ACQUIRING NORTHERN EAST CREE VERBAL MORPHOLOGY: EVIDENCE FROM INCHOATIVE VERBS[*]

Sara Johansson
Memorial University

Intransitive verbs may be divided into two sub-classes cross-linguistically. Unergative verbs have a single argument base-generated in argument position; unaccusative verbs have a single argument base-generated in object position, which subsequently moves to subject position (Perlmutter 1978; Chomsky 1981; Burzio 1986; Levin & Rappaport Hovav 1995).[1] As such, these verbs have the same surface representation (verbs with a single argument), but differ at an underlying level (1).

(1) a. Unergative verb   NP [$_{VP}$ V]
          -Argument base-generated in subject position
          -θ-role: Agent
          -e.g., *The girl danced*

      b. Unaccusative verb
          -Argument base-generated in object position   [$_{VP}$ V NP/CP]
          -θ-role: Theme
          -e.g., [*The vase*]$_i$ *broke t$_i$.*
                                    (Levin & Rappaport Hovav, 1995:3, ex. 1)

Unaccusative verbs present a very interesting acquisition problem, as their surface representation is identical to that of unergative verbs, but they differ from unergative verbs in their underlying representation and in the θ-role of their argument. I give an overview of some approaches to this puzzle below.

1.   Background: A-Chain Maturation Hypothesis and Misanalysis

An influential idea in child language acquisition is the A-Chain Maturation

Hypothesis (ACMH: Borer & Wexler 1987). The ACMH holds that the ability to form Argument-chains (e.g., to move arguments in the syntax) matures at a certain age. Before this time, children are unable to form A-chains. As unaccusative verbs require the formation of an A-chain (the movement of the argument to subject position), children are predicted to have difficulty with these structures.

If children lack the ability to form A-chains, two potential misanalyses may arise. The Unergative Misanalysis Hypothesis (Borer & Wexler 1992) posits that children analyze the subject of an unaccusative verb as an argument base-generated in subject position; that is, children treat unergative and unaccusative verbs identically. This hypothesis has been supported by acquisition studies of Russian genitive-of-negation and locative inversion constructions (Babyonyshev et al. 2001; Kallestinova 2007), but contradicted by acquisition studies of Japanese full unaccusatives (e.g., unaccusatives with a *by*-phrase) and *te-iru* aspect constructions (Sano, Endo, & Yamakoshi 2001; Shimada & Sano 2007).[2] One problem associated with this hypothesis is that it requires that children can violate the Uniformity of Theta Assignment Hypothesis (UTAH: Baker 1988), base-generating theme arguments in subject position.

The Non-Raising Misanalysis Hypothesis posits that the subject of an unaccusative verb remains *in situ* in direct object position. This wrongly predicts that nominative case is associated with both subjects and direct objects and that subjects of (objectless) transitive verbs are misinterpreted as themes (Sano, Endo, & Yamakoshi 2001).

In this paper, I present findings from a case study of the longitudinal acquisition of a set of unaccusative and unergative ("*piyi*-derived") verbs in Northern East Cree, which are of particular interest because unaccusative and unergative *piyi*-derived verbs are morphologically identical. As this is a longitudinal study, not an experimental study, my findings are descriptive in nature and do not directly bear on the ACMH, but do show an increase in morphological complexity over time.

The set of *piyi*-derived verbs is introduced below in §2. In §3 I present my methodology. In §4 I briefly consider *piyi*-derived verbs in child-directed speech (CDS) before presenting the development of *piyi*-derived verbs in child language in §5. I conclude in §6.

2.   Test case: Northern East Cree *piyi*-derived verbs

Northern East Cree (NEC) is part of the Cree-Montagnais-Naskapi (Algonquian) dialect continuum (MacKenzie 1980), and is spoken in the James Bay region of northern Quebec. The particular dialect of interest in this study is spoken in the community of Chisasibi, Quebec.

Like all Algonquian languages, NEC has an animacy-based gender system (Bloomfield 1946). All inanimate nouns denote logically inanimate

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2   The Japanese full unaccusative data was later re-analyzed in support of the
    Unergative Misanalysis Hypothesis (Machida, Miyagawa, & Wexler 2004).

entities (e.g., *uchâpânish* 'car'). There is a correlation between grammatical and logical animacy, such that all logically animate entities are grammatically animate nouns (e.g., *nâpâu* 'man'); a small set of logically inanimate nouns are, however, also grammatically animate (e.g., *tâwâhîkan* 'drum').

The morphological class of an intransitive verb reflects the grammatical animacy of its subject (Bloomfield 1946). So-called "Animate Intransitive verbs" (VAI) are those whose subject is a grammatically animate noun, and "Inanimate Intransitive verbs" (VII) are those whose subject is a grammatically inanimate noun. Importantly, *piyi*-derived verbs permit subjects of either grammatical gender.

Algonquian verbs minimally consist of two morphemes: a root, and a verbalizer. The verbalizer -*piyi* derives *both unaccusative and unergative verbs*, which are *morphologically identical*. These are grouped into three verb classes that arise because of the lexical semantics of the root morpheme (Brittain in press; Johansson & Brittain 2012). These classes are presented below, together with a count of the verbs in the lexicon (2).[3] Table 1 provides some examples.

(2)   a.   ROOT+*piyi*   Spontaneous **unaccusative** (80%)
      b.   ROOT[SPATIAL]+*piyi*   Agentive **unergative** ("vehicle verb") (10%)
      c.   ROOT[EMISSION]+*piyi* Non-agentive **unergative** (verb of emission) (10%)

(Johansson & Brittain 2012)

Piyi-derived class	Morphological class	NEC	Gloss
Unaccusatives	VAI/VII	*pîku**piyiu***	it breaks
Unergatives (vehicle)	VAI agentive / VII non-agentive	*chîwâ**piyiu*** *chîhchi**piyiu***	s/he goes home by vehicle s/he sets out by car or boat; the engine starts on its own
Unergatives (emission)	VAI / VII non-agentive	*tâpwâ**piyiu***	it makes a loud noise

Table 1: Summary of *piyi*-derived verb classes (Johansson & Brittain 2012)

The acquisition of *piyi*-derived verbs is thus a complex undertaking. In the following section, I outline the methodology adopted for my analysis of the acquisition of *piyi*-derived verbs in NEC child speech.

3.   Methodology: Chisasibi Child Language Acquisition Study

This work is a case-study of a monolingual NEC speaker code-named Billy,

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3   The count is based on the Naskapi Lexicon, Naskapi being a closely related dialect of Cree-Montagnais-Naskapi. In fieldwork, no differences between NEC and Naskapi were discovered with respect to *piyi*-derived verbs. http://www.collectionscanada.gc.ca/naskapi.

from age 04;06 to 05;10. Billy is a participant in the Chisasibi Child Language Acquisition Study (CCLAS).

For this project I have analyzed 10 videos (of 22 total), each 30-60 minutes in length and recorded by Darlene Bearskin in her home in Chisasibi once or twice a month. The sessions under study are given below in Table 2.

Session	Age	Session	Age
B3-2005-11-22	04;06.08	B3-2006-10-14	05;05.00
B3-2006-01-10	04;07.26	B3-2006-11-06	05;05.22
B3-2006-02-28	04;09.14	B3-2006-12-11	05;06.27
B3-2006-05-27	05;00.13	B3-2007-03-19	05;10.06
B3-2006-07-26	05;02.12	B3-2007-04-02	05;10.18

Table 2: Sessions under study

All language analysis was undertaken in the program PHON (Rose & MacWhinney in press). Child speech was segmented in PHON, independently transcribed into IPA by two transcribers, and verified by a team of two additional transcribers. The target utterance was provided by Luci Bobbish-Salt, a native speaker of NEC, and transcribed into both IPA and Cree (roman) orthography. CDS was also segmented in PHON and transcribed into Cree orthography.

Morphological analysis of Billy's utterances was undertaken with the PHON auto-parser plug-in.[4] The auto-parser ensures unified spelling and analysis of each morpheme over three data tiers: Orthography, Morpheme Meaning, and Morpheme Type, creating a reliably searchable database.

3.1 *Piyi*-specific methodology

All instances of the verbalizer morpheme -*piyi* corpus-wide (Billy's speech and CDS) were glossed identically (Morpheme Meaning: "inch"; Morpheme Type: "vintr.fin"). A search for the Morpheme Meaning "inch" yields all and only *piyi*-derived verbs in the corpus.

Billy's -*piyi* utterances were extracted form the corpus and placed in the context of the surrounding conversation, forming roughly one-page conversations. These documents included Cree syllabics, roman orthography and an English translation for each utterance. Luci Bobbish-Salt analyzed each conversation look for misanalysis on the part of the researchers, and misuse of *piyi*-derived verbs in Billy's speech, that is, ungrammatical or contextually inappropriate verbs.

3.2 Classification methodology

Each -*piyi* utterance in the corpus (CDS and child speech) was classified as

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4   Developed by Ranjeet Kumar, programmed and implemented by Greg Hedlund.

unergative or unaccusative. However, classification of *piyi*-derived verbs is still an inexact science. Verbs were classified as follows (3).

(3)   a.   Unergative verbs
            -Verb listed in lexicon with designation "by vehicle" in definition
            -Verbs of sound emission

      b.   Unaccusative verbs
            -Change of state verbs and proto-typical unaccusatives

      c.   "Other"
            -Motion verbs without vehicular designation (possibly unaccusative manner-of-motion verbs)
            -Verbs built on relative root 'thusly'[5]

4.   Distribution of *piyi*-derived verbs in CDS

Piyi-derived verbs in CDS were classified as above. In a little over six hours of recorded CDS (06:12:25), Billy was exposed to 167 *-piyi* utterances. The distribution of these is presented in Table 3. Compare this with the distribution of *piyi*-derived verbs in Billy's speech, given in the next section.

Unergative verbs	Unaccusative verbs	"Other"
94/167 56.3%	24/167 14.4%	49/167 29.3%

Table 3: Classification of *piyi*-derived verbs in CDS

5.   Development of *piyi*-derived verbs in Billy's speech

Billy's use of *piyi*-derived verbs roughly approximates the distribution found in CDS, as seen in Table 4. Roughly half of *piyi*-derived verbs are unergative, roughly one-third are relative root and manner-of-motion verbs, and unaccusative verbs are produced least often.

Unergative verbs	Unaccusative verbs	"Other"
33/67 49.2%	11/67 16.4%	23/67 34.3.%

Table 4: Classification of *piyi*-derived verbs in Billy's speech

While this tells us something about his use of these verbs, it does not reveal anything about Billy's acquisition of unaccusative verbs. To this end, I

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5   Relative roots refer to something in the surrounding context, for example the gesture of the speaker. (For more about these verbs, see Bloomfield 1958; Branigan, Brittain, & Dyck 2005; Rhodes 2006; Johansson in prep).

consider his acquisition of the causative alternation in the following sub-section.

5.1   Causative alternations in Billy's speech

Unaccusative verbs that have a related transitive verb are said to enter into the causative-inchoative alternation (see Levin 1993). This is taken to be evidence that the subject of an intransitive unaccusative verb is base-generated in object position (Burzio 1986; Levin & Rappaport Hovav 1995; among others). In Hale & Keyser's terminology (Hale & Keyser 2002), this is the "simple" or "automatic" transitivity alternation. In NEC, I take a verb root that permits both an intransitive and a transitive verbalizer to be a root that alternates, as is the case with the following unaccusative verb root (4a). The transitive verb in (4b) is said to be a "lexical" causative (e.g., Allen 1998).

(4)   a.   *Pîku-**piyi**-u.*
             'It breaks.'

       b.   *Pîku-**n**-im.*
             'S/he breaks it (inan) by hand.'

Unergative verbs do not enter into the causative-inchoative alternation. Instead, these verbs are transitivized with an extra layer of derivational morphology (Hale & Keyser's "complex" transitivity alternation).[6] The original verbalizer morpheme *-piyi* remains on the verbal complex, and an additional causative morpheme is added. The transitive verbs in (5b,c) are said to be "morphological" causatives (e.g., Allen 1998); compare with (4b), above.

(5)   a.   *Tiskimi-**piyi**-u.*
             'S/he goes straight across by vehicle.'

       b.   *Tiskimi-**piyi**-**htâ**-u.*
             'She takes it (inan) straight across by vehicle.'

       c.   *Tiskimi-**piyi**-**h**-â-u.*
             'S/he takes him/her straight across by vehicle.'

Billy correctly forms lexical and morphological causatives of *piyi*-derived verbs throughout the corpus, producing no errors. Consider the lexical causative of an unaccusative in (6) and the morphological causatives of unergatives in (7).[7]

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6   In Algonquianist terminology, this is referred to as "secondary derivation" (Bloomfield 1946; Wolfart 1973; Goddard 1990).

7   Abbreviations used in this paper: 1 – first person; 1/2 – first or second person; 3 – third person; 0.s – inanimate singular; caus – causative; cj – conjunct; dir – direct; dyn – dynamic; emph – emphatic; fut – future; inv – inverse; obv – obviative; p – particle; pl – plural; pro – pronoun; pvb – preverb; thm – theme; quest - question

(6) *Châkât   kâ   mini-**piyi**-ch   ni-chîh   mini-**n**-â-n.*
almost   pvb,cj   pull.off-**dyn**-0.s   1-past   pull.off-**by.hand**-thm.dir-1/2
'When it almost came off, I took it off.'
Target IPA: [ʧakatʰ   ka   mənɪ-pij-ʧ   _-əʧi   mɪn-ɪn-a-n]
Actual IPA: [ʧəkat   ka   pɪtə-pi-ʧ   ni-_   m-ɪn-a-_]
                                            (B3-2006-11-06#115; age 05;05)

(7)   a.   *Nimui pimi-**piyi**-h-â-u   wîyi.*
        not   move-**dyn**-**caus**-thm.dir-3 3.pro
        'He doesn't drive it himself (dirt bike).'
        Target IPA: [nmʊwi   pɪm-pi-h-a-w   wɪj]
        Actual IPA: [mwi   bɪm-bi-h-a-w   w̃ɪ]
                                            (B3-2005-11-22#780; age 04;06)

    b.   *Ni-ki   chishwâwâ-**piyi**-**htâ**-n   mâ   â.*
        1-fut.1/2   noise-**dyn**-**caus**-1/2   emph   p,quest
        'I am going to turn up the sound, okay?'
        Target IPA: [nɪ-gɪ ʧɪwɔˡ-bi-tʰa-n   ma   ʔa]
        Actual IPA: [uʃʌ-bi-t tən   mæh   æ]
                                            (B3-2006-02-28#345; age 04;09)

It is important to remember that production is not necessarily equal to acquisition. Following Allen & Crago's work on passive acquisition (Allen & Crago 1996), I adopt productivity criteria in my analysis of *piyi*-derived verbs. To satisfy the productivity criteria, Billy must produce an alternation between an intransitive and causative variant of a single verb in a single session. Remembering that Billy produces no errors in causativizing *piyi*-derived verbs anywhere in the corpus (from 04;06), there is evidence that Billy productively uses unaccusative verbs at 05;00, six months before unergative verbs at 05;06. A consideration of Billy's causativization of a wider range of verbs is needed to confirm this finding, but it is consistent with Allen's (1998) observation that Inuktitut children acquire lexical causatives before morphological causatives.

Having considered productive acquisition of unaccusative verbs, I now turn to a consideration of the morphological development of Billy's productions.

5.2   Increasing number of morphemes in the verbal complex

One way to assess morpho-syntactic development in a polysynthetic language is to measure the Mean Length of Utterance by morpheme (MLUm). This is a problematic measure in some ways, as it is impossible to know how the child analyzes morphemes in her language (see discussion in Allen & Crago 1996; Fortescue 1985). In this case I assume a linguist's analysis of Cree morphology to count the number of morphemes on the *piyi*-derived verbal complex. Each morpheme was counted from the Actual IPA (e.g., the transcription of the child's utterance).[8] The results are represented in Table 5 and in Figure 1.

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8   A few morphemes were assumed to be present unless part of a cluster of missing

Session	Age	# Verbs	MLUm		
			Minimum	Maximum	Mean
B3-2005-11-22	04;06	13	3	5	3.85
B3-2006-01-10	04;07	1	4	4	4.00
B3-2006-02-28	04;09	4	3	6	4.25
B3-2006-05-27	05;00	8	3	5	3.75
B3-2006-07-26	05;02	6	3	6	4.50
B3-2006-10-14	05;05	5	3	6	4.20
B3-2006-11-06	05;05	2	4	4	4.00
B3-2006-12-11	05;06	8	3	7	5.00
B3-2007-03-19	05;10	5	3	6	4.40
B3-2007-04-02	05;10	14	3	7	4.29

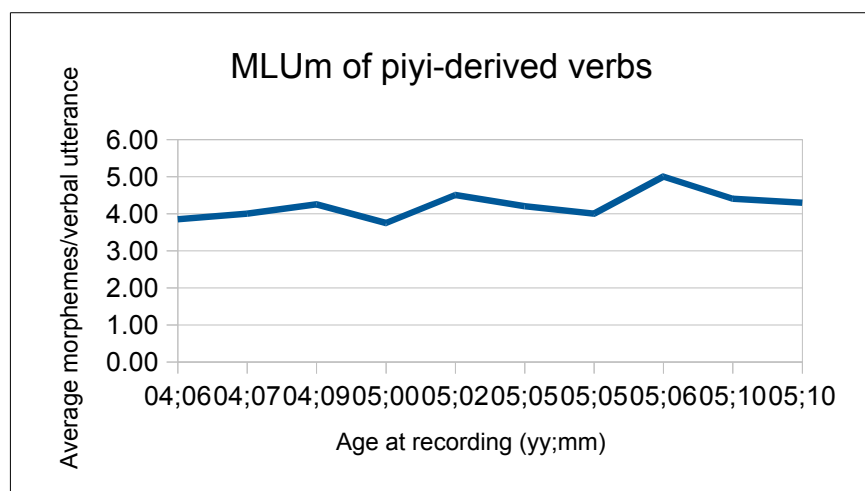Table 5: MLUm measurements of *piyi*-derived verbs

Figure 1: MLUm of *piyi*-derived verbs

The lowest MLUm was 3.75, measured in session 4, at age 05;00. Following this point no MLUm under 4.00 is recorded, thus I take session 4 to mark the end of a first stage of learning. The highest MLUm was 5.00, measured in session 8, at age 05;06, which I take to mark the beginning of a third stage of learning. I adopt these as somewhat arbitrary boundaries in my assessment of the morphological inventory of *piyi*-derived verbs in §5.3, below.

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morphemes, such as word-initial pronominal clitic *ni-*, and word final *-h*, both of which are difficult for English-speaking transcribers to perceive.

5.3 Morphemes in use in *piyi*-derived verbal complexes

Dividing the ten recordings of Billy's speech into three stages, following notable changes in MLUm measurements, we see that age 05;06 is the start of a period of high MLUm and a marked increase in morphological variation in *piyi*-derived verbs (05;06 – 05;10). This coincides with Billy's productive acquisition of the syntax of the passive (Johansson in prep). Consider Table 6.

Morpheme	04;06 – 05;00	05;02 – 05;05	05;06 – 05;10
Derivational: Diminutive	✓	✓	✓
Inflectional: Independent Order	✓	✓	✓
Inflectional: Conjunct Order	✓	✓	✓
Inflectional: Obviative	✓	✓	✓
Inflectional: Subjunctive	✓	✓	✓
Preverb: Conjunct	✓	✓	✓
Preverb: Past	✓	✓	✓
Pronominal clitic	✓	✓	✓
Derivational: Causative	✓	✘	✓
Derivational: Direct theme sign	✓	✘	✓
Derivational: Passive	✓	✘	✓
Preverb: Future conjunct	✓	✘	✓
Derivational: Desiderative	✘	✓	✓
Preverb: Future 2nd / 3rd person	✘	✓	✓
Derivational: Intensifier	✘	✓	✘
Derivational: Medio-reflexive	✘	✓	✘
Inflectional: Impersonal	✘	✓	✘
Inflectional: Imperative Order	✘	✘	✓
Derivational: Inverse theme sign	✘	✘	✓
Preverb: Future 1st / 2nd person	✘	✘	✓
Preverb: Future 3rd person	✘	✘	✓
Preverb: Modal 'should'	✘	✘	✓

Table 6: Distribution of morphemes in *piyi*-derived verbal complexes

Take note of those morphemes that are produced in the first and third

stages, but not in the second stage. These include three derivational morphemes: causative, passive, and direct theme sign. (The direct theme sign is used to indicate which of two animate arguments is the actor and which is the goal, as we will see in §5.3.1). Johansson (in prep) argues that during stage two, Billy is acquiring the syntax of the passive, observing that this stage is marked by a high number of errors and more simplified passive productions. This type of pattern is typical of "U-shaped" development (e.g., Marcus et al. 1992; Rose & Brittain 2011). The distribution of morphemes in *piyi*-derived verbs suggests that the causative and direct theme sign morphology may constitute two other instances of U-shaped development, possibly indicating Billy's discovery of derivational morphology around 05;02. This interesting question must unfortunately be left to future work. However, the present discussion of theme sign morphology will be developed a little further in the next section.

5.3.1 Inverse theme sign morphology

As briefly mentioned above, transitive verbs with two animate arguments bear "theme sign" morphology. This morphology interacts with the Algonquian Person/Gender hierarchy (among other, Bloomfield 1946; Wolfart 1973; Dahlstrom 1991)

(8)   Algonquian Person/Gender hierarchy
        2 > 1 > 3 > 3'

Theme sign morphology indicates which argument is the actor and which is the patient. If the actor is higher on the hierarchy than the patient, the verb is marked with a direct theme sign. If the actor is lower on the hierarchy than the patient, the verb is marked with an inverse theme sign.

It is generally thought that direct verbs are somehow "more basic" than inverse verbs (e.g., Dahlstrom 1991). An examination of theme sign morphology in transitive verbs built on a root+*piyi* stem (e.g., morphological causatives) provides some initial evidence to support this assumption. Morphological causatives of *piyi*-derived verbs are marked with direct theme sign morphology from the first session at 04;06 (7a). Inverse morphology appears a full year later at 05;06 (9).

(9)   *Awâ-yiu-h   kâ   pâ-**piyi-h-îku**-ch.*
        who-obv-obvpvb,cj along-**dyn-caus-thm.inv**-3.pl
        'Who brought them by vehicle?'
        Target IPA: [we-ˈju-_   kæ   bæ-bi-h-igʊ-ʧ]
        Actual IPA: [wa-ɛ-_   kə   ba-bɪ-d-ikɔ-ʤ]
                                            (B3-2006-12-11#196; age 05;06)

This observation suggests that direct theme sign morphology is acquired before inverse morphology. A study of the development of theme sign morphology in basic transitive verbs (e.g., transitive verbs that are listed in the

lexicon) is needed to confirm this observation. In the corpus of Billy's speech, direct morphology appears on basic transitives at 04;06, and inverse morphology at 04;07. It is possible that he uses both productively on basic transitives when the recordings start.

6.   Conclusions and future work

In this study I have considered the longitudinal acquisition of *piyi*-derived verbs in NEC. While my findings do not bear on the Unergative Misanalysis Hypothesis, as I have discovered no evidence that unaccusative verbs are assumed by Billy to be unergative verbs, I have demonstrated that Billy's use of *piyi*-derived verbs increases in complexity over time. This complexity can be seen both in an upward trend in MLUm and in the increasing variety of morphology that he employs in the verbal complex. I have further provided preliminary evidence to support the treatment of transitive verbs bearing direct theme sign morphology as more basic than those bearing inverse theme sign morphology.

My observations point to some interesting questions. I have suggested that Billy's acquisition of derivational morphology may follow a U-shaped development path. I have further suggested that inverse theme sign morphology is acquired later than direct theme sign morphology on basic transitive verbs. Comprehensive studies of the acquisition of derivational morphology and of theme sign morphology will be left to future work.

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