Preferred pattern (>50%) almost always harmonic
  - Preferred patterns on average used 85% (similar to adult regularization)
  - No difference between non-harmonic patterns
  - *"Interestingly, these young learners also appear to prioritize adjective order. When exposed to a non-harmonic input pattern, children systematically shifted the order of numerals to be the same as that of adjectives."* → same as adults for shifting of (Adj-N, N-Num)

[10] S. A. Montrul, *The acquisition of Spanish* (John Benjamins, 2004)

[11] S. Rizzi, L. A. Gil, V. Repetto, J. Geveler, N. Müller, *Studia Linguistica* **67**, 123 (2013)

[12] J. Culbertson, P. Smolensky, G. Legendre, *Cognition* **122**, 306 (2012)

[13] A. E. Goldberg, *Cognition* **127**, 420 (2013)

[14] J. Culbertson, E. L. Newport, *Cognition* **139**, 71 (2015)

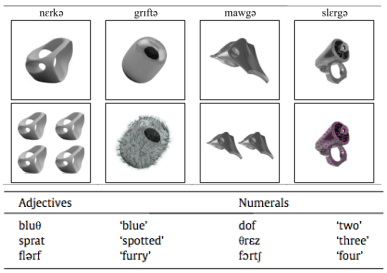

Figure 7: Stimuli.

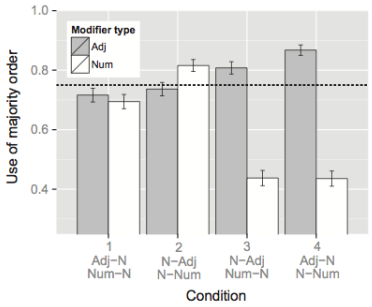

Figure 8: Use of dominant order.

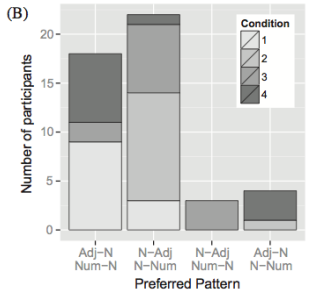

Figure 9: Preferred patterns.

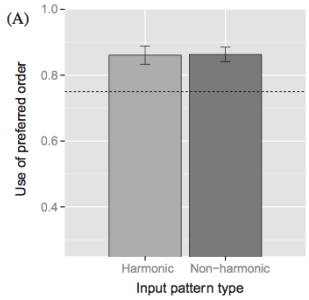

Figure 10: Regularization.

Suffixing preference

Suffixing preference in children

- Label extension vs. mutual exclusivity...
  - Fast-mapping studies suggest that children assume unfamiliar labels should map to unfamiliar objects (properties/actions)[15]
  - But word forms vary morphologically, in some cases without clear change in meaning (e.g., diminutives)
  - Do children have trouble extending variants of an object's label to that object? Are they more likely to do so with suffixed forms?

Mutual exclusivity: soft constraint on word learning; assume one-to-one mapping between objects and labels

[15] R. M. Golinkoff, K. Hirsh-Pasek, L. M. Bailey, N. R. Wenger, *Developmental Psychology*, **28**, 99 (1992)

Suffixing preference[16]

- Research question: Do children extend prefixed or suffixed versions of labels to novel objects?
- Design of the language
  - Lexicon: 8 monosyllabic, 8 bisyllabic nonce nouns, 1 affix (*ko*)
  - NB: affixes are productive (cf. Hupp et al., 2009)
  - Auditory stimuli: live experimenter
  - Visual stimuli: still images of unfamiliar animals
- Procedure
  - Label extension task (10 minutes total)
- Manipulation
  - Word similarity (similar or dissimilar)
  - Affix position (prefix or suffix)
  - Age: children (4yrs) vs. adults (22yrs)
- Participants: 32 monolingual English-speaking children, 32 native English-speaking adults
- Results
  - No label extension of dissimilar words (in line with mutual exclusivity/fast-mapping)
  - More label extension of suffixed similar words compared to prefixed similar words
  - No difference between adults and children
  - Replicates Hupp et al. (2009) results
  - *"As discussed earlier, suffixes may create more acceptable word-form variants than prefixes due to their universal tendency to provide cues to grammatical categories [as opposed to word identification], and this may be reflected in the universal "operating principles" that the ends of words are more salient than the beginnings, which have been postulated to guide early language learners."*

[16] P. Bruening, P. Brooks, L. Alfieri, V. Kempe, I. Dabašinskienė, *Child Development Research* (2012)

Similar		
Simplex	Suffix	Prefix
Gep	Gepko	Kogep
Kaze	Kazeko	Kokaze
Manse	Manseko	Komanse
Pabble	Pabbleko	Kopabble
Dissimilar		
Simplex	Suffix	Prefix
Gep	Kazeko	Kokaze
Kaze	Gepko	Kogep
Manse	Stugko	Kostug
Pabble	Rutcherko	Korutcher

Figure 11: Example trial.

(a) Introductory page. "I call this a *manse*. Can you say *manse*?" (b) Test page. "Now can you tell me which animal is a *wanse*?"

Figure 12: Example trial.

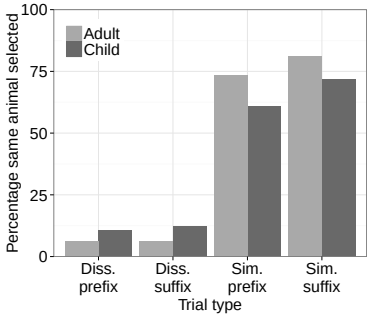

Figure 13: Example trial.