

UBCWPL

University of British Columbia
Working Papers in Linguistics

-Papers for WSCLA 17-

The Seventeenth Workshop on Structure and Constituency
in the Languages of the Americas



Edited by:

Pat Littell, Analía Gutiérrez, Raphaël Girard, and Natalie Weber

May 2014

Volume 36

-Papers for WSCLA 17-

The Seventeenth Workshop on Structure and Constituency in the Languages of the Americas

Chicago, Illinois
March 9–11, 2012

Hosted by:
Department of Linguistics, University of Chicago

Edited by:
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The University of British Columbia Working Papers in Linguistics
Volume 36

May 2014

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).

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Preface

Volume 36 of the University of British Columbia Working Papers in Linguistics (UBCWPL) series presents a selection of papers from the Seventeenth Workshop on Structure and Constituency in Languages of the Americas, which was held at the University of Chicago in Chicago, Illinois, March 9–11, 2012.

This year's conference included a special themed session on information structure. The first paper in this volume, "Marking the boundaries: Blackfoot preverbs in narratives and elicitation" by Heather Bliss, is from that session. The second paper, "Multiple V-V mono-eventive syntactic complex in Mayangna", by Elena Benedicto and Elizabeth Salomón, focuses on the syntactic structure of three different serial verb constructions in Mayangna. The final two papers, "Lexical stress in Chukchansi Yokuts" and "Tone and syllable structure in Karuk (Hokan, California)", discuss the word-level prominence of two Californian languages. We would like to thank all the authors for their submissions.

UBCWPL is a regular publisher of the Proceedings of the Workshop on Structure and Constituency in Languages of the Americas (WSCLA) and the International Conference on Salish and Neighbouring Languages (ICSNL); please contact us if you are interested in back issues.

Natalie Weber
on behalf of UBCWPL

Marking the boundaries: Blackfoot preverbs in narratives and elicitation^{*}

Heather Bliss
University of British Columbia

Certain verbal prefixes in Blackfoot are found more frequently in narratives than in elicitation contexts. This paper explores this distributional difference for the spatiotemporal linker *it-*, and argues that its high frequency in narratives reflects a particular discourse use of *it-*, as an episode-boundary marker. Moreover, it is claimed that this use of *it-* is a predictable by-product of its core semantic function as encoding spatiotemporal boundedness.

1 Introduction

Many field linguists have had the experience of collecting a narrative text in a language whose morphology they take to be familiar only to find that a “simple” task like morpheme breakdown can pose unexpected challenges. The jumping off point for this paper is one such experience. In analyses of Blackfoot narratives, it has been observed that certain verbal prefixes (PREVERBS) are found more frequently in narrative texts than in elicitation contexts (Bullshields et al 2008). Specifically, the spatiotemporal preverb *it-* is found in high frequency in narratives, appearing in morphosyntactic contexts that are unattested in elicitation. In this paper, I explore this distributional difference, and I argue that the high frequency of *it-* in narrative contexts reflects a particular discourse use of this preverb, as an episode-boundary marker. Furthermore, I claim that the use of *it-* as an episode-boundary marker is a predictable by-product of its core semantic function as a marker of spatiotemporal boundedness (Bliss 2012).

The paper proceeds as follows. In §2, I introduce the collection of narrative texts from which I draw my current findings and in §3, I discuss the distribution and interpretation of *it-*, both in elicitation and in narratives. In §4, I focus on the discourse function of *it-* in texts, concluding that *it-* can be used an episode-boundary marker in these contexts. In §5, I argue that the core semantic function of *it-* is to encode spatiotemporal boundedness, and I show how this analysis can account for the behaviour of *it-* in both elicitation and narrative contexts. Finally, in §6, I conclude.

2 Source of data

In addition to the elicitation data, collected in a field setting with speakers of the Siksiká and Kaináá dialects, this paper draws from four traditional Blackfoot stories: *Inisiskimm* “Buffalo Calling Stones,” *Katoyissa* “Blood Clot,” *Naapi* “Napi (the Old Man),” and *Naapi ki Siikokiinis* “Napi and The Black Birch.” These stories are part of a larger collection of narrative texts recorded and made available through the *Niitsitapiisini: Our Way of Life* exhibit at the Glenbow Museum in Calgary, Alberta. Each story is transcribed in Blackfoot, with English and French translations and an accompanying audio recording. In this paper, transcriptions are presented as in the original texts, with morphological analysis and glossing added by the author.

3 Spatiotemporal *it-*

The verbal prefix *it-* belongs to the class of LINKERS (Frantz 2009) or RELATIVE ROOTS (e.g. Rhodes 2010), a closed class of morphemes found across the Algonquian language family that specify various oblique relations (e.g., instrument, means, manner, time, location). Linkers in Blackfoot are

^{*} Blackfoot is an endangered Plains Algonquian language spoken by <10,000 people in Southern Alberta and Northwestern Montana. Many thanks to Beatrice Bullshields and Rachel Ermineskin for sharing their language with me. *Nitsikóhtahsi'taki*. Also thanks to Rose-Marie Déchaine, Bettina Gruber, Hotze Rullmann, Martina Wiltschko, and the audience at WSCLA 17 for insightful discussion on this research. All errors are my own.

functionally analogous to prepositions in languages like English, in that they “link” an adjunct expression to the predicate.

3.1 *it-* in elicitation contexts

In elicitation contexts, *it-* can function to introduce either locative or temporal expressions. An example of each is given in (1) and (2) below.¹

(1) a. *Nítsooyi.*
nit-ioyi
1-eat.AI
“I ate.”

b. *Nitsítsooyi anni itáísooyo’pi.*
nit-**it**-ioyi ann-yi itaisooyo’p-yi
1-**it**-eat DEM-INAN table-INAN
“I ate at the table.”

(2) a. *Anna Leo áíkskima.*
ann-wa L a-ikskimaa
DEM-PROX L IMPF-hunt.AI
“Leo hunts.”

b. *Anna Leo itáíkskima omi itáo’tsstoyi.*
ann-wa L **it**-a-ikskimaa om-yi itao’tsstoyi
DEM-PROX L **it**-IMPF-hunt.AI DEM-INAN November
“Leo hunts in November.”

The distribution of *it-* varies depending on whether it has locative or temporal reference. Specifically, whereas *it-* is obligatory on verbs modified by an overt locative expression, it is optional on verbs modified by an overt temporal expression. This is shown in (3) and (4), respectively.

(3) *Nitsikssta ninaahk*(it)otomiihksa’si omi niyítahtaani.*
nit-iksstaa nit-aahk-**it**-oto-omiihkaa-hsi om-yi niyitahtaan-yi
1-want.AI 1-NONFACT-**it**-go.to-do-go.fish.AI-CONJ DEM-INAN river-INAN
“I want to go fishing at that river.”

(4) *Nitsikssta ninááhk(it)otomiihkaa’si omi ayíipoosii.*
nit-iksstaa nit-aahk-**(it)**-oto-omiihkaa-hsi om-yi ayiipoosi-yi
1-want.AI 1-NONFACT-**(it)**-go.to.do-go.fish.AI-CONJ DEM-INAN summer-INAN
“I want to go fishing this summer.”

When *it-* has temporal reference, it gives the temporal expression a flavour of specificity, or what I later refer to as “boundedness.” More precisely, *it-* restricts or emphasizes the time of the event, or picks out a specific interval within the timespan denoted by the temporal expression. Examples illustrating both of these interpretations are given in (5) and (6).

¹ Unless otherwise cited, data are from the author’s fieldwork with native speakers of Siksiká and Kaináa Blackfoot. Text examples are referenced by the name of the story and sentence number. Abbreviations are as follows: 1,2,3,4= 1st, 2nd, 3rd, 4th person; ACCOMP(animent); AI = animate intransitive; BEN(efactive); CONJ(unct); DEM(onstrative); IC = initial change; IMPF = imperfective; II = inanimate intransitive; INAN(imate); INTS = intensifier; INV(erse); MANR = manner; NEG(ation); NOM(inalizer); NONFACT(ive); NP = non-particular; PL(ural); POSS(essive); PRN = pronoun; PROX(imate); REP(ortative); RR = relative root; TA = transitive animate; TI = transitive inanimate; VOC(ative) .

- (5) *Nitsikssta ninááhkitotomiihkaa 'si omi ayíipoosii.*
 “That’s when I want to go fishing, this summer.”

- (6) *Anná Anna itsisttohkopii matónni.*
 ann-wa A it-isttohkopiyyi matonni.
 DEM-PROX A it-fall.down.AI yesterday
 “Anna fell down at a particular time yesterday.”

Without an overt nominal expression, *it-* cannot receive a locative interpretation. However, it can receive a temporal interpretation. Just as when a temporal expression is expressed overtly, *it-* provides a specific (and contextually-determined) temporal reference for the eventuality denoted by the predicate. In (7), *it-* highlights the fact that Leo’s broom-dancing takes place at the time of speaking:

- (7) *Anna Leo ihp(it)á'paihpiyi annihkayi ihtáyaamaahkimao'pi.*
 ann-wa L ihp-(it)-a'p-a-ihpiyi annihkayi ihtayaamaahkimao'p-yi
 DEM-PROX L ACCOMP-(it)-around-IMPF-dance.AI DEM.INAN broom-INAN
 “(Right now) Leo is dancing around with a broom.”

In sum, in elicitation contexts, *it-* consistently has spatial or temporal reference, either by licensing a locative expression or providing a specific temporal reference for an eventuality. As shown in the following section, this generalization does not seem to extend to narrative contexts.

3.2 *it-* in narratives

As in elicitation contexts, in narratives *it-* serves a licensing function for locative expressions, consistently appearing in the narrative texts whenever there is an overt locative expression. Examples of this are given in (8) and (9).

- (8) *Katoyisa anohk iitayo'kayihk omistsi Katoyissiksi.*
 K annohk ii-it-a-yo'kaa-ihk om-istsi Katoyiss-iksi
 K now IC-it-IMPf-sleep.AI-REP DEM-PL sweet.pine-PL
 “Katoyissa now sleeps at Sweet Pine Hills.” (Katoyissa, 19)

- (9) *Moi saokiohtsi iikitakayimmi iinisskimmiksi.*
 amo-yi saokiohtsi iik-it-waakayimm-yi iinisskimm-iksi
 DEM-INAN prairie INTS-it-be.many.AI-3PL buffalo.stone-PL
 “There are many buffalo stones on the prairie.” (Innisskimm, 13)

The narratives also parallel elicitation contexts in that *it-* appears on a number of verbs that are modified by a temporal expression.

- (10) *Kana'paisiisi iitaisspiipiohsiwa maka'pii.*
 kana-a'paisii-hsi ii-it-a-isspiipiohsi-wa mak-a'pii
 all-time.passes.II-CONJ IC-it-IMPf-get.into.crisis.AI-PROX bad-act.II
 “All the time, he was getting into trouble.” (Naapi, 4)

- (11) *Anniyai mattsiksistsikoyihk ma omahkinaawa iitsitohkoonimayihk ...*
 anniyai matt-iksistsiko-yi-hk om-wa omahk-(n)inaa-wa ii-it-it-ohkoonimaa-ihk
 DEM also-day-INAN-HK DEM-PROX old-man-PROX IC-it-it-find.AI-REP
 “One day the old man found ...”

...katoyisi	mi	saokiohtsi.	
katoyis-yi	om-yi	saokihtsi	
blood.clot-NP	DEM-INAN	prairie	

“...a blood clot on the prairie.” (Katoyissa, 6)

However, the distribution of *it-* in narratives is much broader than that in elicitation contexts, and many instances of *it-* seemingly do not have any spatiotemporal reference.

(12) ...*iitanistsiihk* *mi* *oppitaam* *maahksiksistokomssaksai* *aohkii*
ii-*it*-waanist-yii-hk omi w-ippitaam m-aahk-iksistokomssaki-ayi aohkii
IC-*it*-tell.TA-3:4-REP DEM 3-elderly.wife 3-NONFACT-heat.water.AI-3PRN water
“...(and) he told his wife to heat some water...” (Katoyissa, 7)

(13) *Amohkai* *aakiihk* *anistayihk* *Aapaiaiaakii* *iita'kissiihk* *aohkii.*
amohkayi aakii-hk waanista-yiihk aapaiai-aakii ii-*it*-otáakissi-hk aohkii
DEM woman-REP name-REP weasel-woman IC-*it*-go.for-water.AI-REP water
“This woman named Weasel Woman went to gather water.” (Inniskimm, 4)

Examples like (12) and (13) are unexpected given that *it-* always has spatiotemporal reference in elicitation contexts. Further, the presence of *it-* in narratives without either locative or temporal reference seems inconsistent with its characterization as a spatiotemporal linker. Whether overt or not, in elicitation contexts *it-* has the “linking” function characteristic of linkers. With locative reference, the linked argument is overtly expressed and with temporal reference, it may be null but is nevertheless specific. In the following section, I look in more depth at these unexpected uses of *it-* in narratives, and I argue that they do indeed have spatiotemporal reference, referring to the temporal boundaries of an episode in the narrative.

4 *it-* as an episode-boundary marker

In this section, I argue that *it-* takes on a discourse function in narratives, namely as an episode-boundary marker. First, I introduce the notion of EPISODE in narrative structure and discuss the properties of episode-boundary markers more generally. I argue that the spatiotemporality encoded by *it-* makes it an ideal candidate to function as an episode-boundary marker in narratives, and I demonstrate that *it-* functions to demarcate salient episodes in narratives.

4.1 What is an episode-boundary marker?

Just as sentences have internal structure, so do narratives. Narratives consist of EPISODES, intermediate constituents of narrative structure between the level of the sentence and the level of the text, often corresponding to paragraphs in written texts. The defining characteristic of an episode is an internal continuity in participants, time, or location (Fabb 1997), and shifts in episodes are typically correlated with changes in one or more of these deictic features.

Episodes can be delineated via EPISODE-BOUNDARY MARKERS, whose occurrence may correspond not only with changes in participants, time, or location, but also with changes in the action sequence, changes in the possible world (e.g. real-world to fictional or dream world), or changes in perspective or point-of-view (Brinton 1989). As such, episode-boundary markers fulfill “guidepost” or framing functions in the narrative, by providing overt signals of the structural divisions, or constituency, in the text (Brinton 1996).

Linguistic elements of various syntactic categories can function as episode-boundary markers, but most share the property of referring in some sense to the deictic features of person, time, or location (Brinton 1989, 1996; Fabb 1997). Examples of previously recognized episode-boundary markers include clausal constituents (e.g., *And so it happened that...*), discourse particles (e.g., *now*, *y'know*), spatial or temporal adverbs (e.g., *then*, Old English *þa*), and tense shifts (e.g., English historical present), (Brinton 1996). Specifically in the Algonquian languages, temporal adverbs, the changed conjunct, and shifts in

the obviation and/or animacy status of participants have been discussed in the context of episode-boundary marking (cf. Goddard 1990; Dahlstrom 1991, 1996; Mühlbauer 2008; Russell 1991).

Although, to the best of my knowledge, linkers (or relative roots) have not been previously discussed in this context, *it-* fits within the class of linguistic elements that typically function as episode-boundary markers, as it has spatiotemporal reference. Further, because *it-* can function to restrict or emphasize temporal parameters (as seen in examples such as (14) below, repeated from (7)), it seems a natural candidate for serving as an episode-boundary marker.

- (14) *Anna Leo ihp(it)á'paihpiyi annihkayi ihtáyaamaahkimao'pi.*
 ann-wa L ihp-(it)-a'p-a-ihpiyi annihkayi ihtayaamaahkimao'p-yi
 DEM-PROX L ACCOMP-(it)-around-IMPf-dance.AI DEM.INAN broom-INAN
 “(Right now) Leo is dancing around with a broom.”

To put things another way, the discourse function of *it-* as an episode-boundary marker can be seen as a by-product of its core function as a spatiotemporal linker. Just as *it-* can emphasize the temporal boundaries of an eventuality, it can also highlight the boundaries of salient episodes in a narrative.

4.2 Marking main episode boundaries (*Innisiskimm*)

Of the four narratives analysed here, *it-* is found with the highest frequency in *Innisiskimm* “Buffalo Calling Stones.” This narrative tells the story of how the Blackfoot people came to use *pisskaan*, or buffalo jumps, in the hunting of bison. The narrative can be segmented into three episodes: (1) a scene-setting episode, which gives a description of the difficulties people faced long ago, (2) a main episode, which tells the story of how a woman finds and shares with her people an *innisiskimm*, or buffalo-calling stone, and finally a closing episode, which provides a commentary on how the event has changed the lives of the people, shaping contemporary experiences.

In this story, *it-* is prefixed to every verb in the story, with the exception of those that are in the scene-setting and closing episodes at the beginning and end of the story, respectively. As such, *it-* demarcates the main episode from the scene-setting and closing episodes. In other words, it functions as an episode-boundary marker. Example sentences from each of the three episodes are given below. Note that *it-* does not appear on verbs within the scene-setting and closing sentences in (14) and (17), respectively, but it does consistently appear on every verb in the main episode sentences in (15) and (16).

Example of scene-setting

- (15) *Kiiwa makoyiwa otaistamattsookihpi aahkanistaipaitapiyo'pi.*
 kiiwa makoyi-wa ot-wai'stamatts-ok-i-hp-yi aahk-anist-a-ipaitapii-o'p-i
 VOC wolf-PROX 3-instruct.TA-INV-2:1-NOM-INAN NONFACT-MANR-IMPf-live.AI-INCL-INAN
 “We had wolf’s instructions for us about how to live.” (Innisiskimm, 1)

Examples of main episode

- (16) *Maanistoi'tsatsapssi miiyai ohkotokini otaitatsipssak.*
 m-aanist-o'-it-issa'tsi-hsi amiiyai ohkotok-in-yi ot-a-it-sitsipssat-ok
 3-MANR-it-look.at.TI-CONJ DEM stone-NOM-OBV 4-IMPf-it-speak.to.TA-INV
 “When she looked at the stone, it spoke to her.” (Innisiskimm, 6)

- (17) *Iitaistamattsiihkaiksi ki maatsitsisamoyihka ...*
 ii-it-wai'stamatts-yii-hk-aiksi ki maat-it-isamo-ihk-wa
 IC-it-instruct.TA-3:4-REP-3PL.PRN CONJ NEG-it-be.long.time.AI-REP-PROX
 “She instructed them, and it wasn’t long before...”

... *iitsskainoksiihkaawa*
 ii-it-ssk-a-inokssi-hk-yi-aawa
 IC-it-return-have.appealing.food.supply.AI-REP-3PL-3PL.PRN
 “They returned to having lots of food.”

(Innisiskimm, 11)

Examples of closing

- (18) *Aakaitapi matapiiksi aisaakiohtayissitapiyaawaiksi.*
 waaka-itapi matapi-iksi a-isaaki-oht-ayissitapii-yi-aawa-aiksi
 many-person person-PL IMPF-still-RR-keep.as.bundle.AI-PL-3PL.PRN-3PL.PRN
 ‘Many people still keep them as sacred bundles.’ (Innis-kimm, 14)

In this narrative, *it-* demarcates the boundaries of the main episode from the scene-setting and closing episodes. Seen in this way, the spatiotemporal reference of *it-* is clear; it highlights the time of the events described in the story as distinct from that of the previous and resulting state of affairs. As such, *it-* has a BRACKETING function, to relate the time of the narrated world from the time of the narration (Fabb 1997). In the following section, it is observed that bracketing is only one of the functions that *it-* serves as an episode-boundary marker.

4.3 Marking (sub-)episode boundaries

In the other three narratives, *it-* is found less frequently than in *Innis-kimm*². However, its distribution supports the claim that it can function as an episode-boundary marker. In these narratives, *it-* does not demarcate a single main episode from the scene-setting and closing episodes, but rather, it marks the boundaries of specific salient (sub-)episodes within the main episode.³

4.3.1 *Naapi ki Siikokiinis* “Napi and the Black Birch”

Naapi ki Siikokiinis tells the story of how birch trees came to have striped bark, and partitions into three episodes. The first episode I refer to as the “action;” it describes a time when Napi, the trickster, is caught in a storm. The second episode is coined the “reaction,” as it describes how Napi reacts after the storm dies down, by beating a birch tree with a stick. Finally, as in *Innis-kimm*, there is a closing episode, in which the narrator reflects that Napi’s beating of the birch resulted in the striped bark we see on birch trees today.

Although *it-* occurs less frequently in *Naapi ki Siikokiinis* than in *Innis-kimm*, it shows the same pattern of appearing on a series of verbs to demarcate an episode. In this narrative, *it-* is prefixed to the series of verbs within the “reaction” episode, as shown in (19)-(21) below.

- (19) *Otaipanissi, Naapiowa iitsinisaatsiih mi siikokiinis ...*
 ot-a-ipani-hsi N-wa ii-**it**-inn-isaatsii om-yi siikokiinis
 3-IMPF-die.down.II-CONJ N-PROX IC-**it**-down-climb DEM-INAN birch
 “When it died down, Naapi climbed down from the birch, ...”
- ... *iito’kaasiihk miistsisi itomatapipotsiihkai.*
 ii-**it**-o’kaasi-yiihk miistsis-yi **it**-omatap-ipot-yii-yiihk-ayi
 IC-**it**-pick.up.AI-REP stick-INAN **it**-start-beat.TA-3:4-REP-3PRN
 “...picked up a stick, and began beating it.” (Naapi ki Siikokiinis, 8)
- (20) “*Kimo’kattsitssikaakssi, noohkitsit a’paohpapokay!*
 kit-mao’k-att-**it**-ssikaa(tsi)-ok-i-hsi n-ohkit-**it**-a’p-a-ohpapokay’
 2-why-again-**it**-stop.TA-INV-2:1-CONJ 1-upon-**it**-around-IMPF-be.blown.AI
 “Why did you stop me from being blown around there?” (Naapi ki Siikokiinis, 9)

² In fact, in *Naapi* “Old Man,” *it-* is only found with overt locative and temporal expressions, and appears not to have an episode-boundary marking function. This is perhaps not surprising, given that this narrative doesn’t tell a particular tale consisting of episodes, but rather discusses the importance of the Napi figure within Blackfoot culture.

³ This distinction corresponds with Dahlstrom’s (1996) distinction between *acts* (major components of the story) and *scenes* (smaller sections of a narrative that comprise the acts).

- (21) *Nohksskai*tsit'aami'tsi'pinai sopoyi nitsita'paohpapokaani!"
 n-ohk-sska' -it-i'taam-i'tsi-hp-yini-ayi sopo-yi nit-it-a'p-a-ohpapokai'-n-yi
 1-RR-INTS-it-happy-feel.TI-INAN-3PRN wind-INAN 1-it-around-IMPf-blown.AI-NOM-INAN
 "I was really enjoying being blown around by the wind!" (Naapi ki Siikokiinis, 10)

In *Innisikimm*, *it-* functions to highlight the main episode, but in *Naapi ki Siikokiinis*, *it-* functions to highlight Napi's reaction to the storm, rather than the storm itself. Why might this be so? Arguably, the reaction episode is demarcated by *it-* as a way of drawing attention to Napi's exploits. The significance of this is made clear when we consider the role that Napi stories play in Blackfoot culture. According to Bastien (2004: 89-90), Napi's exploits provide a connection between the destructive aspects of human beings and the powers of the natural world. As such, Napi stories function to teach people about the purpose of their existence and their relationship to the universe; they provide a context for moral and ethical responsibility. By demarcating the episode of Napi's reaction to the storm (rather than the storm itself), the relationship between human beings and the universe is highlighted.

It is important to note that there is nothing in the semantic or pragmatic characterization of *it-* that necessitates that it demarcate the boundaries of the reaction episode, rather than the main episode of the story (i.e., the action), or that it demarcate any episode boundaries at all. Indeed on different tellings of the same story, narrators may choose to employ *it-* to highlight various other episode(s) or sub-episode(s). The claim that is being made here is that, when *it-* takes on the discourse function of an episode-boundary marker, its distribution correlates with the span of an episode that the narrator chooses to mark as salient.

4.3.2 Katoyissa "Blood Clot"

Katoyissa is the story of a hero who travelled around and saved people from evil captors. The narrative is structured around a particular example of Katoyissa's heroism, his rescuing of an old couple from their malicious son-in-law. Unlike the other two narratives, *it-* is not restricted to a single salient episode in this narrative, but appears throughout the story on sentences or series of sentences in which Katoyissa is featured as the main character. An example is given in (22) below.

- (22) *Mattsita*ikamotsiipihk anno kitsihkawayinnoon ...
 mattsii-it-a-ikamotsiipi-yii-hk anno kit-iikhkawa-innoon
 and.then-it-IMPf-bring.to.safety.TA-3:4-REP DEM 2POSS-relative-INCL.POSS
 "And then he saved our people ...
 ... niiksiskayi onohkattayinnokiaawa maka'pato'siiksi.
 anniksskayi onnohkat-a-yinn-ok-yi-aawa maka'pato'si-iksi
 DEM.PL difficult-IMPf-hold.TA-INV-PL-3PL.PRN evil.spirit-PL
 "...from the evil beings who held them captive." (Katoyissa, 16)

In contrast, sentences that do not feature Katoyissa as the central character are not marked with *it-*, as shown in (23).

- (23) *Mi omahkinay otaawa'komookihkai iinii*
 om-yi omahk-(n)inaa-yi ot-waawa'k(imaa)-omo-ok-ihk-ayi iinii
 DEM-OBV old-man-OBV OBV-hunt-BEN.TA-INV-REP-3PRN buffalo
 "The old man hunted buffalo for him..."
 ... ki maataikaksiiyoyiihka miiksi omahkitapiiksi.
 ki maat-a-ikaksii-o-yii-hk-a om-iksi omahk-itapi-iksi
 CONJ NEG-IMPf-share-TA.BEN-3:4-REP-PROX DEM-PL old-person-PL
 "...but he didn't share with the old couple." (Katoyissa, 4)

Although the main characters in the central plotline of the story are the old couple and their daughter and son-in-law, *it-* does not appear on verbs in sentences featuring these characters (unless there is an overt locative expression, e.g. (11) above). Rather, *it-* appears only on sentences that feature Katoyissa, the

hero, as the main character. Assuming that changes in participants reflect episode boundaries (cf. Fabb 1997), the function of *it-* in this narrative is to demarcate episodes featuring a salient participant.

4.4 Summary: *it-* as an episode-boundary marker

To summarize, in narratives *it-* can take on a specific discourse function, as an episode-boundary marker. In the narratives discussed here, we have seen that *it-* can demarcate the main episode from scene-setting and closing episodes (*Innisiskimm*), or demarcate a salient sub-episode from other parts of the story (*Naapi ki Siikokiinis*), or demarcate sub-episodes involving important characters in the story (*Katoyissa*). In other words, the narratives differ with respect to which episode(s) the narrator chooses to demarcate with an episode-boundary marker. Moreover, different telling of the same story may vary with respect to which episodes are highlighted as salient. However, what the narratives share is that, in all cases when *it-* has this discourse function, *it-* appears serially across a number of verbs which can be identified as collectively functioning in the narrative structure as an episode. In the following section, I argue that this use of *it-* in narratives is a predicted consequence of the semantic characterization of *it-* as a marker of spatiotemporal boundedness.

5 The semantics of *it-* and episode-boundary marking

Recall from §3 that in structured elicitation contexts, *it-* functions either to license locative expressions, or to provide a specific temporal reference for an eventuality denoted by a predicate. The question addressed in this section is how this distribution fits with the use of *it-* in narratives as an episode-boundary marker. The answer I argue for here is that these two generalizations about *it-* are not inconsistent, but rather, both reflect the spatiotemporality of *it-*. In particular, I claim that the episode-boundary marking function of *it-* is predictable from its semantic characterization as a marker of spatiotemporal boundedness.

5.1 *it-* encodes spatiotemporal boundedness

In this section, I argue that, whether locative or temporal, *it-* makes a consistent semantic contribution. Specifically, I claim that under both interpretations, *it-* provides spatiotemporal boundaries for the eventuality denoted by the predicate. In other words, *it-* locates the eventuality at a bounded place or time.

If a unified semantics of the locative and temporal uses of *it-* is possible, what accounts for the different distribution of *it-* with locative versus temporal reference? I propose that the distributional differences are a consequence of a difference in how times and places are grammaticized. Specifically, the linguistic encoding of the boundaries of an eventuality differs depending on whether the boundaries are spatial or temporal, and the distribution of *it-* reflects this difference. In what follows, I use specific examples of *it-* in its locative and temporal uses to explain how spatial and temporal boundaries differ.

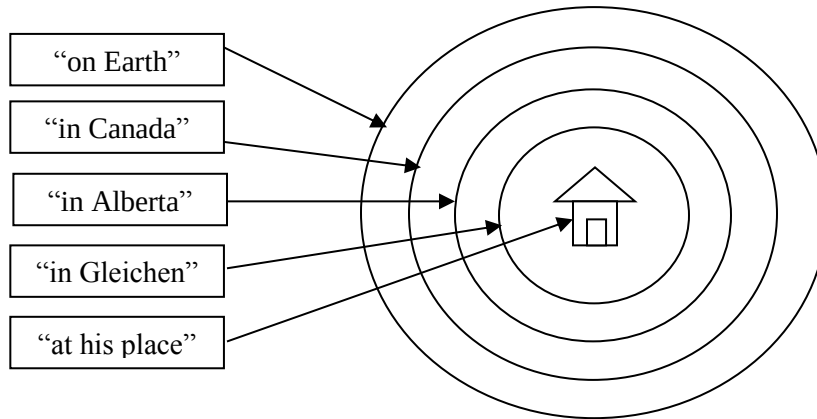
First, consider the examples in (24), which demonstrate the licensing function of *it-* with locative reference.

- (24) a. *Nit(*sit)ááhksaissaotooyi.*
 nit-aahksa-issaot-ooyi
 1-always-outside-eat
 “I always eat outside.”
- b. *Nits*(it)ááhksa-issaot-ooyi áanna ookóówayi.*
 nit-**it**-aahksa-issaot-ooyi anna w-ookoowa-yi
 1-**it**-always-outside-eat DEM 3-house-INAN
 “I always eat outside, at his place”

In both (24a) and (24b), a location for the event is provided by an adverbial prefix *issaot-* “outside.” However, only in (24b), in which there is an overt locative expression, is *it-* grammatical. Why is this so?

Arguably, without specifying “at his place,” the location of the event is unbounded; it doesn’t have any spatial boundaries. In other words, “outside” refers not only to the location *at his place*, but also the wider spatial context, e.g. *in Gleichen*, *in Alberta*, *in Canada*, *on Earth*, etc. Whereas each of these locations have defined spatial boundaries, as schematized in (25), the locative expression “outside” does not.

(25) Representation of spatial boundaries



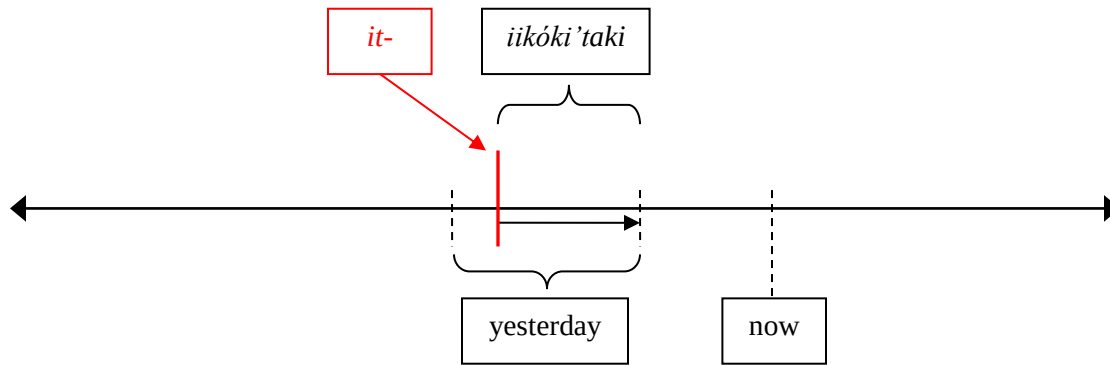
A locative expression such as “at his place” or “on Earth” confines the event to a bounded spatial context. Thus, by licensing the locative expression, *it-* provides spatial boundaries for the event.

Now consider the distribution of *it-* with temporal reference. Recall from §3.1 that, in elicitation contexts, *it-* restricts or emphasizes the time of the event, or picks out a specific interval within the timespan denoted by the temporal expression. I propose that these various interpretations reflect the core semantic function of *it-* as encoding (spatio)temporal boundedness, and that the differences arise depending on the discourse context and/or the aspectual properties of the verb. In what follows, I give some examples that highlight the ways in which *it-* marks temporal boundaries. First consider an example with a stative predicate, as in (26).

- (26) a. *Anná Beth iikóki'taki matónni.*
 ann-wa B. iik-ok-i'taki matonni
 DEM-PROX B. INTS-bad-feel yesterday
 “Beth was really mad yesterday.”
- b. *Anná Beth itsiikóki'taki matónni.*
 ann-wa B. **it**-iik-ok-i'taki matonni
 DEM-PROX B. **it**-INTS-bad-feel yesterday
 “Beth got really mad yesterday.”

Both (26a) and (26b) are grammatical, but when *it-* appears on the stative verb in (26b), it yields an inchoative reading. Arguably, this is a reflex of the temporal boundedness contributed by *it-*; in this sentence, *it-* provides a starting point, or a temporal boundary, for the state. This can be schematized as in (27).

(27) Representation of temporal boundaries in (26)



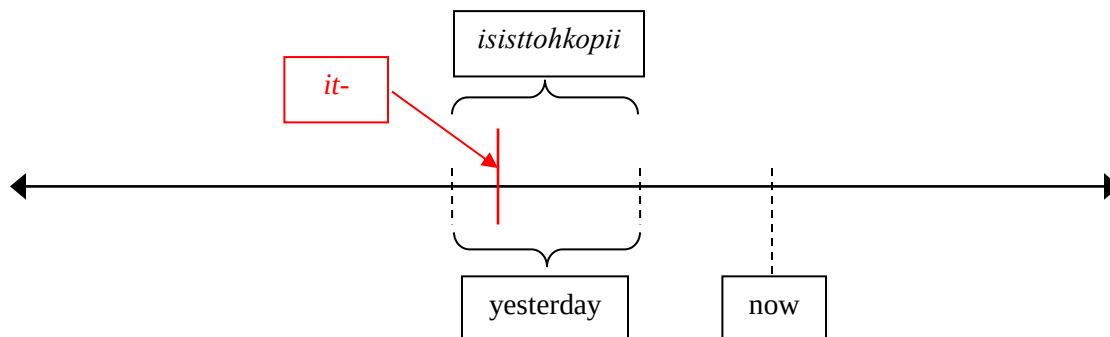
The figure in (27) depicts the temporal span of the eventuality denoted by the predicate *iikóki'taki* “be really mad” in (26). The contribution of *it-* is to mark the left boundary, or the starting point, of this eventuality.

With non-stative verbs, *it-* also picks out specific temporal boundaries. Consider the example in (28) (repeated from (6)):

- (28) a. *Anná Anna isisttohkopii matónni.*
 ann-wa A isttohkopiiyi matonni.
 DEM-PROX A fall.down.AI yesterday
 “Anna fell down yesterday.”
- b. *Anná Anna itsisttohkopii matónni.*
 ann-wa A it-isttohkopiiyi matonni.
 DEM-PROX A it-fall.down.AI yesterday
 “Anna fell down at a particular time yesterday.”

In both (28a) and (28b), the time of the event is specified by the temporal expression *matónni* “yesterday.” However, whereas in (28a), the temporal expression provides a time span in which the event occurred in (28b), *it-* picks out a specific point within that time span. In other words, *it-* provides temporal boundaries for the event. This is depicted in (29).

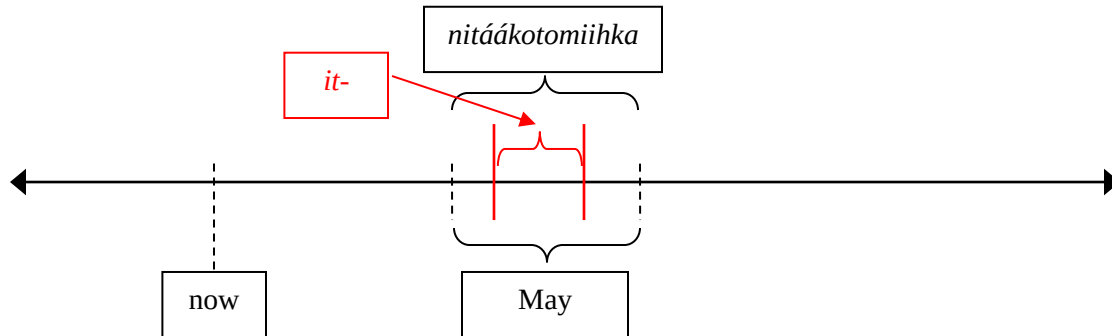
(29) Representation of temporal boundaries in (28)



The same can be said for the contribution of *it-* with predicates that express non-instantaneous events (e.g., activities or accomplishments). Again, *it-* provides temporal boundaries, effectively restricting the time span of the event. An example is given in (30), with a representation of the temporal boundaries in (31).

- (30) a. *Apistsiskitsááto'si nitáákotomiihka.*
 apistsiskits-aato's-yi nit-aak-oto-mii-hkaa
 blossom-month-INAN 1-FUT-go.to.do-fish-acquire.AI
 "I'm going to go fishing in May."
- b. *Apistsiskitsááto'si nitáákitotomiihka.*
 apistsiskits-aato's-yi nit-aak-**it**-oto-mii-hkaa
 blossom-month-INAN 1-FUT-**it**-go.to.do-fish-acquire.AI
 "I'm going to go fishing (at a certain time) in May."

(31) Representation of temporal boundaries in (30)



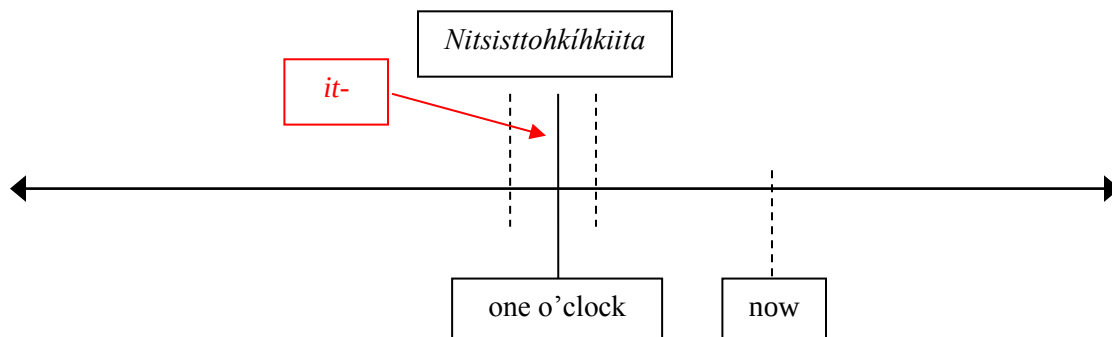
In (31), the temporal span of the event is restricted by the boundaries provided by *it*-.

Recall from §3.1 that *it*- may also be interpreted as restricting or emphasizing the time of the eventuality, as in (32).

- (32) a. *Nitsisttohkihkiita o'takóóhsin ni'tókska.*
 nit-isttohk-ihkiitaa o'takoohsin ni'tokska
 1-flat-bake.AI hour one
 "I made pancakes at/(around) one o'clock."
- b. *Nits**it**sisttohkihkiita o'takóóhsin ni'tókska.*
 nit-**it**-isttohk-ihkiitaa o'takoohsin ni'tokska
 1-**it**-flat-bake.AI hour one
 "That was when I made pancakes, at one o'clock."

In (32b) *it*- doesn't function to pick out a specific time interval, but rather, it restricts the event to occurring at exactly and only that time. Arguably, this is the same boundary-marking function as in (26)-(31). Without *it*-, the boundaries of the event are undefined; the temporal expression gives an approximate reference for the time of the event but does not restrict it to exactly that time. With *it*-, the temporal boundaries are defined and precise, as schematized in (33).

(33) Representation of temporal boundaries in (32)



In (33), the temporal span of the event is loosely defined as sometime around one o'clock. The contribution of *it-* is to restrict to the event to precisely that time.

The claim that *it-* is sensitive to the distinction between spatial and temporal boundaries is supported by the observation that, whereas the temporal reference of *it-* is always specific, *it-* can license non-specific locations, as in (34).

- (34) *Nitsikssta ninaahkitsipsstso'kaahsi ksikokóówayi.*
 nit-ikssta nit-aahk-**it**-ipsst-yo'kaa-hsi ksikokóówa-yi
 1-want 1-NONFACT-**it**-inside-sleep-CONJ tent-INAN
 "I want to sleep in a tent."
 ✓WIDE SCOPE READING: *There is a tent I want to sleep in.*
 ✓NARROW SCOPE READING: *I want to sleep in some tent.*

Whether interpreted with wide or narrow scope, the locative expression in (34) requires *it-* in order to be licensed. This is markedly different from the temporal use of *it-*, which, whether used with an overt temporal expression or not, always has a specific reference. However, under the view that *it-* contributes spatiotemporal boundedness, and that spatial and temporal boundaries are grammaticized differently, this difference is expected. Whereas temporal boundaries are defined by picking out a specific reference point within a temporal span, spatial boundaries don't require a specific reference. Rather, spatial boundaries can be defined by confining an eventuality within a spatial parameter. As shown in (34), this location need not be specific; the location of sleeping in (34) is confined to the parameters of (some) tent. By licensing the locative expression, *it-* defines the spatial boundaries of the event.

In sum, whether used with temporal or locative reference, *it-* has a consistent semantic contribution, namely to provide spatiotemporal boundaries for an eventuality. In the next section, I show that this characterization of *it-* can account for its function in narratives as an episode-boundary marker.

5.2 Boundedness and episode-boundaries

We have seen that narrative episodes are characterized by an internal continuity in participants, time, or location, and are distinguished from one another by discontinuity in one of these categories. It has been observed that the need to mark episode-boundaries can have consequences for morphosyntax (Fabb 1997). In particular, morphosyntactic elements encoding features related to participants, time, or location can be recruited for the purposes of episode-boundary marking.

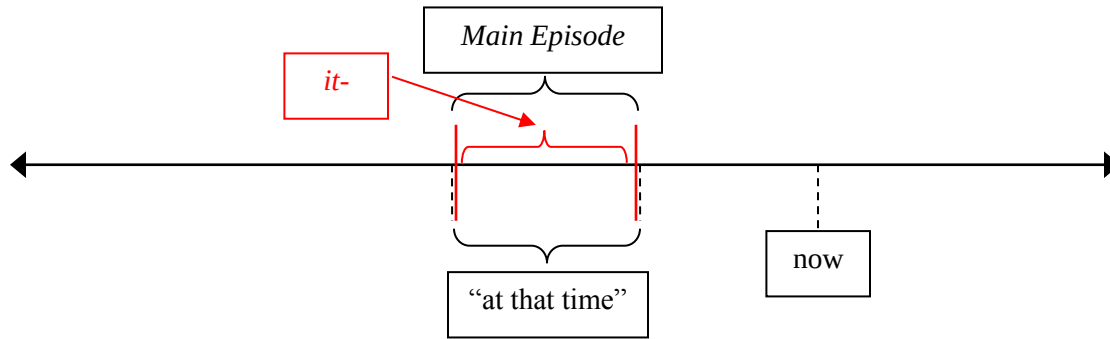
As a marker of spatiotemporality, *it-* is well-suited for the purpose of episode-boundary marking. Further, as a function of providing spatiotemporal boundaries for an eventuality denoted by a predicate, *it-* can partition eventualities into those that share common boundaries from those that don't. In other words, *it-* can demarcate episodes. Under the view that episodes can be characterized by continuity in time and space, an episode can be understood as a collection of eventuality-denoting predicates that share spatiotemporal boundaries. The function of *it-* is to mark those boundaries.

For example, consider the function of *it-* in Inniskimm, which I argued in §4.2 is to demarcate the main episode in the story from the scene-setting and closing episodes. An example of a sentence from the main episode was given in (16), and is repeated in (35) below.

- (35) *Maanistoi'tsatsapssi miiyai ohkotokini otaitatsipssak.*
 m-aanist-o'-**it**-issa'tsi-hsi amiiyai ohkotok-in-yi ot-a-**it**-sitsipssat-ok
 3-MANR-**it**-look.at.TI-CONJ DEM stone-NOM-OBV 4-IMPF-**it**-speak.to.TA-INV
 "When she looked at the stone, it spoke to her." (Inniskimm, 6)

The preverb *it-* appears on both verbs in this sentence, as it does on every verb within the main episode of the story. I propose that its contribution here is equivalent to that in (30), where it restricts the temporal boundaries of an event to a certain time. In (35), *it-* signals that the event(s) denoted by the predicate(s) happened at a certain time, namely the time of the main episode. This is schematized in (36).

(36) Representation of *it-* as an episode-boundary marker



The discourse effect of marking the temporal boundaries for each predicate within a salient episode is to highlight the continuity and cohesion within an episode, as compared with discontinuity with the rest of the story.

Fabb (1997) notes that episode-boundary markers signal not just a discontinuity in the relevant feature(s) that they typically encode, but a break between episodes more generally. For example, if tense shifting is employed to mark episode-boundaries, it may mark boundaries primarily characterized by a shift in participants or location, and not just boundaries characterized by shifts in time. Turning to *it-*, we can observe that, even if the episode-boundary does not expressly coincide with a change in time or location, *it-* marks the saliency of the episode by demarcating its spatiotemporal boundaries. In the narratives considered here, we have seen that episode-boundaries may coincide with a change in time (e.g., *Innisskimm*), a change in participants (e.g., *Katoyissa*), or a change in the action sequence (e.g. *Naapi ki Siikokiinis*). However, by providing spatiotemporal boundaries for the eventualities that comprise the episode, *it-* demarcates that episode, marking it as salient in the narrative.

6 Conclusions and future directions

To summarize, I have shown that the distribution of the Blackfoot preverb *it-* varies across elicitation and narrative contexts. In structured elicitation, *it-* encodes spatiotemporal boundedness either by licensing locative expressions or by restricting or defining the temporal parameters of an eventuality. In narratives, on the other hand, *it-* takes on a broader role, and is recruited as an episode-boundary marker. I have argued that these two patterns both reflect the semantic characterization of *it-* as a marker of spatiotemporal boundedness. As a function of encoding spatiotemporal boundedness, *it-* can demarcate episodes within a narrative.

These findings lead to a number of questions for future research. One direction concerns the syntax of *it-*. Specifically, is *it-* a functional head or an adjunct, and how does *it-* compose with locative and temporal expressions? Does *it-* merge in a different position when it functions as an episode-boundary marker? In addition, there are questions regarding narrative structure in Blackfoot. In particular, it would be interesting to investigate if and how *it-* interacts with other episode-boundary markers that have been identified for other Algonquian narratives. Does *it-* correlate with obviation (which can mark shifts in participants), or clause-typing (which can mark shifts in location)?

Looking at narrative structure can inform our knowledge of these various grammatical elements, and conversely, an understanding of their syntactic and semantic properties can help us understand their role in discourse. To conclude, our understanding of the syntax and semantics of morphemes such as *it-* requires looking at their distribution and interpretation in both structured elicitation and narrative contexts.

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Multiple V-V mono-eventive syntactic complex in Mayangna*

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In this paper we propose a structural analysis for a previously unidentified mono-eventive V-V complex in Mayangna. We identify three different subtypes and propose an underlying structure based on different levels of application of the Merge operation; different structural layers are identified: aspectual, transitivity, complex path and result state. The language shows that different structural mechanisms are used in Complex Movement predicates to encode Manner (of Movement) and to encode Complex Path.

1 Mayangna verb combining devices and serial verb constructions

Mayangna presents a relatively well-studied system of Serial Verb Construction (SVC) which incorporates a morphological Switch Reference System with a Same-Subject (Proximate) paradigm and a Different-Subject (Obviative) paradigm (Norwood, 1997; Hale, 1989, 1991, 1992, 1997). This system is used for a variety of configurations (Sequential, Causative, Perception structures, etc.), some of which are mono-eventive while some are not. Here are some examples:

- (1) Nawah as talik îranayang
tiger D-DEF see.SS1s run.PST1s
'I saw a tiger and I ran.'
- (2) Nawah as taling kîrana
tiger D-DEF see.DS1s run.PST3s
'I saw a tiger and it ran.'

Examples (1) and (2) are cases of sequential SVCs and the crucial element in them is the agreement morpheme (1st person singular in both) appearing on the first verb, the first one (-*ik*) indicating identity of reference with the following verb and the second one (-*ing*) indicating disjoint reference with the subject of the following verb.

In the structures that we deal with in this paper, previously unidentified, the initial verbal forms are bare, that is, they contain no verbal morphology of any kind, agreement or otherwise. The following is an example:

- (3) dî as ûnitak kidi tak pamnin
thing D-DEF skin-POS3s D peel.Ø PAMNIN.INF
'to peel something'

In (3) we can observe that the first verb (*tak*) appears in its bare root form, contrary to what we could observe in (1)–(2) (*talik* and *taling*, respectively). Here we concentrate on the structure in (3) and we determine its types, properties and corresponding underlying structural configurations.

*Abbreviations used are as follows: 1 = first person, 2 = second person, 3 = third person, D = determiner, D-DEF = indefinite determiner, DS = different subject (switch reference), IMP = imperative, INF = infinitive, O = object clitic/agreement, p = plural, P = postposition, POS = possessive inflection, PRN = pronoun, PRS = present, PST = past, SS = same subject (switch reference), STA = stative (Verb/Auxiliary), s = singular, tr = transitive, Ø = no inflection.

2 The Mayangna V-V complex

The structures of the type in (3) show the following properties:

- (4) a. they contain multi-verbal sequences (V-V, V-V-V, ...);
- b. they are all mono-eventive;
- c. they contain verbal units with no inflexion except for the last one.

Three different sub-types have been identified:

- (5) a. Aspectual;
- b. Intransitive Complex Path;
- c. Transitive Complex Path.

In the Aspectual sub-type, the last verb, which contains the sentential inflection, has been grammaticalized for aspectual properties. The example in (3) before, repeated here for convenience is a case of this sub-type:

- (6) dî as ûnitak kidi tak pamnin
thing D-DEF skin-POS3s D peel.Ø PAMNIN.INF
'to peel something'

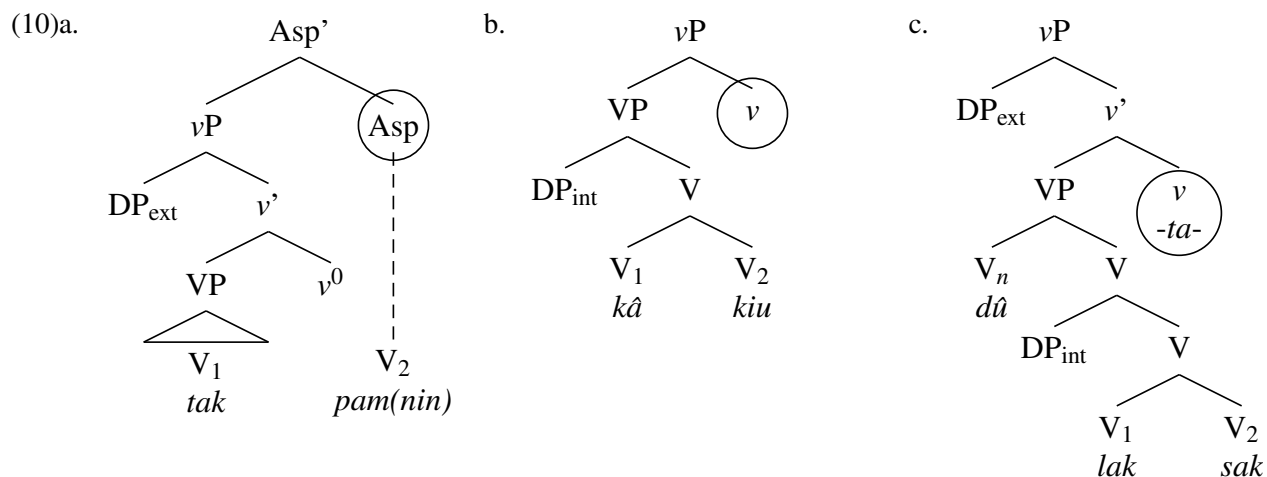
Sub-types (5b–c) encode the complex path of a movement predicate, the first one in an unaccusative intransitive formation, the second one adding an agent and thus forming a transitive predicate. Examples (7) and (8), respectively, are a case in point:

- (7) was yak kâ kiuna
river P enter.Ø go.PST3s
'(s)he/it went into the river'
- (8) mutsila dû lau-ta-h (yaklaunin, 'stand up')
backpack have.Ø stand_up-tr-IMP2s
'put the backpack up!'

3 The hypothesis

In this paper we propose that the bare V-V complex is the result of merging at different levels, below or at little *v*, contrary to what happens with cases like those in (1)–(2), which would correspond to merging above little *v*. Our Hypothesis, thus, can be stated as in (9) below:

- (9) The *V-V Complex Hypothesis*
 - i. bare V-V complex is the result of Merge below *v*
 - ii. different structural levels of Merge underlie the sub-types in (5), as specified in (10) below.



The structure in (10a) corresponds to the Aspectual type in (5a), where the aspectually grammaticalized final verb heads an Asp head; this verb will then be subject to other syntactic operations by which it will end up carrying the corresponding sentential inflection (Tense and Agreement).

The structure in (10b) corresponds to a movement predicate, with a complex path specification (V1, V2) under an unaccusative v , the intransitive type of (5b). Finally, (10c) corresponds to the merging of a complex path specification structure (V1, V2) with a V_n triggering a transitive v ; that is, a v that introduces an external (agentive) argument (DP_{ext}).

4 The structural types of syntactic V_i - V_f

In this section we will address the properties observed in each of the types identified in (5) above and will evaluate how they behave with respect to the structures proposed in (10).

4.1 $\langle V_i$ - $V_f \rangle$, with $V_f = \text{aspectual}$

As mentioned before, the last verb in this V-V complex has been grammaticalized to encode aspectual meaning, while coexisting with its original non-grammaticalized lexical counterpart. In (11) below, we list the three items identified thus far with their lexical counterpart:

(11) Values for $V_f = \text{aspectual}$

Lexical verb			Grammaticalized aspectual meaning
pamnin	‘to throw’	≫	completed event without specification of process
dânin	‘to leave (sth)’	≫	culminated process
lânin	‘to cross’	≫	change of state

Let us now look at them individually.

pamnin This element that originally means ‘to throw’ and ‘to fish’ (by throwing the *kuyulh*) encodes the aspectual meaning of completed event without specifying the process involved. Here are some examples:

- (12) rumh pamnayang
 throw_away.Ø PAMNIN.PST1s
 ‘I threw it away’ (and I’m done with it)

- (13) âdika wasni dî pam-ta-h
 this water drink.ø PAMNIN-tr-IMP2s
 ‘drink up that *fresco*!’ (at once, not little by little)

The requirement for the lack of reference to the process becomes evident when the lexical predicate refers to a long complex process that cannot be obviated, as is the case with *alahus wis* ‘to harvest the rice’ in (14) below. In this case, *pamnin* is unacceptable while *dânin*, which indeed targets the process in a predicate as we will see next, is acceptable.

- (14)a. *warmani alahus wis pam-ta-h
 today rice harvest.ø PAMNIN-tr-IMP2s
 *‘go harvest the rice today (at once)!’
 b. warmani alahus wis dâ-ta-h
 today rice harvest.ø DÂNIN-tr-IMP2s
 ‘go finish harvesting the rice today!’

When the process portion of an event can be obviated, then both options are possible (with the corresponding change in meaning). Thus, in (15a) the meaning of the main verb allows the process portion of its meaning to be obviated and the use of *pamnin* is allowed; in (15b), on the contrary, the aspectual *dânin* targets precisely the process portion and, under that interpretation, its use is allowed:

- (15)a. bakan pam-ta-h
 buy/sell.ø PAMNIN-tr-IMP2s
 ‘sell it already (... I’ll come back tomorrow for another one)’
Context: I’m in the market looking at an object to buy when another lady comes and also shows interest in the object; I utter (15a) thus allowing the seller to sell it to the other buyer.
 b. bakan dâ-ta-h
 buy/sell.ø DÂNIN-tr-IMP2s
 ‘be done with your buying (... I’m in a hurry and I want to go now...)’
Context: A husband and wife are in the market looking at an object to buy; the wife is looking at it and considering whether she is sufficiently interested or not, and asking questions about it; the husband becomes impatient and utters (15b) to end the process.

dânin The original lexical meaning of this element is ‘to leave something somewhere’ and it has been grammaticalized into an aspectual element referring to the culmination of an event’s process or the end of that process. Here are some examples:

- (16) asna yaunik balna bitik suh dânayang
 clothes wash.INF1s PL all wash.ø DÂNIN.PST1s
 ‘all the clothing that I had to wash, I finished washing’

The question arises as to the scope of this aspectual element; that is, is the object under its scope (thus producing a telic event) or outside. Let us consider the following modified example:

- (17) yang pat asna suh dânayang
 PRN.1s already clothes wash.ø DÂNIN.PST1s
 ‘I am already done washing the clothes’

In this case, there are two possible readings: one in which there are still clothes to wash but I’m done for the day (non-telic reading: object not affected); and one where there are no more clothes to wash

(telic reading: affected object). The answer to the above question is then that the telic reading is possible but not obligatory. We can suggest a way of dealing with this along the lines of optional movement of the object to the Spec of the Asp head (see 10a), in the spirit of proposals like Borer (2005).

lânin Originally meaning ‘to cross over’, this element has been grammaticalized into an aspectual meaning of change of state. Here are some examples:

- (18) ...dawak yamni buh lâlâna
and well dry.Ø LÂNIN.PST3p
‘...and they dried out well’

Example (18), as a continuation to (16) or (17), indicates the change of state from wet to dry. In these cases, the lexical meaning of the base predicate seems to have an effect on the use of the corresponding aspectual head:

- (19)a. tîbil/ûpas us lânayang (/ pamnayang / dânayang)
table/house clean.Ø LÂNIN-PST1s / PAMNIN-PST1s / DÂNIN.PST1s
‘I got the table/house to become clean.
(/ I cleaned the table/house at once, in one go / I stopped cleaning the table/house)’
- b. tîbil/ûpas suh *lânayang (/ pamnayang / dânayang)
table/house clean.Ø *LÂNIN.PST1s / PAMNIN.PST1s / DÂNIN.PST1s
*‘I got the table/house to become clean.
(/ ✓I cleaned the table/house at once, in one go / ✓I stopped cleaning the table/house)’

In (19a), the predicate *us* ‘to clean’ involves a cleaning with something wet and implies a short process, with a clear change of state; *lânin* is thus compatible (as is *pamnin* obviating the process part of the event, and *dânin* targeting precisely the process part of the event). In (19b), however, the predicate *suh* also ‘to clean’ involves, on the contrary, a long and complex process which does not accept *lânin*,¹ seemingly indicating the lack of availability of a change of state, whereas the acceptability of *pamnin* and *dânin* indicates the availability of a process that can be obviated.

4.2 <V_i... V_n-V_f>, with V_i... V_n-V_f = complex path (movement)

This V-V complex type is used to encode complex movement predicates. It does not, however, encode the more well-known type of complex movement, that of manner of movement. Manner of movement is encoded using the other V-combining device presented above in (1)–(2), using the Switch Reference paradigm, as shown in the following examples:

- (20)a. *balh kiuna
fly.Ø go.PST3s
- b. balhwi kiuna
fly.SS3s go.PST3s
‘s/he flew (away)’ (fly-went)

¹It may be interesting to further investigate whether *usnin* but not *suhnin* encodes a result state or not. A similar contrast exists in Spanish between *lavar* ‘to wash’ (✓*lavado*, result past participle) and *limpiar* ‘to clean’ (**limpiado*, result past participle).

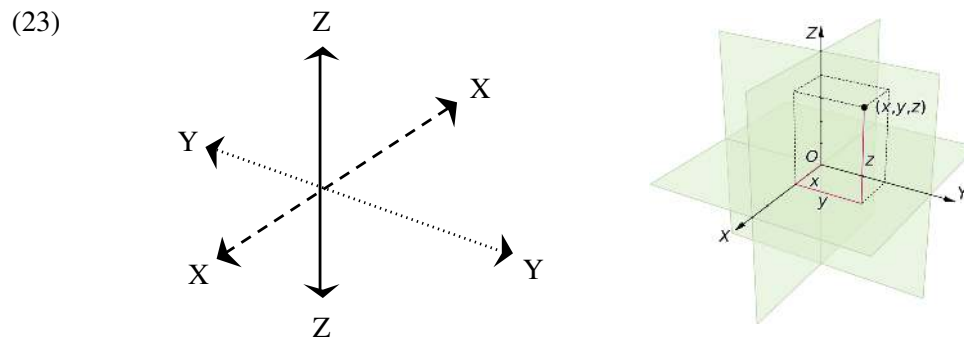
- (21)a. *kar lakwanayang
roll.Ø go_down.PST1s
- b. kartik lakwanayang
roll.SS1s go_down.PST1s
'I rolled down (the hill)'

The bare V-V complex that occupies us here is used instead to encode a complex path. The following are some examples:

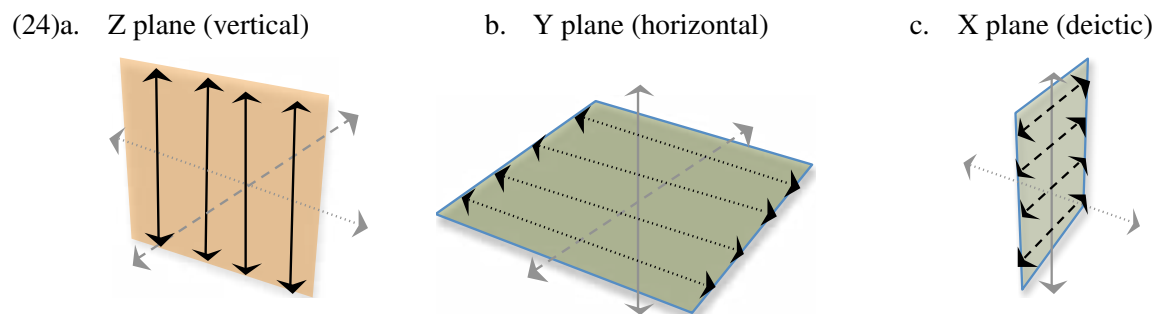
- (22)a. truk lak kiuna
truck go_down.Ø go.PST3s
'the truck went down (the hill)'
- b. truk kil kiuna
truck go_up.Ø go.PST3s
'the truck went up (the hill)'

In the previous examples, the last V, *kiuna*, encodes movement towards or away from the speaker (or the reference point); in that sense, we can identify it as 'deictic.' The previous V, *lak* 'to go down' or *kil* 'to go up', indicates movement along the vertical axis.

We can conceptualize this system as a reflection of a Cartesian Coordinate System,² using three axes representing a three-dimensional space representation.



Linguistically, such a system can be used to encode movement along planes defined on the basis of these axes, with respect to a reference point, as follows: Z for the vertical axis (up/down), Y for the horizontal, sideways, axis (across); and X for the deictic (away/towards the reference point):³



²The figure in (23) is taken from: http://en.wikipedia.org/wiki/Euclidean_space, accessed August 2011.

³Interestingly enough, from a crosslinguistic point of view, we can see this system reflected in languages geographically and genetically as unrelated as SwaTawWe (Sino-Tibetan; Zheng, 2012) or the organization of space in Sign Languages (Barberà, 2012; Brentari, 1998).

(25) Z axis plane, vertical: *kilnin* ‘go up’ *(yak)laknin* ‘go down’
 Y axis plane, horizontal: *yaklanin* ‘to cross (over)’
 X axis plane, deictic: *kiunin* ‘go (away)’ *kainin* ‘come’

(26)a.

kâma	tât	amang	kil	yakla	kiuna
iguana	board	through	go_up.ø	cross.ø	go.PST3s
			✓Z	Y	X

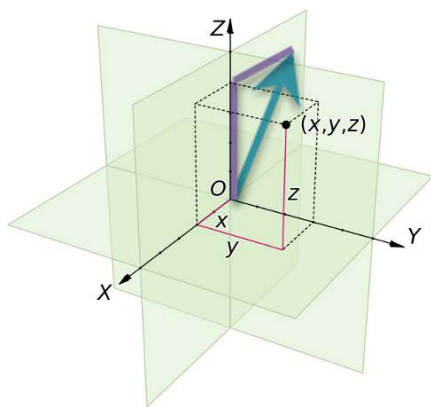
b. *kâma tât amang yakla kil kiuna
iguana board through cross.ø go_up.ø go.PST3s
 *Y Z X

c. *kâma tât amang kiu yakla kilna
iguana board through go.PST3s cross.ø go_up.ø
 *X Y Z

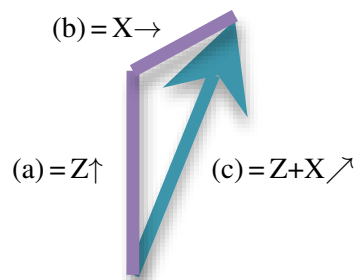
'The iguana went up (through) the board across (the creek).'

(28) truk kil kiuna
truck go_up.Ø go.PST3s
'the truck went up (the hill)'

(29)a.

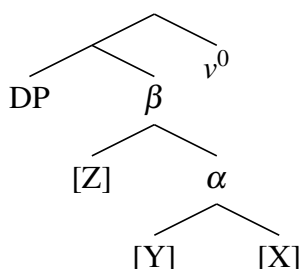


b.



The structure that we are proposing for this type, along the lines of the one stated earlier in (10b), is the one we find in (30), with direct Merge of the roots in the order established:

(30)



This structure leaves the right-most V root as the one that will stay (linearly) adjacent to the sentential head-final inflection of the language; that's why *kiuna* in the previous examples carries the Past tense inflection of the sentence.⁴ We will come back to this issue in the next sub-section, when we consider whether we only have surface linear adjacency or head movement.

From a compositional semantic point of view, the denotation of the α and β nodes would need to be calculated via some variation of Event Identification (Kratzer, 1996), which would yield the mono-eventivity of the structure and the fact that all the V roots share one single internal argument (DP), as unaccusative roots.

A final point to address in this subsection is the role of elements like *kâ(nin)* in (7), repeated here for convenience:

- (31) was yak kâ kiuna
 river P enter.ø go.PST3s
 '(s)he/it went into the river'

We contend that the role of *kânin* in these cases introduces the end point argument of the complex predicate, thus playing the role of a telicity marker. Its absence will indicate the general direction of the movement but not 'entering into the river' (by drowning or by sinking):

- (32) was yak kiuna
 river P go.PST3s
 '(s)he/it went towards the river'

The tree in (30) implies a different directionality for lexical and functional heads (lexical heads Z and Y left-merge, while v right-merges), something that is not uncommon crosslinguistically. If this is in

⁴The tree in (30) is a partial tree, that will be subject to further Merge of inflectional heads (Asp, T, etc.)

the right direction, and if *kânin* in V-V complexes is indeed a telicity marker, then it behaves along lexical roots (left-merged) and not functional heads (right-merged), thus making a difference between ‘inner aspect’ (or Aktionsart) and ‘external’ aspect (as illustrated by the first subtype in Section 4.1). We leave the implications of this issue for further research.

4.3 <V_i-V_f> + -ta, (complex path) movement + agent

The specific characteristic of this sub-type is the fact that it adds an agent to the predicate, that is, it transforms an (unaccusative) intransitive predicate into a transitive one. Additionally, it can also present a result sub-structure or a beneficiary sub-structure (in complementary distribution). Let us begin by considering some examples:

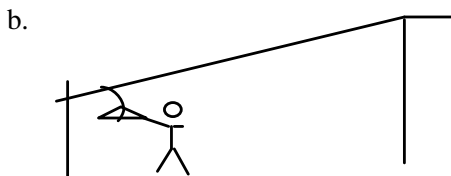
- (33) mutsila dû lau-ta-h
 backpack have.Ø stand_up-tr-IMP2s
 ‘pick up the backpack!’

In (33) we can observe how, out of the (unaccusative) intransitive *yaklaunin* ‘to stand up’ we obtain a transitive predicate by adding *dû* (from *dûnin* ‘to have’). Evidence for the fact that the resulting complex predicate is transitive comes not only from the interpretation associated with (33) but also from the presence of the morpheme *-ta* in sentence final position.⁵ The intransitive version of *yaklaunin* ‘to stand up’ shows a thematic morpheme *-wa-* instead of the *-ta-* we see in (33), as we can observe in (34) next:

- (34) (yang) lau-wa-yang ‘I get up / I stand up’
 (man) lau-wa-man ‘you get up / you stand up’

The presence of the initial verb *dûnin* ‘to have’ is, however, not always necessary. The example in (35) does not have it, still showing the transitive *-ta* morpheme, while the case of (36a), corresponding to the prompt in (36b), has a different one, *mur* ‘to pull’:

- (35) mutsila il sak-ta-h⁶
 backpack go_up.Ø be(at).STA-tr-IMP2s
 ‘get the backpack up (and leave it / let it be)!’
- (36)a. mur lâ wit-ta-h
 pull.Ø cross.Ø be(_hanging).STA-tr-IMP2s
 ‘pull it over (while hanging)!’



What makes (35) and (36) interesting is the fact that they show that the verbal inflectional element *-ta*, indicating transitivity, appears (right) adjacent, not to the initial transitive verb (*dû* in 33, *il* in 35 or

⁵Intransitive *yaklaunin* also has an additional mark of intransitivity: the prefix *yak-*. However this morpheme is only present in 3rd person singular, and the example in (33) is 2sg.

⁶(*K*)*ilnin* ‘to go up’ is also a verb whose (in)transitivity shows through verbal morphology as in (34) and a prefix, *k-* in this case, for 3rd person. Like in the case of (33), however, the examples is in 2sg and thus the (3rd person) *k-* does not appear.

mur in 36), but to the totality of the V-V complex, right after the last element.

This is especially interesting because of the nature of that last element in (35) and (36), *sak* and *wit*, respectively. These elements belong to a paradigm of five (positional) stative verbs (Norwood, 1997; Benedicto, 2002) with a particular inflectional paradigm, clearly distinct from regular lexical verbs. These elements take the (Person) Agreement morphology directly and can never take verbal elements like *-ta-* or *-wa-*, which are obligatory in verbal elements:

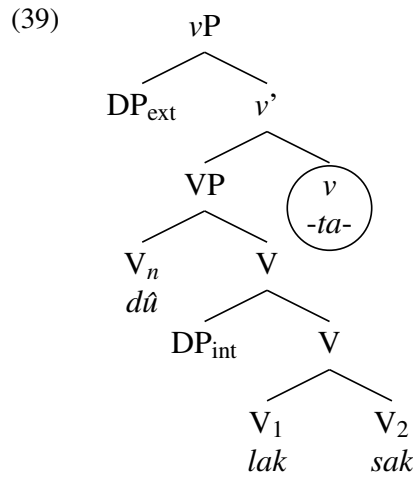
- (37) a. (yang) sak yang b. *sak-**ta**-yang c. *sak-**wa**-yang
 (man) sak man
 (witing) sak ki

The fact that the transitivity morpheme *-ta-* in (33), (35), and (36) appears adjacent to the stative verbs (*sak*, *wit*), together with the impossibility of (37b) (and 37c) shows that such a morpheme is not attached to the stative verb itself but to the totality of the V-V complex. We will address this particular property in the revised structure we propose at the end of this section.

A further property of this subtype is the fact that the transitive V of the V-V complex must appear at the absolute left edge of the V-V compound, after the complex path sub-structure:

- (38) dū lau il sak-tayang
 have.∅ stand_up.∅ go_up.∅ be(at).STA-trPRS1s
 ‘(s/he) raises it up (and lets it be)’

In summary, the transitive V in the V-V complex must appear in absolute initial position, whereas the transitive inflection that it triggers must appear at the V-V complex absolute final position. This is captured by the structure proposed in (10c), repeated here for convenience, where the transitivity marker instantiating little *v* takes the VP formed by the V-V complex via successive Merge of its individual Vs:

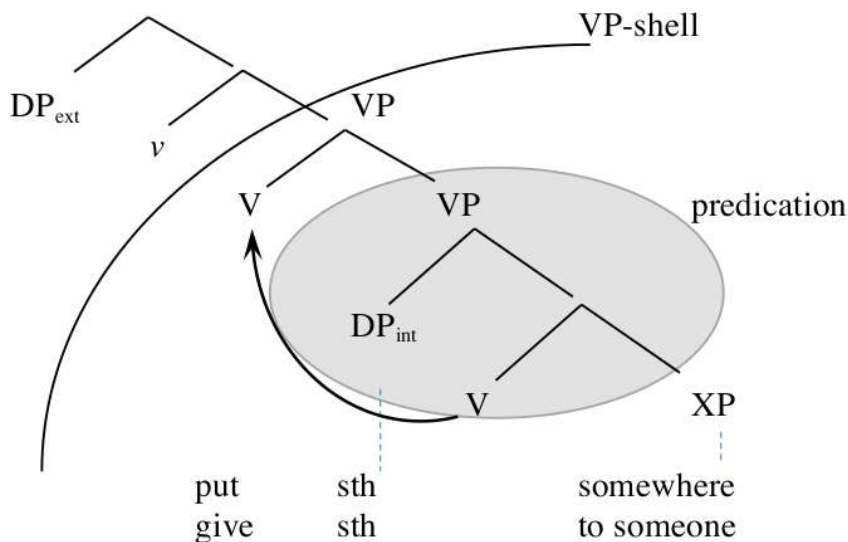


In addition to the transitivity of this subtype, we also identified a result sub-structure, contributed by the stative verbs *sak* and *wit* in the above examples, (35)–(38). Though this sub-structure does not seem to be required (see 33), it is incompatible with the presence of another optional sub-structure, that of a beneficiary/goal: compare (40a) and (40b) with (41) below.

- (40)a. *dû* *lau* *sak-na*
have.Ø stand_up.Ø be(at).STA-trPST3s
‘(s/he) raised it (and let it be)’
- b. *dû* *lau* *yâna*
have.Ø stand_up.Ø O1s.give.PST3s
‘(s/he) raised it up to me’
- (41) **dû* *lau* *sak* *yâna*
have.Ø stand_up.Ø be(at).Ø O1s.give.PST3s
‘(s/he) raised it (and let it be) for me’ (in a location closer to me)

The structure in (39), however, does not account for this incompatibility. In order to address this issue, we will revise this initial structure along the lines of a Larsonian VP-shell analysis proposed for ditransitives. This type of approach proposes two layers for these predicates, where the lower one corresponds to a predication structure; the V in that lower structure then raises to the upper one leaving the DP subject of the lower predication as the ‘object’ of the resulting (di)transitive structure. In a head-initial language like English, the structure for predicates like ‘put something somewhere’ or ‘give something to someone’ would be as in (42), with the final lexical verb (‘give’ or ‘put’) as the output of the complex head V+V:

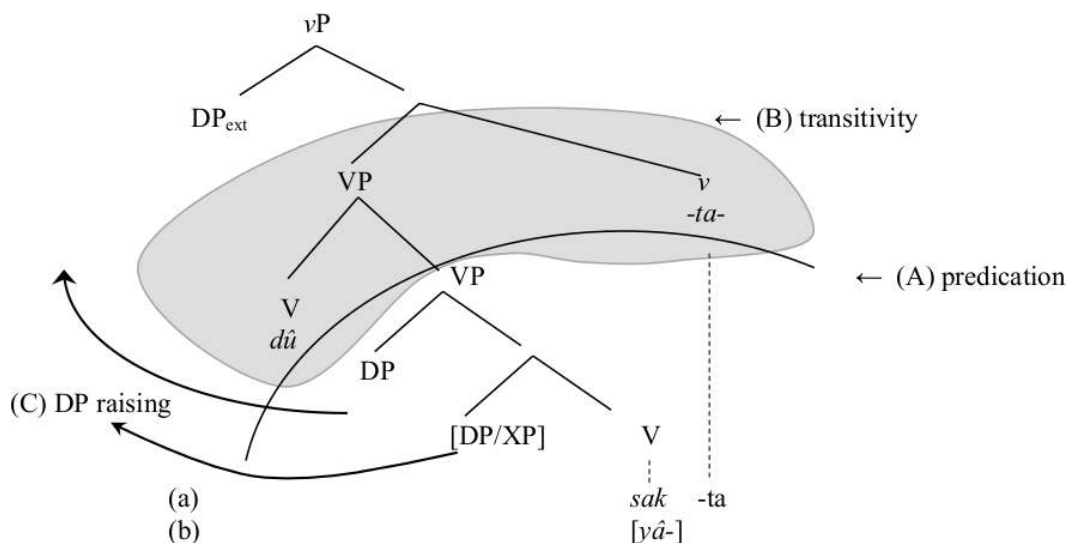
(42) **VP shell analysis for ditransitives**



We will propose that, in Mayangna, the upper V is represented by the initial *dû* while the lower V is lexically represented by the stative verb (as in 40a or by the dative marking ‘give’ V in (40b)). The reason why these two elements are incompatible, as we saw in (41) is precisely because they are competing for the same position, the lower V.

The final structure proposed for this subtype, thus, is the one we set in (43), with a lower predication layer (A) and an upper transitivity layer (B), with independent lexicalization of the individual V heads (and further raising of the internal arguments for Case purposes):

(43)

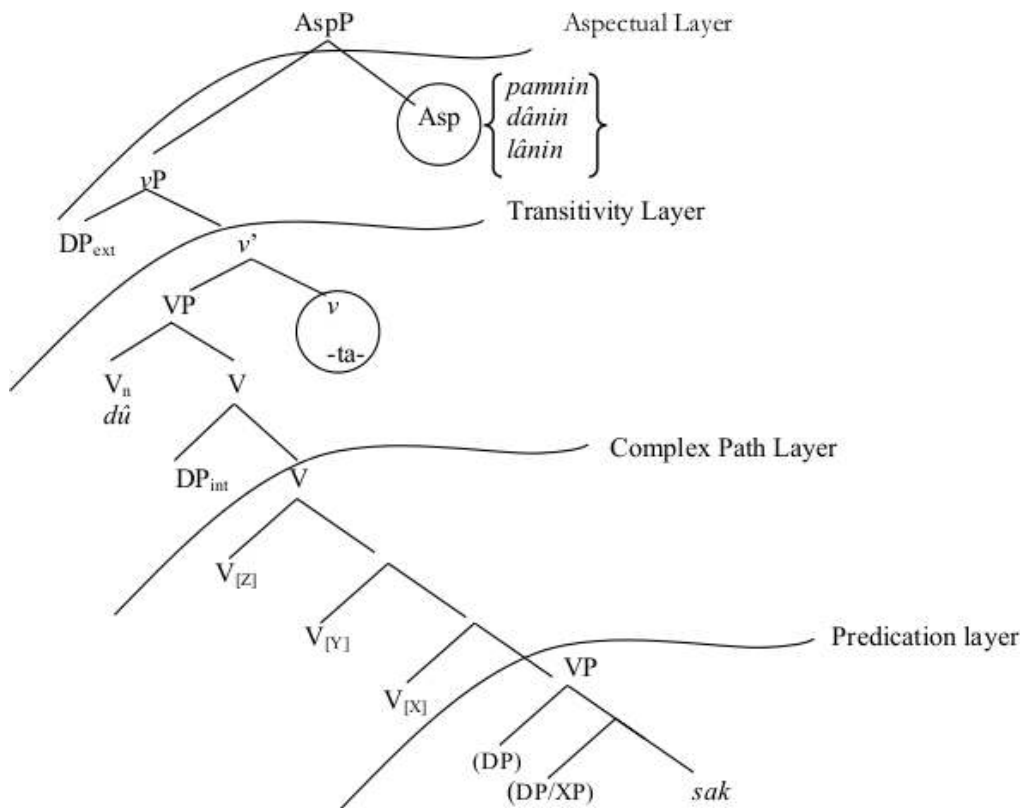


The structure proposed in (43) then accounts for all the properties identified for these structures: (i) the ‘left-edge’ effect for the transitive V in the V-V complex; (ii) the ‘right-edge’ effect of the transitivity marker; (iii) the surprising and unexpected apparent attachment of the transitive marker to the final stative element (as a surface linear adjacency by-product out of the structural adjacency of v and VP); and (iv) the complementary distribution of the final stative element and the beneficiary element.

5 Conclusions

In this paper we have identified a new type of syntactic V-V complex, with at least three different subtypes. We have proposed that these three types are the result of merging at different levels with a potential layered structure of the type in (44):

(44)



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Lexical stress in Chukchansi Yokuts

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Lexical stress in Chukchansi has never been studied in any detail. In the following paper, I illustrate Chukchansi stress as a weight-sensitive language. I explain stress in a simple, two-step hierarchy; first, if a long vowel is present, whether in penultimate or antepenultimate position, it is stressed. If no long vowel is present, stress by default falls on the penultimate syllable. A realignment of syllable weight to include CVV syllables as the only heavy syllables in Chukchansi, but not CVC or CV, explains the stress shift from the default penultimate position to the antepenultimate position. Finally, two native speaker intuition tests lend support for the aforementioned conclusion.

1 Background

1.1 Phoneme inventory

Chukchansi is classified as a mutually intelligible dialect of Yokuts. In regards to phonetics a more accurate account of Chukchansi (which had the benefit of utilizing modern technology) is given in Martin (2011). The following phoneme inventories (Tables 1 and 2) are taken from that aforementioned study (albeit with slight modifications).

Table 1: Chukchansi consonant inventory

Phoneme	Bilabial	Dental	Alveo-palatal	Velar	Glottal
voiceless unaspirated	p	t	ɕ	k	ʔ
voiceless aspirated	p ^h	t ^h	ɕ ^h	k ^h	
ejective	p'	t'	ɕ ^h '	k'	
voiceless fricative		s		x	h
nasal	m	n			
glottalized nasal	m'	n'			
approximant	w	l	j		
glottalized approximant	w'	l'	j'		

Table 2: Chukchansi vowel inventory

short	ɪ	e	ɜ	o	u
long	i:	e:	ɜ:	o:	u:

The distinction between short and long vowels is important in regards to stress and will be discussed in further detail in the following sections. The high-front vowel has been traditionally transcribed as /i/, including in Martin (2011), however it is more accurately characterized as a near-front unrounded vowel /ɪ/.¹ The long version of this vowel, however, is undoubtedly a close-front unrounded vowel /i:/.

¹/ɪ/ should be regarded as a phoneme, not a variant of /i/. In some environments, especially preceding a glottal stop, /ɪ/ appears to allophonize to [i].

The use of /ɜ/ is adopted from Martin (2011) to replace the less accurate low-vowel symbols /a/ or /ɑ/, although I retain [a] in the /aw/ diphthong.

1.2 Speakers & data collection

Chukchansi is a moribund variety of Yokuts (similar to other Yokuts varieties). At the time of this study (2010–2012) only two native (i.e., first-language) speakers could be confirmed. Both speakers, who are sisters, were the language consultants for this study. Though only two speakers are immediately known, they both claim “a few more [Chukchansi speakers] exist.” This dearth of language consultants limits the current study, though this often is the nature of fieldwork with endangered languages.

Both sisters, named “Holly” [born 1941 in Coarsegold] and “Jane” [born 1943 in Madera] currently live in Fresno, California, about 35 miles south of Coarsegold at the Picayune Rancheria of the Chukchansi Indians. The sisters acquired Chukchansi as a first language while living with their grandmother during childhood. They then acquired English when they entered elementary school at the age of 5 or 6 (Martin 2011). Similar to other Native American communities, English is the dominant and de facto language of not only Holly and Jane, but virtually all Chukchansi Indians. The sisters primarily speak English with each other and with all others around them.

The entirety of the data used for this study is primary. I elicited the majority of the recorded data on numerous occasions at *California State University, Fresno* (CSUF) with the language consultants. A sizeable number of recordings used in this study came from Isaac Martin. The majority of the data is composed of lists of words recorded in isolation, three times. Most word classes (nouns, verb [paradigms], adjectives and adverbs) were recorded. A Chukchansi translation of Aesop’s fable *North Wind and the Sun* was also used as data.

The majority of the words used for this study are in citation form, with the exception of the recording of *North Wind and the Sun*. An attempt was made to record a narrative (i.e., more “naturalistic” data), spoken between the sisters, but this has proved incredibly difficult for various reasons (the personalities of the consultants, language fluency, comfort levels, etc.).

All the recordings, except the ones from Martin (2011), which were recorded at the Picayune Rancheria, were recorded at *California State University, Fresno*. The elicitations mentioned above, save the *North Wind and the Sun* recording, produced a corpus of 141 words. Once the words were recorded, they were then phonemically transcribed in IPA (*International Phonetic Alphabet*) format and analyzed. The recordings took place in a sound-proof booth at CSUF between the fall of 2010 and fall 2011. As mentioned earlier, the words used for elicitation were culled randomly from the *Bilingual English-Chukchansi* dictionary (3rd ed.). Subsequent elicitations, however, included words with certain phonological forms that were lacking in earlier elicitations. For example, an elicitation in the fall of 2011 focused primarily on words with the high-back vowel /u/ in the final syllable.

Aside from *North Wind and the Sun*, each of the 141 words recorded were recorded in isolation with three tokens being produced for each word. The reason for this was the emphasis on lexical stress. The recording of sounds in carrier sentences, it was felt, would add the extra and unwanted (possible) dimension of higher-level stress (i.e., phonological phrase and utterance level stress).

1.3 Literature review

Existing academic research on Chukchansi is slim; not much scholarly research has been done on Chukchansi Yokuts, much less stress in Chukchansi. The most systematic linguistic analysis of Chukchansi taken up thus far has been by T.L. Collord who wrote a general grammar of the language in 1968. Within the grammar, the only reference to stress is:

In a word uttered in isolation three intensities of stress can be detected. Primary stress is on the penultimate syllable and, as a rule, is accompanied by a higher pitch than preceding syllables. A secondary stress is found on the closed syllables (non-penult) with pitch if following

primary stress elsewhere. Non-penultimate open syllables are weakly stressed with pitch following primary stress and about the same pitch as surrounding syllables elsewhere. It must be borne in mind that these features characterize the isolated word of *two or more syllables*, and they do not necessarily hold true in longer utterances. (Collord 1968)

Stress has also been briefly investigated in other Yokuts languages. In Yawelmani (Yowlumne) Stanley Newman (1944) similarly concluded that stress is *mainly* on the penultimate syllable. The vast majority of scholarly research on Yokuts has been on the Yawelmani dialect. Since Stanley Newman's early research on Yawelmani in the early- and mid-20th century, virtually all research on Yokuts has been about the language's rich morphophonology. If stress is mentioned in any of these studies, it is only to give background to the language. However, no original research on stress is presented and it is "assumed" that stress is on the penultimate syllable, following both Newman and Collord.

The last couple of years have seen a proliferation of original data on the Chukchansi dialect. Two theses, Guekguezian (2011) and Martin (2011) are rich in original data, with the former about prosodic morphology and the latter a phonetic overview of the Chukchansi vowel space. Both theses follow the literature in assuming penultimate stress.

2 Explaining Chukchansi stress

2.1 Stress at the prosodic level

The prosodic, or phonological word in Chukchansi consists of strong and weak feet in which the head of the strong foot attracts primary stress. In a typical Chukchansi word, which can vary from one to five syllables, one primary stress is used while secondary and tertiary stress is presumable. However, the focus of this paper is on primary stress.

Stress in Chukchansi can be simply explained in a hierarchy in which syllables that contain a long vowel are automatically stressed over any other syllable. If no long vowel is present, the stress falls on the penultimate syllable. Though Chukchansi has a rich morphology, inflection has no effect on stress (i.e. stress is not sensitive to the language's morphology).

As mentioned above, Chukchansi distinguishes between long and short vowels. A large amount of Chukchansi words that are at least disyllabic contain one and only one long vowel. Of the words that have a long vowel, stress automatically falls on the long vowel syllable. Example (1a-c) illustrates this:

- (1) a. gosneeno'hiy /gos.'ne:.noʔ.hij/
 kitchen
- b. teesa'hi' /'te:ɬʔ.hiʔ/
 lizard
- c. boyiida' /bo.'ji:ɬʔ/
 chick

Long vowels will occur in the penultimate or antepenultimate syllables only. Of the recorded corpus, no long vowels have been found to occur in any other position outside of the penultimate or antepenultimate positions. The reasons surrounding the omission of long vowels in syllables outside the penultimate and antepenultimate will be explained below.

Following the primary ranking of long-vowel stress, penultimate stress follows. Many words in Chukchansi do not contain long vowels in which case stress automatically falls on the penultimate syllable. Example (2) below illustrates this:

- (2) kalwansa /k^h3l.'w3n.s3/
pumpkin

The fact that long vowels tend to already occur in penultimate position leads to primary stress overwhelmingly occurring on the penultimate syllable.

2.2 Antepenultimate stress

As the data in the preceding section show, primary stress is confined to mainly the penultimate syllable. So how is antepenultimate stress then accounted for? A simple explanation of Chukchansi as a quantity-sensitive language (see below) suffices. To resolve this issue, the main stress will shift to the antepenultimate, CVV syllable. Take the following, (3) and (4), as examples of antepenultimate stress:

- (3) shopeeyanaw /ʃo.'pe:je.naw/
fo ('pe:) (je.naw)
Wednesday

- (4) hihina /hi.'hi:n3/
hi ('hi:) (n3)
owl

The first syllable in (3), /ʃo/, contains one mora (μ) while the second, antepenultimate contains a long vowel (CVV) and thus contains two morae. The last bracketed foot, /je.naw/ contains two morae as each syllable is light and contains one mora.² A moraic breakdown appears below in (5) and (6):

- (5) shopeeyanaw μ('μμ)(μ)(μ)³
- (6) hihina μ('μμ)(μ)

Many APU-stressed words, however, contain penultimate and ultimate syllable structures that are CVC. Therefore it is important to briefly explain the Chukchansi syllable. According to Guekguezian (2011), CVC syllables are considered bimoraic and thus heavy. Therefore a word like *aapulkat* /'ʔ3:pul.k3t/, should moraically break down as follows:

- (7) aapulkat *(μμ)(μμ)(μμ)

However, if this were the case (that CVC syllables are indeed bimoraic and thus heavy), we would have stress clash, as the APU and PU syllables are both heavy. If this was the case (that all three syllables are indeed heavy), we would not be able to explain APU stress.

A more accurate analysis should be to consider CVV heavier than CVC since only a CVV syllable attracts stress off the penultimate syllable. This falls in line with the *Khalkha* criterion (Gordon 1999a) that states that CVV is heavy but CVC is not.⁴ In languages like Khalkha, Telugu and Chickasaw there is a

²Though many languages (cp. Hawaiian, Fijian) treat a diphthong in a syllable as bimoraic, I suggest it be treated as monomoraic. Therefore, the only bimoraic syllable in Chukchansi is CVV (containing a long vowel). See following section.

³No extrametricality exists in Chukchansi as there appears to be no rule of consistently leaving the first (or last) syllable unfooted.

⁴According to Gordon 1999a, the Khalkha criterion is one of two main distinctions of weight in most languages. The other criterion, known as the Latin criterion, treats *both* CVV and CVC as bimoraic and heavy.

three-way hierarchy in which CVV is heaviest, followed by CVC and CV (Gordon 2002). By reexamining Chukchansi weight to make CVV heavier than CVC, we could explain the stress shift from the PU syllable to the long-vowel containing APU syllable. Therefore *aapulkat* more accurately breaks down as:

- (8) *aapulkat* (‘μμ)(μ)(μ)

The reanalysis of the Chukchansi syllable to consider CVV as the only heavy syllable explains the stress shift from the default, penultimate position to antepenultimate position. This makes Chukchansi a quantity-sensitive language.

2.3 Quantity-sensitive in Chukchansi

The data above naturally lead to the fact that Chukchansi is a quantity-sensitive language—a language in which every heavy syllable receives stress (Hayes 1985). Conversely, in this type of system, light syllables, or monomoraic syllables in Chukchansi, tend to resist stress. As noted above, no light syllable in the penultimate position is stressed if and only if a heavier (bimoraic) syllable is around.

Guekguezian lists the surface forms of Chukchansi syllables as CV(X) with “X” either being a long vowel in a CVV syllable or a coda in a CVC syllable (though not *CVVC which violates *SUPERHEAVY). Onsetless syllables and complex onsets and codas are not to be found. Onsets of course add no weight to the syllable. In stark opposition to Guekguezian (2011) I argue that codas do not add weight; in a CVC syllable the coda shares a mora with the preceding vowel.

Underlyingly, Chukchansi syllables can contain either long or short vowels. This phenomenon, as Guekguezian states, “must be shortening of an underlying long vowel to satisfy the CVX maximum, not lengthening of an underlying short vowel in an open syllable.” The violation of (or permitting of) *SUPERHEAVY would result in a *CVVC syllable and the possibility of having more than one long vowel per Chukchansi word. What logically follows is the possibility of two bimoraic, heavy CVV syllables (as a coda is not moraic)⁵ in one word, which would then result in stress clash. This could be illustrated in a hypothetical (and ungrammatical) word like (9) below:

- (9) *goobkoolo */go:b.ko:lo/
 STRESS CLASH → */μμ.μμ.μ/

Therefore, it can be argued that the shortening of underlying long vowels in closed syllables, as observed by Guekguezian, is (at least partly) due to the avoidance of *SUPERHEAVY, which could lead to two bimoraic syllables in a single word and thus stress clash.⁶

Although it appears as if diphthongs exist in Chukchansi, /aj/ /ɪw/ /ɑw/ /ew/ /ej/ /ij/, these digraphs should be analyzed as having a short-vowel rhyme as they are more accurately characterized as a (short) vowel followed by a glide consonant (making them fit a CVC syllable structure). These Chukchansi digraphs do not appear to be restricted to any syllable and often tend to monophthongize in many environments. The fact that they do not attract stress from the penultimate syllable, unlike a long vowel, and that

⁵Though Guekguezian considers *CVVC in Chukchansi as violating the bimoraic syllable maximum, I consider syllable nuclei and not codas as projecting morae. Though codas can project morae, it is only in cases where long vowels are *not* present. It is (controversially) claimed that certain dialects of Dutch ignore vowel length for weight purposes. However, it is also claimed that the long vowels in question are not actually long, but tensed (van Oostendorp 2000). Furthermore, Archangeli (1991) and Zoll (1993), both consider morae to dominate only vowels and not codas in Yawelmani, a much-studied Yokuts language.

⁶This claim is subjectively stated as it is possible that in this hypothetical situation, in which CVVC is permitted in Chukchansi, that a CVVC syllable surfaces in a word without another heavy (i.e. bimoraic) syllable, thus avoiding stress clash (cp. */go:b.lo/). In fact, a couple of words have been elicited that are indeed CVVC: [ʃi:f.wɪ.lɪt] “was embarrassed” and [mɜ:l.deʔ] “sticks tongue out” (Guekguezian 2011). Note that only one long vowel appears in each word, however.

they fit a typical CVC syllable structure are reasons to be considered oblivious to stress. Furthermore, many examples exist of words that contain both CVV syllables and CVC syllables (-VC being a diagraph) as in *shopeeyanaw* /ʃo.ˈpeː.je.məw/, *sawaadanaw* /sɜː.wɜː.dɜː.nəw/ and *yukʻshuushaʻhiy* /jukʻ.ˈfuː.ʃɜː.hij/. In these words, stress is on the heavy, long-vowel syllable. Therefore, Chukchansi syllable weight can finally be summarized in the following table:

Table 3: Syllable weight

	Morae	Example	Moraic structure
CVV	μμ	<i>yaate</i> /ˈjɜː.te/	/ˈμμ.μ/
CVC	μ	<i>yukshut</i> /ˈjuk.fut/	/ˈμ.μ/
CV	μ	<i>kʻebesh</i> /ˈkʻe.bes/	/ˈμ.μ/

The preceding table illustrates the moraic breakdown of each Chukchansi syllable. As mentioned above, diphthongs do not appear to exist in Chukchansi. The digraphs /aj/ /ɪw/ /əw/ /ew/ /ej/ /ij/ should be analyzed as -VC syllables and therefore light.

2.4 Native speaker intuition

Native speaker intuition is highly valuable in studies of stress. During two separate recording sessions, one of the two informants was asked about her intuition of stress placement. After she was given a fundamental definition of stress and how native speakers of a language “figure out” stress by way of a certain technique (i.e. pencil tapping), she proceeded to confirm the above findings. Out of a total of 21 common Chukchansi words tested (as opposed to “test words” discussed below), she correctly identified the stress in all 21 words.

Another native speaker intuition task involved the repetition of authentic Chukchansi words by a non-Chukchansi speaker (myself). The words were spoken with stress on different syllables and the native speaker was asked to determine which token sounded more “native” or “accurate.” The words in this task are listed in the Table 4:

Table 4: Authentic Chukchansi test words

Test word	Spoken Tokens	
aabula	/ˈɜː.bu.lɜ/	✓
	/ɜː.ˈbu.lɜ/	
	/ɜː.bu.ˈlɜ/	
baabas	/ˈbɜː.bɜs/	✓
	/bɜː.ˈbɜs/	
nopol	/ˈno.pop/	✓
	/no.ˈpop/	
sawaadanaw	/sɜː.ˈwɜː.dɜ.nəw/	✓
	/sɜː.wɜː.ˈdɜ.nəw/	
	/sɜː.wɜː.dɜ.ˈnəw/	

The checkmarks (✓) represents the token selected by the native speaker as being the most “native” or “accurate” sounding. Each token selected by the native speaker was the token with correct stress (i.e. stress on the PU syllable or APU that contains a long vowel).

It is important to note that even though a non-Chukchansi speaker spoke each word, the phonology of each word was accurate (i.e. Chukchansi phonemes that conformed to Chukchansi syllable structures (CV, CVC, or CVV) see above). Furthermore each token of each word was produced (and thus heard) twice. When requested by the native speaker, the tokens were replayed.

However, the most concrete evidence comes from the “test words” utilized during the second session. Twelve words were created that either conformed to Chukchansi phonology or did not. The words that did not conform to Chukchansi phonology, which are marked by an asterisk, included long vowels in syllables outside the antepenultimate or penultimate syllables. The words are included in the following table:

Table 5: Fictional Chukchansi test words

Test word	Speaker approximation
*aabadoxbu	/ʔ3.b3.'dox.bu/
beebeshuto	/bi.bes.'hu.to/
shatoo	/ʔ3:tu/
xooshutoshu	/xo:tu.so:fu ⁷ /
kokoko	/ko.'ko.ko/
shashusha	/ʔ3.'fu.ʔ3/
sumsutu	/sum.'su.tu/
tatata	/t3.'t3.t3/
shufaadi	/su.'f3:di/
baababa	/b3.'b3.b3/ ⁸
shafuda	/s3.'fu.d3/
shafida	/ʔ3.'fi.d3/

A quick look at the speaker approximations shows that the phonology in the test words, when in contrast to the speaker’s native phonology, was violated. The long vowels in the words *aabadoxbu, *beebeshuto and *shatoo are all in violation as they exist outside the PU or APU syllables. When approximated, the long vowels were either shortened, as in /ʔ3.b3.'dox.bu/ and /bi.bes.'hu.to/, or metathesized as in /ʔ3:tu/. These three approximations all conform to Chukchansi phonology discussed in this chapter. These three examples, plus the example of *xooshutoshu*, clearly illustrate the aforementioned violation of long vowels in any syllable outside of the PU or APU. Unsurprisingly, but extremely important for the current study, stress was either on the CVV syllables or the PU syllables for each approximation as the transcriptions show.

The non-asterisked words all conform to Chukchansi phonology. The reason for their inclusion is simple; to test which syllable would be stressed when the words were approximated. Again unsurprisingly the non-asterisked test words provide solid evidence of the two-step hierarchy of stress mentioned in this chapter. With a couple of minor (and unimportant) phonetic differences in *shufaadi* and *shafuda* (/s/ for /ʃ/), stress is either on the CVV or the PU syllable.

Also of note is the vowel lengthening of the PU /u/ in /s3.'fu.d3/. However it is important to show that the final vowel is not lengthened. This example could be indicative of the overwhelming tendency to stress a PU syllable (i.e. a stress “overextension”).

⁷The speaker had great difficulty with this word. It was effectively produced as two separate words, i.e. a large break was taken between the 2nd and 3rd syllables. This explains why the transcription above illustrates two long vowels in a word. A more accurate way to transcribe what was spoken by the speaker is: /'xo:tu/ /'so:fu/. In this formalism, which more accurately represents what was spoken, Chukchansi phonology is unsurprisingly not violated.

⁸Though *baababa* conforms to standard Chukchansi phonology, the word was produced three times as /b3.'b3.b3/. A likely reason for this may simply be a misreading of the test word.

3 Conclusion

In conclusion, stress in Chukchansi can be understood as occurring defaultly on the penultimate syllable, which in the majority of words is the heaviest syllable (as the majority of long vowels surface in the penultimate syllable). Long vowels sometimes surface in the antepenultimate syllable, which would cause stress clash if fixed penultimate stress occurred. To avoid stress clash however, stress shifts to the heavy, antepenultimate syllable. Languages that are averse to stress clash, like Chukchansi are languages that are sensitive to weight. Long vowels (i.e. heavy syllables) do not occur in every Chukchansi word, but when they do, they are always stressed. No heavy vowel in a Chukchansi word is unstressed. Further evidence comes from native speaker intuition. Three separate tasks further illustrate that stress indeed obeys the two-step hierarchy discussed above.

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Tone and syllable structure in Karuk (Hokan, California)*

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Word-level prosody in Karuk incorporates both tone and stress, and the placement of prominence is sensitive to complex interactions of lexical, phonological, and morphological factors. This system has traditionally been analyzed as an accent system. In this paper, the placement of prominence in stems is shown not to be lexically conditioned by an arbitrary accentual class of the stem, but rather as being predictable and phonologically conditioned by the requirements of tone. Preliminary results of a quantitative analysis of prominence in Karuk roots are reported, which show that syllable structure is an important factor in determining placement of tone. A constraint against high tone on short closed syllables, *CVC, is proposed to capture this effect. The same parameter affecting the static distributions of tones is also shown to be active in derived contexts; contributing to the degree of stability of tone under affixation and triggering a vowel lengthening process seen with certain affixes. *CVC thus unifies and motivates seemingly arbitrary phonological rules, and results in the Karuk system being far more predictable than has previously been thought.

1 Introduction

1.1 Karuk accent as a mixed tone/stress system

Languages that do not fall neatly into the categories of prototypical tone or stress languages pose theoretical and descriptive challenges. Some of these languages, such as Karuk, have been described as having accent or pitch accent, but accent is a vague term which may be used to describe prosodic systems that are quite different from one another (Hyman 2006, 2009; Hualde 2012). Some have been characterized as simplified tone or stress systems, but this fails to capture the complexity of languages such as Karuk, a Hokan language of Northern California, where both stress and tone are present and interact in intricate ways. In this paper, a tone-driven phonological explanation is proposed which unifies several accentual patterns in Karuk that have previously required arbitrary, morpheme-specific rules.

Tone and stress are both present in Karuk, and normally coincide, making it difficult to determine which is basic. The only time they do not coincide is when a final high tone is deleted before a pause, in which case stress falls on a low-toned syllable. This phenomenon is discussed further in §5.3 below. For clarity, high tone (H) is marked with an acute accent mark, high-low falling tone (HL) with acute and grave accent marks, and except in examples demonstrating tone only, stressed syllables are underlined.

Stress is culminative and obligatory, with one stress per word, which can fall on almost any syllable of a root or affix. Examples (1a)–(1d) show that stress can fall on the first, second, third, or fourth syllable of a word.¹ Stress can also fall on the final syllable of a word, as shown in (1e). Alternations between high tone and no high tone in this word represent intonational phrase-medial vs. intonational phrase-final pronunciations.

*Acknowledgements: I thank Andrew Garrett, Larry Hyman, and Sharon Inkelas for their guidance, suggestions, and insightful comments. All errors are my own. I am grateful to all the Karuk language teachers, especially Vina Smith and Lucille Albers, and the UC Berkeley Karuk Dictionary and Texts group for the recent Karuk data.

¹The practical Karuk orthography is used throughout, except for transcription of accent. /ʔ/ is transcribed as <'>, /θ/ as <th>, /ʃ/ as <sh>, /tʃ/ as <ch>, and long vowels as a doubled vowel. Following Crowhurst and Macaulay (2007), tone is transcribed on both orthographic vowels of a long vowel for clarity (á and áá for H, on short and long vowels, respectively, and áà for HL).

- (1) a. *thúkinkunish* 'blue, green, yellow'
 b. *yupsítanach* 'baby'
 c. *suvaxráxar* 'drying rack'
 d. *kuyrakiníykih* 'eight'
 e. *kunpííp* ~ *kunpiip* 'they say'

High (H) and high-low falling (HL) tones contrast on long vowels in stressed syllables. Word pairs showing examples of surface H and HL contrasts on non-final syllables are given in (2)–(3). Example (4) shows the contrast between what I assume here are underlying H and HL tones in words with final prominence. The level high in the word for 'rat' in (4a) is deleted at the right edge of an intonational phrase, but the falling high for the word for 'oak bark' in (4b) is not deleted.

- (2) a. *púúfich* 'deer'
 b. *púùvish* 'bag'
- (3) a. *áápunma* 'know'
 b. *áànaxus* 'weasel'
- (4) a. *achnáát* ~ *achnaat* 'rat'
 b. *ahtúùn* 'oak bark'

Stem accentuation is affected in non-uniform ways by various affixal morphology, resulting in extraordinarily complex derivations of surface tone placement. Examples of tones shifting are given in (5)–(6).

- (5) a. *imnísh* 'to cook'
 b. → *imníúsh-tih* 'to be cooking'
 c. → *ú-mniish-tih* 'he is cooking'
- (6) a. *imnísh* 'to cook'
 b. → *imníúsh-tih* 'to be cooking'
 c. → *imniish-tíh-at* 'was cooking'
 d. → *u-mniish-tíh-at* 'he was cooking'

Examples (5)–(6) show a relatively simple example of how stem accentuation is affected in non-uniform ways by both prefixes and suffixes. Following Bright's (1957) derivations for words containing these morphemes, example (5b) and (6b) show vowel lengthening and a H tone realized on the final stem syllable before the durative suffix *-tih*. Example (5c) shows the H tone shifting one syllable to the left with the addition of the third person singular agreement prefix *u-*. Example (6c) shows that with the addition of the past tense suffix *-at*, H tone shifts one syllable to the right to the final stem syllable before the suffix *-at*. However, when the third person singular prefix *u-* is added to this stem, in (6d), there is no leftward shift of H tone.

Verbs and verbal suffixes are focused on here, and an overview of numbers of roots and affixes is provided in Table 1 to give the reader a sense of the complexity of the system.

Table 1: Overview of Karuk verbal system

Verb Roots	1- σ	85
	2- σ	379
	3- σ +	312
Affix Positions	Suffixes	Approx. 12
	Prefixes	2 plus proclitics
Affixes	Suffixes	over 80
	Prefixes	21

1.2 Previous analyses

Karuk’s prosodic system was meticulously described by Bright (1957) in accentual terms, and was more recently characterized in terms of tone and stress (Macaulay 1990; Crowhurst and Macaulay 2007), but it has so far defied a comprehensive analysis. Under Bright’s system, an extensive list of seemingly arbitrary rules is required to define the environments where different processes are active. The current work builds on Crowhurst and Macaulay (2007), which breaks accent down into tone and stress, and seeks to find generalizations that make the system more predictable. Crowhurst and Macaulay (2007) did not address the role of coda consonants, which are found to be key in the current analysis.

1.3 Proposal

This paper makes two points of relevance to the study of mixed tone and stress prosodic systems. On one hand, it is shown that an extraordinarily complex system of affixes with a myriad of prosodic effects, such as that of Karuk, can be reanalyzed in typologically familiar terms from the study of accent (i.e., ‘strong’ and ‘weak’ affix classes). On the other hand, it is shown that the variable effects of an affix on different stems in this system are best analyzed *not* as lexically conditioned by an arbitrary accentual class of the stem, but rather as being predictable and phonologically conditioned by the requirements of tone. This second point makes this analysis quite different from classical analyses of ‘accent systems’.

I claim that tone in Karuk is partially predictable based on syllable structure.² A constraint against H tone on closed syllables with a short vowel is proposed: $*(C)\acute{V}C$. This constraint accounts for a number of seemingly disparate patterns, including skewed tone distributions in roots, stability of tone under affixation, and affix-triggered vowel lengthening. It is shown that this constraint is active in different domains (roots, derivational morphology), and provides coherent phonological motivations for some of the patterns which have previously required diacritics. Interactions with several other factors make the $*(C)\acute{V}C$ constraint rarely surface-apparent. These include the fact that this structure is found in roots, the constraint’s interaction with preferred tone-foot alignment, and opacity created by surface gemination.³ It is further claimed that a bimoraic foot with an associated H-L melody is important in Karuk, a new foot type not

²Syllabification of words here assumes Bright’s characterization of the Karuk syllable: “Any consonant plus an immediately following vowel, plus any immediately following consonant that is *not* immediately followed by a vowel, constitute a syllable. In other words, Karok speech may be divided into units of the pattern CV(C)” (Bright 1957:11). Bright notes that syllables of the form CCV(C) also occur, in the context of initial vowel deletion, and that there are some loan words with unusual syllable structures, but that these are not treated any differently by the grammar than more typical syllables. V(C) syllables are also clearly possible word-initially in Karuk, but do not otherwise occur. Therefore, whenever there is a VCV sequence, I assume it is syllabified V.CV, and whenever there is a VCCV sequence, I assume it is syllabified VC.CV. The sequence V.V is never found.

³Consonants (other than the non-geminable consonants /h, ’, v, r, y/) are automatically geminated medially in most roots, and in certain morpheme-initial configurations (see Bright 1957:9–10, 17–18, and 51 for more details). Gemination is not written in the practical orthography.

previously proposed for this language.

1.4 Outline of paper

Sources of data for the current analysis are given in §2. A brief overview of Karuk prosodic phonology is given in §3. The tonal constraint $*(C)\acute{V}C$ is discussed in §4. In §5, evidence from non-derived contexts for the proposed constraint is provided, in particular, it is claimed that a skewed distribution of tone in verb roots can be attributed to avoidance of H on initial (C)VCs. Section §6 provides evidence from two derived contexts for the proposed constraint. It is claimed that $*(C)\acute{V}C$ interacts with tone-foot alignment constraints to determine which stems react to tone-moving processes, and that vowel lengthening is a repair for a stem-final derived H on (C)VC syllables. Conclusions are given in §7.

2 Data sources and methods

The current work combines phonological analysis based on Bright's descriptions of accentuation and accentual shifts with a distributional analysis of a database of Karuk words. The quantitative data come from a 3368 lexical item database created by the author, drawn from the xml source file of the online Karuk dictionary,⁴ representing the electronic version of the Karuk Dictionary (Bright and Gehr 2005). Karuk words included in the online dictionary from sources other than Bright's (1957) grammar were not included in the current version of the database. Descriptions of phenomena analyzed here are all based on those in Bright (1957).

The reasons for basing the current analysis on the previous phonetic descriptions are threefold. Bright was able to work with a greater number of speakers and more fluent speakers than is possible today, and it seems probable that present-day speakers have had some level of change in the accent system in their speech, either due to attrition, English interference, or both. It is essential in the context of language attrition to describe the prosodic system in its fullest possible version. Secondly, it is clear from Bright's descriptions that he was not, in fact, conflating intonation, pitch, stress, and/or vowel length, a common source of inaccuracies in transcriptions of prosody. Finally, there are few useful recordings from Bright's time. Nonetheless, additional phonetic analysis of recorded material will certainly prove useful in future work.

Where possible, Bright's descriptions of tone and stress in Karuk have been confirmed with analysis of modern phonetic data. Modern data comes from the Karuk Dictionary and Texts project at UC Berkeley and are also available on the online Karuk Dictionary and Texts website.

3 Representation of tone and stress

3.1 Overview of Karuk tone and stress

Tone and stress have an impoverished distribution in Karuk. Each word follows the pattern of a span of H tone followed by a span of L tone, as shown in the simplified schema in (7), although the entire pattern is not always realized on very short words.



The drop represents either a HL tone or a H tone followed by a L on the next syllable. HL is only possible on long vowels,⁵ while H occurs on both short and long vowels. The placement of this tone is generally unpredictable overall, but I will show that it is actually predictable in a number of contexts.

⁴Karuk Dictionary and Texts, <http://linguistics.berkeley.edu/~karuk/>

⁵There are two exceptions, both English loan words: *fīsh* 'fish' and *prāms* 'plums'.

Each word bears exactly one stress, which coincides with the syllable containing the tone-bearing mora (at the right edge of the H span), when present. Thus stress marks the surface contrastive tone in the word.

3.2 Representation of tone

Every Karuk word has a single underlying H tone. By default, a L tone is supplied immediately following every H, when possible. I follow Macaulay (1990) in representing both H and HL surface tones with an underlying H tone linked to a single mora underlyingly. Macaulay's schema is reproduced here in (8), with the current tone terminology.

(8)	a. HL	b. H (UR)		c. H (surface)
	long vowel	long vowel	short vowel	long vowel short vowel
	H	H	H	H H
				^
	μ μ	μ μ	μ	μ μ μ
	∨	∨		∨
	V	V	V	V V

A HL long vowel has a H tone linked to its first mora, and the L on the second mora is supplied by rule. A H long vowel has a H tone linked to its second mora, and the H spreads leftward by rule, creating a level H over the entire syllable. The leftward H tone spreading rule is needed independently in Karuk to account for H tones on syllables to the left of a stressed H in longer words. Underlyingly toneless, short vowels in word-initial syllables surface as L due to a word-level boundary L tone. Long vowels in word-initial syllables are not affected. Syllables following the syllable containing the H tone receive L tone by default.⁶

I diverge from previous researchers in analyzing a final prominence that surfaces as alternating H~L as a final H tone. Before pause, a right edge phrasal boundary L tone can cause a word-final H to delete. Only a very few words with final prominence display a non-alternating final H; I consider these to be lexical exceptions. The vast majority of words with final prominence show the alternation. Issues in representing tone in words with final prominence is beyond the scope of this paper.

3.3 Representation of stress

Because H and HL contrast on stressed syllables, tone must be lexically specified, and because stress predictably coincides with tone, there is no need for it to be lexically specified. Stress coincides with any syllable containing a realized lexical H tone (including a HL syllable). Assignment of stress is assumed not to occur until the post-lexical level, because when a final H is deleted due to a phrasal boundary L, default stress assignment occurs. According to Bright (1957:13), if no surface H is present, stress falls on a long vowel, when present,⁷ otherwise on the rightmost syllable. This raises the interesting question of whether stress or tone is basic, however, this question is left to future research.

⁶See Bright (1957:11–13, 52–55) for details of phonetic realizations of pitch on stressed and unstressed syllables.

⁷No words with more than one long vowel are found without H tone.

4 Tonal constraints

While a $*(C)\acute{V}C$ constraint in particular has not been seen before, some precedence for avoidance of tone on a closed syllable exists. Gordon (1999) makes a distinction between a type of syllable weight that attracts stress, based on total energy, and a type of syllable weight that attracts tone, that crucially depends on sonorant energy. This distinction could account for a CV syllable being a better target for tone than a CVC syllable. In a typological study of contour tones, Zhang (2001) finds that in some Chinese dialects CV syllables can bear more tonal contrasts than CVC syllables.

In Karuk, the categorical restriction limiting surface contour tones to syllables with long vowels is readily explained by a representation in which long vowels have two moras, either of which can have a H tone linked to it. However, a more gradient representation of syllable weight than that of moras is also needed in Karuk. A gradient restriction causes high tones to be attracted to rimes which are relatively longer than others, though at a sub-moraic level. It is gradient because there is a hierarchy of rime length, as shown in (9), which interacts with other constraints on tone placement. In this hierarchy, a CV syllable is a better tone bearing unit than a CVC syllable, and because it has the greatest sonorant energy, a CVV syllable is the best tone bearing unit.

$$(9) \quad (C)V\acute{V}(C) \succ (C)V \succ (C)VC$$

The harmonic scale in (9) gives us a corresponding constraint ranking in (10), of which only the highest ranked constraint is active in the phenomena discussed here.

$$(10) \quad *(C)\acute{V}C \gg *(C)\acute{V} \gg *(C)\acute{V}\acute{V}(C)$$

A general constraint for avoidance of a high tone on a closed short syllable is given in (11a). This constraint can be seen to be active, though not extremely highly ranked, throughout the grammar. A more specific ban on H on (C)VC syllables is also needed, given in (11b), for word-initial syllables. It is apparent that this constraint is active in roots.

- (11)a. $*(C)\acute{V}C$
A (C)VC syllable cannot bear H tone.
- b. $*\#(C)\acute{V}C$
A word-initial (C)VC syllable cannot bear H tone.

5 Evidence from non-derived contexts

As shown in (1) above, placement of prominence in Karuk roots can contrast. Crowhurst and Macaulay (2007) demonstrate some systematicity in placement of tone in roots, but require lexical tone in many cases. This section focuses on one additional salient generalization that can be made regarding the placement of tone in roots, and provides a constraint-based analysis of the pattern.

5.1 Skewed distributions of tone

Two facts are particularly striking about the distribution of prominence in Karuk roots. First, in disyllabic roots, final prominence is more common than initial prominence, while in longer roots there is a marked avoidance of final prominence. Final prominence is rare in roots of three syllables with all short vowels, and never occurs in longer roots (i.e., never in roots of four moras or more).⁸ Second, in disyllables with two short vowels, whether the first syllable is open or closed is important in determining where

⁸Generalizations are based on my analysis of a database created from the online Karuk dictionary.

prominence falls. Both of these distributional anomalies are accounted for by the constraint against H tone on closed syllables with short vowels introduced above, in conjunction with other common constraints.

Disyllabic verb roots with short vowels are focused on here because these are very numerous and show the greatest skewing.⁹ In Table 2, the distributions of tone in disyllabic words are broken down by syllable structure.

Table 2: Distribution of tone in disyllabic verb roots with short vowels

Shape of 1st syllable	Syllable with tone	
	1st	2nd
Open	94	17
Closed	0	187

When verbs are sorted by syllable structure as in Table 2, a pattern becomes apparent: the placement of prominence in these verbs is highly dependent on whether the first syllable is open or closed. If the first syllable is open, high tone is more likely to fall on the first syllable, as in example (12a), than on the second, as in example (12b). If the first syllable is closed, as in example (13), high tone never falls on the first syllable. Closed syllables are quite common in Karuk, and many more words included in the counts in Table 2 have a closed final syllable than an open one. The presence or absence of this final consonant, however, does not seem to affect placement of tone.

- (12)a. *cháfich* ‘gnaw meat from’
 b. *chifích* ‘defeat’
- (13) *tathríp* ‘strain out (soaked acorns)’

Overall, the skewing is too great to be due to chance. In this section, an optimality theoretic account is proposed which accounts for this skewed distribution of prominence, assuming three possible tonal inputs (disyllables may be underlyingly toneless or have a H tone linked to any one mora), and an interaction between a ban on H on initial (C)VCs, a ban on H on final moras, and tone faithfulness.

5.2 Avoidance of initial H tone

As shown in Table 2, initial prominence on a (C)VC syllable is avoided categorically. For the reasons discussed in §4, it is better to analyze this avoidance as a constraint against H tone, rather than stress, on this syllable type. There is more motivation for tone than stress to be preferentially attracted to a (C)V syllable over a (C)VC syllable, and there is no metrical or syllable-weight based explanation for stress to be avoided on syllables of this shape.

Based on disyllabic roots only, it is impossible to tell whether this is due to a ban on H tone on (C)VC syllables in general, from which word-final syllables are exempt for some reason, or whether it is due to a ban on word-initial (C)VC syllables specifically. Longer roots provide evidence that H tone is avoided on word-initial (C)VCs in particular. Word-initial H on (C)VC syllables is vanishingly rare in Karuk. Not including disyllables, out of 313 roots beginning with (C)VC, only 9 have initial H tone (listed exhaustively in 14). Many of these are proper nouns which might be more likely to have atypical prosody. This indicates that H on initial (C)VC syllables is generally avoided in Karuk.

⁹There are comparatively few disyllabic roots containing long vowels (less than 100), which show some tendency for tone and stress to fall on the long vowel, but not categorically so. In these roots and in longer roots, the avoidance of high tone on CVC syllables is less pronounced than in disyllables, but this could be due to many apparent roots actually being morphologically complex but lexicalized to some degree.

- (14)a. *ásneepirax* 'woman's name'
 b. *chánhaayfur* 'exclamation of Coyote'
 c. *ímpaha* 'to decide'
 d. *tánmaha* 'to owe'
 e. *tínxuumnipaa* 'placename'
 f. *tháthriinaa* '(two filled containers) to sit'
 g. *xútnahich* 'thin (as of fabric)'
 h. *yúxtuuyruk* 'placename'
 i. *yúxtuuyrup* 'placename'

H on word-medial (C)VC syllables is much more common than H on initial (C)VCs, although not as common as H on open syllables. For comparison, several examples (not exhaustive) of H on word-medial (C)VC syllables are given in (15). This shows that the avoidance of H on initial (C)VC syllables, specifically, is behind the pattern in disyllables, even if, as I show in §6, a more general avoidance of H on (C)VC syllables is active in Karuk phonology. If the avoidance were not limited to the initial syllable, it would also be necessary to explain why a H tone on a final closed syllable is possible while a H tone on an initial closed syllable is not.

- (15)a. *furáthfip* 'to be nervous, cranky, fretful'
 b. *patányish* 'to ask a question (of someone)'
 c. *pathúvriin* 'to measure strings of dentalia'
 d. *pithvúyram* 'to meet, assemble'
 e. *suváxrah* 'to spread out to dry'
 f. *tarúprav* 'to lace'
 g. *thapáxrah* 'to be very thirsty'
 h. *tharámpuk* 'to cook acorn soup'
 i. *thaxústay* 'to suspect'

5.3 Avoidance of final H tone

In addition to the avoidance of initial prominence in specific syllable structures, there is also avoidance of final prominence in Karuk. This avoidance is more general, and not limited to any particular syllable structure. Note that in the words with open first syllables in Table 2, 97 have prominence on the first syllable, and only 17 have prominence on the second syllable. This asymmetry cannot be attributed to the shape of the second syllable in these roots; most are closed in both groups. As mentioned above, final H is extremely rare in roots greater than two syllables. Furthermore, from a close inspection of Bright's description of accentual effects of derivative suffixes (see Appendix A), it is clear that final H never occurs in derived stems.

In principle, the static pattern of avoidance of final prominence in root forms could be either stress-driven or tone-driven. Evidence that it should be considered tone-driven comes from the default stress pattern in Karuk. A word with a final H tone, such as *umáh* in (16a) and *u'úúm* in (17a), surfaces without that H tone at the end of an intonational phrase. When this happens, stress defaults either to the final syllable of the word, as in (16b), or to a long vowel, when present, as in (17b) and *uumi* in (17c) (2)f.][12–13, 57]Bright:1957.

- (16)a. kári xás káán umáh akvaat ...
 then then there 3s(>3)-see raccoon
 ‘And there he saw raccoons...’ (source: WB_KL-05)
- b. kári xás umah
 then then 3s(>3)-see
 ‘And he saw her.’ (source: WB_KL-62)
- (17)a. xás pakáán u’úúm yánava vúra áhtaay má’ninay ...
 then NOMZ-there 3s(>3)-arrive EVID INTS fire-much high.mountain.country
 ‘And when he got there, he saw lots of fire in the mountains...’ (source: WB_KL-10)
- b. xás u’uum.
 then 3s(>3)-arrive
 ‘She arrived.’ (source: JPH_PHM-24-343a)
- c. ... îkam kúúk uumi!
 outdoors to.there arrive-IMPER
 ‘... go outdoors!’ (source: WB_KL-61)

The position of stress in toneless words with all short vowels indicates that the default position for stress is rightmost, not penultimate. The position of stress in toneless words containing a long vowel shows that stress is weight sensitive. If the default position for stress is rightmost, then the avoidance of this position must be driven by requirements of tone. Further support for avoidance of final prominence being tone-driven comes from the fact that stress is predictable based on tone in Karuk (stress always coincides with the tone-bearing syllable), but tone is not predictable based on stress in (a stressed long vowel can have either surface HL or H tone). Additionally, in words longer than two syllables, HL tone is found on final long vowels while H tone is not, meaning that it is not prominence on the final syllable *per se* that is problematic, but rather a H tone linked to the final mora of a word.

I analyze the avoidance of final prominence in Karuk as tone-driven non-finality. It would also be possible to refer to footing here (for instance, to require H tone to associate with the head of a trochaic foot), but it is not necessary.

5.4 Evidence for lexical H tone

There are three logical possibilities for underlying representations for words with two short vowels: a lexical H tone could be linked to either syllable, or a default tone could be assigned. I assume that two lexical H tones would be impossible, due to the Obligatory Contour Principle.

Words with identical syllable structures, such as those seen in example (12), can have two different tonal patterns, H-L and L-H. Since it is only possible for one of these patterns to be a default, at least one of them must be the result of a lexical tone. I assume that words which follow the minority pattern L-H, as in (12b), have lexical tone associated with the second syllable, while those receiving default tone follow the majority pattern, H-L.

5.5 Constraints

Ban on H on initial (C)VC syllables To account for the avoidance of initial prominence in disyllabic roots, a specific *#(C)VC constraint is used. The constraint from (11b) above is repeated here in (18). This constraint must be highly ranked because there is an absolute ban on initial CVC syllables in disyllabic roots.

- (18) *#(C)VC
 A word-initial (C)VC syllable cannot bear H tone.

Ban on Final H In disyllabic roots which do *not* have an initial CVC syllable, there is a tendency to avoid final prominence. Therefore, a constraint against final prominence is required to counterbalance the constraint against initial prominence. To account for avoidance of final prominence, a NON-FINALITY(TONE) constraint (abbreviated as NON-FIN(T)), given in (19), is employed. NON-FIN(T) must be ranked below $*\#(C)\acute{V}C$, as it is violated in all disyllabic roots with a closed initial syllable.

(19) NON-FIN(T, μ , ω)

A tone T must not fall on the final mora of a prosodic word (after Hyde 2007).

NON-FIN(T) in effect requires a H to be followed by a L, because a L is supplied by default following a H tone.

Preserve Lexical H The tendency against final prominence in words with an open initial syllable is strong but not absolute. Therefore, there must be another constraint ranked above NON-FIN(T), which allows for final prominence in some of the words with an open initial syllable. I analyze the words with an open initial syllable and final prominence as having a lexically associated tone on their final mora. The identity constraint in (20) outranks NON-FIN(T) and ensures that a lexically associated tone is preserved in the output.

(20) IDENT-ASSOC(T)

If there is an association between x and tone T in the input, then there is an association between x' and T' in the output, where x' and T' are the correspondents of x and T respectively (de Lacy 2002).

Assuming Richness of the Base, initial H on CVC is avoided even for an input with a lexically associated tone on the first mora. Therefore, the faithfulness constraint in (20) must be ranked below $*\#(C)\acute{V}C$.

One Prominence Per Word Every word bears stress and one high tone (assuming that the process switching words with final H to L when they occur before pause is a late one). Stress always falls on the rightmost syllable linked to a high tone. I will assume therefore that there are highly ranked constraints requiring each grammatical word to be a prosodic word, and aligning the prosodic head with a (rightmost) H.

5.6 Constraint ranking

Tableaux are given in (21)–(22) that illustrate the interactions of the constraints given in (18)–(20) using representative Karuk words of each shape. Not shown are undominated constraints requiring one H tone and one stress per word, and stress alignment constraints that ensure stress aligns with H tone.

For a disyllabic word with an open first syllable, two outcomes are seen in the data, initial H tone and final H tone. There are two possible inputs that would result in a surface form with initial H tone, such as *cháfich*. The tableau in (21a) shows that a H tone associated with the first syllable in the input must be retained in the output. The tableau in (21b) shows that an input with no lexically associated tones would also result in an initial H, since a final H would violate NON-FIN(T). Only one possible input would result in final H tone in a word with this shape, such as *chífich*. The tableau in (21c) shows that a H tone associated with the final syllable in the input must be retained in the output, violating NON-FIN(T).

(21) Sample Tableaux for CV.CVC Word

a.	/chafich/ H	*#(C)VC	IDENT-ASSOC(T)	NON-FIN(T)
a.	☞ cháfich			
b.	chafí <u>ch</u>		*!	*

b.	/chafich/ H	*#(C)VC	IDENT-ASSOC(T)	NON-FIN(T)
a.	☞ cháfich			
b.	chafí <u>ch</u>			*!

c.	/chifich/ H	*#(C)VC	IDENT-ASSOC(T)	NON-FIN(T)
a.	chífich		*!	
b.	☞ chifí <u>ch</u>			*

This provides the partial ranking IDENT-ASSOC(T) $\gg$ NON-FIN(T), because if NON-FIN(T) were ranked above IDENT-ASSOC(T), final H tone would never surface in a word of this form, and *chifich* would come out as **chífich*.

For a disyllabic word with a closed first syllable, there should be only one possible outcome, final H tone. The tableaux in (22) show that with this constraint ranking, all three possible inputs would result in a surface form with final H tone, such as *tathríp*. The tableau in (22a) shows that a H tone associated with the first syllable in the input is not retained in the output because it violates *#(C)VC. The tableau in (22b) shows that a H tone associated with the second syllable in the input is retained. The tableau in (22c) shows that an input with no lexically associated tones would also result in a final H, since an initial H would violate *#(C)VC.

(22) Sample Tableaux for CVC.CVC Word

a.	/tathrip/ H	*#(C)VC	IDENT-ASSOC(T)	NON-FIN(T)
a.	táthrip	*!		
b.	☞ tathrí <u>p</u>		*	*

b.	/tathrip/ H	*#(C)VC	IDENT-ASSOC(T)	NON-FIN(T)
a.	táthrip	*!	*	
b.	☞ tathrí <u>p</u>			*

c.

/tathrip/	*#(C)VC	IDENT-ASSOC(T)	NON-FIN(T)
a. <u>tá</u> thrip	*!		
b. tath <u>ríp</u>			*

*#(C)VC must outrank IDENT-ASSOC(T), because if *(C)VC were ranked below IDENT-ASSOC(T), an input with a lexical tone on the first syllable would come out as **táthrip*. *(C)VC (and a constraint requiring each word bear a H tone) must outrank NON-FIN(T), otherwise final H tone would never surface. The full constraint ranking is given in (23). This ranking reflects a situation in which an initial H tone is worse than faithfulness to a lexical tone, and while a final tone is also dispreferred, it is better to be faithful to a lexical tone than to avoid a final tone.

(23) *(C)VC ≫ IDENT-ASSOC(T) ≫ NON-FIN(T)

5.7 Summary

The chart in (24) summarizes the outputs of this constraint ranking for each of the three possible inputs for a word with two moras: lexical high tone associated with the first mora, lexical high tone associated with the second mora, and no lexical tones.

(24)

Underlying Tone	(C)V.CV(C)	(C)VC.CV(C)
a. $\begin{bmatrix} \mu & \mu \end{bmatrix}_w$ H	<u>H</u> -L	L- <u>H</u>
b. $\begin{bmatrix} \mu & \mu \end{bmatrix}_w$ H	L- <u>H</u>	L- <u>H</u>
c. $\begin{bmatrix} \mu & \mu \end{bmatrix}_w$	<u>H</u> -L	L- <u>H</u>

For a (C)V.CV(C) word, there are two ways to get the H-L pattern (a lexical H on the first syllable and the default), and one way to get the L-H pattern (a lexical H on the second syllable). For a (C)VC.CV(C) word, only the L-H pattern is possible with either lexical H or the default. Assuming some number each of words with lexical tone associations to the first and second syllables, and a default class where tone is assigned to the most harmonic position, the constraint ranking in (23) correctly predicts one possible outcome for (C)VC.CV(C) roots, and two for (C)V.CV(C) roots, with one being more likely than the other. The distributions seen in Table 2 are not only possible, but quite numerically plausible under this analysis.

The skewed patterns of tone distribution in disyllabic words with short vowels, then, can be seen as a manifestation of a more general ban on word-initial CVC syllables active in Karuk (*#CVC). The constraint ranking in this section can also be extended to explain why final prominence is so common in disyllables and so rare in longer words. Final prominence occurs in disyllabic words only to avoid initial prominence. In longer words, final prominence can be avoided without violating *(C)VC by having prominence fall on some other medial syllable.

6 Evidence from derived contexts

6.1 Focus of analysis

In this section, further evidence for avoidance of H on (C)VC syllables is demonstrated by the mobility of stem tone under affixation and a vowel lengthening process sometimes triggered by affixation.

I group Karuk suffixes into three classes based on the possible types of effect they have on the tone of the stem they attach to:

1. *Tone-neutral*: No effect on input tone in any stem
2. *Strong*: Impose tone, erasing any previous tone on input
3. *Weak*: Interact with input tone¹⁰

There is no obvious correlation between these classes of affix and morpheme order. There are few tone-neutral suffixes, but they include both inner and outer suffixes. No strong suffixes are found among the outermost suffixes. Weak suffixes are the most common and occur in all positions in the verb stem.

Tone-neutral suffixes have no effect on the tone of any stem they attach to, as shown in example (25).

- (25)a. *chúúpha* ‘to talk’ + *-naa* PLURAL → *chúúphinaa* ‘(plural) to talk’
b. *ihéèra* ‘to smoke’ + *-naa* PLURAL → *ihéèranaa* ‘(plural) to smoke’
(source: Bright 1957, p. 112)

Strong suffixes affect input stems with any tone and shape the same way. For verbal suffixes, they assign a H tone to the (first syllable of the) suffix, or to the syllable preceding the suffix. An example of a strong suffix which always receives H tone on its first syllable is given in (26). Note that it will even erase a HL tone which, as will be seen below, is normally a very stable tone.

- (26)a. *ikyáv* ‘to make’ + *-tánmah* ‘for nothing, for no reason’ →
ikyaatánmah ‘to make for nothing’
b. *éèh* ‘to give’ + *-tánmah* ‘for nothing, for no reason’ →
eehtánmah ‘to give for nothing, gratis’
(source: Bright 1957, p. 110)

Weak suffixes normally shift stem tone rightward within the stem they attach to (if tone is already on the rightmost stem syllable, it will not shift further right onto the suffix triggering the shift). Examples are shown in (27).

- (27)a. *ikríviki* ‘to sit on’ + *-tih* DURATIVE → *ikrivíritih* ‘to be sitting on’
(source: Bright 1957, p. 48)
b. *chúúpha* ‘to talk’ + *-tih* DURATIVE → *chuuphítih* ‘to be talking’
(source: LA-VS-01, CT-01)

¹⁰My tone-neutral class includes Bright’s Zero accentuation class as well as the suffixes he describes as having no effect on accentuation. My strong class includes Bright’s Suffixal, Presuffixal, and Pre-presuffixal accentuation classes. My weak class includes Bright’s Progressive, Modified Progressive, and Special Progressive classes. The terms ‘strong’ and ‘weak’ are not intended to align exactly with traditional notions of accent categories of strong/weak and dominant/recessive (e.g. Czaykowska-Higgins 1993; Kiparsky 1973). I do not use the term ‘recessive’ to avoid confusion with Bright’s category ‘Recessive accentuation’ which contrasts with ‘Progressive accentuation’, and refers to processes that typically move tone leftward. See Appendix A for a list of suffixes by class.

However, weak suffixes display irregularities in their effects, depending on the stem they are affixed to. When a suffix of this class is attached to certain stems, a vowel lengthening process is triggered in addition to the tone shift, as can be seen in the final stem syllable before the suffix in the examples in (28).

- (28)a. *ikrívruh* ‘to roll’ + *-rupu* ‘downriver’ → *ikrivrúúhrupu* ‘to roll downriver’
(source: Bright 1957, p. 37)
- b. *fikríp* ‘to pick out, sort’ + *-tih* DURATIVE → *fikríptih* ‘to be sorting’
(source: GD-MD-VSu-01)

When a suffix of this class is attached to certain other stems, however, no tone shift or vowel lengthening takes place, as in the examples in (29).

- (29)a. *ítap* ‘to know’ + *-tih* DURATIVE → *ítaptih* ‘to be knowing’
(source: GD-MD-VSu-01, VS-10)
- b. *ihéèra* ‘to smoke’ + *-tih* DURATIVE → *ihéèratih* ‘to be smoking’
(source: Harrington 1932, p. 46, VS-11)

The current analysis focuses on these irregularities, which are discussed in turn in the following section. Both are shown to be fully or partly explained by the $*(C)\acute{V}C$ constraint.

6.2 Role of coda consonant in stems that resist tone shift

6.2.1 Which tones are exempt from moving?

A number of different weak tone-moving prefixes and suffixes normally cause a tone shift, as seen above, in (27). Some stems, such as those shown in (29), are exempt from these shifts. I call stems that are affected by and exempt from these processes ‘moveable tone’ and ‘fixed tone’ stems, respectively. Whether a stem has moveable or fixed tone is not arbitrary. Rather, it is determined by the syllable structure of the tone-bearing syllable and (sometimes) the syllable immediately following the tone-bearing syllable. This is true of derived and underived stems, and includes both nouns and verbs.

The descriptive generalization is as follows. Stems that have ‘fixed’ tone with respect to these weak tone-moving processes are stems in which a HL sequence is realized on a single syllable (i.e., a long vowel bearing HL tone), and those in which a H-L sequence realized on two short vowels, the first of which is in an open syllable. Any other configuration is ‘moveable’.¹¹ Structures that are and are not sensitive to these processes are given schematically in (30).

- | | | |
|------|------------------------------|------------------------------|
| (30) | <u>Fixed</u> | <u>Movable</u> |
| a. | (C) $\acute{V}\acute{V}$ (C) | (C) $\acute{V}\acute{V}$ (C) |
| b. | (C) $\acute{V}$.CV(C) | (C) $\acute{V}C$.CV(C) |
| c. | | (C) $\acute{V}$ (C).CVV(C) |
| d. | | (C) $\acute{V}$ (C)# |

¹¹Bright (1957:45) defines ‘fixed accent’ stems as those with circumflex accent and those containing a $\acute{V}C\acute{V}$ sequence, and ‘moving accent’ stems as all others. There are exceptions, of two types. (1) Tone in some words that fit the fixed criteria are not fixed; Bright calls this ‘unstable accent’ (these are almost all attributable to derived tonal patterns caused by four affixes, found in Table 4 in Appendix A, with a few lexicalized roots.) (2) When the two syllables of the second fixed pattern lie on either side of a morpheme boundary, whether the tone is fixed or not depends on which side of the morpheme boundary the consonant falls on and whether it is geminable or de-geminated. Some sets of affixes only affect a subset of ‘moving accent’ stems

Thus, (30a) shows that any HL tone is fixed, and any H tone on a long vowel is moveable, regardless of other syllables in the word. The structures in (30b) show that a H tone on a short open syllable followed by any short syllable is fixed, while a H tone on a short closed syllable followed by any short syllable is moveable. A H tone on a short syllable followed by a long syllable (30c)¹² and a H tone on a word-final short syllable (30d) are both moveable.

It is important to note that these patterns hold for both underived roots and morphologically complex stems, and that a H tone can ‘move into’ a fixed position. That is, moveable or fixed accent is not an inherent, diacritic property of roots. For example, the two roots in (31) each contain one of the moveable structures above. When one of these roots has a weak tone-shifting suffix added to it, the H tone moves rightward to the final syllable of the root. In (31a), the H tone lands on a short open syllable followed by a CV(C) syllable. The tone is now fixed and will not move again when another tone-moving suffix is added. By contrast, if the tone lands on a closed syllable, as in (31b), or on a long vowel, the tone will move again if another tone-moving suffix is added. This means that in the context of suffixes that trigger these changes, the underlying tone of a stem is unimportant.

(31)a. *Moveable position to fixed position*

mááhva ‘to visit’
 → mahvú-tih ‘to be visiting’
 → mahvú-tih-an ‘the one who is visiting’ (source: constructed, after Bright 1957 p. 67)

b. *Moveable position to moveable position*

íimnih ‘to love’
 → iimníh-tih ‘to be loving’
 → iimnih-tíh-an ‘the one who is loving’ (source: constructed, after Bright 1957 p. 48)

6.2.2 Why some stems are exempt from tone shift

Which stems do and do not participate in tone shift can be explained by a combination of two factors: tone-foot alignment, and the avoidance of H tone on (C)VC. I propose here that fixed stems are those with the ideal foot for tone in Karuk, in which a HL sequence is realized over exactly two moras, forming a moraic trochee.

Assuming a moraic representation of syllable weight in which short vowels have one mora and long vowels have two, what unifies the two fixed tone structures in (30) above is that they both contain a H-L sequence realized over exactly two moras, without an intervening coda consonant. This can be represented as a moraic trochee in which the head is associated with a high tone and the non-head associated with a low tone at a moraic level, despite the fact that stress must be associated with the entire syllable in a bimoraic foot consisting of a single long vowel, as shown in (32).

(32)	H	L	H L
	μ	μ	μ μ
	(C)V.	CV(C)	(C)VVC)
	(x	.)	(x)

Because this is the ‘ideal’ foot from the point of view of tone placement in Karuk, this structure is unaffected by tone-moving processes, while tone in other, less optimal, feet is affected. Moveable stems, then, are those with a non-ideal foot structure. This representation accounts for three of the four types of moveable stems in (30) above. Regardless of how it is footed, any long vowel with H tone (30a)

¹²Based on Bright’s description, the tone in a (C)V̇.CVV(C) sequence is predicted to be moveable, but not enough examples of words including this structure have been found to confirm that this is definitively the case. For now, I will assume that they are moveable.

must be dispreferred. A ($\acute{\mu}\acute{\mu}$) foot is bimoraic, but a HL contour is not realized, violating the requirement for the moraic foot to align with a HL sequence. A ($\acute{\mu}\acute{\mu}.\acute{\mu}$) foot meets the requirement for the HL tone association, but is not strictly bimoraic. A ($\acute{\mu}.\acute{\mu}.\acute{\mu}$) foot would, of course, violate both criteria. Likewise, a ($\acute{\mu}.\acute{\mu}\acute{\mu}$) foot, as in (30c), meets the requirement for the HL tone association, but is not strictly bimoraic, and were the syllables reversed, it would violate both criteria. Finally, a high tone which falls on a short vowel in the final syllable of a word, as in (30d), is problematic because it cannot meet the HL contour requirement.

This representation alone cannot account for why a disyllabic foot with an open first syllable should have fixed tone while one with a closed first syllable, as in (30b), should not. H must avoid (C)VC independently of syllable weight. If a coda consonant were moraic, one would expect stress to be attracted to closed syllables over open ones. For instance, given the word /axaska/, one would expect *axáska, but the actual form is áxaska ‘to be thin, lose weight’, with stress on an open syllable. Given /thanfirip/, one would expect *thánfirip or *thanfírip, but the actual form is thanfírip ‘to miss, fail to hit’, again with stress on the open syllable. Based on many words like these where stress falls on an open syllable, codas cannot be moraic. If a coda consonant is not moraic, (C)VC.CV(C) and (C)V.CV(C) feet have the same moraic structure. The factor differentiating these two feet, then, is simply the syllable structure of the tone-bearing syllable. Therefore, a H tone on a (C)VC syllable must have some inherent instability, which is captured by the *CVC constraint.

It is clear that the dispreference for H tone on a (C)VC is not strong enough to prevent a H tone from *landing* on a (C)VC syllable, it only means that a tone in this structure is available to move. This tone moving process, as well as one repair for the creation of the dispreferred CVC structure due to it, is explored in greater detail in the following section.

6.3 Role of coda consonant in output of affixation

In this section, another irregularity, this time in the output of tone-moving affixation processes, is also shown to be due to the *CVC constraint. When the dispreferred structure is a result of derivation, a new repair strategy is found, namely, vowel lengthening. To illustrate this process, the directional suffixes are focused on here. The directional suffixes represent the largest set of weak tone-moving affixes¹³, and they also have quite regular effects on tone, as a group. All the directional suffixes cause rightward tone movement. Some also trigger vowel lengthening in some stems, which will be shown to be accounted for by *CVC.

As expected for weak tone-moving affixes, the directional suffixes have no effect on fixed stem tone. The examples in (33–34) demonstrate directional suffixes being attached to the two structures with fixed tone, (C)V.CV(C) and a long vowel with HL tone, with no effect.

- (33) *ikvíríp* ‘to run’ + *-faku* ‘from uphill’ →
ikvíríp-faku ‘to run down from uphill’ (source: Bright 1957 p. 96)

- (34) *kúùntaku* ‘to sit on’ + *-ish(rih)*¹⁴ ‘down’ →
kúùntak-ish(rih) ‘to sit down on’ (source: Bright 1957 p. 97)

Also as expected, these suffixes cause moveable tone to shift one syllable to the right, as in the examples in (35–37). In (35–36), the tone is moveable because H falls on a long vowel. The example in (37) demonstrates another moveable tone structure, (C)V.CV(C). In all three cases, the addition of a weak tone-moving suffix shifts the tone one syllable rightward. Note that in these examples, a consonant-initial suffix is added to a vowel-final stem, or a vowel-initial suffix is added to a consonant-final stem.

¹³The directional suffixes are comprised of 30 consonant-initial and 8 vowel-initial suffixes. A complete list of verbal suffixes and their tonal effects is given in Table 5 in Appendix A.

¹⁴Parentheses indicate an alternate longer form of a suffix.

- (35) *ííthva* ‘to pack’ + *-faku* ‘from uphill’ →
iíthvá-faku ‘to pack down from uphill’ (source: Bright 1957 p. 96)
- (36) *ííthri* ‘container to sit’ + *-kirihi* ‘into fire’ →
íthrí-kirihi ‘to set a container on fire (causative)’ (source: Bright 1957 p. 98)
- (37) *ikrívruih* ‘to roll’ + *-unih* ‘down’ →
ikrivrúh-unih ‘to roll downhillward’ (source: Bright 1957 p. 104)

Examples (38–39) show stems with the moveable tone structure, (C)VC.CV(C), and example (40) shows a stem with the moveable tone structure of H on a long vowel. As in the previous set of examples, the addition of a weak tone-moving suffix shifts the tone one syllable rightward. However, when consonant-initial suffixes are added to consonant-final stems, as in these examples, a short vowel in the final syllable of the stem is lengthened.

- (38) *ishpát* ‘to break (intr.)’ + *-rav* ‘in’ →
ishpáát-rav ‘to break (sth) into two (tr.)’ (source: Bright 1957 p. 100)
- (39) *ikrívruih* ‘to roll’ + *rupu* ‘downriver’ →
ikrivrúúh-rupu ‘to roll downriver’ (source: Bright 1957 p. 37)
- (40) *ikréemyah* ‘to blow’ + *-varak* ‘from upriver’ →
ikreemyááh-varak ‘to blow down from upriver, north wind to blow’ (source: Bright 1957 p. 104)

This vowel lengthening process cannot be attributed to vowel lengthening in stressed syllables, because no lengthening takes place when the result is a stressed H on a CV syllable, e.g. when a consonant-initial suffix is added to a vowel-final root, as in (35–36), or when a vowel-initial suffix is added to a consonant-final root, as in (37). Bright describes ‘progressive accentuation’ as moving H one syllable to the right, while the vowel lengthening process is described as stem-final. However, no evidence is given for *this* set of affixes moving accent to anywhere but the final syllable of the stem.¹⁵ I propose that it is not a coincidence that the syllable which is lengthened by the addition of these suffixes is also the syllable bearing tone in the output, rather than the vowel lengthening occurs as a repair whenever a H tone ends up on a closed short syllable.

In all the most common verb root shapes, the weak tone-shifting affixes either have no effect due to fixed tone, as in examples (33–34), or they move H tone to the final syllable of root, as in examples (35–40). In each of the root shapes that have moveable tone, a H ends up on the last syllable before the suffix under affixation. When a H lands on an open CV syllable, as in the words in (35–36), shown here in (41–42), no vowel lengthening occurs. This is because the ideal tonal feet (*vá.fà*)_{μμ} and (*rí.kì*)_{μμ} are created, whereas a H on a CVV syllable would be less optimal.

- (41) *ííth.va* + *-faku* → *iíth.vá.fa.ku* (**iíth.váá.fa.ku*) ‘to pack down from uphill’
- (42) *ííth.ri* + *-kirihi* → *íth.rí.ki.rihi* (**íth.ríí.ki.rihi*) ‘to set a container on fire (causative)’

When a H would land on a closed CVC syllable, as in the words in examples (38–40), shown here in (43–45), vowel-lengthening is triggered, indicating that a H on a CVV syllable is preferable to a H on a CVC syllable.

¹⁵In any case, the number of roots that would accommodate rightward movement of tone without it landing on the final syllable is very small. For other affixes that attach further from the root, the continuing rightward pattern may be seen. These patterns are left to further research.

- (43) ish.pát + -rav → ish.**páát**.rav (*ish.**pát**.rav) ‘to break (sth) into two (tr.)’
- (44) ik.rív.ruh + -rupu → ik.riv.**ruúh**.ru.pu (*ik.riv.**rúh**.ru.pu) ‘to roll downriver’
- (45) ik.réém.yah + -varak → ik.reem.**yááh**.va.rak (*ik.reem.**yáh**.va.rak) ‘to blow down from upriver’

However, when the final consonant of the root can syllabify with a following vowel across the morpheme boundary, as in the word in (37), shown here in (46), no lengthening occurs. This is because, again, an ideal tonal foot (rú.hù)_{μμ} is created.

- (46) ik.rív.ruh + -unih → ik.riv.**ru.hu**.nih (*ik.riv.**ruu**.hu.nih) ‘to roll downhillward’

These patterns show that it is better to lengthen a short vowel than to have a H on a short closed syllable in the output, but that lengthening a short vowel is *not* better than having a H on a short open syllable in the output. It is also clear that a highly ranked faithfulness constraint makes the deletion of coda consonants an unacceptable repair to violations of H on (C)VC, even though this would create an more optimal output (a (ḡ.ḡ) foot) than does the vowel lengthening. The directional suffixes thus provide more evidence for avoidance of H on (C)VC syllable, because vowel lengthening only occurs when a H tone would otherwise fall on a (C)VC syllable.

6.4 Summary

In this section, evidence for the avoidance of H on (C)VC syllables in Karuk from two different parts of verb derivation has been provided. This constraint has been shown to be partly responsible in determining which stem tones will move under affixation, and also accounts for vowel lengthening in some outputs of tone-moving affixation.

I have also shown that a bimoraic HL trochee represents the most preferred tone-foot alignment in Karuk, as evidenced by the fixed nature of tone whenever it falls into this structure. This phenomenon indicates that tone assignment is sensitive to metrical structure even when it is not dependent on stress.

7 Conclusions

To sum up, the phenomenon of avoidance of a H tone on a short closed syllable unifies and explains several different phonological patterns in Karuk. This avoidance is reflected in different ways at different levels of the grammar, namely: static distributions of tone in roots, mobility of tone in stems, and vowel lengthening under affixation. The fact that avoidance of H on (C)VC is limited to initial (C)VC syllables in roots, whereas it is a more general constraint in derived forms, is not surprising given that roots often allow structures that derived forms avoid, and that the initial syllable is a prominent position where marked structures might be less well tolerated.

In conclusion, while Karuk affixes can be understood in terms of strong, weak, and neutral classes typical of traditional accent analyses, the accentual behavior of stems is best attributed not to arbitrary accentual categories, but to tone-driven phonological constraints. These findings reinforce the idea that tone is active in the Karuk system, as Crowhurst and Macaulay (2007) propose. However, the findings indicate that tone interacts with a metrical system in a more involved and complicated way than has previously been observed (e.g Bright 1957; Macaulay 1990; Crowhurst and Macaulay 2007). By introducing coda consonants as a factor in the placement of tone by way of the constraint *(C)VC, this analysis makes the Karuk system more predictable, both in terms of static tone distributions and in terms of morphological effects on word prosody. While more work remains to be done, in particular, modeling the mechanisms by which tones are moved and understanding more complex morphological interactions, the generalizations made here represent a step towards better understanding this system and an important data point in the space of ‘pitch-accent’ languages.

Appendix

A Verb suffixes

Tables 3–5 list Karuk verbal suffixes. Verbal prefixes and nominal prefixes and suffixes function similarly, and are fewer in number. Eight deverbal derivational suffixes also have not been included in these tables. Also excluded are *-sap* (‘closing up’, derivational class 2(?), PS or PA)¹⁶, and *-iruv* ‘too much’, derivational class 4(?), PS or PA), due to insufficient description of accentual effects.

Verbal derivational suffix position classes follow Bright (1957), incorporating more recent work by Macaulay (1990), but note that Bright’s classes are partially semantically determined and not wholly reflective of combinatoric restrictions. I have tentatively collapsed Bright’s four inflectional position classes into three, based on his description of combinatoric possibilities, taking prosodic effects into consideration, and incorporating Macaulay’s (1989) reanalysis of Bright’s ‘syntactic postfixes’ as suffixes. However, more work remains to be done to determine the correct analysis of these suffixes.

Table 3: Tone-neutral Verbal Suffixes

Affix	Gloss	Type
-Ovrik	‘in response to motion’	Derivational Class 4
-naa, -vunaa	PLURAL	Derivational Class 6 (SA*)
-ach	DIMINUTIVE	Derivational Class 8
-N	IMPERATIVE	Inflectional Class 1

¹⁶SA: ‘Suffixal Accentuation’ – H or HL on first syllable of suffix, as indicated

PS: ‘Presuffixal Accentuation’ – H on syllable preceding suffix

UPS: ‘Unstable Presuffixal Accentuation’ – ‘Unstable’ H on syllable preceding suffix

UPPS: ‘Unstable Pre-presuffixal Accentuation’ – ‘Unstable’ H two syllables preceding suffix

PA: ‘Progressive Accentuation’ – generally speaking, rightward moving tone

SP: ‘Special Progressive Accentuation’ – PA that only operates on a limited set of stem shapes

MP: ‘Modified Progressive Accentuation’ – PA that only operates on stems Bright labels ‘unaccented’

PL: ‘Potential Lengthening’ – Vowel lengthening (where applicable in consonant-final stems)

VS: Vowel shortening (where applicable)

() indicates under certain conditions

* indicates different accentuation in combination with monosyllabic stems

** indicates an irregular allomorph or accentuation in combination with particular morphemes

Table 4: Strong Tone Verbal Suffixes

Affix	Gloss	Type	Effect
-chak	‘closing up’	Derivational Class 2	PS
-fip	‘completely’	Derivational Class 4	PS
-kiri	(motion)	Derivational Class 4	PS
-sar	‘along with’	Derivational Class 4	PS
-kiri	INSTRUMENTAL	Derivational Class 4	PS, VS
-koo	‘to’	Derivational Class 4	PS, VS
-tárar	(unknown)	Derivational Class 2	SA
-tánmah	‘for nothing, for no reason’	Derivational Class 4	SA
-úùr	‘for a long time’	Derivational Class 4	SA
-iichva	‘in pretense’	Derivational Class 4	UPS
-oo	HABITUAL	Derivational Class 4	UPS, VS
-vaana	‘oneself’	Derivational Class 4	UPS
-va	PLURAL ACTION	Derivational Class 6 ¹⁷	UPPS, (VS, PL)**

Table 5: Weak Tone-Moving Verbal Suffixes

Affix	Gloss	Type	Effect
-va	PLURAL ACTION	Derivational Class 1	PA, (PL)
-riv	‘at rest’	Derivational Class 2	PA, PL
-taku	‘on or onto a horizontal surface’	Derivational Class 2	PA, PL
-kath	‘hence across a body of water’	Derivational Class 3	PA, PL
-kiv	‘out through a tubular space’	Derivational Class 3	PA, PL
-ku	‘onto a vertical surface’	Derivational Class 3	PA**, PL
-mu, -vu	‘thither, to, toward’	Derivational Class 3	PA, PL
-path	‘around in a circle’	Derivational Class 3	PA, PL
-raa	‘hither’	Derivational Class 3	PA, PL
-rav	‘in, into’	Derivational Class 3	PA, PL
-rip	‘off, out’	Derivational Class 3	PA, PL
-faku	‘hither from uphill’	Derivational Class 3	PA, PL
-kara	‘horizontally toward the center of a body of water’	Derivational Class 3	PA, PL
-rina	‘hither across a body of water’	Derivational Class 3	PA, PL
-ruprin	‘through’	Derivational Class 3	PA, PL
-rupu	‘hence downriverward’	Derivational Class 3	PA, PL
-sip(riv)	‘up (to the height of a man or less), to start to’	Derivational Class 3	PA, PL
-suru	‘off, away’	Derivational Class 3	PA, PL
-tunva	‘toward each other, together’	Derivational Class 3	PA, PL
-vara	‘in through a tubular space’	Derivational Class 3	PA, PL
-furuk	‘into an enclosed space’	Derivational Class 3	PA, PL, (PS*)

¹⁷Following Macaulay (1990), PLURAL ACTION -va is classified in position class 1 when directly attached to a root, but in class 6 when attached to a derived stem. Different accentual effects when attached to a root vs. a derived stem support this division.

Table 5: Weak Tone-Moving Verbal Suffixes

Affix	Gloss	Type	Effect
-kirih	‘into or onto fire’	Derivational Class 3	PA, PL, (PS*)
-kurih	‘into water’	Derivational Class 3	PA, PL, (PS*)
-ramnih	‘in or into a container’	Derivational Class 3	PA, PL, (PS*)
-ripaa	‘horizontally across a body of water’	Derivational Class 3	PA, PL, (PS*)
-risuk	‘out of a container’	Derivational Class 3	PA, PL, (PS*)
-roovu	‘hence upriverward, around a basket’	Derivational Class 3	PA, PL, (PS*)
-rupaa	‘out of one’s mouth’	Derivational Class 3	PA, PL, (PS*)
-ruprav	‘out through a solid’	Derivational Class 3	PA, PL, (PS*)
-ruprih	‘in through a solid’	Derivational Class 3	PA, PL, (PS*)
-rupuk	‘out of an enclosure’	Derivational Class 3	PA, PL, (PS*)
-varak	‘hither from upriver’	Derivational Class 3	PA, PL, (PS*)
-varayva	‘here and there within an enclosure’	Derivational Class 3	PA, PL, (PS*)
-ish(rih)	‘down (from the height of a man or less)’, RESULTATIVE	Derivational Class 3	PA, (SA**)
-0thuna	‘here and there, in various places’	Derivational Class 3	PA
-unih	‘down from a considerable height, hence downhillward’	Derivational Class 3	PA
-uraa	‘up from a considerable height, hence uphillward’	Derivational Class 3	PA
-0vraa	‘over’	Derivational Class 3	PA
-0vrath	‘into a sweathouse, over’	Derivational Class 3	PA
-0vrin	‘in opposite directions’	Derivational Class 3	PA
-0vruk	‘down over the edge of something’	Derivational Class 3	PA
-ahiv	‘on some occasion’	Derivational Class 4	PA
-ar	‘to go in order to’	Derivational Class 4	PA
-ara	INSTRUMENTAL	Derivational Class 4	PA
-eep	‘away from (a person)’	Derivational Class 4	PA
-ihi	BENEFACTIVE	Derivational Class 4	PA, PL
-mara	‘to finish Xing’	Derivational Class 4	PA, PL
-math, -vath	CAUSATIVE	Derivational Class 4	PA, PL
-rih	‘up’	Derivational Class 4	PA, VS(?)
-uk	‘hither’	Derivational Class 4	PA
-unis	‘to, at, about’	Derivational Class 4	PA, (SA, VS**)
-ahi, -va	ESSIVE	Derivational Class 5	PA
-tih	DURATIVE	Derivational Class 7	SP, PL
-i	IMPERATIVE	Inflectional Class 1-3	PA, PL**
-at	PAST TENSE	Inflectional Class 1	PA, PL
-an, -han	PARTICIPIAL	Inflectional Class 2	PA
-ahak	‘where’	Inflectional Class 2-3	PA**

Table 5: Weak Tone-Moving Verbal Suffixes

Affix	Gloss	Type	Effect
-irak	IRREALIS	Inflectional Class 2-3	PA
-aheen	ANTERIOR TENSE	Inflectional Class 2-3	SP**
-anik, -hanik	ANCIENT TENSE	Inflectional Class 2, 3	SP**
-avish	FUTURE TENSE	Inflectional Class 1	MP
-ara	NEGATIVE	Inflectional Class 2-3	MP, (SA*)
-ap	INVERSE	Inflectional Class 2	MP
-at, -hat	PAST TENSE	Inflectional Class 3	MP

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