UBCWPL

University of British Columbia
Working Papers in Linguistics

Proceedings of the Eighteenth and Nineteenth Workshop on Structure and Constituency in the Languages of the Americas

-Papers for WSCLA 18 & 19-

Edited by:
Natalie Weber and Sihwei Chen

June 2015 **Volume 39**

Proceedings of the Eighteenth and Nineteenth Workshop on Structure and Constituency in the Languages of the Americas

-Papers for WSCLA 18 & 19-

WSCLA 18: Berkeley, California
April 5–7, 2013

Hosted by:
University of California, Berkeley

WSCLA 19: St. John's, Newfoundland
April 25–27, 2014

Hosted by:
Memorial University

Edited by:
Natalie Weber and Sihwei Chen

The University of British Columbia Working Papers in Linguistics
Volume 39

June 2015

UBCWPL is published by the graduate students of the University of British Columbia. We feature current research on language and linguistics by students and faculty of the department, and we are the regular publishers of two conference proceedings: the Workshop on Structure and Constituency in Languages of the Americas (WSCLA) and the International Conference on Salish and Neighbouring Languages (ICSNL).

If you have any comments or suggestions, or would like to place orders, please contact :

UBCWPL Editors
Department of Linguistics
Totem Field Studios
2613 West Mall
V6T 1Z2
Tel: 604 822 8948
Fax 604 822 9687
E-mail: <ubcwpl@gmail.com>

Cover artwork by Lester Ned Jr.

Contact: Ancestral Native Art Creations
10704 #9 Highway
Compt. 376
Rosedale, BC V0X 1X0
Phone: (604) 793-5306
Fax: (604) 794-3217
Email: ldouglas@uniserve.com

Table of Contents

Part I
Papers for WSCLA 18

Underspecified modality in Washo*

M. Ryan Bochnak
University of California, Berkeley

Abstract: In this paper I describe and analyze the semantic properties of the Washo modal verb *-eʔ*. The data show that this verb is underspecified for both modal force and modal flavor: it is compatible with both necessity and possibility claims, as well as epistemic and various root modalities. To account for this variability, I adopt the analysis of Rullmann et al. (2008) using modal choice functions, whereby the type of modal base is underspecified. The discussion is framed with an eye towards the semantic typology of both individual modal expressions, and modal systems as a whole.

Keywords: Washo, modality, underspecified modality, semantics, semantic typology, copula

1 Semantic typology of modal systems

The semantic typology of modals and modality systems has recently received much attention from researchers investigating understudied languages, and in particular languages of the Americas. Under the standard semantic analysis of modals as quantifiers over possible worlds (Kratzer 1977, 1981, 2012), there are two relevant parameters that determine the interpretation of a given modal: (a) *modal force*, whether the modal encodes a force of necessity (universal quantification over worlds) or possibility (existential quantification over worlds); and (b) *modal flavor* or type of modality, roughly the background against which a modal claim is made (e.g., epistemic, deontic, circumstantial). Generally in English, modal force is lexically specified, while modal flavor is contextually determined. For instance in (1a), *must* is compatible with an epistemic or deontic flavor, although it has a necessity interpretation across uses. Roughly, *all* worlds compatible with a body of evidence (epistemic) or with a set of rules (deontic) are such that Line is in her office in those worlds. Meanwhile in (1b), *may* is likewise compatible with an epistemic or deontic interpretation, but always has a possibility interpretation. That is, *some* worlds compatible with a body of evidence or set of rules are such that Line is in her office in those worlds.

(1) a. Line must be in her office.
→ epistemic (given what we know) or deontic (given the rules); necessity only

b. Line may be in her office.
→ epistemic or deontic; possibility only

Recent cross-linguistic work has shown that these parameter settings are subject to variation. For instance, Rullmann et al. (2008) have shown that in St'át'imcets (Salish), modal flavor is lexically specified, while modal force is determined contextually. For instance, the modal *ka* in (2) can be used to make either a necessity or possibility claim, but is always deontic.

*I would like to thank Washo elders Ramona Dick and Steven James for teaching me their language. I would also like to thank Eva Csipak, Peter Klecha, Jozina Vander Klok, and the audience at WSCLA 18 in Berkeley for helpful feedback on this work. All errors are my own. I gratefully acknowledge the support of the Jacobs Fund of the Whatcom Museum of Washington State, the American Philosophical Society Phillips Fund for Native American Research, and the National Science Foundation under grant #1155196.
Contact info: bochnak@berkeley.edu

In Proceedings of the Workshop on Structure and Constituency in the Languages of the Americas 18 & 19,
University of British Columbia Working Papers in Linguistics 39,
Natalie Weber and Sihwei Chen (eds.), 2015.

(2) lán-lhkacw **ka** áts'x-en ti kwtámts-sw-a
already-2SG.SUBJ DEON see-DIR DET husband-2SG.POSS-DET
'You must/can/may see your husband now.' (St'át'imcets; Rullmann et al. 2008:328)

Additionally, Vander Klok (2013) has shown that Paciran Javanese (Austronesian) has modals that are lexically specified for both force and flavor. For instance, *mesthi* in (3) is only compatible with epistemic necessity claims, while *oleh* in (4) is only compatible with deontic possibility claims.[1]

(3) a. Context: The math teacher says: "The ball is in box A or in box B or in box C. It is not in box A. It is not in box B. So…"

b. Bal-e **mesthi** neng C.
ball-DEF EPIST.NEC in C
'The ball must be in C.' (Javanese; Vander Klok 2013:352)

(4) a. Context: According to the rules of the hospital, only family members are allowed to enter the patient's room during visiting hours. You came to visit your sister, but it was after visiting hours. But the really nice nurse says…

b. Awakmu **oleh** melbu.
2SG DEONT.POSS enter
'You may come in. (Javanese; Vander Klok 2013:355)

Given this state of affairs, a typology of modals emerges as illustrated in Table 1. However, given that there are two relevant parameters of variation, there are four types of modals that are logically possible, although only three out of four boxes in the table are filled in. This raises the question: could there be modals that are underspecified for both force and flavor, leaving both up to context?

Table 1: Preliminary typology of modal distinctions

		Modal Flavor	
		specified	*contextual*
Modal Force	*specified*	Javanese (*mesthi*, *oleh*)	English (*must*, *may*)
	contextual	St'át'imcets (*ka*)	**?**

In this paper, I argue that the verb *-eʔ* in Washo (Hokan/isolate) is a modal that fills in the empty slot in the typology. I show that this verb is compatible with both necessity and possibility claims, across a range of modality types, thereby completing the typology in Table 1.

The rest of the paper is structured as follows. In Section 2, I provide some relevant background on the Washo language, and describe the morphosyntax of the modal construction. In Section 3 I show that the verb *-eʔ* is compatible with necessity and possibility claims with various modal flavors. I provide an analysis of *-eʔ* in Section 4 based on a modal choice function following Rullmann et al. (2008) for the variable force modals in St'át'imcets. In Section 5 I examine the

[1]Note that it is not the case that the whole modal system in Paciran Javanese is arranged in this way. For example, the modal *kudu* is a general root necessity modal; see Vander Klok (2013) for details.

interaction between *-eʔ* and negation, and in Section 6 I argue that *-eʔ* is a true modal rather than a marker of irrealis mood. Section 7 concludes.

2 Background on Washo *-eʔ*

Washo is an endangered language spoken in the area of Lake Tahoe in California and Nevada. It is classified as a language isolate within the hypothetical Hokan family (see Mithun 1999 for discussion). Neutral word order is SOV, although adjuncts can appear pre-or post-verbally (see Jacobsen 1964 and Bochnak 2013 for more details).

The verb *-eʔ* is a copula that can serve to predicate noun phrases or adpositional phrases of an individual-denoting subject. There are two distinct agreement patterns for copula constructions. One series of agreement follows the standard subject agreement for other vowel-initial verbs in the language; this is illustrated in (5) where the prefix *ʔ-* agrees with a third person subject. A second form of agreement is shown in (6), where the prefix *k'-* agrees with a third person subject. Bochnak et al. (2011) argue these agreement paradigms track whether the predicate is a stage-level or individual-level predicate.

(5) Tim lí:nuya ʔéʔi

Tim li:nu-a ʔ-eʔ-i
Tim Reno-LOC 3-COP-IPFV
'Tim is in Reno.' (stage-level predicate)

(6) t'é:liwhu dókto k'éʔi

t'e:liwhu dokto k'-eʔ-i
man doctor 3-COP-IPFV
'The man is a doctor.' (individual-level predicate)

The individual-level version of *-eʔ* also has a non-copula use where it has no overt subject and takes a subordinate clause as a complement. As I will show, sentences with this use of *-eʔ* receive a modal interpretation, whereby the subordinate clause serves as the prejacent proposition for the modal claim.[2] Subordination can syntactically be realized one of two ways. First, the modal use of *-eʔ* can embed a non-finite clause: the verb of the embedded clause is marked for subject agreement, but without a final temporal/aspectual suffix (e.g., *-i* 'imperfective' or *-aʔ* 'aorist'), which is obligatory in finite clauses. This is shown in (7), which has a generic interpretation.

(7) lí:nuya pú:luŋa deyéwamé:sha k'éʔi

li:nu-a pu:lul-ŋa de-yewam-e:s-ha k'-eʔ-i
Reno-LOC car-NC NMLZ-drive-NEG-CAUS 3-COP-IPFV
'He never drives to Reno.'

[2]Due to space constraints, I will assume familiarity with some technical terms from the modality literature, e.g., prejacent, modal base, ordering source. Readers are referred to von Fintel and Heim (2011) for a lucid introduction to this domain of semantics.

Second, the embedded clause can be a full clause (with a fully inflected verb form, including final temporal/aspectual morphology) that is marked by the relative clause suffix *-gi*, as shown in (8), which expresses future modality. This is the same relativizing morphology that is found in subject internally-headed relative clauses in the language (Jacobsen 1981). Note that (8) contains two instances of the verb *-eʔ*: the version in the embedded clause is the copula use (compare 5), and uses the "regular" agreement paradigm used for stage-level copula predications (first person = *le-*), while the matrix version of *-eʔ* contributes the modal interpretation, and uses the agreement paradigm found with individual-level copula predications (first person = *L-*).

(8) wát wútpɨda léʔgabigi Léʔi

wat	wutpɨd-a	le-eʔ-gab-i-gi	L-eʔ-i
tomorrow	Woodfords-LOC	1-COP-FUT-IPFV-REL	1-MOD-IPFV

'I will be in Woodfords tomorrow.'

Most often, the modal verb inflects for third person subject, regardless of the subject of the prejacent, but can also inflect for the same subject as the prejacent, as in (8). What conditions this alternation is not known. In cases where *-eʔ* is marked for a third person subject, but embeds an internally-headed relative clause with a non-third person subject, the switch reference marker *-š* appears on the embedded verb, as shown in (9), which has the reading of an ability modal.

(9) déʔek hádigi t'í:yeliʔ dibípɨsišgi k'éʔi

deʔeg	hadigi	t'-i:yel-iʔ	di-bips-i-š-gi	k'-eʔ-i
rock	that	NMLZ-big-ATTR	1-pick.up-IPFV-SR-REL	3-MOD-IPFV

'I can lift that big rock.'

3 A highly flexible modal verb

In this section, I provide a series of examples that shows that the modal use of *-eʔ* is compatible with necessity, weak necessity, and possibility claims, and is also compatible with a variety of modal flavors, including deontic, metaphysical, epistemic, bouletic, generic, and pure circumstantial.[3]

Deontic necessity (possible worlds that conform to a set of rules)

(10) a. Context: You borrowed a pot from Beverly, and now you need to give it back to her.

b. bévali wí:diʔ lé:šɨl k'éʔi

bevali	wi:diʔ	le-išɨl	k'-eʔ-i
Beverly	this	1-give	3-MOD-IPFV

'I need to give this to Beverly.'

[3]Many of the contexts used here are borrowed from or inspired by those found in Rullmann et al. (2008) and Deal (2011), or were elicited using the Totem Field Storyboards: www.totemfieldstoryboards.org.

(11) a. Context: A friend comes to visit, and brings her dog along. You don't want the dog to come in the house.

b. súku baŋáya ʔéʔišgi k'éʔi

suku baŋaya ʔ-eʔ-i-š-gi k'-eʔ-i
dog outside 3-COP-IPFV-SR-REL 3-MOD-IPFV
'The dog has to stay outside.'

Metaphysical/future necessity (possible worlds given a normal progression of time)

(12) a. Context: I ask you where you will spend the day tomorrow. You say:

b. wát wútpɨda léʔgabigi Léʔi

wat wutpid-a le-eʔ-gab-i-gi L-eʔ-i
tomorrow Woodfords-LOC 1-COP-FUT-IPFV-REL 1-MOD-IPFV
'I will be in Woodfords tomorrow.'

(13) a. Context: At a school dance, you wonder whether a shy boy will talk to a girl he likes. Your friend says "Yes,..."

b. mé:hu šáwlamhuhak'a wagayáyʔigi k'éʔi

me:hu šawlamhu-hak'a wagayayʔ-i-gi k'-eʔ-i
boy girl-with talk-IPFV-REL 3-MOD-IPFV
'The boy will talk to the girl.'

Epistemic necessity[4] (possible worlds consistent with a body of evidence)

(14) a. Context: You are planning to drive over the mountains. It's started to snow, and you know that whenever it snows, the road over the mountains is closed.

b. déʔešáŋawiš yéweš gumbeyéc'igigi k'éʔi

deʔeš-aŋaw-i-š yeweš gum-beyec'ig-i-gi k'-eʔ-i
snow-good-IPFV-SR road REFL-close-IPFV-REL 3-MOD-IPFV
'It's snowing a lot, so the road must be closed.'

Bouletic necessity (possible worlds that conform to one's desires)

(15) a. Context: You are at a restaurant, and the waiter says that today's special is fish, your favorite food. You say:

b. ʔát'abi léʔwigi Léʔi

ʔat'abi le-iʔiw-i-gi L-eʔ-i
fish 1-eat-IPFV-REL 1-MOD-IPFV
'I have to eat the fish!'

[4]The verb *-eʔ* does not often appear in epistemic contexts. In such contexts, speakers tend to use an evidential, or provide another paraphrase not using a modal. Nevertheless, the examples in (14) and (21) show that *-eʔ* is still compatible with epistemic modality, even though it is dispreferred.

Bouletic weak necessity

(16) a. Context: At a school dance, you tell your friend that a boy who is being shy should talk to a girl he likes.

b. mé:hu šáwlamhu wagayáŋaʔ k'éʔi

me:hu šawlamhu wagayaŋaʔ k'-eʔ-i
boy girl talk 3-MOD-IPFV
'The boy should talk to the girl.'

Generic (possible worlds where a certain property holds)

(17) lí:nuya pú:luŋa deyéwamé:sha k'éʔi

li:nu-a pu:lul-ŋa de-yewam-e:s-ha k'-eʔ-i
Reno-LOC car-NC NMLZ-drive-NEG-CAUS 3-COP-IPFV
'He never drives to Reno.'

Deontic possibility

(18) a. Context: Mary's friends come over to see if she is allowed to come out to play.

b. wádiŋ hé:š ʔump'áyt'igišuweʔ k'éʔi

wadiŋ he:š ʔum-p'ayt'i-giš-uweʔ k'-eʔ-i
now Q 2-play-along-hence 3-MOD-IPFV
'Now are you allowed to come play?'

(19) a. Context: At a school dance, you see a shy boy who wants to talk to a girl but isn't. You ask your friend if that boy is allowed to talk to that girl. Your friend responds: "Yes…"

b. mé:hu šáwlamhuhak'a wagayáyʔigi k'éʔi

me:hu šawlamhu-hak'a wagayayʔ-i-gi k'-eʔ-i
boy girl-with talk-IPFV-REL 3-MOD-IPFV
'The boy is allowed to talk to the girl.' = (13)

Future possibility

(20) a. Context: You have been working on building a house for quite a while now. I ask when you will be finished. You say it's possible you'll finish tomorrow.

b. wát didó:damamaʔišgi k'éʔi

wat di-do:da-mamaʔ-i-š-gi k'-eʔ-i
tomorrow 1-build-finish-IPFV-SR-REL 3-MOD-IPFV
'I might finish building it tomorrow.'

Epistemic possibility

(21) a. Context: You hear a knock at the door. You can't see who it is, but can see that the person looks about the same height as Beverly.

b. bévali k'éheligi k'éʔi

bevali k'-eʔ-hel-i-gi k'-eʔ-i
Beverly 3-COP-SUBJ-IPFV-REL 3-MOD-IPFV
'It might be Beverly.'

Circumstantial possibility (possible worlds that are consistent with a set of circumstances)

(22) a. Context: You see someone trying to pick up a very heavy rock. You are very strong, so you tell them that you can lift that rock.

b. déʔek hádigi t'í:yeliʔ dibípisišgi k'éʔi

deʔeg hadigi t'-i:yel-iʔ di-bips-i-š-gi k-eʔ-i
rock that NMLZ-big-ATTR 1-pick.up-IPFV-SR-REL 3-MOD-IPFV
'I can lift that big rock.'

(23) a. Context: You are discussing what could grow in the garden, given the type of soil.

b. dawpáp'ɨl ʔíʔmiʔaŋawigi k'éʔi wáʔ ŋáwaya

dawp'ap'ɨl ʔiʔimiʔ-aŋaw-i-gi k'-eʔ-i waʔ ŋawa-a
flower grow-good-IPFV-REL 3-MOD-IPFV here dirt-LOC
'Flowers could grow well here in this dirt.'

In sum, the Washo modal *-eʔ* is compatible with both necessity and possibility claims, and with a variety of modality types, indicating that it is not lexically specified for either modal force or flavor.

4 Analysis

The challenge now is to provide an analysis for modal *-eʔ* that can capture its flexibility with respect to both modal force and flavor. To do this, I follow Rullmann et al. (2008) in their analysis of modals in St'át'imcets. Recall that modals in St'át'imcets, while specified for flavor, show variable force. To capture this behavior, Rullmann et al. provide an analysis that makes use of a *choice function*. A choice function is a function that applies to a set and returns an individual from that set. Choice functions have figured prominently in the analysis of specific indefinites (e.g. Kratzer 1998; Matthewson 1999; Reinhart 1997). Rullmann et al. posit a *modal choice function*, which applies to a non-empty set of worlds, but instead of picking out a single world from that set, it returns a subset of worlds from that set. The formal definition of a modal choice function is given in (24).

(24) Modal choice function: A function f of type $\langle st, st\rangle$ is a modal choice function iff for any set of worlds W, $f(\mathrm{W}) \subseteq \mathrm{W}$ and $f(\mathrm{W}) \neq \emptyset$. (Rullmann et al. 2008:337)

The modal choice function operates over the set of worlds that is already restricted by a modal base (and ordering source)[5] in the sense of Kratzer (1981). The set of worlds returned by the choice function is then universally quantified over. That is, the modal asserts that in *all* the worlds chosen by the choice function, the prejacent proposition holds in those worlds. Rullmann et al.'s analysis of the St'át'imcets deontic modal *ka* is given in (25), where the specification of a deontic modal base is stated as a presupposition.

(25) $[\![\ ka\ ]\!]^{c,w}$ is only defined if c provides a deontic modal base B. If defined,
$[\![\ ka\ ]\!]^{c,w} = \lambda f_{\langle st,st\rangle} \lambda p_{\langle s,t\rangle}.\forall w'[w' \in f(B(w)) \rightarrow p(w')]$ (Rullmann et al. 2008:340)

Under this analysis, variable force is derived from the size of the set of worlds picked out by the choice function. The smaller the subset of worlds chosen, the weaker the modal force. In the case where the choice function is an identity function, the entire set of worlds in the modal base is universally quantified over, resulting in a necessity interpretation. In the case where the choice function returns a proper subset of worlds in the modal base, the result is a possibility interpretation.

While Washo *-eʔ* and St'át'imcets modals both display variable force behavior, the difference between them is that Washo *-eʔ* is not specified for any particular modal flavor. We can thus adopt the analysis for St'át'imcets modals to take care of the variable force, but only specify that the context provide *some* modal base, without specifying what type of modal base it is. We can therefore model the semantics of Washo *-eʔ* as in (26).

(26) $[\![$ *-eʔ* $]\!]^{c,w}$ is only defined if c provides a modal base B (which is also restricted by an ordering source). If defined,
$[\![$ *-eʔ* $]\!]^{c,w} = \lambda f_{\langle st,st\rangle} \lambda p_{\langle s,t\rangle}.\forall w'[w' \in f(B(w)) \rightarrow p(w')]$

Let me illustrate how the analysis works for the Washo sentence (13) = (19), repeated as (27), which as we have seen is compatible with metaphysical necessity and deontic possibility claims.

(27) a. mé:hu šáwlamhuhak'a wagayáyʔigi k'éʔi

me:hu šawlamhu-hak'a wagayayʔ-i-gi k'-eʔ-i
boy girl-with talk-IPFV-REL 3-MOD-IPFV

b. 'The boy will talk to the girl.'

c. 'The boy is allowed to talk to the girl.'

To get the interpretation in (27b), the modal base and ordering source derive a set of worlds metaphysically accessible from the actual world. The choice function is then the identity function over those worlds. That set of worlds is then universally quantified over to arrive at a necessity interpretation. To get the interpretation in (27c), the modal base and ordering source derive a set of worlds where the relevant rules in the actual world are obeyed. The choice function then picks

[5] Rullmann et al. collapse the separate contributions of the modal base and ordering source, and only talk about the modal base.

a proper subset of those worlds, which is then universally quantified over, yielding a possibility interpretation.

Both cases could be paraphrased in the following way: "In all the worlds chosen by the choice function, the boy talks to the girl in those worlds." The difference between the two interpretations, though, lies in the type of modal base (and ordering source), and the size of the subset of worlds chosen by the choice function. If the choice function is the identity function, we get a necessity interpretation; if the choice function picks out a proper subset, we get a weaker, possibility interpretation.

This style of analysis thus captures the variable force behavior of the Washo modal *-eʔ* as desired. However, I will point out an interesting consequence that arises from this analysis, namely that it uniformly involves *universal quantification* over a set of worlds. That is, the modal itself isn't actually underspecified for quantificational force – the effect of variable force comes from the size of the set quantified over, which is regulated by a modal choice function. We will return to this issue in Section 7 when we reconsider the semantic typology of modals.

5 Interaction with negation

There is another analysis for variable force modality on the market which I haven't considered here, namely that of Deal (2011) for the Nez Perce root modal *-o'qa*. What Deal observes is that *-o'qa* only has a variable force interpretation in upward-entailing environments. Meanwhile in downward-entailing environments only a possibility reading is available; witness (28) vs. (29).

(28) a. Context: A friend is preparing for a camping trip. I am taking this person around my camping supplies and suggesting appropriate things. I hand them two blankets and say:

b. 'inehne-**no'qa** 'ee kii lepit cickan
take-MOD you DEM two blanket
'You can take these two blankets.'
'You should take these two blankets.' (Nez Perce; Deal 2011:561)

(29) a. Context: You are explaining to someone who thinks they have to leave that they are not in fact required to do so. It's not necessary for them to leave.

b. # weet'u 'ee kiy'-**o'qa**
not you go-MOD
Consultant: "That's a different conversation, not this one. You're just saying *weet'u 'ee kiyo'qa*, 'you can't go'." (Nez Perce; Deal 2011:574)

Deal proposes that Nez Perce *-o'qa* is actually only a possibility modal; however, it is compatible with necessity force in upward entailing environments because of a lack of a necessity modal that would otherwise give rise to a scalar implicature. Deal draws an apt comparison to English quantifiers *some* and *all*. The use of *some* in upward entailing environments normally gives rise to a scalar implicature *but not all*. The generation of this implicature crucially relies on the existence of the stronger *all* that forms a scale with *some*. In the absence of a stronger element on the scale, the use of the weaker element then generates no such implicature. This is what Deal proposes for *-o'qa*: it is a possibility modal with no necessity counterpart, and thus gives rise to apparent quantificational variability in upward-entailing environments. However, in downward-entailing environments,

the scalar relations are reversed: possibility is no longer compatible with necessity, so we would not expect variable force readings here.

To rule out such an analysis for Washo *-e?*, we should test the behavior of *-e?* in downward entailing environments as well. It turns out this test is difficult to apply in Washo, since *-e?* does not like to be embedded.[6] For instance, *-e?* seems to only be able to take wide scope with respect to negation. Negation can only appear within the prejacent clause; it cannot be marked on the modal itself, as shown in (30)–(34). In these environments, we still find the variable force behavior of the Washo modal *-e?*.

(30) a. Context: You see someone trying to pick up a very heavy rock, but they can't lift it. You are not very strong, so you say that you can't pick up the rock either.

b. dé?ek t'í:yeliŋa dibípisé:sišgi k'é?i

de?ek t'-i:yel-i?-ŋa di-bips-**e:s**-i-š-gi k'-e?-i
rock NMLZ-big-ATTR-NC 1-pick.up-**NEG**-IPFV-SR-REL 3-MOD-IPFV
'I can't pick up that big rock.' (circumstantial: □¬)

c. * de?ek t'-i:yel-i?-ŋa di-bips-i-š-gi k'-e?-**e:s**-i
rock NMLZ-big-ATTR-NC 1-pick.up-IPFV-SR-REL 3-MOD-**NEG**-IPFV

(31) a. Context: You have been working on building a house for quite a while now, and you still won't finish it by tomorrow.

b. wát didó:damama?e:sgabišgi k'é?i

wat di-do:da-mama?-**e:s**-gab-i-š-gi k'-e?-i
tomorrow 1-build-finish-**NEG**-FUT-IPFV-SR-REL 3-MOD-IPFV
'I won't finish building it tomorrow.' (metaphysical: □¬)

c. * wat di-do:da-mama?-gab-i-š-gi k'-e?-**e:s**-i
tomorrow 1-build-finish-FUT-IPFV-SR-REL 3-MOD-**NEG**-IPFV

(32) a. Context: Someone offers you some candy, but your doctor says you shouldn't eat candy.

b. demuc'úc'uŋa lé?wé:sigi Lé?i

demuc'uc'u-ŋa le-i?iw-**e:s**-i-gi L-e?-i
sweet-NC 1.eat-**NEG**-IPFV-REL 1-MOD-IPFV
'I shouldn't eat candy.' (deontic: □¬)

c. * demuc'uc'u-ŋa le-i?iw-i-gi L-e?-**e:s**-i
sweet-NC 1.eat-IPFV-REL 1-MOD-**NEG**-IPFV

[6] Rullmann et al. (2008) likewise find that the variable force modals in St'át'imcets cannot be embedded.

(33) a. Context: You have been working on building a house for quite a while now, and you're not sure if you'll finish it by tomorrow.

b. wát didóːdamamaʔéːsheligi Léʔi

wat di-doːda-mamaʔ-**eːs**-hel-i-gi L-eʔ-i
tomorrow 1-build-finish-**NEG**-SUBJ-IPFV-REL 1-MOD-IPFV
'I might not finish building it tomorrow.' (metaphysical: ◇¬)

c. * wat di-doːda-mamaʔ-hel-i-gi L-eʔ-**eːs**-i
tomorrow 1-build-finish-SUBJ-IPFV-REL 1-MOD-**NEG**-IPFV

(34) a. Context: We are discussing the weather for tomorrow. It might rain, but it might not.

b. wát háʔašéːsgabigi k'éʔi

wat haʔaš-**eːs**-gab-i-gi k'-eʔ-i
tomorrow rain-**NEG**-FUT-IPFV-REL 3-MOD-IPFV
'It might not rain tomorrow.' (metaphysical: ◇¬)

c. * wát háʔaš-gab-i-gi k'-éʔ-**eːs**-i
tomorrow rain-FUT-IPFV-REL 3-MOD-**NEG**-IPFV

The lack of embeddability of Washo *-eʔ* means that we can't yet rule out an analysis along the lines proposed by Deal for Nez Perce *-o'qa*. As for other downward-entailing environments (e.g., restriction of a universal quantifier, antecedent of a conditional), my preliminary investigations reveal that it is difficult to embed *-eʔ* in these environments as well, although I must leave a more detailed investigation to future work.

6 Not an irrealis marker

It has been observed that languages of the Americas tend to make use of a general realis/irrealis distinction, rather than making more fine-grained modal distinctions like English and other Indo-European languages do (Mithun 1999; Palmer 2006). Roughly speaking, irrealis is a category that tends to mark non-assertion, or that a proposition is unrealized in the actual world (Mithun 1999; Palmer 2006). Since I have shown that Washo *-eʔ* is quite underspecified for type and force of modality, it is conceivable that it could be analyzed as a marker of irrealis mood.

I suggest, however, that this is not the case, and that Washo *-eʔ* should be considered a modal alongside more familiar examples like English *must* and *may*. First, note that *-eʔ* is crucially absent in at least three environments where we might otherwise expect irrealis marking to occur: questions, negation, and imperatives (Palmer 2006).[7]

[7]There is some controversy as to whether to qualify as an irrealis marker, a form must appear in *all* environments where we expect it to occur given the semantic definition above. See Michael (2014) for discussion.

Questions:[8]

(35) géwe hé:š mí:giʔayt'iʔi

gewe he:š m-i:giʔ-ayt'iʔ-i
coyote Q 2-see-PLUPERF-IPFV
'Did you see a coyote?'

(36) dáŋal dedó:daʔ mášašé:she:ši

d-aŋal de-do:daʔ m-ašaš-e:s-he:š-i
D.POSS-house NMLZ-build 2-not.know-NEG-Q-IPFV
'Do you know anyone who builds houses?'

Negation:

(37) t'ánuŋa ʔí:biʔé:si

t'anu-ŋa ʔ-i:biʔ-e:s-i
person-NC 3-come-NEG-IPFV
'Nobody came.'

(38) géwe t'ánuŋa ʔiʔwé:si

gewe t'anu-ŋa ʔ-iʔiw-e:s-i
coyote person-NC 3-eat-NEG-IPFV
'The coyote didn't eat anybody.'

Imperatives:

(39) Lynda gemugá:gim

Lynda ge-muga:gim
Lynda IMPER-ask
'Ask Lynda!'

(40) háda ditóšaba gedulá:š

hada di-tošab-a ge-dule-a:š
there 1.POSS-bag-LOC IMPER-hand-be.in.something
'Get it (money) out of my bag there!'

Second, reality status marking is canonically realized as an inflectional category, often fused with other inflectional categories such as person and number (Palmer 2006). This is obviously not the case for Washo: *-eʔ* is itself a verb, which participates in the inflectional paradigms of verbs more generally in the language.

Thus, for these reasons, I conclude that Washo *-eʔ* is not a marker of irrealis mood, but rather falls squarely under the category of modals.

[8]It is not the case that *-eʔ* is banned from appearing in questions, but when it does, a modal interpretation obtains; cf. (18) above. Also note that irrealis marking in Nanti (Arawak) is absent in questions, a language which Michael (2014) claims behaves like a prototypical irrealis-marking language.

7 Conclusions

I have shown that the Washo modal *-e?* is lexically underspecified for both modal force and modal flavor. This discovery allows us to complete the semantic typology of modals in Table 2.

Table 2: Revised typology of modal distinctions

		Modal Flavor	
		specified	*contextual*
Modal Force	*specified*	Javanese (*mesthi*, *oleh*)	English (*must*, *may*)
	contextual	St'át'imcets (*ka*)	**Washo** (*-e?*)

Although the distinctions in Table 2 describe the empirical generalization that modal force is variable for Washo *-e?* (and the St'át'imcets modals), the analysis proposed in Section 4 following Rullmann et al. (2008) hard-wires universal quantification over worlds into the meaning of *-e?*. Likewise an analysis along the lines of Deal (2011) specifies existential quantification to account for variable-force behavior. Thus, under both styles of analysis, modal force is in fact always lexically specified, and some other mechanism must be posited for deriving the effect of variable force. The typological generalizations might thus be stated in another way, as suggested by Deal (2011): languages differ as to what types of modal quantifiers it makes use of. Some languages have both universal and existential quantification over worlds (English, Paciran Javanese), while others make use of only one type (Washo, St'át'imcets, Nez Perce). Within the latter group, some languages have only universal quantification (Washo, St'át'imcets), while others have only existential quantification (Nez Perce).[9] This state of affairs is summarized in Table 3, where we consider not just the quantificational force of particular modal expressions, but the way in which the modal system as a whole is organized in a language.

Table 3: Quantificational force in modal systems

Modal quantifiers available	$\forall, \exists$	$\forall$ only	$\exists$ only
Languages	English, Javanese	St'át'imcets, Washo	Nez Perce

I close with some speculations on the relation between the modal use of *-e?* and its use as an individual-level copula.[10] A striking similarity between these two functions is that both have been proposed to involve universal quantification over some sort of abstract entity. In this paper, I argued for an analysis of modal *-e?* in terms of universal quantification over possible worlds. Meanwhile, individual-level predication has been analyzed in terms of universal quantification over situations or events (e.g., Chierchia 1995), which was adopted in a previous analysis of individual-level use of the copula in Washo (Bochnak et al. 2011). It is my hope that future research will explore the relationship and connections between these two interpretations and possible historical and cross-linguistic relationships between copula clauses and modal interpretations.[11]

[9] Deal hedges on whether this is true for all modals in Nez Perce, or just root modality.

[10] Recall that *-e?* can also be used with stage-level predicates, but with a different agreement paradigm than the one used for the i-level and modal uses.

[11] Interestingly, Russian uses a form of the verb 'to be' (*by*) that Dobrushina (2010, 2013) analyzes as a subjunctive marker used to express wishes, necessities, optatives, or hypotheticals. Thanks to Katie Sardinha for pointing me to this literature.

Orthography and glossing conventions

All Washo data come from primary fieldwork unless otherwise noted. The orthography used for Washo examples is adapted from Jacobsen (1964), where most characters correspond with their IPA values, with the following exceptions: *c* = [t͡s]; *L* = [l̥]; *M* = [m̥]; *š* = [ʃ]; *y* = [j]. Acute accents over vowels represent stressed syllables. I use the following abbreviations in glosses: 1, 2, 3 = first, second, third person; AOR = aorist; ATTR = attributive; CAUS = causative; COP = copula; D.POSS = d-possessive; DEON = deontic; DEONT.POSS = deontic possibility; DEM = demonstrative; DET = determiner; DIR = direct; EPIST.NEC = epistemic necessity; FUT = future; IMPER = imperative; INCH = inchoative; INS.NMLZ = instrument nominalization; IPFV = imperfective; LOC = locative; MOD = modal; NC = negative concord; NEG = negation; NMLZ = nominalizer; PLUPERF = pluperfect; POSS = possessive; Q = question particle; REFL = reflexive; REL = subject relative clause marker; SBJ = subject; SG = singular; SR = switch reference; SUBJ = subjunctive.

References

Bochnak, M. R. (2013). *Cross-linguistic variation in the semantics of comparatives*. PhD thesis, University of Chicago, Chicago.

Bochnak, M. R., Grinsell, T., and Yu, A. C. L. (2011). Copula agreement and the stage-level/individual-level distinction in Washo. In Black, A. and Louie, M., editors, *Proceedings of the 16th Workshop on Structure and Constituency in Languages of the Americas*, pages 1–10, Vancouver. UBCWPL.

Chierchia, G. (1995). Individual-level predicates as inherent generics. In Carlson, G. and Pelletier, F. J., editors, *The Generic Book*, pages 176–223. University of Chicago Press, Chicago.

Deal, A. R. (2011). Modals without scales. *Language*, 87(3):559–585.

Dobrushina, N. (2010). Subjunctive in Russian relative clauses. *Oslo Studies in Language*, 2(1):181–210.

Dobrushina, N. (2013). The verbless subjunctive in Russian. Ms. National Research University Higher School of Economics (Moscow, Russia).

von Fintel, K. and Heim, I. (2011). Intensional semantics. Ms. Massachusetts Institute of Technology.

Jacobsen, W. H. (1964). *A Grammar of the Washo Language*. PhD thesis, University of California, Berkeley.

Jacobsen, W. H. (1981). Headless relative clauses in Washo. In *Conference on the Syntax of Native American Languages*, pages 102–116.

Kratzer, A. (1977). What *must* and *can* must and can mean. *Linguistics and Philosophy*, 1:337–355.

Kratzer, A. (1981). The notional category of modality. In Eikmeyer, H.-J. and Rieser, H., editors, *Words, Worlds, and Contexts: New Approaches to Word Semantics*, pages 163–201. Walter de Gruyter, Berlin.

Kratzer, A. (1998). Scope or pseudo-scope: Are there wide-scope indefinites? In Rothstein, S., editor, *Events in Grammar*, pages 163–196. Kluwer, Dordrecht.

Kratzer, A. (2012). *Modals and Conditionals: New and Revised Perspectives*. Oxford University Press, New York.

Matthewson, L. (1999). On the interpretation of wide-scope indefinites. *Natural Language Semantics*, 7:79–134.

Michael, L. (2014). The Nanti reality status system: Implications for the typological validity of the realis/irrealis contrast. To appear in *Linguistic Typology*.

Mithun, M. (1999). *The Languages of Native North America*. Cambridge University Press, New York.

Palmer, F. (2006). *Mood and modality*. Cambridge University Press, Cambridge, 2nd edition edition.

Reinhart, T. (1997). Quantifier scope: How labor is divided between QR and choice functions. *Linguistics and Philosophy*, 20:335–397.

Rullmann, H., Matthewson, L., and Davis, H. (2008). Modals as distributive indefinites. *Natural Language Semantics*, 16:317–357.

Vander Klok, J. (2013). Pure possibility and pure necessity modals in Paciran Javanese. *Oceanic Linguistics*, 52(2):346–378.

Person hierarchies trigger syntactic inversion*

Javier Carol
Universidad de Buenos Aires, Argentina

Andrés Pablo Salanova
Université d'Ottawa, Canada

Abstract: Chorote (Mataco-Mataguayo, northern Argentina and western Paraguay) exhibits a split intransitive or active-inactive alignment that is, in very broad terms, typical of the Gran Chaco and southern Amazon region. More specifically to Chorote, when the verb is suffixed with the prospective auxiliary *-hayi*, the argument on the resulting complex predicate is always marked in the inactive form, irrespective of the semantics of the lexical verb. In this paper, we argue that this pattern of subject marking in Chorote can be explained most elegantly by means of a structural analysis in which "winning" the competition for the person prefix slot in prospective forms may entail triggering sintactic inversion in lexical verbs. We further discuss the status of pronominal markers in Chorote, and briefly compare the behavior of *-hayi* in Chorote with related morphemes in Nivaclé which display different characteristics.

Keywords: person hierarchy, inverse voice, Mataco-Guaykuruan languages, raising predicates

1 Introduction

So-called person hierarchy effects are a well-known linguistic phenomenon that may be found in a great number of languages throughout the world. One well-known example is the *me-lui* constraint in Romance languages (Rivero 2008; Ormazábal and Romero 2007), whereby it is impossible to combine a non-third person direct object clitic with a third-person indirect object clitic:

(1) *Me$_{DO}$ le$_{IO}$ recomendaste./*Le$_{IO}$ me$_{DO}$ recomendaste./*Se$_{IO}$ me$_{DO}$ recomendaste.
Intended: You recommended me to him.

Person hierarchy effects may also be found in several languages of the Americas, where person prefixes on transitive verbs may represent the object or the subject, always choosing the non-third-person participant if there is one. This may be observed in the following data from Guaraní:[1]

* The authors wish to thank the audience at WSCLA 18 for many helpful comments, as well as the organizers of the volume. The talk at WSCLA also included a part on Guarani transitivity that is not incorporated here for reasons of space. An earlier version of the present paper was prepared for presentation at the 54th International Congress of Americanists in Vienna. We thank the organizers of the symposium on animacy hierarchies, Jimena Terraza and Katharina Haude, who circulated an extended handout among participants, as well as audiences in Santa Fe, Buenos Aires, OCLU at Ottawa and LASA in San Francisco, who heard previous versions of the talk. We also wish to thank our Chorote consultants, and Alain Fabre for discussion of Nivaclé data. All remaining errors are ours. The data for this paper was collected by Carol in various trips to the field between 2005 and 2011, through elicitation and participant observation unless indicated otherwise. This paper is dedicated to Ana Gerzenstein, *in memoriam*.

[1] The following abbreviations are used: 1, 2, 3 = first, second and third persons; ACT = active case; CL = clitic; DEM = demonstrative; DESID= desiderative; DO = direct object; IMPRS = impersonal; INCT = inactive case; IO = indirect object; O/S = object of transitive or subject of intransitive; P = applicative or adposition; pl/PL = plural; POSS = possessive; PRON = pronominal root; PRSP = prospective; sg = singular.

In Proceedings of the Workshop on Structure and Constituency in the Languages of the Americas 18 & 19,
University of British Columbia Working Papers in Linguistics 39,
Natalie Weber and Sihwei Chen (eds.), 2015.

(2) a. che-nupã
1INCT-beat
'he/she/it beats me'

b. ai-nupã
1ACT-beat
'I beat it/him/her'

Silverstein (1976) was the first to observe that there is a universal tendency for a particular hierarchy of noun phrase types to be respected in these cases, one that has commonly come to be called the *person hierarchy*. In the standard definition, the hierarchy goes from most to least "referential" in the order 1 > 2 > 3 > non-pronominal NP. The way in which the hierarchy may be seen acting in the two cases mentioned above is that, in (1), it is impossible to have a DO that is higher in the hierarchy than the IO, and in (2), that the participant which is higher in the hierarchy among subject and object is the one that surfaces as a person prefix in the only available slot.

The exact ordering of elements in the hierarchy has come into question on several occasions, and it seems clear that the ordering 1 > 2 is not universal (see e.g. Junker 2011). This question does not concern us directly here. Rather, the present paper touches on what sort of effect the person hierarchy triggers, whether it is a morphological effect or a syntactic one. While for the Romance languages this is a debate that has been laid out explicitly (see Rivero 2008 for references), and some discussion has occurred regarding the Algonquian languages (Rhodes 1994), there is to our knowledge no previous discussion of syntactic solutions to person hierarchy effects in the languages of the South American lowlands.

As an example of a purely morphological analysis applied to a hierarchy effect such as that exemplified in (2), we cite Nevins & Sandalo (2010). For Nevins & Sandalo, the constraints on co-occurrence of person features are a consequence of morphological operations of feature deletion. As such, they are not expected to interact in any way with other syntactic phenomena.

On the other hand, there exist analyses where hierarchy effects are attributed to syntax. For instance, Béjar & Rezac (2009) explain Algonquian agreement patterns through the mechanics of Agree, a syntactic operation. Effectively, this approach is syntax-driven, in the sense that morphology is sensitive to syntactic domains, but the morphological facts are not directly tied to any specifically syntactic consequence. This seems to be a characteristic of most syntactic approaches to hierarchy effects.

In this paper, we claim that inverse voice is triggered to satisfy the person hierarchy in Chorote, a Mataco-Mataguayan language of northern Argentina and western Paraguay.[2] In particular, we argue that hierarchy-driven agreement facts interact with a raising operation found in the prospective construction in the Iyo'(a)wujwa'/Manjui variety of this language. To our knowledge, such a syntactic effect of the person hierarchy has not been reported elsewhere, though it is contemplated as a possibility in, e.g., Béjar and Rezac (2009).

A broader consequence of our analysis of Chorote regards the analysis of split-ergative systems. A large body of literature attemps to explain splits in alignment by appealing to functional motivations, rooted in discourse and in cognition. Examples of such work are Dixon (1994) and Gildea (2004). In this paper, we endeavor to show that the pattern of participant marking in Chorote

[2] Chorote (ISO codes: crt, crq) is spoken by no more than 3,000 people in Argentina (province of Salta) and Paraguay (Boquerón county). It belongs to the (Mataco-)Mataguayan or Matacoan family, along with Wichí (Argentina, Bolivia), Nivaclé (Paraguay, Argentina) and Maká (Paraguay) languages. There is a major dialectal division between (a) Iyojwa'(a)ja', spoken in Argentina (ISO: crt), and (b) Iyo'(a)wujwa', spoken in Argentina, plus Manjui (or Lumnana, or Wikina Wo) spoken in Paraguay (ISO crq). This paper focuses in the (b) dialect, sometimes called *montaraz* ("from the forest"), by opposition to the (a) *ribereño* (from the riverbank), since its speakers lived mainly in the forests of Paraguayan Chaco until the first half of the XXth century.

unmarked and prospective clauses can be explained most elegantly by means of a structural analysis, an approach that has precedents in the analysis of tense-aspect and person splits within formal syntax (cf., for instance, Coon 2012; Nash 1995).

2 Chorote split intransitivity

Chorote exhibits a pattern of split intransitivity that is, in very broad terms, typical of the Gran Chaco and southern Amazon region.

Among intransitive verbs, those whose subjects are agentive in a broad sense display *active* person and number inflection, while those whose subjects are non-agentive display *inactive* person and number inflection:

(3) a. a-lak^{y}en
1ACT-play
'I am playing'

b. si-hwɪhl^{y}en
1sg.INCT-dream
'I am dreaming'

When a verb is transitive, still only one participant is indexed by person prefixes.[3] In Chorote, the person hierarchy follows a 1 > 2 > impersonal > 3 order. The prefixal inflection on the verb will always correspond to the person and number of the argument that is highest in this hierarchy, irrespective of its grammatical function. For inflection corresponding to the object, the *inactive* series of person prefixes is used, while for that corresponding to the transitive subject, the *active* series is used:

(4) a. a-lan
1ACT-kill
'I killed you/{him/her/it}'

b. si-lan
1sg.INCT-kill
'you/{he/she/it} killed me'

(5) a. hi-lan
2ACT-kill
'you killed him/her/it' (but never 'you killed me')

b. in-lan
2INCT -kill
'he/she/it killed you' (but never 'I killed you')

As can be seen in the previous examples, first person wins over second and second over third and, as the following examples show, first and second person also win over the impersonal prefix *ti-*, even if in this case the impersonal is still realized by a secondary exponent in the suffix *-a(h)*

[3] There are other morphemes beyond the person prefixes that also serve to index participants and are not subject to the person hierarchy discussed here; these include impersonal and plural suffixes. However, only the prefixes encode the full set of person distinctions in the language, and are thus regarded as primary.

not subject to person hierarchy (see footnote 3 and Section 5.1); finally, (6c) shows that the impersonal wins over regular third person:

(6) a. si-lan-a
1INCT-kill-IMPRS
'they (impersonal) killed me'

b. in-lan-a
2INCT-kill-IMPRS
'they (impersonal) killed you'

c. ti-lan-a
IMPRS-play-IMPRS
'they (impersonal) killed it/him/her'

Third person inflection displays some peculiarities. In transitive verbs, when third person acts on third person, the prefix is always *i-* (*y-* before vowels), but in intransitives there are four or five stem classes defined by the prefixes, among which there is also *i-* (*y-*). The active intransitive verbs can belong to three different prefix classes: *ti-* (*t-*), ∅-, and *i-* (*y-*), while the inactives can belong to prefix classes *(i)n-*, (*a-*) in addition to the aforementioned ∅- and *i-* (*y-*). (For simplicity, we only show singular forms of the person prefixes; plural forms are expressed by means of a combination of a singular prefix plus a suffix not subject to person hierarchy, except for the plural of first person inactive, which uses a portmanteau prefix.)

(7) a. Active intransitives (/_C /_V)

1	a-	∅-
2	hi-	hl-
IMPRS	ti-	t-
3	i-	y-
	ti-	t-
	∅-	

b. Inactive intransitives (/_C /_V)

1	si-	s-
2	in-	n-
3	i-	y-
	in-	n-
	(a-) ∅-	
	∅-	

Since the third person prefix *i-* occurs in both the active and inactive paradigm, one cannot tell by the prefixes only whether *i-* (*y-*) in transitive verbs marks the A or the O participant. We will assume the first to be the case. Some evidence for this comes from the fact that *i-* (*y-*) coocurs with the reflexive morpheme, cf. *i-wit lan* (3ACT-REFL kill) 'He/she kills himself/herself': if we consider that *wit* occupies the object position, then *i-* must be indexing the subject. This would be the only place where Chorote prefixal person marking displays some sensitivity to grammatical function in simple predicates, indexing subjects rather than objects when all else is equal.

3 A split in the marking of subjects

The pattern described above changes in the *montaraz* variety when the verb is suffixed with the prospective auxiliary *-hayi* (usually *-yi* after a vowel; *-(ha)yu* in the Manjui variety of Paraguay).[4] The argument on the (now complex) predicate is always marked in the inactive form, irrespective of the semantics of the lexical verb:[5]

(8) a. si-lak^{y}ehnayi'
si-lak^{y}an-hayi
1sg.INCT-play-PRSP
'I am going to play'

b. si-hwɪhl^{y}ehnayi'
si-hwihl$^{(y)}$an-hayi
1sg.INCT-dream-PRSP
'I am going to dream'

With transitive verbs in the prospective, while the argument that is marked on the complex predicate is that which is highest in the person hierarchy, the form that the prefix takes is always inactive (though see footnote 5), irrespective of whether it represents the object or the subject of the lexical verb. This can be seen clearly in the following comparison between the unmarked and the prospective forms.

(9)	*Unmarked*	*Prospective*
a.	a-lan 1ACT-kill 'I killed you/{him/her/it}.'	si-lahnayi' 1sg.INCT -kill.PRSP 'I am going to kill you/{him/her/it}.'
b.	si-lan 1sg.INCT-kill 'you/{he/she/it} killed me.'	si-lahnayi' 1sg.INCT-kill.PRSP 'you are/{he/she/it} is going to kill me.'

As one can see in these examples, the addition of the prospective results in a neutralization of the information on grammatical function that is expressed in the prefix: it is impossible to distinguish between *active* and *inactive* participants in the prospective. In summary, this is how all the prefixal person combinations in the singular do in the unmarked and in the prospective forms of the verb (we exclude impersonal here):

---

[4] In the *ribereño* or *iyojwa'(a)ja'* variety, things are very different: prospective is indicated through an invariable particle *ha* which precedes the verb (which takes irrealis morphology) and the negation morpheme, cf. ***ha*** *ke i-lyaki'n* (**PRSP** NEG 1ACT.IRR-play) 'I am going to play'.

[5] A potential exception is the impersonal, which does not distinguish between active and inactive forms, e.g. ***ti***-*lak^{y}en-a-hayi'* (IMPRS-play-IMPRS-PRSP) 'they (impersonal) are going to play'. In fact, impersonal prefixes could be regarded as active ones, since they coocur less frequently with inactive verbs and, with transitive ones, the impersonal prefix can only indicate the subject and never the object, e.g. *ti-lan-a-hayi'* (IMPRS-play-IMPRS-PRSP) 'they (impersonal) killed it/him/her'. In this sense, impersonal 'active' prefixes with prospective could be considered as an exception to the generalization stated in the text.

(10) *1 on 2/3*

a. a-lan
1ACT-kill
'I killed you/{him/her/it}'

b. si-lahnayi'
si-lan-hayi
1sg.ACT-kill-PRSP
'I am going to kill you/{him/her/it}'

(11) *2/3 on 1*

a. si-lan
1sg.INCT-kill
'you/{he/she/it} killed me'

b. si-lahnayi'
si-lan-hayi
1sg.ACT-kill-PRSP
'you are/{he is/she is/it is} going to kill me'

(12) *2 on 3*

a. hi-lan
1ACT-kill
'you killed him/her/it.'

b. in-lahnayi'
in-lan-hayi
2INCT-kill-PRSP
'you are going to kill him/her/it.'

(13) *3 on 2*

a. in-lan
2INCT-kill
'he/she/it killed you'

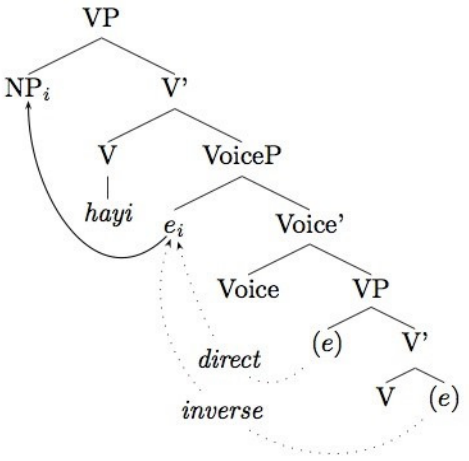
b. in-lahnayi'
in-lan-hayi
2INCT-kill-PRSP
'He is/she is/it is going to kill you'

3.1 Synopsis of our analysis

In this paper, we will argue that the prospective marker *-hayi* is a raising verb rather than an inflectional ending, and that the person prefix that surfaces on a predicate in the prospective corresponds to an argument that is raised, in the sense of Postal (1974), from the lexical verb's argument grid. Raising typically targets the subject of an embedded predicate, and hence our analysis implies that when the patient argument of a transitive verb is indexed in a prospective

construction, syntactic inversion has to have taken place in the embedded lexical verb, even if this is not revealed directly by inverse voice morphology. We may synopsize our analysis by means of the following tree, where the raising verb *-hayi* is lexically specified to assign inactive case to its specifier, whereas the lexical verb is stripped of the ability to assign any case.

(14) *-hayi* as a raising verb



Before we proceed to the central tenets of our analysis, we focus on a related point in our exploration: whether the person prefixes should be considered pronouns or agreement. Establishing this will allow us to fill in some of the technical details of our analysis, namely whether raising targets an actual pronominal prefix or a normally empty noun phrase, with which the predicate later agrees. Whether the person prefixes are pronouns manipulated by the syntax or agreement markers is not crucial to our analysis, but for the sake of concreteness we favor the idea that they are indeed pronouns.

4 Person prefixes as pronouns

The idea that person affixes may in certain languages be pronouns acting as arguments rather than agreement marks is first introduced to formal syntax by Jelinek (1984) as the "pronominal argument hypothesis", but the intuition is possibly much older. In this section, we give some evidence that person affixes in Chorote are pronominal. The evidence, though suggestive, is not conclusive. For this reason, when we present the raising analysis in Section 5, we discuss briefly how the analysis would have to be adapted were we to conclude that the prefixes are not pronominal.

Chorote is a strongly head-marking language where noun phrases and free pronominal forms are normally omitted, and clauses typically consist of only the predicate with its bound pronominal indices.

(15) (Y-em) a-'wen ('-am)
(1sg.POSS-PRON)[=I] 1ACT-see (2POSS-PRON)[=you]
'I see/saw you.'

What could be called free pronouns in the language are normal nouns. These free pronouns have internal structure, sharing a "pronominal root" *-am-* to which the various possessive personal indices and number markers are affixed:

(16) a. y-em
1sg.POSS-PRON
'I'

b. '-am
2POSS-PRON
'you'

c. hl-am
3POSS-PRON
'he/she/it'

Plural pronouns are marked with the plural suffixes that are used to pluralize possessors, rather than the nouns themselves: compare (17) and (18) to (19), where e.g. the suffix *-is* (the one that appears in (17c) *hl-am-is* 'they') indicates plurality of the possessor and not of the possessed noun. Nominal plurals usually have distinct suffixes, as *-l* in (19) illustrates, and the possessor plural is always on the outside of the nominal plural:

(17) a. **s**-am
1pl.POSS-PRON
'we'

b. **'**-am-**eɬ**
2POSS-PRON-2pl
'you (pl)'

c. **hl**-am-**is**
3POSS-PRON-PL
'they'

(18) a. **si**-'wet
1pl.POSS-place
'our place/home'

b. **'a**-'wet-**eɬ**
2POSS-place-2pl
'your (pl) place'

c. **hi**-'wet-**is**
3POSS-place-PL
'their place/home'

(19) **hi**-ts'e-l-**is**
3POSS-belly-PL-PL
'their bellies' (Gerzenstein 1983:98)

Pending a better understanding of the information structure status of independent pronouns in Chorote, we could compare the distribution of pronouns in this language to that of other pronominal argument languages, or even to the so-called *pro*-drop Romance languages (Jaeggli and Safir 1989) or Turkish (Kornfilt 1984).

Admittedly, this falls somewhat short of establishing that person indices on the predicate are in complementary distribution with full noun phrases or free forms of pronouns, which is the hallmark of a pronominal argument language. However, there are some hints that go in this direction. Complementary distribution between an NP (*tewak* 'river' in (20a)) and a pronominal marker (-*'a*- '2' in (20b)) does in fact obtain with applied/adpositional arguments:

(20) a. a-tahl-e **tewak-ih**.
1ACT-come.out-P **river-P**
'I obtained it from the river.'

b. a-tahl-e-**'a-yh**.
1ACT-come.out-P-**2-P**
'I obtained it from you.'

5 -*hayi* as a raising predicate

The -*hayi* seen in examples (9) et ss. above, repeated here as (21), encodes a meaning that might be translated as an imminent future, or, as we have put in the glosses, *prospective*.

(21)	*Unmarked*	*Prospective*
a.	a-lan	si-lahnayi'
	1ACT-kill	1sg.INCT-kill.PRSP
	'I killed you/{him/her/it}.'	'I am going to kill you/{him/her/it}.'
b.	si-lan	si-lahnayi'
	1sg.INCT-kill	1sg.INCT-kill.PRSP
	'you/{he/she/it} killed me.'	'{you are/he is/she is/it is} going to kill me.'

Prospective -*hayi* may act as a desiderative or intentional in Chorote and in sister languages. This can be seen clearly in the following data from Nivaclé (data from Seelwische 1975:190) and Maká (data from Gerzenstein 1994:110):

(22) a. ts'-iyαx-xayu
1INCT-drink-DESID
'I'm thirsty', i.e. 'I want to drink'. (Nivaclé)

b. ni-wapi-hiyu
3INCT-rest-DESID
'He/she wants to have a rest.' (Maká)

In Chorote, examples such as those in (8), repeated here as (23), admit desiderative readings side-by-side with the prospective given in the earlier glosses.[6]

(23) a. si-lak^{y}ehnayi'
si-lak^{y}an-hayi
1sg.INCT-play-PRSP
'I am going to play'
'I intend to play' (Chorote)

b. si-hwɪhl^{y}ehnayi'
si-hwihl$^{(y)}$an-hayi
1sg.INCT-dream-PRSP
'I am going to dream'
'I intend to dream' (Chorote)

However, there are also clear examples to show that *-hayi* cannot be only a desiderative in Chorote. In the following example *-hayi* occurs with a verb whose subject cannot be the experiencers of a desire: [7]

(24) In-tapo-yi-we
3INCT-be.full-PRSP-P
'It will be full' (e.g., a pail). (Chorote)

In fact, the contrast between the desiderative and the prospective meanings is accompanied in Nivaclé, though not in Chorote, by a difference in their morphosyntax, suggesting that we might be dealing with two homophonous but distinct markers. Consider the following data from Nivaclé:

(25) a. k'a-yαα
1ACT-drink
'I drink' (Nivaclé)

b. k'a-yαα xayu
1ACT-drink PRSP
'I am going to drink.' (Nivaclé)

If one compares (22a) with (25b), one sees that the case of the person prefix is the same as that which is selected by the lexical verb in the latter, but is always inactive in the former. Chorote, on the contrary, has generalized the inactive morphology to all constructions involving *-hayi*, whether they are desiderative or prospective.

[6] True "want to" constructions exist in Chorote, and they consist of a *want* verb taking a finite complement. The discussion about the exact meaning of the morpheme *-hayi* is only relevant to our argumentation insofar as it allows us to establish whether *-hayi* takes or not a volitional (e.g., thematic) subject.

[7] More subtly, one could think that any sentence where the person prefix in the construction corresponds to the object of the lexical verb, as in (10b) and (12b), would also pose difficulties to thinking of *-hayi* as always being desiderative.

5.1 The analysis

Our starting premise for analyzing the facts of the prospective/desiderative *-hayi* in Chorote is that a verb containing *-hayi* is a complex predicate. The suffix *-hayi* is difficult to classify as inflectional for at least two reasons: (a) Chorote lacks a tense paradigm to which *-hayi* could belong; while various other morphemes affect temporal, modal or aspectual interpretation, these seem to be enclitics to the verbal complex, rather than being in paradigmatic opposition with *-hayi*, which appears closer to the verb stem, before the applicative clitics and number markers; (b) *-hayi* seems semi-lexical insofar as it encodes both a temporal-aspectual sense and a desiderative. On the other hand, it is also implausible to classify *-hayi* as a derivational affix, as it comes outside at least one plausibly inflectional affix, i.e., the *-a(h)* exponent of the impersonal/first person plural, seen in (6), and follows any causative and antipassive suffixes. For these reasons, we suggest that *-hayi* is a secondary verbal stem that merges morphologically with the lexical verb.

The fact that predicates with *-hayi* take the *in-*/*n-* third person inactive intransitive prefix (see (7b)) suggests that the construction is intransitive. However, a second argument of the lexical verb may still be expressed by a non-prefixal exponent, as the impersonal suffix *-a* (not subject to person hierarchy) in the following example shows. Such a combination of a personal prefix and an impersonal suffix is impossible with simplex intransitive predicates.

(26) a. in-'wen-**a**-hayi'
2INCT-see-IMPRS-PRSP
'they (IMPRS) will see you.'

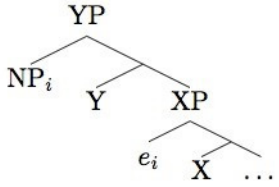
b. *hi-lak^{y}en-a
2ACT-play-IMPRS

The only plausible way to resolve this apparent paradox is by accepting that the construction is complex, consisting of a transitive lexical verb plus an intransitive prospective. In this complex predicate, arguments are "shared" between the prospective/desiderative and the lexical verb, much as they are in clauses with verbs that take infinitival complements in more familiar languages, where the subject argument is only expressed in the finite matrix clause:

(27) a. I want to eat.
b. Je veux partir.

Schematically, we may express this situation by means of the following structure:

(28) Complex predicate



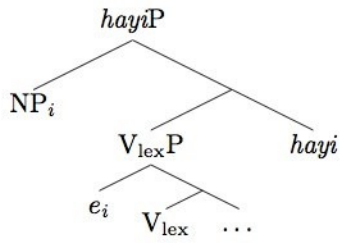
The elements X and Y represent the two parts of the complex predicate. In the case at hand, X would correspond to the lexical verb, while Y corresponds to the prospective/desiderative. The subject argument is represented by the empty position with the index *i*, while the other arguments

of the verb are left out (indicated as …). "Sharing" the subject here is interpreted as having one of the subjects be empty (*e*), but coindexed with the expressed subject NP. Whether the subject that is pronounced is the one corresponding to the lower or the higher predicate is an empirical question that might be answered differently in each particular case (e.g., much as there exists "backward control", as in Polinsky and Potsdam 2002, we could expect to find "un-raising" constructions where the higher predicate fails to attract the shared argument).

In languages that are verb-medial, it is easy to see that the expressed subject in complex constructions such as (27a) and (27b) belongs to the finite verb in the matrix clause. In addition to the position of the subject in the clause, one sees this in the agreement displayed by the verbal forms, and in the nominative case that the subject takes, which, in English and French, is associated with subjects of finite verbs.

In a language such as Chorote, where complex predicates follow a head-final order and the person markers are prefixes, the order of the elements in the complex predicate will not by itself tell us much about which predicate the overt person prefix is associated with. However, we observed above that the prospective/desiderative is associated with inactive person markers. We can extend the reasoning about nominative being associated with finite verbs in English and French to argue that the invariably inactive person prefix that is expressed in the complex predicate is associated with the higher part, i.e. the prospective. Summing this up, we have the following structure, with -*hayi* being its own predicate, and the clause headed by the lexical verb being the complement of -*hayi*:

(29) -*hayi* and the lexical verb as a complex predicate



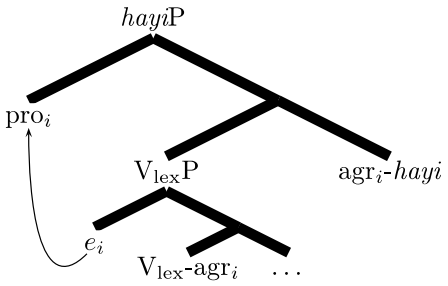
More specifically, we believe that the Chorote prospective is what Postal (1974) calls a raising construction.

If this analysis is right, there follows an important consequence for how we conceive person inflection in Chorote and in other languages where it is determined by the person hierarchy. While in raising constructions in languages such as English and French it is always the subject that raises, in Chorote, in light of data such as (11b) and (13b), it is the argument that is highest in the person hierarchy that will raise. We believe that this can only happen if inversion is triggered in the lexical verb whenever the arrangements of arguments in the direct voice is such that the object is higher in the person hierarchy than the subject. In other words, what argument is expressed as a person prefix in the Chorote verb is not simply an artifact of morphology. Chorote person prefixes always correspond to *grammatical subjects*. When the prefix corresponds to an object of a transitive verb, it is because the verb has undergone inversion. This inversion is not indicated in the morphology in Chorote, but may be seen in the fact that it is always the argument that is indexed on the verb that will raise to the subject position of a higher predicate.

In Section 4 we promised the reader an alternative account in case we were forced to consider the person prefixes of Chorote to be agreement rather than referential (pronominal) elements. There are two alternatives to deal with this, but that which is closest to the analysis that we sketch above

is one where one simply considers overt noun phrases and pronouns to be argumental. When they are present, it is they that are raised. When absent, what is raised is a phonologically empty argument. Predicates agree locally, as expected, therefore a complex predicate with *-hayi* will agree in person with the noun phrase that has raised, whereas the lexical verb may agree in number (plus the impersonal suffix). This is essentially Baker's (1996) revision to Jelinek's pronominal argument hypothesis. The following structure represents the case where there is no overt noun phrase:

(30)



This does not exhaust the possibilities, but we consider any further discussion along these lines to be beside the point, as whatever analysis is chosen will have to deal with similar locality issues with agreement, which we may summarize as follows: (a) *-hayi* is the main agreeing element; we know this because it determines that agreement has to be *inactive*; (b) agreement is with whichever of the two arguments of the lexical verb wins in the person hierarchy. Therefore, any formal analysis of the phenomenon will have to include a device to make the winning argument more local to *-hayi*. The device that we have chosen is raising plus inverse voice where required. The raising part may be substituted by an equivalent operation that does not require movement (i.e., downard Agree, as described in Chomsky 1998). The part about inverse voice, however, is an inescapable component of any analysis.

In a purely morphological approach, the syntactic pivot in a clause such as (31) would still be 2sg. The fact that the verb agrees with the object because of the person hierarchy is simply a consequence of a superficial operation of person feature deletion.[8]

(31) ('-am) si-'wen
(2POSS-PRON) 1INCT-see
'you see/saw me'

If this is so, one would expect that in a raising construction the second person pivot would raise to become the syntactic subject of the higher predicate. As we discussed above, this is not what happens in Chorote:[9]

[8] As an example of such an approach, we quote the following from Nevins and Sandalo (2010:361): "We assume that 1st person agreement nodes are created in the syntax, but disappear in the specific context of co-occurring within the same complex morphological word as a 2nd person. Thus, the absence of 1st person prefixes in the presence of 2nd person prefixes must be determined *postsyntactically*, within a local domain."

[9] However, forms such as *in-'wehnayi sa'am* (3INCT-see.PRSP 1pl.POSS-PRON) meaning '(S)he intends/is going to see us' were sporadically documented in elicitation sessions with a young speaker from Misión La Paz.

(32) in-'wehnayi'
in-'wen-hayi
2INCT-see-PRSP
'you are going to see me', #'I am going to see you';
OK as 'he is going to see you', 'you are going to see him'

This is our main reason to claim that a syntactic approach is preferable for Chorote. Ideally, we should be able to find other syntactic behavior where there is evidence that the element with which the verb agrees has become the syntactic pivot. Such evidence in independent clauses is in fact hard to come by, and so far inconclusive. Referent tracking in clause coordination, for instance, seems not to be subject to syntactic constraints in Chorote. Thus, a sentence such as (33) is ambiguous:

(33) *Juan*y-eh na *Pedro*, y-em.
Juan 3ACT-beat DEM Pedro 3ACT-go.away
'Juan beat Pedro and (Juan/Pedro) left.'

Thus this diagnostic tells us little regarding what participant is the syntactic pivot. Furthermore, if a first or second person participant is present (i.e., in any interesting example as far as the person hierarchy is concerned), the indices on the predicates will do the participant tracking. Something similar occurs with control of subjects of adjunct clauses. All adjunct clauses are finite, and therefore person marks will be present, precluding any potential ambiguities.

6 Conclusions

In this paper, we have argued for a structural analysis of person marking facts in the prospective construction of Chorote. We claim that an explanation to these facts, and in particular the inactive marking of both participants in the prospective, can easily be found if we consider the prospective marker *-hayi* to be a raising verb. This analysis contraposes itself to a strictly morphological one, in that it requires syntactic inversion to take place in the lexical verb, and leads us to expect other syntactic correlates to the agreement pattern. Though evidence for these correlates is still inconclusive, an argument may be made for the syntactic nature of the agreement facts from the prospective construction itself, as compared to similar constructions in other languages.

More broadly, we hope that this paper shows the value of structural analysis to unveil the motivations behind patterns of argument tracking, as opposed to functionally-motivated generalizations. Though not explicitly discussed in the paper for reasons of space, the phenomenon presented exhibits a pattern of "split" person marking that lies beyond the most well-known functional discussions of split-S, and that would require some gymnastics to explain in such a framework.

References

Baker, M. (1996). *The polysynthesis parameter.* Oxford University Press.

Béjar, S., & Rezac, M. (2009). Cyclic Agree. *Linguistic Inquiry* 40(1):35–73.

Chomsky, N. (1998). Minimalist Inquiries: the Framework. *MIT Occasional Papers in Linguistics* 15. Cambridge: MIT Press.

Coon, J. (2012). TAM Split Ergativity. At http://ling.auf.net/lingbuzz/001457.

Dixon, R.M.W. (1994). *Ergativity.* Cambridge: Cambridge Unversity Press.

Gerzenstein, A. (1983). *Lengua chorote. Variedad 2*. Buenos Aires: Instituto de Lingüística, Facultad de Filosofía y Letras, Universidad de Buenos Aires.

Gerzenstein, A. (1994). *Lengua Maká. Estudio descriptivo*. Buenos Aires: Instituto de Lingüística, Facultad de Filosofía y Letras, Universidad de Buenos Aires.

Gildea, S. (2004). Are There Universal Cognitive Motivations for Ergativity? In F. Queixalós (Ed.) *L'ergativité en Amazonie*, vol. 2, 1–37. Brasília: CNRS, IRD and LALI. At http://celia.cnrs.fr/FichExt/Documents de travail/Ergativite/2dGildea.htm.

Jaeggli, O. and K. Safir. (1989). The Null Subject Parameter and Parametric Theory. In O. Jaeggli & K. Safir (Eds.) *The Null Subject Parameter*, 185–214. Dordrecht: Kluwer.

Jelinek, É. (1984). Empty Categories, Case, and Configurationality. *Natural Language and Linguistic Theory* 2:39–76.

Junker, M.-O. (2011). Debunking the I above You Illusion: You and I and the Universal Person Hierarchy. *LIAMES* 11:25–50.

Kornfilt, J. (1984). *Case Marking, Agreement, and Empty Categories in Turkish*. Ph.D. dissertation, Harvard University.

Nash, L. (1995). *Portée argumentale et marquage casuel dans les langues SOV et dans les langues ergatives : l'exemple du géorgien*. Doctoral dissertation, Paris 8.

Nevins, A. and F. Sandalo. (2010). Markedness and Morphotactics in Kadiwéu [+participant] Agreement. *Morphology* 21:351–378.

Ormazábal, J. and J. Romero. (2007). The Object Agreement Constraint. *Natural Language and Linguistic Theory* 25:315–347.

Polinsky, M. and E. Potsdam. (2002). Backward Control. *Linguistic Inquiry* 33.2:245–282.

Postal, P. (1974). *On Raising*. Cambridge: MIT Press.

Rhodes, R. (1994). Valency, inversion, and thematic alignment in Ojibwe. In Susan Gahl, Chris Johnson, and Andy Dolbey (Eds.), *Proceedings of the Twentieth Annual Meeting of the Berkeley Linguistics Society*, 431–446. Berkeley: University of California, Berkeley Linguistics Society.

Rivero, M. L. (2008). Oblique Subjects and Person Restrictions in Spanish: a Morphological Approach. In R. D'Alessandro, S. Fischer, & G. H. Hrafnbjargarson, *Agreement Restrictions* (Eds.), 215–250. Mouton de Gruyter.

Seelwische; J. (1975). *Na Lhasinônash napi Nivacle – Gramática nivaclé*. Asunción.

Silverstein, M. (1976 [1986]). Hierarchy of Features and Ergativity. In R.M.W. Dixon (Ed.) *Grammatical Categories in Australian Languages*, 112–171. Reprinted in P. Muysken &nd H. van Riemsdijk *Features and projections* (Eds.), 163–232. Dordrecht: Foris.

The instrument linker *iiht-/oht-* in Blackfoot as a functional *p*[*]

Kyumin Kim
University of Calgary

Abstract: This paper demonstrates that an instrument linker in Blackfoot, which introduces a non-core argument, cannot be represented by the Applicative head (Appl). Although the applicative morpheme, realized as Appl, is well-known to introduce a non-core argument across many languages, including Blackfoot, the linker is shown to have a different syntactic distribution from that of applicative morphemes. It is argued that the linker is represented by a functional head *p*. This paper also shows that the syntax of linkers in the language is not coherent: for instance, the instrument linker may occupy a different structural position, depending on its meaning. Thus, the syntax of non-core arguments is more heterogeneous than previously proposed in the literature.

Keywords: (instrument) linker, functional, non-core argument

1 Introduction

In Blackfoot, an Algonquian language, there are set of prefixes called linkers that mark a range of oblique roles which are usually indicated by prepositions in English (Frantz 2009). Those arguments that are oblique are often referred to as non-core arguments in the verbal argument structure literature (e.g., Baker 1988, Kim 2012, Marantz 1993, Pylkkänen 2008, among others).[1] Among the linkers, this paper focuses on the syntax of an instrument linker that marks a wide range of non-core arguments such as instrument, means, source, contents, and path (Frantz 2009). I have also found that it can mark cause/reason. As illustrated in (1), the instrument linker *iiht- (oht-* in a non initial position) can optionally add a non-core argument of instrument/means (1a) or cause/reason (1b). I assume that the linkers are adpositional, following Kim (2014a).

[*]I would like to thank Sandra Many Feathers (formerly Crazybull) and Brent Prairie Chicken for sharing their language with me, and Betsy Ritter for her support and valuable comments. Of course, all errors are my own. Significant amount of time has passed since I presented this work, and this paper somewhat diverges from the materials presented at WSCLA 18. Similar issues but a significantly expanded version of them has been presented at NELS 44. This research is supported by the Social Science and Humanities Research Council (SSHRC) of Canada Postdoctoral fellowship to the author (#756-2012-0483). Additional support comes from the Jacobs Research Fund and the Philips Fund for Native American Research. Unless otherwise noted, all data presented in this paper are from my own fieldwork. The data presented come from the Kainai (Blood) dialect. The following abbreviations are used in the paper: 1/2/3 – 1st/2nd/3rd person; APPL – applicative morpheme; AI – intransitive animate; AN – animate; DIR – direct object theme; DEM – demonstrative; DIRECTION – direction linker; IN – inanimate; INST – instrument linker; INV – inverse theme; PL – plural; S – singular; TA – transitive animate; TI – transitive inanimate.
Contact info: kyumin.kim2012@gmail.com

[1] A linker-type morpheme is called the relative root in the Algonquian literature (e.g., Rhodes 2010), but I use linker in this paper.

(1) a. *iihtawayaakiaawa miistsii*

iiht-waawayaaki-aa-wa	miistsisi
INST-hit.TA-DIR-3S	stick

'He was hit **by** a stick.' (Frantz 2009)

b. *ana isttoan nohta'kai'taki*

ana	isttoana	nit-**oht**-a'ka-i'taki
DEM	knife	1-**INST**-hate-AI

'I have hatred **because of** the knife.' (i.e., 'I hate the knife.')

In this paper, I show how the instrument linker is different from another non-core argument introducer, an applicative morpheme in the language which patterns similarly to those in other languages. I argue that the linker cannot be represented as Appl as in Pylkkänen (2008), despite similar roles to those of Appl that the linker introduces. I also argue that it is represented as a functional *p*, rather than a lexical P. It will be argued that the linker phrase is a functional *p*P that adjoins to *v*P. I also argue that the linker can appear in different syntactic positions, depending on the kind of meaning it indicates. As will be argued in this paper, it appears as a *v*P adjunction when it indicates means or reason. On the other hand, it appears in the specifier of I(nner)-AspP (in the sense of Travis 2010) when it indicates a path meaning appearing with motion verbs, which has also been argued for the direction linker (*itap-*) in the language (Kim 2013, 2014b).

This paper shows that, building on Blackfoot data, not all non-core arguments are syntactically represented in the same way, and that they are not always introduced by an Appl head. Moreover, it shows that a non-core argument introduced by the same linker may not be in the same structural position. Thus, the proposed account shows that the syntax of non-core arguments are more refined than current theories suggest (e.g., Baker 1988; Pylkkänen 2008).

2 Instrument linker is not an applicative head

The instrument linker is similar to the applicative morpheme in world languages, e.g. Bantu, in that it introduces a wide range of oblique roles, as some of which are illustrated in (1). However, I show that it is not syntactically the same as an applicative morpheme by comparing the linker to the applicative suffix *-omo* in the language. I assume that the applicative suffix is represented by Appl in the sense of Pylkkänen (2008), as suggested in Bliss (2010). I discuss five different properties of the linker that differ from those of the applicative suffix: morphology, the absence of person prefix marking, animacy, theme marking, and agreement. Other linkers such as associative or direction have been shown to behave in the same way as the instrument linker with respect to these properties (Kim 2013).

The linker is a prefix as shown in (1), while the applicative morpheme is a suffix *-omo* as shown in (2). This morphological difference initially suggests that they cannot not belong to the same element.

(2) *nitsskiitomok napayin ana John*

nit-ihkiit-**omo**-ok-wa	napayin	ana	John
1-bake-**APPL.TA**-DIR-3S	bread	DEM	John

'John baked bread **for** me.'

The linker also differs from the applicative suffix in that it cannot be marked by a person prefix, *nit-* or *kit-*. In (2), a beneficiary is indicated by the person prefix *nit-*. In contrast, the object of the

instrument linker cannot be expressed by the person prefix, as the ungrammaticality of (3a) shows. A grammatical version of (3a) is shown in (3b), where the argument introduced by the linker must appear as an independent pronoun.

(3) a. **ana John nohta'kai'taki*

ana John **nit**-oht-a'ka-i'taki-wa
DEM John **1**-INST-hate-AI-3S
Intended: 'John hates me.'

b. *ana John iihta'kai'taki niistoo*

ana John iiht-a'ka-i'taki-wa **niistowa**
DEM John INST-hate-AI-3S **I**
'John hates me.'

Animacy plays a significant role in Blackfoot. For instance, core arguments, such as actor or primary object, show sensitivity to animacy (Frantz 2009). More specifically, those arguments must be sentient (Bliss 2010, Kim 2014c, Ritter and Rosen 2010); the beneficiary cannot be an inanimate entity such as 'the wagon', as illustrated in (4).

(4) **nitaahkanomoawa anni ainaka'si qamiksi si'kaaniksi*

nit-(w)aahkan-omo-a-wa	ani	ainaka'si	am-iksi	si'kaan-iksi
1-sew-APPL.TA-DIR-3S	DEM	wagon.AN	DEM-INA.PL	blanket.INA.PL

Intended: 'I sewed those blankets for the wagon.' (Adapted from Bliss 2010)

However, non-core arguments of linkers do not show any animacy restrictions. That is, they can be a sentient animate 'John', a grammatically animate 'the knife', or an inanimate 'the soup', as exemplified in (5).

(5) *ana John/ni koopis/ni isttoana nohtaawaakomi'taki*

ana	John	/ ani	koopis	/ ani	isttoana	nit-oht-aawaakom-i'taki
DEM	John.**AN**	/ DEM	soup.**INA**	/ DEM	knife.**AN**	1-INST-love-AI

Lit. 'I am in love, **by means of John/the soup/the knife**.' ('I love John/the soup/the knife.')

Theme marking in Blackfoot, like other Algonquian languages, indicates the direction of the action. Like animacy, it indicates the direction of action between core-arguments. Direct-inverse systems make reference to a person scale such as that shown in (6), which is simplified for the purpose of this paper. If the direction of action is from a 1st/2nd person to a 3rd person, or from 1st person to 2nd person, the verb is marked as being direct. If the direction is the opposite, such as a 3rd person to a 1st/2nd person or from 2nd person to 1st, then the verb is marked as being inverse. For instance, in (2) above, the 3rd person subject 'John' acts on the 1st person beneficiary 'me'; as a consequence, the inverse marker *-ok* appears.

(6) Simplified scale

a. 1st, 2nd > 3rd b. 1st > 2nd

However, non-core arguments of the instrument linker are inert to theme marking. For instance, in (7), 'the finger' is introduced by the instrument linker *iiht-*. The intended direction of the action is from 'the finger' to the first person 'I' as might be marked by the inverse marker *-ok* in (7).

However, the sentence is ungrammatical with this interpretation. An acceptable interpretation of the sentence is 'Someone caught me by the finger', where the direction of action is from an unknown 3rd person to the 1st person, marked with the inverse marker *-ok*.

(7) *na mookitsis nohtsissino'tokwa*
ana mookitsis nit-**oht**-yissino'to-**ok**-wa
DEM finger.AN 1-**INST**-catch.TA-**INV**-3S
'The finger caught me.' (3 > 1)
'Someone caught me by the finger.' (3 > 1)

Lastly, the linker is also different from the applicative suffix in that it cannot be marked for agreement. In (8), the beneficiary is in the singular and agrees with the verb, as the 3rd person singular suffix shows.

(8) *nitaahkanomoawa anna issitsimaan amiksi si'kaaniksi*
nit-(w)aahkan-omo-a-**wa**/*-yi **ana** **issitsimaan** am-iksi si'kaan-iksi
1-sew-APPL.TA-DIR-**3S**/*-3PL **DEM** **baby** DEM-PL blanket-PL
'I sewed those blankets **for the baby**.' (Bliss 2010)

With respect to the argument introduced by the linker, as shown in (9), it does not agree with the verb. In (9b), for instance, 'those arrows' is introduced by the linker, and it is plural. However, the verb agrees with the object in the singular, as the singular suffix *-wa* shows.

(9) a. *nohtsissino'taya niksi saahkomaapiiksi ni apssi*
nit-oht-yissino'to-a-yi an-iksi saahkomaapi-iksi ani apssi
1-inst-catch.**TA**-DIR-3PL DEM-PL boy.AN-PL DEM arrow.IN
'I caught the boys by means of the arrow.'

b. *nohtsissino'tawa na saahkomaapi nistsi apssistsi*
nit-oht-yissino'to-a-wa ana saahkomaapi an-istsi apssi-istsi
1-inst-catch.TA-DIR-3S DEM boy.AN DEM-PL arrow.IN-PL
'I caught the boy by means of the arrows.'

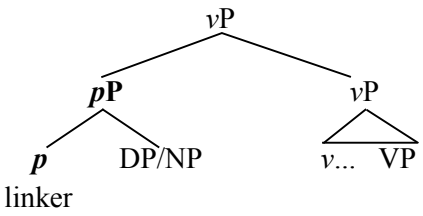
The data discussed in this section strongly indicate that the instrument linker cannot be represented by Appl. Otherwise, the differences between the linker and Appl remain unexplained.

3 Instrument linker as a functional *p*

There are a variety of studies that propose a functional head above P (e.g., Van Riemsdijk 1990, Zeller 2001, among many others). The name I give for this functional head is *p*, following Svenonious (2003), and I argue that a linker is a realization of this functional *p*, shown in (10). Evidence for this proposal will be detailed in next sections. Throughout the paper, I use *p* to refer to a functional adposition which has been termed with various labels in different studies (e.g. F in Zeller 2001), and I use P for a lexical adposition.

The previous discussion demonstrates that a linker cannot be represented by Appl, although it introduces non-core arguments. Abstracting away from the issues of discontinuity,[2] I argue that linkers are syntactically represented by a functional *p*, and at some point in the derivation they are adjoined to a functional phrase, *v*P, rather than to a lexical phrase, VP, as represented in (10). On the other hand, they are not the same as lexical Ps (i.e. non-linkers) in the language, as shown in the previous section. The fact that a linker can introduce either a DP or an NP will be pointed out as the section unfolds.

(10) a.



b. *iihtawayaakiaawa miistsii*
iiht-waawayaaki-aa-wa **miistsisi**
INST-hit.TA-DIR-3S **stick**
'He was hit **by a stick**.'

3.1 Instrument linker as a p

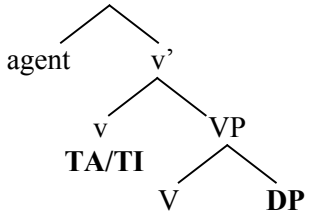
I present evidence for the functional status of the instrument linker. Some of the evidence presented in this section is from Kim (2013; 2014a,b), where linkers in general are argued to be functional in contrast to non-linkers.

One type of evidence comes from Zeller's (2001) claim that a functional *p* has a functional feature similar to *v* or *n*; in particular, in Germanic languages, a *p* head has been proposed to allow a lexical P to assign case to its complement (Svenonius 2003, Zeller 2001). Although Blackfoot does not have case, I argue that the instrument linker has functional properties like *v*, in that it licenses an argument in a manner similar to *v* in the language. In Blackfoot, *v* licenses an argument but not by assigning case, unlike other familiar languages of the world (Ritter and Rosen 2010). Ritter and Rosen (2010) showed that the functional head *v* in Blackfoot is realized by the final morphemes. In particular, the head *v* that is realized by the TA, TI, or AI finals introduces an agent, as illustrated in (11). Crucial to the present discussion is that *v* licenses a DP or an NP object. A transitive *v* realized by the TA or TI finals licenses a DP object (11a), while an intransitive *v* realized by the AI final licenses an NP object complement (11b).[3]

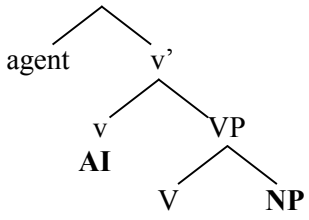
[2] Discontinuous constituents are characteristic of Algonquian languages (e.g., Reinholtz 1999). As shown through the examples on the linkers in this paper, a linker and its object are also discontinuous. Moreover, the proposed account in (10) suggests that the linker phrase, *p*P, is also discontinuous from a lexical PP, a non-linker phrase; however, unlike discontinuous DPs often discussed in the literature where D can appear with an NP, the discontinuous *p*Ps do not seem to appear with a PP in the first place. As shown by examples provided in this paper, linkers do not have to appear with PPs, and vice versa. I leave this issue for further research.

[3] Specifically, it is proposed that an NP object, unlike a DP object, is licensed by being incorporated into *v* covertly (Glougie 2000).

(11) a.



b.



In Blackfoot, it has been shown that an NP consists of a bare N, while a DP consists of either a demonstrative and an NP or of a bare plural (Glougie 2000). For example, in (12a), a TA verb licenses a DP object consisting of a demonstrative and an N, but not an NP consisting of a bare N. With an AI verb, as in (12b), an NP object is possible but not a DP object.

(12) a. *naowatsiw *(amo) mamii*

na-oow-at-yii-wa	amo	mamii
PAST-eat-TA-DIR-3S	DEM	fish.AN

'S/he ate this fish.'

b. *naoyiw (*amo) mamii/akoopis*

na-ooy-i-wa	(mamii/akoopis)
PAST-eat-AI-3S	(fish/soup)

'S/he ate (fish/soup).' (Ritter and Rosen 2010)

Thus, the functional head *v* in Blackfoot licenses an object complement: the TA/TI-final *v* a DP, but the AI-final *v* an NP. That is, the licensing of an argument is not mediated by case in Blackfoot, but the capacity to introduce a DP or NP can be viewed as licensing an argument.

I argue that this ability is exactly what the instrument linker has: The linker is like the Blackfoot *v* in that it can introduce an argument. In particular, similar to *v* (11), it introduces either a DP or an NP complement, as shown throughout this paper. As in (13), the instrument linker may introduce either an NP made up of a bare N or a DP made up of a demonstrative and an N.

(13) *(ana) mamii nohta'kai'taki*

(ana)	**mamii**	nit-**oht**-a'ka-i'taki-wa
(DEM)	**fish**	1-**INST**-hate-AI-3S

Lit. 'I have hatred **because of (a/the) fish**.' (i.e., 'I hate a/the fish.')

In contrast, non-linkers in the language lack this functional property. Non-linkers are similar to linkers in that they are prefixes attached to verb stems, and indicate prepositional meanings (Frantz 2009). Importantly, they differ from linkers because they cannot introduce either DP or NP complements, as shown by *waamis-* 'up' in (14).

(14) *nitaamisokska'si (*ni isspahkoyi)*

nit-waamis-okska'si	(*ani	isspahkoyi)
1-up-run.AI	(*DEM	hill)

'I ran up (*the hill).'

The similarity between *v* and the linker (examples (11) and (13) respectively) supports the proposal that the linker is functional, like *v*. Moreover, the contrast between a linker (13) and a non-

linker (14) provides additional evidence that a non-linker is not functional. For now, I assume that there is no PP projection between a linker and its complement, similar to the functional (adpositional) projection in German discussed in Zeller (2001).[4]

Another piece of supporting evidence is based on Baker's (2003) proposal that a functional element cannot be the input or output of derivational morphological processes.[5] I show that the instrument linker, in contrast to non-linkers in the language, does not participate in derivational morphological processes. Non-linkers are prefixes like linkers, as shown in (14), but they can be separated from the verb by being attached to a locative suffix. Some of them are illustrated below:

(15) a. *aamisoohtsi*	b. *ipsstoohtsi*
waamis-oohtsi	ipsst-oohtsi
up-place	in-place
'upper place' (e.g. upstairs)	'indoor'

My fieldwork reveals that the locative morpheme *-oohtsi* in Blackfoot can be suffixed to non-linker productively, and derives a noun; a typical property of derivational morphemes. For example, (15a) 'upstairs' can appear with a demonstrative in the language, as shown in (16).

(16) *nitsitapokska'si ni aamisoohtsi*

nit-itap-okska'si	ani	waamis-oohtsi
1-DIRECTION-ran.AI	DEM	upstairs-place

'I ran to upstairs.'

The fact that the demonstrative can appear with the derived word *waamis-oohtsi* 'upstairs' indicates that the derived word is a noun, as in Blackfoot the demonstrative can only appear with a noun. Thus, it seems safe to conclude that the morpheme *-oohtsi* is a derivational morpheme. This conclusion is also consistent with the Blackfoot Dictionary (Frantz and Russell 1995). In the dictionary, there are some examples of non-linker combining with the morpheme *-oohtsi*. Importantly, they are marked as nouns, as the examples in (17) show. The derived word in (17a) is the result of the combination of the non-linker (17b) and the locative suffix *-oohtsi*. In (17a), the label *nin* indicates that the derived word is an inanimate *noun*. Also, note (17c) where the derived noun *saipa'-oohtsi* is preceded by a demonstrative *amo* 'this'.

(17) a. saipa'-oohtsi 'the area beyond a boundary or limit.' ***nin***
b. saipa' : outside of a certain boundary
c. **amo saipa'-oohtsi** iikayissta'piiwa
'It gets noisy **beyond our boundary**.' (Frantz and Russell 1995)

On the other hand, the instrument linker cannot participate in this derivational process, as shown in (18). The possible meaning of the ungrammatical derivation in (18) is not indicated, as a

[4] It may be the case that there is a null P below *p*. Alternatively, a linker is realized under the null P and incorporates into *p*. I have no evidence favoring either of these proposals over the other. Lacking such evidence, I assume the simpler structure proposed in (10).

[5] Another form of evidence used in Baker (2003) is the cross-linguistic pattern of incorporation. This is hard to test in Blackfoot, so I do not discuss this type of evidence.

potential plausible meaning is unclear. Nevertheless, the example in (18) demonstrates that the linker does not behave like non-linkers with respect to the locative morpheme *-oohtsi*.

(18) **iihtoohtsi*
iiht-oohtsi
INST-place

The fact that the linker cannot participate in the derivational process suggests that they are not lexical, but functional. Another emerging conclusion seems to be that non-linkers in the language belong to lexical P, as they can participate in this derivational process. This is consistent with the fact that it cannot introduce an argument, in contrast with the linker.

In sum, the data discussed in this section provides solid evidence for the proposed analysis that the instrument linker belongs to a functional category, unlike lexical Ps (i.e. non-linkers) in the language.[6]

3.2 Instrument linker as an adjunction to *v*P

I have so far shown that the instrument linker is a functional element. The next question is where it adjoins; I argue that it adjoins to *v*P. In this subsection, I first show that the linker phrase appears above I(nner)-AspP, the lowest functional phrase in Blackfoot phrase structure that appears between *v*P and VP (see (19) or (22) below), and then show that it adjoins to *v*P above I-AspP, rather than to IP.

Abstract nominalization in Blackfoot shows that a linker phrase must appear above I-AspP. Abstract nominalization is one of the several nominalization types available in the language and is morphologically marked with *-n* or *-hsin* (Frantz 2009). The first variant attaches to stems ending in *-aa*. The second allomorph appears elsewhere. Abstract nominalization indicates either the state or process described by the verb (Frantz 2009).

In a recent study on abstract nominalization in this language (Ritter 2014a), it has been shown that the source of the nominalization is I-Asp (in the sense of Travis 2010), located between *v*P and VP, as represented in (19).[7]

(19) $[_{vP}$ V $[_{I\text{-}AspP}$ **I-Asp** $[_{VP}$ V $]]$

The proposal that abstract nominalization targets I-Asp (19) predicts that an element outside I-Asp cannot undergo abstract nominalization, while an element inside I-Asp can. In particular, regarding the linker, the prediction is that it should not undergo abstract nominalization if it appears outside I-Asp.

This is what is exactly attested in Blackfoot. The instrument linker is ungrammatical with abstract nominalization, as shown in (20).[8]

---

[6] Kim (2013b) provides more evidence from idioms for the same conclusion.

[7] I-Asp in Blackfoot, unlike temporal languages where it marks a telic or atelic distinction, appears to mark an animacy distinction (Ritter 2014b ms, Kim 2014b). For instance, it has shown in Kim (2014b) that an event can have an endpoint expressed by a direction linker (*itap-*) only if the subject is semantically animate, e.g., 'The boy will go to the river' is grammatical in Blackfoot, but the Blackfoot counterpart of 'The wagon will go to the river' is ungrammatical, as the subject is inanimate. See (26) for examples.

[8] A similar range of data regarding abstract nominalization is shown in Bliss, Ritter, and Wiltschko (to appear) with a locative linker *it-*.

(20) ***iihta'kai'takihsin***
iiht-a'ka-i'taki-**hsin**
INST-hate-AI-**NOM**
Intended: 'Hating (someone/something).'

The ungrammaticality suggests that the linker attaches to a phrase higher than I-AspP. Lexical Ps (non-linkers) contrast with the linkers in (20) in this respect. They are grammatical with abstract nominalization, as shown in (21). This grammaticality suggests that P, a non-linker, attaches to a phrase inside I-Asp, contrary to the linkers. I assume that it appears inside VP, following Kim (2014a).

(21) a. *aamisokska'ssini*
waamis-okska'si-hsin
up-run.AI-NOM
'Running up.'

b. *iihkitopiihsin*
iihkit-opii-hsin
on-sit.AI-NOM
'Sitting on.'

Evidence from abstract nominalization indicates that linkers appear above I-AspP in contrast to non-linkers, which appear below I-Asp. A remaining question is the position of the linkers above I-AspP. I show evidence that a linker phrase is an adjunct to *v*P, as proposed in (10).

Assuming the phrase structure for Blackfoot illustrated in (22) (Bliss 2010, Ritter and Rosen 2010, Ritter and Wiltschko 2009, in press) where irrelevant phrases are not presented, there are two potential adjunction site for the linkers: IP and *v*P, both of which appear above I-AspP. In (22), a final morpheme is realized as *v*.

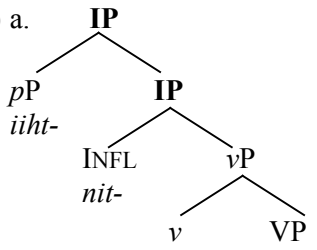
(22) [$_{IP}$ INFL [[$_{vP/ApplP}$ v/Appl [$_{I\text{-}AspP}$ I-Asp [V (DP)]]]]] – *person/number*[9]
PERSON Final/Ben
(1st/2nd prefix)

1st and 2nd person prefixes have been argued to be realized under INFL as in (22) (Ritter and Wiltschko 2009, in press), as mentioned earlier; this needs some explanation. Ritter and Wiltschko argue that Blackfoot grammar is organized in terms of participants, not tense. Blackfoot lacks evidence of temporal organization in the grammar: there is no dedicated morphological present or past tense marker, and no evidence of telicity (Kim 2014c, Louie 2008, Ritter and Rosen 2010). Under the hypothesis in which languages can vary with respect to which grammatical features, such as tense or person, are associated with functional categories,[10] Ritter and Wiltschko (in press) argue that in Blackfoot the content of INFL is PERSON rather than tense.[11] Crucial to the current discussion, they show that person prefix markings in Blackfoot are functionally equivalent to tense in other languages (for details see Ritter and Wiltschko 2009, in press), and as such, the person prefixes are realized under INFL.

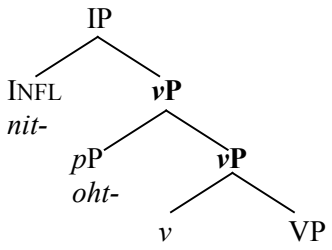
[9] PERSON in the prefixal position and *person* in the suffixal position cannot be treated in the same way (Ritter and Wiltschko 2009). The suffixal morphemes realized as *person* are the regular form of (object) agreement, unlike PERSON under INFL. See Ritter and Wiltschko (2009) for evidence. I assume this distinction as well.
[10] This is the essence of the Parametric Substantiation Hypothesis in Ritter and Wiltschko (in press).
[11] According to Ritter and Wiltschko (in press), this does not mean that tenseless languages like Blackfoot cannot express temporal meaning. Rather, what they are arguing is that INFL in such tenseless languages is associated with a different grammatical feature than tense. e.g., PERSON in Blackfoot or location in Halkomelem.

Getting back to the central question of where the linkers adjoin, there are two likely places. They could either adjoin to IP (23a) where a person prefix (e.g., *nit-* 1st person) is realized under INFL, or they could adjoin to *v*P (23b). I argue that the correct position is *v*P. As is cross-linguistically noted (e.g. di Sciullo 2005), prefixes show different linearization mechanism than suffixes. Although I am abstracting away from a precise mechanism of prefix linearization in Blackfoot, I assume that the prefixes are linearized according to their relative height in the structure in Blackfoot (Bliss 2013). If so, adjunction to IP (23a) yields an order of linker-person prefix, while an adjunction to *v*P (23b) yields the opposite order of person prefix-linker.

(23) a.



b.



The data presented in this paper support the order predicted by (23b) where the adjunction site is *v*P. A representative example is presented in (24). Person prefixes appear before a linker in (24a), which corresponds to the structure in (23b) above. If the order is changed between the two so that the linker appears before the person prefix, the sentences are ungrammatical, as shown in (24b) which corresponds to the structure of (23a) above.

(24) a. *ana mamii nohta'kai'taki*

ana	**mamii**	nit-oht-a'ka-i'taki
DEM	fish	1-INST-hate-AI

Lit. 'I have hatred **because of the fish**.' (i.e., 'I hate the fish.')

b. ***iiht-nit**-a'ka-i'taki-wa

The pattern in (24) constitutes evidence that *p* attaches to the functional phrase *v*P, not to IP.

The linker is an adjunct to *v*P; this in part captures the fact that the linker is not marked for person prefix marking, theme marking, animacy, or agreement. These properties are possible for only arguments of the VP, not adjoined arguments. As an adjunct, a linker phrase is not eligible for these types of markings. Moreover, semantically, *p*P adjunction to *v*P captures the fact that this operation modifies the event phrase described by the verb phrase.

4 Instrument linker with a path use

I have shown that the instrument linker is functional, being represented as *p*, and adjoins to *v*P. In Kim (2013), it is shown that direction linker *itap-* 'to' in the language is also functional, by providing evidence similar to what is discussed in this paper. The direction linker usually appears with motion verbs, as illustrated in (25). In (25), the linker *itap-* introduces a goal of motion, 'the hill', described by the verb. The linker is obligatory in (25); inherently directed motion verbs such as 'go' must be prefixed with an element that indicates direction, e.g., a direction linker as in (25) or a direction non-linker such as *waamis* 'up' or *sainnis* 'down' (Kim 2014b).

(25) *aakitapoo ni isspahkoyi*

yaak-*(itap)-oo-wa	ani	isspahkoyi
will-DIRECTION-go.AI-3S	DEM	hill

'(S)He will go to the hill.'

In Kim (2014b), the direction linker is argued to appear in the specifier of I-Asp when it occurs with inherently directed motion verbs such as 'go' in (25), which is different from the position of the instrument linker argued in this paper. In this section, I show some evidence that the instrument linker may appear at the level of I-Asp like the direction linker, when it indicates a path meaning such as 'past/along' or 'from'. Thus, it may be possible that the instrument linker can appear in a different structural position depending on its meaning: it appears at *v*P level in its means/cause use, as shown in the previous section. On the other hand, it appears at I-Asp level in its path use.

I-Asp is the lowest functional head in Blackfoot clause structure, as illustrated earlier in (22). Major evidence for the claim that the direction linker appears inside I-Asp is that (i) the direction linker is obligatory with inherently directed motion verbs (see (25)),[12] and (ii) its distribution is subject to the animacy of the subject.[13] The direction linker can appear only if the subject is a semantically animate (26a), and ungrammatical with a grammatically animate but semantically inanimate subject (26b).

(26) a. *ana John aakitapoo oomi isspahkoyi*

ana	**John**	yaak-itap-oo-wa	oomi	isspahkoyi
DEM	**John**	will-DIRECTION-go.AI-3S	DEM	hill

'John will go to the hill.'

b. **ana ainaka'si aakitapoo oomi isspahkoyi*

ana	**ainaka'si**	yaak-itap-oo-wa	oomi	isspahkoyi
DEM	**wagon**	will-DIRECTION-go.AI-3S	DEM	hill

Intended: 'The wagon will go to the hill.' (Kim 2014b)

Fact (i) indicates that the direction linker is not an adjunct. Fact (ii) indicates that in Blackfoot, a motion event is subject to the semantic animacy restriction supporting previous studies with similar conclusions (Kim 2013, Ritter 2014b, Ritter and Rosen 2010, Ritter and Wiltschko 2009, in press). In particular, in Blackfoot, Wiltschko (2012) and Ritter (2014b) propose that I-Asp in nominal domain bears the feature [animate]. Assuming that the same aspectual feature is used to classify both nouns and verbs between the nominal and verbal domains (Ritter and Wiltschko 2009, in press), they suggest that the verbal domain may be organized in terms of animacy, and thus I-Asp in the verbal domain bears the same feature [animate]. Kim's (2014b) study on motion verbs provides new evidence that the feature [animate] indeed plays a role in the verbal aspectual domain. More specifically, the animacy restriction of the direction linker as shown in (26) is captured in terms of the feature [animate] on I-Asp in the verbal domain: it is proposed that the direction linker can appear in the specifier of I-AspP when the feature [animate] appears on the head I-Asp.

[12] More specifically, it is argued that the linker fills the initial position of the stem, which is an obligatory position in Algonquian verb stems. See Kim (2014b) for evidence of this claim.

[13] Other evidence provided in Kim (2014b) comes from abstract nominalization and idioms. For example, the direction linker can undergo abstract nominalization, unlike the means use of the instrument linker.

4.1 Path uses of the instrument linker and I-Asp

Recall that, among the linkers, the instrument linker has the widest distribution of meanings, and one of them is path (Frantz 2009), as illustrated in (27):

(27) a. *nitaakohto'too mohkinsstsisi*
nit-oht-o'too Mohkinsstsisi
I-INST-arrive.AI Calgary
'I am from Calgary.'

b. *nitaakohtoo ni niitahtaayi*
nit-yaak-oht-oo-wa ani niitahtaayi
1-will-INST-go.AI-3S DEM river
'I will go along the river.'

c. *nitaakohtsitskoo ni niitmoyisi*
nit-yaak-oht-itsk-oo-wa ani niitmoyisi
1-will-INST-pass.by-go.AI-3S DEM tipi
'I will walk past the tipi.'

The name path minimally can refer to four meanings following Jackendoff (1983): 'to' (goal), 'toward' (direction), 'from' (source), or 'past/along' (route). In Blackfoot, the first two meanings are expressed by the direction linker *itap-* (Frantz 2009, Kim 2014b), as illustrated earlier. The last two meanings are expressed by the instrument linker *iiht-/oht-*, as illustrated in (27).

I show that path use of the linker has a different distribution from that of the other uses of the linker, such as means or cause, as discussed throughout the paper. The properties and distribution of the instrument linker in its path use are identical to those of the direction linker discussed in (25)–(26). The similar distribution seems to suggest that the instrument linker occupies the specifier of I-Asp, as argued for the direction linker *itap-* in the language.

The first defining difference between the path and mean/cause use is that the instrument linker is obligatory when it appears with inherently directed motion verbs. In (28a), the linker is prefixed to the verb 'go' and introduces 'the river', and in (28b), it is prefixed to the verb 'flee' and introduces 'the mountains'. Without the linker, the sentences are ungrammatical. This is in contrast with when it indicates means/cause (see (1)).

(28) a. *nitaakohtoo ni niitahtaayi*
nit-yaak-*(oht)-oo ani niitahtaayi
1-will-INST -go.AI DEM river
'I will go along the river.'

b. *nitaakohtsipikssi miistakistsi*
nit-yaak-*(oht)-ipikssi miistak-istsi
1-will-INST-flee.AI mountain-PL
'I will flee from mountains.'

The second interesting property of the path use of the instrument linker is that its distribution is subject to the animacy of the subject. That is, it can appear when the subject of inherently directed motion verbs is semantically animate (a human or an animal) as exemplified in (29):

(29) *ana saahkomaapi/na poos aakohtoo ni niitahtaayi*

ana	saahkomaapi	/	ana	poos	yaak-oht-oo-wa	ani	niitahtaayi
DEM	boy	/	DEM	cat	will-INST-go.AI-3S	DEM	river

'This boy/this cat will go along the river.'

As shown in (30), the linker cannot appear with a grammatically animate but semantically inanimate subject, e.g., *ainaka'si* 'wagon'.

(30) **ana ainaka'si aakohtoo ni niitahtaayi*

ana	ainaka'si	yaak-oht-oo-wa	ani	niitahtaayi
DEM	wagon	will-INST-go.AI-3S	DEM	river

Intended: 'The wagon will go along the river.'

As the data (29)–(30) suggest, the path use of the instrument linker has similar distribution to the direction linker. Thus, it is possible that the instrument linker may appear in I-AspP when it indicates a path meaning, but appear as an adjunction to *v*P when it indicates a means/cause meaning. The two different structural positions correlated with different meanings may predict that the instrument linker will have a means/cause meaning when its use is not obligatory. This seems to be true, as illustrated in (31). The motion verbs in (31) must appear with either the non-linker *miistap-* (31a) or the linker *itap-* (31b) obligatorily. Prefixed to these elements is an instrument linker. In this case, the instrument linker is optional, and as predicted, the instrument linker has cause meaning, not path meaning. In fact, the sentences are ungrammatical with the path meaning of the instrument linker. For instance, (31a) cannot mean 'I will go far away from this house.'

(31) a. *nitaakohtiistapoo ni naapioyisi*

nit-yaak-**oht-[**miistap-oo**]**	ani	naapioyisi
I-will-**INST**-[away-go.AI]	DEM	house

'I will go (far) away, **because of** this house.'

b. *nitaakohtsitapoo miistakistsi na nohko*

nit-yaak-**oht-[**itap-oo**]**	miistak-istsi	ana	nohko
1-will-**INST**-[direction-go.AI]	mountains	DEM	my.son

'I will go to the mountain, **because of** my son.'

5 Conclusion

I have shown that the instrument linker that introduces a non-core argument in Blackfoot cannot be an applicative head. The linker shows different morphological and syntactic properties from the applicative head in the language, which has been recognized in Algonquian literature (e.g., Rhodes 2010). Alternatively, I proposed that the linker is introduced by a functional head *p*. Thus, it is not the case that all non-core arguments are syntactically represented in the same way, but their syntax can vary. Moreover, it has been shown that different linkers or even the same linker in Blackfoot do not seem to have the same syntax, either. I have provided some preliminary evidence that the instrument linker in its means/cause use appears at the *v*P level, but in its path use may appear at the I-AspP level like a direction linker. It remains to be seen what the different syntax of different linkers suggests for Blackfoot grammar.

References

Baker, M. C. (1988). *Incorporation: a theory of grammatical function changing*. Chicago: University of Chicago Press.

Baker, M. C. (2003). *Lexical categories: verb, nouns, and adjectives*. Cambridge: Cambridge University Press.

Bliss, H. (2010). Argument structure, applicatives, and animacy in Blackfoot. In H. Bliss & R. Girard (Eds.), *WSCLA 13 & 14: Proceedings of the 13 and 14th Workshop on the Structure and Constituency of Languages of the Americas*, *February, 4–7, 2008* (pp. 58–69).Vancouver: UBC Working Papers in Linguistics.

Bliss, H. (2013). *The Blackfoot configurationality conspiracy: parallels and differences in clausal and nominal structures*. Doctoral dissertation. University of British Columbia.

Bliss, H., E. Ritter, & M. Wiltschko. (To appear). Blackfoot nominalization patterns. In M. Macaulay, & R. Valentine (Eds.), *Papers of the 44th Algonquian Conference, October, 25–28, 2012*. Albany: SUNY Press.

Di Sciullo, A. M. (2005). Affixes at the edge. *Canadian Journal of Linguistics* 50, 83–117.

Frantz, D.G. (2009). *Blackfoot grammar*. University of Toronto Press.

Frantz, D.G. and Russell, N. (1995). *Blackfoot dictionary of stems, roots, and affixes*. University of Toronto Press.

Glougie, J. R.S. (2000). *Topics in the syntax and semantics of Blackfoot Quantifiers and Nominals*. Unpublished M.A. thesis. University of British Columbia.

Kim, K. (2014a). *Argument structure theory and non-core arguments*. Manuscript submitted for publication.

Kim, K. (2014b, April). *Spatial PPs and structure of motion verbs in Blackfoot*. Paper presented at the 19th Workshop on Structure and Constituency in the Languages of Americas (WSCLA 19). Memorial University, Canada.

Kim, K. (2014c). PERSON all the way in Blackfoot: evidence from psych-predicates. In S. Leo (Eds.), CLA 2013: Proceedings of the 2013 Annual Meeting of Canadian Linguistic Association, June 1–3, 2013.

Kim, K. (2013, October). *Refining the syntax of non-core arguments: P, applicative, and functional p*. Paper presented at the North East Linguistic Society 44 (NELS 44), University of Connecticut, Storrs, CT.

Kim, K. (2012). External argument-introducing heads: Voice and Appl. In Cuervo, M.C. & Y. Roberge (Eds.), *The end of Argument Structure?*, *Syntax and Semantics*. (pp. 132–154). UK: Emerald.

Louie, M (2008). *Atemporal anchoring of individuals, events, and subevents in Blackfoot: Consequences for the syntax-semantics interface*. MA thesis, University of Toronto.

Marantz, A. (1993). Implications of asymmetries in double object constructions. In Sam A. Mchombo (Ed.), *Theoretical Aspects of Bantu Grammar 1*. (pp. 113–150). Stanford: CSLI Publications.

Pylkkänen, L. (2008). *Argument introducers*. Cambridge: MIT press.

Reinholtz, C. (1999). On the characterization of discontinuous constituents: evidence from Swampy Cree. *International Journal of American Linguistics, 65*, 201–227.

Rhodes, R. A. (2010). Relative root complement: A unique grammatical relation in Algonquian syntax. In J. Wohlgemuth & M. Cysouw (Eds.), *Rara & rarissima: Documenting the fringes of linguistic diversity* (pp. 305–324). Berlin: Mouton De Gruyter.

Van Riemsdijk, H. (1990). Functional prepositions. In P. Harm & I. Genee (Eds.), *Unity in diversity*. (pp. 229–241). Dordrecht: Foris.

Ritter, E. (2014a). Nominalizing inner-aspect: Evidence from Blackfoot. In P. Ileana (Ed.), *Cross linguistic investigations of nominalization patterns* (pp. 20–50). Amsterdam: John Benjamins.

Ritter, E. (2014b). *Featuring Animacy*. Manuscript submitted for publication. Ben Gurion University.

Ritter, E., & S. Rosen. (2010). Animacy in Blackfoot: Implication for event structure and clause structure. In M. Rappaport-Hovav, E. Doron, & I. Sichel (Eds.), *Syntax, lexical semantics and event structure* (pp. 124−152). Oxford: Oxford University Press.

Ritter, E., & M. Wiltschko. (2009). Varieties of Infl: Tense, Location, and Person. In J. van Craenenbroeck (Ed.), *Alternatives to cartography* (pp. 153−202). Berlin: Mouton de Gruyter.

Ritter, E., & M. Wiltschko. (In press). The composition of INFL. An exploration of tense, tenseless languages, and tenseless constructions. *Natural Language and Linguistic Theory*.

Svenonius, P. (2003). Limits on P: filling in holes vs. falling in holes. *Nordlyd, 31*, 431–445.

Travis, L. (2010). *Inner Aspect: The articulation of VP*. Dordrecht: Springer.

Wiltschko, M. (2012). Decomposing the count-mass distinction: evidence from languages that lack it. In D. Massam (Ed.), *Count and mass across languages* (pp. 146−171). Oxford: Oxford University Press.

Zeller, J. (2001). *Particle verbs and local domains*. Amsterdam: John Benjamins Publishing Company.

The Dene verb: how phonetics supports morphology*

Joyce M McDonough
University of Rochester

Abstract: A model of the polysynthetic Dene or Athabaskan verb is elucidated by providing evidence for its internal structure based on phonotactic distributions and phonetic properties which implicate a type of internal structure best accounted for in a word-and-paradigm model in which paradigms are organizational principles in lexicon, with implications for lexical access and learning. Evidence for this structure is presented using data from Navajo. The data underscores the importance of phonetic documentation especially in understudied/resourced languages.

Keywords: Morphology, polysynthesis, Athabaskan

1 Introduction

There are two primary principles issues at play in a discussion of word formation in languages with complex inflectional morphology, both concern speakers' knowledge of word structure. The first concerns the units that speakers use to build words, and the second, how those words are stored and retrieved. These are interrelated issues, of course, and are best treated as aspects of the same problem, but approaches to answering them are very different. In this paper I will take up the first of these, the units speakers work with to build words. The answer to the question involves an investigation of sound forms and phonotactics, what, in effect, phonetics can tell us about word structure. From a study of the phonetic structure of Dene, I'll present evidence for the existence of specific units within the Dene (Athabaskan) verb that are likely to be salient in word formation, and how they might work using a model of Dene verb argued for in McDonough (1996, 2000a, 2000b, 2003, 2010). I'll make two uncontroversial assumptions: one that speaker simplification of sound forms is a force in language change and variation, and two, word formation is built on learnability. I'll provide a working model of the verb within a Word-and-Paradigm framework, demonstrating how words are put together in this model, using paradigms.

The first of these assumptions is a first principle of language change (Campbell, 1996; Bybee, 2002, 2012). Most or all language change is phonetically based. This has repercussion for models such as the Athabaskan slot-and-filler template often used in the description of the Dene verb (Sapir & Hoijer, 1967). While this model has been important as a comparative device, and is useful in determining the morphosyntactic properties of the verb, it is highly unlikely to provide the forms speakers are using to build and store words, or learn them. The reason is straightforward, the sound forms of the template are too theoretical, too abstract. The processes required to produce full forms contradict what we know about sound change. Speakers will tend to simplify overly complex or opaque underlying-to-surface representations of sound forms, and to reorganize and make use of more emergent and transparent versions of these forms; this simplicity impulse overrides morphosyntactic complexity. Also, in the Dene languages, the morpheme combinations and rules that govern the underlying-to-surface forms required by this template model have never been shown to work,[1] which is not the same as saying that they are not useful. But they are highly unlikely to

* Contact information: joyce.mcdonough@rochester.edu.

[1] That the template doesn't work as a word formation device in Athabaskan has been acknowledged for a couple decades. In an attempt to use the template as a word formation device, for instance, Kari (1989) stated

In Proceedings of the Workshop on Structure and Constituency in the Languages of the Americas 18 & 19, University of British Columbia Working Papers in Linguistics 39,
Natalie Weber and Sihwei Chen (eds.), 2015.

be what a fluent native speaker is learning, using and storing. For this reason it becomes incumbent on us to figure out what forms native speakers are using and how this evidence might inform a realistic, working and learnable model of a morphologically complex lexicon.

In this paper I will present evidence in the Dene verb for the existence of 1) a major domain break between the rightmost stem which I will call the LEX stem and all the material in the word to the left of the stem, what we will call the *pre-stem* or TAM domain,[2] 2) the adjunction of these two units LEX and TAM as the basis for a viable model of Dene word formation. In this view, each domain is comprised of at least one morpheme, an obligatory morpheme that is the base of that domain. Thus the boundary between these two morphemes is a domain boundary that represents the two major parts of the verb and is significant in the word formation process. The two morphemes, one from each domain, comprise a minimal fully inflected word form, the core verb, with the minimal morphosyntactic specification. The minimal verb form is two syllables by morpho-syntactic imperative. These two morpheme forms have clearly distinct phonetic and phonotactic properties across the language family.

(1) [TAM]x [LEX]y = verb word $_{x(y)}$
σ σ

The following discussion of this basic verb structure is rooted in two theoretical strategies, laboratory phonology, in which phonological generalizations arise from phonetic realities, and word-and-paradigm morphology, in which paradigms are well-formed categories of morphological organization, fully inflected words are lexical units. The paper may be taken as an argument against a purely syntagmatic approach to word formation as found in theories such as distributed morphology (Halle & Marantz, 1993; Lieber, 1992).

2 Paradigmatic structure

In a morphologically complex lexicon, words reside in dense neighborhoods of related forms, the more highly inflected a word, the denser its neighborhood by virtue of its inflectional and derivational variants. In work on lexical access, dense neighborhoods delay word recognition, which opens the question of the strategies used by speakers of complex morphologies, like the Dene languages, to access highly inflected forms. Although it might be supposed that delays caused by richly inflected words may impede recognition, the Dene languages, as a case in point, are highly stable over centuries, and in fact seem to resist innovations. There appears to be no discernable disadvantage to inflection (except to a second language learner). One way to approach this question is to examine the structure of the lexicon in polysynthesis. The most striking property of inflected forms in any language is their paradigmatic structure, i.e. change-outs that occur at particular places in the word, vertical structure, so to speak, rather than linear concatenation. Slot-and-filler templates by definition are devices that take this vertical change-out and impose linear concatenation on them. Instead we take another approach, paradigms exist as organization principles in a lexicon. The inflected forms can be seen to form an inflectional or conjugational paradigm, these are used in lexical access.

---

that it was only partially successful and the model has 'many grey areas'. Kari suggested instead a 'zone' approach to Athabaskan word structure formation, which is close in spirit to the present model.

[2] Putting aside for the purpose of this paper a discussion of the make up and morphosyntactic properties of this domain. For a discussion of these properties in this view, see McDonough (1990, 1999).

Over the past several years a body of work has emerged on the processing of these type paradigmatic relationships (Baayen, 2003; Milin et. al., 2009; Kuperman et. al., 2008, Moscoso del Prado Martin et al, 2004; Blevins, 2003; Kostic et.al, 2003). In this view, paradigms themselves are well-defined organizing units in the lexicon; they have an effect on learnability, word processing and word retrieval. Words, including fully inflected words, are the basic units in the lexicon. Inflected words are organized into paradigms by definition. By definition, a paradigm is an organized set of the inflected variants of a word. In the rest of the paper I will elucidate a model of the Dene verb that uses paradigms.

2.1 Dene morphological structure

In Table 1, for instance, is a paradigm for the Navajo word *bits'á'nisht'ááh,* here inflected in the n-imperfective paradigm for the 1st person singular (nIPFV.1s), glossed in (2) taken from Young and Morgan (1987, hereafter YM).

(2) bits'á'nisht'ááh

bi-	ts'á'-	nish+	t'ááh
3S-	away.out.of.sight-	nIPFV.1S+	fly(INTR.IPFV)

'I'll (fly away and) leave it behind out of sight.' (YM 1987:d247)

In Table 1 below, a common paradigm layout, the verb stem ***t'ááh*** (the LEX morpheme in this model) has been bolded; it is the rightmost morpheme (baring enclitics) in the Dene verb word. The columns represent number, for Navajo, singular and dual; the rows represent person, 1st and 2nd person, and two rows of the rich set of Navajo third person markings (see Young and Morgan, 1987 for further explanation.)

Table 1 Example of the Navajo word in (53) in its n-imperfective paradigm

	singular	*dual*	*tense/mode*
1	bits'ánish**t'ááh**	bits'á'nii**t'ááh**	IMPV
	I (fly away) leave it		
2	bits'á'ní**t'ááh**	bits'á'nóh**t'ááh**	
3	yits'á'í**t'ááh**	—	
3a	bits'á'jí**t'ááh**	bits'á'da'jí**t'ááh**	*plural*
3	yits'á'ní**t'á'**	yits'á'da'as**t'á'**	PFV

It is an uncontroversial assumption that a fluent speaker, given one form in one conjugation (here n-imperfective), can inflect the verb word for the other forms in other conjugations, can parse conjugated forms, does not produce 'bad' forms (McDonough & Willie, 2000) and can recognize conjugation errors.

What is striking about the Dene verb is its complex structure. The traditional Athabaskan template may have up to 23 different morpheme positions covering both inflection and 'derivational' morphemes (YM, 1980:38 for an example).[3] The free concatenation of morphemes from these positions results in massive production of ill-formed words. To produce well-formed words using the template, the morpheme concatenations must be strongly constrained by principles operating on the occurring outputs. As such, the template has no predictive power whatsoever.

[3] It is not the role of this paper to argue against the template, which is used by convention alone in discussion of word formation in these languages. The template is a comparative device, not a word formation device.

Much work has been done on the nature of the syntactic and phonological constraints on templatic morpheme orderings in Athabaskan (Kari, 1976; Willie, 1996, 1991; Speas, 1984, 1988; Hale, 1996; Hale & Platero, 1997; Hargus, 1988; Stanley, 1969).[4] However, the number of these constraints in the literature needed to account for occurring forms and the stipulative nature of the constraints indicate that the primary issues with the template are two: in the reduction and the production of licit morpheme concatenations (Kari, 1989).

Another approach to the verb structure problem adopted here is to examine emergent distribution properties in the patterns in the words and paradigms themselves. In Table 1 above, the last row represents the 3rd person form in the n-*perfective* conjugation, in contrast to the imperfective. Note the imperfective verb stem **t'ááh,** present in this form in all the cells, except the last row. This form changes to its perfective form **t'á'** with the perfective conjugation. So we have at least two forms of the verb stem, **t'ááh, t'á',** marked for aspect. This kind of variability in the stems, associated to aspectual contrasts, has been called 'stem set alternations' in the literature. The variation involves vowel length, vowel quality, tone, codas. I'll consider this to be a type of paradigmatic variation (vertical change-out). Although there are patterns in the alternations, the variation in the forms is not productive (Reichard, 1949; YM, 1980, 1987; Young, Morgan and Midgett, 1992; Hardy, 1985; Eddington and Lachler, 2006). The aspect of the fully inflected verb arises from the combination of the aspect of the TAM domain combined with the aspect of the LEX domain[5] (Smith, 1996; see full explanation and examples in YM 1987:164). What is of interest to the present discussion are the forms the stem takes. The alternations occur *within* the stem syllable, even prefixation does not alter this (the d-effects and 'classifier' alternations, and tonogenesis hypotheses). YM write the abstract root in CAPS, below in (3), in this case the three stems are the occurring alternations of the root form **T'ÁÁH:** *t'ááh, t'ah, t'a'*.[6] We will return to the special phonetic and phonotactic status of stems in the next section.

(3) **T'ÁÁH** 'fly' / t'ááh, t'ah, t'a'

For a full discussion of how the stem shape encode aspect and combine with the TAM domain to produce the aspect of the full verb see YM (1987) and their root and stem dictionary (YM 1992). I will consider these alternation patterns a type of paradigmatic variation, particular to the stems.

2.2 The TAM paradigms

Table 2 is a repeat of Table 1 with the LEX stem *t'ááh* removed. What remains is the TAM domain.

Table 2 The TAM paradigm in the n-imperfective

	sing	dual	tense/mode
1	*bits'á'**nish***	*bits'á'**nii***	IMPV
2	*bits'á'**ní***	*bits'á'**noh***	
3	*yits'á'**í***	----	
3a	*bits'á'**jí***	*bits'á **da'jí***	*plural*

[4] In no way is this a complete bibliography of work done on these topics in the Dene languages. Many references have been omitted due to space limitations.

[5] It is not the case that they must agree. The rich set of aspectual variation present in these languages comes from the differences in aspect in these two domains. See YM 1987 for discussion.

[6] This verb stem is related to the noun stem 'wing' in *'at'a'* (YM 1987).

This domain has a base, which carries the obligatory morphosyntactic information necessary to the TAM domain; these bases are conjugational forms. In Table 3 are the base forms of the n-imperfective and n-perfective paradigms, as listed in YM (1987:200), classic paradigmatic forms, varying in person (column) and number (row). The forms are bolded in red. These forms carry morphosyntactic information associated to the cell they are associated to.

Table 3 The n-imperfective and perfective conjugational morphemes

	nIMPV		*nPFV*	
	sing	*dual*	*sing*	*dual*
1	nish	nii(d)	ní	nii(d)
2	ní	noh	yíní	noo
3	yí, jí		ní, jí	

These are *conjugational* paradigms. YM (1987:200ff) list 16 distinct paradigms that come out of 5 basic conjugational patterns for Navajo, of which the n(i)-conjugation is but one. (It goes without saying that not all words inflect in all conjugations). For a fully articulated set of the 16 distinct conjugational paradigms for Navajo see YM (1987:200ff).[7] Similar conjugational paradigms have been identified in Tsuut'ina (Sarcee) (Starlight & Donavan, 1990; Cox, 2010).

The *bits'á'* 'away out of sight' below in (4) sits at the left edge of the word, in the so-called disjunct domain[8] and is attached to the *n-impf* base and conjugates as such (*yi* is an alternate form of *bi*, see YM 1987:65; Willie, 2000).

(4) bi- ts'á'-
3S- away.out.of.sight

Note, importantly, *bits'á'* is attached to the conjugational form here *nish* nIPFV.1S. In current view, the structure of the verb in the model we are assuming is in (5).

(5) bits'á'nísht'ááh

[-	TAM]	[LEX]
[bits'á'-	**nish**]	[**t'ááh**]
from it : away out of sight-	**nIPFV.1S**	**fly(INTR.IPFV)**

Both the TAM and LEX stems are inflected for aspect (and the TAM stem for person and number). These domains are the base of productive verb formation in the Dene verb. The conjugational forms are the base of the TAM domain, just as the stem variants of the root (as in (3)) are the base of the LEX domain.

In (6) is the sketch of the model: the word is a conjunction of two independent domains, each with distinct morphosyntactic and lexical features.

(6) Dene word structure domains

$$[\ [\ (af)\ -\ \text{TAM}]_x\ [\ (af)-\ \text{LEX}\ ]_y\ ]\ \ \text{Word}_{(x(y))}$$

[7] These are necessary because they are not concatenative; they do not arise out of the template. These are the forms that the rules must produce.
[8] A domain of more loosely attached forms.

The argument is that speakers/learners are aware of these two units and use them productively in word formation and lexical retrieval. Note also that in the word and paradigm model, the *whole inflected word* is listed. This is necessary to produce the many opaque combinations of morphemes available to a fluent speaker.

In the next section phonotactic and phonetic evidence for the two morphemes and the domains will be reviewed, then I'll return to the predictions the model makes about word formation processes; the ability of the model to produce well-formed fully inflected Navajo words.

3 Phonotactics and phonetic structure

3.1 Phonotactics

One area that has not received much attention is the unusual phonotactic patterns in the Dene languages. Two facts in the Dene phonotactic patterns surface, both refer to the morphological stems:

- Noun and verb stems carry lexical meaning, they are monosyllables and considered classificatory.
- They are a closed class set of morphemes.

YM (1987:267) propose that there are around 550 stems in Navajo. Given these facts, the productive parts of the grammar are the verbs, not nouns. New words are verbal. In this paper, we are referring to these verbal stems as the base of the LEX domain as in (1).

The stems are phonotactically prominent. To see this consider the Dene phoneme inventory. All the Dene languages tend to share a similar sound inventory (for examples of the phoneme inventories of the northern Dene languages with example sound files, see the Dene Speech Atlas).[9] Ladefoged and Maddieson (1996:90) refer to Dene Sųłine as having 'one of the largest and most complex' set of affricate contrasts In the UPSID database of 317 language families (Maddieson, 1984), the ratio of sonorant to obstruent is 3/7. The Dene Sųłine inventory is approximately 16% sonorants, with around 30 obstruents and 5 sonorants; this is a typical Athabaskan pattern. Additionally, most of the Dene obstruent consonants are complex: there are six sets of stops, 4 of them are affricates, all the affricates are coronal, that is the consist of a coronal closure followed by a fricative release.

[9] Dene Speech Atlas is at http://www.ling.rochester.edu/DeneSpeechAtlas/

(7) Phoneme inventory of Dene Sųłine

Dene Sųłiné (after Li, 1946) (Orthography)

	lab	Inter dental	alveolar		Post-alveolar	Velar (uvular)	gl
			central	lateral			
stops	(b)		d t t′			g k k′ gʷ kʷ kʷ′	ʔ
affricates		dð tθ t′θ	dz ts ts′	dl tɬ tɬ′	dj tc t′c		
fricatives		ð θ	s z	ɬ l	c y	x xw ɣ ɣʷ	h
rhotic			r				
nasals	m		n				
approx					y	w	

Of note is the fact that the onset of stems is the single place in the lexicon where these sound contrasts occur; i.e. the rich affricate inventory is basically an inventory of stem onsets. This is of particular significant because they occur in the onset of a closed class of morphemes. Outside the stems, in the pre-stem TAM domain, basically the inflectional domain, the sound contrasts are reduced to a much smaller set of contrasts. McDonough (2003) observed that the consonantal phonemes of the prefixes are not much greater than those found in English inflectional morphemes. This holds of the vowel contrasts also, the prestem domain exhibits a loss of vowel quality contrasts, typically a Dene language will have a 'default' vowel, with 'default' (or 'marked') tone. Length, nasality are also neutralized in the prestem morphemes. The contrast set outside of stems is very reduced.

There is one exceptional morpheme in the pre-stem domain. At the left edge of word in the so called 'disjunct domain' there is a single position for what YM call 'postpositional stems'. These morphemes have stem-like phoneme distribution patterns; i.e. affricate and ejective onsets may appear here. This is the position of incorporated nouns in the Dene languages that have them. In Table 4 (a) below are examples from YM of Navajo words with complex stem onsets (affricates and ejectives), and forms with postpositional stems in (b). The stems are bolded. The 'postpositional' stems (which is the position of incorporated nouns in Dene languages that have them) have similar properties to the noun and verb stems. We will take this issue up again in the discussion of the model outputs in above.

Table 4 Stem distribution in Navajo words (from YM 1987)

a. stems		***b. stems***	
neheshk'ǫ́ǫ́h	*I slice it (as bread)*	bits'ánistsóós	*I took it from them*
'ahéénísh**tł'éé**h	*I jogged around in a circle*	bi**k'eh**dish**dleeh**	*I overcame him*
diniiish**jih**	*I grabbed it and hung on*	bi**ts'á**néii**t'aash**	*we left him*

Finally, in terms of phonotactic patterns, most pre-stem morphemes are CV(V), except at the right edge of the TAM domain, the TAM conjugational morphemes. Consonant clusters consistently occur at this point in the word, as we see demonstrated in Table 4. This is a breaking point in the word, we return to this point in Section 4. These patterns are clear and may be observed by perusing the verbs of any Dene grammar or dictionary.

Thus in examining the basic phonotactics of the lexicon, a structure within in the verb emerges, separating out the stems from other morphemes in the verb. The stems are prominent, distinguished

as units by strong phonotactic properties. This is an uncontroversial fact. The contribution the model makes is that these stem morphemes vary independently of the rest of the word.

3.2 Phonetics

These phonotactic patterns are reflected in the phonetics in the duration patterns of the stem onsets and nuclei versus the prefixes of the TAM domain. The phonetic prominence of the stems are related to these facts.

McDonough and Wood (2008) provided evidence that the Athabaskan phoneme inventory involved a fundamental contrast between simplex and complex segments. The simplex segments involved a single gesture; these were the approximants, fricatives, and the plain (unaspirated) stops (/b, d, g/)). Complex segments involved two gestures, a closure and a fricated release; these are the affricates, the ejectives and the affricated plain stops /t/ and /k/. In Figure 1 are the duration measurements for the plain stops /d, g/ versus the ejectives /t'/ and /k'/ and the affricated plain 'aspirated' stops /t, k/ from this paper.

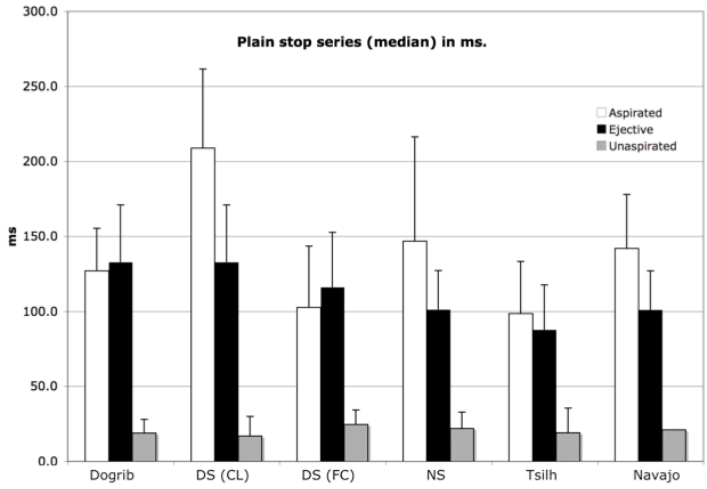


Figure 1 Durations of plain stops versus aspirated and ejectives in 4 Dene languages, adapted from McDonough and Wood (2008)

The plain ejective and affricated stops, the set /t, t', k, k'/, have the same release duration profile as the affricates, a fact observed by many linguists.[10] YM classify the /t/ as an affricate and not a stop. McDonough and Wood demonstrated that this is a pervasive phonetic property across several of the Dene languages, likely inherited from the parent language. This fact affects the manner contrasts. For instance it is responsible for the characteristic Dene ejective pattern as shown in Figure 2. The ejective is realized between the release of the stop closure and the release of the glottal closure, indicated by the dotted arrow in Figure 2; the length of the release period results in an audible 'period of silence' in the production of the Dene ejective. Note also the length of the stem onset indicated by the solid arrow.

[10] See discussion and references in McDonough and Wood (2008). The /t / and /k/ are not aspirated stops, but affricates /tx/ and/kx/. Like the other affricates, the sounds written as <t> and <k> are not found outside the stems in Navajo. Whether or not this holds true of other Dene languages is an open question, but I think it is more likely than not.

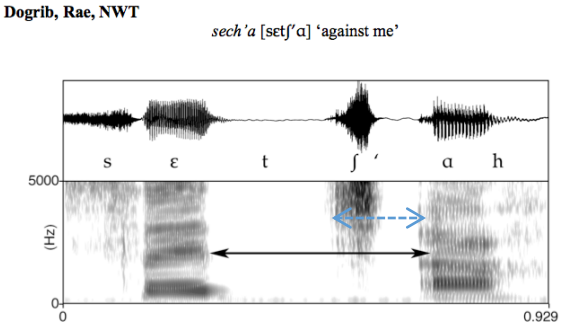


Figure 2 A demonstration of the characteristic ejective pattern, in Dogrib

Thus all the complex sounds are composed of a stop closure followed by a long release, including the ejectives (Figure 3). Since the stop closure is always coronal (there are no labial or velar affricates); the contrasts between these segments are in the release periods, which carry the cues to the place and manner distinctions of these segments.

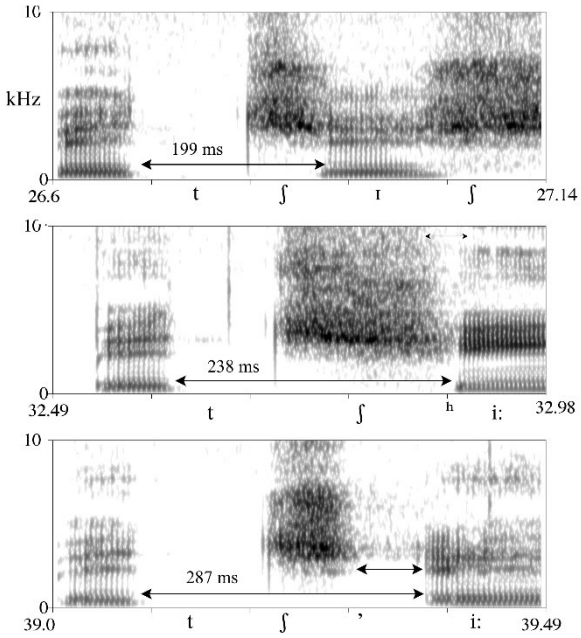


Figure 3 Examples of stem initial complex stem onsets in Navajo, affricates series /j [tʃ], ch [tʃʰ] , ch' [tʃˀ]/ adapted from McDonough (2003).

It is not surprising that the duration of the release periods is maintained in speech; it is, however not a necessary fact, but it is strikingly consistent across several of the Dene languages, and in the face of the geographic isolation of the speech communities, a situation where considerable variation at the phonetic level might be expected, but is not found. These are the stems of the LEX domain.

Concomitantly, when the stems are preceded by a syllable (in TAM) with a coda as in (8), it is the closure period that is compacted; the release period maintains its significant duration profile.

(8) bił dzidishkaad 'I gave him a slap' (YM:d354)

bił	[dzid	-ish	] [ø	kaad	]
with him	['using arm'	-øIPFV.1s]	[CL	'move in a spreading way'	]
	[TAM	]	[LEX		]

In Figure 4 are spectrograms of longer more complex words *biłtsidiłkaad* and *biłtsidishkaad*, the 1st and 3rd person forms of the verb translated 'I gave him a slap'. The gloss is above in (8).

The last two syllables contain the core verb (marked by dotted arrow). The stem (marked by solid arrow) remains prominent even in longer words. In the model I am assuming, the last syllable is the LEX domain. The penult syllable is the TAM domain. There is a break in the word between these two domains critical for word formation.

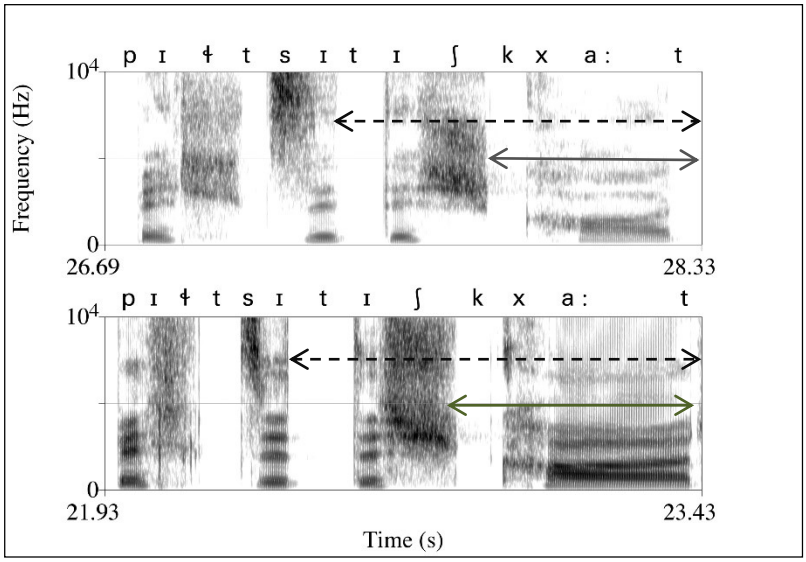


Figure 4 Spectrograms of Navajo verbs demonstrating the prominence of the stem, final syllable, and the LEX domain from McDonough (2003)

In summary, while it is unsurprising that the phonetics would reflect and support the phonotactic structure of the verb, especially given the distribution facts discussed in the previous section, it is quite interesting, even remarkable, the consistency with which this is accomplished at the phonetic level across the Dene languages. The stems are phonetically prominent in words; especially stem onsets. In this position, a distinction exists between simple segments, i.e. plain 'unaspirated' stops (b, d, g), fricatives and approximants, and the complex segments: affricates (including the 'aspirated' stops, *t* and *k*), and ejectives, all of which consist of a stop (closure) plus a long and characteristic fricative release. The distinction between place of articulation and manner among affricates is realized in these releases. In non-stem morphemes, only simplex segments are found. The vowel contrasts too are reduced in non-stems to short vowels, and in general there is a tendency for non-stems to have a CV syllable structure and a language specific default vowel. Exceptions to these generalizations are found among the conjugational morphemes of the TAM

domain, in which both long vowels and codas may appear, making these morpheme also distinct. Finally the length and prominence of the stems makes the boundary between the stems and the pre-stem or TAM domain an observable break in the word.

In Section 4, I'll demonstrate how a model using this structure might work, followed by a discussion and summary.

4 Modeling the verb

The model of the verb we are using is repeated in (9). In this structure the verb word is a compound of two separate domains with distinct phonological and phonotactic properties, what we have called TAM and LEX. Each domain has a base, i.e. obligatory, morpheme.

(9) (repeated from 6) Dene word structure

$$[\ [\ \ (af)\ \ -\ \text{TAM}]_x\ \ [\ \ (af)\text{-}\ \ \text{LEX}\ ]_y\ \ ]\ \ \text{Word}_{(x(y))}$$

The constraints on the minimal verb word in Dene are determined by the morphological structure, not the phonology (10). The basic word requires two domains, TAM and LEX. These domains have base forms,[11] one from one of the conjugational paradigms: aspect inflected for person and number. The other is from the LEX domain, the verb stem.

(10) Minimal $\text{Word}_{(x(y))}$ = [[TAM_X]x [LEX_Y]y]$_{x(y)}$

Thus the minimal verb is a licit compound of these two morphemes. In (11) is an example of a minimal word *yishcha* 'I'm crying' with a TAM base in the ø-imperfective conjugation: the 1st singular *ish* (glide is epenthetic, the null prefix *ø-* is a valence marker on the verb stem, not under discussion in this paper[12]).

(11)

[[TAM]$_{1S/IMPF}$	[LEX]$_{IMPF}$]$_{1S/IMPF\ (CRYIMPF)}$
(y)ish	ø-cha
øIPFV.1S	'cry'$_{mprf}$

yishcha
'I'm crying'

The pre-stem TAM domain can be complex, with prefixes to the conjugational base, as we see in (12) below the verb form *'áhodishcha* 'I pretend to be crying' (YM 1987:71). The TAM domain consists of the prefix *'áhodi- 'fake, pretend' (*which consists of the reflexive + area prefixes), conjugated in the ø-imperfective, the form *'áhodishcha* has the øIMPV.1s form *ish* as its base (as in (61)).

[11]Or fix-up rules which provide a default specification for the base, in the case that the cell for that specification is empty, often the 3rd singular. This is what the 'pepet vowel' of Athabaskan literature is, a place filler for the 3rd singular null imperfective conjugation (McDonough 1990, 1999). Note the pepet vowel of Hoijer comes with the conjugational information of the cell it belongs to (3rd singular, null imperfective).

[12] See the discussion of the so-called (and misnamed) 'classifier' alternations that refer to the alternations on the stem onset that this morpheme triggers (Howren, 1971; McDonough, 2001). Prefixation only changes the stem onset from a simple segment to a complex one, it does not otherwise affect the size of the LEX domain.

(12) *'áhodishcha* 'I pretend to cry'

[	af-	TAM]	[af-	LEX]
[	'áhod-	ish]	[l-	cha]
	pretend-	*øIPFV.I*		*'cry'*

The conjugation pattern for person and number for *'áhodish* is listed in YM 1987:71. This TAM morpheme can be added to verb stems such as *cha* 'cry' and *hosh* 'sleep' to produce more compositional meanings 'pretend to sleep' and 'pretend to cry', but also less transparent ones as in Table 5.

Table 5 Forms with 'pretend' morpheme

'ahodishwosh	*'I pretend to be asleep'*
'ahodish'į'	*'I lie' (make a pretend)*
'ahodiyiilkah	*'we dilly-dallied' (pretend to walk, 3+ actors)*

These forms are constructed from the verb stems *l-wosh* sleep, *l-į́* 'make', and *l-kad* '3+ actors walking'. In (13) is a longer form with a positional stem /ch'í/ 'on horizontal surface'.

(13) ch'íninishkaad 'I herd them out'

[	ch'í-	ni-	nish]	[	ł -	kaad]
	'horizontal'	*term*	*nIPFV.1S*		*'trans'*	'move in a spreading way'

I cause them to move out along a horizontal surface YM:d290

The forms in Table 6 all have the pre-stem – in the n-imperfective conjugation – and are joined to different stems.

Table 6 The TAM domain morphemes *ch'íninish* 'on a horizontal surface'+ LEX stem

ch'íninishchéél	*'I drove them out'*
ch'íninish'áál	*'I lure him out' (deceive)*
ch'íninish'íih	*'I snuck it out" (act without being seen)*

While the full compounds are fairly transparent, they are so only after you know their meaning; the actual meaning of the word may be difficult to interpret accurately even if you are familiar with the meaning of the two independent units. The form with the verb stem *'áál* to deceive, with the pre-stem domain, conjugated in the n-conjugations, means to 'deceive him out along a horizontal surface' i.e. to lure, or to 'act on something without it being seen out along a horizontal surface', i.e. to sneak something out.

4.1 Example outputs

In its simplest form the model combines a conjugational morpheme from TAM with a stem morpheme from LEX; the output is a fully inflected word (in (52)). Fully inflected words are also paradigmatically organized. The TAM paradigms may have a rich set of prefixes that build meaning into the word (Table 7 and Table 8), these constrain the stems they may occur with. An investigation of these combinations is an open area of research, and includes research into the output of the extensive aspectual combinations the two domains provide.

In Table 7 is the TAM *bits'á'nish* 'away from x' with different stems that conjugate with this pre-stem domain. The whole is considered to be a lexical unit insofar as the combinations are not compositional.

Table 7 TAM domain *bits'á'nish 'away from x'* with different LEX stems

bits'á'nish kǫǫ́h	swim away from it
bits'á'nish 'eeł	sail away from it
bits'á'nish dlǫǫsh	move away 'on all fours'
bits'á'nish báás	drive away from it

In Table 8 are several different pre-stem domains that build meaning units from the same stem.

Table 8 Different TAM domains with the same LEX stem dzį́į́s 'pull '

'iis dzį́į́s	pull or drag obj out of sight
'adaas'iis dzį́į́s	pull obj down from a height
'ałts'ás dzį́į́s	pull apart obj
bíis'iis dzį́į́s	pull and add obj to a pile
bikiis dzį́į́s	cover obj
'adah ch'és dzį́į́s	drag obj over the edge
haas dzį́į́s	pull O out (like a splinter)

To be a fluent native speaker and part of the speech community is to know the licit forms: which conjugational patterns are concatenated to which stems, the stem's possible conjugations and the conventional meanings associated to the inflected forms. The TAM and LEX combinations are only semi-compositional. The morphology is striking (and frustrating for non-fluent speakers) for the lack of transparency in the combinatorial units. Anecdotally, it is not uncommon to hear a Navajo say that they were talking to an elderly person who used words they didn't know. This is common feature of morphology and happens much less often at the syntagmatic level, where sentence production tends to be strongly and transparently compositional. This kind of lack of full compositionality is a property of paradigmatic variation in particular and thus of morphology.

5 Discussion

Paradigmatic variation is a type of grammatical variation, associated with word formation and the lexicon, distinct from syntagmatic (syntax). It is not linearly concatenative, though it may have concatenative properties (compounding); this type concatenation is more compositional than paradigmatic processes. Paradigmatic organization differs from syntagmatic processes in a number of ways worth investigating, but not under discussion in this paper. The point here is that the Dene verb makes exquisite use of paradigmatic encoding in the lexicon.

The paradigmatic model makes several predictions:

- Paradigmatic organization is efficient and viable
- The two domains, TAM and a LEX, are the basis of all productive verb formation and the core verb is two syllables long by morphological imperative
- The domains are independent
- They represent distinct types of paradigms.
- The meaning of the whole, all its morphosyntactic specification, is x(y), as TAM (LEX)
- The TAM paradigms are conjugational, marked for person and number

- These paradigms are organizational principles in the lexicon
- Stems are very phonetically and phonologically prominent and carry base lexical meaning.
- Speakers learn to produce licit inflected forms by association of a fully inflected word to its conjugational paradigms via knowledge of its compound structure.
- Speakers are aware of this structure and use it.
- Children are likely to learn the stems first

The claim of this paper that this model discussed in this paper will be useful as a teaching model, a model of lexical access and language acquisition.

6 Summary

Generalizations about structure and constituency in lesser studied languages will emerge from examining phonetic data and undertaking phonetic analyses, examining features that emerge. Language documentation will benefit from careful and systematic phonetic studies of segmental and prosodic structure. Studies of the combinatorial properties of TAM and LEX in the Dene verb are likely to yield fruitful insights into word formation and meaning important to models of grammar, as well as modeling a speaker's knowledge of structure as constrained by principles of sound change and simplicity.

References

Baayen, R. (2003). Probabilistic approaches to morphology. In Bod, R., J. Hay and S. Jannedy (eds), *Probability theory in linguistics*, pp. 229–287. The MIT Press.

Blevins, J. P. (2003). Stems and paradigms. *Language* 79:737–767.

Bybee, J. (2002). Word frequency and context of use in the lexical diffusion of phonetically conditioned sound change. *Language Variation and Change* 14:261–290.

Bybee, J. (2012). Patterns of lexical diffusion and articulatory motivation for sound change. In Solé, Maria-Josep and Daniel Recasens (eds), *The initiation of sound change: Perception, production, and social factors*. Amsterdam and Philadelphia: Benjamins.

Campbell, L. (1996). On sound change and challenges to regularity. In Durie, Mark and Malcolm Ross (eds), *The comparative method reviewed: Regularity and irregularity in sound change*, 72–89. New York: Oxford University Press.

Cox, C. (2010). Verbal inflectional morphology in Tsuut'ina: a paradigm approach. Manuscript.

Eddington, D. and J. Lachler. (2006). A Computational Analysis of Navajo Verb Stems. In Rice and Newman (eds), *Empirical and Experimental Methods in Cognitive/Functional Research*. CSLI Publications

Hale, K. (1996). Remarks on the Syntax of the Navajo Verb. MIT and Navajo Language Academy Linguistics Workshop. NCC, Tsaile, Arizona.

Hale, K. and P. Platero. (1996). Navajo reflections of a general theory of lexical argument structure Jelinek, Rice and Saxon (eds), *Athabaskan Papers for Robert Young*, pp. 1–14.

Halle, M. and A. Marantz. (1993). Distributed morphology and the pieces of inflection. In Hale, K. and Keyser, S. J. (eds), *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*, pp. 111–176. MIT Press, Cambridge, Mass. (*Current Studies in Linguistics* 24).

Hardy, F. (1985). Pseudo-suffixes and optative stem shape prediction in Navajo. *International Journal of American Linguistics* 51:435–438.

Hargus, S. (1988). Phonological evidence for prefixation in Navajo verbal morphology. *Proceedings of the West Coast Conference on Formal Linguistics* 5:53–67.

Howren, R. (1971). A formalization of the Athabaskan 'd-effect'. *International Journal of American Linguistics* 37:96–113.

Kari, J. (1989). Affix Positions and Zones in the Athabaskan Verb Complex: Ahtna and Navajo. *International Journal of American Linguistics* 55:424–455.

Kari, J. (1976). *Navajo Verb Prefix Phonology.* New York: Garland Publishing Company.

Kostić, A., T. Marković, and A. Baucal. (2003). Inflectional morphology and word meaning: Orthogonal or co-implicative domains? In Baayen, R. H. and R. Schreuder (eds), *Morphological Structure in Language Processing*, pp. 1–44. Berlin: Mouton de Gruyter.

Kuperman, V., R. Bertram, and R. H. Baayen. (2008). Morphological dynamics in compound processing. Manuscript submitted for publication, Radboud University, Nijmegen.

Ladefoged, P. and Maddieson, I. (1996). *Sounds of the Worlds Languages*. Oxford: Blackwell.

Lieber**,** R**.** (1992). *Deconstructing Morphology*. University of Chicago Press.

Maddieson, I. (1984). *Patterns of Sounds*. Oxford University Press.

McDonough, J. (2010). Morphology/phonology interface in the Dene verb. *Workshop on the Interface between Syntax and Phonology/Morphology*, invited talk, Syracuse University.

McDonough, J. (2003). *The Navajo Sound System*. Kluwer Academic Press.

McDonough, J. (2001). Incorporating onsets in Navajo: the d-effect. In Carnie, Jelinek, and Willie (eds), *Papers in honor of Ken Hale*, pp. 177–188. MIT Working Papers in Linguistics.

McDonough, J. (2000a). On the bipartite model of the Athabaskan verb. In Fernald, T. B. and P. R. Platero (eds), *The Athabaskan Languages: Perspectives on a Native American Language Family*, pp. 139–166. Oxford University Press.

McDonough, J. (2000b). Athabaskan redux: Against the position class as a morphological category. In Dressler, Pfeiffer, Pochtrager and Rennison (eds), *Morphological Analysis in Comparison*, pp. 155–78. Amsterdam: John Benjamins.

McDonough, J. (1999). Tone in Navajo. *Anthropological Linguistics* 41(4):503–539.

McDonough, J. (1996). Epenthesis in Navajo. In Jelinek, Rice and Saxon (eds), *Athabaskan Papers for Robert Young*, pp. 45–58. Albuquerque: University of New Mexico Press.

McDonough, J. (1990). The Phonology and Morphology of Navajo. PhD dissertation. Department of Linguistics, University of Massachusetts at Amherst.

McDonough, J. and Mary Willie. (2000). Allowable variability: A preliminary investigation of word recognition in Navajo. *University of Rochester Working Papers in the Language Sciences* (WPLS:UR), Spring 00-1:1–23.

McDonough, J. and V. Wood. (2008). The stop contrasts of the Athabaskan languages. *Journal of Phonetics* 36(3):427–449.

Milin, P., D. F. Durdevic, and F. Moscoso del Prado Martín. (2009). The simultaneous effects of inflectional paradigms and classes on recognition: Evidence from Serbian. *Journal of Memory and Language* 60:50–64.

Moscosos del Prado Martín, F., A. Kostić and R. H. Baayen. (2004). Putting the bits together: An informational theoretical perspective on morphological processing. *Cognition* 94:1–18.

Sapir, E. and H. Hoijer. (1967). The Phonology and Morphology of the Navaho Language. *University of California Publications in Linguistics* 50. Berkeley: University of California Press.

Smith, C. (1996). Aspectual Categories of Navajo. *International Journal of American Linguistics* 62:227–263.

Speas, M. (1988). Phrase Structure in Natural Language. Ph.D. dissertation, Department of Linguistics, Massachusetts Institute of Technology.

Speas, M. (1984). Navajo Prefixes and Word Structure Typology. In Speas, Margaret and Richard Sproat (eds), *MIT Working Papers in Linguistics* 7:86–109.

Stanley, R. J. (1969). The Phonology of the Navaho Verb. Ph.D. dissertation, Department of Linguistics, Massachusetts Institute of Technology.

Starlight, B. and G. Donavan. Tsuut'ina Verb Paradigms. Unpublished manuscript.

Reichard, G. A. (1949). The character of the Navaho verb stem. *Word* 5:55–76.

Willie, M. (2000). The Inverse Voice and Possessive yi/bi. *International Journal of American Linguistics* 66(3):360–382.

Willie, M. (1996). On the expression of Modality in Navajo. In Jelinek, Eloise, Sally Midgette, Keren Rice and Leslie Saxon (eds), *Athabaskan Language Studies: Essays in honor of Robert W. Young*, pp. 331–347. Albuquerque: University of New Mexico Press.

Willie, M. (1991). Navajo Pronouns and Obviation. Ph.D Dissertation, Department of Linguistics, University of Arizona.

Young, R. W. and W. Morgan. (1987). *The Navajo Language*. Revised edition. Albuquerque: University of New Mexico Press.

Young, R. W., and W. Morgan. (1980). *The Navajo Language*. Albuquerque: University of New Mexico Press.

Young, R. W., W. Morgan and S. Midgette. (1992). *Analytical Lexicon of Navajo*. Albuquerque: University of New Mexico Press.

The proleptic possessive construction in Kaqchikel Maya

Tammi Stout
The University of Texas at Austin

Abstract: Kaqchikel exhibits two possible alternations for encoding a third argument for ditransitive verbs. Similar to the English dative alternation, Kaqchikel encodes a third argument as an indirect argument of the verb marked as an oblique. Additionally, Kaqchikel employs the proleptic possessive construction to semantically encode a recipent argument as a pronominal dependent of the object. In this paper, I show that the proleptic possessive constructions exhibits an interesting pattern of usage that requires an actual transfer of possession rather than just the potential of change in possession, which contrasts with the English variation between the double-object construction and the dative alternation.

Keywords: lexical semantics, argument structure, ditransitives, Kaqchikel

1 Introduction

The proleptic possessive is a construction found in Kaqchikel, a Mayan language spoken in the central highlands of Guatemala that has been observed to semantically encode a third argument (the recipient) in ditransitive verbs. The construction is formed by attaching the possessive pronoun morpheme to the noun in the same manner as a regular possessed[1] NP as illustrated in (1) and (2).

(1) Juan x-ø-u-ya' [jun nu-wuj]
Juan PRFV-A3s-B3s-give one 1s-book
'Juan gave me a book' (lit. 'Juan gave my book.')

(2) Yin x-ø-in-sik'ij [jun nu-wuj]
1s PRFV-B3s-A1s-read one 1s-book
'I read my book.'

Though the bracketed constructions in both (1) and (2) are morphologically identical, I argue that the possessive construction in (1) actually functions as both the recipient argument (*nu-*) and the theme argument (*-wuj*) when combined with verbs encoding three-participants with a 'caused possession' event.

Previous approaches to event structures for ditransitive verbs (Beavers 2011, Dowty 1979, Foley & Van Valin 1984, Rappaport Hovav & Levin 1998, Rapport Hovav & Levin 2008, inter alia) assume that there is a difference among classes of ditransitive verbs with a common split for *give*-type, *send*-type, and *throw*-type verbs cross-linguistically. The common assumption in the literature is that only *give*-types necessarily encodes a 'change of possession' event, while *throw*-types and *send*-types do not necessarily encode a 'change of possession', but the 'change of possession' meaning can be added to these verbs via different argument realization strategies as with the English dative alternation. However, I assume that there is a difference between verb

Contact info: stoutT@utexas.edu

[1] It is common for Mayanists to use 'Set A' and 'Set B' to refer to agreement markers, where Set A correlates to both the ergative subject and the possessive marker on nouns and Set B correlates to the absolutive.

In Proceedings of the Workshop on Structure and Constituency in the Languages of the Americas 18 & 19, University of British Columbia Working Papers in Linguistics 39,
Natalie Weber and Sihwei Chen (eds.), 2015.

types that *only* entail the possibility of transfer of possession and verbs that entail actual possession for languages such as Kaqchikel (Beavers 2011, Gropen et al. 1989).

In this paper, I argue that not all of the corresponding verbs in Kaqchikel show this pattern, and *throw* cannot be augmented to encode 'change of possession' with the proleptic possessive construction as it can in the English dative alternation. I also aim to analyze the lexical and semantic properties of the proleptic possessive construction in Kaqchikel as compared to the lexical and semantic properties encoded in the dative alternation in English. In the section that follows, I outline some of the cross-linguistic strategies for encoding three participants for ditransitive verbs as they relate to the strategies found in both Kaqchikel and English. In Section 3, I discuss some of the approaches to analyzing three-participant events as proposed by Rappaport Hovav & Levin (2008) and Beavers (2011). In Section 4, I illustrate how the previous accounts of 'caused possession' and 'caused motion' events do not account for the alternation found in Kaqchikel with the proleptic possessive construction. I conclude in Section 5.

2 Three-participant events cross-linguistically

Malchukov et al. (2010) define a ditransitive construction as one that consist of a verb with an agent argument, a recipient-like argument and a theme argument. There are several strategies attested cross-linguistically for how languages encode the third participant in a ditransitive construction. Margetts & Austin (2007) provide an overview of the various strategies for encoding these types of three-participant events including syntactic, semantic, and pragmatic realizations for arguments. The strategies discussed in the paper are listed in (3).

(3) a. three-place predicate strategy
b. oblique/adjunct strategy
c. serial verb strategy
d. incorporation strategy
e. adnominal strategy
f. directional strategy
g. absorption strategy

English employs two of the above strategies: a three-place predicate strategy and the oblique/adjunct strategy. Kaqchikel also employs the oblique/adjunct strategy in addition to the adnominal strategy. Due to their relevance for the languages of discussion, these three strategies are discussed further below.

In addition to the various strategies for encoding a third participant, languages also tend to show either a T(heme)-type of alignment or an R(ecipient)-type of alignment (Margetts & Austin 2007). For R-type languages, the recipient tends to be the argument as the oblique. For T-type languages, the theme tends to be marked as the oblique. The most common pattern cross-linguistically is an R-type pattern, but some languages exhibit both patterns depending on the verb. Most verbs in English exhibit an R-type alignment.

(4) a. Mary sent the letter to John.
b. Mary sent the letter.
c. *Mary sent to John.

In (4a–c), the theme *the letter* is the unmarked argument in addition to being the obligatory argument amongst the theme and recipient. This provides some evidence that it is not the adjunct[2] argument here. The oblique marked argument *to John* is the recipient argument in addition to being an optional argument of the verb. However, some English verbs also show a T-type pattern where the recipient is obligatory.

(5) a. Mary fed the cereal to John.
b. Mary fed John cereal.
c. *Mary fed cereal.
d. Mary fed John.

In (5a), *to John* is still the oblique marked recipient object. However, the constructions where neither argument is overtly marked in (5b–d), *John* is now the obligatory argument as the one being fed.

Kaqchikel also exhibits the properties of an R-type language marking recipient is the oblique argument.

(6) Juan x-ø-u-ya' ri wuj [cherä ri ak'al.]
Juan PRFV-B3s-A3s-give DET book [RN.3s DET child]
'Juan gave the book to the child.'

As with the English construction, the recipient argument *cherä ri ak'al* is marked as adjunct or oblique argument of the verb *ya'* 'give'.

2.1 Three-place predicate strategies

There are three sub-types of three-place predicate strategies: the direct argument, causative, and applicative strategies. In each of these strategies, all three arguments are arguments of the verb. English double object constructions exemplify the direct argument strategy.

(7) Mary gave John the book.

In (7), *Mary, John,* and *the book* are all unmarked arguments of the verb *give* without any additional morphology added to the verb or to the arguments. The other two types of three-place predicates include additional morphology to increase the valence of a verb.

Both the causative and applicative strategies involve additional morphology to increase the valence of the verb. For the causative strategy, the verb itself is only encoded to have two arguments, so additional morphology is necessary to signal that the third argument is an argument of the verb increasing the valence from a two-place predicate argument structure to a three-place predicate argument structure. The causative strategy is illustrated in Saliba, a language of Papua, New Guinea.

[2] Due to the high variability in languages between adjuncts and obliques in terms of what qualifies as an adjunct, I leave the terms undifferentiated because the distinction does not have a great significance for the purposes of this paper.

(8) Tautau wa ya he-kita-go
picture GIVEN 1SG CAUS-see-2SG.O
'I showed you the picture.' (Margetts & Austin 2007: 14)

The verb *-kita* 'see' in (8) is only a two-place predicate verb in Saliba. However, the causative morpheme *he-* on the verb tells the verb to look for a third, or causer, argument. The applicative strategy also utilizes the valence increasing morphology to increase valency from two to three arguments, where a third benefactive or recipient type argument is added to the verb. This strategy is found in the Mayan language, Tzotzil.

(9) 7a li Xun-e ba y-ak'-be chitom li 7antz-e
TOP the Xun go A3-give-APPL pig the woman-CLF
'Xun went to give the pig to the woman.' (Aissen 1987: 105)

In (9), *Xun* and *chitom* 'the pig' are direct arguments of the verb, but the applicative morpheme *-be* signals that there is an additional benefactive argument *li 7antz-e* 'the woman' of the verb.

2.2 Oblique/adjunct strategy

With an oblique or adjunct strategy, the third participant for a three-participant event is marked as an oblique or adjunct of the verb. The other two participants are direct unmarked arguments of the verb. This strategy is found in English with the dative *to* construction.

(10) a. Mary gave the book to John.
b. Mary sent the book to John.
c. Mary threw the ball to John.

The argument *to John* in (10a–c) functions as the third argument of the verbs 'give', 'send', and 'throw', where the preposition *to* (commonly considered the English dative) marks *John* as an oblique argument.

Kaqchikel also employs this strategy. For the Kaqchikel oblique construction, the third argument is headed by a relational noun. Relational nouns, common in Mayan languages, function similarly to adpositions. They differ from other basic adpositions in that they show agreement with their dependents, but other purely prepositional words do not show the same agreement pattern.

(11) Juan x-ø-u-k'aq ri tzapuy chwä rin
Juan PRFV-B3s-A3s-throw DET ball RN.1s 1s
'Juan threw the ball to me.'

(12) Juan x-ø-u-k'aq ri tzapuy pa ri qanja.
Juan PRFV-B3s-A3s-throw DET ball PREP DET river
'Juan threw the ball in the river.'

The example in (11) contains an oblique argument headed by the relational noun *chwä,* and it is marked for agreement with the 1s object. However, the example in (12) contains a regular preposition *pa,* and there is no agreement with the object. For the purposes of this paper, only the construction in (11) is considered as a third participant for a three-participant event because it

contains a benefactive or recipient argument. The example in (12) contains a locative (adjunct) argument rather than an additional participant for the event.

2.3 Adnominal strategies

In an adnominal strategy, the third argument of the verb is marked as a dependent on one of the two direct arguments of the verb. There are two subtypes for the adnominal strategy: the possessive strategy and the proprietive strategy. The proleptic possessive construction in Kaqchikel is an example of the possessive strategy. In This construction, the R-type argument is a dependent of the T-type argument.

(13) Juan x-ø-u-ya' [jun nu-wuj]
Juan PRFV-B3s-A3s-give one A1s-book
'Juan gave me a book' (lit. 'Juan gave my book.')

As previously discussed, the 1s possessive marker *nu-* is the third semantic argument of the construction and is a dependent of the T-type argument *wuj* 'book'.

For languages that exhibit a T-type alignment, the proprietive strategy is found. In a proprietive strategy, the third argument, the theme, is marked as a dependent on the recipient argument. This is found in Dyirbal (Pama-Nyungan, North-Eastern Australia).

(14) Niya marndi-jarra [kanthathu-na wirrin-kuru]
3sg.NOM deprive-PST [father-PST.OBJ money-PROP]
'He took money off his father.' (Evans 1995: 420, cited in Margetts & Austin 2007)

In (14), *kanthathu-na wirrin-kuru* forms one NP argument, where the proprietive marked noun 'money' is a dependent of the NP 'father', which is marked as the object of the verb.

Of the different strategies of encoding three-participant events discussed in this section, only the three-place predicate strategy and the oblique/adjunct strategy have a strong representation in the literature. Previous studies primarily focus on the English double object construction (direct argument strategy) and the dative alternation (oblique/adjunct strategy). However, cross-linguistic data indicates that there are some similarities for the semantic encoding of a third participant for common ditransitive verbs, like 'give', 'send', and 'throw'. However, in terms of augmenting the meaning of verbs via different encoding strategies, languages such as Kaqchikel show more restrictions than the English alternation, which I discuss in the following section.

3 Event structure and types of 'caused possession'

It has been observed that the English dative alternation can be analyzed as having two different event structures: one for events of caused possession and one for events of caused motion. Rappaport Hovav & Levin (2008) provide the two following structures for the alternation in English:

(15) a. Caused possession: (*x* cause *y* to have *z*)
b. Caused motion: (*x* cause *y* to be at *z*)

In English, the verb 'give' necessarily encodes the 'caused possession' event indicated in (15a), but for verbs like 'send' and 'thow', the basic event structure is that provided in (15b). Rappaport

Hovav & Levin (2008) consider this to be a verb sensitive approach to analyzing the event structures of the English dative alternation. The idea behind the verb sensitive approach is that the event can be augmented to add meaning when a different alternation is used. For English, the event that is lexicalized onto the verb is the event template found for the dative *to* construction. However, the double object construction can be used to add the 'caused possession' event to verbs where it is not already lexicalized (adapted from Rappaport Hovav & Levin 2008).

(16)	Dative *to*	Double object
give-type:	caused possession	caused possession
send-type:	caused possession/motion	caused possession
throw-type:	caused possession/motion	caused possession

What the table in (16) suggests is that for verbs like 'give' which lexicalize the meaning of 'caused possession', there is no difference between the dative construction and the double object construction because the 'caused possession' meaning is already there. However, 'send' and 'throw' lexicalize the 'caused motion' event (with the possibility of a transfer of possession, but it is not a lexicalized event of the verb) for the dative *to* construction, but the 'caused possession' event is added when the double object construction is used.

Beavers (2011) extends the analysis of Rappaport Hovav & Levin (2008) with the idea of prospective possession (originally in Gropen et al. 1989) vs. actual possession.
Prospective possession only entails the *possibility* of possession in the future rather than any sort of actual transfer of possession necessarily occurring in the event. This allows for cancellation of the result state of possession for verbs that only entail prospective possession:

(17) a. John threw the ball to Mary, and she received/caught it.
b. John threw the ball to Mary, but she didn't receive/catch it.
c. John threw Mary the ball, but she didn't catch it.

For each of the sentences in (17), 'caused possession' is not necessarily encoded via the different strategies, which then results in the cancellability of the 'change of possession' for both (b) and (c), where Mary might come into possession of the ball though not necessarily.

However, *give*-type verbs involve an actual transfer of possession. When there is actual transfer of possession entailed for the verb, the result state of possession cannot be cancelled:

(18) a. John gave Mary a book, and she received it.
b. #John gave Mary a book, but she didn't receive it.
c. #John gave a book to Mary, but she didn't receive it.

Interestingly, there appear to be parallels in Kaqchikel where a difference exists in the possible strategies that can be employed that depend on whether there is actual transfer of possession or only the possibility of a 'caused possession' event. However, the alternation for strategies between the oblique (dative) construction and the proleptic possessive construction in Kaqchikel seems more limited in the classes of verbs that can be augmented to add this meaning of 'caused possession'.

4 Kaqchikel: A closer look at events of possession

As discussed in Section 2, there are two strategies for realizing the third argument in a three-participant event in Kaqchikel: the oblique strategy and the adnominal (proleptic possessive) strategy. The oblique strategy can be used as a strategy for expressing the third participant for all classes of ditransitive verbs.

(19) a. Juan x-ø-u-ya' ri wuj cherä ri ak'al.
Juan PRFV-B3s-A3s-give DET book RN.3s DET child
'Juan gave the book to the child.'

b. Maria x-ø-u-taq pa chwä rin jun tzibanik.
Maria PRFV-B3s-A3s-send PREP RN.1s 1s one letter
'Maria sent a letter to me.'

c. Maria x-ø-u-k'aq chwä rin ri tzapuy.
Maria PRFV-B3s-A3s-throw RN.1s 1s DET ball
'Maria threw the ball to me.'

Similar to with English, the 'caused possession' event for (19c) can be cancelled but not for (19a), as shown in (20).

(20) a. # Juan x-ø-u-ya' ri wuj cherä ri ak'al,
Juan PRFV-B3s-A3s-give DET book RN.3s DET child
po ma x-ø-u-kon tä.
but NEG PRFV-B3s-A3s-receive IRR
'Juan gave the book to the child, but he didn't receive it.'

b. Maria x-ø-u-k'aq jun tzapuy cherä riya,
Maria PRFV-B3s-A3s-throw one ball RN.3s 3s
po riya ma x-ø-u-chap tä
but 3s NEG PRFV-B3s-A3s-catch IRR
'Maria threw her the ball, but she didn't catch it.'

Further, the oblique recipient argument is obligatory for the verb *ya* 'give', but not for the verbs *taq* 'send' or *k'aq* 'throw' for the oblique strategy:

(21) a. * Juan x-ø-u-ya' ri wuj
Juan PRFV-B3s-A3s-give DET book

b. Maria x-ø-u-taq pa jun tzibanik.
Maria PRFV-B3s-A3s-send PREP one letter
'Maria sent a letter.'

c. Maria x-ø-u-k'aq ri tzapuy.
Maria PRFV-B3s-A3s-throw DET ball
'Maria threw the ball.'

This indicates that the verb *give* requires a third recipient argument, which provides evidence that the proleptic possessive construction differs semantically from a regular possessed NP.

The proleptic possessive construction also shows an interesting pattern for the restrictions on verb classes that it can occur with. Recall that in the English dative alternation, the 'caused possession' event is encoded on *give*-type verbs and can be added to the other classes of verbs when the double object construction is used. If we expect other languages to pattern similarly to English, the prediction for the two different strategies in Kaqchikel would then be that the proleptic possessive construction could be used in a similar manner to augment the meaning of the *throw*-type and *send*-type verbs. However, consider the data in (22).

(22) a. Ri ak'al x-ø-u-ya' jun nu-tzabwij
DET child PRFV-B3s-A3s-give one A1s-ball
'The child gave me a ball.'

b. *Ri ak'al x-ø-u-k'aq jun nu-tzabwij
DET child PRFV-B3s-A3s-throw one A1s-ball

The proleptic possessive construction can only be used with the verbs that encode actual transfer of possession (*give*-types), but not for verbs where transfer of possession is not encoded in the meaning of the verb (*throw*-types). What is interesting with *taq* 'send' is that it can also occur with the proleptic possessive construction.

(23) x-ø-u-taq pa jun nu-tzibanik
PRFV-B3s-A3s-send PREP one A1s-letter
'She sent me a letter.'

What this seems to suggest is that the proleptic possessive construction is restricted to usage with verb classes that encode a stronger notion of 'caused possession' than with the English constructions. If this is true, the proleptic possession construction is predicted to being limited to contexts where the 'change of possession' is an actual transfer of possession. Verbs such as *sell* where a 'caused possession' event is encoded on the verb would then be expected to be possible with the proleptic possessive construction as shown in (24).

(24) Maria x-ø-u-k'y jun nu-chakat
Maria PRFV-B3s-A3s-sell one A1s-chair
'Maria sold me a chair.'

As with the *give*-types and *send*-types of verbs, *-k'y* 'sell' is also possible with the proleptic possessive. This suggests and supports the notion that beyond the differences between *give*-types and the *send/throw*-types, there is a fine-grained difference between the properties of *throw*-types and *send*-types in Kaqchikel though they pattern similarly in English. This lends to the idea that a mere possibility of transfer of possession is not strong enough to capture these differences for Kaqchikel.

5 Conclusions and future work

Based on the above patterns for the Kaqchikel alternations for realizing a third participant in three-participant event, it is clear that Kaqchikel behaves differently than the alternation in English when

considering the difference between prospective possession and actual or permanent transfer of possession. Crucially, the proleptic possessive construction can only be used with verbs that denote actual transfer of possession but not when there is only prospective or possible transfer of possession. Though this is only a preliminary study on a limited set of verbs in Kaqchikel, it leads to a larger question as to how different languages lexicalize certain events to some verb classes but not others. It also demonstrates how different languages employ different strategies to augmenting or adding events to certain verbs that do not lexicalize the 'caused possession' meaning. A much larger set of Kaqchikel verbs that have been observed to encode a third participant in other languages is necessary to gain a deeper understanding of the extent to which the proleptic possessive construction can encode a third participant as compared to being realized as only a possessed NP. This would allow for a clearer picture of the cross-linguistic possibilities for encoding a third argument in a ditransitive construction beyond those considered in the English dative alternation.

References

Aissen, Judith. (1987). *Tzotzil Clause Structure. Studies in Natural Language and Linguistic Theory*. Dordrecht: Reidel Publishing Company.

Beavers, John. (2011). An aspectual analysis of ditransitive verbs of caused possession in English. *Journal of Semantics* 28, 1–54.

Dowty, David. (1979). *Word Meaning and Montague Grammar*. Dordrecht: Reidel.

Evans, Nicholas. (1995). *A Grammar of Kayardild*. Berlin: Mouton de Gruyter.

Foley, William A. and Robert D. Van Valin. (1984). *Functional Syntax and Universal Grammar*. Cambridge: Cambridge University Press.

Gropen, Jess, Steven Pinker, Michelle Hollander, Richard Goldberg and Ronald Wilson. (1989). The learnability and acquisition of the dative alternation in English. *Language* 65, 203–57.

Malchukov, Andrej, Martin Haspelmath, and Bernard Comrie. (2010). *Studies in Ditransitive Constructions: A Comparative Handbook.* Berlin: De Gruyter Mouton

Margetts, Anna and Peter Austin. (2007). Three participant events in the languages of the world: towards a cross-linguistic typology. *Linguistics* 45, 393–451.

Rappaport Hovav, Malka and Beth Levin. (2008). The English Dative Alternation: The Case for Verb Sensitivity. *Journal of Linguistics* 44, 129–167.

Rappaport Hovav, Malka and Beth Levin. (1998). Building Verb Meanings. In: M. Butt and W. Geuder (eds.). *The Projection of Arguments. Lexical and Compositional Factors.* Stanford, CA: CSLI Publications, 97–134.

Part II

Papers for WSCLA 19

Root-stress in Gitksan: Modeling the path to lexical accent*

Clarissa Forbes
University of Toronto

1 Introduction

This paper discusses the pattern of stress assignment in Gitksan, a Tsimshianic language spoken in the northwest Interior region of British Columbia.[1] As previous work by Rigsby (1986) and Tarpent (1994) shows, word stress in this language is assigned largely on the basis of the position of the lexical root. Though these works argue that stress is assigned to the final syllable in the root, a substantial number of initial-stressed forms are attested in the language as well. Rigsby (1986) and Tarpent (1994) derive these forms with a set of epenthesis rules; I present an alternative metrical analysis in which root-internal stress is sensitive to weight. Under this analysis, syllables with long vowels attract stress leftward. I formalize this system in a generative metrical framework, following Idsardi (1992).

Further, I discuss the broader potential for diachronic change in stress systems dependent on morphological knowledge. Because these systems are affected by factors of both phonological and morphological opacity arising over time, I suggest that this may be a place where lexical accent systems emerge. Gitksan, being a language with a relatively small number of polysyllabic root forms and a somewhat substantial number of exceptions, is an interesting case to examine.

In Section 2, I present the basic stress patterns found in Eastern Gitksan polysyllabic roots and how they have been accounted for in Rigsby's (1986) analysis of stress. I present an alternative to his root-internal fixed-stress system: a root-internal weight-sensitive system. In Section 3 I discuss sets of exceptions to both analyses, and compare how each analysis accounts for them. Finally, in Section 4 I consider how such morphologically dependent metrical systems might change over time, proposing that the rise of exceptions to possible generalizations might result in learners positing lexically-specified accentual systems. There is a greater possibility of such development when the lexicon of relevant forms is small.

*Foremost, I thank my Gitksan consultants (Barbara Sennott, Vince Gogag, Hector Hill, and others). Ha'miyaa! Thank you also to Tyler Peterson for graciously allowing me access to his recordings (obtained with an ELDP (SOAS) Fieldtrip Grant), and to the UBC Gitksan Research Lab for their continued commitment to collaborative work. I also thank Elan Dresher and the University of Toronto phonology group for support along the way with this analysis. Data is from my own fieldwork unless otherwise sourced. This research was supported by a Jacob's Research Fund award and an Ontario Graduate Scholarship.
Contact info: c.forbes@mail.utoronto.ca

[1] I focus mainly on the eastern dialects due to the larger body of established vocabulary work done on them. My materials include words sourced from Hindle and Rigsby's (1973) word list, Rigsby's (1986) grammar, and Brown (2008), all based on the Hazelton/Kispiox dialect (Gitxsanimx̲), as well as the cross-dialectal fieldwork of myself and the UBC Gitksan Research Lab. Eastern dialect forms are presented here.
Abbreviations: 3 = third person, ANTI = antipassive, DSTR = distributive, EPIS = epistemic modal, II = series II suffixal person marking, INTR = intransitive, NMZ = nominalizer, PL = plural, SG = singular, TR = transitive, VAL = valency adjuster. Morpheme breaks are hyphens (-) for affixes and equals signs (=) for clitics. Reduplication is marked by tildes (∼).

In Proceedings of the Workshop on Structure and Constituency in the Languages of the Americas 18 & 19,
University of British Columbia Working Papers in Linguistics 39,
Natalie Weber and Sihwei Chen (eds.), 2015.

2 Root-internal stress patterns

No targeted phonetic study has been done on the phonetic correlates of Gitksan syllable stress; impressionistically, its major markers are increases in intensity and pitch.[2] The position of stress in Gitksan is dependent on the position of the morphological root, rather than on the boundaries of the prosodic word. This can be demonstrated by examining the forms in (1), where the root is positioned differently in each four-syllable word. In each example, the stress falls on the monosyllabic root.

(1)	a.	[ʔan.ˈ**siː.pʔ**ɪnsxʷ.diːt]	NMZ-**like**-TR-ANTI-3PL.II	'their friend'
	b.	[ɬa.ɢa.ˈ**tsuː**.diːt]	NMZ-DSTR-**other**-3PL.II	'the others'
	c.	[ha.ʔni.ɢan.ˈ**ʔwɪn**]	NMZ-on-empty-**teeth**	'gums'

It would be ideal to additionally show a form in which stress falls on the initial syllable of four; unfortunately, I have not been able to find or construct a chain of suffixes more than two syllables long. The forms below demonstrate that there is nothing barring initial stress (2a–b), and that the number of posttonic syllables may be extended by the addition of a clitic after the root (2c).[3]

(2)	a.	[ˈ**he.d**ɪn.diːt]	**stand**-TR-3PL.II	'stand (them) up'
	b.	[ˈ**baː.sɢ**an.diːt]	**split**-TR-3PL.II	'separate (them)'
	c.	[nɪ.ˈ**niː.nixs**.xʷdiː.dɪ.ma]	PL∼**marry.PL**-VAL-3PL.II=EPIS	'maybe they married'

Stress occurs on the morphological root in almost all cases; exceptions to this robust generalization will be discussed in Subsection 3.2. In alternate terms, this is an interface system, dependent largely on morphological factors (Revithiadou 1999). A substantial majority of Gitksan roots are monosyllabic: the preferential root shape in this language is CVC (Tarpent 1987). As a consequence, morphological information alone is often enough to determine the position of stress.

In the next subsections I address the question of how stress is assigned within polysyllabic roots, with generalizations deriving from a database of Gitksan roots (compiled from Hindle and Rigsby 1973; Rigsby 1986; Brown 2008; as well as primary fieldwork). I focus on bisyllabic forms, as I have found few root forms with three or more syllables.[4]

---

[2] Some current work is being done on aspects of syllabification and prominence in Gitksan. One study suggests that some fricatives may be perceived by speakers as nucleic; minimal pairs such as the following were both reported by participants as having two "beats", despite one being monovocalic (Schwan and Anghelescu 2013).

(i) a. [mɪtxʷ] 'fill.INTR'
b. [mɪdɪn] 'fill.TR'

Such findings are relevant for an investigation of syllable structure and prominence. However, I assume for the purposes of this work that only vocalic peaks are potential targets for stress.

[3] Under some analyses clitics are adjoined to the prosodic word, and thus would not be expected to contribute to syllable counts for stress assignment purposes (see e.g. the analysis of some functional morphemes in European Portuguese by Vigário 1997). Still, I include these examples for the sake of illustration, and because the theoretical prosodic nature of clitics as opposed to other morphology in Gitksan is not yet determined.

[4] Note that I assume that subsequent forms in this paper are synchronically "atomic". That is, while some may be further historically decompositional, I have not noted productive morphological alternations within these forms and thus consider them to have "root" status. In an effort to remain conservative about my estimates of the difference between synchronic and historical roots, I have largely followed Rigsby's (1986) claims

I begin with consideration of final-stressed forms, and review the analysis of Interior Tsimshianic stress given by Rigsby (1986) and Tarpent (1994), in which stress is root-final. Many roots in Gitksan exhibit stress on the initial syllable, however. I consider these forms in Subsection 2.2 and discuss factors of syllable weight that may be at play in Subsection 2.3.

2.1 Root-final stress

Rigsby (1986) and Tarpent (1994) argue for a system of root-final stress placement (the former for Gitksan, and the latter for all the modern Tsimshianic languages). Forms such as those in (3) demonstrate this.

(3) a. [gɪ.ˈba] ‘wait.for’
b. [gʷɪ.ˈla] ‘blanket’
c. [laχ.ˈʔni] ‘hear’
d. [bɪs.ˈdaʔj] ‘grouse’
e. [sdɪ.ˈkʔeːkʷ] ‘sister’

Bisyllabic roots would thus be described metrically as iambs. This would be simple to formally model: below in Table 1, a boundary is placed on the rightmost edge of the initial metrical plane (Line 0); a boundary on the left would suffice equally well at this point. The only crucial parameter is the one which locates the head of the Line 0 constituent to the right, allowing only the final syllable to be projected onto Line 1 as the root’s main stress.

Table 1: A final-stressed root

	x	Line 1
x	x)	Line 0
gʷɪ	la	‘blanket’

(4) *Head Location Parameter (Line 0):*
Project the rightmost element of a constituent on Line 0 onto Line 1.

Final-stressed forms make up the majority of bisyllabic roots (about 70% of the approximately 180 forms I have collected). However, this still leaves significant number of initial-stressed forms that must be accounted for. The next section discusses an analysis for these forms.

2.2 Initial stress

There are a number of other disyllabic forms which do not have surface final stress, as in (5).

about root status, and have excluded forms with potential frozen affixes from consideration as “atomic”. Investigating the synchronic status of such forms in the minds of speakers will be the subject of future work.

(5) a. [ˈnaː.sɪkˀ] ‘raspberry’
b. [ˈlaː.ʁal] ‘examine’
c. [ˈʔoː.tsˀɪn] ‘soul’
d. [ˈhoː.bix] ‘spoon’
e. [ˈʁoj.pˀaχ] ‘bright’
f. [ˈnam.qˀap] ‘bank of stream’

Assuming that these forms are synchronically atomic, examples such as these must be accounted for via some other phonological phenomenon. Rigsby (1986) does this by calling on two processes of epenthesis which follow stress-assignment (R represents a sonorant).

(6) a. ∅ → ə / ...V́ːC_C
b. ∅ → ə / ...V́(R)Cˀ_C (Rigsby 1986: 220–1)

The first rule epenthesizes a vowel in coda consonant clusters following a long vowel, while the second epenthesizes a vowel in coda clusters where the initial consonant is glottalized.[5] Note that both processes are necessarily root-internal; in clusters where segments are separated by morpheme boundaries, epenthesis does not occur. This is demonstrated in the following words with the pronominal suffix [-t] ‘3SG’ added after the root, creating a cluster:

(7) a. [sdɪ.ˈkˀeːkʷt] ‘his/her sister’
b. [hoːxʲt] ‘he/she wore/used ...’
c. [ɬɔˀqt] ‘he/she swallowed’

Assuming the root-internal epenthesis rules in (6), the underlying forms of the initial-stressed roots in (5) may be considered monosyllabic, as shown below:[6]

(8) a. [ˈnaː.sɪkˀ] /naːskˀ/ ‘raspberry’
b. [ˈlaː.ʁal] /laːql/ ‘examine’
c. [ˈʔoː.tsˀɪn] /ʔoːtsˀn/ ‘soul’
d. [ˈhoː.bix] /hoːpx/ ‘spoon’
e. [ˈʁoj.pˀaχ] /ʁojpˀχ/ ‘bright’
f. [ˈnam.qˀap] /namqˀp/ ‘bank of stream’

This requires no additions to the stress assignment process discussed in the previous section, but relies on a greater degree of underlying abstraction in speakers’ mental representations of root forms, and several active epenthesis processes for which there is no obvious evidence from alternations.

It is important to note that on the surface, there is little that differentiates epenthesized unstressed vowels from inherent unstressed vowels. The quality of the unstressed/epenthetic vowels in (8) is predictably determined by the place of neighboring consonants: lowering processes apply beside

[5] Rigsby’s (1986) original rule for (6b) specified that the second member of the cluster be either a stop or [χ] (and in the latter case, be optionally followed by another consonant), but I have seen no compelling evidence for a more specific rule as opposed to a more general one. I thus present the more generalized formulation here.

[6] Voiced obstruents in the phonetic representation correspond to underlying voiceless obstruents; there is a robust process of prevocalic voicing in the Tsimshianic languages (Rigsby 1986; Tarpent 1987).

uvulars and laryngeals, and rounding processes apply beside labiovelars (see Rigsby 1986). The default vowel is [ɪ]. The quality of unstressed vowels with a corresponding segment in the underlying representation is subject to the same processes. This is demonstrated by alternation in the vowel quality of the plural prefix /lə-/ below:

(9) a. [lɪtseːxʲ] 'PL-be.full'
b. [laʔaks] 'PL-drink'
c. [luxʷdaxʲ] 'PL-be.hungry'

We may therefore consider the possibility that both of the vowels in consistently bisyllabic, initial-stressed forms are underlying. With such underlying forms as those in (5), another immediately apparent method of deriving initial stress is via sensitivity to syllable weight.

2.3 Weight sensitivity

Under a weight-sensitive analysis of stress, we may exchange Rigsby's (1986) epenthesis rule applying after long vowels for, instead, an additional mechanism in the stress assignment process. Such a mechanism would equally well account for the generalization that stress always falls on a long vowel, if one is present in a root.

This mechanism comes in the form of a syllable-boundary parameter. Such a parameter places constituent boundaries on the edges of heavy syllables, defined here as long vowels:

(10) *Syllable Boundary Parameter (Line 0):*
Project a right-parenthesis on the right side of a syllable containing a long vowel.

The addition of a second boundary on Line 0, situated on the right side of the initial heavy syllable, allows for the formation of two metrical constituents, and thus the projection of two metrical units to Line 1. On Line 1, it is therefore necessary that the *leftmost* element project to Line 2, to become the main stress of the word. It is again ambiguous whether Line 1's edge boundary should be assigned to the left or right; I have placed it on the left in Table 2 below to correspond with the leftward-oriented projection parameter.

Table 2: An initial-stressed root

x		Line 2
(x	x	Line 1
x)	x)	Line 0
hiː	ɬuxʷ	'morning'

(11) *Head Location Parameter (Line 1):*
Project the leftmost element of a constituent on Line 1 onto Line 2.

It may be beneficial to exchange the epenthesis rule for this more complex stress assignment process when considering the fact that a small number of roots do not apparently undergo epenthesis after a long vowel:

(12) a. [baːsxʲ] ‘be afraid’
b. [ɢaːqɬ] ‘rat’
c. [nuːɬχ] ‘be wet (of person)’

The next question in a discussion of quantity-sensitivity is whether codas contribute to weight. The following examples demonstrate that coda obstruents and sonorants are both apparently invisible to stress assignment, as stress is never pulled to the initial syllable when a coda is present there.[7]

(13) a. [ʔix.ˈsda] ‘tasty/sweet’
b. [laχ.ˈʔni] ‘hear’
c. [gɪm.ˈxdi] ‘sibling (different gender)’
d. [hɪn.ˈda] ‘where’

Of the several remaining initial-stressed forms which are unaccounted for, most have a glottalized onset in the second syllable. This could be accounted for with Rigsby’s (1986) other epenthesis rule, which applies to underlying glottalized consonant clusters.

(14) a. [ˈɢo.ʔmɪl] ‘blink’
b. [ˈnam.qʔap] ‘bank of stream’
c. [ˈɢoj.pʔaχ] ‘bright’

Unlike the previous epenthesis rule, which applied after long vowels, there is no clear way to reincorporate this epenthesis rule as a feature of a quantity-sensitive system. I thus follow Rigsby in suggesting that it could be incorporated as a phonological process that follows stress assignment. A sample derivation is provided in Table 3: stress assignment applies to the unmodified underlying form.

Table 3: Stress assignment with root-internal epenthesis

x		Line 1
x)		Line 0
/ qoj	pʔχ /	
[ɢoj	pʔaχ]	‘bright’

In conclusion, stress assignment in Gitksan may be analyzed as a quantity-sensitive process. Under a weight-based analysis, stress defaults to the final syllable, but may be pulled forward if the initial syllable is heavy. Heavy syllables are those containing long vowels (CV:) but not those

[7] There are some forms where having a coda sonorant in the initial syllable results in initial stress, but these may largely be identified as historically complex. Some examples are presented below with a potential related or root form, where one is identifiable.

(i)

	Word		*Root*	
a.	[ˈsɪl.gʷɪns]	‘middle finger’	[sɪlkʷ]	‘middle, waist’
b.	[ˈgɪl.bɪl]	‘two’	[gʲalp]	‘testicles’
c.	[ˈsgɪm.sɪm]	‘eagle species’	?	

with codas. This allows for more transparent underlying representations of words with long vowels, but root-internal epenthesis is still a necessary process to explain initial stress near glottalized consonants in a small number of forms.

3 Exceptions

In this section I discuss some exceptions to the analyses of stress presented above in Section 2. These include both phonological and morphological exceptions. In the former category, I discuss some initial-stressed forms which are accounted for neither under a fixed root-final nor a quantity-sensitive stress assignment analysis, and propose an epenthesis rule to account for them supported by patterns of speaker variation. In the latter category, I discuss some exceptional stress which falls on affixes, as well as irregular stress on plural forms. Finally, I briefly consider the role of loanwords in the Gitksan system and how loanword stress differs from and impacts native stress.

3.1 Phonological exceptions

Forms which end in the dorsal fricatives [xʲxʷχ] disproportionately display initial stress, often in a pattern that is not motivated by either of the analyses presented so far. Further investigation shows variation in many of these forms, both in their pronunciation by speakers and in their documented spelling (Hindle and Rigsby 1973).

(15) a. [tˀɪlxʲ ~ ˈtˀɪ.lixʲ] ‘(oolichen) grease’
b. [dɪlχ ~ ˈdɪ.laχ] ‘tongue’
c. [lanxʲ ~ ˈla.nixʲ] ‘throat’
d. [lɪmxʲ ~ ˈlɪ.mixʲ] ‘song’

Such variation is not limited to root-internal position, as demonstrated most obviously by variation seen in of the name of the language itself, in the derivational suffix /-əmχ/ ‘language’.

(16) [gɪt.ˈxsa.nɪmχ ~ gɪt.ˈxsa.nɪ.maχ] ‘Gitksan language’

I propose that this process, which sees variation both across and within speakers, as well as between lexical items, is the result of epenthesis between a preceding sonorant and an immediately following dorsal fricative, as formalized in (17).

(17) ∅ → ə / ...VR_X

Application of this epenthesis rule would, like epenthesis in glottalized clusters, apply after the assignment of stress. Unlike that epenthesis process, which holds only within the domain of the root, the domain of this rule is the whole word. An example is shown in Table 4.

The final total of necessary epenthesis rules thus stands at three for a quantity-insensitive analysis (one word-internal, and two root-internal), and two for a quantity-sensitive analysis (one word-internal, and one root-internal). With this variation accounted for, both analyses accurately predict the stress patterns found in Gitksan roots, but differ in the posited underlying representations of some forms.

Table 4: Stress assignment with late-stage epenthesis

x		Line 1
x)		Line 0
/ la	nx^{j} /	
[la	nix^{j}]	‘throat’

3.2 Morphological exceptions

Though to this point I have considered stress assignment a purely root-internal phenomenon, there are a small number of morphological exceptions to this generalization. These come in two categories: suffixal stress, and irregular plural stress.

I have so far identified three suffixes which take stress instead of the roots to which they attach. These are /-ul/, the human classifier which appears on numbers (18a–b), and the unidentified derivational suffixes /-eːʔ/ (18c) and /-əs(t)/ (18d).

(18)

	Root		*Derived*	
a.	[tχalpχ]	‘four’	[tχalpχ.ˈdul]	‘four (people)’
b.	[x^{w}sdɪns]	‘five’	[x^{w}sdɪn.ˈsul]	‘five (people)’
c.	[baɬ]	‘spread’	[bɪ.ˈɬeːʔ^{e}]	‘curtains’
d.	[tʔam]	‘mark’	[tʔɪ.ˈmɪs]	‘write’

Notably, of all of these suffixes, none seem to be currently productive. The human counter is found, predictably, only on the ten number words, and combines in a phonologically transparent fashion with only six of them (Hindle and Rigsby 1973; and see Tarpent 1983a for a thorough review of the development of Tsimshianic counting words). The /-eːʔ/ suffix is not used productively in speech; it is found on a limited set of nouns including [ʔi.ɬeːʔ^{e}] ‘blood’, which has no bare root form. Similarly, Rigsby (1986: 216) identifies the /-əs(t)/ suffix in only two words. It could perhaps be identified in the following final-stressed words as well, based purely on phonological resemblance:

(19)

a.	[bɪl.ˈʔust]	‘star’	PL: [bɪx.bɪl.ˈʔust]		(Hindle and Rigsby 1973)
b.	[sɢa.ˈʔnɪst]	‘mountain’	PL: [sɪx.sɢa.ˈʔnɪst]		
c.	[sgɪ.ˈnɪst]	‘jackpine’			

The above forms in (19) can be clearly identified as polysyllabic roots in speakers’ vocabulary by examining reduplicated plural forms, where available. Reduplication targets the root, and in these forms targets the unstressed first syllables rather than the syllable under stress (Tarpent 1983b). This indicates that the unstressed syllables cannot be interpreted as prefixes; they must be part of the root.[8]

[8]Regular plural-formation processes serve as a useful diagnostic in Gitksan for the position of the root, in fact, since these morphemes (whether reduplicative or simply prefixal) always appear immediately neighboring the root, separating away other prefixes. This diagnostic cannot always be utilized, however, as Gitksan plural forms are frequently irregular or suppletive, and many nouns—which comprise a large proportion of polysyllabic forms—have no distinct plural at all.

The above forms constitute evidence for two classes of affixes in Gitksan: the majority which do not impact stress, and these marked suffixes that apparently fall within the domain of stress assignment. There are two potential methods of accounting for such suffixes. First, these forms could simply have been analyzed by speakers as whole roots, though this seems unlikely for all cases. As roots, they would be subject to stress assignment as whole units, which would default to the right.

Alternatively, the stress assignment process may be cyclic, with a second round of stress assignment being triggered by only these marked suffixes. Following Halle and Vergnaud's (1987) notion of cyclic suffixes, implemented for cases such as Russian and Lithuanian dominant suffixes or English *-ity*, the addition of a cyclic suffix results in previous segmental material from Line 0 (that is, only the x marks) being copied into a new round of stress assignment on a distinct structural plane. This has the effect of erasing previous metrical constituents and allowing for a "fresh" round of stress assignment. Stress falls on the suffix, due to the rightward orientation of stress. Changes in the final vowel quality of the root may be due to reduction requirements for unstressed vowels. The process is exemplified in Table 5 below.

Table 5: Cycle A (root) and cycle B (suffix-triggered)

x		Line 1_A
x)		Line 0_A
/ tʔam /		'mark'
	x	Line 1_B
x	x)	Line 0_B
/ tʔam	-əs /	
[tʔɪ	mɪs]	'pencil'

The irregular plurals are another series of cases with irregular stress. These forms involve vowel lengthening, either within the reduplicant (20), or root-internally (21).[9]

(20)

	Sg	*Pl*	
a.	[noχ]	[ˈnoː.naχ]	'mother'
b.	[woq]	[ˈwoː.waχ]	'sleep'
c.	[naχ]	[ˈnaː.naχ]	'snowshoe'

(21)

	Sg	*Pl*	
a.	[gʷɪ.ˈla]	[gʷiː.ˈla]	'blanket'
b.	[gɪ.ˈʔnam]	[giː.ˈʔnam]	'give something'
c.	[gʷɪ.ˈneːqxʷ]	[gʷiː.ˈneːqxʷ]	'feel cold'

The stress patterns of these two types of irregular plural are split: in the forms where the reduplicant lengthens, stress shifts off the root to the newly-lengthened reduplicant vowel. Conversely, in

[9]Though the targets of these irregular plural formation mechanisms constitute very clear phonological classes, this does not mean that the processes are regular. Normal reduplication of the type in (20), for example, outputs singular/plural pairs such as [ʤoq] / [ʤaχ-ʤoq] *'dwell'*, or [maɢaj] / [maχ-maɢaj] *'rainbow'*.

the vowel-lengthening type shown in (21), stress is retained on the final syllable, rather than shifting it to the newly-lengthened first syllable.

The lengthened-reduplicant types in (20) could feasibly be analyzed as suppletive-like forms which are input whole into the initial root-level stress assignment process. In a weight-sensitive system, stress would be attracted leftward onto the heavy reduplicant. Alternately, these irregular reduplicants could have the same marked, cyclic status as the affixes discussed above, with a reduced stem form.

Table 6: An irregular plural with long reduplicant

x		Line 2
(x	x	Line 1
x)	x)	Line 0
wo:	waχ	'sleep.PL'

Under a root-final stress analysis, the root vowel in the forms in (20) must instead be input later in the course of the derivation via epenthesis (Rigsby 1986; Tarpent 1983b).

The vowel-lengthening types cannot be so analyzed; here, where length is a result of internal change, there appears to be no effect on stress. The assignment of stress on these forms is unproblematic for a root-final stress system regardless of what time in the course of the derivation vowel length is introduced, but in a weight-based system requires a special rule marked for these particular types of irregular plurals. Vowel lengthening must be the consequence of a morphological rule which follows the assignment of stress.

Table 7: Derivation for internal-change plurals

	x	Line 1
x	x)	Line 0
/ g^wi	la /	
g^wi:		V-lengthening
[g^wi:	la]	'blanket.PL'

In this subsection, I have reviewed two kinds of morphological exceptions to the previous generalization of root-internal stress. The first, suffixal stress, motivated the addition of cyclicity to the stress assignment mechanism, triggered by a small class of non-productive affixes. The second is of irregular plurals: weight seems to trigger the movement of stress from the root to the reduplicant, though in another class of irregular forms long vowels in the plural do not result in the movement of stress. For a weight-sensitive analysis, the difference in the latter two cases are accounted for largely as a matter of what stage in the derivation vowel length was introduced: as part of a semi-suppletive root or irregular cyclic prefix, or as a later rule of internal change.

3.3 The influence of loanwords

Remaining exceptions to the phonological generalizations put forth thus far are almost entirely loanwords from English, which retain the initial stress found in their source language despite being

otherwise phonologically nativized. Note that these forms were not necessarily borrowed by fluent bilinguals, as evidenced by the English plural *-s* frozen to the singular form in (22c).[10]

(22) a. [ˈbi.ja] ‘beer’
b. [ˈsu.gʷa] ‘sugar’
c. [ˈʤɪ.gɪnz] ‘chicken’

Related Coast Tsimshian also has a large number of English borrowings. Though initial stress is found there as well, stress is also frequently shifted to the final syllable, as in (23c–e) (Ts’msyen Sm’algya̲x Authority 2013).

(23) a. [ˈsweː.ta] ‘sweater’
b. [ˈpaw.da] ‘powder’
c. [su.ˈgʷa] ‘sugar’
d. [ka.ˈbɪts] ‘cabbage’
e. [ka.ˈpiː] ‘coffee’

The above forms demonstrate different nativization patterns in the different languages. While both languages demonstrate some non-native phonology in English loanwords (for example, prevocalic voiceless/aspirated stops, rather than voiced stops), only the Gitksan forms demonstrate consistently non-native stress as well. These differences could be attributed to different nativization strategies in the two languages (full nativization in Coast Tsimshian and only partial in Gitksan; see e.g. Itô and Meister 1995 and Pater 2005 for discussions on the organization of the lexicon in such situations). Alternately, or additionally, it might be attributed to differences in the languages’ stress systems, both of which are generally root-final (Tarpent 1994). It is possible that the productivity of the root-final stress assignment rule was stronger in Coast Tsimshian than in Gitksan at the time of loan adoption; the Gitksan system may have developed a higher degree of flexibility in incorporating initial-stressed forms without modification.

The role of non-Western loanwords in the Gitksan lexicon is also worthy of recognition. A significant body of loanwords come from the other Tsimshianic languages through contact and trade, and yet more come from neighboring Athabaskan languages and Tlingit, often in terms for animals. The distinctly different phonological shape of words from these languages (usually polysyllabic) versus those of Tsimshianic (usually monosyllabic) results in a large proportion of polysyllabic forms of foreign-language origin, potentially with foreign stress that must be nativized or accommodated.

If the properties of the stress assignment system are subject to the data available in a learner’s lexicon, then shifting proportions of root shapes and stress patterns during an influx of loanwords may have consequences for the next generation’s analysis. The existing system, no matter how simple, may not be maintained if it is not the best analysis for the new input.

4 Learnability, reanalysis, and lexical accent

Both analyses of the Gitksan stress system presented so far rely crucially on a learner’s ability to a) split the root from both productive and non-productive morphology, and b) systematically abstract

[10] I do not discuss names in this paper, but nativized English names are in frequent use in Gitksan, and all that I have heard also retain stress from English.

away from certain initial-stressed forms, creating monosyllabic underlying forms which undergo epenthesis. This section considers the problem of maintenance of such a system: how might root-internal stress systems be understood from the perspective of their learnability? I argue that these may be particular cases where lexically-specified accent systems emerge through reanalysis.

The learner's first step must be to determine that the stress system is root-based: this is presumably not too difficult a property to figure out, given a certain degree of morphological awareness: all that is needed is sufficient exposure to morphemes that neither receive stress nor shift the position of stress on the stems and roots to which they attach, despite changing the overall shape of the word. Subsequently, there are three aspects that learners must consider to evaluate the position of stress in unknown forms and come to a more specific analysis: phonological, morphological, and lexical.

Learners of all metrical systems must consider the effect of phonological structure on the position of stress (see e.g. Dresher 1999 for consideration of this learning process). Root-based stress systems are additionally dependent on a learner's acquired morphological knowledge, and thus have greater potential for change when morphology becomes frozen. In essence, I suggest that there may come a point where morphology become too opaque for a root-internal stress system to be passed on without modification.

Consider the following near-minimal pair in Gitksan. The first form is monomorphemic; the second vowel is derived via a regular phonological process epenthesizing "echo vowels" after postvocalic glottal stops (Rigsby 1986; Tarpent 1987). Thus, stress is not expected on the second vowel. The second form has the same shape, but is polymorphemic; stress occurs on the second vowel.

(24) a. [ˈmo.ʔon] /moʔn/ 'salt'
b. [mɪ.ˈʔɪn] /mə-ʔin/ 'smoke' cf. root: [jeːn] 'cloud'

Once phonological change has sufficiently distanced a derived form from its historical root such that a learner cannot transparently connect them, as could be the case in (24b), it is unclear how the derived form should be categorized with respect to root-status. Once the derived nature of a form is unclear, how might the system change in response?

The notion of pertinacity (discussed in metrical systems by e.g. Lahiri and Dresher 1999, Dresher and Lahiri 2005) is relevant here. Pertinacity concerns the aspects of a system that learners maintain—what remains constant in a language—when reanalysis occurs. The system itself may be maintained; it may be a robust enough system that exceptions do not hinder the learner from making the relevant generalization. Alternately, the output forms alone may be maintained, and the underlying system changed to accommodate it.

The first type of pertinacity is essentially a form of regularization of the input by the learner. This is what is seen in the Coast Tsimshian loans: full nativization of stress ([ˈkæ.bɪʤ] → [ka.ˈbɪts]). The same process could happen language internally as well, for either phonological or morphological reasons. Consider two forms from the hypothetical Language X below, based on Gitksan. InTable 8, a form which previously relied on epenthesis of its second-syllable vowel to derive an initial stress pattern is reanalyzed with two underlying vowels. Being an anomalous exception to both of the predictably root-final stress systems developed in Section 2, the form is eventually changed to fit the majority of the rest of the system. In Table 9, a historically complex form which was morphologically reanalyzed as atomic undergoes the same process.

The second kind of pertinacity does not involve change in the actual form of words, but rather in the internal organization of the system itself: it operates like output faithfulness. In a system

Table 8: Phonological reanalysis of *namk̲'ap* 'bank of stream' in Language X

/namqʔp/	→	[ˈnam.qʔap]	Stress derived by epenthesis
/namqʔap/	→	[ˈnam.qʔap] ?	Reanalysis of underlying form
/namqʔap/	→	[nam.ˈqʔap]	Reanalysis of stress

Table 9: Morphological reanalysis of *mi'in* 'smoke' in Gitksan'

/mə - ʔin/	→	[mɪ.ˈʔɪn]	Complex form
/miʔn/	→	[mɪ.ˈʔɪn] ?	Reanalysis of morphology
/miʔn/	→	[ˈmɪ.ʔɪn]	Reanalysis of stress

with a large number of idiosyncrasies, there may be a simpler analysis not held by adult speakers which is able to account for the data equally well, or better. If the learner encountering the system analyzes it with this method, then both old and new generations would produce the same output forms, but utilize different internal processes for storing and deriving them. An example would be the reanalysis of stress in Middle English, as discussed by Dresher and Lahiri (2005): the Germanic pattern of initial stress could not account for the influx of Latinate-stressed words borrowed from French. At some stage, learners acquired the Latinate stress pattern, which was able to account both for the loanwords and for the majority of native English words.

For root-based stress systems, which are subject to pressures of both morphological and phonological opacity, it is inevitable that eventually the learner will be dealing with a larger and larger number of forms that they cannot break down to the original root. When this happens, I suggest that one "simpler analysis" that learners might come to is one where stress is determined lexically, by the incorporation of underlying accent.

At what point does it become easier to determine the position of stress via memorization than by generalized rule? Yang (2005) discusses the critical threshold for the productivity of morphological rules: should the number of exceptions to a morphological rule fall above approximately 20% of the relevant lexicon, it cannot be analyzed as a productive rule. If this percentage can be taken as a generalized threshold that also holds for phonological rules, then, for a lexicon of about 180 roots, it would take about 35 exceptions for it to be just as much work to memorize all forms in the lexicon as "exceptional"—that is, lexically determined.

Let us assume that this is the case in Language Y. In this language, a combination of phonological and morphological reanalysis of root forms leads to an increasing number of forms having initial stress, some for no easily discernable reason such as vowel length. Learners of this language decide to mark these forms as exceptionally marked for stress, as in Table 10. When this number rises over the critical threshold of 20%, learners simply mark all forms for their underlying stress, as stress marking cannot be reliably called productive. This is shown in Table 11.

While it is unclear where Gitksan is in its diachronic development, I propose that the combined factors of morphological and phonological opacity in a root-based stress system might be one of the ways that lexical accent systems arise over time. As the rules determining the placement of root-internal stress become more complex, or as increasing numbers of exceptions to these rules develop, it would be increasingly likely for memorization of individual stress patterns to be a simpler, more

Table 10: Lexical stress marking for *namk̲'ap* 'bank of stream' in Language Y

/namqʔp/	→	[ˈnam.qʔap]	Stress derived by epenthesis
/namqʔap/	→	[ˈnam.qʔap] ?	Reanalysis of underlying form
/na̲mqʔap/	→	[ˈnam.qʔap]	lexically

Table 11: Lexical stress marking for *gwila* 'blanket' in Language Y

/gʷila/	→	[gʷɪ.ˈla]	Root-final stress
/gʷila̲/	→	[gʷɪ.ˈla]	Stress marked lexically

favorable option for achieving the correct output forms. For systems with small numbers of root forms, like Gitksan, the critical threshold for this simplification is much smaller.

5 Conclusion

In this paper I have described the stress patterns within polysyllabic roots in Eastern Gitksan (Gitxsanim̲x̲) and considered two potential metrical analyses: a fixed-stress analysis (Rigsby 1986), and a quantity-sensitive analysis. Both systems required additions to account for some initial-stressed exceptions to these rules. These included epenthesis (I discussed variation motivating a new type of epenthesis between sonorants and dorsal fricatives), and cyclic affixes capable of moving stress from the root. Further, I discussed some differences in the nativization of stress in loanwords between Gitksan, in the east, and related Coast Tsimshian, in the west. These differences were suggestive of different analyses at work in the metrical component between the two languages.

Finally, I discussed how such a metrical system might develop, based on two different notions of pertinacity: one resulting in the regularization of stress, and one resulting in underlying reanalysis that allowed for output faithfulness. Either of the two different outcomes might be expected on the basis of the size of the relevant lexicon and the number of exceptions a learner must account for.

I argued that the second option, where the output stress of all forms is retained but the underlying analysis is simplified, is a route by which lexically-based metrical systems may develop. A stress system's dependency on morphological knowledge means it will be vulnerable to the rise of morphological opacity: such a metrical system cannot be maintained if morphological knowledge is not correspondingly maintained.

The synchronic place of Gitksan on a continuum between regular root-internal productive stress assignment and lexically-determined stress is as yet unknown. This calls for future investigation into the question of speakers' morphological awareness.

References

Brown, J. (2008). *Theoretical Aspects of Gitksan Phonology*. PhD thesis, University of British Columbia.

Dresher, B. E. (1999). Charting the learning path: Cues to parameter setting. *Linguistic Inquiry*, 30(1):27–67.

Dresher, B. E. and Lahiri, A. (2005). Main stress left in Early Middle English. In *Historical Linguistics 2003: Selected Papers from the 16th International Congress of Historical Linguistics*, pages 74–85.

Halle, M. and Vergnaud, J.-R. (1987). Stress and the cycle. *Linguistic Inquiry*, 18(1):45–84.

Hindle, L. and Rigsby, B. (1973). A short practical dictionary of the Gitksan language. In *Northwest Anthropological Research Notes*, volume 7.

Idsardi, W. (1992). *The Computation of Prosody*. PhD thesis, MIT.

Itô, J. and Meister, R. A. (1995). The core-periphery structure of the lexicon and constraints on reranking. In *Papers in Optimality Theory. University of Massachusetts Occasional Papers*, volume 18, pages 817–838.

Lahiri, A. and Dresher, B. E. (1999). Open syllable lengthening in West Germanic. *Language*, 75:678–719.

Pater, J. (2005). Learning a stratified grammar. In Brugos, A., Clark-Cotton, M. R., and Ha, S., editors, *Proceedings of the 29th Boston University Conference on Language Development*, pages 482–492. Cascadilla Press.

Revithiadou, A. (1999). *Headmost accent wins: Head dominance and idea prosodic form in lexical accent systems*. PhD thesis, Leiden University.

Rigsby, B. (1986). *Gitxsan Grammar*. Ms., University of Queensland, Australia.

Schwan, M. D. and Anghelescu, A. (2013). Nuclear consonants in Gitksan. Poster presented at the Canadian Linguistic Association, Victoria BC.

Tarpent, M.-L. (1983a). The evolution of the Nisgha counting system: A window on cultural change. In *Working Papers of the Linguistics Circle*, volume 3. University of Victoria.

Tarpent, M.-L. (1983b). Morphophonemics of Nisgha plural formation: A step towards Proto-Tsimshian reconstruction. In *Studies in Native American Languages II*, volume 8. Kansas Working Papers in Linguistics.

Tarpent, M.-L. (1987). *A Grammar of the Nisgha Language*. PhD thesis, University of Victoria.

Tarpent, M.-L. (1994). Tsimshianic stress assignment and the words for MEAT, BEAR. In *Proceedings of the 29th International Conference on Salish and Neighbouring Languages*.

Ts'msyen Sm'algyax Authority (2013). Sm'algyax living legacy talking dictionary. M. Anderson (editor). Prince Rupert, B.C.

Vigário, M. (1997). The prosodic status of stressless function words in European Portuguese. In Hall, T. A. and Kleinheinz, U., editors, *Studies on the Phonological Word*, pages 255–294. John Benjamins Publishing Company.

Yang, C. (2005). On productivity. *Linguistic Variation Yearbook*, 5:265–302.

The phonology of reduplication in Paraguayan Guaraní*

Khashayar Hamidzadeh and Kevin Russell
University of Manitoba

Abstract: This paper outlines the phonological patterns of verb reduplication in Paraguayan Guaraní and discusses the challenges it poses for crosslinguistic generalizations about reduplication and prosody. The basic pattern is to copy the last two verb syllables of the verb root. If the verb root has only one syllable, phonological material from neighbouring morphemes must be included in order to satisfy the disyllabicity requirement. All morphemes to the left of the root are easily included in the copy; only a subset of morphemes to the right can be included, and these with a high degree of inter- and intra-speaker variability. Morpheme integrity requirements are stronger for affixes than for lexical roots. Finally, the disyllable that is copied appears to be just a sequence of two syllables and cannot be insightfully characterized as a prosodic constituent (iamb, minimal word).

Keywords: reduplication, Guaraní

1 Introduction

This paper outlines the challenges posed by Paraguayan Guaraní (Tupí-Guaraní; Paraguay) for cross-linguistic generalizations about reduplication and prosody. Our data is drawn from elicitation work with native speakers and from a corpus of spoken and written texts.

We are deeply indebted to the speakers we have worked with, who are (with the communities where they learned Guaraní):

- Vicente Cardozo (Yaguarón and Asunción)
- David Barrios (Ca'aguazú)
- Jazmin Pinazzo (near Asunción)
- Melki Melgarejo (near Concepción)
- Evelia Careaga (Asunción)
- Liza Amarilla (Ca'aguazú)
- Luz Ojeda (early Spanish/Guaraní bilingual, Asunción)

All elicitation work that was specifically focussed on reduplication took place with the first five speakers.

The following two examples from Guaraní works of fiction illustrate the most common pattern of reduplication: the final two syllables of a two- or three-syllable verb root are copied — the whole root /ɟoˈpɨ/ in (1) and the second two syllables of /ãpɨ̃ˈsẽ/ in (2).[1]

*We would like to thank our speakers for their superhuman patience. The field methods course that this research arose from was funded in part by a special grant front the office of the Dean of Arts and continuing research was funded in part by grant from the University of Manitoba/SSHRCC small grants program.
Contact info: Kevin.Russell@umanitoba.ca, umhamidk@myumanitoba.ca

[1] Abbreviations used in this paper: 3P.SUBJ = third person plural subject, A1P.E = first person plural exclusive Set-A person prefix, A1P.I = first person plural inclusive Set-A person prefix, A1S = first person singular Set-A person prefix, A3 = third person Set-A person prefix, B1P.E = first person plural exclusive Set-B person pre-

(1) from chapter 3 of the novel *Kalaíto Pombéro*, Zarratea (1981)

... nda- i- katú -i voi avave o- u che-rembe'y-jopy **jopy** ...
NEG-B3-possible-NEG EMPH nobody A3-come B1S-edge- press REDUP
'... nobody can push me around [repeatedly on my edges, like a pie crust], ...'

(2) from the short story "Jevy ko'ẽ", Delgado (2007)

Amógotyo mie o- hecha iñ- apysẽ **pysẽ** óga tuja mi -mi ...
more.over.that.way A3-see B3-poke.out REDUP house old DIM-DIM
'A little further he saw a few old houses poking up,...'

The final syllables of both the base and the reduplicant are stressed, with primary stress falling on the reduplicant suffix (unless it is drawn even further right to another stressable suffix, see below).

The reduplicative construction has several related meanings that are often grouped together under the heading of "pluractionality" in the semantics literature (e.g., Lasersohn 1995). The most common of these are: distributive over some participant in the clause (agent, patient, etc.), dispersion in time (iteratively, repeatedly, or intermittently), dispersion in space ("here and there", and by extension, "carelessly"), as well as continuousness and durativity (see Hamidzadeh 2013).

In discussing reduplication across the Tupí-Guaraní family, Rose (2005) distinguishes between monosyllabic and disyllabic reduplication, with different semantics. Paraguayan Guaraní keeps only the old disyllabic pattern productively. Old monosyllabic reduplications remain only in fossilized verb roots (often onomatopoeic), such as *kirirĩ* [kĩɾĩˈɾĩ] 'be quiet' and *tyryry* [tɨɾɨˈɾɨ] 'get dragged' (there being no extant roots *kirĩ* and *tyry*).

Many verbs show free variation (within and between speakers) between full reduplication of the root and two-syllable partial reduplication. All verbs may undergo partial reduplication, which we restrict our attention to here. There is also a formally similar reduplication process for adverbs and numerals, which we will likewise not discuss here.

2 Background

Regular stress in Guaraní falls on the final syllable of the rightmost stressable morpheme. Stressable morphemes include all verb and noun roots, as well as a number of suffixes, including totalitive *-pa*, *-se* 'want to', *-vy* 'somewhat', *-(e)te* 'very'. Unstressable suffixes, such as future *-ta*, perfective *-ma*, and the relative clause marker *-va*, generally (but far from always) follow stressable suffixes. There are a number of exceptional lexical roots where the stressable syllable is non-final, such as *ajúra* [aˈɟu.ɾa] 'neck'.

The inventory of Guaraní is given in (3). Every phoneme has a form that appears within a nasal span and a form that occurs elsewhere, respectively indicated to the right and left of the slashes in (3). Nasal spans can be analyzed as the result of a harmony process spreading nasality leftward

fix, B1S = first person singular Set-B person prefix, B2P = second person plural Set-B person prefix, B3 = third person Set-B person prefix, CAUS = causative, COM.CAUS = comitative causative, DIM = diminutive, EMPH = emphatic particle, INCL = inclusive, NEG = negative, OPT = optative, PASS = passive, PL = plural, REDUP = reduplicant, REFL = reflexive, REL = relative, TOT = totalitive (exhaustive aspect/quantification).

from the stressable syllable of a lexical root, or from any prenasalized consonant, across any grammatical prefixes to the beginning of the word (cf. Piggott and Humbert 1997). The two halves of the reduplication construction form separate domains for nasal harmony.[2]

(3)	p/p	t/t		k/k	kʷ/kʷ			i/ĩ	ɨ/ɨ̃	u/ũ
	mb/m	nd/n	ɟ/ɳ	ŋg/ŋ	ŋgʷ/ŋʷ			e/ẽ		o/õ
		s/s	ʃ/ʃ			h/ɦ			a/ã	
	ʊ/ʊ̃	ɾ/ɾ̃		ɯ/ɯ̃	w/w̃					
		l/l̃								

Syllable structure in the native vocabulary is simple (C)V, though it can be more complicated in Spanish loanwords and in a small handful of non-Spanish words of uncertain origin.

The only practical problem in defining the syllables of Guaraní is how to deal with sequences of a vowel followed by an unstressed high vocoid. Alongside the obviously disyllabic root *hai* [haˈi] 'write', there's the questionable root *hái* 'sour'. it is possible that the final *i* might be an entire unstressed syllable — the analysis that appears to be favoured by Gregores and Suárez (1967) — since both onsetless syllables and exceptionally stressed roots exist independently. The final *i* might also be syllabified as an off-glide into the same syllable as the *a*; this is the analysis that Krivoshein de Canese and Acosta Alcaraz (2001) assume without argument. Similar situations can arise even if the first vowel is unstressed; for example, does the root *saingo* 'hang' have two syllables [sãĵ.ŋgo], or three [sã.ĩ.ŋgo]?

Reduplication is the only phonological process we have found where the answer to this question matters. Such sequences count as a single syllable for the purposes of the disyllabicity requirement:

(4) a. o- saingo saingo [o . sãĵ̩.ŋgo . sãĵ̃.ŋgo]
A3-hang REDUP
'they hang here and there'

b. * o- saingo ingo *[o . sã.ĩ̩.ŋgo . ĩ̃.ŋgo]
A3-hang REDUP
'they hang here and there'

3 What copies?

Most roots in Guaraní are two or three syllables long, but there are several monosyllabic roots, some of which are listed in (5).

[2] In the standard orthography, stress on a final syllable is unmarked. Stress on a non-final syllable is marked by an acute accent. Nasality is marked by a tilde on the rightmost vowel of a nasal span, unless nasality on that vowel is predictable from one of the surrounding consonants. A non-final stressed nasal vowel is marked only with a tilde, not with both a tilde and an acute accent.

(5) Some monosyllabic verb roots:

dynamic			stative		
mýi	[mɨ̃ȷ̃]	‘move, budge’	*he*	[hɛ]	‘tasty, delicious’
po	[po]	‘jump’	*ne*	[nɛ̃]	‘stink’
sẽ	[sɛ̃]	‘go out, leave’	*kã*	[kã]	‘dried’
páy	[paɨ̯]	‘wake up ’	*sýi*	[sɨj]	‘slippery’
so	[so]	‘be torn, escape’			
pẽ	[pɛ̃]	‘get broken’			
kái	[kaj]	‘get burned’			
ke	[kɛ]	‘sleep’			
’u	[ʔu]	‘eat, drink’			

In order for these monosyllabic roots to be reduplicated, additional material from neighbouring morphemes needs to be incorporated. In this section, we give a quick overview of the structure of the Guaraní verbal complex. In the next two sections, we consider which morpheme classes in this complex can and cannot donate phonological material to satisfy the disyllabicity requirement of reduplication.

3.1 The Guaraní verbal complex

The morphemes of interest in the Guaraní verbal complex follow the order in (6), of which only the person prefix and the root are obligatory.

(6) Positions in the Guaraní verbal complex

optative prefix	*t(a)-*
negative prefix	*nd(a)-*
PERSON prefix	e.g., *o-, i-, ñande-, ore-*
voice prefixes	reflexive/passive, reciprocal, causative, antipassive
incorporated noun	
ROOT	
derivational suffixes	e.g., *-vy* ‘somewhat’
control predicate suffixes and magnitude suffixes	*-se* ‘want to’, *-pa* ‘do entirely’, *-kuaa* ‘know how to’, intensifiers ‘very’, diminutives, *-ve* ‘more’
mood/aspect suffixes	e.g., future *-ta*, uncertain *-ne*, perfective *-ma*
...	many other mood, aspect, negative, and complementizer suffixes

The verbal complex is defined by its ability to occur as a constituent in front of second-position question and evidential clitics. How far to the right the verbal complex must or can extend is hazy/variable, but fortunately that is irrelevant for reduplication. Reduplication cannot incorporate phonological material from any suffix in or after the “mood/aspect” position (except, as we will see below, the negative suffix *-i*).

4 Material before the root copies easily

In this section, we will move leftwards through the positions in the verbal complex sketched in (6), from closest to the verb root left to the start of the verbal complex, and see that each of them is capable of donating phonological material to satisfy the disyllabicity requirement (for most speakers in most cases).

4.1 (Portions of) incorporated nouns

Guaraní has a morphological process of noun incorporation that can place a noun root immediately to the left of the verb root inside the verbal complex (Velázquez-Castillo 1996). This incorporated noun may donate material to the reduplicant, as *po* 'hand' does in (7) to fill out the monosyllabic verb root *héi* [hej] 'wash'.

(7) Ñande ja- je- **po-** héi pohéi. [ɟa.ɟe.poˌhej . poˈhej]
we.INCL A1P.I-REFL-**hand-**wash REDUP
'We're washing our hands over and over.'

If, as is likely, the incorporated noun has more than one syllable, reduplication copies only the one syllable necessary for satisfying the disyllabicity requirement. For example, the only the second syllable of the incorporated noun *akã* [ãˈkã] 'head' is included in the reduplicant in (8):

(8) Oñ-**akã-** 'o kã'o umi kure. [õ.ɲã.kãˌʔo . kãˈʔo]
A3- **head-**remove REDUP those pig
'They kept cutting heads off the pigs.'

We may note in passing that the reduplicant syllable corresponding to the bound verb root /ʔo/ and that corresponding to the noun syllable /kã/ are faithful in nasality to their respective base syllables. This creates a disyllable that is otherwise ill-formed under Guaraní nasal harmony: an unstressed nasal syllable followed by a stressed oral syllable in the same "morpheme".

4.2 Voice prefixes

To the left of any incorporated noun in the verbal complex come one or more of a set of prefixes that manipulate the argument structure of the resulting verb:

(9)

je-/ñe-	[ɟe]/[ɲẽ]	reflexive, passive, impersonal
jo-/ño-	[ɟo]/[ɲõ]	reciprocal
mbo-/mo-	[mbo]/[mõ]	causative (for an intransitive verb)
(gue)ro-	[(we)ɾo]/[(w̃ẽ)ɾ̃õ]	comitative causative ('make s.b. do with one')
poro-	[poɾo]/[põɾ̃õ]	antipassive (on human patients)

These prefixes, too, can donate material to fill out an otherwise undersized reduplicant:

(10) Umi avakachi o- **je-** ʾu jeʾu -pa. [o.ɟe̯.ʔu . ɟe.ʔu ˈpa]
those pineapple A3-PASS-eat REDUP-TOT
'Little by little, all the pineapples were eaten.'

(11) Haʾe o- **mo-** pẽ mopẽ pe yvyrarakã. [õ.mõ̯.pẽ . mõˈpẽ]
he A3-CAUS-break REDUP the tree.branch
'He broke the branch into pieces.'

4.3 Person prefixes

Guaraní has two sets of person prefixes:[3]

- Set A: for the agents of dynamic verbs (including all syntactically transitive verbs)
- Set B: for the subjects of (intransitive) stative verbs/adjectives and the patients of transitive verbs, as well as noun possessors.

Only one person prefix gets marked on a transitive verb, whichever ranks higher on the person hierarchy: 1 > 2 > 3. The person prefixes are listed in (12); again, the forms used in oral and nasal spans are separated by a slash.

(12)

	Set A		Set B	
1sg	*a-*	[a] / [ã]	*che-*	[ʃe] / [ʃẽ]
2sg	*re-*	[ɾe] / [ɾ̃ẽ]	*nde-* / *ne-*	[nde] / [nẽ]
3	*o-*	[o] / [õ]	*i-* (or *h-*)	[i] / [ĩ]
1pl.incl	*ja-* / *ña-*	[ɟa] / [ɲã]	*ñande-* / *ñane-*	[ɲãnde] / [ɲãnẽ]
1p.excl	*ro-*	[ɾo] / [ɾ̃õ]	*ore-*	[oɾe] / [õɾ̃ẽ]
2pl	*pe-*	[pe] / [pẽ]	*pende-* / *pene-*	[pẽnde] / [pẽnẽ]

Material from a person prefix will copy in reduplication if the verb root is monosyllabic and there is no intervening incorporated noun or voice prefix that can donate material instead. The most commonly cited example of this in the Tupí-Guaraní literature is with the monosyllabic verb root *po* 'jump' (e.g., Jensen 1998; Rose 2005):

(13) **a-** po apo [a̯.po . aˈpo]
A1S-jump REDUP
'I jump over and over.'

[3] Which set a person prefix belongs to is indicated at the beginning of its gloss in our interlinear examples, e.g., A1S, B3. We follow Tonhauser (2006) in the terminology of "Set A", "Set B", as well as "dynamic" and "stative" verbs.

(14) **I-** hái ihái ko'ã apepu. [i˛haj . i'haj]
B3-sour REDUP these orange
'These oranges are sour.'

A more complicated situation occurs when a monosyllabic stative verb/adjective root is preceded by one of the Set B person prefixes that have two syllables, *ñande-*, *ore-*, or *pende-*, something which is quite rare in practice. Speakers differ on what to do in this situation. Some speakers copy both syllables of the prefix, even if this results in a three-syllable reduplicant, and reject attempts to copy only part of the prefix:

(15) a. **ore-** ne **ore**ne [õ.ɾẽ˛nẽ . õ.ɾẽ'nẽ]
B1P.Estink REDUP

b. * o**re-** ne **re**ne [õ.ɾẽ˛nẽ . ɾẽ'nẽ]
B1P.Estink REDUP
'We each stink'

(16) a. **pende-**sýi **pende**sýi [pẽ.nde˛sɨj . pẽ.nde'sɨj]
B2P- slippery REDUP

b. * pe**nde-**sýi **nde**sýi [pẽ.nde˛sɨj . nde'sɨj]
B2P- slippery REDUP
'You guys are slippery.'

Other speakers are unable to reduplicate verbs like *ore-ne* at all, though one speaker finds splitting the prefix (?**ore-ne rene*) less bad than preserving both prefix syllables (**ore-ne orene*) or using a one-syllable reduplicant (**ore-ne ne*), and another speaker finds the one-syllable reduplicant (??*ore-ne ne*) less bad than the other options.

The disyllabicity requirement of reduplication is strong enough that it can even summon person prefixes into being which would otherwise be very unlikely to occur. A small number of stative verbs/adjectives (especially some of those expressing colour and size) are almost always used without person prefixes, even when they are clausal predicates. For our speakers, it would not be strictly ungrammatical to have the third person prefix *i-* on *hũva* in (17), but it is strongly dispreferred:[4]

(17) Peru o- hecha heta mbarakaja **hũ** -va.
Pedro A3-see many cat **black** -REL
'Pedro saw many cats that were black.'

But the dispreferred prefix becomes obligatory when *hũ* is reduplicated:

(18) Peru o-hecha heta mbarakaja **i-** hũ **ihũ** -va. [ĩ˛hũ . ĩ'hũ .ʊa]
B3-black REDUP -REL
'Pedro saw many cats, each of which was black.'

[4]The relative clause suffix *-va* is unnecessary for expressing the meaning 'black cat', but its presence makes it clear that *hũ* 'black' here is acting not as a bare attributive adjective to 'cat', but as the predicate of a relative clause and thus something that should normally have a person prefix. As seen in (18), relative *-va* is too late in the verbal complex to fall within the domain of reduplication.

4.4 The negative prefix

Guaraní expresses most clausal negation using a negative prefix *nd-/n-* paired with a negative suffix *-i/-iri* on the verbal complex. For some speakers, the negative prefix can be included in the reduplicant if a following vowel-initial person prefix is also being copied.

(19) Umi mitã **nd-** o- hó-**i** **nd**ohó**i** jepi eskuéla =pe. [ndoˌhoj ndoˈhoj]
those child NEG-A3-go-NEG REDUP repeatedly school =to
'From time to time, the children do not go to school.'

Note that copying the negative prefix is unnecessary for the purposes of satisfying the disyllabicity requirement — copying the onset-less person prefix *o-* alone would have sufficed for that.

Note also that the [-i] of the negative *suffix* is also included in the reduplicant in (19), despite the fact that it occurs much further to the right in the verbal complex outlined in (6) than anything else that ever gets copied in reduplication.[5]

Other speakers are unable to reduplicate a negative verb using any pattern. Given the fact that the same speakers can copy the even earlier optative prefix, as discussed in the next section, it is possible that their inability to reduplicate a negative verb has more to do with the odd status of the negative *suffix* than with the negative prefix: perhaps these speakers cannot include the negative suffix because it is outside the domain of reduplication, nor can they exclude it disrupting the correspondence between the reduplicant's and the base's final syllables.

4.5 The optative prefix

The optative prefix at the beginning of the verbal complex may be copied:

(20) Ere chupekuéra **t-** o- sẽ tosẽ Paraguái =gui. [tõˌsẽ . tõˈsẽ]
you.say to.them OPT-A3-go.out REDUP Paraguay=from
'Tell them to leave Paraguay separately.'

Copying only the person prefix and not the optative prefix in (20) would result in *t-o-sẽ osẽ*, which one speaker judges as rather bad and one speaker judges as fine (though not as good as *tosẽ tosẽ*).

it is possible, but not obvious, that the (somewhat optional) copying of the optative prefix is motivated by a weak desire to preserve the syllabic integrity of the base. A similar effect is found with epenthetic consonants between the person prefix and the root. For example, if the B3 prefix *i-* comes before the vowel-initial root *ayvu* 'be noisy', the two vowels are separated by an epenthetic palatal /ɟ/, making *ij-ayvu*.[6] This epenthetic consonant may either be copied in the reduplicant, as in (21a), or not, as in (21b).

[5] The speaker of (19) also accepts the version of the sentence where the negative suffix is not copied, but occurs only once after the entire base-reduplicant pair: *ndoho ndohó**i***. This appears to be the result the optional process of *j*-deletion that this speaker uses, as discussed in Subsection 6.1.

[6] The sound that we've been transcribing /ɟ/ actually varies freely between affricate [ɟʝ], a more plosive [ɟ], fricative [ʝ], and approximant [j], with the affricate being the most common. This epenthesis process is morphologically governed — as can be seen on almost every page of this paper, Guaraní has no general aversion to sequences of vowels.

(21) a. I**j-** ayvu **j**ayvu hikuái. [i.ɟaɨ̯.ʊu . ɟaɨ̯ˈʊu]
B3-be.loud REDUP 3P.SUBJ

b. I**j-** ayvu ayvu hikuái. [i.ɟaɨ̯.ʊu . aɨ̯ˈʊu]
B3-be.loud REDUP 3P.SUBJ
'They're all noisy.'

5 Stressable suffixes sometimes copy

There are a handful of stressable suffixes that can occur close to the right of the verb root, before any unstressable suffixes. The most important of these are:

(22)			
	-vy	[ˈʊɨ]	mitigative 'somewhat, a little'
	-'i, -mi	[ˈʔi], [ˈmĩ]	diminutive
	-pa	[ˈpa]	totalitive 'all, finish, completely'
	-se	[ˈse]	'want to'
	-ve	[ˈve]	'more' (e.g., to form comparatives)
	-(u)ka	[uˈka], [ˈka]	causative (for a transitive verb)
	-ete/-ite/-te	[eˈte], [iˈte], [ˈte]	intensifier 'very, a lot'
	-eterei/-iterei/-terei	[tereˈi], [itereˈi], [tereˈi]	intensifier 'very, a lot'

In order to satisfy the disyllabicity requirement with a one-syllable root, stressed suffixes sometimes cannot, sometimes can, and sometimes must copy. Some representative examples of this complexity are shown in (23):

(23)		suffix not copied	suffix copied
a.	o- kai **-vy** A3- burn -somewhat	*[o.kaj . o.kaj ˈvɨ]	[o. kaj.vɨ . kajˈvɨ]
b.	ha- 'u **-ka** A1S- eat -CAUS	*[ha.ʔu . ha.ʔu ˈka]	[ha.ʔu.ka . ʔuˈka]
c.	ro- sẽ **-mi** A1P.E- go.out -DIM	?[ɾõ.sẽ . ɾõ.sẽ ˈmĩ]	[ɾõ. sẽ.mĩ . sẽˈmĩ]
d.	o- puka **-vy** A3- laugh -somewhat	[o. pu.ka . pu.ka ˈvɨ]	[o. pu.ka.vɨ . kaˈvɨ]
e.	o- je- 'u **-pa** A3- PASS- eat -TOT	[o. ɟe.ʔu. ɟe.ʔu . pa]	[o.ɟe. ʔu.pa . ʔuˈpa]
f.	i- ro **-ve** B3- bitter -more	[i.ɾo i.ɾo ˈve]	*[i.ɾo.ve . ɾoˈve]

The mitigative suffix *-vy* 'somewhat' copies obligatorily in *kai-vy* 'burn a little' in (23a), but only optionally in *puka-vy* 'laugh a little, i.e., smile' in (23d) — a much more conventionalized sequence.

Maybe this is because reduplication would rather copy the suffix in (23a) than a person prefix. On the other hand, it has no problems with obligatorily copying the person prefix in (23f) in preference to the suffix *-ve* 'more'.

The most extreme fully inflected but sub-minimal verb is the monomoraic *he* [he] 'it is tasty'.[7]

(24) * he he
3.tasty REDUP

The only way a verb with the root *he* can be reduplicated is if it has the intensifier suffix *-terei*, which it typically has even when not reduplicated. (Note that all three syllables of *-terei* are copied, even though only two are necessary.[8])

(25) Umi pakova-kuéra he **-terei** terei. [he.te.re̯.i . te.re'i]
those banana-PL 3.tasty**-very** REDUP
'The bananas all taste good.'

6 The reduplicant is not an iamb

Since reduplication copies disyllables which are stressed on the second syllable, it would be reasonable to think Guaraní's reduplicative template is an iamb, but this would lead us to expect some of the properties that tend to go with such iambs crosslinguistically. Iambic stress systems often require the left syllable to be light/short and the right syllable to be heavy/long, and, even when it is not a absolute requirement, they often conspire to create a short–long asymmetry, or at the very least to avoid a long–short asymmetry (cf. Hayes 1995).

This description does not fit disyllabic reduplication in the Tupí-Guaraní languages in general, where, as discussed by Rose (2005), disyllabic reduplication goes out of its way to create a sequence of two short (monomoraic) syllables. Even in those languages that, unlike Paraguayan Guaraní, have kept their historical coda consonants, these are deleted in the reduplicant, as in the following example from Emérillon, where the final coda *g* does not appear in the (infixed) reduplicant, even though including it would have resulted in a perfect iamb:

(26) A- **lowa-** lo- wag pol.
A1S-REDUP-COM.CAUS-go pot
'I moved the pot several times.' (Emérillon, Rose 2005)

It seems dubious that reduplicative template in Emérillon and other Tupí-Guaraní languages should be described as an iamb, and Paraguayan Guaraní is no different. With no coda consonants in its native vocabulary, the only thing that could make a syllable heavy is the offglide of a

[7] *He* is one of a large number of stative verbs in Guaraní where third person is marked by the fact that the stem-initial consonant is /h/ — rather than /ɾ/, as it is in other persons — and where no separate Set-B *i-* prefix is used.

[8] This may be a general constraint favouring the morphological integrity of suffixes, parallel to the same speaker's insistence on copying both syllables of a two-syllable person prefix. But it could also be a quirk of the particular suffix *-eterei*, whose last two syllables would be confusable with a different suffix, *-rei* 'uselessly, in vain, for no good reason'.

diphthong. If diphthongs do create a heavy syllable, this turns out to be completely irrelevant for reduplication. Guaraní does not show the slightest dislike of heavy–light reduplicants: for example, *o-saingo-saingo* [o.saj.ŋgo saj.ŋgo] 'hangs-REDUP'. In Subsection 6.1, we will see that many Guaraní speakers preserve a reflex of the historical pattern of coda deletion exemplified in (26). In Subsection 6.2, we will look at cases where reduplication seems indifferent even to the stress pattern of the reduplicant, allowing stressed–unstressed disyllables as well as unstressed–stressed.

6.1 *j*-deletion

If Guaraní diphthongs create a heavy syllable, then both bases and reduplicants with the favoured iambic shape of light–heavy can arise spontaneously with verbs that end in a diphthong, such as *sapukái* [sapuˈkaj] 'shout'

(27) o- sapukái **pukái** [o.sa.puˌkaj . puˈkaj]
A3-shout REDUP
'she shouts...'

And indeed speakers can reduplicate *sapukái* as in (27). Yet, perversely, many speakers also have a process that deletes the final glide from the diphthong of the base, resulting in a sub-optimal iamb there:

(28) Peru o- sapuk**a** puk**ái** korapý =pe. [o.sa.puˌk**a** . puˈkaj]
Pedro A3-shout REDUP back.yard=to
'Pedro kept shouting in the backyard.'

Of the four speakers we have tested with roots like *sapukái*, two use *j*-deletion in their own speech, and two do not use it in their own speech but recognize it as something other speakers do. For the speakers who use *j*-deletion, there is a complex pattern of obligatoriness and optionality that we have not figured out yet. For example, for speaker VC, *j*-deletion appears to be obligatory for the root *hy'ái* [hɨˈaj] 'sweat' in (29), but is odd to ungrammatical for the root *hesarái* [hesaˈraj] 'forget' in (30).[9]

(29) Umi hugador-kuéra hy'**a** hy'**ai** -pa. [hɨˌʔa . hɨ.ʔaj . ˈpa]
those player -PL 3.sweat REDUP -TOT
'Each of the players is sweating profusely.'

(30) ?? Hesar**a** sar**ái** jepi iñ- aranduká=gui. *[he.saˌɾa saˈɾaj]
3.forget REDUP repeatedly B3-book from
'She often forgets her book.'

Trying to maintain that Guaraní reduplication involves iambs would require one or more of the following additional stipulations or mechanisms to cope with *j*-deletion — all of them otherwise unmotivated synchronically in the language:

[9]For speaker VC, this deletion process cannot apply to any glide other than *j*, such as the [w] of *karáu* 'twisted' or the [ɨ̯] of *páy* 'wake up'. Apart from this and a moderate dispreference for using *j*-deletion on stative verb roots, we have not been able to figure out any pattern distinguishing the set of roots that VC can use *j*-deletion for — including *purahéi* 'sing', *johéi* 'bathe', *vevýi* 'smooth', *kúi* 'fall' — and those which he cannot — including *kái* 'burn', *uhéi* 'be thirsty', *mondýi* 'be scared', *kuerái* 'be irritated'.

- There is an active attempt to destroy the preferred light–heavy asymmetry in an iamb that bears secondary stress.
- The reduplicant is more faithful to the underlying representation of the root than the base itself is.
- The reduplicant affix is infixed inside the final syllable of the base. (Historically at least, this one appears to have been closest to right.)

6.2 Apparent trochees

One underived stative verb in the native vocabulary has a trochaic rather than an iambic shape: *héra* [ˈhɛ.ɾa] ‘be named’. These two syllables alone can satisfy the disyllabic requirement, which would be surprising if reduplication copied an iamb:[10]

(31) Ore- mbo- héra héra hikuái. [õ.ɾ̃ẽ.mbo . ˌhe.ɾa ˈhe.ɾa ...]
B1P.E-CAUS-be.named REDUP 3P.SUBJ
‘They gave us each a nickname.’

Guaraní has borrowed from Spanish several other stative verbs/adjectives with an unstressed final syllable, including several that have become thoroughly nativized over the centuries, for example, *výro* [ˈʊɨ.ɾo] ‘silly, naive’, originally from Spanish *burro* ‘donkey’. One of our speakers treats such trochaic roots exactly the same way as *héra* ‘be named’ — sufficient on its own to satisfy the disyllabicity requirement:

(32) I- výro výro umi arriero-kuéra. [iˌʊɨ.ɾo . ˈʊɨ.ɾo ...]
B3-silly REDUP those guy -PL
‘Those guys are all silly.’

Other speakers treat Spanish loanwords differently: the two syllables of the root are not sufficient to satisfy the disyllabicity requirement and the person prefix is raided for an extra syllable, as in (33); however, both syllables of the root must still be reduplicated — an apparent morphological integrity condition that we do not find at all with native Guaraní verb roots. This pattern may be more morphologically than phonologically governed.[11]

[10] It may be worth pointing out that, in contrast to the soul-searching that accompanied some of the other questions during our elicitation sessions, all five speakers reduplicated *ombohéra* as in (31) instantly, without any prompting, and with complete confidence.

Many nouns in the native vocabulary also end in a trochaic stress pattern, and virtually any noun can be converted into a stative verb of possession. Unfortunately for phonologists, derived verbs of possession cannot undergo reduplication, no matter what their prosodic shape.

[11] it is possible that the pattern of (33) may be due to an almost purely morphological constraint on one stratum of the lexicon. The one speaker with whom we have tested longer borrowed stative verbs shows the same pattern as in (33) — copying both the person prefix and the entire root — no matter how long the root is, e.g., *i-simapéna isimapéna* ‘they procastinate (REDUP)’, *i-malisióso imalisióso* ‘they’re sly (REDUP)’. He applies the same pattern to *i-plíki iplíki* ‘they’re languorous (REDUP)’, where the phonotactically aberrant *plíki* is of uncertain (but probably not Spanish) origin. We mentioned in the introduction that many Guaraní verb roots have the option of using full reduplication as well as partial (disyllabic) reduplication; the only new twists

(33) I- výro ivýro umi arriero-kuéra. [iˌʊɨ.ɾo . iˈʊɨ.ɾo ...]
B3-silly REDUP those guy -PL
'Those guys are all silly.'

It would seem that the historic reduplication pattern of copying two monomoraic syllables has been liberalized (to varying degrees for different speakers) towards a pattern that copies any two syllables, of any weight and with any stress pattern. At no point in the present or reconstructable past has the reduplicant had the properties of a prototypical iamb.

7 Conclusion

We have seen that the Guaraní reduplicant is minimally disyllabic. The disyllabicity requirement is preferentially satisfied with material from the verb root. However, if the root has only one syllable, then material between the verb root and the left edge of the verbal complex is available for copying. Most of the material in the verbal complex to the right of the root is not available for copying, with two exceptions: a subset of stressable derivational, control, and augmentative/diminutive suffixes which occur very close to the root (and always before any non-stressable suffix), and, for some speakers, the negative suffix *-i*, if it is syllabified into the last syllable of the reduplicative base.[12]

Reduplication respects the morphological integrity of person prefixes. If reduplication needs to borrow material from a two-syllable prefix, then either both syllables are copied (for some speakers) or the reduplication is impossible (for other speakers). Morphological integrity might also be enforced for the intensifier suffix *-eterei*, all three syllables of which copy in (25), as well as for most stative (but not dynamic) verb roots borrowed from Spanish, though the details of this remain to be worked out. No such morphological integrity is found with lexical roots of the native vocabulary — there is no hesitation to copy only part of either a native verb root or a native incorporated noun.

Reduplication often, but not always, respects the integrity of the syllables of the base. Onsets are typically copied even if they do not belong to the same morpheme as the vowel that could have satisfied the disyllabicity requirement alone (e.g., the negative and optative prefixes, epenthetic /ɟ/ after the person prefix *i-*).

The two syllables that satisfy the disyllabicity requirement do not act at all like a conventional iamb, completely disregarding crosslinguistic syllable weight preferences and sometimes even the stress pattern of unstressed–stressed. Many Guaraní speakers retain a reflex of the historical coda-deletion process that ensured that *both* syllables of proto-Tupí-Guaraní reduplicants were monomoraic. The reduplicant cannot be defined as a minimal word either, since the minimal word in Guaraní has a single mora: *he* 'it is tasty'. The Guaraní patterns pose a problem for any theory that defines the size of reduplicants solely in terms of prosodic constituents.

The "canonical forms" approach of Downing (2006) might be more successful. Under this approach, disyllabic "templates" for reduplication do not result from constraints requiring specific prosodic constituents, but from a general morphology-prosody mapping constraints: morphological

with this subset of verbs would be the obligatory use of full reduplication and the obligatory, prosodically unmotivated, copying of the person prefix. But even this speaker has at least some phonological conditioning on the morphological pattern: a finally stressed Spanish loan can reduplicate either this way or in the ordinary way, e.g., either *i-santoro isantoro* or *i-santoro toro* 'they're nasty (REDUP)'.

[12] The zone of the Guaraní verbal complex that is eligible for reduplication is reminiscent of a mirror image of the "macro-stem" that can be copied in some Bantu languages (Cook 2013; Downing 2000).

roots must branch prosodically. This would allow a canonical forms account to require a reduplicant as a sequence of two syllables, as the facts of Guaraní seem to call for, rather than as an iamb or some other prosodic constituent. Unfortunately, alongside encouraging two-syllable lexical roots, Downing's approach tries just as hard to encourage affixes to be monosyllabic. This seems to offer little insight into why Guaraní affixes are even more insistent on keeping all their syllables in reduplication than lexical roots are.

Finally, any account in any theory will face a challenge in coping with the widespread variation both within and across lexical items, and within and across speakers, that characterizes Guaraní reduplication.

References

Cook, T. (2013). The status of the macrostem in reduplication in Ndebele and Zulu. In Cathcart, C., Chen, I.-H., Finley, G., Kang, S., Sandy, C. S., and Stickles, E., editors, *Proceedings of the 37th Annual Meeting of the Berkeley Linguistics Society*, page 46–60.

Delgado, S. (2007). *Jevy ko'ẽ: Día del regreso*. Arandurã Editorial, Asunción.

Downing, L. J. (2000). Morphological and prosodic constraints on Kinande verbal reduplication. *Phonology*, 17:1–38.

Downing, L. J. (2006). *Canonical forms in prosodic morphology*. Oxford University Press, Oxford.

Gregores, E. and Suárez, J. A. (1967). *A description of colloquial Guaraní*. Mouton, The Hague and Paris.

Hamidzadeh, K. (2013). Reduplication in Paraguayan Guaraní. Master's thesis, University of Manitoba, Winnipeg.

Hayes, B. (1995). *Metrical stress theory: Principles and case studies*. University of Chicago Press, Chicago.

Jensen, C. (1998). Comparative Tupí-Guaraní morphosyntax. In Derbyshire, D. C. and Pullum, G. K., editors, *Handbook of Amazonian Languages*, volume 4, page 489–618. Mouton de Gruyter, Berlin and New York.

Krivoshein de Canese, N. and Acosta Alcaraz, F. (2001). *Gramática Guaraní*. Colección Ñemitỹ, Asunción.

Lasersohn, P. (1995). *Plurality, Conjunction and Events*. Kluwer, Dordrecht.

Piggott, G. and Humbert, H. (1997). Representations and constraints: the case of Guaraní nasal harmony. In Booij, G. and van de Weijer, J., editors, *Phonology in progress: Progress in phonology*, number 3 in HIL Phonology Papers, page 219–256. Holland Academic Graphics, The Hague.

Rose, F. (2005). Reduplication in Tupi-Guarani languages: going into opposite directions. In Hursch, B., editor, *Studies in Reduplication*, page 351–368. Mouton de Gruyter, Berlin.

Tonhauser, J. (2006). *The temporal semantics of noun phrases: Evidence from Guaraní*. PhD thesis, Stanford University, Stanford.

Velázquez-Castillo, M. (1996). *The grammar of possession: Inalienability, incorporation and possessor ascension in Guaraní*. Number 33 in Studies in Language Companion Series. John Benjamins, Amsterdam.

Zarratea, T. (1981). *Kalaíto Pombéro*. Ediciones NAPA, Asunción.

Mi'gmaq as a discourse configurational language*

Michael David Hamilton
McGill University

Abstract: I argue that Mi'gmaq is discourse configurational, in that the underlying syntax is configurational but discourse factors contribute to the surface appearance of non-configurationality. I present three diagnostics–superiority effects, Binding Condition C effects, and Long-Distance Agreement– to show that the syntactic structure of Mi'gmaq is underlyingly configurational. I follow by present results from a production experiment to show that focus, a discourse factor, can effect surface word order.

Keywords: syntax, prosody, configurationality, discourse, Algonquian, Mi'gmaq

1 Introduction

Mi'gmaq (Eastern Algonquian) is a language which can described as being non-configurational since it typically displays the characteristics in (1).

(1) CHARACTERISTICS OF NON-CONFIGURATIONALITY (Hale (1983))
   a. Null anaphora
   b. DPs are freely ordered
   c. Discontinuous DPs are allowed

However, it is not the case that we can understand the underlying syntactic structure based surface appearance alone. It is necessary to leave prior theoretical biases aside and use syntactic tests in order to determine the underlying syntactic structure. In this paper, I argue that Mi'gmaq is discourse configurational, in that it is underlyingly configurational, but discourse factors contribute to the surface appearance of non-configurationality. In Section 2, I present three diagnostics to show that the syntactic structure of Mi'gmaq is underlyingly configurational. In Section 3, I present results from a production experiment to show that focus, a discourse factor, can effect surface word order. I conclude in Section 4.

2 Configurationality

In this section I present three arguments to argue for the underlying configurational nature of Mi'gmaq: superiority effects, Binding Condition C effects, and Long-Distance Agreement. All three are subject-object asymmetries, which provide evidence that: a) subjects asymmetrically c-command objects, and b) arguments being base generated in A(rgument)-positions. These two characteristics are important aspects of a configurational account.

*I would like to thank Janine Metallic, Mary Ann Metallic, Janice Vicaire, and Joe Wilmont for sharing their knowledge of Mi'gmaq with me. I would like to thank Jessica Coon, Alan Bale, Michael Wagner, the McGill Mi'gmaq Research group, audiences of the 44th Algonquian Conference, 2013 Winter meeting for the Society of the Study of the Indigenous Languages of the Americas, and WSCLA 19.

In Proceedings of the Workshop on Structure and Constituency in the Languages of the Americas 18 & 19,
University of British Columbia Working Papers in Linguistics 39,
Natalie Weber and Sihwei Chen (eds.), 2015.

2.1 Superiority

Mi'gmaq has obligatory *wh*-movement.[1] For a *wh*-word to receive a *wh*-phrase interpretation, it must undergo *wh*-movement, otherwise it will receive a *wh*-indefinite interpretation. In (2), *wen* 'who' undergoes *wh*-movement to Spec-CP, thus linearly precedes the object (*wenju'su'n* 'apple') and the verb (*pegwatelg* 's/he buys it'), regardless of the order in which they appear. However, if the *wen* does not undergo *wh*-movement it proceeds the verb, receives a *wh*-indefinite interpretation ('anyone'), as in the yes-no questions in (3).

(2) *Wh*-QUESTION

a. **wen** pegwatel-g wenju'su'n?
who buy.VTI-3 apple
'**Who** is buying the/an apple?'

b. **wen** wenju'su'n pegwatelg?

(3) YES-NO QUESTION

a. wenju'su'n pegwatel-g **wen**?
apple buy.VTI-3 **one**
'Is **anyone** buying the/an apple?' *'**Who** is buying the/an apple?'

b. pegwatelg wenju'su'n **wen**?

c. pegwatelg **wen** wenju'su'n?

Mi'gmaq has multiple *wh*-questions, and in order for both *wh*-words to receive a *wh*-phrase interpretation, they both must move to Spec-CP. However, the only grammatical word order is the one in which the subject *wh*-phrase precedes the object *wh*-phrase (4a). Word orders in which the object *wh*-phrase precedes the subject *wh*-phrase (4b) are ungrammatical. Word orders in which only *wh*-phrase undergoes *wh*-movement, such as (4c), do not result in multiple *wh*-question interpretation.

(4) *Context: I tell you that I went to a pot-luck yesterday. You ask me:*

a. **wen goqwei** pegisi-toq-s'p?
who what bring.VTI-3-PST
'**Who** brought **what**?' [triggers a pair-list response]

b. ***goqwei wen** pegisi-toq-s'p?
what who bring.VTI-3-PST
intended: '**Who** brought **what**?' or '**What** did **who** buy?'

c. **wen** pegisi-toq-s'p **goqwei**?
who bring.VTI-3-PST **what**
'**Who** brought **anything/something**?'; *'**Who** brought **what**?'

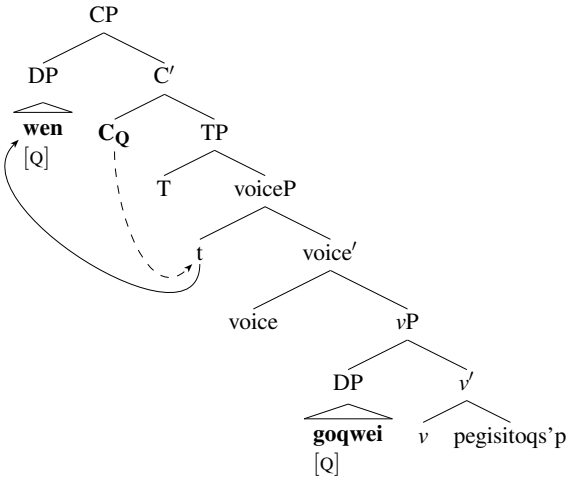
This strict ordering of subjects before objects after *wh*-movement can be account for as a superiority effect (Chomsky 1973; Richards 1997) or an instance of relativized minimality (Rizzi

[1]Please see Hamilton 2013 for arguments in favour of a *wh*-movement analysis for Mi'gmaq.

1990). The explanation being that the base-generated c-command relationship is maintained after *wh*-movement. This Mi'gmaq data can be accounted for assuming a standard account of multiple *wh*-movement in languages with superiority effects, e.g., Richards (1997) for Bulgarian.

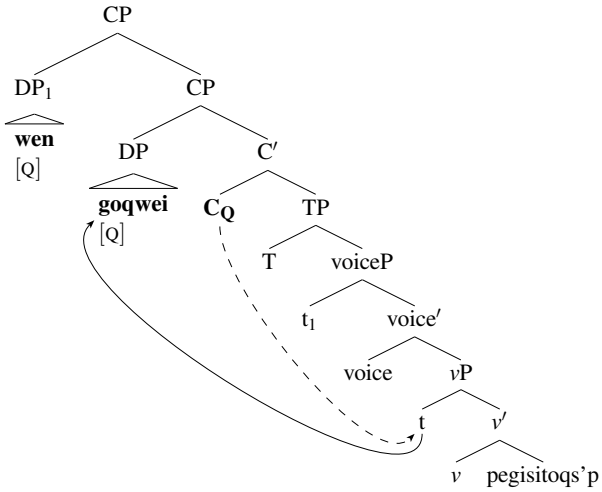
The derivation of superiority effects adopts standard assumptions about *wh*-movement: (i) that it is triggered by a Q-feature (Cable 2007) on C^0 which is shared by *wh*-phrases, and (ii) that is involves a probe-goal AGREE relationship (Chomsky 2001), such that (a) feature probing is limited to its c-command domain, (b) a probe can only enter into a single AGREE relation with (and raise) one DP at a time, and (c) that a probe will AGREE with (and raise) the most local, structurally closest DP if there are multiple potential goals. The derivation has two steps, the first involving the principle ATTRACT CLOSEST (5) and the second involving the principle SHORTEST MOVE (6) (Richards 1997). In step one, C^0 has a Q-feature and probes, AGREEs, and raises the subject *wh*-phrase (*wen*) to Spec-CP. Although both *wh*-phrases have the relevant Q-feature, since the subject *wh*-phrase (*wen*) is structurally higher than the object *wh*-phrase (*goqwei*), the subject will be the closest relevant goal for the Q probe on C^0. This is the principle ATTRACT CLOSEST (Richards 1997). This results in the representation in (5).

(5) ACCOUNT FOR 4, STEP 1: ATTRACT CLOSEST



In step two, in C^0 probes a second time and AGREEs with the object *wh*-phrase (*goqwei*) and attracts it to an inner specifier of CP. This movement is called "tucking-in" and is motivated by the principle SHORTEST MOVE, since an inner specifier is closer than an outer specifier for movement considerations (Richards 1997). This results in the representation in (6). Thus rigid subject before object ordering with *wh*-phrases in Mi'gmaq receives a principled analysis under this account.

(6) ACCOUNT FOR (4), STEP 2: SHORTEST MOVE



Thus, the strict ordering of subject *wh*-phrases before object *wh*-phrases is taken to be indicative of an underlying asymmetry between subject and object A-positions. The fact that this is the result of *wh*-movement supports the base-generation of *wh*-phrases in argument positions.

2.2 Binding

Mi'gmaq has a unique possessive construction unattested for other Algonquian languages, in which the possessor is marked with the possessive suffix *-ewei* and cannot be marked for obviation. This provides us a rare glimpse into the structural relationship between subjects and objects via binding. In Mi'gmaq, as in other Algonquian languages, 3rd persons are either morphological unmarked and interpreted as being proximate, roughly equivalent to being topical, or morphologically marked as being obviative, relatively less topical than a proximate 3rd person. This particular possessive construction only applies in limited contexts, as it is only possible with an alienable possessum (McClay 2012).[2] In forms where the subject is a proper name (*Mali*) and the object possessor is a pronoun (*negm*), co-reference is possible (7a). In forms where the subject is a pronoun (*negm*) and the object possessor is a proper name (*Mali*), co-reference is not possible (7b). In (7a), disjoint reference is triggered whether the subject pronoun is overt or not.

[2]The other possessive construction, in which the possessum but not the possessor is marked with a possessive morpheme, can be used with both alienable and inalienable possessum.

(7) POSSESSIVE DP OBJECTS

a. SUBJECT DP, PRONOUN OBJECT POSSESSOR
Mali$_1$ ges-at-g [**negm**$_{1/2}$-ewei wi'gatign]
Mary like-VTI-3 [**3**-POSS book]
'**Mary**$_1$ likes **her**$_{1/2}$ book.'

b. SUBJECT PRONOUN, DP OBJECT POSSESSOR
(**negm**$_7$) ges-at-g [**Mali**$_{*7/8}$-ewei wi'gatign]
(**3**) like-VTI-3 [**Mary**-POSS book]
'**She**$_7$ likes **Mary**$_{*7/8}$'s book.'

Evidence that this asymmetry is not a product of this particular possessive construction but is structural, comes from similar effects when the relevant pronoun or DP is embedded in a relative clause that modifies the matrix object (8). In (8a), the matrix subject is a proper name (*Mali*) and the embedded subject that modifies the matrix object is an optional 3rd person singular pronoun (*negm*). Similar to the possessive construction, the pronoun can optionally co-refer with the matrix subject. In (8b) where their positions are switched, the matrix subject is the optional 3rd person pronoun and the embedded subject is the proper name, co-reference is not possible. Note that the embedded subjects in these examples are not marked with obviation since it is optional, as it does not violate the restriction on having only one proximate argument per clause (Brittain 2001, 2013). The lack of obviation is important because marking the embedded subject with obviation will obligatorily trigger disjoint reference, thus obscuring the structural co-reference possibilities.

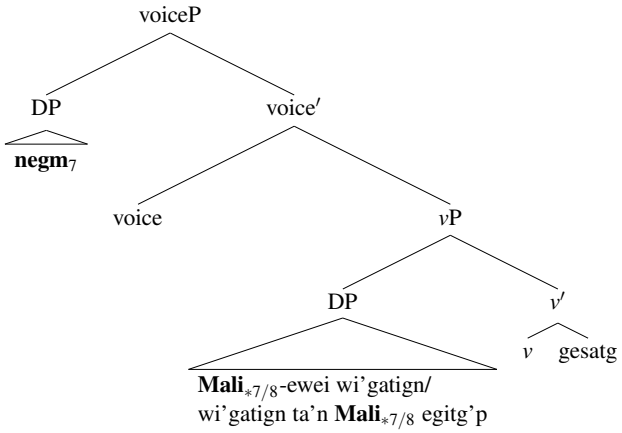
(8) OBJECTS MODIFIED BY RELATIVE A RELATIVE CLAUSE

a. **Mali**$_1$ ges-at-g wi'gatign [ta'n (negm$_{1/2}$) egit-g-'p]
Mary like-VTI-3 book [COMP (**3**) read-3-PST.DK]
'**Mary**$_1$ likes the book that **she**$_{1/2}$ read.'

b. (**negm**$_7$) ges-at-g wi'gatign [ta'n Mali$_{*7/8}$ egit-g-'p]
(**3**) like-VTI-3 book [COMP **Mary** read-3-PST.DK]
'**She**$_7$ likes the book that **Mary**$_{*7/8}$ read.'

The potential for subjects to bind objects is a direct result of both arguments being base-generated in A-positions, with the subject asymmetrically c-commanding the object. Since the object contains a proper name (*Mali*) in both (7b) and (8b), the obligatory disjoint reference with the subject pronoun (*negm*) is analyzed as a Binding Condition C effect. Binding Condition C is defined as in (Chomsky 1986): An R-expression is free. Thus, because in their base-generated positions, *negm* c-commands, thus can bind, *Mali* in both (7b) and (8b), disjoint reference is triggered. Both examples are collapsed together and shown in (9).

(9) ANALYSIS OF (7b) and (8b)



Thus, disjoint reference is taken to be indicative of the fact that subjects asymmetrically c-command and bind into objects, causing a Binding Condition C effect. This data follows from the assumption that DPs are always base generated in argument positions, thus always have a consistent asymmetric relation.

2.3 Long-Distance Agreement

Long-Distance Agreement (LDA) is the label given to a configuration in which a matrix verb agrees with a constituent of its sentential complement (Branigan and MacKenzie 2002; Polinsky and Potsdam 2001).[3] In Mi'gmaq, LDA can occur with arguments that originate in embedded declaratives, although they pattern differently.[4] Mi'gmaq has an inverse system in which all forms are direct, except forms in which an obviative 3rd person in the subject and proximate 3rd person is the object. Recall that 3rd persons are either morphological unmarked and interpreted as being proximate, roughly equivalent to being topical, or morphologically marked as being obviative, relatively less topical than a proximate 3rd person.

In the dataset below, the matrix verb is in the direct and contains forms with (10b) and (10c), and without (10a) LDA. Note that in all three forms, the embedded clause is identical and enclosed in brackets.[5] In the form where LDA does not occur (10a), the matrix verb *ge(j)i-* 'know' has a suffix (*-tu*) that indexes an inanimate object. The inanimate object suffix can be analyzed as default agreement with the complement clause itself (Piggott 1989), since clauses do not have ϕ-features. In direct forms in Mi'gmaq, LDA is limited to the embedded subject, as in (10b). Here the suffix *-g* (3rd person singular) can appear on the matrix verb and index the embedded subject *Mary*. This contrasts with (10c), as an additional suffix *-ig* (3rd person plural) cannot be attached to the verb. This shows that agreement cannot occur with the embedded object *Sa'nal aq Je'gal*.

[3]The analysis presented in this subsection is the result of joint work with Brandon J. Fry.

[4]I assume that arguments that undergo LDA are base-generated in embedded clauses without motivation given space concerns. See Branigan and MacKenzie 2002 for supporting evidence of this analysis for Innu-aimûn.

[5]It is an open question whether LDA's arguments move into the matrix clause or stay in the embedded clause. Since in either case, movement must to through the edge of the embedded, I focus on this movement and leave the question of movement into the matrix clause for further research. The square brackets here and throughout serve as a guide.

(10) MI'GMAQ, EMBEDDED DECLARATIVE DIRECT

a. NON-LDA, DEFAULT AGREEMENT
ge(j)i-***tu*** [**Mali** ges-al-a-j-i Sa'n-al aq Je'g-al]
know-VTI [**Mary** love-VTA-DIR.3-3-3.PL John-OBV COOR Jack-OBV]
'I know that Mary loves John and Jack.'

b. LDA WITH EMBEDDED SUBJECT
geji'-**g** [**Mali** ges-al-a-j-i Sa'n-al aq Je'g-al]
know.VTA-**3** [**Mary** love-VTA-DIR.3-3-3.PL John-OBV COOR Jack-OBV]
'I know that **Mary** loves John and Jack.'

c. *LDA WITH EMBEDDED OBJECT
*geji'-**g-ig** [Mali ges-al-a-j-i **Sa'n-al aq Je'g-al**]
know.VTA-**3-3.PL** [Mary love-VTA-DIR.3-3-3.PL **John-OBV COOR Jack-OBV**]
intended: 'I know that Mary loves **John and Jack**.'

It is important to note that if the embedded argument which undergoes LDA is overt (it may also be covert), it must linearly precede all other material in the embedded clause. While varying word orders are possible in embedded clauses in without LDA, only SVO and SOV word orders are acceptable in embedded clauses in which LDA occurs, such as in (10b). For (10c), however, varying the word order in the embedded clause does not improve the grammaticality. This also applies for all Mi'gmaq declarative LDA data.

When LDA occurs with embedded declaratives in the inverse, the reverse pattern appears, as LDA is only possible with the embedded object and not the subject. In (11b), the 3rd person singular (*-g*) and 3rd person plural (*-ig*) suffixes appear on the matrix verb. These suffixes combine to index the embedded object *Sa'n aq Je'g* 'John and Jack.' In (11a), however, if only the 3rd person singular suffix (*-g*) is attached to the verb, the result is ungrammatical. This is intended to index agreement with the embedded subject *Mali-al* 'Mary-OBV'. This shows that LDA cannot target the embedded object in the inverse in Mi'gmaq. In sum, LDA can only target the subject in the direct and the object in the inverse.

(11) MI'GMAQ, EMBEDDED DECLARATIVE INVERSE

a. *LDA WITH EMBEDDED SUBJECT
*geji'-**g** [Sa'n aq Je'g ges-al-gwi'-tit-l **Mali-al**]
know.VTA-**3** [John COOR Jack love-VTA-INV-3.PL-OBV **Mary-OBV**]
intended: 'I know that **Mary** loves John and Jack.'

b. LDA WITH EMBEDDED OBJECT
geji'-**g-ig** [**Sa'n aq Je'g** ges-al-gwi'-tit-l Mali-al]
know.VTA-**3-3.PL** [**John COOR Jack** love-VTA-INV-4.PL-OBV Mary-OBV]
'I know that Mary loves **John and Jack**.'

If LDA with embedded declaratives was driven by A'-movement triggered by a specific feature, such as in topicalization, focus, or *wh*-movement, then we expect that any argument bearing this feature would be able to undergo LDA, as in Innu-aimûn (Branigan and MacKenzie 2002) or Passamaquoddy (Bruening 2001, 2009; LeSourd 2010). In order to derive the declarative pattern

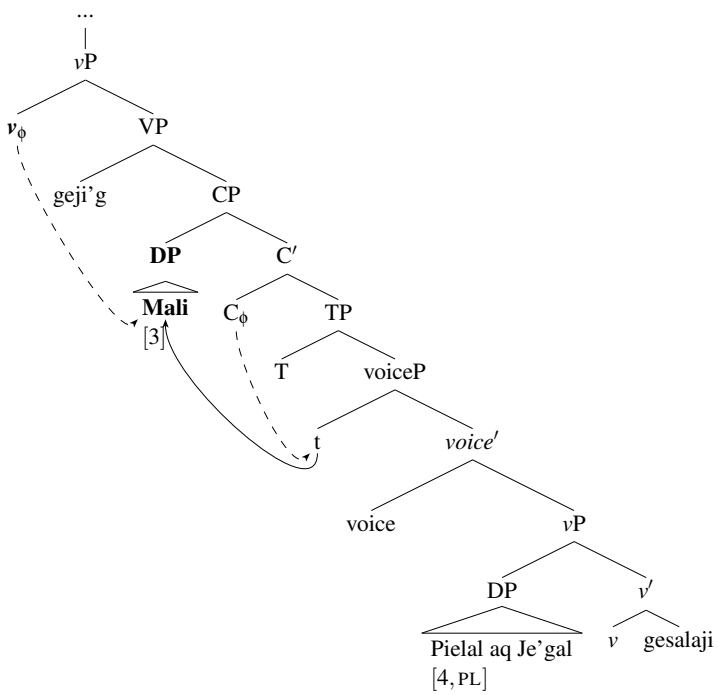
under the same analysis, we would need to stipulate that only subjects in the direct and objects in the inverse can bear a specific feature. Such an analysis only serves to describe the pattern as opposed to explaining it. I propose that the explanation resides in the structural asymmetry between subjects and objects, and involves a ϕ-feature probe on embedded C^0 which attracts the closest DP with ϕ-features to embedded Spec-CP. Although the means by which arguments get to embedded Spec-CP differs between the embedded interrogative and declarative analyses, what ties the two analyses together is that LDA occurs with the argument in embedded Spec-CP.

In the direct, embedded declarative C^0 has a ϕ-feature probe. It probes, AGREEs with, and raises the structurally highest argument, the subject *Mali*, as shown in (12). If subjects and objects are base generated in A-positions with the subject position c-commanding the object position, then we can explain why LDA with the object is not possible in these forms. It is simply because the subject is structurally higher than the object, thus will be the closest potential goal for the ϕ-probe on embedded C^0.

(12) ANALYSIS OF LDA WITH AN EMBEDDED DECLARATIVE DIRECT

a. geji'-**g** [**Mali** ges-al-a-j-i Sa'n-al aq Je'g-al]
know.VTA-**3** [**Mary** love-VTA-DIR.3-3-3.PL John-OBV COOR Jack-OBV]
'I know that **Mary** loves John and Jack.'

b.



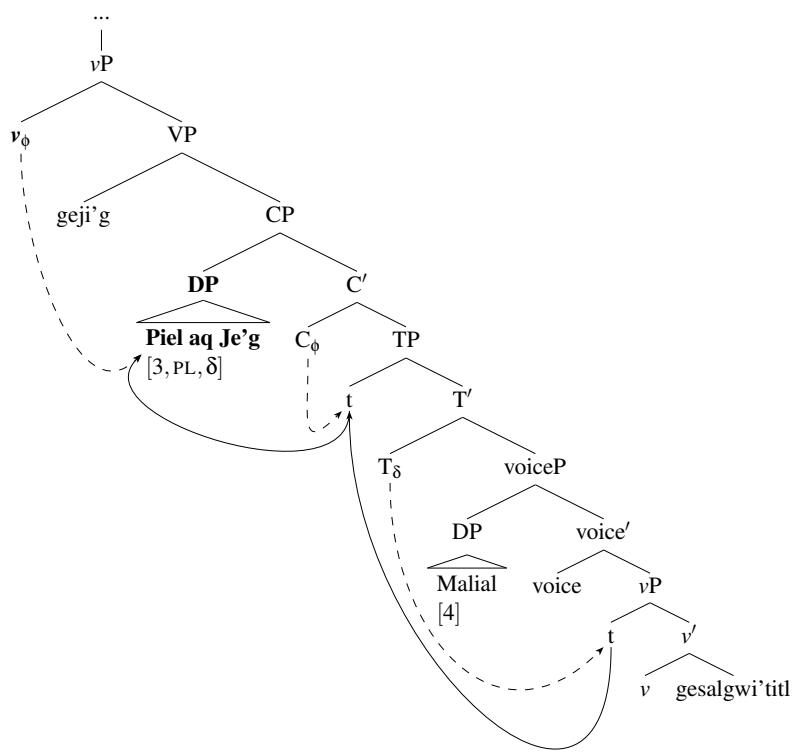
In the inverse, the embedded declarative C^0 also has a ϕ-feature probe. It probes, AGREEs with, and raises the structurally highest argument, which is the object *Sa'n aq Je'g*, as in (13). The embedded object becomes structurally higher in the inverse because it undergoes A-movement over the subject to a higher functional projection, e.g., embedded Spec-TP (Bruening 2001, 2009; Oxford 2014). This movement is triggered by a δ-probe on T^0 which probes both the subject and object, but only AGREEs with and raises the proximate DP, assuming that proximate is more topical than

obviative. In inverse forms, this will always be the object DP. This analysis allows us to derive the inverse LDA pattern, as the ϕ-probe on C^0 will raise the object DP since it is the structurally highest in its derived position in embedded Spec-TP.[6]

(13) ANALYSIS OF LDA WITH AN EMBEDDED DECLARATIVE INVERSE

a. geji'-**g-ig** [**Sa'n aq Je'g** ges-al-gwi'-tit-l Mali-al]
know.VTA-**3-3.PL** [**John COOR Jack** love-VTA-INV-4.PL-OBV Mary-OBV]
'I know that Mary loves **John and Jack**.'

b.



To summarize, we have seen that the pattern of LDA in embedded declaratives in Mi'gmaq is limited to subjects in the direct and objects in the inverse. Under a configurational account, this pattern of LDA is analyzed as being limited to the structurally highest argument. While the subject is base-generated as the highest in the direct, the object undergoes a movement over the subject in the inverse and becomes the structurally highest.

2.4 Summary

I have presented evidence showing that DPs are base generated in A-positions and that the subject A-position asymmetrically c-commands the object A-position in Mi'gmaq from: superiority effects, Binding Condition C effects, and Long-Distance Agreement. If this is the right analysis of the underlying syntactic structure of Mi'gmaq, then we need to account for the fact that surface word order is relatively free. The most apparent account would attribute word order variation to discourse

[6]Movement to embedded Spec-TP also occurs in the embedded direct clauses, but has been omitted from (12) for simplicity.

factors. In the next section, I present evidence to show that this account is on the right track, as focus can affect word order in Mi'gmaq.

3 Focus

In this section I discuss an experiment designed to determine the effect of focus, a discourse factor, on word order.[7] The experimental hypothesis is that speakers of Mi'gmaq will be able to manipulate word order to convey focus information since Mi'gmaq is a discourse configurational language. This hypothesis was supported by the results.

3.1 Experimental design

This is self-paced production experiment that was modelled after Calhoun 2013, originally designed for Samoan, and run with minimal changes. This experiment targets two different kinds of focus: question focus on the constituent which answers the *wh*-phrase in the question, and corrective focus on the constituent which corrects a constituent in a previous question. The placement of focus was varied on the subject or object. A summary of the conditions is shown in (14), and includes broad focus, in which the entire answer is focused, as a baseline for comparison.

(14) CONDITIONS

a. Broad focus (BroadF)

b. Subject Question-focus (SubjQF)

c. Subject Corrective-focus (SubjCF)

d. Object Question-focus (ObjQF)

e. Object Corrective-focus (ObjCF)

The experiment has twenty items, in which the animacy of the object and transitivity of the verb varies. All subjects are animate, while objects vary between being animate (n=6) or inanimate (n=14).[8] Balancing of items across animacy of objects and the transitivity of the verb was sacrificed in order to maintain potential comparability with Calhoun 2013. Forms in which the object are animate are marked as being obviaitve. Recall that 3rd persons are either morphological unmarked and interpreted as being proximate, roughly equivalent to being topical, or morphologically marked as being obviative, relatively less topical than a proximate 3rd person. Forms with animate object are either in transitive utterances with animate subject (VTA) or are implicit objects in intransitive utterances with an animate subject (VAI+O). Forms with an animate subject and inanimate objects (VTI) fill out the rest of the items.

The task involved presenting a participant with a picture depicting an event. Participants heard a question and prompted to answer naturally, appropriately, and in a complete utterance based on

[7] The experiment presented in this subsection is the result of joint work with Michael Wagner, Janine Metallic, Mary Ann Metallic, Janice Vicaire, and Elise McClay.

[8] More specifically, all subjects and two objects are real-world animate, i.e., dog, and girl, while the remaining four objects were grammatically animate, i.e., ball, milk, and shirt. This does not effect the data in this experiment, although in future experiments balancing real-world and grammatically animate objects would be ideal and may potentially effect word order.

the information in the picture. Question were presented to prompt participants to answer with a particular focus. A sample picture is shown in Figure 1, and a corresponding set of condition specific questions is shown in (15). The word order is noted next to each condition and note that three conditions have SVO word order, i.e., SubjQF, SubjCF, and ObjectCF, while ObjQF has OVS and BroadF V. These were determined to be the most natural word orders by first language Mi'gmaq speaking co-authors.

Figure 1: Sample picture (Calhoun 2013)

(15) SAMPLE ITEM: QUESTIONS BY CONDITION

a. BROADF: V
Taliaq-ass sepei?
happen.VII-PST.IK this.morning
'What happened this morning?"

b. SUBJQF: SVO
Wen gis-oqs'-g-'s gegs sepei?
who already-bake.VTI-3-PST.IK cake this.morning
'**Who** baked the cake this morning?'

c. OBJQF: OVS
Goqwei gis-oqs'-g-'s gisigui'sgw sepei?
what already-bake.VTI-3-PST.IK old.woman this.morning
'**What** did the grandmother bake this morning?'

d. SUBCF: SVO

'Lpa'tuj	gis-oqs'-g-'s	gegs	sepei?
boy	already-bake.VTI-3-PST.IK	cake	this.morning

'Did **the boy** bake the cake this morning?'

e. OBJCF: SVO

Gisigui'sgw	gis-oqs'-g-'s	**petaqan**	sepei?
old.woman	already-bake.VTI-3-PST.IK	**pie**	this.morning

'Did the grandmother bake **a pie** this morning?'

The experiment was run so that all participants saw all conditions from all items and did not include fillers. Participants were given a training session immediately prior to undertaking the experiment to familiarize them with subjects, objects and the experimental task. Given that there is not a standard orthography and as a result there is varying levels of literacy in the community, the entire experiment and instructions were recorded and presented aurally. The experiment was run in a room in the Listuguj Education Directorate on a 17" Macbook Pro with a LogitechH390 USB headset. The training session was presented using Microsoft Power Point 2011. The experiment was presented using MatLab (Version 2010) and Psychtoolbox extensions (Kleiner et al. 2007). Sound files were annotated and truncated using Praat (Boersma and Weenink 2013). Sound files were aligned with transcripts using the ProsodyLab aligner (Gorman et al. 2011). Data was extracted using Praat and analyzed using R (Team et al. 2012).

The experiment was run on 15 native speakers of the Listuguj-dialect of Mi'gmaq, spoken in Listuguj, Quebec, Canada. All speakers are bilingual, 2nd language English speakers, with many also having rudimentary knowledge of French. 4 speakers were excluded for not following instructions, leaving 11 (7 women and 4 men) for data analysis. Of the 1100 potential tokens, 779 mono clausal utterances remained for data analysis after others were excluded for various reasons, e.g., dropped arguments, blanks, and errors.

3.2 Results

Table 1 shows the breakdown of word order by condition. Across all conditions, SVO word order was the most common within each (58%–98%) and across all conditions (87%). OVS was the next most common word order across conditions (7%), but was mainly limited to the ObjQF condition (37%). SOV was sparingly used across conditions (5%) and used most commonly in the BroadF (9%) and ObjCF (8%) conditions. The other three word orders were quite rare. A Chi^2 test for independence shows that word order is not independent from condition ($p>0.001$). To support this finding, a logistic regression model was fit with word order (SVO vs. other) as the predictor and condition as the fixed variable. All conditions, except ObjCF, significantly differ from BroadF. Subject focus conditions shows less variation from SVO word order than BroadF ($z=-3.083$, $p=0.002$ for both SubjQF and SubjCF). While ObjQF shows significantly more variation from SVO word order than BroadF ($z=5.768$, $p>0.001$).

ObjQF was the only condition where another word order (OVS) other than SVO was frequent. Table 3 shows the breakdown of word order by verb type in ObjQF. VTI forms showed a 51% to 41% split between SVO and OVS forms, while VTA forms showed a 82% to 18% split. A Chi^2 test for independence of the difference between VTI and VTA, shows that word order is not independent from verb type ($p=0.007$). This is supported by a logistic regression model, fit with word order as

Table 1: Word order by condition

	BroadF	SubjQF	ObjQF	SubjCF	ObjCF	Total
SVO	160 (88%)	161 (98%)	74 (58%)	161 (98%)	120 (86%)	676 (87%)
OVS	1 (0.5%)	1 (0.5%)	47 (37%)	0	7 (5%)	56 (7%)
SOV	17 (9%)	1 (0.5%)	4 (3%)	4 (2%)	11 (8%)	37 (5%)
OSV	1 (0.5%)	1 (0.5%)	3 (2%)	0	0	5 (0.6%)
VSO	1 (0.5%)	1 (0.5%)	0	0	1 (0.7%)	3 (0.4%)
VOS	1 (1%)	0	0	0	1 (0.7%)	2 (0.3%)
Total	181	165	128	165	140	779

the predictor (SVO vs. other) and verb type (VTI vs. VTA) as the fixed effect. In ObjQF, word order in VTA verbs differ significantly from VTI verbs (z=-2.788, p=0.005).

Table 2: Word order by verb type in ObjQF

	VTI	VTA	VAI+O	Total
SVO	43 (51%)	23 (82%)	8 (53%)	74 (58%)
OVS	35 (41%)	5 (18%)	7 (47%)	47 (37%)
SOV	4 (5%)	0	0	4 (3%)
OSV	3 (4%)	0	0	3 (2%)
Total	85 (66%)	28 (22%)	15 (12%)	128

3.3 Discussion and summary

Support for the experimental hypothesis was found as word order and condition were found not to be independent. While the BroadF condition allowed some word order variation (SVO=88%), very little word order variation was found in subject focus conditions (SVO=98% in both SubjQF and SubjCF). The ObjQF condition allowing even more word order variation (SVO=58%). One possible explanation for the increase in OVS word order in ObjQF is because the question used was in OVS word order as well, which may have led to an increase use of OVS word orders in the answers. A follow-up experiment has recently been conducted to test the effect of question word rode on answer word order using the same experimental design with 10 new first-language Mi'gmaq speakers from Listuguj, Quebec. Preliminary results suggest that question word order does not effect answer word order.

The word order data suggests that there are two focus strategies: Focus-A, in which the focused element always appears utterance initial, SVO in SubjF conditions and OVS in ObjF conditions; and Focus-B in which the word order is invariant, i.e., SVO in all conditions. These two strategies appear to interact with verb type, as while VTIs show a relatively even proportion of SVO to OVS (51:41), VTAs are predominantly SVO (82%). Given the fact that all of the forms in this experiment had 3rd person animate DPs, in VTAs animate object were obviative, which suggests that the avoidance of ordering objects before subjects can be reducible to an avoidance of ordering obviative DPs before proximate DPs. This provides experimental support for Junker 2004, who suggests a similar effect of obviation on word order for East Cree.

In sum, the results show that focus can, and does, have an effect on word order in Mi'gmaq. The effect of discourse is also implicated through the interaction of obviative objects and word order.

4 Conclusion

In this paper I presented a series of subject-object asymmetries–superiority effects, Binding Condition C effects and Long-Distance Agreement–to argue that arguments are base-generated in A-positions in which the subject asymmetrically c-commands the object in Mi'gmaq. I followed with experimental rests to show that focus, a discourse factor, can effect the word order in Mi'gmaq. Both of these support the hypothesis that Mi'gmaq is a discourse configurational language. This suggest that exploring other discourse effects, such as topics, will further aid in understanding word order variation in Mi'gmaq.

References

Boersma, P. and Weenink, D. (2013). Praat. *Amsterdam: Department of Phonetics, University of Amsterdam. ijpor. oxfordjournals. org*, (5.3.39).

Branigan, P. and MacKenzie, M. (2002). Altruism, A-movement, and object agreement in Innu-aimûn. *Linguistic Inquiry*, 33(3):385–407.

Brittain, J. (2001). *The morphosyntax of the Algonquian conjunct verb: A minimalist approach*. Routledge.

Brittain, J. (2013). Obviation and coreference relations in Cree-Montagnais-Naskapi. *Linguistica Atlantica*, 23:69–91.

Bruening, B. (2001). *Syntax at the edge: Cross-clausal phenomena and the syntax of Passamaquoddy*. PhD thesis, Massachusetts Institute of Technology.

Bruening, B. (2009). Algonquian languages have A-movement and A-agreement. *Linguistic Inquiry*, 40(3):427–445.

Cable, S. (2007). *The grammar of Q: Q-particles and the nature of Wh-fronting, as revealed by the Wh-questions of Tlingit*. PhD thesis, Massachusetts Institute of Technology.

Calhoun, S. (2013). The interaction of prosody and syntax in Samoan focus marking. Ms. Victoria University of Wellington.

Chomsky, N. (1973). Conditions on transformations. A festschrift for Morris Halle, edited by Stephen Anderson & Paul Kiparsky, 232–286.

Chomsky, N. (1986). *Knowledge of language: Its nature, origin, and use*. Greenwood Publishing Group.

Chomsky, N. (2001). Derivation by phase. Ken Hale: A life in language, Ed. by Michael Kenstowicz, 1–52.

Gorman, K., Howell, J., and Wagner, M. (2011). Prosodylab-aligner: A tool for forced alignment of laboratory speech. *Canadian Acoustics*, 39(3):192–193.

Hale, K. (1983). Warlpiri and the grammar of non-configurational languages. *Natural Language & Linguistic Theory*, 1(1):5–47.

Hamilton, M. D. (2013). Wh-movement in Mi'gmaq. Presented at the Canadian Linguistics Association, University of Victoria.

Junker, M.-O. (2004). Focus, obviation, and word order in East Cree. *Lingua*, 114(3):345–365.

Kleiner, M., Brainard, D., Pelli, D., Ingling, A., Murray, R., and Broussard, C. (2007). What's new in psychtoolbox-3. *Perception*, 36(14):1–1.

LeSourd, P. (2010). Raising to object in Maliseet-Pasamaquody. In Bliss, H. and Girard, R., editors, *Workshop on Structure and Constituency in Native American Languages*, volume 13 and 14. UBCWPL 26.

McClay, E. (2012). Possession in Mi'gmaq. Honors thesis, McGill University.

Oxford, W. R. (2014). *Microparameters of agreement: A diachronic perspective on Algonquian verb inflection*. PhD thesis, University of Toronto.

Piggott, G. (1989). Argument structure and the morphology of the Ojibwa verb. *Theoretical perspectives on Native American languages*, pages 35–49.

Polinsky, M. and Potsdam, E. (2001). Long-distance agreement and topic in Tsez. *Natural Language & Linguistic Theory*, 19(3):583–646.

Richards, N. (1997). *What moves where when in which language?* PhD thesis, Massachusetts Institute of Technology.

Rizzi, L. (1990). *Relativized minimality*. The MIT Press.

Team, R. C. et al. (2012). R: A language and environment for statistical computing.

Version, M. (2010). 7.10. 0.499 (r2010a). *The MathWorks, Inc. Protected by US and international patents*.

Spatial PPs and the structure of motion verbs in Blackfoot*

Kyumin Kim
University of Calgary

Abstract: In recent studies on Blackfoot (Algonquian), it has been numerously shown that the grammar of the language is animacy oriented. This paper provides novel empirical evidence for the animacy oriented grammar of Blackfoot from the interaction between motion/posture verbs and spatial PPs. In particular, the evidence shows that aspectual verb classification in Blackfoot is based on semantic animacy, rather than boundedeness in temporal languages like English. This paper suggests that not all of the morphologically same verb class is mapped onto the same aspectual verb class.

Keywords: animacy, boundedness, telicity, spatial PPs

1 Verb classification in Blackfoot and temporal language

In Blackfoot, verb classification is based on transitivity and animacy (Bloomfield 1946), as illustrated in Table 1. For instance, AI of verbs is marked with a final morpheme that indicates that the verb is intransitive and its subject is animate. II morphology on the verb indicates that the verb is intransitive, like AI, but that its subject is inanimate. Thus, the Bloomfield verb classes are arranged in terms of morphological animacy.

Table 1. Bloomfield verb classes for Algonquian languages

Verb Class	Transitivity	Animacy
Transitive Animate (TA)	Yes	Animate (obj)
Transitive Inanimate (TI)	Yes	Inanimate (obj)
Intransitive Animate (AI)	No	Animate (subj)
Intransitive Inanimate (II)	No	Inanimate (subj)

It is also suggested that Bloomfield verb classes are the Algonquian counterpart of Vendler-Dowty verb classes (Louie 2008, Ritter 2014a, b, Wiltschko 2009). The Vendler-Dowty verb classes are presented in Table 2.

* I would like to thank Sandra Many Feathers (formerly Crazybull) and Brent Prairie Chicken for sharing their language with me, and Betsy Ritter for her support and valuable comments. I also wish to thank Martina Wiltschko for support. Of course, all errors are my own. This research is supported by the SocialScience and Humanities Research Council (SSHRC) of Canada Postdoctoral fellowship to the author (#756-2012-0483). Unless otherwise noted, all data presented in this paper are from my own fieldwork. The data presented come from the Kainai (Blood) dialect. The following abbreviations are used in the paper: The following abbreviations are used in the paper: 1/2/3 – 1st/2nd/3rd person; AN – animate; AI – animate intransitive; DEM – demonstrative; FUT– future; II – intransitive inanimate; INAN – inanimate; INST – instrument; INTS – intensifier; LOC – locative linker; PATH – path linker; PL – plural; S – singular; TA – transitive animate; TI – transitive inanimate.

Contact info: kyumin.kim2012@gmail.com

In Proceedings of the Workshop on Structure and Constituency in the Languages of the Americas 18 & 19, University of British Columbia Working Papers in Linguistics 39,
Natalie Weber and Sihwei Chen (eds.), 2015.

Table 2. Vendler-Dowty classes for temporal languages

Verb Class	Process	Boundeness
Accomplishments	Yes	Telic
Activities	Yes	Atelic
Achievements	No	Telic
States	No	Atelic

Unlike the verb classification in Blackfoot, which is animacy oriented, Vendler-Dowty classes are a temporal-based aspectual classification. A temporal language like English, where INFL is marked with [+/-past], is an example of this type of classification. As indicated in Table 2, there are two factors that affect event classification in Vendler-Dowty classes. An event with a process is an event that unfolds over a period of time, while an event without a process is punctual, giving rise to a distinction among event classification, e.g., an accomplishment vs. an achievement. Another factor that distinguishes among eventualities is boundedness: whether an event has an inherent temporal endpoint or not.[1] A goal PP expressed by a preposition 'to' in English marks a temporal endpoint of an event. For instance, contrast (1a), whose event is atelic without an endpoint, with a goal PP 'to the store' in (1b), which indicates that the event of pushing a cart has an endpoint, namely 'the store'; i.e., the event temporally terminates at the spatial point 'the store'. This second factor, boundedness, gives rise to a distinction between a telic and an atelic event. A bounded event is telic having a spatial endpoint, while an unbounded event is atelic lacking an endpoint.

(1) a. John pushed a cart [for an hour/?in an hour]. atelic
b. John pushed a cart <u>to the store</u> [?for an hour/in an hour]. telic

One well-known diagnostic for boundedness distinctions is time adverbial phrases, the time span adverbial phrase, 'in X time', and the durative phrase, 'for X time'. The former is compatible with a telic event in that the phrase expresses the amount of time that passes before the end of the event. The latter is compatible with an atelic event in that the phrase expresses how much time is passed with respect to the event. For example, in (1a) where no endpoint phrase appears and thus the event is atelic, a durative phrase is grammatical, rather than a time span adverbial. In contrast, in (1b) where an endpoint appears and thus the event is telic, the durative phrase is ungrammatical but the time span adverbial is grammatical.

Having this background on the Vender-Dowty aspectual verb classification in mind, let us go back to the initial discussion where the Bloomfield classification is the counterpart of Vendler-Dowty verb classification. Ritter (2014b) suggests that the two systems are very alike; the core aspect of her suggestion crucial to this paper is that there is correspondence between the two factors that classify events in the Bloomfield and the Vender-Dowty classifications. Animacy in the Bloomfield classification corresponds to boundedness in the Vendler-Dowty classification and transitivity to process; consequently, AI verbs may correspond to achievement, while II verbs correspond to states. Abstracting away from the correspondence between transitivity and process, a question is whether animacy plays a role in event classification in the way that telicity does in

[1] An incremental theme (Dowty 1979) can also contribute to boundedness of an event. I do not discuss how this can play a role in Blackfoot verb classification, but see Ritter (2014b) for some discussion.

English type languages.[2] As a first step to address this question, in what follows, I discuss Inner-Asp, a locus of boundedness in temporal languages.

1.1 Boundedness and Inner-Asp

Inner-Asp (I-AspP) is the lowest functional category, as illustrated in (2). In temporal languages like English, the feature [bounded] is associated with I-Asp and it is responsible for a distinction between telic and atelic events (Wiltschko 2009, adopted from Travis 2005).[3]

(2) $[_{vP}$ v $[_{I\text{-}AspP}$ **I-Asp** $[_{VP}$ V]]
[bounded]

More specifically, a telic event is licensed by the feature [bounded] on I-Asp. For instance, the telic event in (1b) in the previous section has I-Asp projected with a [bounded] feature. When I-Asp is not specified for the feature, an event is not bounded. That is, the event is atelic.

Ritter's (2014b) suggestion that animacy in Bloomfield classification corresponds to boundedness in the Vendler-Dowty verb classification predicts that I-Asp in Blackfoot is animacy oriented, not telicity oriented, as in (3).[4] In other words, instead of having [bounded] feature, I-Asp in Blackfoot bears [animate] feature. In particular, I show that animacy in (3) refers to semantic animacy, not grammatical animacy.

(3) $[_{vP}$ v $[_{I\text{-}AspP}$ **I-Asp** $[_{VP}$ V]] Blackfoot
[animate]

The main focus of this paper is AI motion and posture verbs, as the verbs often require spatial PPs that indicate a goal of motion (i.e., an endpoint) or a location where an event takes place. Thus, these types of verbs and their interaction with spatial PPs are an ideal testing ground for how animacy oriented I-Asp (3) can be characterized. To this end, this paper addresses two questions: (i) what predictions does animacy based I-Asp make about AI motion verbs?, and (ii) what does (3) suggest for the aspectual classification in Blackfoot? Regarding question (i), I show that in Blackfoot what matters for aspectual classification is semantic animacy, rather than the presence of an endpoint phrase, unlike temporal languages. Regarding question (ii), this paper suggests that there is no one-to-one mapping between morphology and aspectual verb classification. It is shown that the same morphological class of AI verbs are not aspectually the same. In other words, some AIs correspond to a telic event, but others correspond to an atelic event.

Before leaving this section, I would like to lay out the relationship between types of spatial PPs and types of events, as established in the literature regarding temporal languages, which will provide important background for the comparison between Blackfoot and temporal languages in Section 3. In temporal languages, in general, a goal PP can change an event structure by adding an endpoint (e.g., MacDonald 2008, Svenonius 2010). As discussed earlier, the event with a goal PP

[2] See Ritter (2014b) for a larger picture on how Bloomfield class should be understood with respect to Vendler-Dowty class. Largely, this paper pursues the same direction as Ritter, but is different from Ritter in that it develops how animacy plays a role with spatial PPs.
[3] I assume features are privative following Ritter (2014b).
[4] Underlying assumption for this is Universal Spine Hypothesis (USH) approach (Ritter and Wiltschko 2014, Wiltschko 2014).

in (1a) is atelic; however, by adding a goal PP 'to the store', the event becomes telic as in (1b). In contrast to goal PPs, locative PPs do not alter an event structure, as shown in (4).

(4) John pushed a cart in the store [for an hour/ ? in an hour]. atelic.

Differently from (1a), the same event of pushing a cart in (4) has a locative PP 'in the store.' However, adding the locative PP does not change the event structure at all: it is atelic as in (1a), as indicated by the contrast between the time adverbial phrases. The event in (4) is compatible with the durative phrase 'for an hour', but not with the time span phrase 'in an hour'. Goal and locative PPs contribute to event structure in different ways: a goal PP change an event structure to telic by adding a temporal endpoint phrase, but a locative PP does not. In other words, a goal PP is licensed by the [bounded] feature on I-Asp, but with a locative PP, I-Asp is not bounded.

2 Spatial PPs in Blackfoot

Spatial PPs refer to PPs that indicate either path or location (Jackendoff 1983). Consider an example in (5).

(5) a. John went to the store.
b. John is in the room.

In (5a), the P *to* indicates path, a trajectory that John (Figure) followed with respect to the reference point object 'the store' (Ground). In particular, the P in (5a) specifies Ground as a goal of motion. On the other hand, in (5b), the P *in* indicates a place (Ground) where John is located.

In Blackfoot, path or location meanings are expressed with a set of prefixes called linkers and non-linkers (Frantz 2009, Kim 2014a), which are often called relative roots in the Algonquian literature (Rhodes 2010). Except where the distinction between linkers and non-linkers is necessary, I call these prefixes spatial PPs. Examples of spatial PPs are provided in (6–7).

(6) a. *anna John itapoo anni niitahtaayi*

anna	John	**itap**-oo-wa	**anni**	**niitahtaayi**	path
DEM	John	GOAL-go.AI-3s	DEM	river	

'John is going **to the river**.'

b. *anna John itohpaipiiyi anni niitahtaayi*

anna	John	**it**-ohpai'piiyi-wa	**anni**	**niitahtaayi**	locative
DEM	John	LOC-jump.AI-3S	DEM	river	

'John is jumping **in the river**.'

(7) a. *anna John aamisoo*

anna	John	**waamis**-oo-wa	(*anni	niitahtaayi)	vertical
DEM	John	up-go.AI-3s	(*DEM	river)	

'John is going **up**.'

b. *anna John naawokska'si*

anna	John	**naaw**-okska'si-wa	(*anni	niitahtaayi)	lateral
DEM	John	left-run.AI-3s	(*DEM	river)	

'John is running **leftwards**.'

Among the motion verbs, inherently directed motion verbs such as 'go' or 'flee' obligatorily require spatial PPs. In other words, the verb 'go' in (6a) and (7a) cannot appear alone in Blackfoot; a linker such as *itap-* 'to' or a non-linker such as *waamis-* 'up' is obligatory with these verbs. In contrast, manner of motion verbs in (6b) or (7b) do not require spatial PPs.

As noted in Jackendoff (1983), English has several types of path expressed by different prepositions; for instance, goal ('to'), source ('from'), direction ('toward'), and route ('along'/'pass'). In Blackfoot, these paths can be expressed by two linkers: the linker *itap-* expresses a goal or a direction, as shown in (6a) above, while the linker *oht-* expresses source or route, as illustrated in (8). The linker *oht-* undergoes initial change and thus it appears as *iiht-* in (8a) (see Frantz 2009).

(8) a. *anna saahkomaapi iihto'too Mohkinsstsisi*

anna	ssahkomaapi	iiht-o'too-wa	Mohkinsstsisi	source
DEM	boy	SOURCE-arrive.AI-3S	Calgary	

'The boy is coming from Calgary.'

b. *nitaakohtaamisoo ami niitahtaayi*

nit-yaak-oht-aamis-oo	ami	niitahtaayi	route
I-FUT-ROUTE-go.AI	DEM	river	

'I will go along the river.'

Non-linkers can express a similar range of meanings without introducing a Ground, as shown in (9).

(9) a. *aaksainnisoo*

yaak-sainnis-oo-wa	vertical
will-**down**-go.AI-3S	

'(S)he will go downward.'

b. *nitaakiistapohpai'piiyi*

nit-yaak-miistap-ohpai'piiyi	central
I-will-**away**-jump.AI	

'I will jump away.'

c. *aakopamoo*

yaak-opam-oo-wa	route
will-**across**-go.AI-3S	

'(S)he will go across.'

3 I-Asp in Blackfoot is not [bounded]: no telic/atelic distinction

3.1 No telic/atelic distinction in Blackfoot

Unlike temporal languages (e.g., English, see Section 1), no telicity distinction, and thus no boundedness distinction, is observed in Blackfoot. For instance, time adverbial expressions, which are often used for distinguishing between telic and atelic events, do not show a distinction with respect to the types of spatial PPs. For example, consider the examples in (10) with a time adverbial expression (lit. 'one hour clock').

(10) a. *nitsitaamisoo ni'to'takoohssini iihtaiksistsikomio'p*
nit-it-**waamis**-oo [ni't-o'takoohssini iihtaiksistsikomio'p]
I-time-**up**-go.AI one-hour clock
'I went up for an hour / in an hour.'
(i.e., 'I was going up for an hour.' / 'It took an hour for me to go up.')

b. *nitsitsitapaamisoo anni isspakohyi ni'to'takoohssini iihtaiksistsikomio'p*
nit-it-**itap**-waamis-oo anni isspakohyi [ni't-o'takoohssini iihtaiksistsikomio'p]
I-time-**goal**-up-go.AI DEM hill one-hour clock
'I went up the hill for an hour / in an hour.'
(i.e., 'I was going up the hill for an hour, regardless of getting to the hill.' / 'It took an hour for me to get to the hill.')

The time adverbial phrase in (10) is ambiguous between 'in X time' and 'for X time'; thus, there is no distinction in telicity between the spatial PPs. As in (10a), where English counterpart would be interpreted as an atelic event, the sentence is compatible with both 'for an hour' (atelic) and 'in an hour' (telic) readings. The sentence in (10b) where the goal phrase of the motion is expressed by the linker *itap*- shows the same ambiguity.

In English, not all path types are telic as shown in (11): the route path 'past' can be telic (11a) like a goal path (see (1b)), but the same route type of path 'along' is atelic (11b).

(11) a. [The boy ran **past** the tree] ?for one minute /in one minute. telic
b. [The children walk **along** the river] for an hour /?in an hour. atelic

In contrast, in Blackfoot, all path types seem to be insensitive to temporality, as the two different route paths illustrate in (12). Like the goal path in (10), the route path in (12) allows either a telic or an atelic reading as evidenced by the grammaticality of either reading of the time adverbial. The same type of paraphrase as in (10) applies to these examples.

(12) a. *nitohtaamisoo ami niitahtaayi ni'to'takoohssini iihtaiksistsikomio'p*
nit-**oht**-waamis-oo ami niitahtaayi [ni't-o'takoohssini iihtaiksistsikomio'p]
I-**ROUTE**-go.AI DEM river one-hour clock
'I walked along the river for an hour/in an hour.'

b. *nitohtsitskoo anni niimoyistyi ni'to'takoohssini iihtaiksistsikomio'p*
nit-**oht**-itsk-oo anni niitmoyisyi [ni't-o'takoohssini iihtaiksistsikomio'p]
I-**ROUTE**-past-go.AI DEM tipi one-hour clock
'I walked past the tipi for an hour/in an hour.'

These examples show that in Blackfoot, telicity is not a crucial factor in the determination of event classification. The remaining puzzle is what this factor is, if it is not telicity. In the next section, I argue that it is semantic animacy that determines Blackfoot aspectual event classification.

3.2 Semantic animacy and spatial PPs

In this section, I show that in Blackfoot, it is not the presence of an endpoint but the presence of semantically animate argument that determines the event type. I first discuss animacy of nouns in Blackfoot. In this language, a noun is classified into two grammatical types, animate and inanimate

(Frantz 2009). The inanimate class of nouns are those that refer to objects or things. The animate class of nouns are those that refer to humans or animals. In addition, there are a set of semantically inanimate nouns that belong to grammatically animate noun class. e.g., 'wagon', 'car' or 'train'. These grammatically animate nouns show the same type of noun inflections as real world animate nouns. For instance, they are marked with an animate plural marker: *saahkompaapi-iksi* 'boy-PL' and *ainaka'si-iksi* 'wagon-PL' unlike grammatically inanimate noun *saakokotoissko-istis* 'bottle-PL'.

Turning to the data of spatial PPs and motion verbs, the semantically animate subject of the verb can appear with path PPs, as shown in (13).

(13) *anna saahkomaapi itapoo oomi isspahkoyi*

anna	**saahkomaapi**	itap-oo-wa	oomi	isspahkoyi	goal/direction
DEM	boy	GOAL-go.AI-3S	DEM	hill	

'The boy went toward/to that hill.'

In (13), the semantically animate subject 'the boy' can mark the endpoint of the motion event, *oomi isspahkoyi* 'the hill' that is introduced by the goal/direction linker *itap-*. The prediction for semantically inanimate but grammatically animate subjects such as 'wagon' is that they should show the same pattern as in (13). Surprisingly, however, this is not the case, as illustrated in (14).

(14) * *anna ainaka'si itapoo oomi isspahkoyi*

anna	**ainaka'si**	itap-oo-wa	oomi	isspahkoyi
DEM	wagon	GOAL-go.AI-3S	DEM	hill

'**The wagon** went toward/to that hill.'

In (14), the subject of the motion verb 'the wagon' is grammatically animate like the semantically animate subject 'the boy' in (13). However, as the ungrammaticality of (14) shows, semantically inanimate subjects cannot mark an endpoint. This is not only true of the goal/direction path, but other paths, e.g., route, also show the same pattern, as exemplified in (15). In passing, note that this is also different from English-type languages, where a different path type shows different telicity (compare (1b) vs. (11b) and (11a) vs. (11b))

(15) a. *anna akiikoan iihtoo anni niitahtaayi*

anna	**akiikoan**	iiht-oo-wa	anni	niitahtaayi	route
DEM	girl	ROUTE-go.AI-3S	DEM	river	

'That girl went along the river.'

b.* *anna ainaka'si iihtoo anni niitahtaayi*

anna	**ainaka'si**	iiht-oo-wa	anni	niitahtaayi
DEM	wagon	ROUTE-go.AI-3S	DEM	river

'That wagon went along the river.'

In contrast, when the endpoint-denoting PP is absent, this contrast in semantic animacy is not observed. In other words, both semantically and grammatically animate subjects show no difference when a path non-linker or a locative linker appears with them. Consider examples in (16) with a non-linker and in (17) with a locative linker.

(16) a. *anna akiikoan sainnisoo*

anna	akiikoan	sainnis-oo-wa	vertical
DEM	girl	down-go.AI-3S	

'That girl went downward.'

b. *anna ainaka'si itskoo*

anna	ainaka'si	itsk-oo-wa	route
DEM	wagon	route-go.AI-3S	

'That wagon passed by.'

(17) a. *anna saahkomaapi itsipoyi anni itaisooyo'p*

anna	**saahkomaapi**	**it**-ipoyi-wa	anni	itaisooyo'p	locative linker
DEM	boy	LOC-stand.AI-3S	DEM	table	

'**That boy** is standing **on** the table.'

b. *anna ainak'si itsipoyi anni kssahkoyi*

anna	**ainaka'si**	**it**-ipoyi-wa	anni	ikssahkoyi
DEM	wagon	LOC-stand.AI-3S	DEM	earth

'**That wagon** is standing **on** the ground.'

Although additional examples cannot be replicated here due to space reasons, I found that not only more agent-like grammatically animate nouns like 'wagon' or 'car', but also less agent-like grammatically animate nouns such as 'ball', 'doll' or 'stone' show the same behavior in a relevant context; e.g., with path linkers, they are ungrammatical, while with non-linkers or locative linkers, they are grammatical.

The data discussed in this section suggest that in Blackfoot, it is not the presence of an endpoint-denoting PP, but the presence of a semantically animate subject that determines an event type. Only in the presence of a semantically animate subject can an endpoint be marked. Moreover, it is not only an endpoint-denoting PP, but also other path types such as direction or route that are licensed by a semantically animate subject. The feature [bounded] on I-Asp cannot capture the range of facts in Blackfoot; otherwise, regardless of semantic animacy, an endpoint-denoting PP should be grammatical, contrary to the facts. I argue that I-Asp in Blackfoot does not have a [bounded] feature but has an [animate] feature, as presented in table 3. In other words, the feature [animate] in Blackfoot is the counterpart of feature [bounded] in English. As a locative PP in English is licensed by the absence of a [bounded] feature on I-Asp, the locative linker and path non-linker are licensed by the absence of an [animate] feature on I-Asp.

In sum, Blackfoot does not have telicity-based I-Asp, but has animacy-based I-Asp.

Table 3. Summary on correspondence between English and Blackfoot

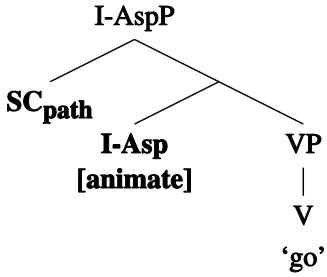
English	Path PP	Loc PP
I-Asp	[bounded]	--------
Blackfoot	**Path linker**	Loc linker & path non-linker
I-Asp	**[animate]**	--------

4 Structure of motion AIs in Blackfoot: [animate]

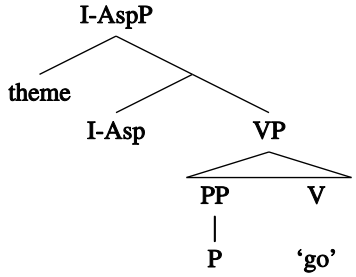
The data presented in the previous section suggest that the difference between temporal languages and Blackfoot can be captured by the feature [animate] on I-Asp, where the feature [bounded] is realized in temporal languages. The proposed structures of motion and posture verbs with spatial PPs are shown in (18). I assume that linkers are functional categories such as p while non-linkers are lexical categories P, following the previous studies (Kim 2014a, *forthcoming*).

Path linkers – goal, direction, and route – are licensed by [animate] on I-Asp (18a), which captures their distribution with semantically animate subjects (i.e., theme of the motion event). By contrast, the distribution of a non-linker or locative linker is not subject to the animacy of the theme: either a semantically animate or inanimate subject is allowed. In these cases, the feature [animate] is absent on I-Asp as presented in (18b–c).

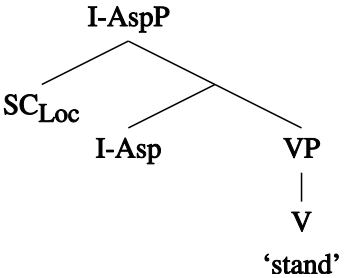
(18) a. Path linker (p)



b. Non-linker (P)



c. Loc linker (p)



d. [$SC_{path/loc}$ theme [$p_{path/loc}$ DP/NP]]

Building on the previous studies on Figure (usually a theme) and Ground relations (e.g., Svenonius 2010), I propose that a linker is like a predicator mediating a relation between the theme of the verb and the nominal that it introduces. For instance, in (13), a path linker indicates a path relation between a theme of the verb (i.e., Figure) 'the boy' and a goal of motion 'the hill' (Ground). As shown in (18d), a linker is a realization of the head of SC, and mediates a path or locative relation between the theme and its complement (DP or NP) introduced by a linker.

In the rest of this section, I focus on the details of the structure in (18). Linkers and non-linkers appear inside I-Asp but at different levels. More specifically, linkers appear in the specifier of I-AspP in a form of SC, and non-linkers appear at the VP level.[5] I provide evidence for this aspect of the structure from abstract nominalization, idioms, and initial position in the stem.

4.1 Spatial PPs and abstract nominalization

Abstract nominalization in Blackfoot is one of the several nominalization types available in the language (Frantz 2009), and is morphologically marked with *-n* or *-hsin*. The first variant attaches to stems ending in *-aa*. The second allomorph appears elsewhere. Abstract nominalization indicates either the state or process described by the verb (Frantz 2009). Crucial to the present discussion is that abstract nominalization is only possible with intransitives such as AIs, not with verbs marked with TA or TI finals (Frantz 2009).

[5] Bliss et al. (2013) proposed that locative linkers are an adjunction to IP, in contrast to the proposed structures for spatial linkers in this paper (see (18)). Unlike this paper, their data are not on motion and posture verbs. As suggested in Kim (*forthcoming c*), it may be the case that not all linkers appear in the same position in the structure.

In recent approaches to abstract nominalization, I-Asp is proposed to be the target of abstract nominalization, and AI finals are realized as I-Asp (Ritter 2014a). A prediction is that an element outside I-AspP would be ungrammatical with abstract nominalization, but that an element inside I-AspP would be grammatical. This is schematically represented in (19).

(19) abstract nominalization ✘ ✓

... [$_{XP}$ X [$_{I\text{-}AspP}$ I-Asp [$_{YP}$ Y]]]

AI

Another fact shown in Ritter is that pseudo-transitive AI verbs, which allow an optional NP object, do not allow abstract nominalization, as shown in (20). The pseudo-transitive AI verb 'hunt' in (20) can have an optional NP object 'elk' and the abstract nominalization of the verb is ungrammatical.

(20) * *ikskiimaani ponoka aakohkotsiksstonatapi*

ikskimaa-n-yi	**ponoka**	yaak-ohkot-ik-sstonnat-a'pii
hunt.AI-NOM-INAN	elk	will-able-INTNS-dangerous-BE.AI

Intended: 'Hunting an elk can be really dangerous.' (Ritter 2014a)

However, the nominalization becomes grammatical if the NP undergoes incorporation into the verb, as shown in (21).

(21) *ponokaiksskimaani aakohkotsiksstonatapi*

ponoka-ikskimaa-n-yi	yaak-ohkit-ik-sstonnat-a'pii
elk-hunt.AI-NOM-INAN	will-able-INTNS-dangerous-BE.AI

'Elk-hunting can be really dangerous.' (Ritter 2014a)

Motion and posture verbs are AI verbs, and they do not allow an object, as shown throughout the paper, which suggests that abstract nominalization would be grammatical with these verbs. Importantly, however, some of them obligatorily require path or locative spatial PPs. Thus, their abstract nominalization should be considered with those spatial elements together. With non-linkers, the nominalization of these verbs is always grammatical, as shown in (22). The grammaticality supports the proposed structure (18b), where non-linkers must appear inside I-AspP.

(22) a. *nitaamisoohsin*
nit-waamis-oo-hsin
1-up-go.AI-NOM
'My going

b. *nitsinnoohsin*
nit-inn-oo-hsin
1-down-go.AI-NOM
'My going down. (Kim 2014a)

With respect to linkers, the nominalization seems to be ungrammatical. Consider the examples in (23). In (23a), the direction linker *itap-* introduces a goal of the motion event 'going', namely, 'school'. When (23a) is abstract nominalized as in (23b), it is ungrammatical.

(23) a. *aakitapoo iitaissksinimatsohko'p*

yaak-itap-oo-wa	iitaissksinimatsohkio'p
FUT-GOAL-go.AI-3S	school

'He will go to school.'

b.* *itapoohsini iitaissksinimatsohkio'p aaksoka'pii*
itap-oo-hsin-yi **iitaissksinimatsohkio'p** yaak-sok-a'pii
GOAL-go.AI-INAN school will-good-be.AI
'Going **to school** will be good.'

Interestingly, however, as with pseudo transitive AI verbs as in (23a), the abstract nominalization is grammatical if the object of the direction linker, 'school' incorporates into the verb 'go', as shown in (24).

(24) *itapiitaissksinimatsohkio'poohsiniaaksoka'pii*
itap-**iitaissksinimatsohkio'p**-**oo**-hsin-yi yaak-sok-a'pii
GOAL-school-go.AI-NOM-INAN will-good-be.AI
'**School going** will be good.'

The locative linker *it-* with posture verbs is also grammatical with abstract nominalization, as shown in (25):

(25) *nitsitopiihsin*
nit-it-opii-hsin-yi
1-loc-sit.ai-nom-inan
Lit. 'sitting in the office.' / Idiomatic: 'my term in the public office ('My sitting')

The data on abstract nominalization suggest that both linkers and non-linkers appear inside I-AspP, providing support for the proposed analysis in (18).

4.2 Spatial PPs and idioms

In a previous study (Kim 2014a), I have shown that patterns found in idioms suggest that linkers and non-linkers in Blackfoot appear in different domains, functional vs. lexical. This conclusion is based on previous studies of idioms (Marantz 1997, Svenonius 2005, Harley and Stone *in press*, Kim 2014b). These studies collectively suggest that elements *outside* lexical domains such as VP do not belong to idioms, while elements *inside* lexical domains tend to belong to idioms, as illustrated in (26a). The arrow in (26) indicates the boundary for idiomatic interpretation. A similar split is found with linkers and non-linkers in Blackfoot with respect to idiom formation, such that a linker will appear in the functional domain but a non-linker will appear in the lexical domain, as illustrated in (26a). As shown in the previous section, both spatial PPs appear in I-Asp, and thus the relevant FP in Blackfoot (26b) is I-Asp.

(26) a. $[_{FP}$ F ... ↓ $[_{VP}$ V]] (adapted from Kim 2014b)

b. $[_{I\text{-}AspP}$ Linker ↓ $[_{VP}$ Non-linker V]] Blackfoot

This prediction is borne out by the data. In Blackfoot it is easy to find idioms formed with non-linkers, lexical Ps, but this is not the case with the linkers. The Blackfoot dictionary (Frantz and Russell 1995) shows numerous idioms that consist of a non-linker and a verb, some of which are illustrated in (27). Strikingly, in the dictionary, there are no idioms formed with the linkers.

(27) a. *aakistaahtooa*
yaak-[VP [PP **istaaht**] -oo] -wa
will- under -go.AI -3S
'He will [go to Hell].' (Lit. 'He will go under.')

b. *ohkitopii*
ohkit-opii
on-sit.AI
'ride a horse.' (Lit. sit on) (Frantz and Russell 1995)

As our concern is I-AspP, and given that both linkers and non-linkers appear inside I-AspP as evidenced by abstract nominalization, the patterns of the idioms support the proposed structures in (18), where a linker appears in the functional domain, I-AspP, while a non-linker appears in the lexical domain VP.

4.3 Spatial PPs as occupying initial position of the stem

It is well known that verb stems in Algonquian are tripartite, consisting of initial-medial-final (Bloomfield 1946, Goddard 1990), as schematically presented in (28). Initial is the position at the left edge of the stem, and the elements that fill the position are often called left edge elements: initial position can be filled with any syntactic category. Final position is at the right edge of the stem, and usually a category-defining element occupies the position. Medial position is filled with a noun. Initial and final positions are obligatorily filled (Goddard 1990), while medial position is optional.

(28)

INITIAL	MEDIAL	FINAL
Any syntactic category	N	V

Among the elements that can occupy initial position, preverbs often fill the initial position (Goddard 1990, Branigan et al. 2005, Brittain 2005). Preverbs typically have an adverbial meaning, and they appear between the tense marker and the stem (29).

(29) personal prefix – tense – preverb(s) – [stem initial – medial – final] – inflection

For the purpose of this paper, an important question with respect to an initial element is what syntactic position it occupies. In recent studies, one answer to this question has been that it fills a specifier of XP; for instance, in Ojibwe, it occupies a specifier of *v*P (Mathieu 2007, Slavin 2012).

Adopting this approach, I argue that some spatial linkers and non-linkers in Blackfoot are left-edge elements in the stem and occupy the specifier of I-AspP and the specifier of VP, respectively. As noted earlier, linkers and non-linkers are obligatory with motion verbs such as 'go' or 'flee' or posture verbs such as 'stand'. Moreover, like left edge elements, the linkers or non-linkers appear between tense marker and stem, as exemplified with a linker in (30).

(30) *nitaakitapoo oomi isspahkoyi*
nit-**yaak-itap-oo** oomi isspahkoyi
1-will-GOAL-go.AI DEM hill
'I will go to that hill.'

The two previous sections provide support that linkers and non-linkers appear in I-AspP. More specifically, linkers appear in I-Asp above VP, but non-linkers appear below VP. Given that these elements are left-edge elements occupying relevant specifier positions, as the previous studies suggest, I propose that linkers appear in the specifier of I-AspP and non-linkers appear in the specifier of VP (see (18)), satisfying the left edge requirement.

5 Consequences

I have shown that I-Asp in Blackfoot is not bounded, but has an [animate] feature that corresponds to [bounded] in temporal languages. Recall the discussion in section 1 that verb classification in Blackfoot is oriented by morphological animacy, as the Bloomfield verb class suggests, but it is also aspectual, as suggested by recent studies. In particular, Ritter (2014b) suggests that there is a correspondence between boundedness and animacy. The results of this study provides strong novel evidence for the suggested correspondence. Moreover, this study shows that the correspondence may not be one-to-one (see Table 4 below). If animacy corresponds to boundedness in a one-to-one manner, for instance, all AI verbs would correspond to telic events. In other words, all AI verbs are predicted to allow endpoint-denoting PPs. Contrary to this prediction, what I have shown is that not all AI verbs allow an endpoint-denoting PP, i.e., a path linker. Only those that have a semantically animate subject allow a path linker; otherwise, the AIs with inanimate subjects correspond to atelic events only allowing a non-linker or a locative linker. In other words, AIs whose I-Asp is [animate] correspond to telic events, while AIs whose I-Asp is not specified with the feature can correspond to atelic events. Motion AI verbs appear to be of two types, although their specification of morphological animacy (i.e., AI) is identical. That is, there is no one-to-one mapping between morphology and aspectual verb classification.

Table 4. Sub-classification of motion AIs

Verb Class	Semantic Animacy	Correspondence	I-Asp
Motion AIs	Animate	telic	[animate]
	Inanimate	atelic	--------

6 Conclusion

This paper discussed the distribution of spatial PPs in Blackfoot with respect to motion and posture verbs, which has not previously been studied in the literature. This paper showed how the distribution of spatial PPs in Blackfoot is animacy-based, rather than boundedness-based, which is consistent with previous studies on various parts of Blackfoot grammar (Ritter and Rosen 2010, Wiltschko 2009, 2012, Bliss 2010, Kim 2014c, Ritter 2014a, b). I argued that the feature [animate] plays a central role in the distribution of spatial PPs in Blackfoot, which is in parallel with [bounded] in temporal languages. A significant consequence of this paper is that not all verbs belonging to the same morphological class are aspectually identical. Rather, verbs are mapped onto different aspectual classes corresponding to telic or atelic, i.e., animate or inanimate.

References

Bliss, H. (2010). Argument structure, applicatives, and animacy in Blackfoot. In H. Bliss & R. Girard (Eds.), *WSCLA 13 & 14: Proceedings of the 13 and 14th Workshop on the Structure*

and Constituency of Languages of the Americas, *February, 4–7, 2008* (pp. 58–69).Vancouver: UBC Working Papers in Linguistics.

Bliss, H., R.-M. Déchaine & T. Hirose. (2013, June). Locative PPs in Blackfoot and Plains Cree. Paper presented at the 2013 Canadian Linguistics Association (CLA), University of Victoria, BC.

Bloomfield, L. (1946). Algonquian. In Harry Hoijer (Ed.), *Linguistic Structures of Native America*. (pp. 85–129). New York: Viking Fund Publications in Anthropology 6.

Branigan, P., J Brittain, and C. Dyck. (2005). Balancing syntax and prosody in the Algonquian verb complex. In H. Christoph Wolfart (Ed.), *Papers of the Thirty-sixth Algonquian Conference, October 28–31, 2004*. (pp. 1–19). Winnipeg: University of Manitoba.

Brittain, J. (2005). A distributed morphology account of the syntax of the Algonquian verb. In S. Somesfalean and S. Burrell (Eds.), *CLA 2003: Proceedings of the 2003 Annual Conference of the Canadian Linguistic Association*, *June 1–4, 2003*.

Dowty, D. R. (1979). *Word Meaning and Montague Grammar*. Dordrecht: Reidel.

Frantz, D.G. (2009). *Blackfoot grammar*. University of Toronto Press.

Frantz, D.G. and Russell, N. (1995). *Blackfoot dictionary of stems, roots, and affixes*. University of Toronto Press.

Goddard, I. (1990). Primary and secondary stem derivation in Algonquian. *International Journal of American Linguistics,* 56, 449–83.

Harley and Stone. (in press). The 'No Agent Idioms' hypothesis. *Proceedings of OnLi (On Linguistic Interfaces)*. Oxford: Oxford University Press.

Jackendoff, R. (1983). *Semantics and Cognition*. Cambridge: MIT press.

Kim, K. (forthcoming). The instrument linker *iiht-*/*oht-* in Blackfoot as a functional p. In N. Weber (Eds.), *WSCLA 18: Proceedings of the 18th Workshop on the Structure and Constituency of Languages of the Americas*, *April, 5–7, 2013*.Vancouver: UBC Working Papers in Linguistics.

Kim, K. (2014a). *Refining the syntax of non-core arguments: P, applicative, and functional p*. In L. Kusmer and J. Iyer (Eds.), *NELS 2013: Proceedings of the 2013 North East Linguistic Society, October 18–20, 2013.*

Kim, K. (2014b). Phase and idioms. In E. Predolac and A. Joseph. (Eds.), *WAFL 9: MIT Working Papers in Linguistics: Proceedings of 9th Workshop on Altaic Formal Linguistics*, *August 23–25, 2013*.

Kim, K. (2014c). PERSON all the way in Blackfoot: evidence from psych-predicates. In S. Leo (Eds.), CLA 2013: Proceedings of the 2013 Annual Meeting of Canadian Linguistic Association, June 1–3, 2013.

Louie. (2008). Atemporal Anchoring of Individuals, Events and Subevents in Blackfoot: Consequences for the syntax-semantics interface. MA Thesis, University of Toronto.

MacDonald, J. (2008). The syntactic nature of inner aspect. John Benjamins.

Marantz, A. (1997). No escape from syntax: Don't try morphological analysis in the privacy of your own Lexicon, In A. Dimitriadis et al. (Eds.), PLC 21: Proceedings of the 21st Annual Penn Linguistics Colloquium: Penn Working Papers in Linguistics 4. (pp. 201–225).

Mathieu, E. (2007). *The syntax of abstract and concrete finals in Ojibwe*. Manuscript. University of Ottawa.

Rhodes, R. A. (2010). Relative root complement: A unique grammatical relation in Algonquian syntax. In J. Wohlgemuth & M. Cysouw (Eds.), *Rara & rarissima: Documenting the fringes of linguistic diversity* (pp. 305–324). Berlin: Mouton De Gruyter.

Ritter, E. (2014a). Nominalizing inner-aspect: Evidence from Blackfoot. In P. Ileana (Ed.), *Cross linguistic investigations of nominalization patterns* (pp. 20–50). Amsterdam: John Benjamins.

Ritter, E. (2014b). *Featuring Animacy*. Manuscript submitted for publication. Ben Gurion University.

Ritter, E., & S. Rosen. (2010). Animacy in Blackfoot: Implication for event structure and clause structure. In M. Rappaport-Hovav, E. Doron, & I. Sichel (Eds.), *Syntax, lexical semantics and event structure* (pp. 124−152). Oxford: Oxford University Press.

Ritter, E., & M. Wiltschko. (2014). The composition of INFL. An exploration of tense, tenseless languages, and tenseless constructions. *Natural Language and Linguistic Theory* 32: 1331–1386.

Slavin, T. (2012). Phonological and syntactic evidence for stem structure in Oji-Cree. *International Journal of American Linguistics,* 78, 497–532.

Svenonius, P. (2010). Spatial P in English. In Guglielmo Cinque, and Luigi Rizzi (Eds.), *Mapping spatial PPs* (pp. 127–160). Oxford: Oxford University Press.

Svenonius, P. (2005). Extending the extension condition to discontinuous Idioms. *Linguistic Variation Yearbook,* 5, 227–263.

Wiltschko, M. (2014). *The Universal structure of categories: Towards a formal typology*. Cambridge: Cambridge University Press.

Wiltschko, M. (2012). Decomposing the count-mass distinction: Evidence from languages that lack it. In Diane Massam (Ed.), *Count and mass across languages* (pp. 146–171). Oxford: Oxford University Press.

Wiltschko, M. (2009). How do languages classify their nouns? Cross-linguistic variation in the manifestation of the mass count distinction. In WSCLA 13 & 14: *Proceedings of the 13 and 14th Workshop on the Structure and Constituency of Languages of the Americas*, *February, 4-7, 2008* (pp. 223–241). Vancouver: UBC Working Papers in Linguistics.

A metrical stress analysis of Mushuau Innu

Erica Woolridge
Memorial University

Abstract: This paper provides a metrical stress analysis of Mushuau Innu, a dialect of Innu-aimun spoken in Natuashish, Labrador. The majority of the data could be analyzed using two distinct analyses: a penultimate analysis (not quantity sensitive, stress falls on the penult at the underlying representation) and a right-most heavy analysis (quantity sensitive, final syllable extrametricality, stress falls on the right-most heavy syllable at the underlying representation). The right-most heavy analysis is preferred as it is quantity sensitive and allows for comparison to the related dialects of Northern East Cree and Southern East Cree. This is the first instrumental study of Mushuau Innu. Pitch differences between stressed and unstressed vowels were found to be statistically significant and the fact that the resulting metrical stress analysis found for Mushuau Innu patterns similarly to those described for other dialects indicates that the methodology of using pitch to determine stress placement is promising.

Keywords: metrical stress analysis, Innu-aimun, Algonquian language family, acoustic analysis, Mushuau Innu

1 Introduction

This paper provides a metrical stress analysis of Mushuau Innu, a dialect of Innu-aimun spoken in Natuashish, Labrador.[1] To date, the metrical stress parameters of Mushuau Innu, an Algonquian dialect of the Cree-Montagnais-Naskapi complex, have not been analyzed.

Descriptions of the Mushuau Innu phonological system are provided in MacKenzie (1980), Ford (1978, 1982), and Scott (2000), and it is acknowledged that Mushuau Innu is the most outlying of all of the dialects in terms of phonological behaviour and variability. Although a preliminary sketch of the stress system of Mushuau Innu is presented in Scott (2000), there is no detailed account of the metrical system. This is the first study focusing exclusively on the dialect's metrical stress parameters.

The current analysis is based on acoustic measurements from data collected for the purposes of undertaking a metrical stress analysis (see Section 3 on Methodology). The purpose of this research is to establish the metrical stress parameters (Hayes 1995) for Mushuau Innu and to support the analysis with empirical evidence of the stress pattern. This paper constitutes the first instrumental acoustic study of Mushuau Innu and will add new information to the literature and aid in comparison between dialects.

There are additional recordings and field notes from Mailhot (1971) which contain impressionistic stress markings. However, stress markings are provided on approximately one quarter of the data and due to the quality of the recordings (e.g., background noise, feedback), they are not suitable for an instrumental analysis.

1.1 Background: Metrical stress analysis (Hayes 1995)

Several theoretical assumptions are needed to describe stress placement in Mushuau Innu.

Contact info: erica.woolridge@mun.ca

[1] The community of Natuashish is formerly known as Davis Inlet.

In Proceedings of the Workshop on Structure and Constituency in the Languages of the Americas 18 & 19,
University of British Columbia Working Papers in Linguistics 39,
Natalie Weber and Sihwei Chen (eds.), 2015.

This paper uses the metrical theory advanced by Hayes (1995). Metrical stress theory uses strong and weak syllable positions within a word, wherein the syllable is the stress-bearing unit and syllables are parsed into feet. The syllable that is stressed may be described as 'strong' and the syllable that is not stressed may be described as 'weak'. Additionally, syllables may be described as 'heavy' or 'light' based on whether or not the language is quantity sensitive (i.e., whether the internal structure of the syllable factors into stress placement).

Trochees and iambs are two types of binary foot constructions. A trochaic foot is made up of a stressed syllable followed by an unstressed syllable and an iambic foot is made up of an unstressed syllable followed by a stressed syllable. In addition, a language may not have bounded foot constructions, but instead have unbounded feet where a foot consists of one strong syllable and an unrestricted number of weak syllables.

Languages also differ in the direction in which footing occurs (i.e., whether the parsing of syllables into feet starts at the left or right edge), and may differ in whether or not it allows extrametricality. Extrametricality occurs when a constituent (e.g., syllable, foot) is excluded from the stress analysis: its presence does not affect stress assignment (Hayes 1981). Extrametricality most commonly affects the outer edges of word (i.e., occurs at the left-most or right-most edge).

Languages may also allow or disallow degenerate feet. A degenerate foot consists of a single weak syllable as there is no strong counterpart to make it a binary foot. The language may leave such syllables unfooted or foot them into degenerate feet. A language may also favour the left-most or right-most strong syllable to receive primary stress assignment and can hence be described as End Rule Left/Right.

Specific metrical stress parameters as they apply to Mushuau Innu are described in detail in Section 7 below.

1.2 Background: Related dialects

1.2.1 Southern East Cree (Brittain 2000)

Brittain (2000) conducted an impressionistic study of metrical stress assignment in Southern East Cree (SE Cree), a subdialect of Cree spoken on the Quebec-Labrador peninsula along the east coast of James Bay. She found that SE Cree is a quantity sensitive language, where heavy syllables attract stress and light syllables do not. Heavy syllables are defined in SE Cree as those containing a long vowel, or a short vowel closed by a glide or a nasal. All other syllables are light.

Stress placement was found to fit with two analyses: binary iambic feet and also unbounded feet. Under the iambic analysis, within a foot, a weak syllable must be followed by a strong syllable. Under the alternative unbounded analysis, feet could consist of an unlimited number of light syllables and a single heavy syllable which attracts stress.

The final foot in SE Cree is extrametrical, therefore not included in determining stress assignment, like Munsee and Unami Delaware, Malecite-Passamaquoddy, and Eastern Ojibwa, as cited in Brittain (2000). Excluding the extrametrical foot, the right-most heavy syllable is then stressed (End Rule Right).

1.2.2 Northern East Cree (Dyck, Brittain and MacKenzie 2006)

Dyck, Brittain and MacKenzie (2006) examined stress placement in Northern East Cree. The analysis of stress placement was impressionistic, although an acoustic analysis was also employed in certain cases to confirm transcriptions. They found that NE Cree is a quantity sensitive language at the level of the nucleus. Heavy syllables are defined in NE Cree as those containing a historically long vowel or rising diphthong (i.e., a diphthong where the second sound is more sonorous than

the first; i.e., a glide followed by a vowel). Light syllables contain a historically short vowel. Coda consonants do not contribute to syllable weight.

Whereas SE Cree has final foot extrametricality (Brittain 2000), Dyck et al. (2006) found that the final syllable in NE Cree is extrametrical, and that excluding the final extrametrical syllable, the rightmost heavy syllable is stressed (End Rule Right). Feet are iambic and there are no degenerate (L) feet.

Words ending in a string of light syllables were problematic for stress assignment.[2] It was hypothesized, following MacKenzie (1980), that stress placement may be different in LL<L/H> words (and fall on the antepenultimate syllable) due to homophony: different stress patterns are needed to differentiate homophonous words (Dyck et al. 2006: 11).

2 Phonological description of Mushuau Innu

Mushuau Innu has the syllable template CV(:)C. The phonemic inventory as determined by Scott (2000) is listed below in Figures 1 and Figure 2.

p	t	k	
	t^w	k^w	
m	n		
m^w			
	ʧ		
	s		h

Figure 1 Consonant phonemes

Scott (2000) details a variety of allophonic rules that can affect the consonants of Mushuau Innu (Mailhot 1971). However, few of the consonant allophonic rules Scott describes were present in the current data set. The consonant processes that were attested, for example, the voicing of voiceless obstruents intervocalically, did not influence or shift stress assignment.

i			u
i:			u:
	e:		
		a	
		a:	

Figure 2 Vowel phonemes

As illustrated in Figure 2 above, vowel length is phonemic in Mushuau Innu. Processes involving vowels include shortening, gliding, and deletion and these occur in a variety of environments. According to Scott (2000), long vowels have a more restricted set of allophones; long vowels only alternate with short vowels of the same quality (e.g., /i:/ will alternate with/ i/). However, short vowels are less restricted and alternate with vowels of differing qualities (e.g., /i/ will alternate with [ɨ], [ə] and [ʌ]). Scott (2000) determines that short vowels can centralize whereas long vowels can only shorten. This generalization is consistent with the present data.

Vowel hiatus is avoided in Mushuau Innu. To avoid hiatus, /i/ and /u/ become glides when they occur next to other vowels. This is a common occurrence in the data and affects both long and short

[2] That is, in the case of LL<H/L>, the final syllable could be heavy or light and not affect stress as it is extrametrical.

vowels. Syncope is also common and /i/ and /a/ are the only vowels that undergo syncope in Mushuau Innu (Scott 2000). Syncope occurs between homorganic consonants in positions of weak stress (MacKenzie 1980: 125).[3]

3 Methodology

3.1 Data collection

The present study is a preliminary acoustic analysis. New data were collected due to the need for a reliability and instrumental analysis.

The data were collected in November 2012 from a single Mushuau Innu speaker, Mary Jane Edmunds, by Marguerite MacKenzie, who also provided orthographic transcription and morpheme parsing and glossing. Marguerite said the utterance in English and Mary Jane said the sentence back in Mushuau Innu. Each utterance was repeated three times with a short pause between repetitions. I transcribed the utterances from the recordings using broad transcription conventions, and undertook the acoustic analysis using Praat and various Praat scripts. Cross-linguistically, there is no single phonetic property that corresponds to stress. However, pitch, duration, and intensity often show correlation with stressed vowels (e.g., higher pitch, longer duration, and greater intensity). A Praat script was used to measure each of these three possible stress correlates.

The data analyzed consisted of 83 distinct phrases with 169 words, consisting of three repetitions where available (i.e., the majority have three repetitions), for a total of 1294 vowel tokens.

3.2 Deriving the Underlying Representation

In order to determine whether stress assignment occurred at the level of the underlying representation or at the surface form, the underlying representation was established using the orthographic representation as a guide. The orthography was the best phonemic representation available, especially for distinguishing phonemically long vowels from phonemically short vowels (as both can surface as short vowels). Therefore, vowels marked with a circumflex accent [ˆ] were considered underlyingly long vowels (e.g., <â> was considered to be /a:/ in its underlying form). This is supported by evidence from phonological behavior: quality alternations are consistent with the orthography, as per Scott's (2000) description of the phonological behavior of Mushuau Innu vowels, since vowels marked in the orthography as short vowels centralize to other vowels, whereas orthographically marked long vowels only shorten. There is also new evidence from Dyck (2013) that suggests that the NE Cree orthography can be used as a phonemic guide for the underlying representation based on research by Knee (2012). For example, short vowels that are present in the orthography, but not heard in the perception, leave a measurable acoustic 'trace', such as [w] or lengthening of the preceding consonant, that supports the existence of such vowels.

Based on the orthographic and phonological patterning cues, syllables were coded as Heavy (H) or Light (L) syllables. Coda consonants did not contribute to syllable weight. All long vowels were coded as H in the underlying representation and all short vowels as L.

Additionally, the phonological processes of syncope and vowel hiatus occur in the surface representations of the data. The presence/absence of vowels in the underlying form (before syncope or vowel hiatus resolution occurred) was again aided by the orthography. For instance, in (1)

[3] However, the following penultimate analysis results in the deletion of presumably stressed vowels at the level of the underlying representation. The fact that this stressed vowel deletion occurs under the penultimate analysis may add additional information in favour of the right-most heavy analysis.

below, it was determined that the sequence [gw] in [nə**gw**ɑʃ**gw**ebɪnjun] results from vowel hiatus resolution in both cases as the orthography has two adjacent occurring vowels. Also the [j] occurs as a result of gliding to avoid vowel hiatus. It is of interest to note that it is a long vowel [i:] that undergoes gliding as it is the stress bearing vowel under both of the upcoming analyses.

(1)

Translation	Orthography	UR	SR
I jump	nikuâshkuêpanîun	nikua:ʃkue:pani:un	nəgwɑʃgwe:bɪnju

Further evidence for the presence of the /i:/ in the underlying representation can be seen in (2), where the /i:/ shown in the orthography (as <î>) appears in the surface form (where it does not in (1)). In most cases, in the current data, [i]-[u] vowel hiatus has been avoided by the [i:] surfacing as [j]. However, in (2), the [i] is preserved with a glide inserted between the two vowels (and [u] surfaces as [o]). The presence of both vowels and the epenthetic glide were verified by analyzing the structure of the formants and waveform using Praat.

(2)

Translation	Orthography	UR	SR
I jumped	nikuâshkuêpan**îu**nâpan	nikua:ʃkue:pan**i:u**na:pan	nəgwɑʃgwe:bɪn**ijo**nɑbɪn

3.3 Acoustic Analysis

Vowels were segmented and analyzed using Praat. Scripts were used to create gridlines and additional pitch, intensity, and duration scripts provided the measurements used in the analyses. Figure 3 shows the Praat workspace as used to investigate the vowel pitch, intensity, and duration measures.

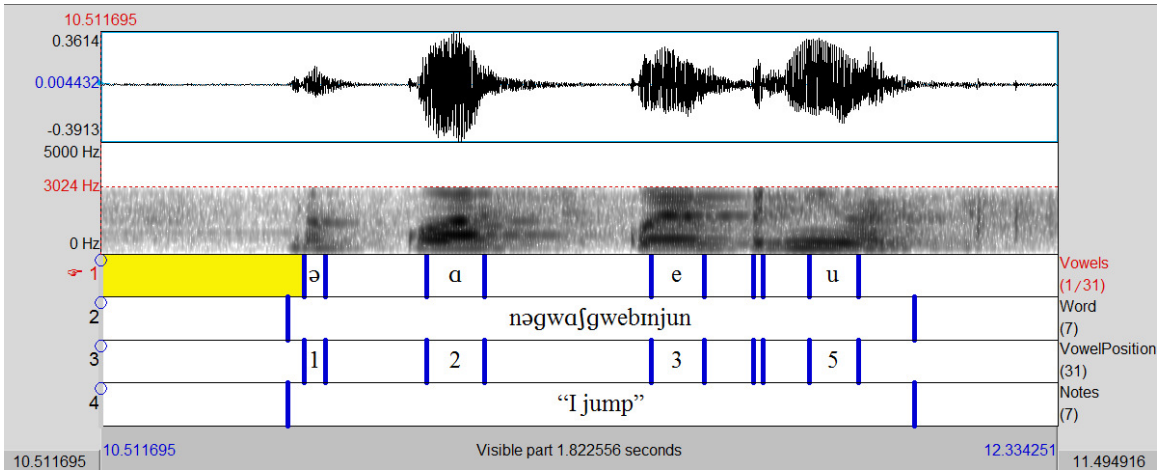


Figure 3

A combination of formant intensity/amplitude and waveform aperiodicity/periodicity was used to determine vowel boundaries. When marking vowel boundaries, the main cue was the periodicity of the waveform. The second cue used was formant intensity/shape with transitions included as

part of the vowel. Ambiguous examples were checked by ear to confirm the boundaries of the vowel segment. The majority of the work in determining vowel boundaries was segmenting neighbouring glides from the vowels. The formant behavior of /j/ (F2 and F3 almost collide before moving in separate directions) and /w/ (starts as single F1 at 200–400Hz, gradually lower F2 and F3 components) proved the most useful in separating glides from vowels.

Vowel boundaries, specifically distinguishing vowels from neighbouring glides, followed guidelines suggested in Di Paolo and Yaeger-Dror (2010): the vowel boundaries were measured from vowel onset to vowel offset, in which case the transition was considered part of the vowel instead of part of the consonant.

The pitch and intensity scripts measured the maximum that occurred between the vowel boundaries. The duration script measured the time between vowel boundaries. All stress markings were determined by basing stress on the highest pitch point as it occurred between vowel boundaries. Vowel duration was also measured. However, due to the phonemic length distinction between vowels in Mushuau Innu, duration was not used to determine metrical stress assignment.

3.4 Statistical analysis

Previous literature suggests pitch is the relevant marker of stress, and the data did not show a consistent relationship between pitch and intensity or a consistent placement of peak intensity. No relationship between maximum intensity and maximum pitch was discovered, which provides support to the proposal that Mushuau Innu is a pitch accent language. To examine the relationship between peak pitch and intensity, I conducted a frequency analysis: how many times did the peak intensity correlate with the peak pitch within a word? Peak pitch and maximum intensity occurred on the same syllable only 36.9% of time as shown in a bar graph in Figure 4.

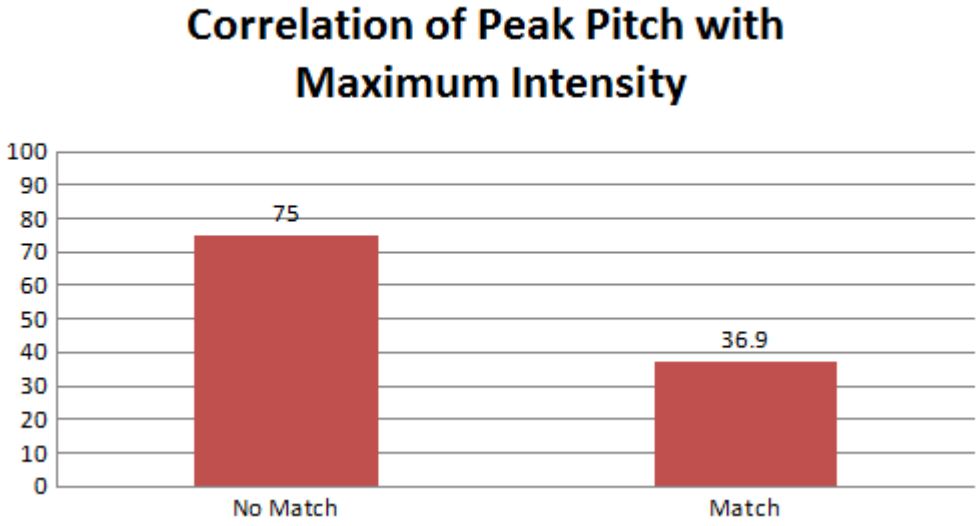


Figure 4

To determine if peak pitch was a suitable measure for marking stress, the pitch of all vowels that were marked as stressed (received peak pitch) were compared with all vowels that were marked as unstressed (did not received peak pitch).

There was a statistically significant difference between vowels marked as stressed and those marked as unstressed for all vowels (Figure 5). There was also a statistically significant difference

between stressed and unstressed vowels that occurred in LLL sequences (Figure 6). LLL sequences were of special interest because they behave differently under the stress analyses discussed in Section 4.

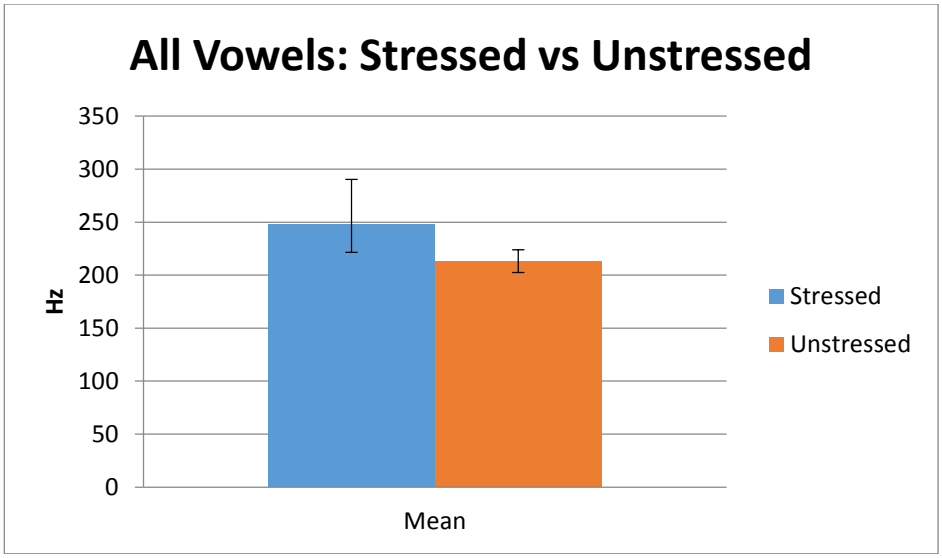


Figure 5

When comparing all unstressed vowels to all stressed vowels, the SEM (standard error of measurement) for unstressed vowels is 20.5, and for stressed vowels it is 6.3. The standard deviation for unstressed vowels is 20.5, and for stressed vowels is 68.2. The unpaired t-test two-tailed p value = 0.0001, showing a statistically significant difference. The confidence interval (the mean of stressed vowels minus unstressed vowels) equals 34.37 and the 95% confidence interval of this difference is from 26.10 to 42.83.

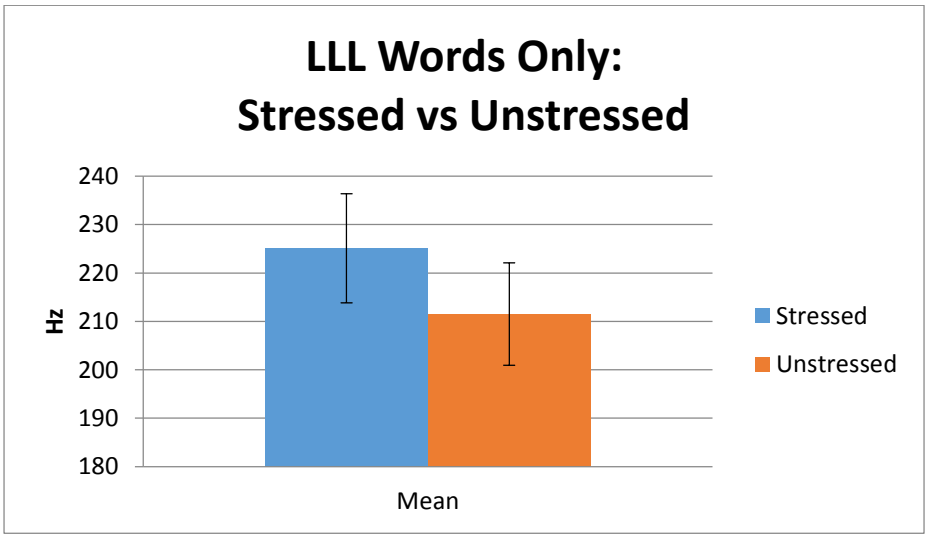


Figure 6

When comparing only the LLL unstressed vowels to LLL stressed vowels, the SEM for unstressed vowels is 2.2, and for stressed vowels it is 3.7. The standard deviation for unstressed vowels is 16.5, and for stressed vowels is 18.3. The unpaired t-test two-tailed p value = 0.0016, showing a statistically significant difference. The confidence interval (the mean of stressed vowels minus unstressed vowels) equals 13.56 and the 95% confidence interval of this difference is from 5.32 to 21.8

For the data set as a whole, the frequency range as measured on all vowels was 97 Hz – 572.3 Hz, with a standard deviation of 42.27, and an average pitch of 222.46 Hz.

4 Detailed analysis of metrical parameters

Multiple word utterances were excluded due to possible stress shift. Sequences of LLL are also excluded due their unpredictability, which will be discussed in Section 5.

In the surface form, stress most frequently falls on the ultimate syllable, followed by the penultimate syllable. The majority of the data could be analyzed using two distinct analyses: a penultimate analysis and a right-most heavy analysis. In both analyses stress is assigned at the level of the underlying representation with surface variations arising as a result of gliding, deletion, diphthongization, and syncope.

In the penultimate analysis, stress is assigned to the penultimate syllable at the level of the underlying representation. In the absence of gliding, deletion, syncope, or diphthongization, stress remains on the penultimate syllable in the surface representation. When a phonological process occurs that affects the number of syllables, a rightward adjustment is made resulting in stress on the ultimate syllable. In the right-most heavy analysis, stress is again assigned at the level of the underlying representation. The final syllable is extrametrical, and therefore does not count towards stress assignment, and stress is assigned to the right-most heavy syllable. If a phonological process occurs that alters the number of syllables at the end of the word, a rightward adjustment is made. Data that can be accounted for using both analyses is presented in Section 4.1., followed by data that works for only one of the analyses in Section 4.2. Exceptional data (that works for neither analysis) is described in Section 4.4.

Stress markings in the surface representation are based on acoustic analysis; maximum pitch determined stress assignment. Stress markings in the underlying representation are based on predicted stress assignment as determined by the right-most heavy and/or penultimate analysis. Vowels were coded as heavy (H) or (L) based on the guidelines described in Section 2.2 above. Data described in Section 4.1 did not have variable stress throughout repetitions: in all repetitions, stress occurred on the same syllable. In the other sections, all variability is described for each example.

4.1 Data that can be accounted for using both a penultimate and right-most heavy analysis

4.1.1 Stress on penultimate syllable

The following data were congruent with both analyses. In (3), there is no change in syllable structure from the underlying representation to the surface form. For the penultimate analysis, stress is assigned to the penult and remains on the penultimate heavy syllable in the surface form. For the right-most heavy analysis, the final syllable containing the short /a/ is extrametrical and stress is assigned to the right-most heavy vowel and remains there in the surface form. The /n/ surfaces as a /j/ as part of a complex [n]-[j] alternation that is a unique feature of the Mushuau Innu dialect.

This alternation can be variable for the same word depending on the speaker and did not affect the length or number of syllables in the current data set.

(3)

Translation	Orthography	UR	SR
our arm	nishpitunâna	niʃpituná:na L L L H L	nɛsbodʌnájɑ L L L H L

Example (4) is similar to example three above. No phonological processes affect the data so the penult (which also happens to be the right-most heavy syllable) receives primary stress.

(4)

Translation	Orthography	UR	SR
I jumped	nikuâshkuêpanîunâpan	nikua:ʃkue:pani:uná:pan L LH LH L HL H L	nəgwɑʃgwebɪnijonábɪn L H H LH L H L

In example (5), the two analyses have different underlying forms, but result in the same surface form. For the penultimate analysis, the penultimate vowel /u/ receives stress in the underlying form, and as no phonological processes affect it, retains primary stress in the surface form. For the right-most heavy analysis, the long vowel /i:/ receives stress in the underlying form (as the final heavy syllable /a:/ is extrametrical). However, to avoid vowel hiatus the long /i:/ is glided causing a rightward adjustment which results in penultimate stress. The process of the stress-bearing long vowel undergoing gliding (and resulting in a right-edge adjustment) is common in the current data set.

(5)

Translation	Orthography	UR	SR
We (incl.) are jumping	tshikuâshkuêpanîunân	ʧikua:ʃkue:pani:una:n L LH LH L HL H	ʤəgwɑsgwebɪnjúnaj L H H L L H

4.1.2 Stress on ultimate syllable

In example (6) and (7), the process of gliding affects the results of both analyses. For the penultimate analysis, the penultimate vowel /i:/ receives stress in the underlying form. However, to avoid vowel hiatus the /i:/ is glided causing a rightward adjustment which results in ultimate stress. For the right-most heavy analysis, the long vowel /i:/ receives stress in the underlying form as it is the right-most heavy vowel. However, to avoid vowel hiatus the long /i:/ is glided causing a rightward adjustment which results in ultimate stress.

(6)

Translation	Orthography	UR	SR
I jump	nikuâshkuêpanîun	nikua:ʃkue:paní:un L LH LH L HL	nəgwɑʃgwebɪnjún L H H L L

(7)

Translation	Orthography	UR	SR
He is jumping	kuâshkuêpanîu	kua:ʃkue:paní:u LH LH L HL	gwɑʃgwebɪnjú H H L L

In example (8), diphthongization affects both analyses. In the penultimate analysis, stress is assigned to the penultimate vowel /a:/ however due to the final two vowels becoming a diphthong to avoid vowel hiatus, a rightward adjustment is made to the ultimate syllable. Similarly, in the right-most heavy analysis, the long vowel /a:/ attracts stress at the underlying representation but becomes a diphthong at the surface form to avoid vowel hiatus. The rightward adjustment results in ultimate stress. This pattern is common throughout the current data set.

(8)

Translation	Orthography	UR	SR
I see him	nuâpamâu	nua:pamá:u LH L HL	nəwɑbma͡ú L H H

4.2 Data that can be accounted for using penultimate analysis only

All of the data that can be accounted for using only the penultimate analysis end in the syllable sequence HLL. In examples (9) and (10), only a penultimate analysis accounts for the stress assignment. For the penultimate analysis, the penultimate /i/ attracts stress. However, due to syllable deletion (it is unclear whether the final or penult /i/ is deleted) a rightward adjustment is made resulting in ultimate stress at the surface form. Under the right-most heavy analysis, stress should fall on the /ɑ/ in the surface form, which it does not.

(9)

Translation	Orthography	UR	SR
I'm falling	nipâtshishin	nipa:ʧĩʃin L H L L	nəbɑʧín L H L

(10)

Translation	Orthography	UR	SR
You are falling	tshipâtshishin	ʧipa:ʧĩʃin L H L L	ʤəbɑʧín L H L

Example (11) displayed variability in the stress placement throughout the repetitions. The first two repetitions fit with the penult analysis. Due to syncope of the penultimate /a/ vowel (vowel syncope between /p/ and /m/, i.e., homorganic segments, is common in Mushuau Innu; see Scott 2000), stress assignment is adjusted to the ultimate syllable. Under the right-most heavy analysis, the /ɑ/ should receive stress in the surface form, which it does not. The last repetition cannot be accounted for under either analysis.

(11)

Translation	Orthography	UR	SR Variations
You see me	tshuâpamin	ʧua:pamin LH L L	ʤəwɑbmín L H L
			ʤəwɑbmín
			ʤə́wɑbmɪn

Example (12) only fits with the penultimate analysis. Due to deletion of the penultimate /a/ vowel, stress assignment is adjusted to the ultimate syllable. Under the right-most heavy analysis, the /ɑ/ should receive stress in the surface form, which it does not.

(12)

Translation	Orthography	UR	SR
He sees you	tshuâpamik^{u}	ʧua:pámik^{w} LH L L	ʤəwɑbmɔ́k^{w} L H L

In example (13), the first repetition does not fit into either analysis. Under the penultimate analysis stress should fall on the penultimate syllable in the surface form (which it does in the last two repetitions). For the right-most heavy analysis, stress should fall on the antepenultimate syllable, which it does not.

(13)

Translation	Orthography	UR	SR Variations
You are nudging me	tshuêpishkun	ʧue:piʃkun LH L L	ʤəwebɪskún L H L L
			ʤəwebískun
			ʤəwebískun

4.3 Data that can be accounted for using right-most heavy analysis only

Example (14) fits with the right-most heavy analysis only. In the underlying form, stress is assigned to the antepenultimate /a:/ and due to the common process of vowel deletion between the /p/ and /m/, stress falls on the penultimate syllable at the surface representation. For the penultimate analysis to work, stress would have to fall on the ultimate syllable in the surface form (due to a rightward adjustment after the stress vowel /a/ underwent syncope), which it was not.

(14)

Translation	Orthography	UR	SR
He sees me	nuâpamik^{u}	nuá:pamik^{w} LH L L	nəwɑ́bmɔk^{w} L H L

Example (15) provides further evidence for the right-most heavy analysis. Under the penultimate analysis, stress should fall on the ultimate syllable in the surface form because the penult undergoes deletion. Stress placement follows the pattern of the right-most heavy analysis, where the right-most heavy /a/ receives stress underlyingly and due to deletion, a rightward adjustment is made to the penultimate syllable in the surface form.

(15)

Translation	Orthography	UR	SR
I'm nudging you	tshuêpishkâtin	ʧue:piʃkáwɛtin[4] LH L H L L	ʤəwebɪskádən L H L H L

4.4 Exceptional data to both analyses

In example (16), using both the penultimate and right-most heavy analyses, stress should fall on the penultimate /ɑ/ syllable in the surface form, not the ultimate /e/. This example is more peculiar because the /t/ surfaces as /s/, which could be explained using the phonological rules in Scott (2000) if [ht]→ [θ]→[s], and the final /n/ is deleted.

(16)

Translation	Orthography	UR	SR
You see it	tshuâpâhtên	ʧua:pa:hte:n LH H H	ʤəwɑbɑsé L H H H

In example 17, the first repetition (with stress on final syllable) does not fit into either analysis. However, the last two repetitions can be analyzed using either pattern: for the penultimate analysis, the penult /u/ becomes part of a diphthong and ends up in stressed penultimate position. For the right-most heavy analysis, the long vowel /a:/ becomes part of a diphthong to avoid vowel hiatus causing stress to fall on the penultimate syllable at the SR.

(17)

Translation	Orthography	UR	SR Variations
I see them	nuâpamâuats	nua:pama:uaʧ LH L H LL	nəwɑbma͡uwíʧ L H H L
			nəwɑbma͡úwɪʧ
			nəwɑbma͡úwɪʧ

In example (18), the first two repetitions with ultimate stress cannot be accounted for using either analysis. The final repetition with stress falling on the penultimate syllable, which is also the right-most heavy syllable, is the form predicted by both analyses.

(18)

Translation	Orthography	UR	SR Variations
He sees it	uâpâ(h)tamᵘ	ua:pa:tamʷ LH H L	wɑbɑtʌ́m H H L
			wɑbɑtʌ́m
			wɑbátʌm

[4] Historically, this word contains the morpheme *awe*, where the *e* is historically short (resulting in a L /ɛ/ in the underlying representation).

4.5 Metrical Grids

To determine the foot type, various metrical grids were constructed, illustrated in Figure 7 and Figure 8 below. However, all four illustrated metrical parses make equivalent predictions for the data that can be accounted for using both the right-most heavy and the penultimate analysis. None of the illustrated structures work for example (16). However this example is already an exceptional piece of data to both proposed stress analyses.

The metrical grids are illustrated using the underlying representation shown in example (7), *kuâshkuepanîu* 'He is jumping', where the stress surfaces on the penultimate heavy syllable. For the right-most heavy analysis in Figure 7, both a moraic trochee grid and an iambic grid account for the data that fits with both analyses above (see Section 4.1). Moraic trochees are preferred to bisyllablic trochees as per Hayes (1985): in a quantity sensitive system, Hayes (1985) proposed not having bisyllabic trochees, but instead moraic trochees which have a single H syllable or two L syllables (Gussenhoven and Jacobs 2011:228).

Moraic Trochees	(X) (X) LH L H<L> kua:ʃkue:pani:u
Iambs	(. X) (. X) LH LH<L> kua:ʃkue:pani:u

Figure 7 Foot construction for right-most heavy analysis

In the first structure shown in Figure 7, the final syllable is extrametrical, heavy syllables are parsed into moraic trochees, leaving the light syllables unparsed due to a ban on degenerate feet. In the second structure (i.e., the iambic parse) shown, the final syllable is extrametrical and the remaining syllables are exhaustively parsed into uneven LH iambs. If the strong syllable of the rightmost foot receives stress, the penultimate syllable is correctly stressed under both metrical analyses.

Unlike the right-most heavy analysis, the penultimate analysis does not make use of quantity sensitivity. For the penultimate analysis, shown in Figure 8, a trochaic analysis or an iambic analysis with final syllable extrametricality fits with the data that can be accounted for using either analysis. Similarly, Dyck (2013) found that the stress pattern of NE Cree is consistent with either an iambic or trochaic analysis.

Trochees	(X .) (X .) σ σ σσ kua:ʃkue:pani:u
Iambs (with extrametricality)	(. X) (. X) σ σ σ σ<σ> kua:ʃkue:pani:u

Figure 8 Foot construction for penultimate analysis

5 LLL

In accordance with the research on NE Cree ((Dyck, Brittain and MacKenzie 2006), words ending in a LLL syllable structure pose a particular challenge. In the absence of a H syllable, foot construction is variable. Even with the presence of a H syllable (in the aforementioned data) there is not enough evidence to determine whether footing is iambic or trochaic, making the parsing of the LLL syllables even more difficult.

If the last three syllables are LLL at the level of the UR, footing is variable because there is no H syllable to attract stress. Twelve out of sixteen utterances ending in LLL have an alternating stress pattern within repetitions of the same word.

In (19), the penultimate vowel is glided to avoid vowel hiatus. Under the penultimate analysis the /u/ should receive stress at the UR and then shift to the ultimate /a/ due to gliding. This does not occur. The right-most heavy analysis cannot be applied due to the absence of a heavy vowel.

(19)

Translation	Orthography	UR	SR
Our shoes	tshimassinaua	ʧimasinaua L L L LLL	ʤəmɪsɪnówɑ L L L L

In (20), syncope occurs between the /p/ and the /m/. Stress falls on the penultimate syllable. This could be consisted with the penultimate analysis but not with the right-most heavy analysis.

(20)

Translation	Orthography	UR	SR
I see you	tshuâpamitin	ʧua:pamitin LH L L L	ʤəwɑbmítən L H L L

In (21), no phonological processes occur. In the first repetition peak pitch falls on the antepenultimate syllable, in the second repetition, two vowels have equal levels of pitch. This example does not fit with either analysis.

(21)

Translation	Orthography	UR	SR Variations
My arm	nishpitun	niʃpitun L L L	nɛ́sbodʌn L L L
			nɛ́sbódʌn

6 Summary of analyses

While the penultimate analysis accounts for more of the current data, the analysis does not take into account syllable weight. If Mushuau Innu is not quantity sensitive, there is no way to explain why three Light syllables in a row result in a variable stress pattern. Presumably, the combination LL<L/H> would behave the same as the final syllable is extrametrical, but there were no LLH utterances at the level of the UR in the current data set. The right-most heavy syllable analysis, which is sensitive to syllable weight, allows for an explanation of the unpredictability of LLL syllable combinations as there is no heavy syllable to attract stress assignment. The right-most

heavy analysis also lends itself to comparison with other related dialects (e.g., NE Cree and SE Cree are both quantity sensitive).

The right-most heavy analysis offers an explanation as to why LLL patterns differently. The sequence of HL(L/H) without gliding or deletion would be ideal to show whether the penultimate or right-most heavy was the preferred analysis; under the penultimate analysis stress should fall on the penultimate L syllable, and under the right-most heavy stress should fall on the antepenultimate H. However, there is only one example of this in the data (cf. example (13)), and it alternates across repetitions. The first repetition does not fit into either analysis, and the last two repetitions only fit into a penultimate analysis.

(22) (previously described in (13))

Translation	Orthography	UR	SR Variations
You are nudging me	tshuêpishkun	ʧue:piʃkun LH L L	ʤəwebɪskún L H L L
			ʤəwebískun
			ʤəwebískun

The rightward adjustments in cases of deletion, gliding, diphthongization, and syncope suggests that footing is trochaic. As per Kager (1995), stress is anchored to its position within the foot and the shift of stress to the right, suggests a trochaic foot. However, other foot analyses, presented in Section 4.5, also work for the data set.

7 Overview of metrical parameters

Metrical stress can be predicted on the basis of a set of parameters (Hayes 1995). The following metrical parameters were determined for Mushuau Innu based on a pattern of maximum pitch. The use of maximum pitch to mark stress assignment was bolstered by the statistical analyses described in Section 3.4, which showed a statistically significant difference between vowels which were marked as stressed and those which were not.

7.1 Penult analysis parameters:

Quantity Sensitivity: Not quantity sensitive.

Extrametricality: None.

Foot type: Unable to determine; possibly trochaic due to rightward stress adjustments (Kager, 1995). It is also ambiguous as to unbounded or binary feet.

Degenerate Feet: Not enough evidence to determine.

Footing is from the right edge of the word.

Penultimate syllable receives stress at the level of the underlying representation. In the presence of deletion, gliding, diphthongization, or syncope of the penultimate or ultimate syllable, a rightward adjustment is made. This suggests a trochaic foot type, however further evidence is needed.

7.2 Right-most heavy analysis parameters:

Quantity Sensitivity: Mushuau Innu is quantity sensitive at the level of the nucleus. Historically long vowels result in a Heavy syllable, historically short vowels result in a Light syllable.

Weight-by-Position: Mushuau Innu does not have weight-by-position (i.e., the presence of a coda does not make a syllable heavy (Hayes 1989)).

Extrametricality: Final syllable is extrametrical.

Footing is from the right edge of the word.

Foot type: In general, the rightward adjustment of stress when deletion occurs is consistent with a trochaic analyses and stress remaining within the foot (as per Kager 1995). However, some examples require stress shift to move the stress beyond its original foot, including onto a syllable which is extrametrical at the UR. The pattern of stress shift therefore does not provide conclusive evidence with respect to foot type.

Degenerate Feet: No degenerate feet.

End Rule Right: Excluding the final extrametrical syllable, the right-most heavy syllable is stressed.

8 Summary and further research questions

The results of my acoustic analysis of Mushuau Innu show two analyses that can account for much of the current data. It appears that the right-most heavy analysis is preferred as it explains why LL<L/H> sequences pattern differently and it also aids in comparison between dialects; related dialects are quantity sensitive, have final syllable or foot extrametricality, and follow End Rule Right (e.g., NE Cree (Dyck, Brittain and MacKenzie 2006) and SE Cree (Brittain 2000) described above).

While the penultimate analysis accounts for more of the current data, it does not take into account syllable weight. The collection of additional data which exhibits the underlying form of HL(L/H) without gliding or deletion would be ideal to provide further insight into both analyses. In the absence of gliding or deletion, the syllable structure would not be altered from the underlying to the surface form. Under the penultimate analysis stress should fall on the penultimate L syllable, and under the right-most heavy stress should fall on the antepenultimate H. The difference in stress placement could highlight the preferred analysis.

This paper represents the first instrumental analysis of Mushuau Innu. In terms of acoustic analysis, stress was assigned based on a pattern of maximum pitch. Pitch differences between stressed and unstressed vowels were found to be statistically significant and the fact that the resulting metrical stress analysis found for Mushuau Innu patterns similarly to those described for other dialects indicates that the methodology of using pitch to determine stress placement is promising. Future research investigating correlations between maximum pitch and native speaker intuitions regarding stress placement has the potential to add further support to this method of investigating stress patterning.

References

Brittain, Julie. 2000. A metrical analysis of primary stress placement in Southern East Cree. *International Journal of American Linguistics* 66: 181–217.

Boersma, P., and Weenink, D. 2005. Praat: Doing phonetics by computer (version 5.3.55) [Computer program]. Retrieved from http://www.praat.org/

Di Paolo, Marianna and Malcah Yaeger-Dror (eds.). 2010. *Sociophonetics: A student's guide*. Routledge.

Dyck, Carrie, Julie Brittain and Marguerite MacKenzie. 2006. Northern East Cree accent. C. Gurski, and M. Radisic (ed.), *Proceedings of the 2006 Annual Conference of the Canadian Linguistics Association*. pp. 1-14. Western University.

Dyck, Carrie. 2013. Northern East Cree accent. Unpublished manuscript. Memorial University.

Ford, Alan. 1978. L'alternance n/yod en Mushuau Innu. In William Cowan (ed.), *Papers of the ninth Algonquian conference*, pp. 237–245. Ottawa: Carleton University.

Ford, Alan. 1982. *Part I of the basics of Utshimashits Mushuau Innu*. Montréal: Département de linguistique, Université de Montréal.

Gussenhoven, Carlos and Haike Jacobs. 2011. *Understanding phonology*. New York: Oxford University Press.

Hayes, Bruce. 1981. *A metrical theory of stress rules*. Ph.D. Dissertation. Massachusetts Institute of Technology.

Hayes, Bruce. 1985. Iambic and trochaic rhythm in stress rules. In Mary Niepokuj, Mary VanClay, Vassiliki Nikiforidou and Deborah Feder (eds.), *Proceedings of the 11th Annual Meeting of the Berkeley Linguistics Society*, pp. 429–446. Berkeley, CA: Berkeley Linguistics Society.

Hayes, Bruce. 1989. Compensatory lengthening in moraic phonology. *Linguistic Inquiry* 20: 253–306.

Hayes, Bruce. 1995. *Metrical stress theory: Principles and case studies*. Chicago: The University of Chicago Press.

Kager, René. 1995. The metrical theory of word stress. In John A. Goldsmith (ed.), *The Handbook of Phonological Theory*, pp. 367–402. Oxford: Blackwell Publishers Ltd.

Knee, Sarah. 2012. Vowel devocalization in Northern East Cree. Ph.D comprehensive paper. Memorial University.

MacKenzie, Marguerite. 1980. *Towards a dialectology of Cree-Montagnais-Naskapi.* Ph.D. Dissertation. University of Toronto.

Mailhot, José. 1971. Davis Inlet field notes. Manuscript, Memorial University of Newfoundland.

Scott, Mark. 2000. *Phonological sketch of Mushuau Innu (Davis Inlet Naskapi).* MA Thesis. Memorial University.

Person restrictions in South Baffin Inuktitut: An argument for feature movement*

Michelle Yuan
Massachusetts Institute of Technology

Abstract: The South Baffin dialect of Inuktitut exhibits an apparent person restriction that bans 1st/2nd person (though not 3rd person) agreement morphology from co-occurring with oblique case. I argue that, contrary to surface appearances, this phenomenon is not actually a restriction on 1st/2nd person features; rather, it is a byproduct of moving the φ-features out of the agreement head and into the head hosting oblique case. The broader theoretical claim is that *feature movement* is a possible means of valuation by Agree.

Keywords: syntax, morphology, agreement, oblique case, Inuktitut

1 Introduction

This paper investigates an apparent person restriction in the South Baffin dialect of Inuktitut (Eskimo-Aleut) that prevents 1st/2nd person agreement morphology from co-occurring with oblique case; the restriction is illustrated here with possessive agreement on nouns and verbal agreement in relative clauses. I argue that this phenomenon arises when two heads enter into a φ-Agree relation, triggering movement of the relevant φ-features from the lower head to the higher head. I therefore make the following theoretical claim:

(1) **Theoretical claim:** A φ-probe on a head X^0 may be valued by the φ-features on a lower head Y^0 by moving the φ-features from Y^0 to X^0.

The person restriction in South Baffin Inuktitut constitutes evidence for the existence of feature movement, originally proposed by Chomsky (1995: ch.4) as an alternative to covert phrasal movement. I will demonstrate that South Baffin Inuktitut has multiple constructions in which a lower head is featurally impoverished while a higher adjacent head is simultaneously featurally enriched; I propose that this is symptomatic of feature movement. I conclude that the person restriction in South Baffin Inuktitut is only superficial; it is derived by moving φ-features out of an agreement head into the head hosting oblique case.

This paper makes two general contributions. First, it provides a morphosyntactic account for a phenomenon previously presumed in the Inuktitut/Eskimo literature to be morphophonological. Second, this paper argues for the existence of φ-feature movement, contra, e.g., Rezac (2010), as well as the dual ability for heads to simultaneously probe and be probed, along the lines of Baker and Willie (2010) and Henderson (2013).

* The data from this talk are, unless otherwise noted, from the South Baffin dialect of Inuktitut, spoken on Baffin Island, Nunavut. The properties described here do not necessarily extend to other dialects or related languages. I'd like to thank my consultant, Saila Michael, for sharing her knowledge of Inuktitut with me, and also the following people for helpful comments and suggestions: the participants at WSCLA19, Richard Compton, Michael Yoshitaka Erlewine, Alana Johns, Norvin Richards, Coppe van Urk, and especially David Pesetsky. All errors are my own.

In Proceedings of the Workshop on Structure and Constituency in the Languages of the Americas 18 & 19,
University of British Columbia Working Papers in Linguistics 39,
Natalie Weber and Sihwei Chen (eds.), 2015.

2 Background

Inuktitut has an ergative case system (Dixon 1979, Johns 1992, a.o.). Ergativity is manifested via case-marking on the noun and portmanteau subject/object agreement on the verb:

(2) a. qimmi-up kii-ja-nga anguti
dog-ERG bite-TR-3S/3S man.ABS[1]
'The dog bit the man.'

b. anguti tikit-tuq
man.ABS arrive-3S.INTR
'The man arrived.'

As indicated by the different agreement endings in *kiijanga* 'it bit him' and *tikittuq* 'he arrived,' Inuktitut has separate paradigms for transitive (subject/object) and intransitive (subject) agreement. The transitive agreement paradigm is generally syncretic with possessor/possessum agreement marked on the possessum (Johns 1987, 1992), as shown in (3). Ergative and genitive case are also morphologically identical, as shown in (4):

(3) a.

qimmi-**ra**	'my dog'
qimmi-**it**	'your (sg) dog'
qimmi-**nga**	'his/her dog'
qimmi-**vut**	'our dog'
qimmi-**si**	'your (pl) dog'
qimmi-nga	'their dog'

b.

kapi-ja-**ra**	'I stab it'
kapi-ja-**it**	'you (sg) stab it'
kapi-ja-**nga**	'he/she stabs it'
kapi-ja-**vut**	'we stab it'
kapi-ja-**si**	'you (pl) stab it'
kapi-si-ju-it	'they stab it'[2]

(4) a. Jaani-**up** qimmi-nga
John-GEN dog-3S/3S
'John's dog'

b. Jaani-**up** kapi-ja-nga
John-ERG stab-TR-3S/3S
'John stabbed it.'

The parallels between possessive phrases and transitive clauses are important here because the apparent person restriction is found in both constructions, as I will show in Section 3.

Finally, Inuktitut, being polysynthetic, has a complex and rigid word-internal syntax. It is generally understood that the position of a morpheme within a given word corresponds to its position in the syntax (Johns 2007, Compton and Pittman 2010, a.o.); thus, the rightmost suffix, usually case or agreement, is structurally highest. This is shown in the Inuktitut verb complex in (5), which is comprised of an incorporated noun, light verb, adverb, negation, and agreement:

(5) umia-liu-gaju-nngit-tuq
boat-create-often-NEG-PART.3S
'He doesn't often make boats.' (Johns 2007)

[1] **Abbreviations:** ABS = absolutive case; ALL = allative case; AP = antipassive; EQU = equalis case; ERG = ergative case; HAB = habitual; GEN = genitive case; I = variant (I) oblique case; II = variant (II) oblique case; INTR = intransitive; LOC = locative case; MOD = modalis case; NEG = negation; PART = participial mood; PL = plural; POSS = possessive; PST = past; TR = transitive; VIA = vialis case; 1S = 1st person singular; 2S = 2nd person singular; 3P = 3rd person plural; 3S = 3rd person singular

[2] My consultant uses the antipassive construction, as marked by the morpheme *si*, when a transitive subject is 3rd person plural, probably to disambiguate it from 3rd person singular.

3 The person restriction

3.1 Data

The person restriction is repeated below:

(6) **Person restriction (descriptively):**
1st/2nd person agreement cannot occur on a lexical item if this lexical item is marked with oblique case.

In addition to genitive, ergative, and absolutive case, Inuktitut possesses several other cases, all oblique.[3] The restriction is found for possessive agreement in oblique possessive phrases, as exemplified in (7):

(7) ***[1/2]-OBL vs. ✓[3]-OBL:**

a. *Jaani surak-si-juq titirauti-**kka**-nit
John.ABS break-AP-3S.INTR pencil-**1S/3P**-MOD
Intended: 'John broke **my** pencils.'

b. *Jaani surak-si-juq titirauti-**tin**-nit
John.ABS break-AP-3S.INTR pencil-**2S/3P**-MOD
Intended: 'John broke **your** pencils.'

c. Jaani surak-si-juq titirauti-**ngin**-nit
John.ABS break-AP-3S.INTR pencil-**3S/3P**-MOD
'John broke **his / their** pencils.'

The person restriction in also seen in relative clauses.[4] Relative clauses may exhibit case concord with the head noun, and may thus be marked with oblique case when the relativized nominal is oblique. In these cases, 1st/2nd person transitive agreement is banned:

(8) ***[1/2]-OBL vs. ✓[3]-OBL:**

a. *Jaani mumi-suuq arnaq-titut [taku-lauq-ta-**ra**-titut]
John.ABS dance-3S.HAB woman-EQU see-PST-TR-**1S/3S**-EQU
Intended: 'John dances like the woman that **I** saw.'

b. *Jaani mumi-suuq arnaq-titut [taku-lauq-ta-**i(t)**-titut]
John.ABS dance-3S.HAB woman-EQU see-PST-TR-**2S/3S**-EQU
Intended: 'John dances like the woman that **you** saw.'

[3] Throughout this paper, I will gloss these oblique cases as they are traditionally glossed in the literature. The reader should take any case marker that is not ERG, ABS, or GEN to be oblique.
[4] Though see Johns (1992), Compton (2012), and Yuan (2013) for some arguments that Inuktitut relative clauses are actually nominalized. If this is so, then we may simply view the person restriction as a general ban on 1st/2nd person agreement on oblique nominals.

c. Jaani mumi-suuq arnaq-titut [taku-lauq-ta-**nga**-titut]
John.ABS dance-3S.HAB woman-EQU see-PST-TR-**3S/3S**-EQU
'John dances like the woman that **he** saw.'

This restriction is circumvented by the construction in (9), which has two salient properties. The agreement morphology is realized as 3rd person, and the 1st/2nd person possessor/agent is expressed periphrastically with an overt pronoun. I will refer to this construction in the following discussion as the **periphrastic construction**.

(9) a. Jaani surak-si-juq **uvanga** titirauti-**ngin**-nit
John.ABS break-AP-3S.INTR 1S pencil-3S/3P-MOD
'John broke my pencils.' *cf. (7a)*

b. Jaani surak-si-juq **igvit** titirauti-**ngin**-nit
John.ABS break-AP-3S.INTR 2S pencil-3S/3P-MOD
'John broke your pencils.' *cf. (7b)*

c. Jaani mumi-suuq arnaq-titut [**uvanga** taku-lauq-ta-**nga**-titut]
John.ABS dance-3S.HAB woman-EQU 1S see-PST-TR-3S/3S-EQU
'John dances like the woman that I saw.' *cf. (8a)*

d. Jaani mumi-suuq arnaq-titut [**igvit** taku-lauq-ta-**nga**-titut]
John.ABS dance-3S.HAB woman-EQU 2S see-PST-TR-3S/3S-EQU
'John dances like the woman that you saw.' *cf. (8b)*

Absolutive arguments are exempt from the person restriction, and thus the periphrastic construction is unavailable in those contexts:

(10) a. qimmi-up kii-qqau-ja-nga irni-**ra**
dog-ERG bite-PST-TR-3S/3S son-**1S/3S**.ABS
'The dog bit my son.'

b. *qimmi-up kii-qqau-ja-nga **uvanga** irni-**nga**
dog-ERG bite-PST-TR-3S/3S 1S son-**3S/3S**.ABS
Intended: 'The dog bit my son.'

Also, the restriction is not observed on a genitive-marked or ergative-marked possessed nominal (i.e. on a possessor/agent that is possessed by a 1st/2nd person nominal), as shown in (11). This is because there is a separate portmanteau paradigm for possessive agreement on a possessor/agent; this portmanteau morphology cross-references two arguments (possessor/agent and possessum/object) and additionally encodes genitive/ergative case. For example, the bolded agreement morphology in (11a) encodes the person of the possessor of *ilisaiji* 'teacher,' as well as the fact that *ilisaiji* is itself a possessor. Similarly, in (11b), *-tta* cross-references a 1st person plural possessor (*our*) and a 3rd person singular possessum (*mother*), and additionally conveys that the possessum (*mother*) is an ergative-marked agent.

(11) a. ilisaiji-**ngma** qimmi-nga ‘my teacher’s dog’
ilisaiji-**vit** qimmi-nga ‘your (sg) teacher’s dog’
ilisaji-**ngata** qimmi-nga ‘his/her teacher’s dog’
ilisaiji-**tta** qimmi-nga ‘our teacher’s dog’
ilisaiji-**si** qimmi-nga ‘your (pl) teacher’s dog’
ilisaiji-**ngata** qimmi-nga ‘their teacher’s dog’

b. anaana-**tta** niri-ja-nga iqaluk
mother-1P/3S.ERG eat-TR-3S/3S fish.ABS
‘Our mother ate the fish.’

The lack of the person restriction effect in these contexts is, I assume, due to the fact that a single morpheme is used to encode both agreement and case.[5] The chart below summarizes what has been discussed so far:

(12)

	ENFORCED	**EXEMPT**	**CIRCUMVENTED**
Person restriction?	[1]/[2] + OBL	[1]/[2] + ABS	[1]/[2] + ERG/GEN
Periphrastic construction?	Required	Unavailable	*Not discussed here:* Optional, see footnote 5

3.2 Previous discussion

The phenomenon investigated in this paper has received fairly little attention in the existing literature on Inuktitut. It is briefly discussed by Dorais (2003:95-96), who takes the phenomenon to be phonologically motivated.[6] As shown below, 1st/2nd person obliques in neighbouring dialects of South Baffin such as North Baffin (spoken further north on Baffin Island) encode 1st/2nd person obliques with nasal clusters:

(13) *North Baffin dialect:*

a. nuna-**nn**ut
land-1S.POSS.ALL
‘to my land’

b. nuna-**ngn**ut
land-2S.POSS.ALL
‘to your land’ (Dorais 2003)

South Baffin, however, has a higher degree of regressive place assimilation, so the /nn/ vs. /ŋn/ contrast in North Baffin is neutralized in South Baffin to [nn].[7] According to Dorais, the periphrastic construction emerged so that 1st and 2nd person could still be disambiguated.

Though this presents a plausible diachronic explanation for why the person restriction is found only in the South Baffin dialect, the story is, by itself, too simplistic for several reasons. First, it

[5] In these contexts, the periphrastic construction is actually optional, though constrained. The facts here are rather complicated; I set them aside for the purposes of this paper.
[6] See also Compton (2012:57).
[7] See Dorais (1988, 2010) and Bobaljik (1996) for extensive discussion of regressive assimilation across dialects of Inuktitut.

misses the generalization that the person restriction holds for *all oblique cases* in South Baffin Inuktitut, including non-nasal-initial ones.[8]

(14) **Oblique cases in South Baffin:**

a. uvanga qimmi-nga-**nit** / *qimmi-ra-nit
1S dog-3S/3S-MOD dog-1S/3S-MOD
'my dog (antipassive)'

b. uvanga qimmi-nga-**nut** / *qimmi-ra-nut
1S dog-3S/3S-ALL dog-1S/3S-ALL
'to my dog'

c. uvanga ilinniavi-nga-**niit** / *ilinniavi-ra-niit
1S school-3S/3S-LOC school-1S/3S-LOC
'in my school'

d. uvanga niuvikvi-nga-**gut** / *niuvikvi-ra-gut
1S store-3S/3S-VIA store-1S/3S-VIA

e. uvanga anaana-nga-**titut** / *anaana-ra-titut
1S mother-3S/3S-EQU mother-1S/3S-EQU
'like my mother'

Moreover, I will argue below that the person-restricted obliques in South Baffin Inuktitut behave the same as plural obliques, a generalization that would be lost under a purely morphophonological analysis. I will propose that this person/number parallel may be uniformly captured under a morphosyntactic analysis that makes reference to φ-features and the nature of Agree. It is possible that the periphrastic construction emerged as a response to the phonological change that took place, and that its morphosyntax developed in analogy to the existing morphosyntax of the plural obliques.

4 Agreement and feature movement

4.1 Preamble

My analysis addresses the following questions: why is a periphrastic pronoun present only when 1st/2nd person agreement is impossible, and why does the agreement surface as 3rd person in these environments?

The first question can be given a straightforward answer. Inuktitut is a pro drop language, and 1st/2nd person core arguments (subjects, objects, and possessors) are in general obligatorily null if they are cross-referenced by the agreement morphology. Correspondingly, 1st/2nd person oblique pronouns, which are not cross-referenced by agreement, *are* overtly realized. These are shown below:

(15) a. *Jaani-up taku-lauq-ta-anga uvanga
John-ERG see-PST-TR-3S/1S 1S
Intended: 'John saw me.'

[8] Moreover, the person restriction in effect holds for all 1st/2nd person + singular/dual/plural number combinations.

b. Jaani mumi-suuq uvanga-titut
John.ABS dance-3S.HAB 1S-EQU
'John dances like me.'

I follow Holmberg (2005), Roberts (2010), and others in assuming that, in pro drop languages, pronominals may be licensed for deletion if their features are recoverable, e.g. through agreement. I additionally assume that this condition is inviolable in Inuktitut, since it appears to be exceptionless. It thus follows that the pronoun in the periphrastic construction is the overt realization of a 1st/2nd person possessor/agent that is normally deleted at PF. Because the agreement is impoverished in this construction, the pronominal cannot be deleted.

This brings us to the next question: why is the agreement impoverished at all? To address this, I will show that impoverishment in oblique contexts extends beyond the person cases discussed so far: obliques with marked number (i.e. plural obliques) resemble singular obliques; this suggests that φ-feature impoverishment in oblique contexts is a general requirement in South Baffin Inuktitut. This will be a central clue to the correct analysis of the person restriction.

4.2 Morpheme variance

As I have shown throughout this paper, 1st and 2nd person agreement morphology is realized as 3rd person in oblique environments; 3rd person agreement morphology, however, is unaffected by this restriction and remains as it is. Examples (16) and (17) demonstrate that plural number agreement also does not appear in oblique environments.[9]

(16) a. nanuq
polar.bear.ABS
'polar bear'

b. nanur-mit
polar.bear-MOD
'polar bear (obl.)'

(17) a. nanu-**it**
polar.bear-PL.ABS
'polar bears'

b. *nanu-**i(t)**-nit
polar.bear-PL-MOD
'polar bears (obl.)'

c. ✓nanur-nit
polar.bear-MOD
'polar bears (obl.)'

The way to express 'polar bears (obl.)' is *nanurnit*, as in (17c), which lacks a dedicated plural morpheme *i(t)* normally found in absolutive contexts. Yet, this form is unambiguously plural. This is because the morpheme *-nit* that signals the oblique argument is plural; its singular counterpart is *nanur**mit*** in (16b). In fact, (most) oblique cases in Inuktitut have two variants, provided in (18) below, which I will call **column (I) and column (II) variants**:

(18)

CASE	**(I)**	**(II)**	
Modalis	**-m**it	**-n**it	
Allative	**-m**ut	**-n**ut	
Locative	**-m**iit	**-n**iit	
Vialis	**-kk**ut	**-g**ut	
Equalis	-titut	-titut	*(invariant, see below)*

[9] The /q/→[ʁ] change between *nanuq* and *nanur-mit/nit* is due to regressive manner assimilation.

Note that, even though the oblique equalis case marker *-titut* is invariant, its stem is still obligatorily impoverished. For instance, in (19), *pusikaaqtitut* 'cat (obl.)' is morphologically impoverished for number but still takes on a plural meaning:

(19) **Context:** *You see a group of women scuffling. They are pulling hair, scratching each other, etc. You say:*
arna-it paa-juit **pusikaaq**-titut/(*pusikaa-**t**-titut)
woman-PL fight-3P.INTR cat-EQU (cat-PL-EQU)
'The women are fighting like cats.'
'The women are fighting like a cat.'

All the other oblique cases have two variants, whose use is conditioned by two factors. As shown above, it is conditioned by whether the stem is *singular* or *plural*, though that is not all. It is additionally conditioned by whether the stem is *uninflected* or *inflected* (Dorais 1988, a.o.). This is illustrated below with the modalis case marker *-mit/-nit*:

(20)

	-MIT (I)	**-NIT (II)**
NUMBER	nanur-mit 'polar bear'	nanur-nit 'polar bear**s**'
	arnar-mit piu-ju-mit woman-MOD pretty-3S.INTR-MOD 'the woman that **is** pretty'	arnar-nit piu-ju-nit woman-MOD pretty-3S.INTR-MOD 'the women that **are** pretty'
INFLECTION	qimmir-mit dog-MOD 'dog'	qimmi-nga-nit dog-3S/3S-MOD '**his/her/their** dog'

In the left column, we see that the column (I) variant *-mit* is found on singular, non-possessed nouns as well as on singular verb agreement. In the right column, we find the column (II) variant not only on plural nouns and after plural verb agreement, but also on stems with (singular or plural) possessive agreement. Moreover, the column (II) variant is used in the person-restricted possessive obliques shown throughout Section 3. We thus see that the choice of variant depends on whether the stem contains a person or number suffix (assuming, following Nevins (2011), that singular number is the absence of plural).

To account for this pattern, I propose the following. First, I assume that oblique case is realized on a prepositional head P^0 and that this head bears an [uvalφ] feature. I moreover posit that the choice of the oblique case suffix is conditioned by the presence or absence of person or number features (φ-features). This, in turn, may be captured by Preminger's (2011) thesis that φ-Agreement may fail; Agree obligatorily takes place if a suitable goal is found, but Agree failure in the absence of such a goal is also acceptable. When the unvalued φ-probe on P^0 searches for a potential goal but fails to find anything (when its stem is singular or uninflected), the [uvalφ] feature remains unvalued and the oblique case suffix is realized with its column (I) variant (*-mit*). However, when the probe on P^0 does find φ-features to Agree with within its c-command domain,[10] it is realized with its column (II) variant (e.g. *-nit*). That the morphological shape of a head may be conditioned

[10] Recall that Inuktitut is head-final, meaning that the rightmost suffix is structurally highest. The oblique case suffix thus takes scope over the stem it attaches to.

solely by successful vs. failed Agree is also demonstrated in Halpert (2012) for the Zulu (Bantu) conjunct/disjunct alternation.

The proposal for South Baffin Inuktitut is illustrated schematically in (21) and (22) below. I assume that [uvalφ] on P^0 is valued by the φ-features on a head, which I label as $φ^0$ for now (I will amend this below).[11]

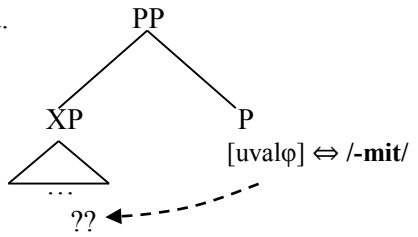
(21) *Number goal:*

a.	Failed Agreement	→	Ø	nanur-**mit** 'polar bear (obl.)'
	Successful Agreement	→	[PL]	nanur-**nit** 'polar bears (obl.)'

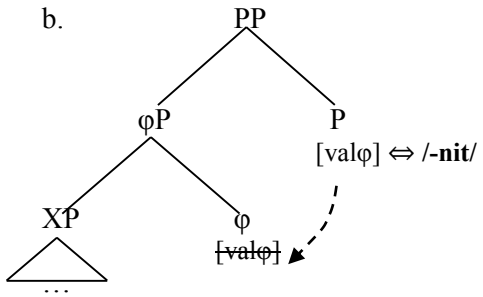
Person goal:

b.	Failed Agreement	→	Ø	qimmir-**mit** 'dog (obl.)'
	Successful Agreement	→	[1]/[2]/[3]	qimmi-nga-**nit** 'his dog (obl.)'

(22) a.



b.



4.3 Impoverishment as feature movement

I showed above that, when a probe on P^0 Agrees with its goal, the oblique marker is realized with its column (II) variant. This is not the only change induced by this process; the agreement morphology adjacent to the oblique is featurally impoverished, i.e., singular or 3rd person. Thus, two morphosyntactic changes take place: the higher head becomes featurally enriched while the lower head becomes featurally impoverished:

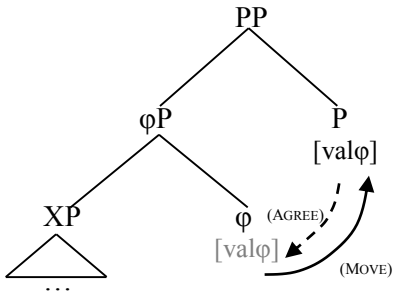
(23) **Higher head:** […] → [F, …]
Lower head: [F, …] → […]

I propose that this is symptomatic of *feature movement* (Chomsky 1995:ch.4). What looks like "valuation and impoverishment" is actually a single operation, in which an Agree relation between two heads X^0 and Y^0 causes the φ-feature to move from Y^0 to X^0.[12] This is illustrated in (24) below:

[11] The $φ^0$, in turn, gets its features by Agreeing with a lower nominal.

[12] Heidi Harley at WSCLA19 pointed out that, under the copy theory of movement, feature movement would leave behind a copy of said feature. I assume that feature movement creates chains, just as XP movement does, and that a postsyntactic process of Chain Reduction deletes the lower copy. I stipulate that this chain holds only between the two heads, i.e. it does not affect the pronominal argument that the lower head Agrees with in the first place, since this argument is overtly realized (= not deleted) in the periphrastic construction.

(24)



According to this analysis, valued heads can Agree with other valued heads (i.e. a given head can both Agree and be Agreed with within a single derivation). This contradicts Chomsky's (2000) stance that uninterpretable features are deleted once checked/valued. However, head-head Agreement is cross-linguistically attested, for instance in Ibibio (Niger-Congo) (Baker and Willie 2010) and in Bemba (Bantu) (Henderson 2013). There is also evidence for head-head Agreement in South Baffin Inuktitut. Example (25) shows that verb agreement normally encodes both person and number. However, as shown in (26), there is a small set of speaker-oriented adverbs in Inuktitut that attach outside of verb agreement; in such constructions, plurality is directly encoded on the adverb, while the verb agreement suffix is obligatorily impoverished (singular).

(25) a. ani-**juq**
go.out-3S.INTR
'He left.'

b. ani-**juit**
go.out-3P.INTR
'They left.'

(26) a. ani-ju-**tuqaq**
go.out-**3S**.INTR-old
'He left a long time ago.' (Compton 2012)

b. ani-ju-**tuqait**
go.out-**3S**.INTR-old.PL
'They left a long time ago.'

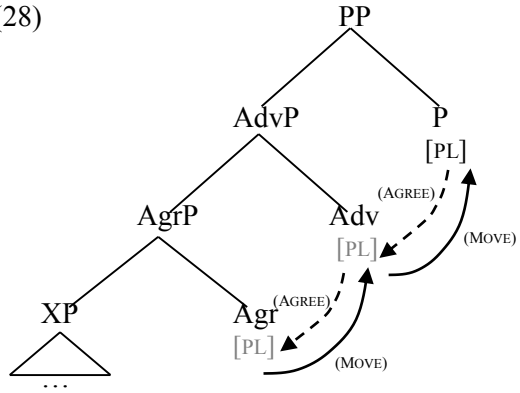
Thus, we see that agreement between (what I take to be) Adv^0 and Agr^0 triggers feature movement, parallel to the structures with P^0 and φ^0 in the nominal domain. Significantly, when there is additional φ-Agreeing morphology outside of these adverbs, such as an oblique case marker, the plural agreement disappears from the adverb as well; it is instead encoded on the *outermost suffix only*. In (27) below, the oblique case marker is realized with its column (II) variant *-nit*, indicating that φ-valuation has occurred on P^0:

(27) a. Miali piuksaq-tuq [anguti-mit [ani-ju-tuqar-**mit**]]
Mary.ABS like-3S.INTR man-MOD.I go.out-3S.INTR-old-MOD.I
'Mary likes the man who left a long time ago.'

b. Miali piuksaq-tuq [anguti-nit [ani-ju-tuqar-**nit**]]
Mary.ABS like-3S.INTR man-MOD.II go.out-3S.INTR-old-MOD.II
'Mary likes the men who left a long time ago.'

In other words, φ-features may move successive-cyclically up a tree. Example (28) illustrates this in greater detail. The [PLURAL] feature on Agr^0 moves to Adv^0, valuating the φ-probe on Adv^0. Once P^0 is Merged, the φ-probe on P^0 searches for a goal and finds the [PLURAL] feature on Adv^0, which is closest to it; Agree (and feature movement) takes place once again. The end result is that plurality is encoded only on the highest head, and all lower Agreeing heads are impoverished.[13]

(28)



4.4 Analyzing the apparent person restriction

I demonstrated above that feature movement occurs throughout the number system of South Baffin Inuktitut. Turning now to the person-restricted obliques, I propose a parallel analysis – that the ban on 1st/2nd person in oblique contexts is also a matter of feature movement. The data in (29) show that only the φ-features of the possessum, and not those of the possessor, are reflected on the agreement morpheme in oblique contexts; that is, the choice between singular *-nga* (29a, b) and plural *-ngit* (29c, d) depends entirely on the number of the possessum.

(29) a. qimmi-ra → uvanga qimmi-**nga**-nut
dog-1S/3S 1S dog-3S-ALL.II
'my dog' 'to my dog'

b. qimmi-vut → uvagut qimmi-**nga**-nut
dog-1P/3S 1P dog-3S-ALL.II
'our dog' 'to our dog'

c. qimmi-kka → uvanga qimmi-**ngin**-nut
dog-1S/3P 1S dog-3P-ALL.II
'my dogs' 'to my dogs'

d. qimmi-vut → uvagut qimmi-**ngin**-nut
dog-1P/3P 1P dog-3P-ALL.II
'our dogs' 'to our dogs'

[13] Note that it is unlikely that plurality is directly encoded so high in the structure because number is Merged higher than other projections. Speaker-oriented adverbs, for instance, arguably occupy illocutionary space above CP (Speas and Tenny 2003, Miyagawa 2012), which might be outside the realm of φ-Agreement.

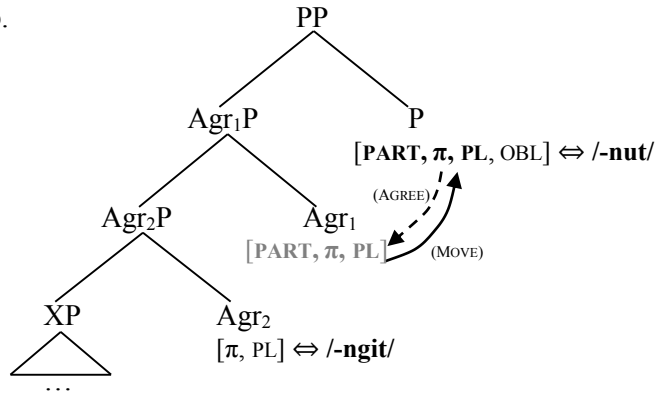
Therefore, although the possessive agreement normally encodes the φ-features of both arguments, in oblique environments the possessor's features are impoverished. At this point, we have an answer for why the agreement morphology is realized as 3rd person: it is not because 3rd person is default per se, but because it only cross-references the possessum, which is inherently 3rd person.

Although the exact structure of the possessor phrase is beyond the scope of this paper, we may infer two things. First, since only the φ-features of the possessor raise to P^0, the features of the possessum are inaccessible for Agreement. This suggests that there are two separate heads cross-referencing the φ-features of the possessor and possessum respectively, which I will call $Agr_1{}^0$ and $Agr_2{}^0$.[14] Second, $Agr_1{}^0$ (possessor) is structurally higher than the $Agr_2{}^0$ (possessum); the φ-features of the possessum never undergo movement to P^0 because the φ-features of the possessor are closer to the probe and thus intervene. I illustrate with *uvagut qimminginnut* 'to our dogs':

(30) a.

qimmi-vut	→	uvagut	qimmi-ngin-nut
dog-1P/3P		1P	dog-3P-ALL.II
'our dogs'		'to our dogs'	

b.



A question that arises here is what prevents $Agr_1{}^0$ from probing $Agr_2{}^0$, since it was established earlier that South Baffin Inuktitut allows head-head Agreement. Although I must leave this as an open question for now, one could stipulate that $Agr_2{}^0$ is simply not a suitable goal for $Agr_1{}^0$; one possibility is that these two Agr heads specifically probe for DPs.

To conclude, the analysis developed in this paper takes the 'person restriction' in South Baffin Inuktitut to be spurious, in that there is no restriction on person in oblique contexts at all. Rather, the φ-features of the possessor vacate $Agr_1{}^0$, triggered by Agree. This yields the appearance of a restriction on person. The remaining agreement morphology is 3rd person because it always cross-references the possessum, whose φ-features do not undergo feature movement. That the mechanism of feature movement exists in South Baffin Inuktitut is not immediately obvious when examining person agreement in obliques alone; the argument for its occurrence comes from the behaviour of oblique plurals, which can be derived in a uniform fashion.

4.5 Some cross-dialectal differences

Finally, why does feature movement occur in South Baffin Inuktitut at all? There are attested cases of head-head φ-Agreement without feature movement; for example, Baker and Willie (2010) show

[14] The 1st/2nd person portmanteau morphemes found in absolutive contexts are presumably the result of a postsyntactic fusion of two terminal nodes into one (Halle and Marantz 1993).

that, in Ibibio (Niger-Congo), all heads in a clausal spine display φ-agreement and do so by successively Agreeing with one another. It is possible that the nature of valuation is a point of cross-linguistic variation or parametrization. A brief comparison between South Baffin and other dialects of Inuktitut suggests that this could well be the case:

(31) a. *Taqramiutitut dialect (Hudson Strait)*
ulu-**ga**-nut
ulu-**1S/3S**-ALL.II
'to my ulu (traditional women's knife)'

b. *Itivimiutitut dialect (Hudson Bay)*
ulun-ni=**uvanga**
ulu-ALL.II=**1S**
'to my ulu (traditional women's knife)' (Dorais 1988)

In (31a), we see that the Taqramiutitut dialect does not display any person restriction effects; yet, the oblique morpheme is realized with its column (II) variant, indicating that Agreement between the two heads has still taken place. Conversely, in the Itivimiutitut dialect example in (31b), the column (II) variant of the oblique is present, though what appears to be conditioning it is the 1st person clitic *uvanga.* A potential avenue of further research is to determine whether this apparent variation in how feature valuation occurs is truly unpredictable across languages or whether a more careful examination might reveal some systematicity.

5 Conclusion

South Baffin Inuktitut displays what appears to be a restriction on 1st and 2nd person agreement morphology in the presence of an oblique case marker. I showed that plural morphology is banned in the same environments; in both cases, the agreement morphology is featurally impoverished, and a particular variant of the oblique case morpheme surfaces. I proposed that both restrictions are best analyzed as feature movement; the φ-features on an agreement head move to a higher head as a result of Agree taking place between the two heads. This has an interesting theoretical ramification. Contrary to some authors who argue against the existence of feature movement in φ-Agreement processes (e.g. Rezac 2010), the South Baffin Inuktitut data suggest that syntax does have a place for feature movement after all.

References

Baker, Mark, and Willie Udo Willie. (2010). Agreement in Ibibio: From every head, to every head. *Syntax* 13:99–132.

Bobaljik, Jonathan. (1996). Assimilation in the Inuit languages and the place of the uvular nasal. *International Journal of Linguistics* 6: 323–350.

Chomsky, Noam. (1995). *The minimalist program*. Cambridge, MA: MIT Press.

Chomsky, Noam. (2000). Minimalist inquiries. In: *Step by step: Essays on minimalist syntax in honor of Howard Lasnik*, eds. Roger Martin, David Michaels, and Juan Uriagereka, 89–155. Cambridge, MA: MIT Press.

Compton, Richard. (2012). *The syntax and semantics of modification in Inuktitut: Adjectives and adverbs in a polysynthetic language*. Doctoral dissertation, University of Toronto.

Compton, Richard. (2014). An argument for genuine object phi-agreement in Inuit: Evidence from mood variance. *Poster presented at GLOW37*. KU Leuven, Brussels, Belgium.

Compton, Richard, and Christine Pittman. (2010). Word-formation by phase in Inuit. *Lingua* 120: 2167–2192.

Dixon, R. M. W. (1979). Ergativity. *Language* 55: 59–138.

Dorais, Louis-Jacques. (1988). *Tukilik: An Inuktitut grammar for all*. Quebec: Association Inuksiutiit Katimajiit Inc., Groupes d'études inuit et circumpolaires, Université Laval.

Dorais, Louis-Jacques. (2003). *Inuit Uqausiqatigiit - Inuit languages and dialects (2nd edition)*. Iqaluit, Nunavut: Nunavut Arctic College.

Dorais, Louis-Jacques. (2010). *The language of the Inuit: Syntax, semantics, and society in the Arctic*. Montreal & Kingston: McGill-Queen's University Press.

Halle, Morris, and Alec Marantz. (1993). Distributed Morphology and the pieces of inflection. In: *The view from building 20*, eds. Kenneth Hale and Samuel Jay Keyser, 111–176. Cambridge, MA: MITPress.

Halpert, Claire. (2012). *Argument licensing and agreement in Zulu*. Doctoral dissertation, MIT.

Henderson, Brent. (2013). Agreement and person in anti-agreement. *Natural Language and Linguistic Theory* 31:453–481.

Holmberg, Anders. (2005). Is there a little pro? Evidence from Finnish. *Linguistic Inquiry* 36: 533–564.

Johns, Alana. (1987). *Transitivity and grammatical relations in Inuktitut*. Doctoral dissertation, University of Ottawa.

Johns, Alana. (1992). Deriving ergativity. *Linguistic Inquiry* 23:57–87.

Johns, Alana. (2007). Restricting noun incorporation: root movement. *Natural Language and Linguistic Theory* 25:535–576.

Miyagawa, Shigeru. (2012). Agreements that occur mainly in the main clause. In: *Main clause phenomena: New horizons*, eds. Lobke Aelbrecht, Liliane Haegeman and Rachel Nye, 79–112. Amsterdam: John Benjamins.

Nevins, Andrew. (2011). Multiple agree with clitics: Person complementarity vs. omnivorous number. *Natural Language and Linguistic Theory* 29:939–971.

Preminger, Omer. (2011). *Agreement as a fallible operation*. Doctoral dissertation, MIT.

Rezac, Milan. (2010). Phi-Agree vs. movement: Evidence from floating quantifiers. *Linguistic Inquiry* 41:496–508.

Roberts, Ian. (2010). A deletion analysis of null subjects. In: *Parametric variation: Null subjects in minimalist theory*, eds. Teresa Biberauer, Anders Holmberg, Ian Roberts and Michelle Sheehan, 58–87. Cambridge: Cambridge University Press.

Speas, Peggy, and Tenny, Carol. (2003). Configurational properties of Point of View roles. In: *Asymmetry in grammar*, ed. Anna Maria DiSciullo, 315–344. Amsterdam: John Benjamins.

Yuan, Michelle. (2013). *A phasal account of ergativity in Inuktitut*. MA thesis, University of Toronto.