

Heavy syllables in Gitksan*

Jason Brown
University of Auckland

Abstract: Very little attention in the existing literature has been devoted to the prosodic structure of Gitksan. Recent work on stress, however, has opened a productive discussion about syllable weight. This paper uses these insights to further the discussion about possible moraic structures, and isolates a difference in how weight is assigned to consonants in stress vs. in other types of prosodic morphology, such as reduplication and word minimality. The patterns that emerge are similar to the behavior of heavy syllables in other languages, but with some key differences.

Keywords: Gitksan, phonology, stress, prosodic morphology

1 Introduction

The status of prosodic units in Gitksan is a topic that has received little recent attention in the literature on the language. Despite the potentially complex syllables in the language, and the range of prosodic morphological operations that are present, aside from recent works such as Brown (to appear) and Schwan and Anghelescu (2013), there has been little discussion as to what the internal prosodic structure of syllables in the language is.

In recent work, Forbes (2015) has shown that the stress system of Gitksan is weight-sensitive, in that stress preferentially falls on heavy syllables that are not in the default position for stress assignment (i.e. in root-final position). While CVV¹ syllables count as heavy, CVC syllables do not seem to behave in the same way, as far as stress assignment is concerned. This work intends to expand on Forbes' important study, and to investigate the role that syllable weight plays in other facets of the language beyond word-level stress.

In short, this paper is a brief note intended to highlight a contrast between the syllables that count as heavy for metrical reasons, and those that count as

* I would like to thank my primary Gitksanimx teachers, Barbara Sennott and the late Doreen Jensen. Thanks are also due to Henry Davis, Clarissa Forbes, Forrest Panther, Tyler Peterson, and Michael Schwan for reading and commenting on earlier drafts of this paper, as well as to the UBC Gitksan Research Lab for general academic stimulation and support, which contributed to the ideas presented here. I would also like to thank the editors for many helpful comments and corrections. All errors are my own.

Contact info: jason.brown@auckland.ac.nz

¹ “CVV” here is used as shorthand for syllables with phonetically long vowels [CV:], or for syllables with diphthongs that are bimoraic [CV₁V₂]. The “C” is intended to reflect an optional syllable onset across languages, and is not intended to be limited to a single consonant, as these structures generally do not contribute to syllable weight cross-linguistically.

heavy for prosodic morphological operations, including reduplication and word minimality. While the evidence indicates that coda consonants are moraic for prosodic morphology, this finding still lends support to Forbes' claim that stress is weight-sensitive, as the minimal word equals the stress foot (Hayes 1995) insofar as it is a heavy syllable. While this short note is not intended to provide an in-depth and unified analysis of the syllabic and sub-syllabic units in the language, it does aim to isolate a pocket of problematic data. The paper is structured as follows: Section 2 provides a brief overview of stress in Gitksan (as presented by Forbes 2015), and draws out the implications for prosodic structure. Section 3 expands the study into the area of reduplication, where it will be shown that coda consonants must be moraic, and section 4 continues this thread in an exploration of the minimal prosodic word. Section 5 provides a brief discussion, and relates the observations to larger theoretical issues.

2 Word stress

Rigsby (1986), Forbes (2015), and Brown, Davis, Schwan & Sennott (to appear) draw the generalisation that lexical stress in Gitksan falls on the final syllable of the morphological root. This is exemplified below² (data from Forbes 2015: 81–82):

- | | | |
|-----|-----------------------------------|----------------|
| (1) | gɪbá | ‘wait.for’ |
| | g ^w ɪlá | ‘blanket’ |
| | laχ ^h ní | ‘hear’ |
| | mijúχ ^w s | ‘good smell’ |
| | ʔamxsiwá: | ‘white person’ |
| | sɪk ^h é:k ^w | ‘sibling’ |

Forbes (2015) notes that this is a default iambic stress pattern. Forbes further illustrates the fact that despite this default pattern, lexical stress is weight-sensitive. That is, if a syllable with a long vowel precedes the root-final syllable, this syllable will instead be stressed, as exemplified in (2):

- | | | |
|-----|-------------------------|----------------|
| (2) | ná:sɪk ^h | ‘raspberry’ |
| | lá:gal | ‘examine’ |
| | ʔó:ts ^h in | ‘soul, spirit’ |
| | naq ^h é:da | ‘muskrat’ |
| | cawaq ^h á:ni | ‘make peace’ |
| | hó:bɪx ^h | ‘spoon’ |

² Syllable breaks are not indicated in these forms. While syllable divisions are unambiguous in many words (e.g. [gɪ.bá] ‘wait.for’, syllabification in other words is much less clear, due to the fact that Gitksan allows fairly extensive clustering of obstruents, and where the ordering of stops and fricatives in a cluster is relatively free. See Brown (to appear) for a discussion of syllable structure in the language.

Thus, stress is sensitive to syllable weight, with long vowels attracting stress away from the default root-final position. The same pattern, however, does not hold for syllables with a short vowel and closed by a coda consonant³:

- (3) *laχ'ni* 'hear'
 bisdá'j 'grouse'
 gimx'dí 'sibling of opposite gender'
 hmdá 'where'

The generalization is thus that the default for stress placement is the root-final syllable, but a heavy syllable in the root can attract stress away from the right-hand position. As defined by the patterns in (2) and (3), a heavy syllable is one with a long vowel (i.e. CVV), and not one with a short vowel plus a coda consonant (CVC). In Optimality-theoretic terms, this would be the result of ranking of WEIGHT-TO-STRESS » RIGHTMOST, such that primary stress is aligned rightmost in the prosodic word, all else being equal, and where this condition can be over-ridden by the presence of a syllable with a long vowel.

2.1 Implications

As the data above illustrates, the stress patterns in Gitksan have implications for the prosodic representations of the language below the level of the syllable. As noted above, the patterns lead Forbes to the sensible conclusion that coda consonants are not moraic in Gitksan, and for the purposes of stress, only long vowels count as heavy. Thus, the representations of the Gitksan syllable are as in Figure 1:

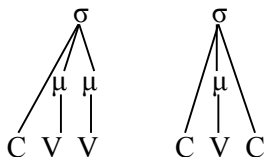


Figure 1 Syllable weight in Gitksan

As Figure 1 illustrates, long vowels are bimoraic, but coda consonants are not moraic. This amounts to one of the options available to languages cross-linguistically, the other option in a system with contrastive vowel length being that coda consonants contribute to syllable weight (i.e., are moraic) (Zec 1995, 2011). In the following sections, data will be presented which supports the view

³ Forbes (2015) actually lists some forms that appear to have this pattern on the surface: [gójp'ax] 'bright', [námq'ap] 'bank of stream'. She notes, though, that the vowel of the second syllable is epenthetic in these cases, motivated by breaking up consonant clusters either (a) after a long vowel, or (b) when the first member of the cluster is glottalized, with the underlying forms of the words above being /qojp'ɣ/ and /namq'p/, respectively. The dynamic introduced by this sub-pattern has obvious implications for a constraint-based approach to stress assignment; however, I will not treat these cases further.

that coda consonants are moraic for some phonological processes in Gitksan. This raises the problem whereby certain structures count as heavy for one phenomenon, and as light for others. This problem will be touched on in Section 5.

3 Reduplication

One aspect of prosodic morphology that requires a distinction between light and heavy syllables in the language is reduplication. Reduplication marks plural number, plural agreement, or durative aspect (Rigsby 1986, Brown 2007). Gitksan exhibits two basic reduplicative templates (plus one more with a fixed palatal fricative, which won't be discussed at length here). One template is a *CV*-reduplicant, with the vowel surfacing as an allophone of /ə/⁴:

(4) *CV*-reduplication

ts'ak'	ɬzi~ts'ak'	'dish'
doʔo	di~doʔo	'cheek'
baʔa	bi~baʔa	'thigh'
lit	li~lit	'wedge'
gin	gi~gin	'to feed someone'
gidax	gi~gidax	'to ask'

This template amounts to a light syllable (σ_{μ}) in the reduplicant. The following illustrates the other template, a *CVC*-reduplicant, where the vowel quality effects are the same as in the pattern above:

(5) *CVC*-reduplication

ʔisx ^w	ʔas~ʔisx ^w	'stink, smell'
ɬzap	ɬzip~ɬzap	'make, do'
jim	jim~jim	'smell (VT)'
t'e:'It	dil~t'e:'It	'be fast, quick'
gats	gas~gats	'pour'
dulp ^{xw}	dil~dulp ^{xw}	'to be short'
masx ^w	mis~masx ^w	'to be red (ochre-coloured)'

Given that there is a contrast between the light syllable template and the template in (5), it's safe to say that the latter is a heavy syllable ($\sigma_{\mu\mu}$).

Assuming that reduplicative templates are derived from genuine units of prosody and not consonantal and vocalic slots (McCarthy & Prince 1986), the surface *CV*- and *CVC*-templates employed in (4)–(5) must be encoded in the grammar in prosodic terms. As argued extensively in Brown (2008), there is no sense in which these reduplicants can fall out of a generalized template; i.e., the reduplicant templates are not shaped by other independent forces in the grammar. Instead, the constraints regulating the reduplicant shape must be stipulated in the

⁴ Most of the [i]s in these forms are more accurately [ɪ]. Vowel quality has been abstracted over in these cases.

form of templatic constraints such as $RED=\sigma_{\mu}$ (“reduplicants equal a light syllable”) and $RED=\sigma_{\mu\mu}$ (“reduplicants equal a heavy syllable”). This is in part because there are no properties of the base that will predict when a given template is used (cf. the similar bases but different templates in *gi~gin* ‘to feed someone’ vs. *jim~jim* ‘smell (TRANS)’), and that there is inter-speaker variation such that some bases will surface with different reduplicants, depending on the speaker, as well as intra-speaker variation such that there is some degree of free variation in reduplicant shape, depending on a given base (for details of the variation associated with plurals, including reduplication, cf. Brown 2007).

4 Minimal words

One other aspect of the prosodic morphology of Gitksan that is worth investigating is the minimal prosodic word. This aspect of the language has not previously been discussed; however, when the possible free-standing words in the language are observed, some clear patterns begin to emerge. The following is only a brief summary; more work in this area is required. The following discussion, however, can perhaps be taken as indicative of the types of constraints on word structure that must be at play. Data from this section is taken from the database collected in Brown (2008, 2010), which subsumes a published dictionary of the language (Hindle & Rigsby 1973), and includes other forms collected during fieldwork.

According to Hayes (1995), the minimal prosodic word in a language corresponds to the minimal stressed foot. As predicted by the account of stress outlined above, this equals a CVV prosodic word.⁵ Aside from the loan [di:]/[tʰi:] ‘tea’, the following constitutes the set of lexical words that are CVV from the database:⁶

⁵ As mentioned in footnote 1, “C” is intended to represent a consonantal onset, and not necessarily a single consonant. Onset clusters exist in the language, and can include lengthy strings of obstruents. See Brown (to appear) for a treatment of onsets in the language.

⁶ There is also a word *x^wda:* ‘mattress’, which, according to the analysis provided by Schwan and Anghelescu (2013), could be interpreted as disyllabic due to the nuclear status of the labialised velar fricative; i.e., [x^w.da:].

(6) CVV words

g ^h o:	‘to move in water, to swim (of fish)’ ⁷
g ^h u:	‘beads’
‘na:	‘out of the woods, into view, against a background’
t ^h a:	‘to sit’
χsda:	‘to win’
je:	‘to go’
ne:	‘no, negative’

Surprisingly, as far as the database in Brown (2008) is concerned, this list is exhaustive.⁸ There are actually just as many, if not more forms that consist of only a syllable with a long vowel, but which are proclitics⁹ (Gitksan makes use of both prenominal and preverbal proclitics, which will be discussed in more detail below):

(7) CVV proclitics

‘ni:	‘on’
lu:	‘inside’
sa:	‘away, off’
sa:	‘suddenly’
si:	‘new, fresh’
‘wi:	‘big, large, great’
gu:	‘one who habitually does (something)’

The prediction made above in Section 2 with respect to stress is that CVC should not count as heavy. There are, however, many more free-standing lexical CVC words that exist in the language than CVV words. In fact, CVC appears to be the canonical, or at least preferred, root shape in the language. (8) illustrates this with only a sampling of those words:

(8) CVC words

bax	‘to run’
ban	‘to ache’
dap	‘liver’
‘mal	‘canoe’
dił	‘bag’
gat	‘to be born, to hatch’
ʔam	‘be good’

If both CVV and CVC count as heavy in the language (i.e. are bimoraic), then the prediction is that the minimal word must be a bimoraic foot. Ito and

⁷ The suppletive plural for this form is also CVV: [lo:].

⁸ There is one additional verbal root *gu*: ‘take, get, catch’; however, as a transitive verb, this root is presumed to never surface without inflectional affixes.

⁹ The clitic status of these morphemes is currently under debate, and further investigation into their prosodic characteristics is likely to yield interesting results; however, for the moment, these structures will be termed clitics, consistent with Rigsby (1986).

Mester (2003) state this as a condition on binary branching, such that the prosodic word must either branch, or the level below it (i.e., the foot) must branch. What is not predicted is a mono-moraic CV minimal word, as this does not constitute a licit stressed foot in the language, and is not a bimoraic structure. For the most part, this prediction holds. There are, however, more than a handful of forms that require some discussion. One set of morphemes is CV, as in (9); however, the forms in (9) are all proclitics (either prenominals or preverbals):

- (9) CV proclitics
- | | |
|-----------|-----------------------|
| tk'i | ‘down’ |
| ʔa, q'a | ‘anew, again’ |
| xsa, xsaχ | ‘only’, ¹⁰ |
| sbi, sba | ‘lair, den’ |
| xsi | ‘fresh’ |
| lgu, lɣwa | ‘small, little’ |
| sga | ‘across the way’ |

Rigsby (1986:58–59) discusses the prosodic status of preverbals. Rigsby notes that prenominals are not free-standing words and are prosodically bound compounding forms, which often have free-standing lexical counterparts. The preverbal clitics, on the other hand, have slightly different properties. Rigsby notes that they are isolable, take secondary stress, and have the distributional properties of words, rather than affixes (such as the property of having full, rather than reduced, vowels). This argues strongly in favor of the preverbals being prosodic words; however, Rigsby (1986:59) states that “They seem to me to be not unlike English prepositions, determiners, and auxiliary verbs [...] and they too don’t bear the primary phrasal stress.” Likening the preverbals to English function words sheds much light on the issue: while the preverbals are not affixes *per se*, they behave like function words in other languages, which typically escape minimality restrictions in languages and are often incorporated into higher-level prosodic structure (cf. Selkirk 1995). Thus these forms do not constitute true exceptions to a ban on CV lexical words, as that ban is assumed to hold on free-standing forms. The behavior of these proclitics is an interesting one, especially the difference between the prenominals and preverbals; however, a more in-depth investigation is still needed in this area.

Finally, there exists a very small set of lexical items that do in fact violate this minimality condition. There are seven lexical items in total, listed in (10):

¹⁰ Dialectally this form is [ksa(χ)].

(10) CV words		
ha		‘air’ ¹¹
psa		‘grey clay’
sa		‘day’
sga		‘herring’
t’a		‘louse’
tqa		‘skin, hide’
wa		‘name’

This exhausts the list of lexical words in the database from Brown (2008). The fact that these vowels are short is demonstrated by measurements from the recordings in Brown et al. (to appear), where the minimal pair [t’a] ‘louse’ and [t’a:] ‘to sit’ can be compared. In unpublished measurements over the tokens from that paper, [t’a:] had an average duration (measured over two productions in isolation) that was more than twice that of [t’a]. It is likely no accident that the vowel in each of these words is the low vowel [a]. No explanation is available at present for this fact, however, and these forms will stand as a list of patterned exceptions. There are three additional forms, the verbal roots *he* ‘to tell (trans)’, *sgi* ‘to be on’, and *wa* ‘to find, to get to someplace’. However, these forms are transitive verb roots, and as such, obligatorily take inflectional affixes. Occasionally trained consultants may produce these as citation forms, but most consultants reject these as free-standing prosodic words.

Finally, there is a piece of supporting evidence in the offglides accompanying short vowels in certain contexts. Rigsby (1986:183–184) notes that in unstressed syllables with short vowels, a resonant [h] offglide follows the vowel. When morphology is added to these roots, the offglide no longer surfaces:

(11) Di!	[dr ^h]	‘Move! (SG)’ ¹²
sa	[sa ^h]	‘day’
sga	[sq ^j ε ^h]	‘herring’

Assuming that the minimal word in Gitksan is CVC, the presence of this offglide in all of the relevant environments such as in (11) suggests that some extra prosodic weight is desired in these sub-minimal forms.¹³

¹¹ Clarissa Forbes (personal communication) notes that this form almost always occurs with the pronominal *laχ* ‘on, in’, yielding the disyllabic *laχha*.

¹² Note that the first form *di* ‘move’ is not in the Brown 2008 database, and thus not listed in example (10) above.

¹³ Thanks to Michael Schwan for bringing this pattern to my attention. He also points out that some consultants will put an apostrophe at the end of these sub-minimal roots to indicate this offglide, and that the offglide is actually orthographically indicated in the Coast Tsimshian language.

5 Discussion

As this paper has shown, while certain syllables count as heavy for the assignment of stress, other syllables count as heavy for other morphological operations. This state of affairs is not as unusual as it seems at first blush. Take, for instance, the case of Maori (Austronesian): long vowels are preferentially stressed, and if no long vowels are present in a word, then diphthongs will count as heavy. Finally, if there are no other “heavy” syllables, the default strategy is to stress a light syllable in initial position (cf. Bauer 1993). In that particular case, both CV_iV_i and CV_iV_j count as heavy, but the grammar makes a distinction when targeting a syllable for stress. The same is true for Kashmiri (Indo-European), where closed syllables will be stressed only if they are the optimal syllable type that is present which can be stressed; i.e., if there are no CVV syllables present (Morén 2000). Mam (Mayan) presents another, similar case: In Mam, CVV syllables are preferentially stressed; if these are not present, then syllables closed with a glottal stop will count as heavy, and will be stressed (England 1983). There are also cases of systems that make a distinction between what counts as heavy for the assignment of primary vs. secondary stress (Rosenthal and van der Hulst 1999). The primary difference between Gitksan and the cases cited above is that Gitksan doesn’t *preferentially* treat CVV over CVC as heavy in the computation of stress. Instead, CVC appears to be uniformly light with respect to stress. Where Gitksan displays similarities with these other systems is in the treatment of CVC as heavy for other types of prosodic morphology. It is in this respect that the inconsistent status of CVC syllables poses an interesting challenge.

These types of weight-inconsistencies across phonological processes have been reported for various other languages, such as Latin, Kiowa, and Lhasa Tibetan (cf. Hayes 1995, Gordon 2006, Zec 2011). It is important to specify that the inconsistency is across *processes*, and not *contexts*, because single contexts such as word-final position, which will be relevant for both the process of stress assignment and the minimal word effect in Gitksan, will yield inconsistencies with respect to the weight of CVC.

While it was noted above that the stressed foot in the language equalled the minimal word, there are still some wrinkles. While the heavy syllable template (i.e. $\sigma_{\mu\mu}$) seemed to be necessary to account for the behaviors of CVC, whatever the reason ultimately may be, CVC does not seem to be the minimal *metrical* foot in the language, but yet it constitutes a legal minimal word. While there remains much work to be done in this particular area, for the moment we can cite Garrett’s (1999) typological work illustrating the point that minimal words, while the smallest legal lexical structures in a language, do not always equal the stressed foot, and that stressed feet and minimal words can coexist in a single system as different prosodic structures.

Finally, Shaw (1992) has presented evidence that sonorants are moraic in the related Nisgha language, where some of the phenomena above, namely, stress assignment and reduplication, exhibit slightly different patterns. If the same types of patterns and behaviours are identified in Gitksan, then this would

present a substantially more complex situation, one worthy of deeper investigation.

References

- Bauer, W. (1993). *Maori*. Routledge.
- Brown, J. (2007). Doubled plurals and the syntax of words in Gitksan. Paper presented at the Workshop on Parts and Quantities, University of British Columbia.
- Brown, J. (2008). Theoretical aspects of Gitksan phonology. Ph.D. dissertation, UBC.
- Brown, J. (2010). *Gitksan phonotactics*. Munich: Lincom Europa.
- Brown, J. (To appear). Sonority in Gitksan. In M. J. Ball (ed.), *Sonority across languages*. Equinox Publishing Ltd.
- Brown, J., Davis, H., Schwan, M. and Sennott, B. (To appear). Gitksan. *Journal of the International Phonetic Association*.
- England, N. C. (1983). *A grammar of Mam, a Mayan language*. Austin: University of Texas Press.
- Forbes, C. (2015). Root-stress in Gitksan: Modelling the path to lexical accent. In N. Weber and S. Chen (eds.), *Proceedings of the workshop on structure and constituency of the languages of the Americas 18 & 19*. UBCWPL 39, pp. 79–93.
- Garrett, E. (1999). Minimal words aren't minimal feet. In M. Gordon (ed.), *UCLA Working Papers in Linguistics 1: Papers in Phonology 2*, pp. 68–105.
- Gordon, M. (2006). *Syllable weight: Phonetics, phonology, typology*. London: Routledge.
- Hayes, B. (1995). *Metrical stress theory*. Chicago: University of Chicago Press.
- Hindle, L. and Rigsby, B. (1973). A short practical dictionary of the Gitksan language. *Northwest Anthropological Research Notes* 7:1–60.
- Ito, J. and Mester, A. (2003). Weak layering and word binarity. In T. Honma, M. Okazaki, T. Tabata, and S. Tanaka (eds.), *A new century of phonology and phonological theory*. Tokyo: Kaitakusha, pp. 26–65.
- McCarthy, J. J. and A. Prince. (1986). Prosodic morphology. Ms, University of Massachusetts and Brandeis University.
- Morén, B. (2000). The puzzle of Kashmiri stress: Implications for weight theory. *Phonology* 17:365–396.
- Rigsby, B. (1986). Gitksan grammar. Ms., University of Queensland.

- Rosenthal, S. and van der Hulst, H. (1999). Weight-by-position by position. *Natural Language and Linguistic Theory* 17:499–540.
- Schwan, M. D. and Anghelescu, A. (2013). Nuclear consonants in Gitksan. Poster presented at the Canadian Linguistic Association, Victoria, BC.
- Selkirk, E. (1995). The prosodic structure of function words. In J. Beckman, L. Walsh-Dickey, and S. Urbanczyk (eds.), *Papers in Optimality Theory*. Amherst: GLSA, pp. 439–469.
- Shaw, P. A. (1992). Templatic evidence for the syllable nucleus. In A. J. Shafer (ed.), *Proceedings of the Northeast Linguistics Society 23*. Amherst: GLSA, pp. 463–477.
- Zec, D. (1995). Sonority constraints on syllable structure. *Phonology* 12:85–129.
- Zec, D. (2011). Quantity-sensitivity. In M. van Oostendorp, C. J. Ewen, E. Hume and K. Rice (eds.), *The Blackwell companion to phonology*. Blackwell, pp. 1335–1362.

