

Tonogenesis in Wakashan¹

Darin Howe

University of Calgary

1. Introduction

- Heiltsuk, spoken in Bella Bella (Wáglísla) and Klemtu (Lhémdu), BC, is unique among Wakashan languages in being considered tonal
- Its vowels and syllabic sonorants are distinctively high-toned (vs. low-toned).²

(1) Some tonal contrasts in Heiltsuk

k ^w ás	‘mussels’	vs.	k ^w as	‘to sit outside’
g ^h éca	‘to belong to s.o.’		g ^h éca	‘how many?’
wígíls	‘how has it moved’		wígíls	‘back of the house exterior’
ṭmécás	‘plant with ṭmécə’		ṭmécás	‘person playing snare drum’
x ^w ása	‘to get ready for sth.’		x ^w asá	‘to sway’
káxʔit	‘to lift the eyebrows’		kaxʔit	‘to slip, start slipping’
ʔíkás	‘place that is high’		ʔíkas	‘ten’
páxsálá	‘odd jobs, casual labour’		páxsala	‘to grope in the air’
máxəlá	‘plucking’		máxəla	‘losing hair or fur’
máʔəlá	‘two doing sth.’		máʔəla	‘swimming’
wátásu	‘you pull’		wátasú	‘to be pulled’
húlális	‘small tide’		húlalis	‘small tides’
x ^w asəlá	‘swaying’		x ^w asəlá	‘getting ready to do sth.’
lasású	‘to be planted’		lasásu	‘you plant’
ʔúpígá	‘shin bone’		ʔúpígá	‘shin bones’
qínák ^w əlá	‘increasing in no.’		qínak ^w əla	‘going straight ahead’

¹ Wakashan (BC, Canada)

- North/Kwakiutlan
 - o Haisla-Henaksiala
 - o Heiltsuk-Oowekyala
 - o Kwakw'ala
- South/Nootkan
 - o Nuu-chah-nulth/Nootka
 - o Ditidaht/Nitinat
 - o Makah (WA)

² All data are from Rath (1981), which subsumes Boas (1928), Kortlandt (1975), and Lincoln and Rath (1980). Only high pitch is marked, after Rath (1981, pace Kortlandt 1975, Rath 1985, Wilson 1987).

- Previous literature on Heiltsuk tone: Kortlandt (1975), Lincoln and Rath (1980:11-2), Rath (1985) and Wilson (1987) [total ≈ 24 pages ☺]
- I here argue that
 - o Heiltsuk is uniquely placed within prosodic systems, which are standardly classified into three basic types: stress, pitch accent, and tone.
 - o Heiltsuk *tone* is the result of both *stress* (§2) and *pitch accent* (§3).
 - o *tonogenesis* results not only from the prosodic phonology of Heiltsuk (stress, pitch accent) but also (indirectly) from glottalization (§2.4, §3.4).

2 Tonal stress

- According to Kortlandt (1975), who first reported tone in Heiltsuk, “[s]tress is automatic and falls on the first high-pitched syllable of a word, if any” (p. 32, also Wilson 1987, de Lacy 2002a:1, fn. 1).
- I propose the converse: in the default case Heiltsuk assigns stress, normally realized as high tone, to the leftmost vowel or syllabic sonorant (henceforth “syllabic”), e.g.³

(2) *Leftmost stress, realized as high tone*

púx ^w ms	‘stomach’
bútkšəla	‘cute boat’
wígaʔciðə	‘instep of the foot’
χ ^w útmxsiyá	‘to cut pieces of sth. into smaller pieces with knife’
χ ^w íðusχ ^w íðusa	‘to eat tomcod’
íatíχ ^w ax ^w íatíχ ^w ak ^w a	‘to eat fish tails’

- All exceptions to leftmost high tone are due to the presence of syllabics which avoid stress.
- Many syllabics which repel stress in Heiltsuk are the usual suspects in prosodic theory: *schwas* (§2.1), *minor syllables* (§2.2), and *clitics* (§2.3).
- A less typical class of exceptional stress, due to *sonorant glottalization*, is discussed in §2.4 below.

³ It is unexceptional to realize stress as high tone (Goldsmith 1987, de Lacy 2002a). Other languages which do this include Creek (Haas 1977), Cayuga (Dyck 1997), and Northern Tepehuan (Kim 1997).

2.1 Schwa

(3) *Stress/high tone “skips” schwas*

ýəʔíxsxʷʔit	‘to become tangled (as rope, wool)’
ʔkʷəɡənú	‘the Halibut Fisherman’
məxmətá	‘bullroarer’
məsʔəɡənáxi	‘marten (over there)’
nəsənəxəláləla	‘to have flexible limbs’ (pl.)
yəxʷyəxʷəlá	‘dancing of the landscape (from rising heat waves)’
čəčəxʷsəyápa	‘(having) short sleeves’
məsʔəqʷənəyúxʷ	‘skunk (near addressee)’

- The stress-repellent property of schwa is well-known.
- Schwa may avoid stress because it is weightless (Kager 1990, Piggott 1995, Kinkade 1998, Hammond 1999, Shaw 1994, 1996, Shaw et al. 1999, Blake 2000, Bach et al. 2005).

Aside:

- Many theorists claim that schwa avoids stress because it is the least sonorous vowel (e.g., Prince and Smolensky 1993, Kenstowicz 1996, Urbanczyk 1996, Bianco 1996, de Lacy 2002b, Gouskova 2005).
- This explanation is inadequate for Heiltsuk if—as seems reasonable—syllabic sonorant consonants (sr̥s̥ ‘mouth’, ʔt̥xʷ ‘snot’, p̥l̥ba ‘flat point’) are less sonorous than the vowel schwa, since stress ignores the latter but not the former in Heiltsuk.

- Schwa may (optionally) appropriate the supralaryngeal features of a preceding (onset) sonorant, which gives rise to a non-schwa syllabic which nonetheless continues to shun high tone. Evidently the derived syllabic preserves the property of schwa which rejects high tone—presumably nonmoraicity (Pulleyblank 1994).

(4) *Variable realization of (tautosyllabic) sonorant+schwa*

yəpkʷ ~ hipkʷ	‘cedar bark mat’
ýəčələ ~ ʔičələ	‘spreading sth. open’
wəsíɡm̥ ~ ʔusíɡm̥	‘belt’
nəλɪf̥ ~ ʔnəλɪf̥	‘to lie on one’s back in the house’

- No high tone is assigned at all to words in which all syllables are headed by schwa, again presumably because schwa does not project a mora which a high tone might dock onto.

(5) *No high tone in words with only schwas*

məckʷ	‘(sth.) shrunk’	čəkʷəxt	‘short (person)’
wəčə	‘tanned hide’	ʔəxʔəkəs	‘strawberry’
məsməs	‘uvula’	kʷəčə	‘hide, leather’
nəsənəx	‘flexible’ (pl.)	ɪəxtəkʷəs	‘fish hawk’
nəxʷsk	‘soapberry’	p̥kʷəs	‘sasquatch’
yəxʷps	‘fond of dancing’	nəkʷəɬ	‘salal berry’
yəxyəqʷəs	‘to lie on the ground’ (pl.)	ʔəxʔəpəs	‘to squat on ground outdoors’
wəɬ	‘in vain, without success’	qəsqəčəs	‘to kneel on the ground outside’

2.2 *Minor syllables*

- Initial obstruents are also ignored in the assignment of leftmost stress (realized as high tone), and no high tone is assigned in all-obstruent words, presumably because they lack sonorant-headed moras which are required for tone docking in Heiltsuk.

(6) qχtú	‘forked at the top’		
sxsábába	‘sharp point’	(7) χ ^w tk ^w	‘(sth.) cut with a knife’
pχ ^w sʔít	‘to start to wither, drop leaves’	ʔxχs	‘thwart of a boat’
k ^w χ ^w bís	‘noiseless fart, cushion creeper’	qqs	‘eye’
ʔxsbíla	‘to spread out on the floor’ (pl.)	tpk ^w	‘flashlight’
χ ^w txtámu	‘knife wound or cut in the knee’		
tx ^w sχʔáqa	‘to jump over and beyond sth.’		

- Howe (2001) suggests for closely-related Oowekyala that at least some obstruents are syllabified without supporting sonorants.
- E.g., they participate in segmental processes such as coda spirantization (see Howe 2004) as well as in prosodic-morphological processes such as reduplication (cf. Bagemihl 1991:606-7 on Nuxalk Salish):⁴

(8) *Some Heiltsuk words with possible obstruent-only syllables*

- | | |
|--|---|
| a. ɬχ ^w -ɬq ^w áćəwá 'brain' | b. t-txstú '(to have) bulging eyes' |
| tx-txəní 'horned owl' | c-cxstəwá 'to wipe the eyes' |
| ɬχ-ɬqá 'to eat seaweed' | q-Gənmí 'women' |
| pł-płá 'to eat fins' | ʃ-ʃχ ^w əmə 'to stroke the face rep.' |
| tx-tká 'to bounce rep.' | c. q ^w G ^w úq ^w 'swan' |
| qł-qłá 'to double up rep.' | qqá 'to give the hunting cry (dogs)' |
| ɬx-ɬk ^w á 'drawers' (lit. "to slide sth. out repeatedly") | qGÍGá 'white diving duck species (cry: "q̇q̇q̇q̇á!")' |

- The initial (hyphenated) obstruents in (8a,b) may well be instances of minor syllables (Hockett 1955, Bell 1978): onset+coda and onset-only syllables, respectively.
- The initial consonants in the onomatopoeiaic words in (8c) may also represent "onset-type syllables" (Hockett 1955:57).
- Even if Heiltsuk grammar admits such obstruent-only syllables, they are avoided by stress, and they lack sonorant-headed moras which might carry a high tone.⁵

2.3 Clitics

- Demonstrative determiners, which are proclitics (⇒) in Heiltsuk, are not assigned any high tone, e.g. (9a), unlike their pronominal counterparts, e.g., (9b).

⁴ Hyphens isolate reduplicants from roots which occur independently; see Lincoln and Rath (1980) for nonreduplicated examples of each root.

⁵ Onset+coda syllables (but not onset-only syllables) are moraic in Kammu; for instance, they can bear tone (Svantesson 1983, Shaw 1994), e.g.:

[pè.ràac] 'mesentery' vs. [pé.lòc] 'forget (CAUS)'

(9) *Some demonstratives in Heiltsuk* (Rath 1981:88, 91)

- | | |
|---|---|
| a. gax ^w ⇒wísm-gaxga 'this man' | b. gáq ^w 'this (one)' |
| this man-N.S | |
| qix ^w ⇒wísm-áχi 'that man' | qíq ^w 'that (one)' |
| that man-R | |
| qkix ^w ⇒G ^w ípálsdə-yaxi 'that smell that(gone) smell-R | s-as dúq ^w əláxt qkíq ^w 'have you (gone) now-2INTER saw that seen that (gone) now?' |

- Prepositions such as his 'with', la 'at' and qn 'for', which are also run together with following words (contra Mithun 2001:551), are likewise not assigned any high tones.

(10) *Some prepositions in Heiltsuk* (Rath 1981:85)

dáduq^w-əlá-i-qi his⇒dúG^wáyú-a-χi la⇒wíl-əyá-χi qn⇒hímás-a-χi
 watch-CONT-SUBJ.R-OBJ.R with⇒binoculars-R-R at⇒beach-R-R for⇒chief-R-R
 {he/she/it} watch {es/ed} {him/her/it} with (the) binoculars on {a/the} beach for {a/the} chief.'

- Proclitics* do not show any high tone because they do not receive (left-most) stress, since by definition they cannot form their own stress domain.
- Heiltsuk proclitics are free in Selkirk's (1996:198) technical sense.
- In contrast to proclitics, pronominal (including deictic) *enclitics* (⇐) are permitted to carry a high tone/stress, because they are internal enclitics in Selkirk's (1996) sense.
- In each of the following examples the stem itself has no stressable syllables (see §**Error! Reference source not found.**) and stress/high tone falls on the enclitic ending.

(11) *Heiltsuk examples with pronominal endings*

- | | |
|------------------------|---|
| wəs⇐í | 'fur (there), the one there is fur(ry)' |
| ləq ^w ⇐í | 'seaweed in plugs (there); sun-dried berries (there)' |
| nəkəł⇐úχ ^w | 'salal berry (near you)' |
| nəχ ^w sk⇐kí | 'that (gone) is/was soap berry' |

wə́ləm←í	‘antler (there); the one (there) is an antler’
nə́spəs←í	‘collapsed house (there), that’s a collapsed house’
mə́sməs←í	‘uvula (there)’
yə́χ ^w ps←(ə)núg ^w a	‘I’m fond of dancing’
čə́łčəx ^w səm←úχ ^w	‘greenish sea urchin near you’
kə́skəsəm←í	‘s/he (there) has a wrinkled face’
čə́k ^w əχt←ənúg ^w a	‘I’m short’
lə́k ^w s←ənúg ^w a	‘I’m different’
ʒə́xʒəkəs←í	‘boulders (there), the ones (there) are boulders’
yə́χ ^w ʒən←úχ ^w	‘dancing paraphernalia ← near you’
nə́χ ^w sg←úχ ^w	‘soapberry near you’
nə́snəχ←ńtk ^w	‘we’re (excl) flexible’
mə́stq←(ə)núg ^w a	‘I dropped (sth.)’
mə́sʒən←úχ ^w	‘marten (near you), that (near you) is a marten’
mə́ʒq ^w əhə́y←úχ ^w	‘skunk (near you)’
mə́cgəhə́y←úχ ^w	‘fish hear (near you), that (near you) is a fish heart’

2.4 Glottalization

- Syllabics that derive from glottalized sonorants cannot be stressed:

(12) Underlying glottalized sonorants shun stress/high tone

a.	√bñ- bñ-Gú (*bñ-Gu)	‘close together’	bə́ñ-á	‘close to sth.’
cf.	√dn- dñ-χsálá	‘to pull aboard’	də́n-á	‘to pull’
b.	√ʒý- ʒi-ps (*ʒíps)	‘fond of buying’	ʒə́y-á	‘to buy’
cf.	√dy- dí-tstəwá	‘wipe tears’	də́y-á	‘to wipe sth.’
c.	√χ ^w l- χ ^w l (*χ ^w l)	‘seal blubber’	χ ^w ə́l-í	‘it’s seal blubber’
cf.	√gl- gí-kəná	‘to crawl on log’	gə́l-á	‘to crawl’
d.	√h- h-sú (*hí-su)	‘you’re dead’	hə́l-ńts	‘we (incl.) are ...’

- This pattern is opaque in Heiltsuk, because glottalization is realized only in onset sonorants in this language (as in Nuuchah-nulth, unlike in Kwakw’ala or Oowekyala, see Howe and Pulleyblank 2001).

- That is, while glottalized sonorants surface as such before vowel- and sonorant-initial suffixes and enclitics, they show no surface glottalization when syllabic, and yet they distinguish themselves from other syllabic sonorants by avoiding stress/high tone.

Compare *Kwakw’ala*:

- Stress falls on the leftmost syllabic sonorant (13a), ignoring schwas.
- Syllabic glottalized sonorants⁶ repel stress (13b).
- In other words, Kwakw’ala admits syllabic glottalized sonorants, but only in unstressed position (cf. syllabic sonorant consonants in English).

(13) Stress in Kwakw’ala⁷

a.	‘dʒmbə́tʃs	‘to bury in hole in the ground’	b.	gm̩’xa	‘to use the left hand’
	‘dŋgustə	‘to pull up’		k ^w ñ’χa	‘clams are spoiled’
	‘wɪgila	‘to stop at a point at a distance’		m̩l’qa	‘to repair canoe’
	‘cik ^w a	‘bird’		dis’tut	‘to wipe eyes’
	‘ʔuxʌla	‘to carry on back’		ʔux’ʌla	‘ib.’ (plural)
	‘qasa	‘to walk’		də́tə’la	‘to laugh’

Aside:

- Kwakw’ala systematically avoids heavy syllables (vowel+tautosyllabic sonorant) and it lacks phonemically long vowels, though vowels are optionally lengthened phonetically in stressed positions (Grubb 1977, Lincoln and Rath 1980:17ff.).
- A mistaken view of Kwakw’ala stress has been perpetuated in widely-cited studies by Zec (1994, 1995a, 1995b, 1998); see also Wilson (1987).
- In forms she draws from Grubb (1977) not only does Zec alternately write ə (e.g., 1995a:105) or e (e.g., 1995a:105) for Grubb’s e (=ə/), but she also adds vowel length marks which are absent in the source, apparently depending on the needs of her analysis.
- In support of her (false) claim that stress falls on the last syllable if no syllable contains a long vowel, Zec adduces gasxá ‘to carry on fingers’

⁶ Glottalized sonorants are preglottalized in onset position but postglottalized in rhymal position in Kwakw’ala, as in most other languages (Ladefoged and Maddieson 1996:110-1, Plauché et al. 1998, Howe and Pulleyblank 2001).

⁷ Data from Boas (1947:218-9, cf. Bach 1975, Lincoln and Rath 1980:20-1).

and max^wts'á 'to be ashamed', citing Boas (1947:217). In citing Boas' two irregular forms gǎsxa' and maχuts!a', Zec ignores 21 examples on the same page which contradict her claim, as well as her other source, Grubb (1977), which gives (different but correct) gǎsxa and máxts'a (p. 171, 195, see also Lincoln and Rath 1980:348, 82).

- Modal sonorants which become glottalized in the course of derivation also avoid leftmost stress/high tone.⁸
- For instance, Heiltsuk, like several other languages (Howe and Pulleyblank 2004), has a relatively large number of glottalizing suffixes, that is, suffixes which carry a floating [+constricted glottis] (Howe 1996).
- Thus the (pan-Wakashan) suffix 'a 'on a rock' causes stem-final stops to become ejective (14a), and stem-final sonorants to become glottalized sonorants (14b). Most fricatives also become homorganic glottalized sonorants under glottalization (14c), there being no glottalized fricatives in Heiltsuk (Howe 1996, cf. Howe 2000, Pulleyblank to appear).⁹

(14) 'a 'on a/the rock (or stove)'

- | | | | |
|------------------------|-----------------------------|-------------------------|--------------------------------|
| a. tík ^w -a | 'to drop (sth.) ...' | cf. tík ^w -a | 'to drop' |
| ǵíq̣-a | 'to put a container ...' | ǵíq̣-a | 'to lift a container' |
| b. k ^w əl-á | 'to lie ...' | k ^w əl-á | 'to lie somewhere' |
| gəỵ-á | 'placed ...' | gəy-álaʔəla | 'placed on a large surface' |
| ǵəỵ-á | 'to be ... for a long time' | ǵəy-ála | '(to be) a long time' |
| c. láẉ-a | 'to stand ...' | láχ ^w -a | 'to stand (animate being)' |
| híł-a | 'well attached ...' | híł-əláʔəla | 'well attached onto a surface' |

- The suffixes 'χu 'throat/neck' and 's 'on the ground outdoors' are also glottalizing, as illustrated in (15a) and (16a). Because they are obstruent-initial, however, their glottalizing effect on a preceding non-stop is covert, as shown in (15b) and (16b): any resulting stem-final sonorant is syllabic, and so cannot surface as glottalized, but it nonetheless shuns stress/high tone, just like an underlyingly glottalized sonorant (cf. (12)).

⁸ Glottalization has varied sources in Heiltsuk, including unusual ones such as voicing and spirantization. See Howe (2004) for a detailed treatment of glottalization vs. tone.

⁹ Some stem-final /s/'s glottalize instead as [č] (ibid.).

(15) 'χu 'throat/neck'

- | | | | |
|--------------------------------------|-------------------------|------------------------------------|--------------------|
| a. ǵíł-əχu | 'long neck' | cf. ǵíł | 'long, tall' |
| k ^w úp-əχu | 'to have a broken neck' | k ^w úp-a | 'to break (stick)' |
| ǵəḳ-əχú | 'to bite the neck' | ǵəḳ-á | 'to bite' |
| čəḳ ^w -əχú | 'short neck' | čəḳ ^w | 'short' |
| q ^w íq̣ ^w -əχu | 'to sprain the neck' | q ^w íq̣ ^w -a | 'to sprain' |
| b. ʔṃ-χú | 'turtleneck, mute' | cf. ʔəm-á | 'to dam off' |
| ʔu-χ ^w ú | 'one's neck' | ʔú-bá | 'end of log' |
| c. tq̣ł-χú | 'itching throat' | tq̣ł-á | 'to itch' |
| q̣ṇ-χút ¹⁰ | 'to fasten around neck' | q̣x-á | 'to fasten' |

(16) 's 'on the ground outdoors'

- a. A glottalizing suffix:

- | | | | |
|------------------------------------|---------------------------|---------------------------------|-----------------------|
| cíłəs | 'to be tilted ...' | cf. cíł-a | 'to tilt' |
| g ^w úḳ ^w əs | 'house ...' | g ^w úḳ ^w | 'house' |
| ḳ ^w ṇq̣əs | 'wet ...' | ḳ ^w ṇq̣ | 'wet' |
| wíχłəs | 'to lean or lie back ...' | wíχ-a | 'to lean or lie back' |

- b. Unstressable syllabic before 's 'on the ground outdoors'

- | | | | |
|---------------------|--------------------------|--------------------------|--------------------------|
| nəx ^w as | 'near ...' | nəx ^w á-(a)lá | 'near to ...' |
| ḳ ^w as | 'to sit ...' | ḳ ^w á-(a)la | 'sitting' |
| gis | 'for a long time ...' | ǵí-χs | 'for a long time aboard' |
| čṃs | 'buried' | čəm-á | 'to bury' |
| las | 'to go ...' | lá-(a)la | 'going' |
| q̣us | 'lake' ('water ...') | q̣ú-χ ^w s | 'water in the canoe' |
| ʔus | 'soil' | ʔú-bá | 'end of log' |
| ʔłs | 'firmly ...' | ʔəl-ála | 'to stay in balance' |
| nas | 'snow ...' | ná-i | 'snow' |
| gis | 'placed or standing ...' | ǵí-čəwá | 'placed in a container' |

¹⁰ /x/ becomes [ṇ] when glottalized, e.g., /mx-'ut/ → [məhút] 'punch-on temple' (cf. məxá 'to punch'); see Howe (2000) for an account of this pattern in Oowekyala.

gəyas	‘crosswise ...’	gəyá	‘crosswise’
yɫs	‘to spread sth. open ...’	yəlá	‘to spread sth. open’
p̄ns ¹¹	‘pit ...’	pəxá	‘to make grooves/notches’

3 Pitch accent

- I claim that Heiltsuk has a mixed prosodic system, with both stress (§2) and pitch accent (this section).

3.1 Lexical accents

- Heiltsuk has several hundreds of suffixes. Of these, little more than a dozen carry a lexical high tone. The list in (17) below is near-exhaustive.
- In each of the examples provided, I suggest that the first high tone represents predictable leftmost stress (see §2.1 above) whereas the second high tone represents a lexically-specified pitch accent.

(17) Some suffixes with lexical tone, with examples

- xsiðá ‘foot, leg’, e.g., k̄ɫx̄s̄h̄xsiðá ‘rag or hide wrapped around one’s leg’; k̄wə̀x̄s̄s̄iðá ‘leather slippers, moccasins’
- áxtis ‘edge of water’, e.g., láx̄wáxtis ‘to stand at the mouth of the river’; ḡwúkwáxtis ‘house at the mouth of a river’
- ðáq̄w ‘speak, sing’, e.g., láðáq̄w ‘to start speaking’; ḡh̄cap̄h̄ðáq̄w ‘how many speeches, songs, ...?’
- ámmas ‘for a while’, e.g., líḡwə́wámmas ‘to borrow for a while’; wáx̄wə́x̄ámmas ‘to smoke for a while’
- ná ‘sth. long and horizontal’, e.g., láx̄w̄ná ‘to stand on sth. long (e.g., log)’; ʔíkułná ‘top side of a horizontal log’
- bá ‘end (sth. long/horiz.)’, e.g., láx̄w̄bá ‘to stand at the end of sth. long/horiz.’; ɫ̄h̄bá ‘moored at the end of sth. long/horiz.’
- ká ‘to reach’, e.g., ʔixaká ‘to be near one’s destination’; wíká ‘to fail to reach one’s destination’

¹¹ See fn. 10.

- igá ‘back’, e.g., ɛ̄m̄digá ‘dorsal fin’; ʔ̄x̄sdígá ‘sheath for a hunting knife’
 - kəyá ‘top’, e.g., k̄w̄ɫkəyá ‘to lie on the boat’s cabin’s roof’; pákəyá ‘top of the boat’
 - m̄yá ‘cheek’, e.g., ʔəsút̄m̄yá ‘(on) the other cheek’; ʔ̄w̄ísut̄m̄yá ‘(on) the other cheek’
 - p̄íq ‘pole, stick’, e.g., gáɫp̄íq ‘pole for hooking’; ʔ̄əw̄h̄p̄íq ‘barbecuing stick’
 - inák̄w ‘home’, e.g., gáx̄inák̄w ‘to come back home’; x̄ɫ̄inák̄w ‘to move back home’
 - íla ‘steep’, e.g., cíxax̄íla ‘steep waterfall or cataract’; ʔ̄əʔ̄h̄x̄ax̄íla ‘steep shore’
 - íɫ ‘inlet, house’¹², e.g., ḡl̄díɫ ‘long inlet’; húḠw̄íɫ ‘to run into the house (of group)’
 - át ‘gloss?’ , e.g., k̄ibát ‘elderberries’ fruit Ha k̄ibát; q̄íx̄át ‘driftwood’
 - h̄c ‘chance’, e.g., h̄m̄ðh̄c ‘chance food’
 - pát ‘layer’, e.g., cícəx̄w̄pát ‘layers of barnacle shells’
 - h̄ta ‘to each other’, e.g., cáq̄h̄ta ‘to throw to each other’
 - dá ‘gloss?’ , e.g., k̄idá ‘little finger’
- Since stress and pitch accent are independently *culminative* (Hyman 1977, Hulst and Smith 1988), only one pitch accent is permitted per word, in addition to the stressed syllable.
 - So for instance, the first suffix of (17) -xsiðá ‘foot’ loses its accent when added to the last suffix of (17) in k̄idáx̄s̄iðá ‘little toe’.

Compare Haisla:

- Many of the lexical high tones of Heiltsuk are paralleled by cognates in its sister Haisla, which may be described as a more typical pitch accent language (Lincoln and Rath 1980:27, 1986, Bach 1998).

¹² This suffix has no high tone in combination with completive -a, e.g. xádiɫa ‘to peek into the house’, cágiɫa ‘to chase into the house’.

- The Haisla forms in (18) below exemplify several suffixes with the same pitch accent as their Heiltsuk counterparts (17).
- So for instance, the second high tone—which I deem a pitch accent—in each of

o Heiltsuk kídá ‘little finger’, kíbát ‘elderberries’, ládzáq^w ‘to start speaking’ and k^wəçsídá ‘moccasins’ is echoed in ...

o Haisla kídá, kíbát, ládzáq^w and k^wəçksídá, respectively.

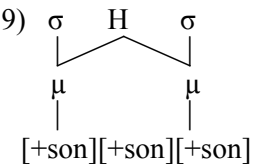
(18) *Some Haisla suffixes with lexical accents, with examples*

-igá ‘back’		-dzáq ^w ‘speak/sing/cry/vocalize’	
gug ^w igá	‘back-house’	gigalədzáq ^w	‘... for the first time (pl.)’
çəmdigá	‘backfin’	ʔagədzáq ^w əla	‘all start to ...’
ʔiʔadigá	‘back sinews’	ʔamadzáq ^w	‘first to say’
gugəg ^w igá	‘back porch’	gidzáq ^w əla	‘... for a long time’
titəgigálkani	‘backsides of hands’	lamadzáq ^w	‘start to ...’
məksəmigáx ^w	‘get hit on back’	ladzáq ^w	‘start to ...’
χ ^w ig ^w igá	‘scrape dirt behind’	q ^w ilidzáq ^w əla	‘talk to oneself’
-bá ‘end’		-áp ‘each other’ (cf. Heiltsuk -ḡta)	
ʔubá	‘end’	çisəlap	‘take care of each other’
gibásu	‘(fixed) on end’	łaluk ^w əχdáp ^t u	‘arguing with each other’
wiswəłbágilak ^w s	‘sharp pointed’	ławinənuk ^w áp	‘love each other’
walabá	‘last in line’	yaq ^w áp	‘gamble (with each other)’
łəngənbá	‘stick (for peeling off bark)’	łalək ^w áp	‘force himself (usually: force each other)’

- While some of the lexical high tones of Heiltsuk may be innovations, the parallelism with Haisla suggests that the pitch accent system itself may hark back to Proto North Wakashan (contra, e.g., Jacobsen 1979, Wilson 1987), since Haisla and Heiltsuk are genetically remote within Northern Wakashan (Bach 2004).

3.2 Tonal feet

- An immediate problem for my proposal that Heiltsuk tones result from stress and pitch accent is that the latter share the property of *culminativity*, as mentioned above, so we expect at most two tones in each Heiltsuk word—one for stress and one for pitch accent—yet many words show more, e.g., łłχʔínúχ^w ‘killer whale, blackfish’, k^wák^wk^wəqáyú ‘windows’, etc.
- The solution lies in a heretofore curious generalization (Lincoln and Rath 1980:11, Rath 1981:11): any word may have no more than three high tones, and this maximum is possible only if the last two high-tone bearing units are separated by a modal sonorant, e.g., χ^włçusχ^włçusanúg^wa ‘I ate tomcod’. (19)
- The stringent nature of the latter adjacency condition strongly indicates that the last two high-tone syllabics share their tonal specification (Wilson 1987:327), as diagrammed in (19).
- Building on Rath (1985) I propose that Heiltsuk grammar actively assigns a pitch accent to a string of (modal) sonorants—heretofore a *sonorant plateau*—and that the resulting configuration (19) constitutes a *tonal foot* (cf. Leben 1996 on Hausa, Zec 1999 on Serbo-Croatian).
- Crucially, this tonal foot is independent from stress in Heiltsuk: the two may overlap (20a), they may be immediately adjacent (20b), or else be removed from each other by any number of syllables (20c).



(20) *Some Heiltsuk words with sonorant plateaux*

a. g ^w úmága	‘ratfish’	b. łíg ^w úmás	‘to lend’
qáníqas	‘balsam tree’	bák ^w álísta	‘to talk in circles’
łłlákut	‘to tie ropes/boats together’	łíg ^w áyú	‘tattooing needle’
pstálíla	‘soak dried her-ring spawn’	χ ^w tχtámúnúg ^w a	‘I’m cut in the knee’
χńyáçi	‘smoke-dried salmon box’	yábrńnúg ^w a	‘I’m a messenger’
cáhiła	‘pour water into the house’	ʔúdzáłłs	‘sth. troublesome outdoors’

- c. ʔíkʷiʔbálá 'to have a bleeding nose'
 kákadikáyú 'unbaited deadfall'
 ʔáxʷstəwísíla 'to make tight, to put under strain'
 ʔíkaspŋgʷustíwá 'ten trips upward, to make ten trips upward'
 síkaχsikaχsɣʔaqanúgʷa 'I pole-vault(ed) repeatedly'

- High tones are attracted to sonorant strings that arise from fricatives changing into homorganic sonorants, due to a voicing suffix—in this case -ači 'container'.¹³

(21) *Tone and lenition*

číkáláči	'warship'	cf. číkálɪɪ	'war hat'
kʷíyáči	'spittoon, cuspidor'	kʷísa	'to spit'
cínáci ¹⁴	'water main/pipe, gutter'	cíxʔit	'to serve water'
cáwáči	'container for catching drips from a leaking roof'	cáxʷa	'to leak, drip'

- High tones are assigned to sonorant plateaux is provided by the (productive) reduplication that accompanies the (glottalizing) suffix /-ʔa/ 'to try'.
- As shown in (22a) the reduplicant is always an open syllable with a fixed vowel [a].¹⁵ Crucially, when this reduplicant is added to a root that begins in a modal sonorant, a sonorant plateau is formed which attracts a tonal foot (19), as shown in (22b).

(22) 'to try ...'

a. dádukʷa	'... to troll'	b. nánúkʷa	'... to get fur seal'
bábika	'... to ignite'	lálíta	'... to search'
kákŋwá	'... to catch crabs'	wáwŋqá	'... to go deeper down'
mámáɪtəyá	'... to recognize'	mámíyá	'... to get fish'
nánáká	'... to use the sling'	yáyápa	'... to send on an errand'

¹³ For more information on this regular process of lenition, see Howe (2000) on Oowekyala.

¹⁴ /x/ becomes [n] when voiced; see Howe (2000) for an account of this pattern in Oowekyala.

¹⁵ A similar reduplicative pattern is found in Algonquian (e.g., Ahenakew and Wolfart 1983).

wáʔúta	'... to pierce' ¹⁶	wáwáta	'... to pull'
yáʔíta	'... to row' ¹⁷	yáyáwa	'... to dance'

- That the proposed tonal foot (19) carries a pitch accent is demonstrated by its culminativity effect.
- On the one hand, the examples in (23) show that a tonal foot precludes a later lexical accent (cf. (17)).

(23) *Culminativity effect of tonal foot on lexical pitch accents*

a. -xsiɬá	qʷúnáxsiɬa	'big toe' (cf. qʷúná 'thumb') 'foot' (*qʷúnáxsiɬá)
b. -ɬáqʷ	mánáɬaqʷ	'to talk, sing, whistle, ... simultaneously' (*mánáɬáqʷ)
c. -bá	sgáyúba	'bayonet' (cf. sgáyú 'spear, harpoon') 'end' (*sgáyúbá)
d. -píq	yáyúwaspiq	'mast' (cf. yáyúwas-ʔit 'to hoist the pole') 'sail' (*yáyúwaspíq)
e. -'igá	dáwábiga	'quill on the back of fish (e.g., back)' (*dáwábígá) 'rock/red cod'
f. -íla	gʷásánúsbíla	'on this side of a steep point of land' (*gʷásánúsbíla) (cf. ʔəʔŋχaxíla 'steep shore')
g. -ŋíta	čícəxʔálíɪŋíta	'to tell stories to each other' (*čícəxʔálíɪŋíta) (cf. chícəxʔálíɪ 'tell stories in turns')

- On the other hand, a lexical accent prevents a later tonal foot, e.g., qŋdigáwatala 'to use a gun' (*qŋdigáwatalá), cf. (23e); cíxaxíla 'steep waterfall or cataract' (*cíxaxílálá), cf. (23f).
- The culminativity is also demonstrated by the fact that a high tone is assigned only to the leftmost sonorant plateau in a word. For instance, adding the pronominal enclitic <=nugʷa 'I' to a sonorant-final stem produces a sonorant plateau which normally yields a tonal foot, e.g.,

¹⁶ The root √wut- 'pierce' shows regular dissimilatory debuccalization (ʔúta 'to pierce').

¹⁷ The root √yit- 'row' also shows regular dissimilatory debuccalization (ʔíta 'to row').

o gíʒa ‘to grind’ : gíʒánúg^{wa};

o níʒa ‘to pull (hair)’ : níʒánúg^{wa}

However, such a tonal foot cannot be added to a stem that already has one, for instance via Ca-reduplication (22b); compare

o gágíʒa ‘to try to grind’ : gágíʒánúg^{wa} with

o náníʒa ‘to try to pull’ : náníʒanug^{wa} (*náníʒánúg^{wa}).

- (24) gáyúyala ‘north wind’
 cáyúsawa ‘one’s spills of liquid’
 lág^wustíwála ‘to go up’
 k^wə́lúttíwála ‘to sleep away from the boat on the shore’
 mámaləmilas ‘swimming pool’
 skápŋg^wustíwáɬəwalayaxi ‘that fifty dollar bill over there’

- The tonal foot in (19) makes crucial reference to a sonorant plateau which is admittedly not a recognized primitive of prosodic theory.
- It is well-established, however, that tones are often realized as flat plateaux rather than as sharp peaks and troughs in the fundamental frequency contour (Silverman and Pierrehumbert 1990, House and Wichmann 1996, D’Imperio 2002). Knight (2003), among others, finds that high pitch intonational plateaux are favored both within a sonorant plateau and within a metrical foot.
- Given that the fundamental frequency is generally perturbed by consonants other than modal sonorants, it is rather surprising that apparently few other tonal systems make crucial reference to sonorant plateaux.

Other tonal feet:

- Two other tonal feet in Heiltsuk attract the pitch accent, just like (19):
 - o a disyllabic foot with the sequence ...əR^ʔ... (schwa+sonorant+high tone syllabic sonorant), which represents another sonorant plateau, and
 - o a heavy syllable shaped C^ʔVR (R=sonorant).
- We will ignore these for time’s sake.

3.3 Pronominal enclisis (revisited)

- The paradigms in (25) are representative of pronominal conjugation.
- About half of these forms illustrate that pronominal enclisis can result in a tonal foot which predictably attracts a pitch accent, as discussed above.
- However, the complete paradigms in (25) reveal that a high tone is assigned more generally between the predicate and the subject enclitic.
- This *boundary high tone* (cf. Hyman 1990) falls on a predicate-final (non-schwa) syllabic if any (e.g., líg^wú←k^wi, ḱqaxá←su, yábŋ←k), else on a syllabic of the enclitic if any (e.g., pəlúp←sú, pəlúp←kí).

(25)		a. líg ^w u	b. ḱqaxa	c. yábŋ	d. pəlúp
		‘borrow’	‘bow head’	‘messenger’	‘sister-in-law’
	1s	←nug ^{wa} líg ^w únúg ^{wa}	ḱqaxánúg ^{wa}	yábŋnúg ^{wa}	pəlúpənúg ^{wa}
	1p.incl.	←nts líg ^w əwŋts	ḱqaxánts	yábəwŋts	pəlúpŋts
	1p.excl.	←ntk ^w líg ^w əwŋtk ^w	ḱqaxántk ^w	yábəwŋtk ^w	pəlúpŋtk ^w
	2	←su líg ^w úsu	ḱqaxásu	yábŋsu	pəlúpsú
	3.near.1	←k líg ^w úk ^{w18}	ḱqaxák	yábŋk	pəlúpk
	3.n.s.invis	←kts líg ^w úk ^w ts	ḱqaxákts	yábŋkts	pəlúpkts
	3.near.2	←u(χ ^w) líg ^w əwú(χ ^w) ¹⁹	ḱqaxáw(χ ^w)	yábəwú(χ ^w)	pəlúpú(χ ^w)
	3.n.a.invis	←uχ ^w ts líg ^w əwúχ ^w ts	ḱqaxáwχ ^w ts	yábəwúχ ^w ts	pəlúpúχ ^w ts
	3.remote	←i líg ^w əwí	ḱqaxáy	yábəwí	pəlúpí
	3.rem.invis	←its líg ^w əwíts	ḱqaxáyts	yábəwíts	pəlúpíts
	3.gone	←ki ²⁰ líg ^w úk ^w i	ḱqaxáki	yábŋki	pəlúpkí

3.4 Glottalization (revisited)

- In §2.4 we remarked that a syllabic that derives from a glottalized sonorant shuns the leftmost high tone, which represents stress.
- Interestingly, a *posttonic* syllabic that derives from a glottalized sonorant actually *attracts* a high tone. This paradoxical pattern, which is reported

¹⁸ /≠k/ (as well as /≠k=ts/ and /≠ki/ below) undergo regular progressive rounding assimilation.

¹⁹ Here and in the next form ...wu... is actually pronounced ...hu... due to regular dissimilatory sonorant debuccalization.

²⁰ This morpheme is possibly a (time-sequential?) combination of -k NEAR SPEAKER + -i REMOTE.

by Rath (1985), is especially clear in C[i]-reduplication, which expresses plurality. Regular stress (realized as high tone) falls on the fixed vowel [i] of the reduplicant, as shown in (26a). Crucially, after this stress/high tone, a syllabic which is underlyingly glottalized (cf. (12) above) surfaces with an additional high tone, as shown in (26b).

(26) *C[i]-reduplication*

	Singular	Plural	
a.	ḥpa	ḥḥpa	‘soft’
	tḥk ^w a	tḥḥk ^w a	‘to eat cured salmon eggs’
	qík ^w k ^w	qíqḥk ^w k ^w	‘thing one lies on, e.g. mat’
	kbiḥa	kíkbiḥa	‘to tuck sth. into/under/between sth.’
b.	bḥgəlá (√bḥ-)	bíbḥgəla	‘close to the (rocky) shore’
	ḥl (√ḥl-)	ḥís-ḥl	‘dead’
	ḥips (√ḥy-)	ḥíḥips	‘spend-thrift’
	sag ^w ḥ	sísag ^w ḥ	‘hairseal’
	qat	qíqat	‘news one has heard’
	ḥmgíla	ḥíḥmgila	‘to cook’
	nax ^w	nínax ^w	‘vagina’

- The following examples illustrate that underlyingly glottalized sonorants in suffixes also attract a high tone when syllabic.

(27) *Underlying glottalized sonorants attract high tone after stressed syllabic*

a.	ýagḥsú	‘to be diseased’	vs.	ýagḥsəw-í	‘...-3SG.’
cf.	mḥcḏu	‘measuring board’		mḥcḏəw-í	
b.	ḏámasú	‘feeding bottle nipple’		ḏámasəw-í	
cf.	pálabu	‘skiff’		pálabəw-í	
c.	qáqapəcasú	‘bull’s eye’		qáqapəcasəw-í	
cf.	mənáyu	‘drumstick’		mənáyəw-í	
d.	ḥúsí	‘day, date’		ḥúsəy-úχ ^w	‘... by you’
cf.	ḥíχaci	‘chiton’		ḥíχacəy-úχ ^w	
e.	páqí	‘board flat on the water’		páqəy-uχ ^w	

cf.	kápi	‘humpback/pink salmon’	kápəy-úχ ^w
f.	mḥcí	‘reserve’	mḥcəy-úχ ^w
g.	múq ^w əḏí	‘pregnant animal’	múq ^w əḏəy-úχ ^w
h.	qáxsí	‘half’	qáxsəy-úχ ^w

- Glottalizing suffixes, too, regularly create a pitch accent, as illustrated below with ‘s ‘on the ground outdoors’ (cf. (16) above).

(28) *Derived glottalized sonorants*

a. A glottalizing suffix: ʔ-s ‘on the ground outdoors’					
	cítəs	‘to be tilted ...’	cf.	cíta	‘to tilt’
	g ^w úk ^w əs	‘house ...’		g ^w úk ^w	‘house’
	k ^w nqəs	‘wet ...’		k ^w nq	‘wet’
	wíχʔəs	‘to lean or lie back ...’		wíχa	‘to lean or lie back’
b. High tone sonorants before ʔ-s ‘on the ground outdoors’					
	kítḥs	‘grass ...’	cf.	kítḥ	‘grass’
cf.	éáqḥs	‘outer cedar bark’			
	kátús	‘meet ...’		kátu	‘meet’
cf.	yəχátus	‘to ride the rapids’			
	mḥsgḥs	‘one round thing...’		mḥsgḥ	‘one round thing’
cf.	lúχ ^w smsgḥ	‘round person’			
	láχ ^w ús	‘to stand together ...’		láχ ^w u	‘to stand together’
	ḏáqús	‘mixing, running of colours ...’		ḏáqu	‘mixing, running of colours’
	gḥcasgḥs	‘how many coins...?’		gḥcasgḥ	‘how many coins?’
	x ^w ílaχíls	‘drop from a higher level outdoors’ (per- son, animal)		x ^w ílaχlá	‘falling down from a higher level’ (person, animal)

- To account for this general pattern, I assume that within the Prosodic Word—but not in its head (stressed) position—[+constricted glottis] “transmutes” to high tone ([+upper register]), as is well-documented in tonogenesis elsewhere (e.g., Kingston to appear on Athabaskan).

4 Conclusion

- Heiltsuk tone appears to interact with two co-existing prosodic systems: stress (which harkens back to Proto Wakashan) and pitch accent (which seemingly arose in Proto North Wakashan).
- Welsh offers a possible parallel: pitch accent is considered ancillary to its stress system (e.g., Jones 1949), and it is tempting to subsume the former under the latter (as, e.g., Williams 1989 argues), but Griffen (1998) argues that both systems are independently required and neither is dominant in Welsh.
- A broader question is whether Heiltsuk tone is synchronically predictable from stress and pitch accent, without being a mind reader (cf. Bolinger 1972).
- For example, suffix sonorants which alternate in tone (cf. *polarity* phenomena) are probably glottalized, even though the glottalization is never surface-apparent:

(29) /-l̥s/ ‘outdoors, land’

- a. With preceding high tone: [-l̥s] (pitch accent)

l̥t̥l̥s ‘to search outdoors’ cf. líta ‘to search’

cf. m̥l̥s ‘measles’

m̥át̥l̥s ‘to fly off from the land’ m̥át̥-əlá ‘to fly’

- b. Without preceding high tone: [-l̥s] (opaque glottalization nonetheless repels stress/high tone?)

l̥əx̥l̥s ‘trail in the woods’ cf. l̥əx ‘trail’

k̥ax̥l̥s ‘to slip or slide outdoors’ k̥axá ‘to slide, make a slip’

ps̥l̥s-əlá ‘to clear an area’ ps-əlá ‘cleared area’

h̥ix̥l̥s ‘clear underbrush’

(30) /-g̥at̥/ ‘sound’

- a. With preceding high tone: [-g̥at̥]

ʔát̥əg̥át̥ ‘loud sound’ cf. ʔát̥-əlá ‘yelling’

k̥ʷúp̥ə-g̥át̥ ‘sound of stick breaking’ k̥ʷúp̥-a ‘to break a stick’

k̥áp̥əg̥át̥ ‘sound of gnawing’ k̥ápa ‘to gnaw’

m̥át̥əg̥át̥ ‘sound of flying off’

m̥át̥-əlá ‘to fly’

q̥ʷáq̥əg̥át̥ ‘to give a scream’

q̥ʷáqa ‘to scream’

ʔígaq̥ʷəg̥át̥ ‘loud sound’

p̥íp̥k̥ʷəg̥ʷát̥ ‘to say a word’ (pl.)

- b. Without preceding high tone: [-gaʔ]

n̥ək̥əgaʔ ‘to utter’ cf. n̥ək ‘to say’

ʂačəgaʔ ‘sound of a slap’ ʂasá ‘to slap’

ʂəp̥əgaʔ ‘sound of slamming door’ ʂəpá ‘to shut the door’

q̥k̥əgaʔ ‘to utter sth.’ (woman) q̥k̥álá ‘to speak’ (woman)

p̥k̥ʷəg̥ʷaʔ ‘to say a word’ p̥k̥ʷálá ‘to talk’

(31) /-(s)ista/ ‘around’

- a. With preceding high tone: [s̥ista] ([c̥ista] after underlying coronal fricatives)

q̥l̥χ̥-s̥istala ‘to cut around’ c̥ík̥aʔ-c̥ista ‘to riot’

k̥íχ̥ʷ-s̥istala ‘running around sth.’ q̥ú-c̥istala ‘travelling around sth. on the water’

l̥úχ̥ʷ-s̥istala ‘to turn around’ m̥át̥-c̥ist-ala ‘swimming around an island’

ʔát̥-c̥ista ‘to go back around again’ q̥án̥-ístala ‘soaring around a bay or inlet’

- b. Without preceding high tone: [sistá]

q̥ʷm̥-sistá ‘to crumble’ maʔ-cistəʔísələ ‘flying around the world’ (“sprinkle around”)

ɕiχ̥ʷ-sistálá ‘riding a bicycle’ (feet pushing around) c̥i-cistálá ‘winding rope around sth.’

x̥ʷiχ̥-sistálá ‘flinging a rope around sth.’ m̥əʔ-cistáwt ‘to mix sth. with sth.’

ʔix-sistá	‘to spawn all around an area’	qɫx ^w -sistəʔɪ	‘to move from a sitting to a lying position’
ʔmsistá	‘to burst open’		

- Similarly, root sonorants which alternate in tone are probably glottalized, but again, no surface glottalization warrants this.

(32) *Reduplication suggests root sonorant is underlyingly glottalized*

	Singular	Plural	
a.	kɪx	kɪkɪx	‘metal, iron’
cf.	tɪq ^w	tɪtɪq ^w	‘soft’
b.	qɪ-χəwála	qɪqɪχəwála	‘to wear sth. around the neck’
cf.	pɪq ^w əlá	pɪpɪq ^w əlá	‘keeping satiated’
d.	k ^w ɪs	k ^w ɪk ^w ɪs	‘to lie on the ground outside’
cf.	k ^w ɪkstáls	k ^w ɪk ^w ɪkstáls	‘to lie on the ground outdoors’
e.	q ^w ɪbá	q ^w ɪq ^w ɪbá	‘to come to an end’
cf.	pɪlca	pɪpɪlca	‘to become moss-covered’
f.	ʔɪmχú	ʔɪʔɪmχu	‘turtleneck, mute’
cf.	ɪmχú	ɪɪmχú	‘(s)he/they (near you) inhaled smoke’
i.	ɡɪχtəwála	ɡɪɡɪχtəwála	‘Christian cross’
j.	ʔix-stús	ʔɪʔixstus	‘generous’
k.	tɪmχ-səyút	tɪtɪmχ-səyút	‘to break wood lengthwise with the hands’
m.	ɪmstút	ɪɪmstut	‘to draw the curtain’
n.	nax ^w	nɪnɪax ^w	‘vagina’
o.	hisábəwá	hɪʔɪsábəwa	‘underneath sth.’
p.	qbusú	qɪqbúsu	‘to spill solids accidentally’
q.	χapk ^w	χɪχápk ^w	‘child’
r.	qəyúχ ^w	qɪqəyúχ ^w	‘expensive’
s.	psɪsələ	pɪpsɪsəla	‘to clear an area’
t.	ʔəpəgaɫ	ʔɪʔəpəgaɫ	‘sound of slamming door’
u.	ʔixsistá	ʔɪʔəχsístá	‘to spawn all around an area’
v.	qásá	qɪqása	‘to level up’

Appendix: Segment inventory of Heiltsuk

Heiltsuk phonology uses voicing and glottalization to distinguish three series of stops and affricates (Howe 1998, contra Kortlandt 1975, Lincoln and Rath 1980:6-7), and two series of sonorant consonants. No overt laryngeal distinctions are made in the fricatives, nor in the syllabics

(33) Segmental inventory of Heiltsuk

p	t	ʔ	c	k	k ^w	q ^w	q
b	d	ɫ	ɬ	g	g ^w	ɠ ^w	ɠ
p̥	t̥	ʔ̥	c̥	k̥	k̥ ^w	q̥ ^w	q̥
		ɬ	s	x	x ^w	χ ^w	χ
m	n	l	y	w			ɦ
m̥	n̥	l̥	y̥	w̥			ʔ̥
ɱ	ɳ	ɭ	i	u	a		ə
ɱ̥	ɳ̥	ɭ̥	í	ú	á		

syllables

—except for pitch. No overt length distinctions are made among the syllabics either. The unrounded velars are highly fronted. There are two types of laryngeals: guttural ones written <h̥, ʔ> which (like unrounded uvulars) lower and backen surrounding segments (especially vowels), and plain ones [h, ʔ] which have no such effect (Howe 1999). Schwa is highly coloured by its environment. Finally, there are three diphthongs: /ay/ [ɛy ~ ʌy], /aw/ [aw ~ ow] and (rarely) /uy/ (e.g., ʔənúy ‘cloud’).

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