Internal linguistic conditioning of /t~k/ variation in Niʻihau Hawaiian

Thomas Kettig

NWAV-AP, Singapore

5 August 2025

Consonants of Hawaiian (Parker Jones 2018)

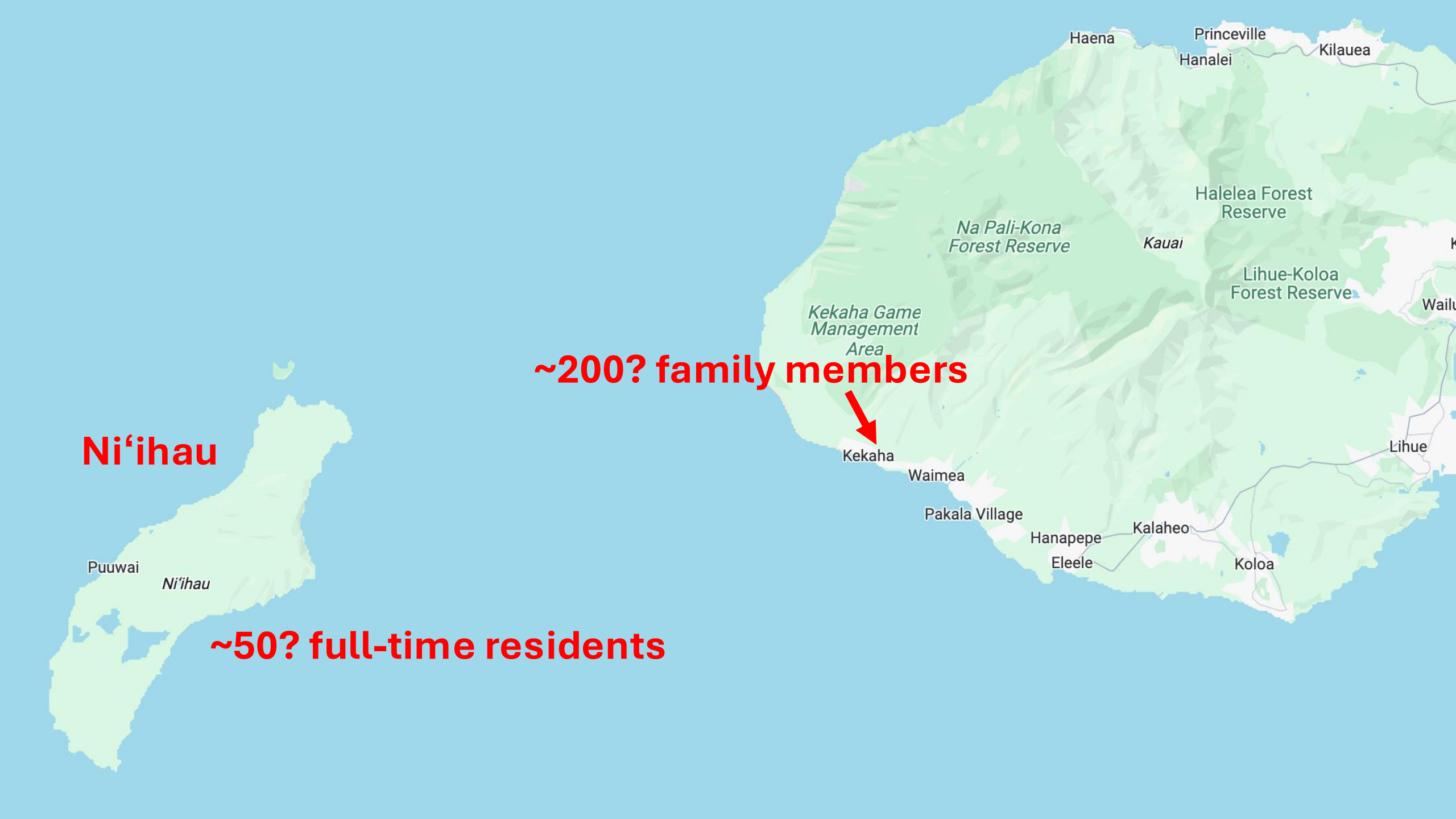
Standard

	Bilabial	Labio-dental	Alveolar	Velar	Glottal
Nasal	m		n		
Plosive	p			k	ʔ
Fricative		v			h
Lateral			l		

m	ˈmaka	*maka*	‘eye’	n	ˈnaka	*naka*	‘quiver’					
p	ˈpaka	*paka*	‘strain’	k	ˈkaka	*kaka*	‘rinse’	ʔ	ˈʔaka	*ʻaka*	‘laugh’
v	ˈvaka	*waka*	‘sharp’					h	ˈhaka	*haka*	‘shelf’
				l	ˈlaka	*laka*	‘tame’					

What is Standard Hawaiian?

- Catastrophic decline after US annexation in 1896, now being revitalized since the 1970s
- ~18,000? speakers on largest islands
- Limited domains of use outside immersion classrooms, but some families speaking at home
- Largely L2 speakers + L1 children of L2 speakers, with complex relationship to English/Pidgin multilingualism and identities of speakerhood (Solomon 2024)
- ‘Neo’/ ‘University’ Hawaiian (NeSmith 2002, Higgins 2019)


Haena
Princeville
Hanalei
Kilauea
Halelea Forest Reserve
Na Pali-Kona Forest Reserve
Kauai
Lihue-Koloa Forest Reserve
Kekaha Game Management Area
~200? family members
Kekaha
Waimea
Pakala Village
Hanapepe
Kalaheo
Eleele
Koloa
Lihue
Niʻihau
Puuwai
Niʻihau
~50? full-time residents

Niʻihau Hawaiian

- Very isolated, recognized as distinct dialect
- Limited mutual intelligibility with Standard Hawaiian in some cases
- Continuous childhood acquisition from surrounding community in most domains – last bastion of ‘Traditional Hawaiian’ (NeSmith 2002)

What about the consonants of Niʻihau?

Let’s listen to some clips of Elama Kanahele (middle) in two styles:

1. Speaking to interviewers in Standard Hawaiian
2. Speaking to a relative in Niʻihau Hawaiian

What differences do you observe?


Ua hoʻomau a hiki i kēlā makahiki,
ʻelua makahiki kēia o koʻu hana ʻana
ma ke Kula Niʻihau o Kekaha.


Amū, ‘o ia tēlā, poina akula e waiho i tou
‘ite aku i ta ‘ohana Ni‘ihau i ta pō nei. Lo‘a
tā mātou pa‘ina Kalikimaka i ka pō nei.

What about the consonants of Niʻihau?

Niʻihau has [t] where Standard has [k]!

- But not *all* /k/ are [t] in Niʻihau. Some are still [k]
- Before we can do a sociolinguistic analysis, we need to understand the envelope of variation

What is the internal conditioning of t~k in Niʻihau Hawaiian?

A little more background…

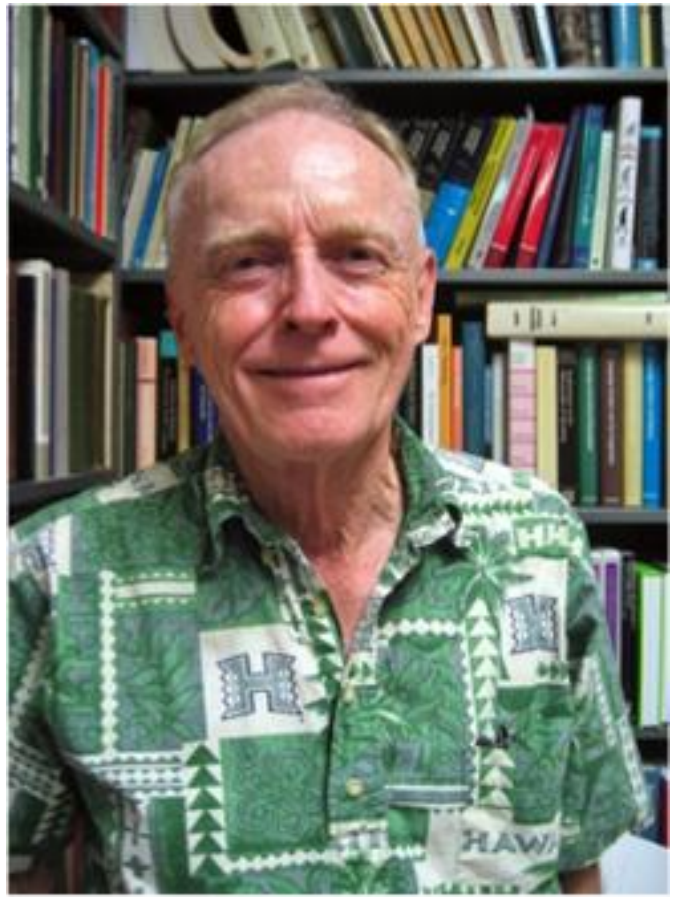
- Hawaiian /k/ comes from Proto-Polynesian *t, and ultimately Proto-Austronesian *t

PPN *fatu ‘plait’	> Rapa Nui **hatu** ‘weave’	Haw. **haku** ‘braid’
PPN *tapu ‘taboo’	> Maori **tapu** ‘taboo’	Haw. **kapu** ‘taboo’
PPN *tasi ‘one’	> Rennellese **tasi** ‘one’	Haw. **kahi** ‘one’
PPN *tali ‘wait’	> Niue **tali** ‘wait’	Haw. **kali** ‘wait’
PAN *ma-takut ‘fearful’	> Siraya **matakot** ‘fear’	Haw. **maka‘u** ‘fear’
PAN *pitu ‘seven’	> Basai **pitu** ‘seven’	Haw. **hiku** ‘seven’
PAN *telu ‘three’	> Amis **tolo** ‘three’	Haw. **kolu** ‘three’
PAN *tuduq ‘drip’	> Bunun **tuduq** ‘drip’	Haw. **kulu** ‘drip’

A little more background…

- Blust (2004) noted that *t > k change has occurred at least 20 independent times in Austronesian languages
- Noticed that in Niʻihau, we tend to see **kVt** rather than **tVt** – some sort of dissimilation?

If it's a process of dissimilation and [t] is the majority, unmarked, 'elsewhere' case, then we should assume in Niʻihau Hawaiian an underlying /t/ that sometimes changes to [k]



A little more background…

- Wong (2019) provides L1 intuitions:

Papa Kuhikuhi Helu 3.1 Na Hua Olelo i Hoohana ia me ke *K* a i *T*

Ka Puana Niihau	*Ka Puana Maamau*
tataahi	kākaʻahi
tataitahi	kākaʻikahi
tala	kālā
teteehi	kekeehi
kapati, sabati	kapaki
kataiaka	kakahiaka
katou	kākou
kikiti	kikiki
koto	koko
tokoleka	kokoleka
tootoo	koʻokoʻo
tutatuta	kūkākūkā

Niʻihau

Standard

- Sometimes, but not always, dissimilates to kVt

A little more background…

- Wong (2019) provides L1 intuitions:

Papa Kuhikuhi 3.2 Na Hua Olelo i Hiki ole ke Hoololi ia ke *K* i *T*

Ka Puana Niihau	*Ka Puana Maamau*
kanake	kanakē
kanaka	kānaka
kalaka	kalaka
kaliki waiu	kāliki waiū
kakani	kakani
kakini	kākini
laikini	laikini
lokeloke	lokeloke
kolekole	kolekole
pakalaki	pakalaki
pukalaki	pūkalakī

Ni‘ihau

Standard

- /t/ > [k] also in the presence of /n/ or /l/
- Points to broader coronal dissimilation

A little more background…

Eia ae kekahi mau hua olelo Niihau i hoohana nui ia ma Niihau. Ma ka hooloili ana i ka hua leka *k* a me ka *t*, e laa hoi me "kali" a me "tali," a okoa hoi ko laua manao kekahi. O ka manao nui o "kali," ua like no kona manao me "alia." A ina komo mai ka *t* ma kahi o ke *k*, okoa kona manao. O ka manao no keia hua olelo i pela ia me ka *t*, pili no i ka mai o ka wahine. A oia ke kumu, aole hiki ke hooloili wale aku no i na hua leka *k* a pau i *t* no ka okoa o ka manao o kekahi hua olelo mai kekahi hua olelo aku.

By exchanging [k] and [t], such as in *kali* and *tali*, one also changes the word's meaning. The meaning of *kali* is "to wait". And if you use [t], the meaning is different: this word with a [t] means the female genitalia. This is the reason that you can't just exchange all [k] and [t], since the meaning of one word might be different from another.

- Some phonemic pairs differentiate what were previously homophones (and still are in Standard)

Elama Kanahele's intuitions

TV interview, 12/20/1997
Mānaleo TV

"*Kātou*, *lākou* – in such words, you can't change the [k]. Yeah, in *lākou* you've got to keep it as [k]. *Mākou* you can pronounce as *mātou*, just as we pronounce *kākou* as *kātou*. But you can't just change all of your [k] to [t], it sounds very odd if you try to do that!"

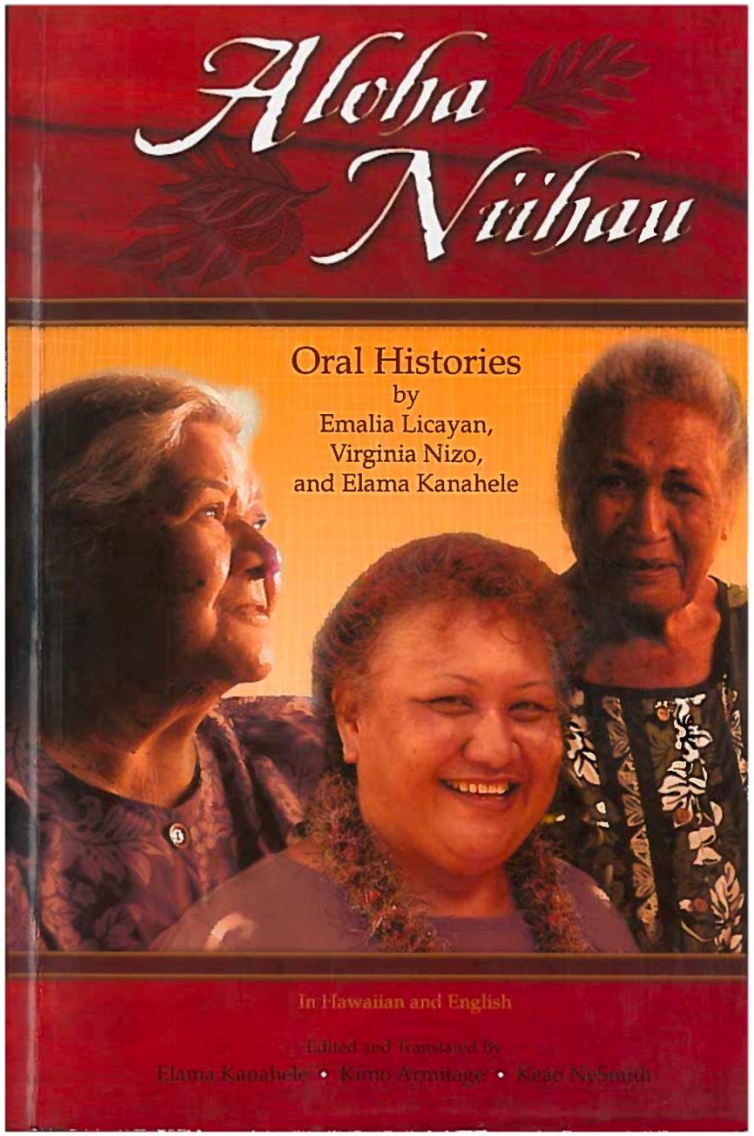
Summary so far:

- Let's assume it's underlyingly /t/ for Niihau speakers (despite the spelling using <k> and Standard speakers having /k/)
- Some sort of coronal dissimilation going on (Blust, Wong)
- We can hear t~k variation in Elama Kanahele's TV data, but she style shifts so much that it's hard to get a good sense of the 'pure' Niʻihau pattern

Wouldn't it be nice if we had a big chunk of single-style Niʻihau data to try to get a baseline understanding of the internal conditioning?

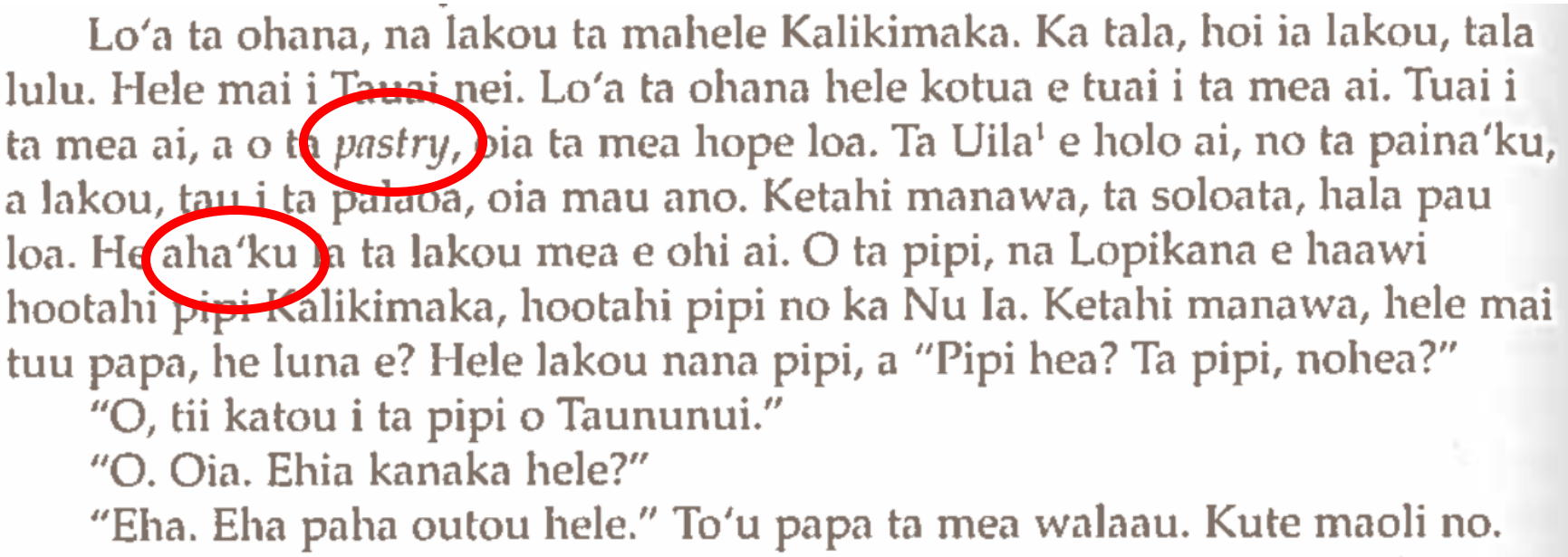
Present data source: *Aloha Niihau*

- Close word-for-word transcriptions of recorded interviews of Elama Kanahele
- <t> and <k> distinguished in orthography, but otherwise typical Niihau orthography that doesn't mark /ʔ/ or long vowels



Present data source: *Aloha Niihau*

- What I did:
  - ‘Corrected’ a couple contractions for ease of searching certain lexemes for t vs. k
  - Stripped punctuation
  - Removed names and words with non-native phonotactics
- 2,979 <t>
- 1,335 <k>



Lo‘a ta ohana, na lakou ta mahele Kalikimaka. Ka tala, hoi ia lakou, tala lulu. Hele mai i Tauai nei. Lo‘a ta ohana hele kotua e tuai i ta mea ai. Tuai i ta mea ai, a o ta *pastry*, oia ta mea hope loa. Ta Uila[1] e holo ai, no ta paina‘ku, a lakou, tau i ta palaoa, oia mau ano. Ketahi manawa, ta soloata, hala pau loa. He aha‘ku ia ta lakou mea e ohi ai. O ta pipi, na Lopikana e haawi hootahi pipi Kalikimaka, hootahi pipi no ka Nu Ia. Ketahi manawa, hele mai tuu papa, he luna e? Hele lakou nana pipi, a “Pipi hea? Ta pipi, nohea?”

“O, tii katou i ta pipi o Taununui.”

“O. Oia. Ehia kanaka hele?”

“Eha. Eha paha outou hele.” To‘u papa ta mea walaau. Kute maoli no.

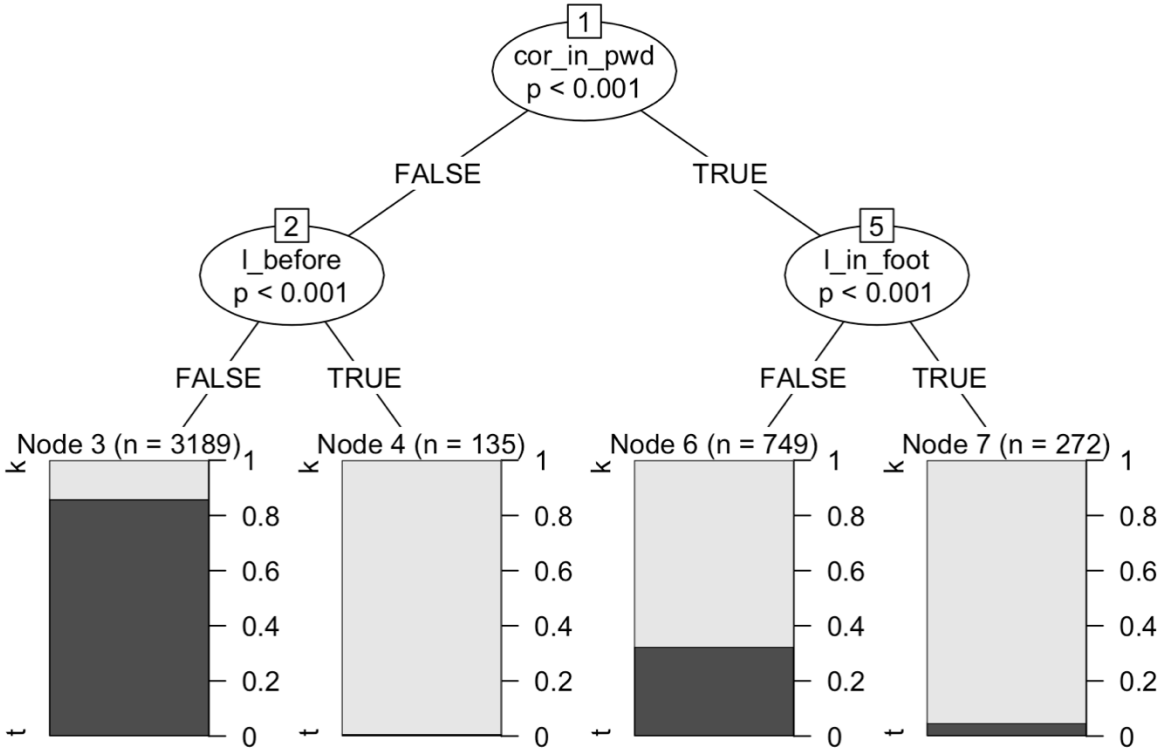
Exploratory Analysis: Conditional Inference Tree

- “Provides estimates of the likelihood of the value of the response variable based on a series of binary questions about the values of predictor variables” (Tagliamonte & Baayen 2012)
- Each t or k token coded for 35 variables:

- Previous vowel
- Following vowel
- Previous consonant
- Following consonant
- Another t/k in word?
- Another t/k before within word?
- Another t/k after within word?
- A(nother) t in word?
- A(nother) t before within word?
- A(nother) t after within word?
- A(nother) k in word?
- A(nother) k before within word?
- A(nother) k after within word?
- An n in word?
- An n before within word?
- An n after within word?
- An l in word?
- An l before within word?
- An l after within word?
- An l/n in word?
- An l/n before within word?
- An l/n after within word?
- A(nother) t/l/n within word?
- A(nother) t/l/n before within word?
- A(nother) t/l/n after within word?
- A(nother) t within foot?
- A(nother) t within PWd?
- An n within foot?
- An n within PWd?
- An l within foot?
- An l within PWd?
- An n/l within foot?
- An n/l within PWd?
- A(nother) t/l/n within foot?
- A(nother) t/l/n within PWd?

Conditional Inference Tree

- Most informative split: presence of a(nother) coronal within the PWd domain
  - If not, next split is whether there's an [l] before it within the word
    - If not, 85.8% likely to be [t] (Node 3)
    - If so, 99.3% likely to be [k] (Node 4)
  - If so, next split is whether there's an [l] anywhere within the foot
    - If not, 67.7% likely to be [k] (Node 6)
    - If so, 95.2% likely to be [k] (Node 7)



Maximum number of splits set to 2

Overall patterns (and complications)

1. Niʻihau t~k is underlyingly /t/, and dissimilates to [k] when located adjacent to a syllable containing /t/, /n/, or /l/

- *teia* (132) ‘this’, *tou/toʻu* (89) ‘your, my’, *matou* (59) ‘we’
- *katou* (97) ‘we’, *ketahi* (59) ‘a’
- *like* (61) ‘like’, *iloko* (45) ‘in’, *kalaka* (12) ‘truck’, *kanaka* (12) ‘person’

Overall patterns (and complications)

1. Niʻihau t~k is underlyingly /t/, and dissimilates to [k] when located adjacent to a syllable containing /t/, /n/, or /l/

But: Sporadic style-shifting cannot always be ruled out when all /t/ in a word unexpectedly become [k] with no apparent trigger

- *kekahi* (5) ‘a’, *hookahi* ‘one’ (1), *ke Akua* ‘God’ (1)

  cf. *te Akua* (24), *ke Atua* (1)

Overall patterns (and complications)

1. Niʻihau t~k is underlyingly /t/, and dissimilates to [k] when located adjacent to a syllable containing /t/, /n/, or /l/

The dissimilation process usually selects targets left-to-right, rendering [kVtV] the preferred output of /tVtV/

- *kute* (24) ‘cook’, *kotua* (11) ‘help’

Overall patterns (and complications)

1. Niʻihau t~k is underlyingly /t/, and dissimilates to [k] when located adjacent to a syllable containing /t/, /n/, or /l/

The dissimilation process usually selects targets left-to-right, rendering [kVtV] the preferred output of /tVtV/

However, other strategies exist and more than one strategy may be attested within-lexeme:

- *te Akua* (24) and
- *takahiaka* (7) and
- *takau* (1) and *katau* (1) ‘write’

teia poe moolelo e walaau ai ia laua. Ahe i katau ia iloko o ta pute. Ahe i takau ia mai la iloko o ta nupepa. Walaau oia i teia poe moolelo

It wasn’t written in the book. It wasn’t written down in the newspaper.

Overall patterns (and complications)

2. Dissimilation may be blocked by a foot/PWd boundary between the trigger and the /t/ target

- *tutu* (52) ‘grandmother’ <{ˌtuː}><{ˈtuː}>
- *tuitui* (19) ‘light’ <{ˌtu.i}><{ˈtu.i}>
- *teoteo* (9) ‘white’ <{ˌte.ʔo}><{ˈte.ʔo}>
- *taulai* (2) ‘hang up’ <{ˌtau}><{ˈla.ʔi}>
- *taulana* (1) ‘famous’ <{ˌtau}><{ˈla.na}>

Overall patterns (and complications)

2. Dissimilation may be blocked by a foot/PWd boundary between the trigger and the /t/ target

However, dissimilation may also apply consistently even across a foot/PWd boundary, and can apply right-to-left:

- *lakou* (107) ‘they’ <{ˌlaː}><{ˈkou}>
- *pilikia* (6) ‘problem’ <{ˌpi.li}><{ˈki.a}>
- *makeneki* (4) ‘magnet’ <{ˌma.ke}><{ˈne.ki}>
- *alakai* (2) ‘lead’ <{ˌal.a}><{ˈka.ʔi}>

Overall patterns (and complications)

3. a) Dissimilation may target a /t/ in a non-adjacent syllable and/or when the trigger is located across foot/PWd boundaries

kamalii (42) ‘child’, *tahakai* (25) ‘shore’, *Kalikimaka* (19) ‘Christmas’

b) The first two /t/ in a word may both dissimilate to [k] if a third coronal comes later in the word

kokote (8) ‘close’, *kakalina* (2) ‘gasoline’

Overall patterns (and complications)

4. Certain words may be lexically specified as consistently having just [t] or [k], including some semantically differentiated minimal pairs.

- Words like *aku* (138) ‘directional particle’, *akā* (13) ‘but’, and *akamai* ‘smart’ (4) are lexically specified to contain [k] with no apparent trigger
- Words like *taula* (7) ‘rope’, *taitunane* (6) ‘brother’, and *tutulu* (3) ‘build’, are lexically specified to contain [t] in violation of the normal dissimilation process

Overall patterns (and complications)

4. Certain words may be lexically specified as consistently having just [t] or [k], including some semantically differentiated minimal pairs.

Borrowed terms may stay relatively phonetically faithful to their origin language, resulting in the creation of new minimal pairs

- *tapu* (11) < Eng. *tub* *kapu* (1) < Eng. *cap*
- *tala* (3) ‘long ago’ *kala* (1) < Eng. *color*

Overall patterns (and complications)

4. Certain words may be lexically specified as consistently having just [t] or [k], including some semantically differentiated minimal pairs.

Not all borrowed terms remain faithful to the origin language. Some exhibit consistently reversed t~k:

- *pute* (10) < Eng. *book*
- *kalaka* (12) < Eng. *truck*

Some borrowed terms exhibit t~k alternation between tokens:

- *kope* (5) and *tope* (5) < Eng. *coffee*
- *talena* (1) and *kalena* (1) < Eng. *talent*

Overall patterns

1. Niʻihau t~k is underlyingly /t/, and dissimilates to [k] when located adjacent to a syllable containing /t/, /n/, or /l/
2. Dissimilation may be blocked by a foot/PWd boundary between the trigger and the /t/ target
3. a) Dissimilation may target a /t/ in a non-adjacent syllable and/or when the trigger is located across foot/PWd boundaries
   b) The first two /t/ in a word may both dissimilate to [k] if a third coronal comes later in the word
4. Certain words may be lexically specified as consistently having just [t] or [k], including some semantically differentiated pairs

Next step: Sociolinguistics!

- Blust (2004: 371), t~k variation arose as “a calculated compromise that enabled speakers to incorporate the prestigious *k* of the standard written language into colloquial speech without completely surrendering the *t* allophone”
- How to operationalize this pattern in a quantitative analysis?
  - Can’t just count up all [t] and all [k]! Need to account for general tendencies, lexical specification, optional outputs, unobserved (impossible?) outputs, etc.
- But if we could operationalize this somehow…

More data from Elama Kanahele

- …we have more data from this very same speaker in the form of archival interviews!
- Call-in format of MānaleoTV show is great for comparing interlocutor- and topic-based style shifting

More data from other Niʻihau speakers

- Check out Tuitui Malamalama on YouTube – many hours of studio-recorded conversations
  - Contemporary speech: episodes and seasons from 2024 and 2025
  - Multiple locally relevant topics
  - Multiple generations
  - Great source of cultural knowledge – and linguistic documentation!

Mahalo i to outou hoolohe ana mai!