



## Grammatical analysis in early morphological development: Evidence from (Northern East) Cree

Julie Brittain, Yvan Rose & Kevin Terry

Memorial University of  
Newfoundland

CLA Annual Meeting  
Concordia University, May 29, 2010

## Presentation roadmap

- Context and scope of research
  - The theories and their predictions
  - Empirical approach
- The evidence
  - Developmental order of verbal forms
  - U-shaped performance curve at a critical moment
- Discussion

## Context

- Competing linguistic theories offer radically different outlooks on the nature of the lexicon
  - **Generative approach:** Set of morphemes dynamically combined through grammatical rules or constraints
  - **Constructivist approach:** No rules needed. All 'used' forms are memorized as separate entries in the lexicon

## Context (cont'd)

- These views have implications for theories of language acquisition
- **Today's aim:** Testing the different predictions made by these models

## Grammatical (generative) approach

- Acquisition as grammatical generalizations across the memorized lexicon
- Potential (over-)generalizations of the most transparent aspects of the system during the developmental period
- Driving factor: grammatical transparency
  - Basic/transparent units acquired first
  - Abstract properties acquired progressively
  - Idiosyncrasies must be memorized
  - Frequency: a potential influence, but does not drive the developmental sequence

## Constructivist (exemplar) approach

- Acquisition from stacking of memory traces
  - “Storage **is** processing” (Bybee 2001)
  - Every used form (in perception or production) leaves a trace in the lexicon
  - No generalizations beyond semantic and/or phonological similarity (analogy)
- Repetition/frequency = determining
  - Early word productions reflect salient/frequent properties of the memorized forms
  - Low-level production issues may hinder initial pronunciations

## Pitting the approaches

- The two approaches differ significantly with regard to the roles of frequency versus grammatical transparency
- We compare these approaches based on acquisition data from Northern East Cree
  - We suggest that an analysis based on input frequency fails to account for our acquisition data
  - We show that a grammatical approach enables a straightforward account of many of the facts observed in the data

## The empirical base: CCLAS

- Longitudinal naturalistic study of L1 acquisition of Cree
  - Memorial University
  - Cree School Board of Québec
- Chisasibi, Québec, approx. 4,000 Cree
  - Mostly Cree L1 (dominant)
  - English (L2)
- 2004-07: video recording at 2-3 week intervals, 45 minute sessions
  - Cohort A (3), 1;09 – 4;06 yrs
  - Cohort B (3), 3;08 – 6;06 yrs
  - Today: 10 regularly spaced sessions for Child A1 (‘Ani’), age 2;01 to 3;08 (basis for Terry 2010)

## Today's focus: Ani's development of verbal morphology

(1)

- Focus: Animate Intransitive (AI) verbs
  - Cree verbs are traditionally classified along lines of transitivity and animacy, intransitive subjects, transitive objects
  - AI verbs are the most frequently occurring form in the 10 sessions (and in target language, 41% for NE Cree)
  - We consider two of the three verbal inflectional “orders”, **Independent**, **Conjunct**, and Imperative

## Independent vs. Conjunct orders

	Independent	Conjunct
<b>Syntax</b>	Restricted to a subset of main clause contexts, and is posited to be the elsewhere inflection (Brittain 2001)	Required in: <ul style="list-style-type: none"> <li>• subordinate clauses</li> <li>• wh-clauses</li> <li>• focus constructions</li> </ul>
<b>Morphology</b>	Less fusional	<ul style="list-style-type: none"> <li>• More fusional</li> <li>• Initial change (IC)</li> </ul>

## Representative examples

(2)

Independent	Conjunct
<i>Aakusiu.</i>	<i>Awaan iyaakusit?</i>
aakusi-u	awaan <b>iyaakusi-t</b>
be.sick-3	who <b>(IC)</b> be.sick-3.s
“S/he’s sick.”	“Who’s sick?”

## Input frequency: Independent versus Conjunct

- (Woods) Cree, inflection types in main clauses (Starks 1994)  
[Recall: **Conjunct is required in subordinate clauses**]

	Conversation		Narrative	
	#	%	#	%
<b>Independent</b>	89	<b>45%</b>	11	<b>23%</b>
<b>Conjunct</b>	95	<b>48%</b>	35	<b>75%</b>
Imperative	14	7%	1	2%
<b>Total</b>	198	100%	47	100%

## Predictions from frequency data

- The Conjunct order is arguably the most frequent order used in Cree
  - We are in the process of verifying this claim for child-directed speech
- Usage-based approaches predict the early emergence of this order over the Independent order
  - This is not the case in our case study

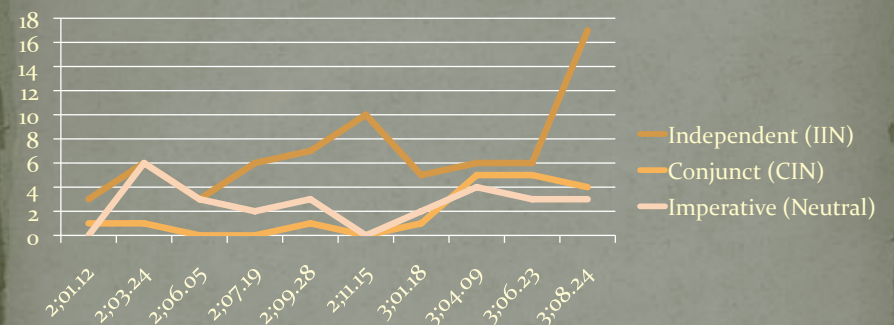
## Working hypothesis

- Memorization of amalgams (unanalyzed chunks) involved in building an initial lexicon, with the onset of creative rule use at around age 3;04
- Pre-3;04: implicit grammatical analysis during the amalgam-storing stage
- From 3;04 onward: productive use of grammatical rules

## Supporting evidence

- Favouring the Independent
  - Grammatically transparent
  - Not the most frequent in the input
- Productive (innovative) inflection of child forms
  - From age 3;04, Ani inflects 'child' forms (AI verbs)
  - Child forms are inconsistently, if at all, inflected in the input
- Performance drop
  - The onset of productive grammatical analysis (3;04) coincides with a drop in performance, suggesting a move from use of stored amalgams to creative use of rules

## Ani's verbal productions (Terry 2010)



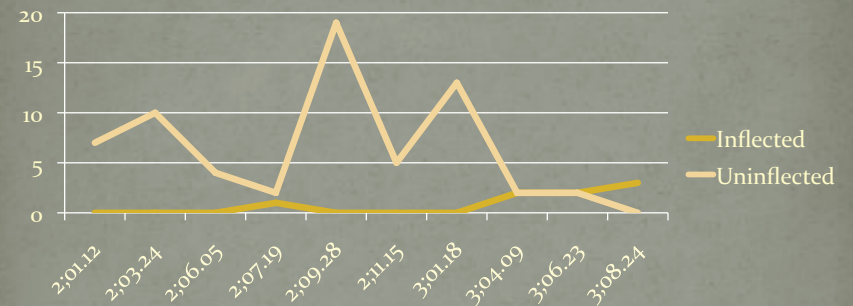
- **Predominance of Independent forms**
- **At around 3;04:**
  - Emergence of productive inflection
  - Dip in overall performance

## Verbal productions: numbers

- Between 2;01 and 3;01
  - 67% of Ani's attempted verbs are Independent
  - 7% are Conjunct
- Between 3;04 and 3;08
  - 55% of Ani's attempted verbs are Independent
  - 26% are Conjunct
- This preference runs counter to expectations if input frequency is a significant force in the acquisition of these forms

## Ani's production of child forms for all 10 sessions (Terry 2010)

(3)



- Virtually no inflection of child forms until 3;04
- Spontaneous appearance of inflections
  - Suggests grammatical over-generalization

## Ani's child forms at ages 2;06 and 3;08

	Age 2;06	Age 3;08	
Orthography	<i>mîmî</i>	<i>mîmî</i>	<i>-u</i>
IPA target	[ˈmimi]	[miˈmij	-o]
IPA actual	[mimi]	[mimij	-o:]
Gloss	sleep	sleep	-3
Morpheme type	Child form	Child form	-IIN
Translation		's/he's asleep'	
Orthography	<i>kîkî</i>	<i>ni-</i>	<i>kîkîsh -n</i>
IPA target	[ˈgigi]	[nə-	ˈgigiʃ -ɪn]
IPA actual	[digi]	[∅-	gigis -jɪd]
Gloss	hurt	1-	be.hurt.dim -non.3
Morpheme type	Ch.form	1-	Ch.form.dim -IIN
Translation		'I'm hurt, I'm in pain'	

## ≈ 3;04: A drop in performance

- As Ani begins to inflect child forms, she starts making errors on forms previously produced close to target
- Focus: 1st person (Independent) forms, which require prefix and suffix
  - Gradual emergence of the prefix; performance drop at 3;04
  - Suffix: performance decreases at 3;04

## Inflection of 1<sup>st</sup> person singular (on AI Independent verbs)

(4)

Age	Prefix (ni-)			Suffix (-n)		
	Target	Actual	%	Target	Actual	%
2;01.12						
2;03.24						
2;06.05						
2;07.19	4	0	0	4	4	100
2;09.28	2	0	0	2	2	100
2;11.15	3	1	33.3	3	3	100
3;01.18	2	1	50	2	2	100
3;04.09	1	0	0	1	1	100
3;06.23	3	0	0	3	3	100
3;08.24	14	7	50	14	7	50

## Summary of observations

(5)

- Prior to 3;04, Ani generalized her use of the language's default inflectional system
  - Default order easier to interpret, acquired faster (despite unfavourable input frequency)
- At around 3;04: emergence of a productive grammatical system
  - Grammatical innovation (inflected child forms)
  - Dip in performance on produced inflections
  - Both prefixes and suffixes are affected

## Discussion

- We cannot build a receptive lexicon for polysynthetic languages without rules
  - A single verbal root can yield over a million forms (Hankamer 1989, on Turkish; Sadock 1980, on West Greenlandic)
- This claim holds true of Cree
  - Most (NE) Cree words (80%) are verbs
  - Verbs encode varied and complex semantic (and, we assume, structural) relationships
- Form-meaning associations within the verb complex logically require some degree of decomposition into smaller units

## Discussion

- Initial productions are stress-driven
  - Segmentation driven by prosodic salience (Mithun 1989, Slobin 1985)
- Ani's initial word forms: (W)S foot (Swain 2009)
  - Prefix deletion: falls outside the foot
  - Suffix production: part of the foot
- The emerging morphological system overrides these phonological constraints

## Discussion

- Emergence of morphology enables larger-domain analysis
  - Gradual revisions of the lexicon incorporate units matching morphological analysis
- Memorization remains an important component of the story
  - Early generalizations arise from phonologically-conditioned, memorized amalgams
- But exemplar storage is **not** processing!