

# Kanien'kéha laryngeals

Simon LiVolsi

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## 1 Introduction

Proposal<sup>1</sup>: The laryngeals (/h/ and /ʔ/ (glottal)) in Kanien'kéha are vowel-like.

- /h/ sometimes behaves like a vowel
- /ʔ/ always behaves like a vowel
- Tonic lengthening and Laryngeal lengthening are the same process.
- Theoretical claim: Both laryngeals can be syllabified into the nucleus with /ʔ/ obligatorily doing so.

Roadmap

- Section 2: Syllables in Kanien'éha
- Section 3: Pitch accent in Kanien'kéha
- Section 4: Tone and Lengthening
- Section 5: /ʔ/ and tone/length
- Section 6: /h/ and tone/length
- Section 7: Intervocalic laryngeals

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<sup>1</sup>Niá:wen to Wári, Akwiratékha', Lyle Lazore, Hilda King, and Maureen Benedict for sharing their knowledge, language, and time with me. Thanks to Heather, Cheman, and Heather Newell for guidance, support, help, and discussion in building this analysis. All remaining errors are my own.

## 2 Syllables in Kanien'éha

### 2.1 Syllable structure

- (1) Syllable structure (O=onset, N=nucleus, R=rhyme,  $\sigma$ =syllable)



Onsets

- Usually contain consonants.
- Strong position that can host most if not all of the consonants in the language.
- The position before the vowel.

Nucleus

- Usually contain vowels.
- Some languages allow consonants in the nucleus.
  - English: 'huddle', 'butter'
- Some languages can leave the nucleus empty! It is more intuitive to think about this historically.

- English: 'canoe', 'tale' [talə]→[ta:l] (Hayes 1989)
- Italian: 'mozarell'
- Languages tend to prohibit having two adjacent syllables with empty nuclei.

#### Codas

- Usually contain consonants.
- Weak position that usually is able to host fewer segments than the onset.
- Often needs to have the same place of articulation. Another way of thinking about this is that the coda consonant cannot have its own independent place of articulation.
  - English: 'bandit'
- Often needs to be higher in sonority (i.e. more vowel-like) than the following onset.
  - English: 'alpine'

Onsets and nuclei can have more than one segment in them such as in the word 'clay' [klei]. The first position in a given constituent (e.g. a nucleus) is called the **head** while the second position is called the **dependent**.

- (2) klei '  
clay'



The sonority patterns over the course of the syllable are the following:

- The more sonorous a segment is, the more vowel-like it is: k<n<l<w<a

- The nucleus has the highest sonority.
- the coda is more sonorous than the following onset.

- (3) 'plantain'



## 2.2 Kanien'éha syllables

Kanien'k'éha allows the following types of syllables:

#### CV

- (4) [wá.ge.las] *wákeras* 'It smells'

#### CVC

- (5) [ga.ʧiʔ.ʧah.dú.t.haʔ] *katsi'tsiahtónhtha* 'You're eliminating flowers'

#### CVV

- (6) [wa.ga.th.wa.dá:ze] *wakathwatá:se* 'I am turned around'

#### V

- (7) [ũ.daʔ.tsóh.t.ha] *ontathsóhtha* 'Her grandmother'

#### VC

- (8) [oh.lú:waʔ] *ohrón:wa* 'ditch, buttercrack'

#### Ch

- (9) [jó.th.de.lũ] *ióthteron* 'it is scary'  
 (10) [s.gá.th.ne] *skáthne* 'together'  
 (11) [kh.já:dũ.s] *khiá:tons* 'I write'

- /h/, in many ways, is like a vowel: no place of articulation, continuous airflow, takes the shape of an adjacent vowel. It is almost like a voiceless vowel.

- The first segment in ChC sequences must be a stop<sup>2</sup>.
- The segment following /h/ in ChC sequences may be any consonant. This is because there is no sonority restriction on the relationship between a nucleic segment and a following onset.

### Cs

- (12) [de.ks.wa.t.hè:.t.haʔ] *tekhsawathè:tha* 'I make it bright'  
 (13) [de.wa.ga.ts.gàh.ũ] *tewakatskà:on* 'I am eating'  
 (14) [de.jo.jaʔ.á.ks.ne] *teioia'áksne* 'It flashes, movie theatre'

- /s/ has the tongue position in the 'default' tongue position<sup>3</sup>.
- In Blackfoot, /s/ behaves like a vowel (Goad 2013).
- The consonant preceding /s/ in CsC sequences must be a stop because there needs to be a rise in sonority from the onset to the nucleus<sup>4</sup>.
- The consonant following /s/ in CsC sequences is unrestricted (as in ChC sequences).

### C

- (15) [ʌ.k<sup>h</sup>.g.wá.t.hoʔ] *enkkwátho* 'I will drop by'  
 (16) [t<sup>h</sup>.gaʔ. wà:.la] *tka'wà:ra* 'meat pie'  
 (17) [k<sup>h</sup>.da.ge.li:.da.s] *ktakeri:tas* 'I am frying'  
 (18) [kh.wi.s:.dáh.a.weʔ] *khwisténhawe* 'I'm holding onto money'

- There is nearly always distance between consonants in Kanien'kéha, whether that is aspiration (e.g. /tk/ → [t<sup>h</sup>k]), length (e.g. /sk/ → [s:k]), or epenthesis (e.g. /kn/ → [gen])<sup>5</sup>
- There are no sonority restrictions, place restrictions, or voicing restrictions. In other words, these consonant clusters do not look like complex onsets, or coda-onsets.

<sup>2</sup>Other segments are sometimes preceding /h/ in ChC sequences, such as /s/, but it is not clear that the /h/ is actually being pronounced here. Rather, it seems like the /s/ lengthens and fills the slot /h/ was in.

<sup>3</sup>Phonologists would say that this tongue position is the unmarked position (coronal).

<sup>4</sup>sC and hsC exist, but seem to be exceptions for different reasons.

<sup>5</sup>The laryngeals are an exception (which we will discuss soon), and /j/

### Summary of new syllable types:

- Ch, Cs, C

## 2.3 Syllable weight and Kanien'kéha

The syllables in Kanien'kéha can be grouped into three groups in reference to 'weight'.

### Heavy syllables

- CVV and CVC syllables are heavy in Kanien'kéha
- Cross-linguistically, stressed syllables are heavier. This is exactly the case in Kanien'kéha.
  - CV̆ → CV̆V
  - CV̆C → CV̆C

### Light syllables

- CV syllables are light in Kanien'kéha.
- These syllable are counted for placing stress
- These syllables can be stressed.
- Lengthening can occur in preceding stressed syllables

- (19) [agwahgá:laʔ] *akwahká:ra* 'my woodchip'

- Ce in CCC epenthesis is light.

### Weightless syllables

- Cs, Ch, C, Ce (CR epenthetic vowel)
- These syllables do not count for placing stress.
- These syllables cannot be stressed.

- (20) [ónelahdeʔ] *ónerahte* 'leaf'

- Vowel lengthening cannot occur in preceding syllables.



## 4.1 Tonic lengthening

Tonic Lengthening: Stressed vowels are lengthened in open syllables (CV).

(31) /kh.já.dũ.s:/ → [kh.já:.dũ.s:] *khiá:tons* 'I write'

(32) /jo.hs.nó.ləʔ/ → [jo.hs.nó:.ləʔ] *iohnsó:re* 'fast'

Recall that Tonic Lengthening does not occur before weightless syllables (Ch, Cs, C, C<sub>e</sub>).

(33) [gjo.h.nú.s:.gwa.no] *kiohnónskwano* 'Cow'

(34) [wa.ge.ná.t.sa.jã] *wakenéntshaien* 'I have an arm/sleeve'

Following works such as Rawlins (2006), I assume that Tonic Lengthening occurs to make the stressed syllable heavy (bimoraic).

- Cross-linguistically, it is very common for the stressed syllable to be 'bigger' or 'heavier' than other syllables. Heavier can mean with a coda, or a long vowel (Zec 1995).
- In phonology, we measure how heavy a syllable is by 'morae' ( $\mu$ ). Usually, a vowel has a mora, a coda has a mora, and a long vowel has two morae (Hayes 1989). In other words, light syllables (CV, V) have one mora and heavy syllables (CVC, CVV) have two.

– V= $\mu$

– Coda= $\mu$  (not in all languages)

– CV= $\mu$

– CVV= $\mu\mu$

– CVC= $\mu\mu$  (not in all languages)

– Ch, Cs, C, C<sub>e</sub>=0

Some languages have the stress move towards the heavier syllables (usually the ones with two morae).

(35) Hixkaryana (Derbyshire 1979, Kager 1999): stress is placed on any heavy syllable (with long vowel or coda)  
[nák.ɲóh.yátʃ.ke.ná:.no] 'They were burning it'

In other languages, the stressed syllable becomes heavy.

(36) Icelandic (Kager 1999): the stressed syllable is lengthened if open

a. /á.kur/ → [á:.kur] 'field'

b. /hár.ður/ → [hár.ður] 'hard'

Kanien'kéha is more like the Icelandic type language.

- The vowel lengthens to make the stressed syllable heavier than the other syllables.
- Kanien'kéha wants the stressed syllable to have two morae (either CVV or CVC).

(37) CV



(38) CVV



(39) CVC



How do we know that Kanien'kéha cares about syllable weight?

- Some epenthetic vowels have weight (breaking up CCC clusters), while others do not (breaking up OS, or C?clusters).
  - Stress is normally on the penultimate syllable.
  - When the final or penultimate syllable has a weightless epenthetic vowel, stress is shifted back (i.e. stress counts morae, not syllables).
  - Stress can also not be placed on a weightless epenthetic vowel.

(40) Moraic epenthetic vowel

- /wak-njak-s/ → [wagénjaks] *wakéniaks* 'I get married'
- /s-k-ahkt-s/ → [sgáhgets] *skáhkets* 'I got back' (Piggott 1995)

(41) Weightless epenthetic vowel

- /i-a-ho-atka?w-?/ → [jahóht<sup>h</sup>ga?we?] *iahóhtka'we'* 'He let him go there'
- /o-nlaht-?/ → [ónelahde?] *ónerahte'* 'Leaf'

We can also see Kanien'kéha caring about weight in stress placement with vowel-less syllables.

- The nucleus can sometimes be filled by /s/, /h/, or 0 (empty).
- None of these segments carry morae, so they are weightless. Since they are weightless, they are not counted for stress in Kanien'kéha.

(42) [jó.ks.deʔ] *iókste'* 'It is heavy'

(43) [jó.t<sup>h</sup>.de.lũ] *ióhtteron* 'it is scary'

(44) [jahóht<sup>h</sup>ga?we?] *iahóhtka'we'* 'He let him go there'

In sum, Kanien'kéha lengthens stressed vowels to make the stressed syllable heavy (bimoraic).

## 4.2 Laryngeal lengthening/deletion

Laryngeal lengthening (LL): Stressed vowels before /ʔ/ or /h/+ [son] are lengthened.

Laryngeal deletion: After laryngeal lengthening, the laryngeal deletes.

(45) Downstress

- /k-theʔt-haʔ/ → [get<sup>h</sup>è:t<sup>h</sup>aʔ] *kethè:tha'* 'I pound'
- /je-la-hlek-s/ → [jehà:leks] *iehà:reks* 'The pusher'

(46) [jahóht<sup>h</sup>ga?we?] *iahóhtka'we'* 'He let him go there'

Maybe it is not necessary to posit a separate rule for laryngeal lengthening.

- Both TL and LL involve lengthening of the stressed vowel.
- There does not seem to be a reason why a separate lengthening process would occur before a laryngeal.
- Could TL just happen in open syllables *and* before laryngeals?

Another question that may arise is about the relationship between lengthening and deletion. Some options (H=laryngeal):

- Lengthening occurs first, and deletion follows as a 'reflex' (Michelson 1988)

– CVH → C<sup>ː</sup>V:H → C<sup>ː</sup>V:

- Lengthening occurs and this results in three slots in the rhyme (VVC), so the laryngeals delete.

– CVH → C<sup>ː</sup>V:H (rhyme constraint) → C<sup>ː</sup>V:

- Deletion occurs first (leaving behind the L tone), and lengthening occurs as a result of deletion (compensatory lengthening) (Rawlins 2006).

- CVH→CV→C $\dot{V}$ :
- But why would deletion occur in the first place?

**Section Summary:**

- Lengthening exists to make the stressed syllable heavier (have 2 moras).
- Lengthening happens in open syllables and before laryngeals.

## 5 /ʔ/ and tone/length

Stressed vowels followed by a glottal stop get length and downstress (HL). In most cases, the glottal stop then deletes.

- (47) /kalũʔtats/→[galù:dats] *karòn:tats* 'I blow, shoot'
- (48) /wakjaʔkũ/→[wagjà:gũ] *wakià:kon* 'I cut it off'

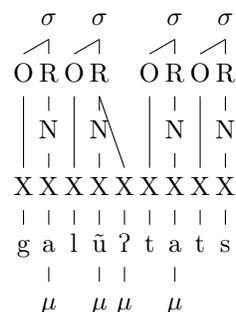
Recall that there are two reasons, within the current theoretical framework, why a stressed vowel would not be lengthened.

- Lengthening does not happen cannot happen in syllables immediately preceding a weightless syllable (as shown previously).
- Codas contribute weight and thus nullify the need for lengthening (i.e. CVC syllables are already heavy).

So why is /ʔ/ not blocking lengthening like other consonants would?

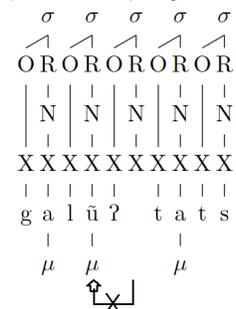
- If /ʔ/ were in the coda it would block lengthening because it would be moraic.

- (49) /kalũʔtats/→[galù:dats] *karòn:tats* 'I blow, shoot'



- If /ʔ/ were the onset of an empty nucleus (constituting a C syllable), it would be weightless and would block lengthening.

- (50) /kalũʔtats/→[galù:dats] *karòn:tats* 'I blow, shoot'



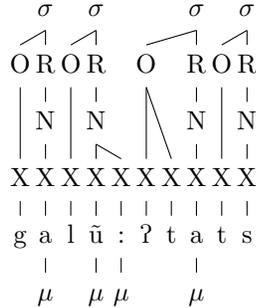
- Additionally, recall that Kanien'kéha prohibits adjacent syllables with empty nuclei and militates against it via epenthesis. ʔCC sequences, however, are premitted.

- (51) [waʔt<sup>h</sup>gaʃihalá:goʔ] *wa'tkəhsihará:ko'* 'I unblock it'

- If /ʔ/ were the first member of a complex onset, there would be no reason why it would delete and cause downstress on the preceding vowel when it lengthens<sup>7</sup>.

- (52) /kalũʔtats/→[galù:dats] *karòn:tats* 'I blow, shoot'

<sup>7</sup>Additionally, for reasons beyond the scope of this presentation, I argue that there are no complex onset in Kanien'kéha

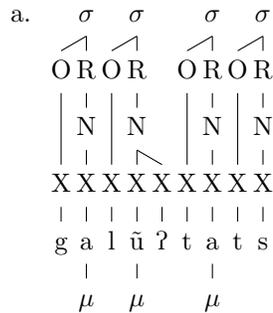


**Proposal:** /ʔ/ is syllabified like a vowel: in the nucleus. Specifically, /ʔ/ is syllabified into the dependent position (second position) of the nucleus.

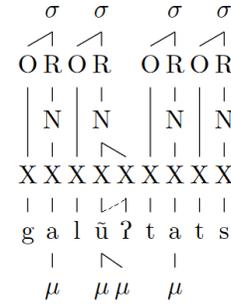
Since /ʔ/ is in the nucleus:

- /ʔ/ does not contribute weight because only vowels have intrinsic morae, and consonants can only get morae from being in the coda.
- /CVʔ/ syllables are light (monomoraic) and therefore must undergo vowel lengthening to become heavy (become bimoraic).

(53) /kalũʔtats/ → [galũ:dats] *karòn:tats* 'I blow, shoot'

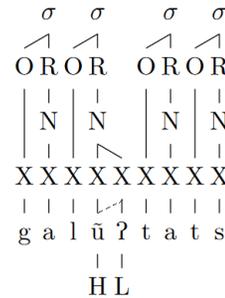


b. ,



Following Michelson (1988) I assume that the laryngeals underlyingly have a Low tone. This Low tone in the dependent position falls from the High tone linked to the head of the nucleus.

(54) /kalũʔtats/ → [galũ:dats] *karòn:tats* 'I blow, shoot'



Other languages show the same interaction between Low tone and ʔ.

- E.g. Nakhorn Sithammarat Thai (Kingston 2011)

Why does the glottal stop sit in the nucleus? I propose that /ʔ/ is more like a vowel inherently (a glottal approximant) and needs to be next to a vowel to be pronounced properly.

This is supported by the fact that /ʔ/ must always be preceded by a vowel.

(55) /katitʔas/ → [katítaʔs] *katíta's* 'I get into something'

(56) /wahskwùt-ʔ/ → [wáhsgùdeʔ] *wáhskonte* 'lean to'

(57) \*#ʔ (no word-initial glottal stops)

Dyck (1997) and Doherty (1993), in fact, propose that /ʔ/ is in the nucleus in Cayuga based on different patterns.

Bonneau 1990 proposes that /ʔ/ is also in the nucleus in Kanien'kéha. That being said, he does this based on very different reasoning.

## 6 /h/ and tone/length

Stressed vowels followed by /h/+sonorant get length and downstress. In most cases, the /h/ then deletes.

(58) /johnjodeʔ/ → [jò:njodeʔ] *iò:niote* 'It is standing'

(59) /genũçihne/ → [genũçì:ne] *kenontsi:ne* '(on) my head'

It is important to note that when /h/ is followed by an obstruent, the preceding stressed vowel does not get length, nor get a falling tone, and /h/ does not delete.

(60) /sahahgadeʔ/ → [saháhgadeʔ] *saháhkate* 'He went back'

(61) /gahljohgawinehseʔs/ → [gahljohgawinéhseʔs] *kahri-ohkawinéhsere* 'I am going to fish'

Observations:

- /h/ preceding a sonorant is behaving like /ʔ/.
- /h/ preceding an obstruent is behaving like a coda consonant, or an onset of a weightless syllable.

I argue that, when preceding an obstruent, /h/ is syllabified into the coda. This is because hOC sequences are not militated against via epenthesis (as normal CCC sequences would).

(62) a. /jahohtkawã/ → [jahoht<sup>h</sup>gà:wã] *iahohtkà:wen* 'He let it go'  
 b. /jahohtkawã/ → \*[jahohet<sup>h</sup>gà:wã] *iahohtkà:wen* 'He let it go'

(63) a. /sohktũ/ → [sóhk<sup>h</sup>dũ] *shóhkton* 'He went back'  
 b. /sohktũ/ → \*[sóhek<sup>h</sup>dũ] *shóhkton* 'He went back'

- Recall that CCC epenthesis (CeCC) militates against two adjacent weightless syllables.

- If /h/ were the onset of an empty syllable when preceding an obstruent (h0C0C), we would expect epenthesis to militate against the weightless syllables.
- /h/ must be in the coda, contributing weight and nullifying the need for lengthening.

(64) [tʃóhsela] *tsóhsera* 'One year'



This asymmetrical behaviour between /h/+[son] and /h/+obs follows from the syllable contact law (Murray & Vennemann 1983).

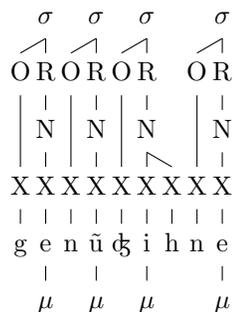
- Syllable Contact Law: Codas should be more sonorous (vowel-like) than the following onset.
- /h/+obs forms a licit coda-onset because the sonority falls from (or is level between) the /h/ to the following obstruent.
- /h/+[son] rises in sonority, forming an illicit coda-onset sequence. This forces the /h/ to syllabify elsewhere.

As with /ʔ/, I argue /h/+[son] involves the laryngeal in the dependent position of the nucleus. To reiterate the alternatives:

- If /h/ is in the coda, it would block lengthening.
- If /h/ is in the onset of a weightless syllable, it would block lengthening.
- If /h/ is the first member of a complex onset (as there is rising sonority), there would be no reason why /h/ would delete and cause downstress on the preceding long stressed vowel.

/h/+[son] is represented like /ʔ/C.

(65) /genũɕihne/→[genũɕi:ne] *kenontsi:ne* '(on) my head'



I propose that, just like with /ʔ/+V, /h/ has a Low tone. Other languages have /h/ causing Low tone as well.

- E.g. Gurung (Ta 2023)

We already saw that /h/ can be in the nucleus if forced to be (such as in ChC sequences). Unlike /ʔ/, does not always have to be close to a vowel.

#### Interim summary of laryngeals and downstress

- /ʔ/ always syllabifies into the dependent position of the nucleus (the vowel position).
- /ʔ/ must always follow a vowel.
- /h/ preceding an obstruent forms a licit coda-onset, so the /h/ syllabifies into the coda and nullifies the need for lengthening.
- /h/ preceding a sonorant forms an illicit coda-onset, so the /h/ must syllabify into the dependent position of the nucleus.

## 7 Intervocalic laryngeals

Recall that intervocalic consonants allow for lengthening in the preceding stressed syllable.

(66) [k<sup>h</sup>.já:.dũ.s] *khiá:tons* 'I write'

(67) [jo.hs.nó:ləʔ] *iohsnó:re* 'fast'

This is because this consonant is in the onset of the next syllable, leaving the light CV syllable stressed.

When /ʔ/ is intervocalic and the preceding syllable is stressed, the stressed vowel lengthens and gets downstress. The glottal stop does not delete.

(68) /wakitaʔũ/→[wagidà:ʔũ] *wakità:'on* 'I slept'

(69) /aʔaleʔ/→[à:ʔaleʔ] *à:'are* 'curtain, net, veil'

I propose that /ʔ/ is linked to both the nucleus in order to be close to the vowel, and the following onset, so that there is not an onsetless syllable.

- Intervocalic /ʔ/ impacts tone and does not block lengthening (i.e. nucleic behaviour).
- Intervocalic /ʔ/ still surfaces as a full segment, so it cannot be fully eclipsed by the spreading vowel.

(70) [wagidà:ʔũ] *wakità:'on* 'I slept'



It is important to note that this an unusual representation. That is, I know of no example of a geminate (doubly linked) glottal stop.

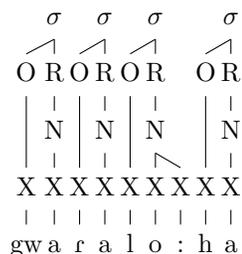
Intervocalic /h/ has two different behaviours in terms of lengthening, but it never causes falling tone.

- (71) Lengthening before intervocalic /h/  
 a. [at<sup>h</sup>gelot<sup>h</sup>i:ha?] *atkerothí:ha* 'Comb'  
 b. [gwaraló:ha] *kwaroró:ha* 'Barn owl'

- (72) No lengthening before intervocalic /h/.  
 a. [gáhi] *káhi* 'Berry, fruit'  
 b. [ganéhũ] *kanéhon* 'Skin, hide'

When there is lengthening before intervocalic /h/, the /h/ is behaving exactly like the non-laryngeals in this position. The natural analysis is that /h/ is in the onset here.

- (73) [gwaraló:ha] *kwaroró:ha* 'Barn owl'



Michelson (1988) notes that lengthening before an intervocalic /h/ is by far the exception as there are only a handful of examples. As there are only a few examples of word-initial /h/ in Kanien'kéha, we can say that sometimes /h/ may be in the onset (but most often not).

Intervocalic /h/ blocking lengthening on the preceding stressed syllable is a little more of a mystery. The four options are the following:

- Option 1: /h/ is a geminate between onset and coda, thus nullifying the need for lengthening because /h/ is contributing weight to the preceding syllable.
  - But geminate /h/s are rare cross-linguistically.
  - If /h/ can be a geminate, why can nothing else be a geminate in Kanien'kéha?

- If /h/ can be a geminate (i.e. there is a strong onset position supporting its twin in the preceding coda), why can't there be word-initial /h/?

- Option 2: /h/ is in the preceding syllable coda.

- If Kanien'kéha is very picky about what can go into the coda, why can there be a coda without a following onset?

- Option 3: This intervocalic /h/ is a series of two /h/s separated by an empty nucleus. This blocks lengthening because lengthening must occur in a syllable before a filled nucleus.

- But if two adjacent onsets are fine to be filled with /h/, why are there no word-initial /h/s?

- Option 4: There is /h/ in the onset, and another /h/ in the preceding coda (blocking lengthening). This is not a geminate because they are not linked.

- This is highly irregular and dispreferred from the perspective of the OCP (McCarthy 1986).

I assume option 2: /h/ is in the coda.

- As mentioned above, /h/ seems to rarely be in the onset. All other options require /h/ to be in the onset.
- This leaves an onsetless syllable (which are allowed word-initially and in hiatus environments anyways).

- (74) [gáhi] *káhi* 'Berry, fruit'



## 8 Conclusion

### Main take-aways

- Glottal stop is tied to the vowel and must be in the nucleus.
- /h/ is more consonant-y but can be in the nucleus when forced to be (e.g. when interconsonantal or when preceding a consonant that /h/ would form a bad coda-onset with).
- /h/ is a fully-fledged obstruent while glottal stop is more like a glottal approximant.

Rice 1992  
Scheer 2004  
Ta 2023  
Zec 1995

	Segment	Fill nucleus alone?	Obligatorily in nucleus?
(75)	/h/	✓	✗
	ʔ	✗	✓
	Vowels	✓	✓

## 9 References

Bonneau 1990  
Clements 1990  
Clements and Hume 1995  
Derbyshire 1979  
Doherty 1993  
Dyck 1997  
Hayes 1989  
Kager 1999  
Kaye 1990  
Kingston 2011  
McCarthy 1986  
Michelson 1988  
Michelson 2016  
Mithun 1979  
Mithun 1999  
Murray and Vennemann 1983  
Pentangelo 2020  
Piggott 1995  
Prince 1983  
Rawlins 2006