

Segmental features in Heiltsuk tone*

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0. Outline

§1 Heiltsuk tone > §2 Glottalization > §3 Spirantization > §4 Analysis

1. Introduction

Wakashan (BC, Canada)¹

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

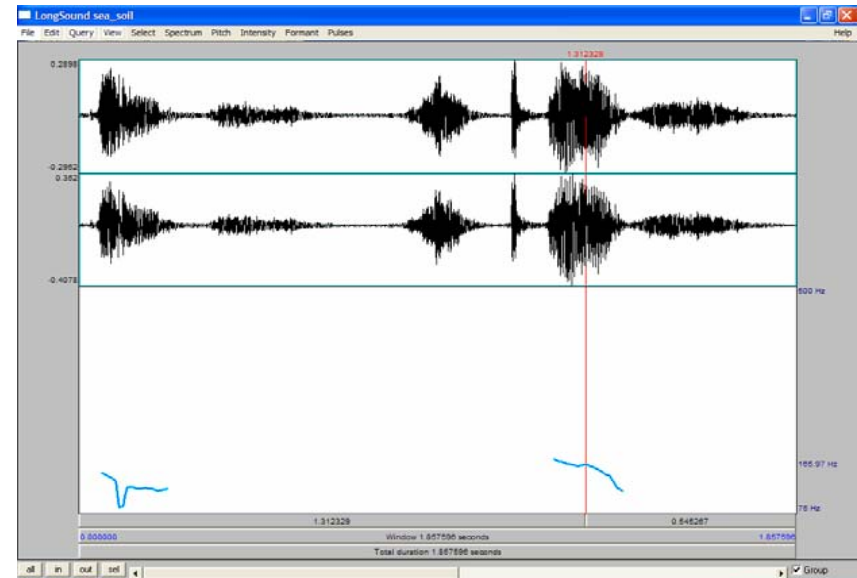
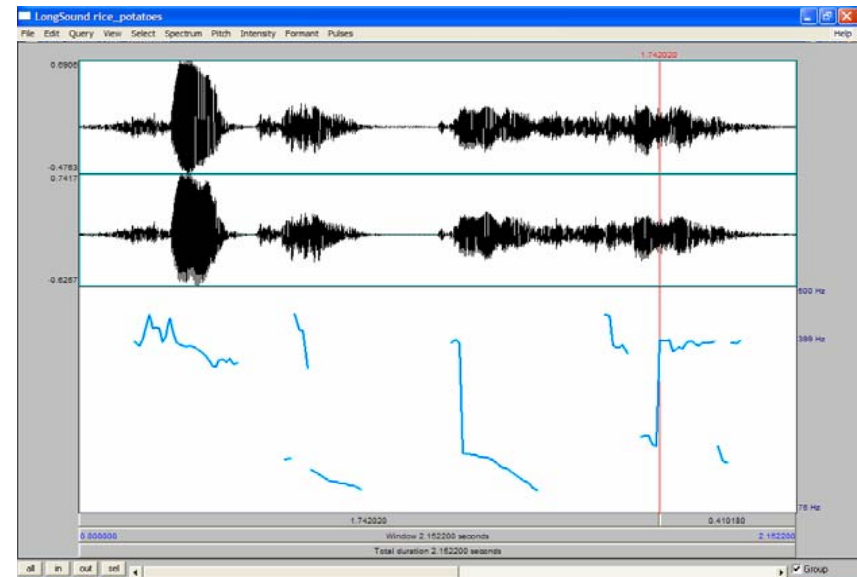
High (´) vs. low tone distinction in Heiltsuk (Kortlandt 1975, Rath 1981, 1985).

(1) k ^w ás	'mussels'	k ^w as	'to sit outside'
tʰás	'out at sea, seaward'	tʰas	'fatty, greasy, oily'
máʔ	'where?'	paʔ	'split board'
k'ús	'nonexistent'	q'us	'lake'
x ^w ása	'to prepare'	x ^w asá	'to sway'
wígls	'how has it moved'	wígls	'back of the house exterior'
x ^w úbí	'a kind of bird'	k ^w abí	'coffee'
q'úsʔit	'to start paddling'	q'usʔit	'to become a lake'
dixdus	'rabbit' (Klemtu)	giludán	'horse'
g ^w usí	'potatoes'	dzúsí	'hole s.o. has dug'
máʔələ	'swimming'	máʔələ	'two people doing sth.'
máχələ	'plucking'	máχələ	'losing hair or fur'
wígíʔa	'on a trip to where?'	wígíʔa	'to take off load from one's shoulder'

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¹ Icebreaker: Find the Proto-Wakashan (< Mosan < Almosan < Amerind) stem:

He.: bústngmʔ	'kind of hat'	Nu.: postinʔath	'American'
(hint: -gmʔ	'mask, head wear')	(hint: -ʔath	'tribe')



“The actual difference of pitch between high and low tone varies, but in slow speech it can be as much as the musical interval of a fourth.”

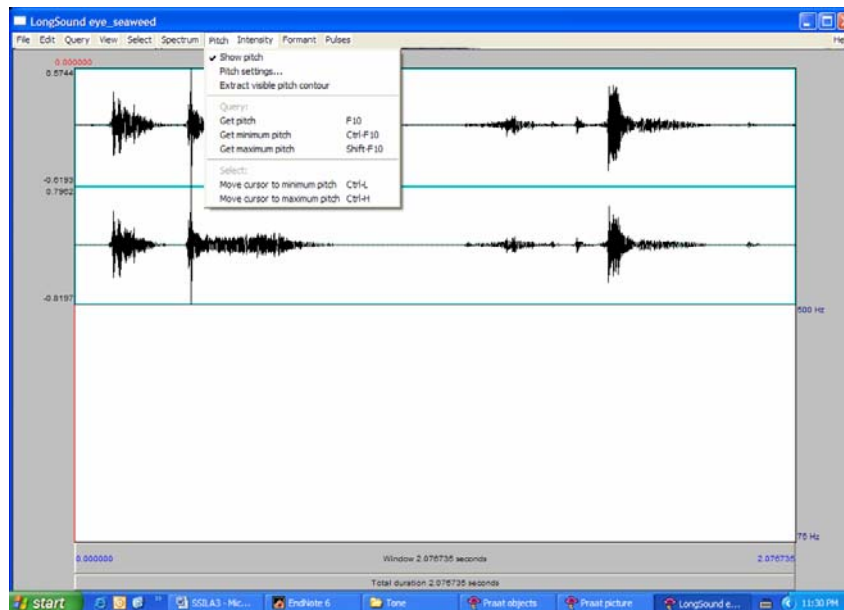
(Lincoln and Rath 1980:11-2)

(2) No tone in obstruent-only words

χ ^w tk ^w	‘(sth.) cut with a knife’	qqs	‘eye’
ʈxχs	‘thwart of a boat’	tpk ^w	‘flashlight’

(3) No tone in words with only schwas (nonlexical)

ʈs'ək ^w əχt	‘short (person)’	məʈsk ^w	‘(sth.) shrunken’
ʈ'əxtʈ'ək'əs	‘strawberry’	wəʈs'ə	‘tanned hide’
k ^w əʈs'ə	‘hide, leather’	məsməs	‘uvula’
t'əxt'ək ^w əs	‘fish hawk’	nəsnəχ	‘flexible’ (pl.)
pk ^w əs	‘sasquatch’	nəχ ^w sk	‘soapberry’
nək ^w əʈ	‘salal berry’	jəχ ^w ps	‘fond of dancing’
ʈ'əxtʈ'əp'əs	‘to squat on the ground outdoors’	jəχjəq ^w əs	‘to lie on the ground’ (pl.)
q'əsq'əʈs'əs	‘to kneel on the ground outside’	wəʈ	‘in vain, without success’



[q^x q^x]
qqs ‘eye’

[ʈ q' ə s t]
lhqst ‘edible seaweed’

Rath (1985) observes that Heiltsuk grammar usually assigns high tones to

- the leftmost “singleton” (any non-schwa sonorant following an obstruent, glottalized sonorant, or word-initial sonorant), and to
- the leftmost “doubleton” (any sonorant+sonorant sequence following an obstruent, glottalized sonorant, or word-initial sonorant) or “tripleton” (any sonorant+sonorant+sonorant sequence following an obstruent, glottalized sonorant, or word-initial sonorant).

(4) a. Leftmost “singleton” and “doubleton” [aR] attract a high tone

k ^w ík ^w lkstáls	‘to lie on the ground outdoors’
díndntʈájáinuχ ^w	‘plural of: person good at the seine, “highliner”’
k ^w ík ^w nχʔnχʈáls	‘dew’
ɖzígntʂáudenug ^w aq ^w	‘I pushed it down in the water with a pole’
x ^w íʈámt'inuχ ^w	‘wrestler’
ʔixst'áuk ^w inug ^w a	‘Am (was) I well?’
x ^w íʈáusəla	‘transferring fish/animal between vessels’
lámstala	‘putting things into the water’

b. Leftmost “singleton” and “doubleton” [RV] attract a high tone

dáduq ^w əlá	‘watch’
gúʈsats'əgənak ^w əlá	‘how many lines?’
híʔəʈgənak ^w əlá	‘to recover from sickness gradually’
ʈəmálatʈəla	‘sth. tied to sth., moored; to tie sth. to sth.’
kúk ^w əláli	‘dried clams’
ʈs'əliχʈs'əliqastup'aʔʔug ^w axga	‘you had one with your shining nose’

b. Leftmost “singleton” and “tripleton” [VRV] attract a high tone

ʔík ^w íʈbála	‘to have a bleeding nose’
kákadik'ájú	‘unbaited deadfall’
lág ^w ustíwála	‘to go up’
ʈáx ^w stəwísíla	‘to make tight, to put under strain’
sk'ápŋg ^w ustíwáɖzəwalajaxi	‘that fifty dollar bill over there’
ʔík'asp'ng ^w ustíwá	‘ten trips upward, to make ten trips upward’
bák ^w álista	‘to talk in circles’
jábínúg ^w a	‘I am (was) a messenger, sent on an errand’
k ^w əʈúʈtíwála	‘to sleep away from the boat on the shore’
bág ^w ána	‘skate (fish)’
ʈsájúsawa	‘one’s spills of liquid’

2. Glottalization and tone

Rath (1985) discovered that glottalization affects Heiltsuk tone in two contradictory ways:

- I. A high tone does *not* fall on the leftmost “singleton” (cf. (4)) if the latter derives from a glottalized sonorant.

(5) Underlying glottalized sonorants

- | | | | | | | |
|----|---------------------|--------------------------------------|-------------------|-----|----------------------------------|----------------------|
| a. | /b _h -/ | bn-gú | ‘close together’ | vs. | bə _h -á | ‘close to sth.’ |
| | | (*b _h -gu) | | | | |
| | cf. /dn-/ | dú-χsálá | ‘to pull aboard’ | vs. | dən-á | ‘to pull’ |
| b. | /tʰi-/ | tʰi-ps | ‘fond of buying’ | vs. | tʰəj-á | ‘to buy’ |
| | | (*tʰips) | | | | |
| | cf. /di-/ | dí-tstəwá | ‘wipe tears’ | vs. | dəj-á | ‘to wipe sth.’ |
| c. | /χ ^w l-/ | χ ^w l (*χ ^w l) | ‘seal blubber’ | vs. | χ ^w ə _l -í | ‘it’s seal blubber’ |
| | cf. /gl-/ | gí-k’əná | ‘to crawl on log’ | vs. | gəl-á | ‘to crawl’ |
| d. | /tʰl-/ | tʰl (*tʰl) | ‘dead’ | vs. | tʰəl-ńts | ‘we (incl.) are ...’ |
| | | tʰl-sú | ‘you’re dead’ | | | |
| e. | /pll-/ | pl (*pí) | ‘thin and flat’ | vs. | píl-ńts | ‘we (incl.) are ...’ |
| | | pl-sú | ‘you’re ...’ | | | |

(6) Derived glottalized sonorants

- a. A glottalizing suffix: -²χu ‘throat, neck’

gít’əχu	‘long neck’	cf. gít	‘long, tall’
k ^w úp’əχu	‘to have a broken neck’	k ^w úp-a	‘to break (stick)’
q’ək’əχú	‘to bite the neck’	q’əká	‘to bite’
tʰs’ək ^w əχú	‘short neck’	tʰs’ək ^w	‘short’
q ^w lq ^w əχu	‘to sprain the neck’	q ^w lq ^w a	‘to sprain’
tʰáχʔəχu ²	‘(to have) a stiff neck’	tʰáχ	‘stiff’

- b. Low tone sonorants before -²χu ‘throat, neck’

ʔmχú	‘turtleneck, mute’	cf. ʔəm-á	‘to dam off’
ʔu-χ ^w ú	‘one’s neck’	ʔú-bá	‘end of log’
tq’lχú	‘itching throat’	tq’l-á	‘to itch’
tʰ’ux ^w a-	‘(to have) pain in the	tʰ’ux ^w á-	‘(to have) pain in the
χəwála	throat’	təwála	ear’
qn-χút ³	‘to fasten around neck’	qxá	‘to fasten’

² ? becomes ʔ in assimilation to χ.

³ /x/ becomes [ɲ] when glottalized, e.g., /mx-²ut/ → [mɲut] ‘punch-on temple’ (cf. məxá ‘to punch’).

- II. After the first high tone, a “singleton” (cf. (4)) is usually low, but it is high if derived from a glottalized sonorant.

(7) Underlying glottalized sonorants

- | | | | | | |
|----|-----------------------|---------------------------|-----|--|--------------|
| a. | jágmsú | ‘to be diseased’ | vs. | jágmsəw-í | ‘...-3sg.’ |
| | cf. mńtsdzu | ‘measuring board’ | | mńtsdžəw-í | |
| b. | dzámasú | ‘feeding bottle nipple’ | | dzámasəw-í | |
| | cf. pádʔabu | ‘skiff’ | | pádʔabəw-í | |
| c. | q’áq’ap’əts’asú | ‘bull’s eye’ | | q’áq’ap’əts’asəw-í | |
| | cf. mənájú | ‘drumstick’ | | mənájəw-í | |
| d. | húsí | ‘day, date’ | | húsəj-úχ ^w | ‘... by you’ |
| | cf. tʰ’íχats’i | ‘chiton’ | | tʰ’íχats’əj-úχ ^w | |
| e. | mńtsí | ‘reserve’ | | mńtsəj-úχ ^w | |
| f. | múq ^w ədží | ‘pregnant animal’ | | múq ^w ədžəj-úχ ^w | |
| g. | q’áxsí | ‘half’ | | q’áxsəj-uχ ^w | |
| h. | páqí | ‘board flat on the water’ | | páqəj-uχ ^w | |

(8) Derived glottalized sonorants

- a. A glottalizing suffix: -²s ‘on the ground outdoors’

tʰít’əs	‘to be tilted ...’	cf. tʰít’a	‘to tilt’
g ^w úk ^w ’əs	‘house ...’	g ^w úk ^w	‘house’
k ^w ’nq’əs	‘wet ...’	k ^w ’nq	‘wet’
wíχʔəs ⁴	‘to lean or lie back ...’	wíχa	‘to lean or lie back’

- b. High tone sonorants before -²s ‘on the ground outdoors’

k’ítńs	‘grass ...’	cf. k’ítm	‘grass’
cf. tʰ’áqms	‘outer cedar bark’	kátu	‘meet’
kátús	‘meet ...’		
cf. jəχátus	‘to ride the rapids’		
mńsgńs	‘one round thing...’	mńsgm	‘one round thing’
cf. lúχ ^w smsgm	‘round person’		
dlátʰχ ^w ús	‘to stand together ...’	dlátʰχ ^w u	‘to stand together’
cf. dzáqus	‘mixing colours’		
gńtsasgńs	‘how many coins...?’	gńtsasgm	‘how many coins?’

⁴ See fn. 2.

The same glottalizing suffixes which cause tone *raising* in a syllabic sonorant that is preceded by a high tone also cause tone *lowering* when there is no preceding high!

(9) *Low tone sonorants before -ʔs* ‘on the ground outdoors’

masms	‘two silver dollars ...’	cf. masín	‘two silver dollars’
nəx ^w as	‘near ...’	nəx ^w á-lá	‘near to ...’
k ^w as	‘to sit ...’	k ^w ála	‘sitting’
gis	‘for a long time ...’	gí-χs	‘for a long time aboard’
dzms	‘buried’	dzámá	‘to bury’
las	‘to go ...’	lá-la	‘going’
q ^u s	‘lake’ (‘water ...’)	q ^u -χ ^w s	‘water in the canoe’
ʔus ⁵	‘soil’	ʔú-bá	‘end of log’
ʔls	‘firmly ...’	ʔəl-ála	‘to stay in balance’
nas		ná-i	‘snow’
gis	‘placed or standing ...’	gí-tʂ ^w əwá	‘placed in a container’
gəjas	‘crosswise ...’	gəjá	‘crosswise’

Sonorants which alternate in tone are probably glottalized.

(10) /-ls/ ‘outdoors, land’

a. *With preceding high tone:* [-l̥s]

lítls	‘to search outdoors’	cf. líta	‘to search’
cf. mísls	‘measles’		
mátls	‘to fly off from the land’	mát-ələ	‘to fly’

b. *Without preceding high tone:* [-ls]

t ^w əxls	‘trail in the woods’	cf. t ^w əx	‘trail’
k ^w axls	‘to slip or slide outdoors’	k ^w axá	‘to slide, make a slip’
psls-ələ	‘to clear an area’	ps-ələ	‘cleared area’
hixls	‘clear underbrush’		

(11) /-gáʔ/ ‘sound’

a. *With preceding high tone:* [-gáʔ]

ʔát ^w əgáʔ	‘loud sound’	cf. ʔát-ələ	‘yelling’
k ^w úp ^w ə-gáʔ	‘sound of stick breaking’	k ^w úp-a	‘to break a stick’
k ^w áp ^w əgáʔ	‘sound of gnawing’	k ^w ápa	‘to gnaw’
mát ^w əgáʔ	‘sound of flying off’	mát-ələ	‘to fly’
q ^w áq ^w əgáʔ	‘to give a scream’	q ^w áqa	‘to scream’
ʔígaq ^w əgáʔ	‘loud sound’		

⁵ /ʔu-/ is the empty root in all Wakashan languages.

b. *Without preceding high tone:* [-gáʔ]

nək ^w əgáʔ	‘to utter’	cf. nək	‘to say’
tʂats ^w əgáʔ	‘sound of a slap’	tʂasá	‘to slap’
tʂp ^w gáʔ	‘sound of slamming door’	tʂpá	‘to shut the door’
qk ^w əgáʔ	‘to utter sth.’ (woman)	qk ^w ála	‘to speak’ (woman)

(12) /-(s)ista/ ‘around’

a. *With preceding high tone:* [sista]⁶

qíχ-sístala	‘to cut around’	tʂík ^w áʔ-tʂístala	‘to riot’
kíχ ^w -sístala	‘running around sth.’	q ^u -tʂístala	‘travelling around sth. on the water’
lúχ ^w -sístala	‘to turn around’	mát-tʂíst-ala	‘swimming around an island’
ʔát-tʂístala	‘to go back around again’	q ^u án-ístala	‘soaring around a bay or inlet’

b. *Without preceding high tone:* [sistá]

q ^w m-sistá	‘to crumble’ (“sprinkle around”)	maʔ-tʂístəʔísələ	‘flying around the world’
dziχ ^w -sistálá	‘riding a bicycle’ (feet pushing around)	tʂi-tʂístálá	‘winding rope around sth.’
x ^w iχ-sistálá	‘flinging a rope around sth.’	məʔ-tʂístáut	‘to mix sth. with sth.’
tʂiχ-sistá	‘to spawn all around an area’	qlx ^w -sistəʔíʔ	‘to move from a sitting to a lying position’

Similarly, root sonorants which alternate in tone are probably glottalized.

(13) *Reduplication reveals glottalized sonorants*

	<i>Singular</i>	<i>Plural</i>	
a.	bngələ	bíbngəla	‘close to the (rocky) shore’
cf.	hńbá	híʔnbá	‘having a boat at the end’
b.	k ^w lx	k ^w ík ^w lx	‘metal, iron’
cf.	tíq ^w	títq ^w	‘soft’
c.	qn-χəwála	qíqńχəwala	‘to wear sth. around the neck’
cf.	pńq ^w ələ	pípńq ^w ələ	‘keeping satiated’
d.	k ^w ls	k ^w ík ^w ls	‘to lie on the ground outside’

⁶ Initial /s/ becomes [tʂ] after (underlying) coronal fricatives; see Howe (2000) for a treatment of this process in Oowekyala.

cf.	k ^w íkstáls	k ^w ík ^w íkstáls	'to lie on the ground outdoors'
e.	q ^w l ^b á	q ^w íq ^w l ^b á	'to come to an end'
cf.	p'lt̥sa	p'íp'lt̥sa	'to become moss-covered'
f.	t̥'ips	t̥'ít̥'ips	'spend-thrift'
g.	ʔmχú	ʔíʔmχu	'turtleneck, mute'
h.	hmgílá	híʔmígila	'to cook'
i.	gíxtawála	gígíxtawála	'Christian cross'
j.	ʔix-stús	ʔíʔixstus	'generous'
k.	tmχ-səjúť	títmχ-səjut	'to break wood lengthwise with the hands'
l.	ʔl	ʔís-ʔl	'dead'
m.	ʔmstút	ʔíʔmstut	'to draw the curtain'
n.	nax ^w	nínáx ^w	'vagina'
o.	hisábəwá	híʔisábəwá	'underneath sth.'
p.	qbusú	qíqbúsu	'to spill solids accidentally'
q.	χapk ^w	χíχápk ^w	'child'
r.	q'əjuχ ^w	q'íq'əjúχ ^w	'expensive'
s.	p̥slsəlá	p̥íps̥lsəla	'to clear an area'
t.	t̥'p'gáť	t̥'ít̥'p'gáť	'sound of slamming door'
u.	t̥'ixsistá	t̥'ít̥'ixsista	'to spawn all around an area'
v.	qlx ^w sistəʔíť	qíqlx ^w sistiť	'to move from a sitting to a lying position'

Not all tones can be imputed to glottalization. Some sonorants systematically have low tones (14), while others systematically have high tones (15).

(14) Reduplication revealing glottalized sonorants

<i>Singular</i>	<i>Plural</i>	
t ^w mk ^w	t'ít ^w mk ^w	'(s.o.) with a scratched face'
q ^w msəlí	q'íq ^w msəlí	'unripe berries'

(15) -bá '(at the) end'

ʔasuť-bá	'the opposite ...'	k ^w 'á-bá	'to sit ...'
m̥lχ ^w -bá	'to lick ...'	dláχ ^w -bá	'to stand ...'
waxs-bá	'both ...'	ʔín-bá	'moored ...'

3. Spirantization and tone

Stem-final plain stops and affricates regularly spirantize preconsonantly.

This spirantization causes a (preceding) syllabic sonorant to be realized at low tone rather than the expected high (i). This lowering effect does not occur before suffixes with glottalized consonants (ii).

(16) /p/ → [m]

a.	kpá	'to jam'
i.	km-χsís	'to jam the foot or toes'
	km-stút	'to jam into a hole or opening, to stuff'
ii.	kín-χsk'áná	'to jam the hand or fingers'
b.	nəpá	'to break through a surface'
i.	nm-sút	'to break through a surface'
c.	q ^w əpa	'to scatter (ashes, etc.), to drop (crumbs)'
	q ^w mstú	'(to have) dirt in the eye'

(17) /t/ → [ʔ]

a.	głt	'long, tall'
i.	glł-t̥sú	'you are ...'
	glł-bálíla	'long point of land'
ii.	glł-k ^w udít	'longer side of the interior of the house'
b.	k ^w m̥ta	'to suck'
i.	k ^w m̥t̥-t̥smís	'leech'
ii.	k ^w m̥t̥-ʔit	'to start to suck'
c.	k ^w íta	'to pry open'
i.	k ^w it̥-t̥sústut	'to pry sth. up with a pole'
ii.	k ^w it̥-ʔit	'to start to pry open'
d.	mátəlá	'to fly'
i.	mať-t̥sistəʔísəlá	'flying around the world'
ii.	mát-ʔuťt'a	'to fly off the shore and out to the sea'
	mát-ʔit	'to start flying'/'to start swimming'
e.	x ^w íta	'to burn (sth.)'
i.	x ^w lł-bálá	'burning at the end'
ii.	x ^w lł-p'álá	'smell of sth. burning'

(18) /t̥/ → [ʔ]

a.	mít̥ta	'to miss a shot, fail to hit a target'
i.	mít̥-təwá	'to have missed the trail'
ii.	mít̥-t̥s'əwá	'to miss the container'
b.	pát̥ta	'to flatten sth.'
i.	pať-t̥sm	'flat thing that is round'
	pať-tú	'flat layer of sth.'
c.	ʔát-əlá	'yelling'
i.	ʔať-t̥səmí	'to yell after s.o.'

(19) /t̥s/ → [s]

a.	q'łt̥sa	'to weight sth.'
i.	q'ls-táut	'to drop the anchor in the water'

- ii. q'ís-ʔit 'to start to weight sth.'
- b. ml̩ʦəlá 'to aim'
 - i. ml̩-ʦə́míga⁷ 'to aim at the back'
 - ii. ml̩s-ʔit 'to take aim'

(20) /k/ → [x]

- a. ʔík
 - i. ʔix-sú 'you are good'
 - ʔix-bítʃa 'to pretend to be good'
 - ʔix-gílák^w 'should be good'
 - ʔix-nála 'good omen'
 - ʔix-stús 'generous'
 - ʔix-tqílá 'still good'
 - ʔix-súk^wəlá 'just a little bit better'
 - ii. ʔix-ʔəgis 'kindhearted person'
 - ʔix-ʔəka 'to eat good food'
 - ʔix-ʔit 'to become good'
 - ʔix-p'a 'good taste'
 - ʔix-p'əc'əwá 'good-natured'
- b. wíka 'to carry a load on the shoulder'
 - i. wix-bá 'to carry sth. on the end of a pole over the shoulder'
 - ii. wíx-səjálə 'carrying sth. on the shoulder up to the woods'
- c. k'íká 'to tie'
 - i. k'lx-smálá 'parcel or bundle tied up'
 - k'lx-stút 'to bandage a wound'

(21) /k^w/ → [x^w]

- a. ʦúk^w-a 'to break to pieces'
 - i. ʦux^w-sí 'to break to pieces'
 - ii. ʦúx^w-ʔit 'to start to break to pieces'
- b. ʔík^wa 'to bleed'
 - i. ʔlx^w-stú 'color of blood'
 - ʔlx^w-bís 'blood'
 - ii. ʔíx^w-p'igá 'blood at the shin'
 - ʔíx^w-ʦs'əwá 'to bleed heavily'
 - ʔíx^w-sk'ánála 'bleeding from the hand or forearm'
- c. tík^wa 'to drop, fall'
 - i. tíx^w-stá 'to drop into the water'
 - tíx^w-stqá 'to drop sth. out of one's hand accidentally'
 - ii. tíx^w-ʔit 'to start to drop'

⁷ ml̩ʦs+ʦə́míga → mls+ʦə́míga → ml̩ʦə́míga (cf. ʔáʔ-ʦmíga 'sinew at the back').

- d. k^wúk^wa 'to chop with an axe'
- i. k^wux^w-stəwá 'to blaze a trail'
- ii. k^wúx^w-sk'ánák^w 'to have become chopped in the hand'
- k^wúx^w-ʔit 'to start chopping'

(22) /q/ → [χ]

- a. ʔáq-a 'to appear'
 - i. ʔáχ-bá '(to be) visible (end of sth.)'
 - ii. ʔáχ-ʔit 'to appear' (inch)
 - ʔáχ-p'astu 'to get within eyeshot'
- b. k^wínq 'wet'
 - i. k^wnχ-sdáná 'sth. caused by dampness'
 - ii. k^wínχ-ʔit 'to become wet'
- c. páqa 'to lay shingles on a roof'
 - i. paχ-ʔəjása 'to put the (flat) roof on a house'
 - paχ-srnt 'to put the sidings on a house'
 - ii. páχ-ʦs'ut 'to lay a flat thing in a container'
 - páχ-ʔnt 'to lay a board flat on sth long'
- d. k'íχk'íqa 'hammer of a gun'
 - i. k'íχ-stálíʃa 'to put the forehead against sth.'
 - ii. k'íχ-ʔatʃəlá 'to bump the forehead against sth.'

(23) /q^w/ → [χ^w]

- a. ʦ'íq^wa 'to cross an overland passage'
- i. ʦ'ix^w-sxtʃaʔíls 'to cross an overland ridge'
- ii. ʦ'íχ^w-ʔit 'to begin to cross ...'
- b. díq^wa 'to drive piles into sth.'
- i. díχ^w-ptá 'to drive a peg or pole into a surface'
- díχ^w-təwílm 'posts put inside a house'
- díχ^w-təwíʃa 'to put posts inside a house'
- ii. díχ^w-ʔit 'to start to drive piles...'
- c. k'íq^wa 'to urinate (male)'
- i. k'íχ^w-bís 'urine (male)'
- ii. k'íχ^w-ʔit 'to start to urinate (male)'
- d. dúq^w-a 'to look for sth.'
- i. dúχ^w-síwála 'looking through sth.'
- dúχ^w-sústíwála 'looking upwards'
- ii. dúχ^w-ʔá 'to catch sight of what one is looking for'
- dúχ^w-ʦs'as 'person who always stares'
- dúχ^w-ʦs'əsut 'to look among things'
- dúχ^w-ʔit 'to take a look'
- dúχ^w-ʔut'álá 'to look out from the shore'

- e. m^húq^wa 'white'
- i. m^hux^w-sr^hn 'white bulky thing'
- ii. m^húx^w-ʔn 'white long thing'
- f. t^húq^wa 'to make bald'
- i. t^húx^w-sr^hn 'round/bulky bald thing'
- ii. t^húx^w-ʔn 'barkless tree'

else, high tone is created on the leftmost syllabic *glottalized* sonorant in the prosodic word, via:

[+constricted glottis] → [+upper register] (Halle and Stevens 1971)

Spirantization is an indirect source of glottalization, via:

(delinked) [-continuant] → [+constricted glottis] (Halle 1995)

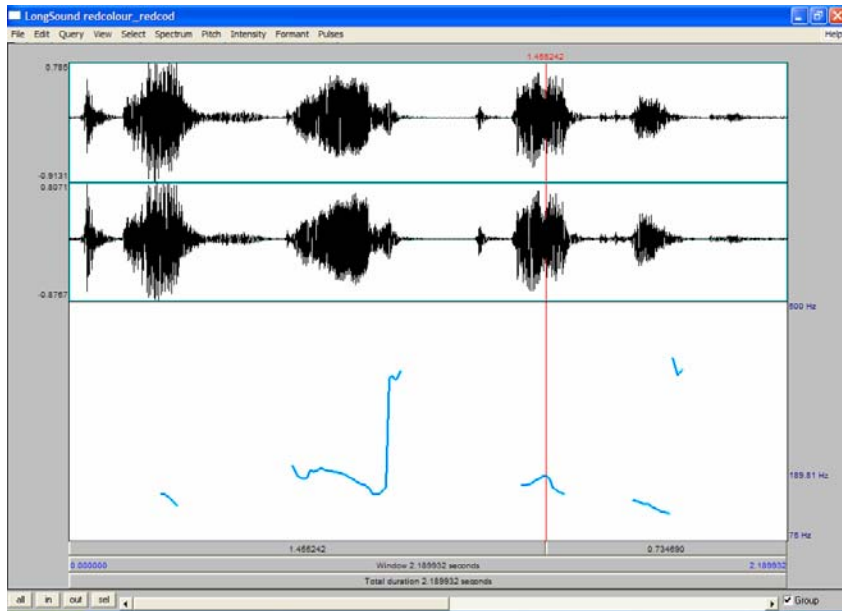
The latter “exchange rule” (Halle et al. 2000) is blocked by the presence of [+constricted glottis]—a dissimilation effect.

(delinked) [-cont] → [+c.g.] / ___ [-c.g.]

Glottalized sonorants arising from spirantization behave like other glottalized sonorants. They cannot head the prosodic word, but within the prosodic word, they can attract a high tone, e.g.:

(25) $k \rightarrow [-CONT] x \rightarrow [+CG] x (\rightarrow [+UPPER] x)$

- a. ʔík 'good'
- ʔix-stús 'generous'
- ʔí-ʔix-stus (pl.)
- b. k'ík 'to tie'
- k'lx-stút 'to bandage a wound'
- k'ík'íxstut (pl.)



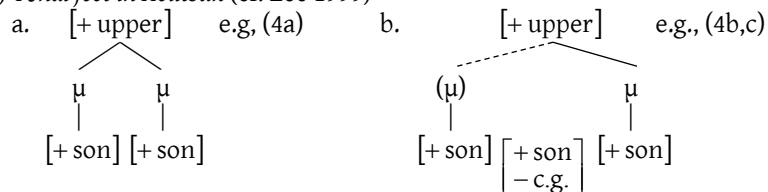
[tʰ à xʷ s t ú] [tʰ á qʷ ì t xʷ]
thaxstú 'red' *tháqvitxv* 'red cod'

4. Preliminary analysis

The head of the prosodic word is the leftmost non-schwa non-glottalized sonorant. It is realized with a high tone.

High tone is also assigned to the leftmost (apparently iambic) tonal foot:

(24) *Tonal feet in Heiltsuk* (cf. Zec 1999)



Appendices:

A. Segment inventory of Heiltsuk

Plain stops:	p	t	tʰ	ts ~ tʃ	kʲ ~ k	kʷ	qʷ	q
Voiced stops:	b	d	dl	dʒ ~ dʒ	gʲ ~ g	gʷ	gʷ	g
Glottalized stops:	pʰ	tʰ	tʰʰ	tsʰ ~ tʃʰ	kʲʰ ~ kʰ	kʷʰ	qʷʰ	qʰ
Fricatives:			ʃ	s ~ ʃ	xʲ ~ x	xʷ	χʷ	χ
Plain resonants:	m	n	l		j	w		ħ h
Glottalized resonants:	m̥	n̥	l̥		j̥	w̥		ʔ ʔ
Vowels: schwa plus:					i	u	a	

(/ħ, ʔ/ are not pharyngeal or epiglottal but “guttural laryngeal.”⁸ Phonetically they seem indistinct from the plain laryngeals /h, ʔ/ (i.e., [ħ, ʔ]) but unlike the latter, and like other gutturals, they have a lowering effect on adjacent segments, e.g., {ə, i, u} → [a, ɛ̃, ɔ̃] / {q, g, qʰ, χ, ħ, ʔ} ____.⁹)

B. Kwakw'ala stress

- Accent falls on the leftmost syllabic sonorant (26a), ignoring schwas.
- Glottalized syllabic sonorants¹⁰ repel this accent (26b).

(26) Stress in Kwakw'ala¹¹

a. 'dʒmbətʃ	'to bury in hole in the ground'	b. ɡm̥'xa	'to use the left hand'
'dngustə	'to pull up'	kʷn̥'χa	'clams are spoiled'
'wlgila	'to stop at a point at a distance'	ml̥'qa	'to repair canoe'
'tʃikʷa	'bird'	dʃs'tut	'to wipe eyes'
'ʔuxdlala	'to carry on back'	ʔux'dlala	'ib.' (plural)
'qasa	'to walk'	dʒtə'la	'to laugh'

⁸ Epiglottals and pharyngeals are common in Nootkan, e.g., the Ahousaht dialect of Nuu-chah-nulth is pronounced [ʔʲa:hhʰ'u:sʔathħ] (Esling et al. 2002).

⁹ Ian Maddieson (p.c.) suggests that the distinction between plain vs. guttural laryngeals in Heiltsuk-Oowekyala be reinterpreted as laryngeals vs. pharyngeals.

¹⁰ 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).

¹¹ Data from Boas (1947:218-9, cf. Bach 1975, Lincoln and Rath 1980:20-1).

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