A grammar of Lumun : a Kordofanian language of Sudan

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3. Tone

3.1. General facts

This first paragraph establishes some general facts of the Lumun tonal system: its tonemes, the tone-bearing unit, and the distribution of tones.

3.1.1. Four tonemes

Lumun can be analysed as having four tonemes: high (H), low (L), falling (HL) and rising (LH). These tones are contrastive in prepausal positions, cf. the following words. Low tone is unmarked. Notably, the words with a rising tone are not actually pronounced with a contour, but —as a whole— at a pitch that remains level (see 3.2.2). When in non-prepausal position it becomes clear that a high tone is underlyingly involved here (see 3.3.1).

L vs. **H**

kərək	‘farming field’	**kərák**	‘bellies’
ŋərɛ	‘work’	**ŋəré**	‘honey’
kəpa	‘bowl (k.o.)’	**kəpá**	‘meat’
paʊn	‘rat’	**maún**	‘fingers’

L vs. **HL**

aʊn	‘rats’	**aûn**	‘bees’
cɪpɪt	‘edge’	**cɪpît**	‘ant’
t̪ʊllɛʈak	‘lightening’	**t̪ʊllɛʈâk**	‘lizard (sp.)’
ɔllɔ	‘step aside’	**ɔllô**	‘run’

L vs. **LH**

kʊʈɪ	‘family member’	**kʊʈĭ**	‘branch (of tree)’
ɛrɛ	‘speak’	**ɛrĕ**	‘(just) like’
t̪ʊʈan	‘theft’	**t̪ʊʈăl**	‘animal (sp., rodent?)’

H vs. **HL**

kunú	‘ear’	**kunû**	‘scorpion’
parí	‘wife’	**parî**	‘tree (sp.)’
aʈaŋkál	'bed’	**əʈaŋkâl**	'name-sharers’

H vs. **LH**

kɻ́t	‘eyes’	**kǐt**	‘wild chicken’
tɔ́k	‘waterplace’	**ʈŭk**	‘dog’
ʈɪ́ɾé ‘art of being a young woman’		**ʈɪʈɛ̆**	‘saying (verbal noun)’
nán	‘on (it), at (it)’	**măn**	‘room, house’

HL vs. **LH**

ʈɛrêt	‘corn cob’	**ʈɛrɛ̆t**	‘talking about (verbal noun)’
cɔrrâ	'needle of hedgehog'	**karră**	'lie’
pɔcâŋ	'lizard (sp.)’	**cɔʈŏŋ**	'mountain’
ɪʈ̈ûn	'in the onion(s)'	**ɪʈ̈ŭn**	'together’

3.1.2. Tones on vowel sequences: counting morae

On diphthongs, it is possible to have more complex tonal contours, in which a low tone on the first part of the diphthong is followed by a falling tone, or by a rising tone, e.g.,

cʊân	‘rat (sp.)’
cʊâl	‘sack’
kʊâ	‘digging tool’
kaôn	‘bee’
ɛ̃̊	‘go’

tʊăn	‘(at) home’
ʈɛŏŋ	‘beard’
tʊkɪă	‘head pad’
mɪ̆̃	‘spell, disease’
waɻ̆	‘cow’
ɪttʊăŋ / ɪttɪăŋ	‘very (modifying **c-ɔʈɛ̆** ‘red’ or **ɔʈɪa** ‘become red’)’

The words with a rising tone (always in final position) are not pronounced with a contour but at a slightly raised pitch that remains level.

There are also some examples of complex tonal contours on long vowels:

tʊô̌n	‘cultivating tool’
ɛɛ̂	'stab, blow'
ɔɔ̂k	's/he'
naâk	'on him/her'

C-**a-ăr**	‘muddy’ (< C-**ɔ-** ‘of’ + **ŋăr** ‘mud’)

Words with a low-falling tone on a diphthong or long vowel can be opposed to words with a high-low tone on a diphthong or long vowel (the derivation between parentheses is explained further below):

kʊâ	‘digging tool’
ŋkúa	‘with the strand of hair’ (< **ŋ-kûa** < **ń-** ‘with’ + **kua** ‘strand of hair’)

Words with a low-rising tone on a diphthong or long vowel can be opposed to words with low-high on a diphthong or long vowel:

C-**aăr**	‘muddy’
ŋaák	‘oil’

waǰ	‘cow’
paí	‘tamarind tree’

The oppositions show that it is useful to take the mora, not the syllable as the unit on which a toneme —low, high, rising or falling— is realized. If the syllable were taken as the counting unit, **ŋkúa** could be regarded as having a falling tone realized on a syllable, but for words like **kʊâ** a more complex LHL contour would have to be posited. Likewise could the tones on **ŋaák** and **paí** be regarded as realizations of the rising tone on a syllable, but then the tones on **c-aăr** and **waǰ** (realized at a slightly raised level pitch) would have to be posited as single more complex tones**.** The mora as the counting unit offers the possibility of regarding the diphthong of **ŋkúa** as underlyingly falling + low (realized as high + low) and **kʊâ** as low + falling. With the mora as counting unit **ŋaák** and **paí** are not seen as realizations of a rising tone on a long vowel or

diphthong, but as low + high, whereas **ɕ-ǎăr** and **waĭ** both have a low + rising tone.

The mora as the unit on which a toneme is realized raises the expectation that on a diphthong or long vowel also high-falling and high-rising sequences might be possible (contours on single morae are always in pre-pausal position). High-falling sequences indeed occur, but only due to tone bridge (tone-bridge will be discussed in 3.5, the tonal derivations between parentheses show the application of the Tone Shift Rule and the Contour Simplification Rule, see 3.3.1 and 3.3.2):

ca cɔ́-cúân 'the head of the rat (sp.)'
(< ca cɔ́-cuân < ca cɔ̂-cuân < **cá** 'head' + **ɕ-ɔ-** 'of' + **cuân** 'rat (sp.)')

High-rising sequences on a diphthong or long vowel are not attested.

Further arguments for the mora as counting unit

The tonal phenomena upon attachment of the prepositional proclitics **ɪ-** 'in', **nɔ-** 'on, at', **tɔ-** 'up on, up at' and **ṭɔ-** 'at' provide a further argument for the mora as counting unit (or the unit of attachment for the toneme). Upon prefixation of **ɪ-** 'in', **nɔ-** 'on, at', **tɔ-** 'up on, up at' and **ṭɔ-** '(down) at' to a low-toned noun, the second mora of the noun becomes falling. If, however, the noun has only one mora, this mora becomes falling. If the noun has more than two morae, the falling tone on the second mora is simplified and realized as high (Contour Simplification Rule, see 3.3.2). Examples:

ɪ-kwâ	(< **ɪ-** + **kwa** 'chaff')	'in the chaff'
nɔ-pəllâ	(< **nɔ-** + **pəlla** 'cat')	'on the cat'
ɪ-narúŋkwaŋ	(< **ɪ-narûŋkwaŋ** < **ɪ-** + **narʊŋkwaŋ** 'grasshoppers (sp.'))	'between the grasshoppers (sp.)'

Diphthongs count as two morae:

ɪ-ʈ̪ɪâk (< **ɪ-** + **ʈ̪ɪak** ‘suffering’) ‘in suffering’
ɪ-aô̱n (< **ɪ-** + **aʊn** ‘rats’) ‘among the rats’

Also the next example shows that the mora rather than the syllable is the carrier of tone. A word-final high tone becomes low in non-prepausal position and can reappear on the first mora of a following word (see the rules of Tone Shift and Contour Simplification, 3.3.1 and 3.3.2). The first noun in the example below has high-toned diphthong. When something follows, it is only the high tone on the last mora that becomes low (and reappears on the first mora of the following word):

kapíɛt k-ɔ́-pʊl ‘the jaw of the person’
(< kapíɛt k-ɔ̂-pʊl < **kapíɛ́t** ‘jaw’ + **ɔ-ɔ-** ‘of’ + **pʊl** ‘person’)

Mora-counting is, however, not without problems. Long vowels behave differently from diphthongs upon attachment of one of the prepositions **ɪ-** ‘in’, **nɔ-** ‘on, at’, **tɔ-** ‘up on, up at’ and **ʈ̪ɔ-** ‘(down) at’. They pattern with short vowels, and not with diphthongs, e.g.,

ɪ-cáa ‘in the grape’ (instead of *ɪ-caâ)
(< ɪ-câa < **ɪ-** ‘in’ + **caa** ‘grape’)

ɪ-ɛ́ɛ ‘in the poison’ (instead of *ɪ-ɛɛ̂)
(< ɪ-ɛ̂ɛ < **ɪ-** ‘in’ + **ŋɛɛ** ‘poison’)

And in (at least) one case of a diphthong, there are alternative tonal realizations:

ɪ-maît / ɪ-máɪt (< **ɪ-** ‘in’ + **maɪt** ‘beans’) ‘in the beans’

In some items with a low + falling or a low + rising tone on a long vowel or diphthong it is clear that this long vowel or diphthong comes from loss of a velar nasal between vowels belonging to adjacent morphemes. Examples are **ɔ-ɔ̂k** ‘s/he’ (< **ɔ́-** + **ŋɔk**), **na-âk** ‘on him/her’ and **ɪ-aâk** ‘in him/her’, which apart from, respectively, the prepositional proclitic **nɔ-** ‘on, at’ and **ɪ-** ‘in’, contain the 3rd person singular formative **ŋɔk** (see also the chapter on pronouns).

ᴄ-a-ăr ‘muddy’, from ᴄ-**ɔ** ‘of’ + **ŋăr** ‘mud’ is another example of loss of a velar nasal. **ᴄ-a-ăr**, however, is not pronounced with a (complex) contour, but at a slightly raisedpitch which remains level, and can also be pronounced with a short vowel (**ᴄ-ăr**). In the case of ᴄ-**aîk** ‘be’ the diphthong with low + falling tone comes from historical loss of an oral palatal between vowels (< ᴄ-**á** ‘be’ + the vague reference particle **cık**). ᴄ-**aîk** ‘be’ and **cık** are discussed in chapters 12.7.1 and 15.2.1, respectively.

Long vowels in (real) roots are rare. And also in such cases, the long vowel may well stem from historical loss of a consonant (a velar nasal?) in between. In (real) roots the long vowel may function as a single tone bearing unit.

In view of the opposition on diphthongs and long vowels between H.L and L.HL patterns on the one hand, and L.H and L.LH patterns on the other hand, and in view of the occurrence of cases like **ı-ṯıâk** ‘in suffering’ with the second low mora of a diphthong becoming falling, and **kapíɛt k-ɔ́-pʊl** ‘the jaw of the person, with the high tone on the second mora of diphthong becoming low (and reappearing on the next word), the mora as counting unit offers an easier way to describe the tonal phenomena in the language than the syllable.

3.1.3. Tone on nasals

Proclitics that consist of only a nasal can carry a tone. These proclitics are the subject pronominal clitics **ń**- ‘I’, **ŋ́**- ‘you (SG)’, **ń**- ‘you (PL) and **n̂-** ‘they’, and the prepositional clitic **ń**- ‘with, by, (away) from’. In the examples below, the nasal proclitics are also marked for tone in case of a low tone (in the other examples in this book the nasal proclitics are only marked for tone when they have a high tone). Notably, the clitics with high tone of their own are realized low in context, due to Tone Shift (see 3.3.1); the clitic with falling tone is realized high in context due to Contour Simplification (see 3.3.2).

m̀-p-a.îk
1-C-be:PR

I am

ǹ-n̰-ímma
2A-C-see:INCOMPL

you (PL) see (it)

ń-n̰-ímma
3A-C-see:INCOMPL

they see (it)

k-kw-á.at	**m̀-pól**	**p-ɛn**
3-C-come:COMPL	with-person	C-DEM

s/he has come with that person

m̀-p-a.kóɣɛ	**man**	**ɲ́.cık**
1-C-start:INCOMPL	house	from_VREF

I will start building the house from the beginning

In the chapter on segmental phonology it was shown that a tone on the very short vowel **ə** may rather be realized on an adjacent (geminated) sonorant or on the nasal part of nasal and stop cluster.

3.1.4. Distribution in other than prepausal position

In other than prepausal position, the distribution of the tones is different. Contour tones are in principle not allowed on a non-prepausal short vowel (a single mora). When, due to phonological and morphological concatenations, a falling tone is expected to appear on a non-prepausal single mora, it is simplified; for more details see 3.3. Rising tones on a (underlyingly) single mora occur only in prepausal position.

On long vowels and diphthongs, contour tones are found in all positions. In other than word-final position these contours generally arise from a morpho-phonological process. Under the mora-approach, I do not analyse such tones as falling or rising tones on a long vowel or diphthong, but as resulting from the combination of two tonemes.

E.g., in the first example below the falling surface tone on the long vowel can be regarded as a sequence of a falling (realized as high) and a low tone underlyingly. The rising surface tone on the diphthong in the second example can be analysed as consisting of a low and a falling (realized as high) tone underlyingly:

ɔn̰óʊlí 'Hyena (as a nickname)' (< ɔn̰ôʊlí < **ɔ́-** + **n̰ʊʊlí** 'hyena')
ɔínɛ 'go to' (< **ɛ̃̂** 'go' + **-ɪnɛ**)

Long vowels that arise across morpheme boundaries are often shortened phonetically; under such circumstances a sequence of high and low can give rise to a falling tone on a phonetically short vowel. Thus, for example, when the proclitic subjunctive particle **â-** is attached to a following **a-**initial element, the result is a long vowel with a contour tone, which, consequently, tends to be pronounced shortened:

ámmá k-kw-áá.t á-ant-ɛ̃̂ / ânt-ɛ̃̂ (< **â- ant-ɛ̃̂**)
if 3-C-come:COMPL SUBJ-(2-)can:DEPINCOMPL-go:DEPINCOMPL
when she arrives, you can go

In fast speech, falling contours arising from morphological processes, can be simplified to a high tone on a short vowel. In the example above **ânt-ɛ̃̂** 'you can go' can also become **ánt-ɛ̃̂**.

Notably, also before other consonants than nasals (and the lateral) a falling tone on a short vowel can arise from morpheme attachment. **âcɔ** in the example below results from **â-** + **ŋ́-** + **ɔcɔ̂**.

â-cɔ muccú m-ɔn̰ókkwakɔ.t cakərók
SUBJ-(2-)string:DEPINCOMPL beads C-be_coloured:COMPL also
you (must) also string beads of different colours (App. III, 16)

Similarly, when the proclitic conjunctive particle **ă-** becomes adjacent to another **a** (or to a vowel that assimilates to it) a long vowel with a rising contour tone may result. The long vowel tends to be pronounced shortened, in which case the rising contour may be simplified to high:

a-á̰tərəpɛ̂ / **á̰tərəpɛ̂** … ‘and the rabbit …’
(< a-â̰tərəpɛ̂ < **ă-** + **ŋaa̰tərəpɛ̂**)

A rising contour is further found on the verbal negation marker **ănn-**. Here, however, no rising toneme is involved. The element **ănn-** is a shortened form of **akə́nn-**, which itself is a shortened form of **akə́rənnɔ**. Apparently, **ănn** is underlyingly a diphthong (**aə́nn**) with a low + high tone, but shortened phonetically. Notably, the rising tone on the shortened negation marker **ănn** cannot be simplified to just a high tone.

ʊkʊl	**w-ănn-ɔ́llɔ̂**
child	C-NEG-run:DEPCOMPL

the child did not run

3.2. The phonetic realization of the tones

This section gives an idea of the phonetic realization of the tones. The transcriptions between square parentheses are based on whistling by the consultants.

3.2.1. Prepausal low tone

A prepausal mora with low tone is pronounced with a slight downglide. Some words follow here which have this final downglide in prepausal position.

kat	‘grasshopper(s)’	[˩]
pəlla	‘cat’	[˧˩]
akkarɔ	‘call’	[˧˧˩]
cʊmɪan	‘bone’	[˧‿˩]
apəɽɪlakɔ	‘hang (with hands)’	[˧˧˧˧˩]

When a high tone precedes a single prepausal low tone within the word, downglide is difficult to hear (first example below). It is more clearly audible in case of more prepausal low-toned morae preceded by a H-tone within the word (second example below).

mpímma pə́lla	'I will see the cat'	[–ˊ _ ¯ _ˎ] or [¯ _ ¯ _ˎ]
mpímma t̪ɔ́mɔccɔ	'I will see the old man'	[–ˊ _ ¯ _ _ˎ] or [¯ _ ¯ _ _ˎ]

3.2.2. Rising tone on short (prepausal) vowels

A rising tone on a (underlyingly) single prepausal mora is never pronounced as rising. Unlike the falling tone in prepausal position, the rising contour cannot as a whole be realized on one mora: in prepausal position the high part of the contour remains unrealized (NB: in context it becomes clear that this tone involves a high part, see 3.3.1).

A couple of phonetic cues make the contrast between the rising and the low tone in prepausal position. In the first place, unlike in prepausal low tones, there is no downglide. In the second place, isolated nouns with a rising tone are, as a whole, realized at a slightly raised pitch as compared to all-low nouns. The differences are clearly audible in the following pairs (though the initial pitch difference, tends to be somewhat smaller than in the transcriptions below):

kat	'grashopper'	[_ˎ]
kĭt	'wild chicken'	[–]
pɛɽɔŋ	'palm tree'	[_ _ˎ]
cɔɽɔ̌ŋ	'mountain'	[– –]
t̪ɔmɔccɔ	'old man'	[_ _ _ˎ]
t̪ɔmɛkɔ̌	'scarification'	[– – –]

The difference between rising and low tones is consistent when words are given in isolation. However, when such nouns occur in sentences (but still before a pause), it is often possible to pronounce the rising tone in the same way as a low tone, i.e. with low pitch and slight downglide. In isolation the words **t̪ŏk** 'dog' and **kəɽi̪ttăŋ** 'knife' have a rising tone.

mpɛt̪ɛt kəllán t̪ǒk ‘I will give the old woman the dog’ [– – – ¯ –]
mpɛt̪ɛt kəllán t̪ʊk ‘I will give the old woman the dog’ [– – – ¯ –\]

kərɛt kaík nɔ-pǔŋ ‘the cloth is on the rack’ [– – –/ – –]
kərɛt kaík nɔ-puŋ ‘the cloth is on the rack’ [– – –/ – –\]

Also in the following cases, there are two possibilities for the realization of the rising tone in prepausal position: as a rising tone (there is a smaller pitch interval with the preceding high tone and no downglide) and as a low tone (there is a bigger pitch interval with the preceding high tone and some downglide). The noun **t̪ɔrǎ** ‘cultivating’ has a rising tone in isolation, the proclitic connexive particle **kɔ** ‘of’ is realized high due to preceding **kɪrɛ́k** ‘hoe’:

kɪrɛk k-ɔ́-t̪ɔrǎ ‘a hoe for cultivating’ [– – ¯ – –]
kɪrɛk k-ɔ́-t̪ɔra ‘a hoe for cultivating’ [– – ¯ – –\]

The two realizations are equivalent in the sense that they raise no expectation of anything following, and that no specific emotion is conveyed. Nevertheless, it is well possible that in certain pragmatic contexts the one tends to be used rather than the other. Physical distance is also a factor that may be of influence. According to one of the consultants (JS), when speaking to somebody who is at a distance, the variant with the rising tone is more likely to be used than the variant with low-tone realization.

The exact conditions of the neutralization of low and rising tones in prepausal position are not clear, and would need further investigation.

When a word with a rising tone follows one or more all low words (or words realized as such), these low tones and the following word with rising tone are pronounced at the same pitch level. This pitch level is (often) not the level of an isolated low word (such as **pʊl** ‘person’ in the first example below) or of the initial mora of a word that is low + high in isolation (such as **aʈík** ‘come!’ in the second example), but the slightly raised pitch level of isolated words with a rising tone:

pʊl ɪ-p-ɪpʊkɪppŏk ‘a very white person’ [– – – – –]
aʈɪk nɔppăn ‘come inside!’ [– – – –]

cịməntɛrį̇	**c-aat**	**n-t̪ɛ-t̪t̪ŭk**	[– – – – – – – –]
hedgehog	C-come:COMPL	with-at-fenced_place_for_livestock	

the hedgehog came out of the animal shelter

3.2.3. High and falling tones

A falling tone is initiated at a somewhat lower pitch than a high tone (but at a higher pitch than an item with a rising tone). This can, for example, be observed in the following pairs:

cį́t ‘eye’ [¯]
cên ‘palm fruit’ [◝]

kunú ‘ear’ [– ¯]
kunû ‘scorpion’ [– ◝]

3.2.4. Downdrift and downstep

Within a clause there can be some downdrift: a high tone following a low tone can be realized at a slightly lower pitch than a preceding high tone, and a low tone following a high tone at a slightly lower pitch than a preceding low tone. Word-internally this is possible as well. Downdrift effects tend to be light and do not continue over long stretches of speech.

In the following sentence there is some downdrift. The high tone on ‘four’ is realized at a slightly lower pitch than the preceding stretch of high tones, while ‘cows’ is realized a little lower than the initial low tone, and the low tones on ‘four’ a little lower than those on ‘cows’**:**

kəllán **éŋ-k-í** **k-ɔ́nó** **kịɛ** **k-ɔ́cɔɣɪn** [‾ ‾ ‾ ‾ ‾ ‾ ‾ ‾]
old_woman DEM-C-NEARSP C-have cows C-four

this old woman has four cows

There is no downstep in Lumun. A downstep effect might be expected in cases of a word-final falling contour tone which is directly followed by an item with an initial high or falling tone. In such cases, the contour tone becomes high (see the Contour Simplification Rule, 3.3.2), but it does not influence the pitch-level of the following high tone, which is on the same level. Some examples:

kəllán **k-érɛ** (< **kəllân kérɛ**) [‾ ‾ ‾]
old_woman C-speak

the old woman will speak

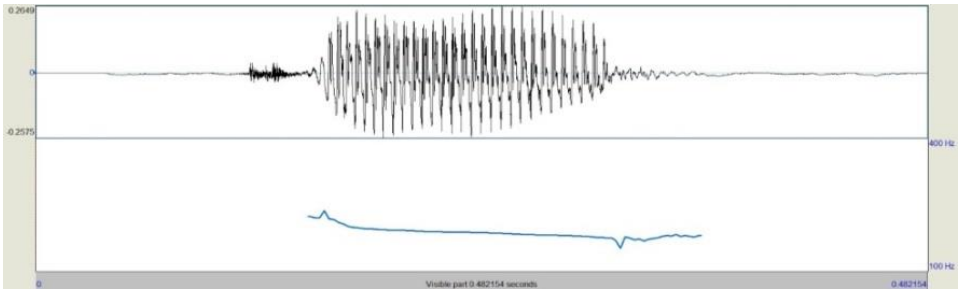
ɔ-kʊkkó-ɔ̂n (< **ɔ́-** + **kʊkkô** + **-ŋɔ̂n**) [‾ ‾ ¬]
PERS-Kʊkkʊ-PL

Kʊkkʊ and his group

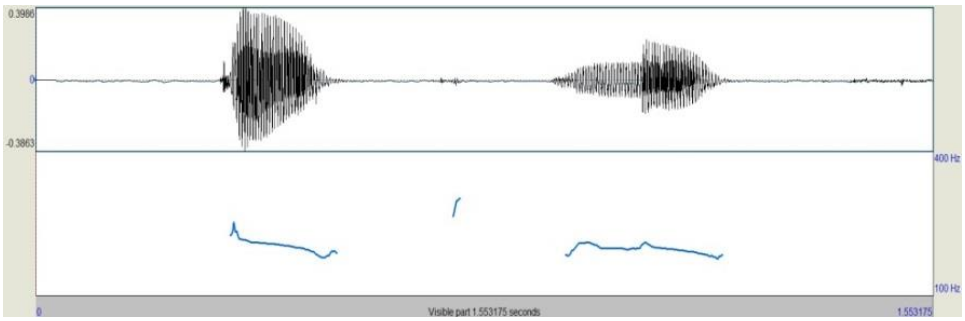
3.2.5. Graphs of phonetic realisations

A few graphs showing phonetic realizations of the four tone patterns on monosyllabic nouns are presented here, as well as a clause. The nouns and the clause are produced by Nafisa Abdullai (at the time ca. 19 years old). In each picture, the second representation is set out on a vertical scale ranging from 100 to 400 Hrz.

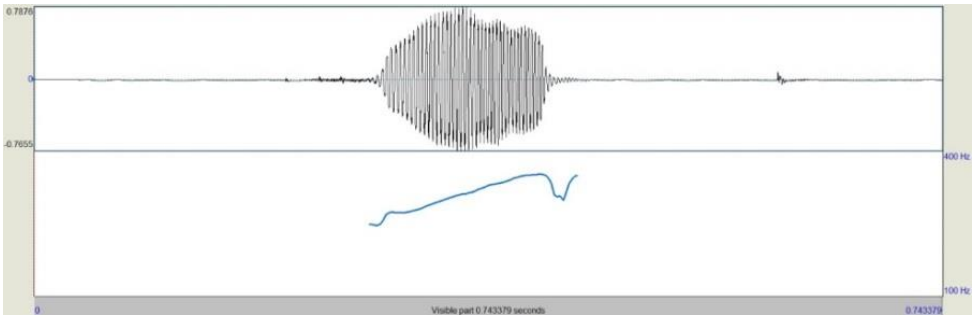
Graph 1. **kat** ‘grasshopper(s)’



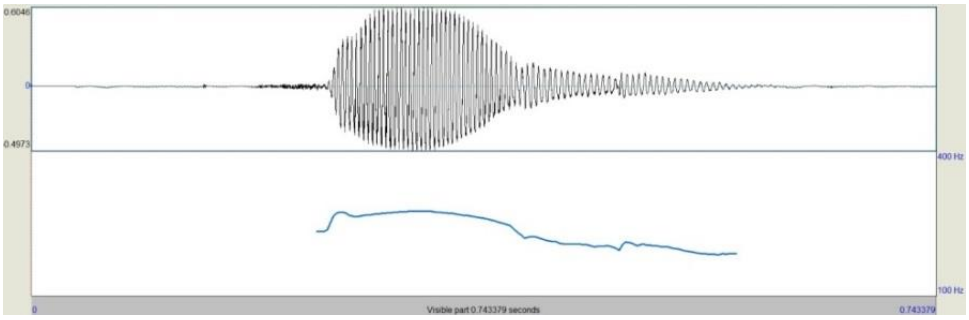
Graph 2. **ṭŏk** ‘dog’, **lŏk** ‘dogs’



Graph 3. **cịt** ‘eye’



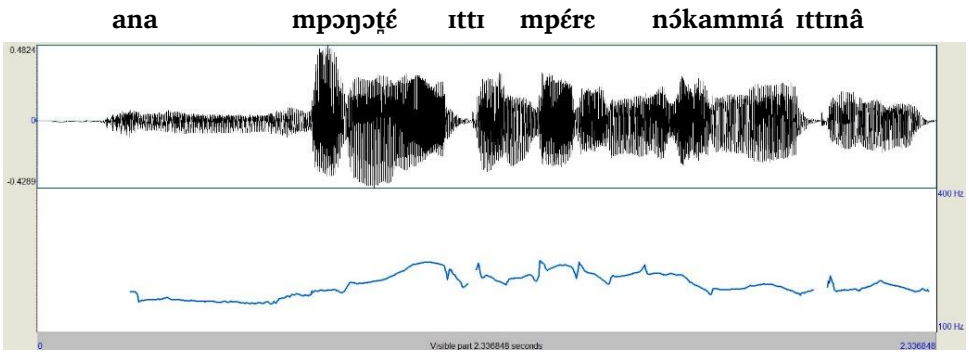
Graph 4. **cịl** ‘grain of sorghum’



Graph 5. ‘and I like to talk about the singing whip like this’

ana	**mpɔŋɔ̱t́é**	**ɪttɪ**	**mpéɾɛ**	**nɔ́-kammɪá**	**ɪttɪnâ**
and	I like	that	I talk	on-singing_whip	like_this

and I like to talk about the singing whip like this (App. II, 30)



3.3. Tone rules

There are a number of tone rules that apply within the sentence (or in a smaller domain before a pause).

3.3.1. Tone shift

Word-final high and rising tones in non-prepausal position undergo specific changes.

Tone Shift Rule: When a word with a (underlying) final high tone is followed by another word, the final high tone becomes low. The high tone reappears on the first mora of the following word if this mora is low (this can be called tone shift), leading to a HL contour. The same behaviour is found with the high part of a rising tone (as mentioned earlier, rising tones (on a single mora) only occur word-finally).

m-p-ɔɽəkɔ.t	**kât**	(< **mpɔɽəkɔ́t kat**)
1-C-eat:COMPL	grasshopper(s)	

I have eaten grasshoppers

ṭ̪-ɔʧəkɔ	**kât**	(< **ṭ̪ɔʧəkɔ̆ kat**)
NOM-eat	grasshopper(s)	

eating grasshoppers

Certain grammatical words as well as words containing certain grammatical morphemes have a floating high tone. These words have a final low tone in isolation but bring a high tone to the first mora of a following word if this mora is low, leading to a HL contour. These words thus behave in accordance with the Tone Shift Rule. In non-prepausal position their final mora is realized low (as it would be, in these cases, in prepausal position as well), while their floating high tone appears on the first mora of the following word if this mora is underlyingly low, leading to a HL contour.

The following example with the Incompletive verb **mpakə́ṭ̪a** 'I will look' illustrates the effect of application of the Tone Shift Rule. This verb, which is based on the verb **ɔkə́ṭ̪a** 'look at/after' (see 12.4 for the segmental and tonal shape of verbs), has a final low tone in isolation, but when followed by a low-toned word, it imposes a high tone on the first mora of that word, leading to a HL contour:

m-p-a.kə́ṭ̪a	**pôl**	(< **mpakə́ṭ̪a** H **pʊl**)
1-C-look:INCOMPL	person	

I will look at/after the person

An example is also the conjunction word **ana** 'and'. In isolation it is pronounced as all-low, but a high tone appears on the first mora of a following low noun, leading to a HL contour:

papɔkıra	**ana**	**kât**	(**papɔkıra ana** H **kat**)
leopard	and	grasshopper	

the leopard and the grasshopper

3.3.2. Simplification of a falling (HL) contour

On a single mora, a falling contour only occurs in prepausal position (this can be different in case of shortened long vowels). The following tone rule applies:

Contour Simplification Rule: A falling contour (on a single mora) is realized as a high tone, except in prepausal position.

Contour Simplification applies after Tone Shift.

The Contour Simplification Rule predicts that there are no falling tones on short vowels in any but prepausal position. In isolation, the word **kəllân** 'old woman' has a final falling tone, **kwɔk** 'shoe' has a low tone. In context, the contour tone of **kəllân** becomes high:

m-p-ɛn̰ɛt	**kəllán**	**kwɔk**
1-C-give:INCOMPL	old_woman	shoe

I will give the old woman the shoe

The non-prepausal falling tone is realized as high, irrespective of the tones of the following item:

mpɛn̰ɛt kəllán t̰í 'I will give the old woman the thorn'
mpɛn̰ɛt kəllán t̰ŏk 'I will give the old woman the dog'
mpɛn̰ɛt kəllán cên 'I will give the old woman the palm fruit'

Tone Shift leads to a HL contour on the first mora of the following word if this mora is low. If this mora is not in prepausal position, Contour Simplification applies. Some further examples follow here. The first two below involve the connexive proclitic C-**ɔ**- 'of' (see 7.1).

ca	**c-ɔ́-pəlla**	(< ca cɔ̂-pʊl < **cá cɔ- pəlla**)
head	C-of-cat	

the head of the cat

kəɽi̱ttaŋ	**k-ɔ́-pʊl**	(< kəɽi̱ttaŋ kɔ̂-pʊl < **kəɽi̱ttăŋ kɔ- pʊl**)
knife	C-of-person	

the knife of the person

m-p-a.ká̱t̰a	**tú̱t̰̱əruk**	(< **mpaká̱t̰a** H **tu̱t̰̱əruk**)
1-C-look:INCOMPL	pig	

I will look at/after the pig

papɔkıra **ana** **pálla** (**papɔkıra ana** H **pəlla**)
leopard and cat

the leopard and the cat

In the next example, the first word has two high tones, the first of which stays in place, while the last mora becomes low. The high tone of this last mora reappears on the initial mora of the next word:

aləpırıt̪ **w-ɔ́-pʊl** (< aləpırıt̪ wɔ̂-pʊl < **aləpırít̪ wɔ- pʊl**)
prayer_mat C-of-person

the prayer mat of the person

Tone Shift applies first, then Contour Simplification. This is illustrated by the following example, which shows that a high tone derived from a falling contour does not shift further (irrespective of whether the falling tone belongs to the lexical item (first example below, with **pəɣɛmê** 'Acheron person') or is generated by the preceding item (second example below, with **pʊl** 'person'.) In the first example only Contour Simplification applies, in the second first Tone Shift, then Contour Simplification).

m-p-ét̪ɛt **pəɣɛmé** **kʊmmʊk** (< **mpét̪ɛt pəɣɛmê kʊmmʊk**)
1-C-give:COMPL Acheron_person pot

I have given the pot to the Acheron person

m-p-a.nékınɛ **pʊ́l** **kʊmmʊk** (< **mpanékınɛ** H **pʊl kʊmmʊk**)
1-C-take_for:INCOMPL person pot

I will take the pot to the person

3.3.3. More details on Tone Shift: Tone Reappearance sub-Rules

While the lowering of the non-prepausal final high or rising tone is general, its (re)appearance on the following word is only found in a subset of contexts. The high tone will reappear on the initial mora of a following word that is (underlyingly) all-low, irrespective of its length. Examples of this were given above. However, in certain cases in which the following word contains a (underlying) high or falling

tone, the high tone will not reappear. It will also not reappear if the following word contains a rising tone.

The circumstances will be specified in four Tone Reappearance sub-Rules.

sub-Rule 1: When the following mora is already high, there is no change to this word. In the examples below, **pəʈá** has a final high tone, **ʈŭk** 'dog' and **pʊcŭŋ** 'barren woman' have a final rising tone in isolation. The nouns **wék** 'leg' and **kálam** 'pen' have an initial high tone in isolation.

mpɛʈɛt pəʈa wék 'I will give the Tira person the leg'
mpɛʈɛt ʈʊk wék 'I will give the dog the leg'

mpɛʈɛt pəʈa kálam 'I will give the Tira person the pen'
mpɛʈɛt pʊcʊŋ kálam 'I will give the barren woman the pen'

sub-Rule 2: When the following word has an initial mora with a low tone, immediately followed by a vowel with a high tone or falling tone, it remains the same. The nouns in the examples have, in isolation, the following tones:

pəʈá 'Tira person', **pʊcŭŋ** 'barren woman', **ɟmíʈ** 'goat' and **apê** 'fish'

mpɛʈɛt pəʈa ɟmíʈ 'I will give the Tira person the goat'
mpɛʈɛt pʊcʊŋ ɟmíʈ 'I will give the barren woman the goat'

mpɛʈɛt pəʈa apê 'I will give the Tira person the fish'
mpɛʈɛt pʊcʊŋ apê 'I will give the barren woman the fish'

sub-Rule 3**:** When the following word has a final or last vowel with a rising tone, this word remains the same, irrespective of the number of low-toned vowels in the word. The nouns in the examples have, in isolation, the following tones:

pəʈá 'Tira person', **pʊcŭŋ** 'barren woman', **ʈŭk** 'dog', **kəʈɟittăŋ** 'knife', **ʈɛnnəkkɛttă** 'testing, test'

mpɛt̪ɛt pəɽa t̪ŏk ‘I will give the Tira person the dog’
mpɛt̪ɛt pɒcɒŋ t̪ŏk ‘I will give the barren woman the dog’

mpɛt̪ɛt pəɽa kəɽi̪ttăŋ ‘I will give the Tira person the knife’
mpɛt̪ɛt pɒcɒŋ kəɽi̪ttăŋ ‘I will give the barren woman the knife’

mpɛt̪ɛt pəɽa t̪ɛnnəkkɛttă ‘I will give the Tira person the test’
mpɛt̪ɛt pɒcɒŋ t̪ɛnnəkkɛttă ‘I will give the barren woman the test’

sub-Rule 4: When the following word starts in a number of vowels with a low tone and has a high tone or falling tone later on in the word, it depends on the word whether or not the first low becomes high (i.e. becomes a falling tone, after which the contour is simplified to high). In some words, the first mora becomes high when there is only one low mora separating it from the high or falling tone of the word itself, in other words, there must be two low morae in between.

All examples below are given with **pəɽá** ‘Tira person’, but could also be given with a noun with a rising tone such as **pɒcŏŋ** ‘barren woman’. The second nouns are, in isolation, **t̪ʊʊlí** ‘hyena’, **ŋʊmpərúŋ** ‘calf (in sucking stage)’ and **t̪akəɽúk** ‘chicken’, all of which have 3 morae (a final high tone preceded by two low morae). Note that in the example with **t̪akəɽúk** ‘chicken’, the first mora does not become high.

mpɛt̪ɛt pəɽa t̪úʊlí ‘I will give the Tira person the hyena’
mpɛt̪ɛt pəɽa ŋúmpərúŋ ‘I will give the Tira person the calf’
mpɛt̪ɛt pəɽa t̪akəɽúk ‘I will give the Tira person the chicken’

Examples with **pʊɽʊpê** ‘bird’, **ŋaṯərəpê** ‘rabbit’ and **aləmúntʊ** ‘gun’ follow here. In the example with **pʊɽʊpê** ‘bird’, the first mora does not become high.

mpɛt̪ɛt pəɽa pʊɽʊpê ‘I will give the Tira person the bird’
mpɛt̪ɛt pəɽa ŋáṯərəpê ‘I will give the Tira person the rabbit’
mpɛt̪ɛt pəɽa áləmúntʊ ‘I will give the Tira person the gun’

There are a few exceptions to these rules. In the first place, counter to sub-Rule 2, **cɪttín** 'bird (sp.)' changes its initial tone into a falling contour.

mpɛǹ̪ɛt pəɽa cîttín 'I will give the Tira person the *cɪttɪn*-bird'

As this also runs counter to Contour Simplification, one may assume that the underlying form of **cɪttín** is **cɪɪttín** with a long vowel. However, in this lexeme, the vowel is always pronounced short.

Another case running counter to sub-Rule 2 (but not to Contour Simplification) is **paɽák** 'fly', the initial low tone of which becomes high:

mpɛǹ̪ɛt pəɽa páɽák 'I will give the Tira person the fly'

The examples above involve nouns with a final high or rising tone. Examples with words with a floating high tone give precisely the same results, for example:

m-p-a.kə́ǹ̪a	**ŋ̀ómpəɽóŋ**
1-C-look:INCOMPL	calf

I will look at/after the calf

mpakə́ǹ̪a ǹ̪úʊlí 'I will look at/after the hyena'
mpakə́ǹ̪a ǹ̪akəɽúk 'I will look at/after the chicken'
mpakə́ǹ̪a pʊɽʊpê 'I will look at/after the bird'

This includes the exceptions to the rules, such as:

mpakə́ǹ̪a cîttín 'I will look at/after the *cɪttɪn*-bird'

When the sentences are further extended, final high, rising and falling tones undergo the same phonological development. Compare:

m-p-ɛǹ̪ɛt	**pəɽa**	**wɛ́k**
1-C-give:INCOMPL	Tira_person	leg

I will give the Tira person the leg

m-p-ɛn̪ɛt	**pəʔa**	**wɛk**	**w-ɔ́-n̪akəʔúk**
1-C-give:INCOMPL	Tira_person	leg	C-of-chicken

I will give the Tira person the leg of the chicken

Repeated application of Tone Shift goes from left to right: first the final high tone of **pəʔá** is lowered and will not reappear on **wɛ́k** because that word has an (initial) high tone itself. Then the high tone of **wɛ́k** is lowered and realized as a falling tone on the connexive element **w-ɔ-**, after which the contour is simplified to a high tone.

3.4. Deviations from the tone rules

There are more tone changes that do not follow from the tone rules established above. Those that seem to be specific to certain morphological and morphosyntactic constellations will be treated in the respective chapters on morphology. Morphemes/words with specific tonal effects include the non-personal proclitic subject pronouns and the 3rd person singular and plural (3 and 3A) proclitic subject pronouns (chapter 6.2), four out of five prepositional proclics (chapter 16.1), the 1st and 2nd person singular possessor (chapter 7.3.1) pronouns and the vague reference particle **cɪk** (chapter 15-2). Conjunctions display tonal properties that do not fully comply with the tone rules (chapter 18).

In general, in situations of vowel coalescence and shortening of an underlyingly long vowel, (non-prepausal) low + high, or high + low tone combinations can be simplified to a high tone; some examples of this with the conjunctive particle **á**- and the subjunctive particle **â**- are presented in chapter 18.2. Examples of this simplification can also be found in 7.1.1 on the connexive. The falling tone of the irrealis morpheme (**â**), on the other hand, cannot be simplified to a high tone in case of coalescence and shortening (chapter 12.8).

The deviating tonal behaviour of certain verb forms with a final falling contour is described here.

3.4.1. Deviation from Contour Simplification: lowering of a final falling tone

Against the expectation raised by Contour Simplification, namely that the high part of a falling contour always remains in place, there are falling tones in word-final position that are, in certain contexts, realized as low, not as high. One such example are the tense-aspect-mood forms (TAMs) of verbs of tone class IIB (i.e. of verbs with a final falling contour) which have a final falling contour, notably the Dependent Incompletive (the stem form itself) and the Incompletive (see chapter 12 for the tone patterns of verbal stems and verbal TAMs).

Examples follow here with the stems of the tone class IIB-verbs **ɔkkɔ̂t** 'do, make' and **ɔcɔ̂** 'string'. When these verbs are followed by an all-low noun such as **lɔn** 'words, matters', their falling tone becomes high, as expected according to Contour Simplification:

ɔkkɔ́t lɔn	'to do things'
ɔcɔ́ lɔn	'to string things'

When the underlying falling tone is followed by an element with an initial high or falling tone or by an element with a high or falling tone on its second mora, the falling contour becomes low:

ɔkkɔt lú	'to make steam'	**lú** 'steam'
ɔcɔ mɛ̂n	'to string palm fruits'	**mɛ̂n** 'palm fruits'
ɔkkɔt kərɛ́t	'to make a cloth'	**kərɛ́t** 'cloth'
ɔkkɔt cʊccʊ̂	'to make a necklace'	**cʊccʊ̂** 'necklace'
ɔcɔ mɔrə́t̪̪ɪ	'to string goatskin bracelets'	**mɔrə́t̪̪ɪ** 'goatskin bracelets'

If the following element has a high or falling tone on its third mora, the falling tone can become high or low. It becomes high here:

ɔkkɔ́t kappəɽ́í	'to make a spoon'	**kappəɽ́í** 'spoon'
ɔkkɔ́t ŋat̪̪t̪̪ɔkɔ̂l	'to make a gourd'	**ŋat̪̪t̪̪ɔkɔ̂l** 'gourd (k.o.)'

In the following example, **nɛɔ̂̂** becomes low:

n-ɛ̃ɔ̃ **n-ɔ-kakkâ**
2A-go:DEPINCOMPL 2A-PERS-Kakka
go with Kakka! (to plural addressee)

In case of a following word with a final rising contour, there are two options for the realization of the verb: the falling tone may become high or low. Recall that the utterances without a high tone realized on the verb, are entirely pronounced at a slightly raised pitch, i.e., the whole stretch is pronounced according to the phonetic realization of the final rising tone.

ɔkkɔ́t n̰ḭ̆k / ɔkkɔt n̰ḭ̆k 'to make a fire' **n̰ḭ̆k** 'fire'
ɔkkɔ́t tʊkɪă / ɔkkɔt tʊkɪă 'to make a bracelet' **tʊkɪă** 'bracelet'

These phrases allow for a third tonal realization: after a final high tone on the verb, the noun can be realized as all-low (see 3.2.2).

In case of a following underlyingly low + high word which is itself followed by another word so that the final high is realized as low, the verbal contour may be realized as high but also as low. The contour thus shows the same behaviour here as when it is followed by a word with a rising tone. Examples of this were the earlier given sentences with the verb **mpɛn̰ḛ̂t** 'I will give' followed by **pəʈá** 'Tira person' and an object noun. Though only one tonal realization was presented in the earlier given examples (the one deviating from Contour Simplification), there are actually two possibilities:

m-p-ɛn̰ɛt / m-p-ɛn̰ét **pəʈa** **wék**
1-C-give:INCOMPL Tira_person leg
I will give the Tira person the leg

The lowering of a falling tone that is found with verb forms with a final falling contour of tone class IIB does not occur in comparable tonal constellations involving two adjacent nouns. An earlier given example for Contour Simplification is repeated here. The contour of **mpɛn̰ḛ̂t** 'I will give' is lowered before the contour or **kəllân** 'old woman' (which is realized as a high tone), but the contour of **kəllân** is not lowered before the contour of **cên** 'palm fruit'.

mpɛ̰tɛt kəllán cên ‘I will give the old woman the palm fruit’

Lowering of a falling contour does not occur in verbs from other tone classes. The examples below have the Completive form **mpɪmmât** of the verb **ɪmma** ‘see’ of tone class I (see chapter 12.4.2 for the tone classes). The verb is followed by the nouns **lú** ‘steam’, **mên** ‘palm fruits’ and **kərét** ‘cloth’. The contour is simplified, leaving its high part in place, in accordance with tone Contour Simplification:

mpɪmmát lú ‘I saw the steam’
mpɪmmát mên ‘I saw the palm fruits’
mpɪmmát kərét ‘I saw the cloth’

Lowering of a final falling contour is, however, found in constructions with the Present of the verb **ɔkâ** ‘be’, C**-aîk** (containing the formative **ɪk** (< **cɪk**)). Compare the following examples with the noun **kwɔk** ‘shoe’. In the fourth case, the prepositional proclitic **ɪ-** ‘in’ causes the contour to lower (see also 16.1).

kwɔk kaîk ‘the shoe is present; there is a shoe’
kwɔk kaík karə̰ta ‘where is the shoe?’
kwɔk kaík nɔ́-wɛ́k ‘the shoe is on the foot’
kwɔk kaɪk ɪ-wɛ́k ‘the shoe is on the foot’

There are some other cases in which, against the expectation raised by Contour Simplification, word-final falling tones are realized as low in non-prepausal position, instead of as high. These include the 3rd person singular and plural (3 and 3A) personal subject pronouns if preceded by the clitic subjunctive particle **â-**: **â-** + **ɔ̂k** > **áɔk** and **â-** + **ɔkîn** > **ákɪn**.

3.5. Tone bridge

In certain contexts, a stretch of low tones becomes high between an underlyingly falling or a non-final high tone and a later falling or non-final high tone, cf.

kəllán **k-á.ɽə́kɔ̂** (< kəllán kaɽəkɔ̂ < **kəllân kaɽəkɔ̂**)
old_woman C-eat:INCOMPL

the old woman will eat it

cullúkkúr **c-á.ɽə́kɔ̂** (< **cullúkkur caɽəkɔ̂**)
bird(sp.) C-eat:INCOMPL

the bird (sp.) will eat it

kəllán **k-á.kə́n̪a** (< kəllán kakə́n̪a < **kəllân kakə́n̪a**)
old_woman C-look:INCOMPL

the old woman will look

cullúkkúr **c-á.kə́n̪a** (< **cullúkkur cakə́n̪a**)
bird(sp.) C-look:INCOMPL

the bird (sp.) will look

Tone bridge occurs less commonly before a final high tone. In the following case there is tone bridge between the underlyingly falling tone on C**-ɔ-** 'of' (received from **caɽĭ** 'day' and simplified to a high tone) and **kíʆt** 'eye'. The derivation between parentheses is given under the gloss line.

caɽı **c-ɔ́-rɔ́-kíʆt**
day C-of-up_on-eyes

(< caɽı cɔ́- tɔ- kíʆt < caɽı cɔ̂- tɔ- kíʆt < **caɽĭ cɔ- tɔ- kíʆt)**
the first day

A rising tone cannot function as the end of tone bridge:

kəpa **k-ɔ́-nɔ-n̪ĭ̂k / k-ɔ́-nɔ-n̪ık**
meat C-of-on-fire / C-of-on-fire

(< kəpa kɔ̂- nɔ- n̪ĭ̂k < **kəpá kɔ- nɔ- n̪ĭ̂k)**
boiled meat (lit.: meat of on the fire)

kəpa **k-ɔ́-waĭ̯ / k-ɔ́-waı̯**
meat C-of-cow

(< kəpa kɔ̂ waĭ̯ < **kəpá kɔ waĭ̯**)
the meat of a cow

There can be no tone bridge between two high/falling tones that occur in the same root. This is irrespective of whether both high/falling tones underlyingly belong to that root or one high tone (the initial one) comes from a preceding element. The latter is the case in the second example below: the high tone on 'rabbit' comes from **pəʈá** 'Tira person'. Thus, the mora between the high tones in 'lizard (sp.)' cannot become high since they both belong to the root, nor can there be tone bridge on 'rabbit':

kapə́ʈɛnṯóŋ 'lizard (sp.)'
mpɛṯét/mpɛṯɛt pəʈa ŋáṯərəpê 'I will give the Tira person the rabbit'

There can, however, be tone bridge when one of the high/falling tones occurs on a clitic or affix. Question words with the suffix **-ṯa** allow for tone bridge. In the example below, **karəṯâ** has received a high tone on its initial mora from **ń-** 'with, by, (away) from' and there is tone bridge:

ɔ-kín	**ṯ-aa.t**	**ŋ́.ŋɪn**	**ŋ-kárə́-ṯâ**
PERS-3A	C-come:COMPL	with:ABS	with-where-QW

(< ŋkárəṯâ < ŋkârəṯâ < **ń- karəṯâ**)
from where did they come with it?

Tone bridge applies after the other tone rules. In certain constellations it is obligatory, in others optional, in again others impossible. The following cases suggest that, at least in some environments, the number of low morae between two high/falling tones plays a role. In the first example, tone bridge is obligatory, in the second it is impossible.

ŋkwɔnú pápɛ́-ɪ (< **ŋkwɔnû papɛ̂ -ɪ**) 'do you have a fish?'
ŋkwɔnú pʊʈʊpɛ́-ɪ (< **ŋkwɔnû pʊʈʊpɛ̂ -ɪ**) 'do you have a bird?

The exact conditions under which tone bridge must, can or cannot be applied have not been fully clarified.

In the following, two common situations of tone bridge are studied, first tone bridge between a subject and an Incompletive verb; second in connexive constructions.

Tone bridge between subject nouns and verbs

A standard situation of tone bridge is found when a subject noun which itself has a final falling contour is followed by an Incompletive verb with a high tone on a non-initial vowel, as in the earlier mentioned examples:

kəllán **k-á.ɽə́kɔ̂** (< kəllán kaɽəkɔ̂ < **kəllân kaɽəkɔ̂**)
old_woman C-eat:INCOMPL

the old woman will eat it

kəllán **k-á.kə́n̪a** (< kəllán kakə́n̪a < **kəllân kakə́n̪a**)
old_woman C-look:INCOMPL

the old woman will look

The possibility of tone bridge depends on the aspectual form of the verb. There is no tone bridge when the verb is a Completive with a final falling contour (first example below) or a Past with a non-final high tone (second example below), nor when it is a Completive with a final high tone (third example below)

kəllán **k-ɔkən̪â.t** (< **kəllân kɔkən̪ât**)
old_woman C-look:COMPL

the old woman has looked

kəllán **k-ɔkən̪á.kaṇɛ** (< **kəllân kɔkən̪ákaṇɛ**)
old_woman C-look:PST

the old woman looked

kəllán **k-ɔɽəkɔ́.t** (< **kəllân kɔɽəkɔ́t**)
old_woman C-eaten:COMPL

the old woman has eaten it

Tone bridge does, however, occur between a subject with a final falling contour and a Completive verb with a final falling contour

preceded by the 'restrictor' (see chapter 9). The high tone of the restrictor cannot reappear on the Completive verb **kɔkən̰̤ât**.

kəllán **í-k-ɔ́kə́n̰̤â.t**
old_woman RES-C-look:COMPL

(< kəllán ɪkɔkən̰̤ât < kəllán í- kɔkən̰̤ât < **kəllân í- kɔkən̰̤ât)**
the old woman who has looked

Verb forms of tone class IIB and tone bridge

As discussed earlier, a non-prepausal final contour of verb forms of tone class IIB will be realized as high in certain circumstances and as low in others. It is realized as low in the first example, and as high in the second and third. There is tone bridge between the subject and the verb in the third example. Notably, verbs with an (underlying) final falling tone do not have a floating high tone.

m-p-a.ɽəkɔ **n̰̤ʊɽît** (< **mpaɽəkô n̰̤ʊɽît**)
1-C-eat:INCOMPL food

I will eat the food

m-p-a.ɽəkɔ́ **pacıkkôt** (< **mpaɽəkô pacıkkôt**)
1-C-eat:INCOMPL mashed_groundnut_dish

I will eat *pacıkkɔt*

kəllán **k-á.ɽə́kɔ́** **pacıkkôt**
old_woman C-eat:INCOMPL mashed_groundnut_dish

(< kəllán kaɽəkɔ́ pacıkkôt < kəllán kaɽəkô pacıkkôt < **kəllân kaɽəkô pacıkkôt**)
the old woman will eat *pacıkkɔt*

In the example below, where the verb has become all-low because of the process described under 3.4.1, tone bridge spans from the subject noun all the way to the object noun:

kəllán **k-á.ɽə́kɔ́** **n̰̤ʊ́ɽît**
old_woman C-eat:INCOMPL food

(< kəllán kaɽəkɔ n̰̤ʊɽît < kəllán kaɽəkô n̰̤ʊɽît < **kəllân kaɽəkô n̰̤ʊɽît**)
the old woman will eat the food

This works also when the noun at the end has a final high tone:

kəllán	**k-á.ɽəkɔ́**	**kə́pá**
old_woman	C-eat:INCOMPL	meat

(< kəllán kaɽəkɔ kəpá < kəllán kaɽəkɔ̂ kəpá < **kəllân kaɽəkɔ̂ kəpá**)
the old woman will eat the meat

Tone bridge can even extend further, as will be exemplified using the expression **caɽı cíáâ̱** ‘on which day’. In the first example below, the final high tone of **kəpá** ‘meat’ has become low, without causing a high tone on the following word because of Tone Reappearance sub-Rule 2 (the next word has itself a rising tone). As a result a long stretch of low tones appears. Note in the tonal derivation presented between parentheses, that in **caɽı cíáâ̱** the final rising tone of **caɽĭ** ‘day’ has become low, and caused the heightening of the initial vowel of **cıaâ̱** ‘which’, after which the two high tones formed a tone bridge: **cíáâ̱**. The second example, with a low-toned subject is given for comparison.

kəllán	**k-á.ɽəkɔ́**	**kə́pá**	**cáɽí**	**c-íá-â̱**
old_woman	C-eat:INCOMPL	meat	day	C-which-QW

(<˛ kəllán k-aɽəkɔ kəpa caɽı cíaâ̱ < kəllán kaɽəkɔ kəpa caɽı cíaâ̱ <˛ kəllán k-aɽəkɔ kəpa caɽĭ cıaâ̱ <˛ kəllán kaɽəkɔ kəpá caɽĭ cıaâ̱ <˛ kəllán kaɽəkɔ̂ kəpá caɽĭ cıaâ̱ < **kəllân kaɽəkɔ̂ kəpá caɽĭ cıaâ̱**)

on which day will the old woman eat meat?

ʊkʊl	**w-a.ɽəkɔ**	**kəpa**	**caɽı**	**c-íá-â̱**
child	C-eat:INCOMPL	meat	day	C-which-QW

(< ʊkʊl waɽəkɔ kəpa caɽı cíaâ̱ < ʊkʊl waɽəkɔ kəpa caɽĭ cıaâ̱ < ʊkʊl waɽəkɔ kəpá caɽĭ cıaâ̱ < **ʊkʊl waɽəkɔ̂ kəpá caɽĭ cıaâ̱**)

on which day will the child eat meat?

The next case is given for comparison as well. The verb is not lowered before **maıt** ‘beans’, so that there is no uninterrupted stretch of low tones between **kəllán** and **cíáâ̱**. There is tone bridge, but not all the way to the question word.

kəllán **k-á.ɽə́kɔ́** **maɪt** **caɽɪ** **c-íá-t̪̂**
old_woman C-eat:INCOMPL beans day C-which-QW

(< kəllán káɽə́kɔ́ maɪt caɽɪ cíat̪̂ < kəllán kaɽəkɔ́ maɪt caɽɪ cíat̪̂ < kəllán kaɽəkɔ́ maɪt caɽ̌ cıat̪̂ < kəllán kaɽəkɔ̂ maɪt caɽ̌ cıat̪̂ < **kəllân kaɽəkɔ̂ maɪt caɽ̌ cıat̪̂**)
on which day will the old woman eat beans?

In the examples above with tone bridge spanning over the verb, the verbs have lowered before they are bridged. The (underlying) final falling tone of a verb of tone class IIB can also function as the left boundary of a tone bridge, as in the next example:

t̪ʊra-t̪ʊ́ra **t̪-ɛɔ́.r-ín** **t̪ɔ́-unú**
insect(sp.)-REDUP C-go:COMPL-O1 at-ears

(< t̪ɛɔ́r-ın t̪ɔ́-unú < t̪ɛɔ́r-ın t̪ɔ̂-unú < **t̪ɛɔ̂t -ín t̪ɔ- unú)**
a *t̪ʊrat̪ʊra*-insect went into my ear (lit.: went me at the ears)

Tone bridge in connexive constructions

In constructions with the connexive marker C**-ɔ-** 'of', tone bridge is applied when C**-ɔ-** has a high tone (always because of Tone Shift followed by Contour Simplification), while the following noun (the possessor) has a final falling contour or a non-final high tone.

kəpa **k-ɔ́-kə́llân**
meat C-of-old_woman

(< kəpa kɔ́-kəllân < kəpa kɔ̂-kəllân < **kəpá kɔ- kəllân**)
the meat of the old woman

kɨt **k-ɔ́-cúllúkkur**
eyes C-of-bird(sp.)

(< kit kɔ́-cullúkkur < kit kɔ̂-cullúkkur < **kít kɔ- cullúkkur**)
the eyes of the bird (sp.)

Tone bridge does not apply when the possessor noun has a final high tone, e.g.,

kəpa **k-ɔ́-ɟmít** (< kəpa kɔ̂-ɟmíʇt < **kəpá kɔ- ɟmíʇt**)
meat C-of-goat

the meat of the goat

In a construction where the connexive marker does not become underlyingly falling because it is preceded by a noun with an (underlying) final falling contour, there is no tone bridge between this underlying contour of the possessed noun and a final falling tone of the possessor noun:

ʈʊrít **ʈ-ɔ-kəllân** (< **ʈʊrît ʈɔ- kəllân**)
food C-of-old_woman

the food of the old woman

cʊɽé **c-ɔ-ʈûn** (< **cʊɽê cɔ- ʈûn**)
bulb C-of-onion

the bulb of the onion

Cf. also the following examples. In the first case below, the connexive has not become underlyingly falling either, but is preceded by an all-low noun which is itself preceded by a verb with (underlyingly) a final falling contour. There is tone bridge spanning over the low noun and the connexive particle to the noun with final falling contour:

m-p-ɔnó **ʈíák** **ʈ-ɔ́-úɽû**
1-C-have appetite C-of-asida

(< mpɔnó ʈɪak ʈɔuɽû < **mpɔnô ʈɪak ʈɔ- ŋuɽû**)
I long for asida

There is, however, no tone bridge when the final noun has a high tone:

m-p-ɔnó **ʈɪak** **ʈ-ɔ-kəpá** (< **mpɔnô ʈɪak ʈɔ- kəpá**)
1-C-have appetite C-of-meat

I long for meat

There is also no tone bridge in the following case, in which the connexive has become high but is followed by a verbal noun with an underlying rising tone:

kɪrɛk	**k-ɔ́-ṯ-ɔra**	**mîl**
hoe	C-of-NOM-cultivate	sorghum

(< kɪrɛk kɔ́-ṯɔră mîl < kɪrɛk kɔ̂-ṯɔră mîl < **kɪrɛ́k kɔ- ṯɔră mîl)**
a hoe for cultivating sorghum

The precise circumstances under which connexive constructions in larger contexts undergo, or do not undergo, tone bridge have not been clarified.

Optional tone bridge

In some contexts tone bridge is optional. Some examples follow here. Note that it concerns verbs with an underlyingly falling contour followed by more than one element: tone bridge spans from the high tone of the verb to the high tone of the second following element.

pʊl	**p-ɔkkínṯɛt**	**ʊkʊl**	**kurrɔ̂ŋ**
pʊl	**p-ɔkkínṯét**	**ʊ́kʊ́l**	**kúrrɔ̂ŋ**
person	C-do_for:COMPL	child	stick

the man has made a stick for the child

ɔ-nnán	**p-ɔnɛk.áṯɛ**	**ʊkʊl**	**a-kw-ɟcɛ.kat**	**cɪk**	**ná-aɽaŋkál**
ɔ-nnán	**p-ɔnɛk.áṯé**	**ʊ́kʊ́l**	**á-kw-ɟcɛ.kat**	**cɪk**	**ná-aɽaŋkál**
PERS-mother	C-take:PST	child	CONJ-3-lay_down:DEPPRFV	VREF	on-bed

the mother picked up the child and laid it down on the bed

In the following sentence there is obligatory tone bridge between the high tone of **pɔpərɔ́t** (underlyingly **pɔpərɔ̂t**) and the falling contour of **papɔttê** (realized as **pápɔ́ttê)**, which is a contraction of **papʊ pɔttê**. Tone bridge between **ŋkwɔṯəkkát** (underlyingly **ŋkwɔṯəkkât**) and **pɔpərɔ́t** is optional. The more common variant in connected speech is with tone bridge.

attɪ	**ŋ-kw-ɔt̪əkká.t**	**p-ɔpərɔ́t**	**pá-p-ɔ́ttɛ̂**
attɪ	**ŋ-kw-ɔt̪əkká.t**	**p-ɔ́pərɔ́t**	**pá-p-ɔ́ttɛ̂**
I_hope_that	2-C-become:COMPL	C-good	thing-C-little

I hope you feel a little better?

When **papɔttɛ̂** is omitted and **pɔpərɔ̂t** is in prepausal position, there cannot be tone bridge between **ŋkwɔt̪əkkát** and **pɔpərɔ̂t**:

attɪ	**ŋ-kw-ɔt̪əkkát**	**p-ɔpərɔ̂t**
I_hope_that	2-C-become:COMPL	C-good

I hope you feel better?

In some cases, tone bridge is a marked intonation, used for covering distance across a valley (people typically communicate over large distances, from one mountain slope to another, shouting with a particular, far-reaching voice). The following phrase (for an example as an answer to 'where are you going', or 'what is going on' is an example:

t̪ɪpa	**t̪-ɔ-kʊkkʊ́**	**ɔ-kín**	**ɔ-kakkâ**	
t̪ɪpa	**t̪-ɔ-kʊkkʊ́**	**ɔ́-kín**	**ɔ́-kákkâ**	(distance covering)
marriage	C-of-Kʊkkʊ	PERS-3A	PERS-Kakka	

the marriage of Kʊkkʊ and Kakka

3.6. Clause-final boundary tone with pragmatic function

In situations of clause chaining, a first clause can take a final high tone. This high tone is an intonational tone; it is independent from tonal properties of the clause-final element or its preceding element. It conveys that the sentence is not finished yet and creates an expectation that something interesting is going to follow in the next clause. It is typically followed by a small pause.

Clauses that start with the conjunction word **ámma** +H 'if, when' or **akka** +H 'when, because', or a compound conjunction containing **ámma** +H or **akka** +H, and that are followed by a clause starting with **ana** +H 'and', the conjunction particle **á** or the subjunctive particle **â**, creating a construction such as 'if/when …, then …', 'as soon as …, x must …' often take the boundary tone.

In the following sentence the word **mpántɔkə̱ta̱k** ‘I can see him’, which has a final low tone in isolation, has a final high tone and precedes a small pause. **mənákka** ‘when, as soon as, even as’ is a compound conjunction of **məná** ‘even’ and **akkă** ‘when, because’.

mən.ákka	**m-p-aa.t**	**ɪ.ccík**	**k-ɔ́ŋ**	**ɪttɪ**
when	1-C-come:COMPL	near	C-POSS3	that

m-p-ánt-ɔkə̱ta̱-k	**ana**	**k-kw-ɨ́rr.a̱tɛ**
1-C-can:INCOMPL-look_at:DEPINCOMPL-O3	and	3-C-jump:PST

when I had come near him so that I could see him, he jumped(written story)

In the next example with **akka**, there is a high tone on the 3SG object pronoun attached to the verb ‘turn’ that would otherwise not be there. This tone causes tone bridge over the entire verb. In isolation, the verb would be realized as **kkwɔ́pərə́ttərɔk** ‘s/he has turned him/her’.

akka	**k-kw-ɔ́pə́rə́ttɔ́.r-ɔ́k**
that	3-C-turn:COMPL-O3

ăccɨ̨k.at	**a-k-kw-ɔ́llʊkkwɔ́.t**
CONJ.(2.)hear:DEPPRFV	CONJ-3-C-slip:COMPL

when he (the bird) turned him (to his other wing), you could hear that he (the tortoise) slipped (away) (App. IV, 126-127)

An example with an **ámma** +H clause and a clause-final high tone (on the anaphoric demonstrative **cɛn**, see 8.2) follows here. Note also that Contour Simplification was not applied to the word ‘rock’ (underlyingly **cʊɣ̂ɔ̂l**). This may have to do with the ability of **l** (and also the nasals) to carry part of the preceding tone.

ámmá	**á-kkɔ́**	**nɔ́-cʊ́ɣ̂ɔ̂l**	**c-ɛ́n**
if	CONJ-(2-)reach:DEPINCOMPL	on-rock	C-DEM

ŋ-kw-a̱t̨-ɪɔt	**cɪk**	**c-ɔkəɣ́íakɔ̨t.ɛ**
2-C-IT:INCOMPL-find:DEPINCOMPL	place	C-be_squeezed:COMPL

á-ppɔ	**tɪt**	**ka̱ta̱**	**ka̱tər**	**k-ɛ̂n**
SUBJ-(2-)pass:DEPINCOMPL	in:ABS	look:IMP	road	C-DEM

when you reach that rock, you will find a narrow space, you must pass there, look, it is that road (i.e. the road you need to take) (fr. written text)

The clause final high tone is not part of these constructions *per se*. In the previous example, **cɛn** 'that' could also be realized with its own low tone. In the next sentence it is possible to realize **apɔ** 'fall' with a final high tone (and a pause), but a low realization of **apɔ** is actually somewhat more natural, since no expectation or "suspense" is involved. It is just a description of what happens under a certain circumstance:

ámmá	**á-kápık**	**apɔ**	**a-kw-íkkɔ**	**cık**	**ı-kəɽúk**	**k-ɛn**
if	CONJ-rain	fall:DEPINCOMPL	CONJ-3-sit:DEPINCOMPL	VREF	in-sheltered_spot	C-of:ABS

when the rain falls, he sits in its shelter (in the shelter of a wall) (App. I, 18)

Other clause chaining constructions can also have this high tone. The final high tone on **púccʊk** 'for some time' in the example below is such a tone:

a-kw-ɔ́cca.kat	**ŋuɽú**	**ı-carək**	**púccʊ́k**
CONJ-3-scoop:DEPPRFV	asida	in-belly	for_some_time

a-kw-ɔ́t̪əka.kat	**a-kw-ɔ́mɛ.kat**	**ıttĭ …**
CONJ-3-become_satisfied:DEPPRFV	CONJ-3-say:DEPPRFV	that

and he scooped the asida into his stomach for some time and he got satisfied and he said … (App. IV, 29-30)

To the same effect the underlying final Falling tone on the last mora of the first **ákka** clause in the example below is realized as high before a small pause (i.e. **ŋuɽú** instead of **ŋuɽû**). In the second clause with **ákka** there is again a final high tone on **pʊccʊk**

akka	**k-kw-ɔ́ɽəkɔ.t**	**ŋuɽú**
that	3-C-eat:COMPL	asida

akka	**ɔ-kín**	**t̪-ɔɽəkɔ.t**	**ŋuɽú**	**púccʊ́k**
that	PERS-3A	C-eat:COMPL	asida	for_some_time

a-kw-ɔ́mɛ.kat̪-ɔ́k	**ıttĭ …**
CONJ-3-tell:DEPPRFV-O3	that

when he had been eating the asida, when they had been eating the asida for some time, he (the bird) said to him: … (App. IV, 24-26)

3.7. Intonation effects in isolated nouns

Intonation effects exist in isolated nouns. If, in answer to a question, a single noun is uttered with annoyance or impatience its tones may be realized slightly differently. An all-low noun may be realized at level pitch (without final downglide) and a final high tone may be realized at a somewhat lower pitch than usual.

There also seem to be intonation effects depending on whether an utterance is an 'out-of-the-blue' remark or provides information that was solicited (typically an answer to a question). In the example below, a final high tone suggests that the information was solicited, a final low tone that it is a thetic remark.

ɔ-paŋ-k-ín	**p-á-nɪ̯́n**	**t̪-á.ík**	**ɪ̯́n-át̪t̪ʊ́t / ɪ̯́n-át̪t̪ʊt**
PERS-sibling-C-POSS1	C-be:PERS-1A	C-be:PR	1A-with_person

my brother is with me

3.8. Tonal properties and representation of affixes, clitics, conjunctions and **cɪk**

Affixal and clitic elements can cause the same tonal changes (or the same lack of change) to their environment as nouns and other words. As already exemplified in this chapter, there are also clitic elements that have tonal implications different from the general ones, such as the prepositional proclitics **ɪ-**, **nɔ-**, **tɔ-**, and **t̪ɔ-** and the 3rd person subject and non-human subject proclitics. It is difficult to give the citation form of such elements a satisfactory tonal representation. In some cases I have chosen not to represent tone on these items, though, unlike the orthography might suggest, these item do not behave as low-toned items, but do have tonal effects on their environment.

There are also affixes and clitics that seem to fit into the system set out by the tone rules, but nevertheless do not have an obvious tonal representation. This concerns prefixes and pro-clitics that bring a high tone to a next element, but being prefixal or pro-clitic, have no prepausal realization. It is precisely the prepausal realization of a

word that easily enables us to distinguish between a final high tone, a final rising tone, and a floating high tone.

Looking at other tonal properties of words with a final high tone, a final rising tone, or a floating high tone shows that the prepausal realization of these words is not their only difference. There is also a difference as to the capacity of words with these patterns to receive a high tone from a preceding element.

As can be seen from the examples given earlier in this chapter:

1. words with a rising tone cannot receive a high tone (unless through tone bridge), irrespective of their number of morae;
2. monomoraic words with a high tone cannot receive a high tone (unless through tone bridge), but longer words with a final high tone in principle can, even though many need a (lexically-determined) minimum space between their first mora (the potential receiver of a preceding high tone) and their own high tone;
3. words with a floating high tone can receive a high tone from a preceding element, though it is unclear if this also holds for monomoraic elements. Verbs, especially Dependent Incompletives and Dependent Perfectives of low-toned verbs, are the best model for this type of tone pattern since they have 1) a prepausal realization, 2) the floating high tone, 3) lack other tones that may influence their ability to receive a preceding tone. There are, however, no monomoraic verbs of this type. The only monomoraic verb is the copula (C-**á**), but the copula cannot occur in prepausal position, so that it is itself a 'problem' case with respect to its tonal representation. For the sake of distinguishing, and because it is certainly not unlikely, we will assume that, unlike monomoraic high and rising elements, a monomoraic element with floating high tone is able to receive a preceding high tone. This then excludes this tone pattern for the copula, since, unless through tone bridge, it cannot receive a high tone itself.

The tonal representation of a mono-moraic element without prepausal realization will thus be determined as follows:

1. Can it generate a high tone on a next element?
   No: low tone; yes: high tone, floating high tone or rising tone
2. Can it receive a high tone itself?
   No: rising or high tone; yes: low tone or floating high tone

This shows that for monomoraic items without prepausal realization and which are unable to receive a high tone, a choice between rising and high remains. In such cases I choose a representation as high, the advantage of which is perhaps that any suggestion of historical loss of a mora —which may be associated with a rising tone— is avoided. The persona prefix (**ɔ́**-), the restrictor (**í**-) and prepositional proclitic **ń**- 'with, by, (away) from' are therefore represented with a high tone (as is the Present of 'be' (C-**á**)).

Conjunctions pose problems in a comparable way: though they are words and can thus be realized alone, in context they are never prepausal so that their isolated tonal realization is not actually trustworthy. Their typical tonal behaviour is to bring a high tone to a next element, while they tend to be realized in isolation with a low tone. Moreover, in some cases their own tonal realizations in context can be rather unpredictable. Though problems remain, I propose a tonal representation for most conjunction words (see chapter 18).

Some of the suffixes and enclitics are less problematic as to tonal representation since they have a prepausal realization and behave regularly. Some of the personal object clitics, however, display irregular behaviour. I nevertheless propose a tonal representation, to avoid confusion with L-toned elements (see chapter 6.4).

The 1SG and 2SG possessor pronouns and the so-called vague reference particle **cık** display tonal properties that deviate from the tone rules. I represent the 1SG and 2SG possessor pronouns as having two tonal alternatives, apparently in free variation, while showing at the same time that some unexpected tonal behaviour remains (see chapter 7.3.1). The irregular behaviour of **cık** does not allow for assignment of an underlying tone. Though its notation may suggest otherwise, I do not regard it as an item with low tone (chapter 15.2).