
Chugach Alutiiq in a separator theory of prosodic structure

Daniel Currie Hall • University of Toronto

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I. INTRODUCTION

The basic theoretical question: How is prosodic constituent structure represented?

Some responses:

- Trees. (e.g., Liberman & Prince 1977)
- Grids. (e.g., Selkirk 1984)
- Grids, with constituents delimited by pairs of brackets.¹ (e.g., Halle & Vergnaud 1987)
- Grids, with constituents delimited by brackets that don't necessarily come in pairs. (Idsardi 1992; Halle & Idsardi 1994)
- Grids, with constituents separated in a way that makes no notational distinction between a left boundary and a right boundary. (Hall 2000; Reiss 2003)
- Who cares? (a standard answer in OT)

Here, I will focus on the differences between the directional but unpaired brackets of the Halle & Idsardi approach and the directionless brackets of what Idsardi (1992) refers to as **separator theory**.

Consider the following three representations in the H&I model:

- (1) a. X) Y 'X belongs to a constituent that excludes Y.'
 b. X (Y 'Y belongs to a constituent that excludes X.'
 c. X) (Y 'X and Y belong to different constituents.'

Separator theory collapses (1a–c) into the single representation in (2):

- (2) X | Y 'X and Y do not belong to the same constituent.'

The difference between the two approaches is potentially important in cases where some material must be marked as unmetrified, and particularly when the unmetrified material is word-medial rather than at an edge.

Reiss (2003: 7) suggests that a word-medial unfooted syllable can be incorporated into an adjacent foot, with no unwanted consequences for the assignment of stress.

However, Idsardi (1992) points out that in Chugach Alutiiq, the distinction between an unfooted syllable and a footed one has consequences for segmental processes as well as for stress.

1. See van Oostendorp (1993) for a discussion of the differences between trees and bracketed grids (and a systematic demonstration that there are some).

To get the correct placement of fortition and stress in Chugach Alutiiq[,] words must have unmetrified elements between constituents, a representation that separator theory is incapable of providing (Idsardi 1992: 159).

Reiss (2003) predicts (but does not argue) that such representations are unnecessary.

In this talk, I will suggest that separator theory is capable of providing such representations in a system in which prosodic structure is build “head-first” rather than “feet-first.”

Where the rest of this talk is going:

- Outline of the Chugach Alutiiq data, and why footing matters
- Background on the separator model to be employed here
- Application of the separator model to Chugach Alutiiq
- Discussion of differences between the separator theory and Idsardi’s approach

2. THE DATA

The Chugach dialect of Alutiiq (a.k.a. Pacific Gulf Yupik, Sugr’sun, etc.) is spoken on the Kenai Peninsula of Alaska.

2.1 The stress

- If all syllables are light, then stress falls on every third syllable, starting from the second.
- The final syllable is stressed whenever the syllable before it is not.

Some words with light syllables only:

- (3) Elenbaas and Kager (1999: 291), quoting Leer (1985):
- | | |
|--------------------------|---|
| a. mu.lú.kan | ‘if she takes a long time’ |
| b. a.kú.ta.mék | ‘akutaq ² (abl. sg.)’ |
| c. ta.qá.ma.lu.ní | ‘apparently getting done’ |
| d. a.kú.tar.tu.nír.tuq | ‘he stopped eating akutaq’ |
| e. ma.ŋár.su.qu.tá.qu.ní | ‘if he (refl.) is going to hunt porpoise’ |

- Heavy syllables are stressed. In initial position, both (C)VV and (C)VC count as heavy; elsewhere, only (C)VV counts.

Some words with heavy initial syllables:

- (4) Elenbaas and Kager (1999: 295), quoting Leer (1985):
- | | |
|--------------------|-------------------------|
| a. taá.ta.qá | ‘my father’ |
| b. naá.ma.ci.qúq | ‘it will suffice’ |
| c. naá.qu.ma.lú.ku | ‘apparently reading it’ |

2. Akutaq is a dessert made from white fish, berries, sugar, and lard. Various recipes can be found in Keim (n.d.).

- (5) Idsardi (1992: 65):
 kúm.la.ci.wí.li.ya.qú.ta.qu.ní.ki ‘if he is going to undertake constructing a freezer for them’

- Stress clashes can arise when a heavy syllable follows another stressed syllable (heavy or light).

Some words with heavy non-initial syllables:

- (6) Elenbaas and Kager (1999: 295), quoting Leer (1985):

| | |
|----------------------|---------------------------|
| a. taá.taá | ‘her father’ |
| e. naá.ma.cí.quá | ‘I will suffice’ |
| g. u.lú.te.ku.tá.raá | ‘he’s going to watch her’ |

- (7) Idsardi (1992: 67):

| | |
|----------------------|-------------|
| ág.ɲuá.qu.tár.tuá.ɲa | (unglossed) |
|----------------------|-------------|

2.2 The structure

This stress pattern can be characterized as the result of parsing the syllables into right-headed binary feet (i.e., iambs), with single light syllables skipped between feet. Sequences of two moras (two light syllables or one heavy one) cannot be unfooted, nor can a foot consist of a single light syllable.

- | | |
|---|---|
| (8) a. (<u>m</u> u.lú).kan | ‘if she takes a long time’ |
| b. (a.kú).(ta.mék) | ‘akutaq (abl. sg.)’ |
| c. (<u>t</u> a.qá).ma.(l <u>u</u> .ní) | ‘apparently getting done’ |
| d. (a.kú).tar.(tu.nír).tuq | ‘he stopped eating akutaq’ |
| e. (<u>m</u> a.ɲár).su.(qu.tá).(qu.ní) | ‘if he (refl.) is going to hunt porpoise’ |
| f. (<u>t</u> aá).(ta.qá) | ‘my father’ |
| g. (<u>n</u> aá).ma.(ci.qúq) | ‘it will suffice’ |
| h. (<u>n</u> aá).qu.(<u>m</u> a.lú).ku | ‘apparently reading it’ |
| i. (<u>k</u> úm).la.(ci.wí).li.(ya.qú).ta.(qu.ní).ki | ‘if he is going to undertake...’ |
| j. (<u>t</u> aá).(taá) | ‘her father’ |
| k. (<u>n</u> aá).(ma.cí).(quá) | ‘I will suffice’ |
| l. (u.lú).te.(ku.tá).(raá) | ‘he’s going to watch her’ |
| m. (ág).(ɲuá).(qu.tár).(tuá).ɲa | |

Further evidence for this footing comes from a segmental fortition process, which applies to foot-initial consonants (underlined in (8) above).

The syllable boundary preceding an accented foot is phonetically similar to a word boundary. [...] Systematically and phonetically, word-initial consonants are fortis. Unaccented feet do not occur word-initially; hence word-initial consonants must begin with an accented foot and are considered fortis. [...] Elsewhere, an accented foot-initial consonant is indicated in the phonetic transcription as fortis, although, as we have mentioned, in some environments this fortition may not be phonetically perceptible [...]. [...] Fortition is phonetically most prominent with a voiceless consonant following a voiced segment. Here a fortis consonant is voiceless and somewhat tense [...] (Leer 1985: 83–84).

Taken together, the stress pattern and the fortition pattern dictate that some syllables must be unfooted. Consider (8i) and (8l), for example, repeated below in (9):

- (9) a. (kúm).la.(ci.wí.li).(ya.qú.ta).(qu.ní).ki
 b. (u.lú).te.(ku.tá).(ráá)

The medial unfooted syllables cannot be absorbed into the feet that follow them, because this would make wrong predictions about the loci of fortition, as shown in (10):

- (10) a. *(kúm).(la.ci.wí).(li.ya.qú).(ta.qu.ní).ki
 b. *(u.lú).(te.ku.tá).(raá)

Nor can they be absorbed into the preceding feet, as in (11):

- (11) a. *(kúm.la).(ci.wí.li).(ya.qú.ta).(qu.ní).ki *or* *(kúm.la).(ci.wí.li).(ya.qú.ta).(qu.ní.ki)
 b. *(u.lú.te).(ku.tá).(raá)

The foot boundaries in (11) are compatible with the fortition facts, but they offer no way of placing the stresses correctly. Is stress foot-initial?

- (12) (kúm.la)

...foot-final?

- (13) a. (ku.tá)
 b. (ráá)
 c. (qu.ní)

...or foot-medial?

- (14) a. (ci.wí.li)
 b. (ya.qú.ta)
 c. (qu.ní.ki)
 d. (u.lú.te)

3. THE SEPARATOR MODEL

As mentioned above, the principal difference between Hall (2000) and other grid-based approaches is the absence of a distinction between a left boundary and a right boundary. However, there is another difference that is of particular relevance to quantity-sensitive systems such as that of Chugach Alutiiq: all relevant information at each level of structure is represented in the same way, as a string of grid marks (X) and separators (|).

The grid begins on line 0, then, not with syllables and foot boundaries, but with moras and syllable boundaries:

| | | | | | | | | | | | | | | | | |
|------|--------|--|---|--|----|---|---|--|---|--|----|--|---|--|--|-------------------------------|
| (15) | line 2 | | | | | x | | | | = word boundary; x = strong foot | | | | | | |
| | line 1 | | x | | x | | x | | | = foot boundary; x = stressed syllable | | | | | | |
| | line 0 | | x | | xx | | x | | x | | xx | | x | | | = syllable boundary; x = mora |

This approach is consistent with the hypothesis that each level of prosodic structure is constructed with reference only to the one immediately below it. For example, Prince and Smolensky's (1993: 47) FOOTBINARITY constraint (16), which refers disjunctively to two levels of structure below the foot, could be restated in these terms as the two constraints in (17):

(16) FOOTBINARITY (FTBIN): Feet are binary at some level of analysis (μ, σ)

- (17) a. Between one line-1 | and the next, there must be at least two line-0 x's.
 b. Between one line-1 | and the next, there must be at most one line-0 |.

In this way, both quantity-sensitive and quantity-insensitive patterns can be generated by counting |'s or x's (up to two at a time), and foot boundaries are constructed as projections of syllable boundaries. For example, the rule in (18) will project a foot boundary at the end of the iambic patterns |x|x| (light-light), |x|xx| (light-heavy), and |xx| (heavy), but not |xx|x| (heavy-light), |xx|xx| (heavy-heavy), or |x| (light):

(18) Starting from the left edge, iteratively count two x's and project the next |.

Hall (2000) shows how these representations can be used to generate several different kinds of stress systems, including quantity-sensitive and quantity-insensitive systems, and systems with and without lexical stresses.

4. THE MODEL APPLIED TO THE DATA

The appropriate structures for Chugach Alutiiq can be generated according to the following rule system:

(19) 0. **Translate from the segmental representation to line 0 of the grid:**

All vowels are moraic; a coda is moraic iff it is in the first syllable.

1. **Project foot boundaries:**

Starting from the left edge of the word:

- a. Project the next line-0 | to line 1.
 b. Count two line-0 x's and project the next line-0 | to line 1.
 c. Repeat (1a–b) until the end of the word is reached.

2. **Readjust to repair lapses:**

| | | | | | | | | | | | | | | | | |
|--|---|--|---|--|--|---|--|---|--|---|--|---|---|---|----|---|
| | | | | | | | | | | | | { | # | } | | |
| | x | | x | | | → | | x | | x | | / | — | { | xx | } |

3. **Make right-headed feet:**

Project to line 1 every line-0 x that is immediately to the left of a line-1 | and is **not** immediately to the right of a line-1 |.

What (19) does:

Step 0 – stipulates what counts as a heavy syllable

Step 1 – alternates between placing a boundary after an iamb and placing a boundary after a single syllable

Step 2 – joins an unfooted light syllable with a following light syllable word-finally and before heavy syllables

Step 3 – assigns stress, and thereby distinguishes between a foot and an unfooted syllable

In step 3, line-1 marks are assigned with reference to line-1 boundaries and line-0 marks, rather than to feet. Once line-1 marks have been assigned, a foot can be defined as the material delimited by two line-1 boundaries that enclose a line-1 grid mark. Foot-initial consonants can then be strengthened.

Words with three to five light syllables:

| | | | |
|---------|------------------------|----------------------------|---|
| (20) 0. | x x x | x x x x | x x x x x |
| | .mu .lu .kan. | . a .ku .ta .mek. | .ta .qa .ma .lu .ni . |
| 1. | x x x | x x x x | x x x x x |
| | .mu .lu .kan. | . a .ku .ta .mek. | .ta .qa .ma .lu .ni . |
| 2. | x x x | x x x x | x x x x x |
| | .mu .lu .kan. | . a .ku .ta .mek. | .ta .qa .ma .lu .ni . |
| 3. | x x x | x x x x | x x x x x |
| | . <u>m</u> u .lu .kan. | . a .ku . <u>t</u> a .mek. | . <u>t</u> a .qa .ma . <u>l</u> u .ni . |

Words with six to seven light syllables:

| | | |
|---------|------------------------------------|--|
| (21) 0. | x x x x x x | x x x x x x x |
| | . a .ku .tar.tu .nir.tuq. | .ma .Nar.su .qu .ta .qu .ni . |
| 1. | x x x x x x | x x x x x x x |
| | . a .ku .tar.tu .nir.tuq. | .ma .Nar.su .qu .ta .qu .ni . |
| 2. | x x x x x x | x x x x x x x |
| | . a .ku .tar.tu .nir.tuq. | .ma .Nar.su .qu .ta .qu .ni . |
| 3. | x x x x x x | x x x x x x x |
| | . a .ku .tar. <u>t</u> u .nir.tuq. | . <u>m</u> a .Nar.su . <u>q</u> u .ta . <u>q</u> u .ni . |

Words with light and heavy syllables:

| | | | |
|---------|--|-------------------------------------|--|
| (22) 0. | xx x x .taa.ta .qa . | xx xx .taa.taa. | xx x x x .naa.ma .ci .quq. |
| 1. | xx x x .taa.ta .qa . | xx xx .taa.taa. | xx x x x .naa.ma .ci .quq. |
| 2. | xx x x .taa.ta .qa . | xx xx .taa.taa. | xx x x x .naa.ma .ci .quq. |
| 3. | x x xx x x .taa.ta .qa . | x x xx xx .taa.taa. | x x xx x x x .naa.ma .ci .quq. |

| | | |
|---------|--|---|
| (23) 0. | xx x x x x .naa.qu .ma .lu .ku . | xx x x xx .naa.ma .ci .qua. |
| 1. | xx x x x x .naa.qu .ma .lu .ku . | xx x x xx .naa.ma .ci .qua. |
| 2. | xx x x x x .naa.qu .ma .lu .ku . | xx x x xx .naa.ma .ci .qua. |
| 3. | x x xx x x x x .naa.qu .ma .lu .ku . | x x x xx x x xx .naa.ma .ci .qua. |

| | |
|---------|--|
| (24) 0. | xx x x x x x x x x x .kum.la .ci .wi .li .ya .qu .ta .qu .ni .ki . |
| 1. | xx x x x x x x x x x .kum.la .ci .wi .li .ya .qu .ta .qu .ni .ki . |
| 2. | xx x x x x x x x x x .kum.la .ci .wi .li .ya .qu .ta .qu .ni .ki . |
| 3. | x x x x xx x x x x x x x x x .kum.la .ci .wi .li .ya .qu .ta .qu .ni .ki . |

| | | |
|---------|---------------------------|---------------------------|
| (25) 0. | x x x x x xx | xx xx x x xx x |
| | . u .lu .te .ku .ta .raa. | . ag.Nua.qu .tar.tua.Na . |
| 1. | | |
| | x x x x x xx | xx xx x x xx x |
| | . u .lu .te .ku .ta .raa. | . ag.Nua.qu .tar.tua.Na . |
| 2. | | |
| | x x x x x xx | xx xx x x xx x |
| | . u .lu .te .ku .ta .raa. | . ag.Nua.qu .tar.tua.Na . |
| 3. | x x x | x x x x |
| | x x x x x xx | xx xx x x xx x |
| | . u .lu .te .ku .ta .raa. | . ag.Nua.qu .tar.tua.Na . |

5. HEAD-FIRST PARSING

What makes it possible for the separator theory to distinguish between a foot and an unmetrified syllable is the fact that feet are identified with respect to line-1 grid marks, rather than vice versa.

The approach proposed here: **Head-first parsing**

- Project to line 1 every line-0 x that is immediately to the left of a line-1 | and is **not** immediately to the right of a line-1 |.
- A pair of |'s on line 1 delimits a foot iff it contains a line-1 x; i.e., if the foot has a head.

Idsardi (1992): **Foot-first parsing**

- Define feet on the basis of left and right boundaries.
- Add grid marks by identifying the left or right edge of a foot.

Under a foot-first approach, a separator model cannot make the distinction necessary to account for Chugach Alutiiq. A head-first approach makes separator theory tenable.

REFERENCES

- Elenbaas, Nine, and René Kager. 1999. Ternary rhythm and the lapse constraint. *Phonology* 16: 273–329.
- Hall, Daniel C. 2000. “Prosodic Representations and Lexical Stress.” In J.T. Jensen and G. Van Herk, eds. *Proceedings of the 2000 Annual Conference of the CLA*, pp. 49–60. Ottawa: Cahiers Linguistiques d’Ottawa.
- Halle, Morris, and Jean-Roger Vergnaud. 1987. *An essay on stress*. Cambridge, Mass.: MIT Press.
- Halle, Morris, and William J. Idsardi. 1994. General properties of stress and metrical structure. In Goldsmith, J., ed. *Handbook of Phonological Theory*, pp. 403–443. Oxford: Blackwell.
- Idsardi, William J. 1992. *The computation of prosody*. Doctoral dissertation, MIT.
- Keim, Frank, ed. No date. *Yupik gourmet: A book of recipes*. Fairbanks: Alaska Native Knowledge Network. Available online at www.ankn.uaf.edu/Marshall/gourmet/index.html.
- Leer, Jeff. 1985. Prosody in Alutiiq. In M. Krauss, ed. *Yupik Eskimo prosodic systems: descriptive and comparative studies*. Fairbanks: Alaska Native Language Center. 77–133.
- Liberman, Mark, and Alan S. Prince. 1977. On stress and linguistic rhythm. *Linguistic Inquiry* 8: 249–336.
- van Oostendorp, Marc. 1993. Formal properties of metrical structure. In S. Krauwer, M. Moortgat, and L. des Tombe, eds. *Proceedings of the sixth conference of the European chapter of the Association for Computational Linguistics*, pp. 322–334. Association for Computational Linguistics.
- Reiss, Charles. 2003. Stress computation using non-directed brackets. Ms., Concordia University.
- Selkirk, Elisabeth. 1984. *Phonology and syntax: The relation between sound and structure*. Cambridge, Mass.: MIT Press.