Logoori Noun Tone 2.0

David Odden
University of Washington, Ohio State University

1. Introduction

A basic problem in analyzing noun tone in Bantu is that there are typically limited possibilities for alternations which can motivate rules, so there is little reason to go beyond just saying what the surface tone of a particular noun is. The highly credible null hypothesis for noun tone in Bantu is that for each noun you just memorize where the surface tone is. Usually, there are very few alternations that motivate rules that change underlying to surface forms, so no reason to claim a difference between the two forms. There may be observable distributional patterns, but the grammar need not encode them.

In contrast verbs generally have just a two-way contrast in roots between H and L which appears in a regular location – root-initially. Because of the system of tone inflection as a consequence of verb morphology, we have plenty of alternations that reveal that there are rules applying in verbs, and underlying and surface forms are not the same. Examples in (1) are from Logoori.[1]

(1)

L verb		*H verb*	
vara-rakʊʊrana	‘they will release e.o’	vara-vóhoollana	‘they will untie e.o’
vakɪ-rákʊ́ʊ́rana	‘they are still releasing e.o’	vake-vohóólláná	‘they are still untying e.o’
na va-rákʊ́ʊ́ráne	‘they will release e.o’	na va-vóhóólláne	‘they will untie e.o’
váá-rákʊʊrana	‘they released e.o’	váá-vóhoollana	‘they untied e.o’
rakʊʊrani	‘release e.o!’	vohóóllání	‘untie e.o!’
ka-rakʊ́ʊ́ráné	‘now release e.o!’	ka-vohóó!lláné	‘now untie e.o!’
vaka-rá!kʊ́ʊ́ráná	‘they just released e.o’	vaka-vó!hóólláná	‘they just untied e.o’
vaa-rákʊ́ʊ́rání	‘they released e.o (hest)’	vaa-vóhóóllání	‘they untied e.o (hest)’

Verb words are made up of many morphemes and the tone of a verb word varies substantially within the paradigm of a given root, so it is impossible to just lexicalize the tone of a verb word, and analyzing data like (1) reveals that there is a complex set of tone rules.

Nouns in Logoori and Bantu in general are highly restricted in their morphological potential: they have significantly reduced alternation potential, so it is much harder to argue for an analysis that goes beyond just “store the stem in its surface form”. A typical Logoori noun has two class-related inflectional prefixes. There are some proclitics such as *nɪ-* ‘it’s a’, *sa-* ‘like’ which reveal very little, and phrasal combinations do not *generally* reveal underlying distinctions as they do in Taita for example, though some distinctions are discussed below.

(2)

ʊ-mʊ-rógoori	‘Logoori person’	a-va-rógoori	‘Logoori people’
n-ʊ-mʊ-rógoori	‘it’s a Logoori’		
s-ʊ-mʊ-rógoori	‘like a Logoori’		

The goal of this paper is to lay out the facts of noun tone in the Luyia language Logoori, striving for an analysis with rules and representations that account for the facts.

To aid in understanding Logoori noun tone, (3) gives the main generalizations about noun tone.

---

[1] As is traditional in Bantu tonology, only H tones are marked in the data, except that low-toned syllabic /m/ is indicated with grave accent.

(3) A stem can have Ø, 1 or 2 H tones
If there is 1 H, it is on the first stem syllable
Minor exception: a few stems with H on V_2 (the penult, almost always)
If there are 2 Hs, the second H is either final or penult
Then the first H goes towards the left edge of the stem (pre-stem or stem-initial)
The location of H_1 is governed by stem length and location of H_2.
H on a long penult is usually level, but can be (lexically) falling

2. General phonological processes

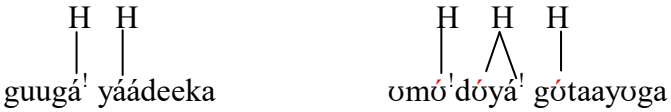
We start with some ubiquitous tone facts of the language. As far as the tonal inventory is concerned, downstep always arises from the concatenation of Hs at the phrasal level as in (4).

Downstep from concatenation of Hs

(4)	guugá	'grandfather'	yáádeeka	'he is having cooked'
	guugá! yáádeeka	'grandfather is having cooked'		
	ʊmó!dóyá	'mashed beans'	gótaayʊga	'before they go bad'
	ʊmó!dóyá! gótaayʊga	'before the beans go bad'		

I treat downstep as non-phonological, the result of a phonetic rule, that whenever two Hs come together, the tone register of the second is lowered, thus the above phrases have the phonological form (5). The phonology of downstep is simply that you have two H autosegments, which is the phonetic component means that pitch is lowered between the two Hs, and the phonology just has H H. You could accomplish this with late floating-L insertion between H autosegments, if you insist.

(5)



A very general tone rule of Logoori is Leftward Spreading, which spreads H to the left through any number of toneless syllables. The rule is optional but usually applies, applying within and across words, and the examples in (6) show spreading applying across a long string of words.

(6) nɪ vwaangʊ marova kʊvarizɪr_avaand_ɪzing'oombe
'it is easy for Marova to count cows for the people'

ní vwáángʊ máróvá kʊ́várízír_áváánd_ízíng'óómbé dáave
'it is not easy for Marova to count cows for the people'

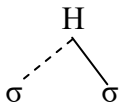
Spreading may bring two H tones into contact, which results in downstep as we see in (7).

(7)	nɪ rahísɪ marova kʊrɪma	'it's easy for Marova to plow'
	nɪ rahí!sí máróvá kwíɪmba	'it's easy for Marova to sing'

Optionality of spreading is illustrated in (8).

(8) ní vwáángó máróvá kwíimba ‘it’s easy for Marova to sing’
nɪ vwaangɔ maróvá kwíimba id.

There are both phonological and phonetic factors that complicate spreading, which would take a whole talk to explain, and I won’t get into that here. The basic phonological conclusion is that there is a rule, (9), which is blocked by certain factors that are not central to the present analysis of noun tone.

(9) 

Leftward Spreading (opt: usually applies)

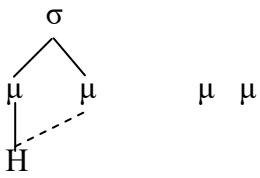
While for the most part we can talk of Logoori tone as specified H versus unspecified L on syllables, there is a contrast between level H and falling tone that exists only on long phrase-penultimate syllables. If a noun with a xical fall is followed by another word, that fall becomes level H as in (10).

(10)

ɪri-dáanji	‘tank’	ɪri-dáánji llara	‘1 tank’
ɔrɔ-nyáasi	‘medicine’	ɔrɔ-nyáá!sí ólláhɪ	‘good medicine’
ɔmɔ-sáaza	‘man’	ɔmɔ-sááza vɔza	‘only a man’
ɔmɔ-sáára	‘tree’	ɔmɔ-sáára mɔlla	‘1 tree’
ín-dóómba	‘drum’	ín-dóó!mb-ííndáhɪ	‘good drum’
eke-kóóndo	‘monkey’	eke-kóóndo vɔza	‘only a monkey’

A second general tone rule is Fall Simplification in (11), whose effect is seen throughout the data.

Fall Simplification

(11) 

In verbs, the existence of a fall/level contrast it is entirely predictable from the specific melodic pattern of the tense. In nouns, this is an irreducible property of lexical items.

3. Lexical tone distribution

With this background, we turn to lexical tone in nouns. We see in (12) a collection of nouns exemplifying the surface tone patterns that exist in nouns. I parse the class prefix from the stem with a hyphen, since the stem is what determines the tone pattern. In light of Leftward Spreading, these surface forms may and in some cases must be assumed to come from more abstract forms with only the rightmost H in a span being associated to a vowel, and associations to the left are due to Leftward Spreading.

(12)

ɔmɔ-doto		‘infant’
ɪkí-bága	/ɪkɪ-bága/	‘cat’
ɪch-áayo		‘herd’
ɪkí!-fóryá	/ɪkí-fɔryá/	‘pan’
é!-ngókó	/é-ngokó/	‘chicken’
daadá		‘father’

eké!-róóró	/eké-rooró/	‘chicken louse’
ʊmʊ́-sáára	/ʊmʊ-sáára/	‘tree’
ʊmʊ́!-yááyɪ	/ʊmʊ́-yááyɪ/	‘boy’
ɪ́-dwáasi	/ɪ-dwáasi/	‘milk cow’
ʊmw-ááraabu		‘Arab ’
ʊm̀-bʊ́!gʊ́sʊ́	/ʊm̀-bʊ́gʊsʊ́/	‘Bukusu ’
ʊmʊ-dɪɪgɪrʊ		‘crutch’
ʊrʊ́-háá!ngáywá	/ʊrʊ-háángaywá/	‘cave’
ɪrɪ́-kááfʊri	/ɪri-kááfʊri/	‘padlock’
ɪ-návódo	/ɪ-navódo/	‘basket’
ʊmʊ́-rógoori	/ʊmʊ-rógoori/	‘Logoori ’
ɪri-syaamogoma		‘gecko’
ɪch-áá!mégéré	/ɪch-áámegeré/	‘mushroom’
e-pé!téróóri	/e-péteróóri/	‘petrol’

The next question is whether there are distributional regularities in the appearance of tone in the stem.

The first distributional issue is the fact that the tone of the noun word is determined by the stem, yet phonetically distinctive tones exist *before* the stem, on the noun class prefix or the augment. Noun class prefixes are *not* generally H toned, they are toneless. That is, they have a H when added to *certain* stems. For instance, when the stem is toneless as in (13), the class prefix is always toneless.

(13)	ʊmʊʊ-ndʊ	‘person’	avaa-ndʊ	‘people’
	ʊmʊ-gera	‘river’	ɪmi-gera	‘rivers’
	ɪrɪ-davaangɪrʊ	‘badly-made pot’	ama-davaangɪrʊ	‘badly-made pots’
	ɪkɪ-haraato	‘famine’	ɪvɪ-haraato	‘famines’
	e-ɲeengero	‘beer pot’	ɪzɪ-ɲeengero	‘beer pots’

Likewise, when attached to a noun that has a lexical H, that H will spread leftward to the class prefix.

(14)	/ʊmʊ-kórʊ/	ʊmʊ́-kórʊ	‘initiate’
	/ava-kári/	avá-kári	‘women’
	/ɪri-dirísha/	ɪrí-dírísha	‘windows’
	/ama-gáraba/	amá-gáraba	‘bean leaves’
	/eke-kóómoori/	eké-kóómoori	‘plant sp.’
	/ɪvi-táraazi/	ɪví-táraazi	‘shelves’
	/ɪ-darája/	ɪ́-dárája	‘bridge’
	/izin-déve/	izín-déve	‘chairs’
	/ʊrʊ-hágayʊ/	ʊrʊ́-hágayʊ	‘hoof’

In (15) we see some nouns, in their pre-spreading form, which have a H on the noun class prefix.

(15)	/ɪ**kí**-fʊryá/	ɪkí!-fʊ́ryá	‘pan’
	/**én**-gokó/	é!n-gókó	‘chicken’
	/ɪ**rí**-bwóoni/	ɪrí!-bwóoni	‘potato’
	/a**má**-bwóoni/	amá!-bwóoni	‘potatoes’
	/ʊ**mʊ́**-yááyɪ/	ʊmʊ́!-yááyɪ	‘boy’
	/ʊ**vʊ́**-cháafu/	ʊvʊ́!-cháafu	‘dirtiness’
	/e**ké**-seegéra/	eké!-séégéra	‘eye swelling coming from spell by dogs’
	/ʊ**vʊ́**-nyeegéri/	ʊvʊ́!-nyéégéri	‘itch’

This is a lexical property of some noun roots: how is the distinction represented in the root? Why is this only found when there is a second H? This is distributional puzzle number one: what is it about the underlying form that causes the pre-stem syllable to have H?

There are also systematic restrictions in (16) on noun tone, where certain patterns are completely missing even though they would be possible given free occurrence of H on any syllable including a pre-stem syllable.

(16)		
	*ɪkí-vanatu	prefix H with no other H
	*eke-sememé ~ eké-sémémé	H only on the final vowel
	*eke-severéta	H only on the penult of 4-syllable or longer word
	*ɪkɪ-bí!ní!má	three Hs

Nouns in Logori can be analyzed in terms of 5 relatively obvious patterns, regardless of stem shape, and what I will do now is present these patterns. The last fact in (16) points to a basic generalization about noun tone, that stems have at most two Hs, therefore we have two-H patterns, and one-H patterns, as well as toneless nouns. The first fact in (16) means that pre-stem H is about where to put the first H in certain two-H nouns. The approach I take here is to first describe single-H nouns, then the double-H nouns, where it turns out that you can predict the location of the leftmost H on the basis of the rightmost H.

(17)		
	L	no H at all
	H	1 H, stem-initially; lexical split on long penult between level H and Fall Plus a minor V_2 single-H pattern.
	HH#	Final H + H on prefix / stem initial
	HH	penult H + H on prefix / stem-initial. Lexical split on long penult between level H and Fall

The most common patterns are L and H, which also characterize verbs that lack an inflectional melodic tone. The L pattern is simply the case where the noun has no H at all, and the H pattern is where there is a single H, on the first syllable of the stem. L nouns in (18) simply have no H, and this accounts for 25% of the noun lexicon.

(18)				
	ɪkɪ-gʊrʊ	‘hill’	ɪ-nyuundo	‘hammer’
	ɪkɪ-haraato	‘famine’	e-geengere	‘bell’
	ɪkɪ-vʊʊzʊʊzi	‘whirlwind’	eke-heregete	‘measles’
	ɪn-dʊvɪri	‘colobus monkey’	ɪvi-goongomello	‘paraphernalia’

H nouns have a single stem-initial H, and make up 42% of the noun lexicon.

(19)				
	e-béde	‘ring’	ʊvʊ́-chíma	‘ugali’
	ɪ-dááywa	‘rooster’	ʊvʊ́-yúúsi	‘corn silk’
	eké-kéreko	‘potash sieve ’	ʊmʊ-rógoori	‘Logoori’
	ɪ-kááyoongo	‘weed’	e-béénzeni	‘wash basin’
	ɪ-báákoora	‘cane’	ʊmʊ-nákɪvara	‘non-Logoori’
	í-náángʊrʊka	‘ugali pot’	ʊmw-íísʊkʊrʊ	‘grandchild’

There is one difference between nouns versus verbs in the single H set, which is that the fall versus level distribution in nouns is lexical. We have both a level H class, which makes up over 3/4ths of CVVCV nouns with single initial H, and falling which is the other quarter of that subset.

(20) Level H: > 75% (of CVVCV single H)

ama-géénga	‘embers’	amá-hóórʊ	‘desire to meet s.o’
eke-bóóko	‘cattle guide’	e-véémbe	‘grass’
ɪ-bʊ́ʊ́nda	‘donkey’	ɪ-dááywa	‘rooster’
ɪkɪ-búúsi	‘cat’	ɪkí-dʊ́ʊ́ndʊ	‘bamboo plant’

Fall: < 25% (of CVVCV single H)

ɪ-híiri	‘clan’	aḿ-béere	‘milk’
eké-róori	‘heifer’	é-ng’éende	‘jigger’
ɪkɪ-tʊ́ʊmi	‘mound’	ɪm-báande	‘dove type’

It is unclear right now how to derive this contrast. There is a big-picture issue that there is idiolectal variation where F → H optionally, and quasi-randomly where some speakers decontour more than others, and some words are more resistant than others (*ʊm-sáára* ‘tree’ vs. *ʊm-sáaza* ‘man’ is a reliable contrast). We will temporarily set aside the question of how to derive this distinction.

Of the remaining single-H patterns, the most common is the second-syllable pattern, which makes up about 2% of the lexicon. Virtually all examples are trisyllabic loan stems with short vowels, with only two words having more than three moras in the stem

(21)

ʊm-féréji	‘water tap’	í-návódo	‘drum’
í-súgúdi	‘conga drum’	í-dágíga	‘minute’
ɲasáaye	‘God’	(also ɲasáye)	
ama-bárábaande	‘loquat’		

There are some H-final nouns, namely the H-toned monosyllables. The one complication that they pose is that they may be realized with just a final H that spreads to the left, or with a downstep between the penult and final syllables. Sometimes there is a third variant with H only on the pre-stem syllable.

(22) *Final H = initial H in CV roots*

amá-rwá ~ amá!-rwá ~ amá-rwa	‘alcohol’	ama-rwá vʊza	‘only alcohol’
ʊvʊ́-tá ~ ʊvʊ́!-tá ~ ʊvʊ́-ta	‘bow’		
ím-bwá ~ í!-mbwá	‘dog’	ɪ-mbwá ndara	‘1 dog’
amá-chí ~ amá!-chí ~ amá-chi	‘heels’		

Generally, it is clear that these are just H-initial CV roots, subject to a peculiar H!H realization pre-pausally. The pre-stem-only realization is much less frequent, and has not been observed for all nouns. The somewhat puzzling fact about the H!H realization is that this is not a general fact of final H’s in the language, it is a quirk about *lexical* tones and some but not all melodic tones. The tone-shifting variant *ʊvʊ́ta* is completely unexpected, insofar as there is no other context where final H’s would be analyzed as having shifted left. Phrasal data on that variant in fact indicates that this is a fundamental reanalysis of the location of H, since even phrase medially, the H can be on the prefix.

(23)

ʊvʊ́-ta vʊza		‘only a bow’
ʊvʊ́!-t_ʊ́vʊ́táámbɪ	ʊvʊ́-tá vʊtáámbɪ	‘long bow’

The remaining patterns are the double-H patterns. The first and largest subset makes up 13% of the noun lexicon. These nouns have H on the last syllable, and H towards the left edge of the stem. That first H is on the first stem syllable when the stem has 3 or more syllables, and is right *before* the stem when the stem has just one syllable.

Double-H nouns

Location of H_2 is lexically specified (final or penult)
Location of H_1 is predictable, given that

(24) HH#=14% of the lexicon

H_1 stem initial with longer stems

eké-mé!nénwá	'cartilage'	ɪzim-bá!róká	'cooked bananas'
ɪ-ná!máárá	'tick'	oro-séé!ng'éengé	'barbed wire'
ɪrí-jíí!kóró	'crow'	ɪkɪ-dúú!kúúrá	'chicken flea'
ama-sí!ríngókó	'chicken droppings'	eké-dó!vóngóryó	'pool of water'
eké-kóó!mámóólí	'ringworm'	ɪkɪ-síí!mbíikírá	'whydah'

H_1 is pre-stem with disyllabic stems

é!n-gókó	'chicken'	í!n-dámá	'tobacco plant'
ɪkí!-fóryá	'pan'	ʊmó!-zúné	'sunbird'
ʊró!fónó	'tether'	ʊró!-dááng'á	'cattle-herding stick'
ɪkí!-fwóóyó	'rabbit'	ɪrí!-ng'ááng'á	'hadada ibis'

Otherwise, accounting for the last 4% of nouns in (25), the second H is on the penult where it is realized as level H in some nouns, and as falling tone in others. Here, the positioning of the first H depends on the prosodic shape of the stem. When the stem has 2 syllables, the first H is always before the stem. If the stem has 4 syllables, H is always stem-initial.

(25) HH=4%
Penult H ~ F lexically determined
Location of left-edge H depends on stem prosody

(26) Two syllables: H_1 is pre-stem. Always CVVCV (*CV́-!CV́CV)

ɪrí!-bwóoni	'potato'	ʊvó!-cháafu	'dirtiness'	í!n-jóʊgʊ	'peanut'
ʊmó!-yááyɪ	'boy'	ʊḿ!-stáári	'line'	ɪrí!-tóónda	'fruit'

In the case of trisyllabic stems, it depends on the length of the penult. If the penult is short, H1 is before the stem, and if the penult is long, H_1 is stem-initial.

Short penult: H_1 is pre-stem

(27)

í!n-dógónyi	'ant sp.'
ʊmó!-ndéréva	'driver'
rí!-dágálla	'grasshopper'
ʊvó!-nyéégéri	'itch'
ɪrí!-káánzíra	'sp. greens'
eké!-séégéra	'eye swelling '

Long penult (fall or level): H_1 is stem-initial

ɪri-dáˈráamu	‘drum’	ɪri-tóˈfáali	‘brick’	vǿ-táˈjíiri	‘riches’
ɪri-chíˈllóóndo	‘bird sp.’	ʊm-fáˈráánza	‘Frenchman’	ɪch-ááˈndáángʊ	‘back door’

With stems of 4 syllables or more, H_1 is always stem-initial

(28)	ɪri-káˈrádáasi	‘paper’	eke-méreméende	‘candy’
	ɪm-báˈrábára	‘road’	eké-héˈɲáhéɲe	‘contempt’
	ɪ-táˈpyórééta	‘typewriter’	ɪkɪ-bíˈráǿǿni	‘small clay bowl’

With the double-H nouns, the first H goes to stem initial position, but certain following syllables can block association. With penult Hs, it also matters if the penult has a short vowel, which prevents stem-initial association, or has a long vowel, which allows initial H. The generalization covering linkage of H_1 to a stem-initial toneless syllable is that the first tone links only when the target is *not* immediately followed by a short H-toned syllable.

There are two other sets of double-H nouns to add to the collection. The first has a clear disposition: these are a few class 1a nouna which in the singular have just a final H. These nouns lack the usual augment-plus-class prefix structure. Although the singulars have only final H, their plurals have the prefix *va*, and have the normal realization of double-H nouns with final H, which is H_1 is on the prefix or stem initial depending on syllable pattern. The basic complication here is that the expected first H cannot link to the first syllable in the singular. The word ‘cousin’ does in fact have a singular prefix /m(ʊ)/, and there *can* be an initial H, but only when the augment is present. There is a subtle usage difference between these forms, that *ǿmˈsháárá* is more a description of a family relationship, and *mshaará* is the name that you call your cousin.

(29)	guugá	vá-ˈgúúgá ~ váá-ˈgúúgá	‘grandfather’
	baabá	vá-ˈbáábá ~ váá-ˈbáábá	‘father’
	koozá	vá-ˈkóózá ~ váá-ˈkóózá	‘uncle’
	m̀-shaará ~ ǿḿ-ˈsháárá	vá-ˈsháárá ~ váá-ˈsháárá	‘cousin’
	ofisá	va-óˈfísá	‘officer’
	mboozó	váá-ˈmbóózó	‘brother’
	(ísé	pl. not used this dialect	‘father’)

Historically what ultimately causes this divergence of singulars in (29) is the lack of an augment in cl. 1a, and that account is tenable for the present dialect, but dialects differ substantial in their treatment of the augment and it is possible that some dialects simply do not have the augment. A formal account of this behavior, even for this dialect, still needs to be worked out.

The second subcollection of double-H nouns is a set of unclear cl. 9 CVCV nouns, which may have just a final H. This is an area where the data is highly variable both across speakers and within a speaker. Considering only the data from the Upper Chanzeywe speaker, we find a handful of nouns with many tonal realizations attested in the data.

(30)	ɪ-mbíˈtí, ɪm-bíti	‘hyena’
	íˈ-mbúrú, ɪm-buru	‘monitor lizard’
	íˈ-sǿná, ɪ-sʊna, í-sǿna, zíˈ-sǿná	‘mosquitoe(s)
	ɪ-sǿmǿ, í-sǿˈmǿ	‘poison’
	é-séré, éˈ-séré, e-séré	‘weevil’
	ím-búku, íˈ-mbúkú, í-mbúˈkú, ɪ-mbuku, í-mbúkú	‘mole’

Much more data needs to be gathered to understand the status of these stems.

To summarize the distribution of tone in Logoori nouns, if a stem has one H, that H is on the stem-initial syllable. If it has two Hs, the second H is either final or penultimate: statistically speaking, final H is more common than penult H. The location of the first H is predictable from knowing where the second H is, plus looking at the prosody of the stem, where the over-arching generalization is that the first H tends to be stem initial, unless that would put H_1 too close to H_2. Finally there is no obvious way to predict whether the non-prefix H on a long penult is realized as level H versus fall. In the single-H and double-H groups, we find both level H and falling tone on a long penult.

4. Warts

Before we think of proposing a set of rules, there are a few more facts to expose, which may challenge certain analyses.

The Fall problem

The first is the fact, noted earlier, that no obvious mechanism generates the contrast H versus fall on long penults, assuming the standard autosegmental treatment of Fall as a H just on the first half of a long vowel.

(31)				
	ʊmʊ-sáára	‘tree’	ʊmʊ-sáaza	‘man’
	ʊmʊ́ˡ-yááyɪ	‘boy’	ɪrɪ́ˡ-bwóoni	‘potato’
	ʊm-fáˡráánza	‘Frenchman’	ɪri-dáˡráamu	‘drum’
	e-péˡtéróóri	‘petrol’	ɪri-káˡrádáasi	‘paper’

One approach to this problem is to attribute all of the level Hs to having H underlyingly on the second mora of the penult, thus underlying forms like (32).

(32)				
	/ʊmʊ-saára/	‘tree’	/ʊmʊ-sáaza/	‘man’
	/H ʊmʊ-yaáyɪ/	‘boy’	/H ɪri-bwóoni/	‘potato’
	/H ʊmʊ-faraánza/	‘Frenchman’	/H ɪri-daráamu/	‘drum’
	/H e-peteroóri/	‘petrol’	/H ɪri-karadáasi/	‘paper’

There is reasonable evidence from other parts of the tonology that a would-be rising tone becomes level H, so this is a promising approach. Unfortunately, root-initial vowels, which are all underlyingly short, also manifest a lexical level versus Fall contrast, in fact with roughly equal probability, in contrast to the other cases of fall versus level H where level H is vastly more common

(33)				
	ʊmw-áana	‘child’	ʊmw-áámi	‘chief, officer’
	ʊm-ʊ́ʊnyʊ	‘seasoning’	ʊrw-ááchi	‘enclosure’
	ʊmw-éeri	‘month, moon’	ʊmw-óógo	‘cassava’
	vw-ɪ́ɪnʊ	‘ink’	ʊmw-ɪ́ɪfa	‘nephew, niece’

One could imaginatively posit that nouns, and only nouns, can have an underlying root-initial long vowels, so that the roots are as in (34).

(34)	/áana/	‘child’	/aámi/	‘chief, officer’
	/óʊnyʊ/	‘seasoning’	/aáchi/	‘enclosure’
	/éeri/	‘month, moon’	/oógo/	‘cassava’
	/íɪnʊ/	‘ink’	/iífa/	‘nephew, niece’

There is ample evidence that verb roots don’t have initial long vowels. In nouns, because of the ubiquitous CV noun class prefix and compensatory lengthening, we don’t generally have direct evidence that these vowels are underlyingly short. While there is not *generally* such evidence, there *is* some in the form of nouns in cl. 11-10, where as we see in (35), all root-initial vowels are short in cl. 10 because there is no CV prefix that merges syllabically with the root-initial vowel, thereby lengthening it.

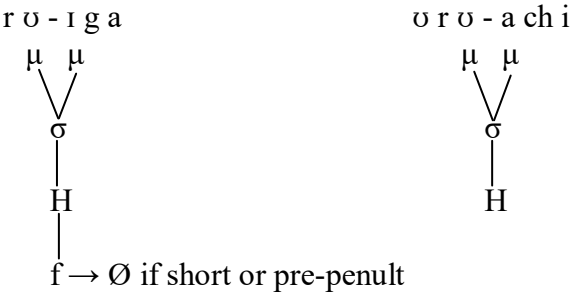
(35)	ʊrw-íɪga	‘horn’	ízínz-ága	‘horns’
	ʊrw-áana	‘childishness’	ɪzínz-ána	‘childishnesses’
	ʊrw-áako	‘boundary’	ɪzínz-áko	‘boundaries’
	ʊrw-íɪmbʊ	‘song’	ɪzíɲ-ímbʊ	‘songs’
	ʊrw-ááchi	‘enclosure’	ɪzínz-áchi	‘enclosures’
	ʊrw-áása	‘gap in teeth’	ɪzínz-ása	‘gaps in teeth’

We can extend the argument that initial vowels are short, to class 1 nouns, thanks to the fact seen in (36a) that the stem of any class 1 noun can be used as an adjective, which then can have a class 9-10 form. In (36b) we see vowel initial cl. 1 nouns used as adjectives, giving rise to a cl. 9 or 10 form with a consonant-final class prefix.

(36)	a.	ʊmʊ-doto	‘infant’		
		ʊrʊgaga ro-doto	‘soft fence’	zindéve zi-ndoto	‘soft chair’
		ʊmó!-hááyá	‘Haya’		
		ɪmívánó ímí!-hááyá	‘Haya knives’	eng’óómbé í!-mbááyá	‘Haya cow’
	b.	ʊmw-áana	‘child’		
		misáárá !my-áana	‘young trees’	ímbwá !ínz-ána	‘young dog’
		ʊmw-áámi	‘chief’		
		ɪkígúútí ch-áámi	‘chief field’	ɪnyóómba ɪnz-ámi	‘royal house’
		ʊmw-íivi	‘thief’		
		éng’óómbe ínz-ívi	‘thief cow’	ékémóórí ch-íivi	‘thief calf’

Such examples show that the stem-initial vowel, which ordinarily is preceded by a CV prefix, can be preceded by a consonant, and when it is, there is no vowel fusion and no lengthening of the short vowel. Vowel initial noun stems have underlying short vowels, but also have a level-H versus Fall contrast when lengthened. This leaves us with a relatively large puzzle, as to what mechanism bifurcates H on penults into two subtypes. In a much longer and more theoretically-oriented version of this paper, I would propose that Fall is simply a H plus some subordinate tonal node that indicates ‘falls’.

(37)



Spurious H

The second major complication in the tonal taxonomy is that there is a lexical split in longer single-H stem, ones with three or more syllables, where some receive a final H when them come before a toneless modieier, and some do not. What makes this problem so vexing is that it only affects stems with 3 or more syllables which are not very frequent, and the facts are quite variable across speakers and within the data for a single speaker. The noun *mrógoori* is a canonical and well-documented example of a noun which acts as predicted given the general tone rules of the language, mainly leftward spreading. In (38a) we find the noun prepausally, before a word with no Hs, or before a word with a H, and the noun stem contains no H other than the stem-initial lexical H. In (38b), the following word has a H which spreads leftward into the noun, which is due to leftward spreading. Lack of spreading in the last two examples of (38a) is because LS is optional.

(38) a. ʊm-rógoori ‘a Logoori’
ava-rógoori mia móója ‘100 Logoori’
akoonyi ava-rógoori vwaangʊ ‘he helped the Logooris quickly’
ʊmʊ-róogori vʊza ‘only a Logoori’
ava-rógoori vára ‘those Logooris’
ava-rógoori amsíini ‘50 Logoori’

b. ava-ró!góórí ámsíini ‘50 Logoori’
ava-ró!góórí vózá váá!kókoonyi ‘only the Logooris have helped us’
ʊmʊ-ró!góórí mtáámbɪ ‘tall Logoori’
ava-ró!góórí ḿnááne ‘8 Logoori’
mbooll_aava-ró!góórí górízí ʊ́mgádi ‘I told the Logooris “sell the bread!”’
ʊm-ró!góórí n_ʊ́mtáámbɪ ‘the Logoori is tall’
ʊm-ró!góórí n_ʊ́mwáángó dáave ‘the Logoori is not quick’

Other nouns that behave like this are given in (39).

(39)	ɪ-míísheni	‘mission’	ɪ-míísheni vʊza	‘only a mission’
	mu-nákɪvara	‘non-Logoori’	mʊ-nákɪvara mʊlla	‘1 non-Logoori’
	óófisi	‘office’	óófisi vʊza	‘only an office’
	ʊmw-íísʊkʊrʊ	‘grandchild’	ʊmw-íísʊkʊrʊ mʊlla	‘one grandchild’
	ri-kááfʊri	‘padlock’	ɪri-kááfʊri llitu	‘heavy padlock’
	ʊmʊ-sáájeni	‘sergeant’	ʊm-sáájeni ʊmwaangʊ	‘quick sergeant’

There are other nouns which are superficially similar in shape, the stem *-ídako* being a canonical example of this second type. These nouns also having only stem-initial H in (40a), and where H from the following word spreads into the noun resulting in two H’s within the stem just like in (38b), examples being in (40a). Unexpectedly, when the next word has no H tone in (c), the noun gains a final H.

(40) a. ʊmw-íídako ‘Idako’
vav_aav-íídako ‘they are Idakhos’
kɪr_ʊmw-íídako ‘every Idakho’
b. mw-íí!dákó ḿtáámbɪ ‘tall Idakho’
mw-íí!dákó móráhi ‘good Idakho’
av-íí!dákó n_áváráhɪ ‘the Idakhos are good’

	av-íí!dákó vááríma	‘the Idakhos plowed’
	av-íí!dákó váné	‘4 Idakhos’
☞	*No good reason for this second H*	
c.	ʊmw-íí!dákó mʊlla	‘1 Idakho’
	ʊmw-íí!dákó vʊza	‘just Idakho’
	av-íí!dákó vara	‘those Idakho’

Other nouns like this are seen in (41).

(41)	eke-sé!gésé vʊza	‘roof peak only’	ke-ségese	‘roof-peak’
	kóké-sé!gésé kííndí	‘different peak’	eke-sé!gésé kɪlla	‘one roof peak’
	ɪkɪ-dáhɪrʊ	‘dipper’	ɪkɪ-dá!híró kɪlla	‘1 dipper’
	ɪri-gáraba	‘bean leaf’	ɪri-gá!rábá llara	‘1 bean leaf’
	ama-gá!rábá márähi	‘good bean leaf’	ama-gá!rábá maangʊ	‘light bean leaves’
	ama-gá!rábá gára	‘those bean leaves’	amá-gá!rábá sítíini	‘60 bean leaves’

We cannot take the pre-L tone pattern to be the underlying tone, because there is also a set of words with stem-initial and word-final H tones in all positions, as we have seen in (24). The stem *-vógʊsó* in (42) is a canonical example of that type.

(42)	ʊm-bó!gósó	‘Bukusu’	ʊm̀-bó!gósó mʊlla	‘1 Bukusu’
	ʊm-bó!gósó mwaangʊ	‘quick Bukusu’	ava-vó!gósó !vávírí	‘2 Bukusu’
	avá-vó!gósó !sábá	‘7 Bukusu’	ava-vógʊs-á!víingɪ	‘many Bukusus’
	ava-vógó!só vara	‘those Bukususs’		
	avá-vó!gósó !váárɪma	‘the Bukusus plowed (stative)’		

Other nouns of this kind are in (43).

(43)	rʊ-háá!ngáywá	‘cave’
	rʊ-háá!ngáywá llara	‘1 cave’
	rʊ-háá!ngáywá !róhéne	‘big cave’
	ɪri-jíí!kóró	‘crow’
	ɪri-jííkoró vʊza	‘crow only’
	ɪri-jíí!kóró tayáari	‘ready crow’
	ʊm-kí!kóyó	‘Kikuyu’
	m-kí!kóyó mʊlla	‘1 Kikuyu’
	ʊm-kí!kóyó !mtáámbɪ	‘tall Kikuyu’
	kɪ-dúú!kúúrá	‘chicken flea’
	kɪ-dúú!kúúrá chaangʊ	‘fast chicken flea’
	kɪ-dúú!kúúrá kenéne	‘big chicken flea’

In other words, we have the three behavioral patterns in (44) where only two are predicted by the current analysis.

Three behavioral classes

(44)	CV-CV́CVCV##	CV-CV́CVCV# L H	CV-CV́CVCV# L	= (38)
	CV-CV́ˈCV́CV́##	CV-CV́ˈCV́CV́# L H	CV-CV́ˈCV́CV́# L	= (42)
	CV-CV́CVCV##	CV-CV́CVCV# L H	CV-CV́ˈCV́CV́# L	= (40)

The analytic puzzle is determining what distinguishes these lexical subsets. A couple of possibilities are hinted at in (45). We could subdivide the double-H nouns into two types, those like *ídako* which would have *no* linked H, thus having a floating as opposed to linked second H is the lexical hallmark of the Spurious H set. Nouns like *vógʊsʊ́* then would have a linked final H, and thus would be the H-final-H set as previously assumed. Alternatively, we could posit that insertion of a second H before a toneless word is a regular process, just in case the stem is more thar disyllabic and has an initial H, so *that* rule would apply to *ídako*. Under *this* analysis, the Spurious H nouns are the regular case, and then invariant stems like *rógoori* would have a special feature that blocks the H insertion rule, perhaps a floating L tone.

(45) CV́CVCV = H; CV́ˈCV́CV́ = H′ + *linked* final H; variable CV́CVCV = H′ **H′**

H	H H	H H
rogoori	vʊgʊsʊ	idako

CV́CVCV = H **L**; CV́ˈCV́CV́ = H H# ; variable CV́CVCV = H

H L	H H	H
rogoori	vʊgʊsʊ	idako

5. Synopsis

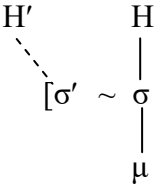
We are now at the stage of summarizing the system, with an interest in the formal analysis, which has been revealed in pieces as we encountered relevant data. We especially return to the question posed initially, namely *when* should we reject the null hypothesis that the underlying and surface forms are identical? Given the optionality of Leftward Spreading, there is not just one surface form for the vast majority of words. This fact easily justifies a certain level of abstractness in underlying forms. When the word for 'minute' can be attested as [ɪdagíga], [ɪdágíga] and [ídágíga], we have a *choice* of possible underlying forms, and classical principles of phonological analysis would select the form with the rightmost H, and the other variants would be derived by applying the well-motivated rule of Leftward Spreading. Since, as I claim, transcriptional downstep is not even *in* the surface form, removing those marks from underlying forms isn't a divergence between underlying and surface form.

There is a good reason to *not* lexically link the first H in double-H nouns, which is that sometimes that tone is linked within the root, but sometimes it is linked to a prefix. The direct evidence that the first H is not linked is that its position alternates.

(46)	ŕˈn-dámá	'tobacco plant'	ɪ-náˈmáárá	'tick'
	ŕˈn-jóʊgʊ	'peanut'	ŕˈn-dʊ́gʊ́nyi	'ant sp.'
	e-sóóˈgóóni	'market'	ɪm-báˈrábára	'road'

H association therefore *is* most of the remaining formal analysis.

(47) *H_1 association*



(complement notation: "and not…")

Concerning the location of H which ends up in stem-initial position in single-H nouns, there is no reason to leave that H floating and link it by rule to the stem-initial position. Even if we did that following some premise that underlying forms should maximally reduce content, we would need to lexically associate the H in the second-syllable set, for words like *ɪdágíga*, and also in order to represent the unpredictable final-H vs. penult H distinction in double-H nouns if we insist on the mora-locational contrast between level versus falling tone. The only consequence of omitting potentially predictable associations from the lexicon (association between the root-initial syllable and the putatively floating tone) is that the count of entities in the lexicon is reduced – but the count of entities in the lexicon has no bearing on the simplicity of the grammar of the language.

The *lack* of evidence for deriving surface forms from more abstract underlying forms, and the premise that you don't make claims without supporting evidence, thus suffices to give us an analysis of most of Logoori noun tonology: if a noun has a H, the rightmost H is linked to some syllable. If it has two Hs, the first is floating,[2] and links to the appropriate position by (47). Everything else either is a lexicalized fact – the number of H's, the choice between level H and Fall, which stem vowel the H links to.

There remain some substantial puzzles, where a high degree of variation in the data impedes the development of a clear solution. One of these puzzles is the problem of H toned monosyllabic roots, which have in addition to the generally-predicted option of a H that spreads to the left (*amá-rwá* 'alcohol') the options of a H!H sequence which does have parallels in the verbal tone system (*amá-!rwá*), as well as a less-common shift-to-penult option (*amá-rwa*) which is not paralleled anywhere else in the language. The second is the Spurious H problem, where some apparent longer single-H nouns gain a phrase-medial H. Again, the phenomenon is not universal across speakers and some roots act both ways for a single speaker, so it is hard to say exactly what facts the grammar should model. In fact, there are other phrasal tone mechanisms that may be relevant to the analysis of spurious H, where H is inserted between noun and demonstrative which may then link to the penult of toneless nouns, or be deleted when the preceding noun is H-final. The ordinary-H vs. Spurious H distinction seems to be relevant to this alternation, since with both types of nouns, the floating H connected to the construction links to the demonstrative, but there also seems to be a difference in terms of whether LS spreads.

(48)	L	ɪzin-dóóngóózi zira	'those peaks'
	HH#	ava-vó!gósó vara	'those Bukusus'
	H	ava-rógoori vára	'those Logooris'
	Spurious H	ama-gá!rábá gára	'those bean leaves'

[2] Or, *may* be floating. In shorter stems like /H′ damá/, the H *is* floating underlyingly, and links to whatever prefix precedes the stem. In [ekeméreméende] 'candy', the stem could be either /méreméende/ or /H′ mereméende/: both assumptions yield the correct output and pose no complications of the grammar. A lexicon-optimization learning approach to underlying forms says that the stem would be /méreméende/, not /H′ mereméende/, because the latter diverges from the experienced form for no reason.

The fact that LS has not applied in *avarógoori vára* is not the last word on this matter, though, since LS is optional – the not completely answered question is whether application of LS is *impossible* in this context. This is, as they say, a matter for future research.