3 Phonology

3.1 General

The prosodic structure, involving tone patterns and vocalic lengthening, is deeply intertwined with morphosyntax. The segmental phonology has a few intricacies, but there are few disfiguring phonological processes that would make it difficult to identify stems and other morphemes in texts. However, Syncope and the consonantal assimilation rules that it feeds are worth paying attention to, since they regularly disguise the identity of (C)vCv- words and stems. An example of this is bèré- 'get', Perfective Negative bèl-lí- (via Post-Sonorant Syncope and Rhotic-Assimilation). In examples in later chapters, I frequently list the full form of lexical items disguised in this way in parentheses after the free translation.

There being no voiced bilabial or labiodental fricative v, I use the symbol "v" for any short vowel, "v:" for any long vowel, and uppercase V as the unmarked symbol for any vowel. The symbol for "syllable" is σ.

3.2 Internal phonological structure of stems and words

Syllables, metrical structures, and compounds are discussed here. For clitics, see §3.6, below.

3.2.1 Syllables

The principal importance of syllables and of their internal structure is in connection with tones, which are realized on the **nucleus** (the syllable minus the onset consonant). In addition, there are some indications of metrical structure, specifically in the initial three syllables of words (strong-weak-strong).

In **contour tones** (those that combine high and low tone components, e.g. "falling" and "rising" tones), each tone component requires at least one **mora** (=timing unit) of its own. Syllables differ in the number of moras, i.e. timing units of the nucleus.

Syllabic structure is derivable from segment strings within words. Syllables are of the types in (xx1) in initial, medial, and final position.

(xx1)	a.	Cv	monomoraic (=light)
	b.	CvC Cv:	bimoraic (=heavy)
	c.	Cv:C Cv:: (= Cvvv)	trimoraic (=superheavy)

The trimoraic subtype Cv:: occurs only when a bimoraic Cv: syllable is extended to allow a bell-shaped <LHL> tone to be articulated; see Contour-Tone Mora-Addition (§3.7.4.1, below).

Word-initial syllables may be of the shapes in (xx1), and may also occur without the initial C, hence v, vC, v:, v:C, v::.

In native Dogon vocabulary, there are no **word-initial consonant sequences**. However, I can cite one Fulfulde loan of this type: ǹjâ:l 'bastard'. Since the initial nasal has its own tone, it must be regarded as syllabic.

3.2.2 Embryonic metrical structure

Many languages have stress or accent systems, which generally have at least a partially undulating, rhythmical nature (alternating stress rules, clash avoidance, etc.). Jamsay is a tone language, whose tones are important both lexically and grammatically. Unusually for such a language (in Africa), there is no "tone sandhi" across word boundaries. In native vocabulary, long words may consist entirely of metrically light, monomoraic Cv syllables. For these reasons, there is no phonetically obvious metrical structure of the sort we observe in English.

However, an **embryonic metrical structure** is manifested in various phonological rules, particularly those applying to verb stems and their suffixal derivatives (including Verbal Nouns). The core sequence involved is a stem-initial bisyllabic [σσ] foot behaving metrically as a **trochee** [sw], i.e., with a metrically strong σ_1 followed by a weak σ_2. Squared brackets demarcate metrical feet. Depending on the phonological process in question, there may be further stipulations on one or both of these syllables (e.g. as to vowel length), or a following third syllable may be required. There is no clear evidence for metrical structure in the third, fourth, and fifth syllables of long, uncompounded stems or words.

The phonological processes that are at least arguably sensitive to the initial [sw] asymmetry are those in (xx1). For each, I give a brief summary (often oversimplified) of the content of the process, name the morphological categories affected, and a schematic representation of the relevant structure (with the targeted segment underlined). In the schemas, σ is used for a syllable that can be of any shape, i.e. initial (C)v(:)C and noninitial Cv(:)C, while more specific representations like (C)v (optional C plus short vowel) are used when the process requires.

(xx1) a. ɡ-Spirantization (§3.3.2)

process: ɡ becomes *f* in C_2 position between low back vowels
domain: all stems
relevant structure: initial [(C)v(:)<u>C</u>v]

b. Post-Sonorant Syncope (§3.5.3.2)

process: V_2 deleted after sonoroant, usually {r r^n}, before coronal
domain: verbs with nonzero AN inflectional suffix
relevant structure: initial [(C)vC<u>v</u>]–[σ…, rarely [Cv:C<u>v</u>]–[σ…

c. Word-Final u-Apocope (§3.5.4.1)
process: final −u (VblN suffix) deleted
domain: Verbal Nouns
relevant structure: [σC−ú], rarely [σσ][(σ)C−ú]

d. Inter-Word u-Apocope (§3.5.4.2)
process: final u deleted
domain: wide range of compounds and phrases
relevant structure: [σCú]-[σ

e. VblN V_2-Lenition (§3.5.3.3)
process: V_2 raised to i (or u) and often reduced to schwa
domain: Verbal Nouns
relevant structure: [σCv]-[C−ú] or the rare [σσ][CvC−ú]

f. Presuffixal V_2-Raising (§3.5.2.2)
process: mid-height V_2 {e ɛ) or (o ɔ} raised to i or u
domain: suffixally derived verbs (e.g. causative)
relevant structure: [σCv]−[Cv−

(xx1.a) is a consonantal lenition that occurs at the onset of σ_2 (but not e.g. σ_3). (xx1.b-e) are vocalic deletions and other lenitions. (xx1.b,d) are strictly limited to σ_2, (xx1.c) is very strongly associated with σ_2 though it applies rarely (in elicitation only) to later syllables; and (xx1.e) can apply equally to σ_2 or a later syllable but there are very few opportunities for it to apply to a later syllable. (xx1.f) is not obviously a lenition process, but since raising is associated with lenition in (xx1.e) one could make a case that (xx1.f) too is a lenition of sorts; it applies only to σ_2.

The relevant structures in (xx1.a-f) are sufficiently divergent to show that no fixed "underlying" metrical structure can account for all the data. σ_2 is always centrally involved, but the lenitions are in some cases extended to following syllables. Only (xx1.a,d) affect stems of all word classes, while (xx1.b-c, e-f) apply only to verb stems (including Verbal Nouns derived from them).

If the metrical structure were better developed, one would expect some kind of undulating stress, so that e.g. a five-syllable word would have an audible organization into metrical feet, e.g. [sw][sw]σ (with extra-metrical final syllable). This is not the case.

3.2.3 Nominal compounds

For nouns, the issue of metrical structure is complicated by the fact that essentially all nouns of four or more syllables, and some with three or even two, behave phonologically like compounds. This applies not only to transparent examples with recognizable initials and/or finals, but also to many **crypto-compound** nouns. Most

quadrisyllabic crypto-compounds have a subtle, **prosodically marked juncture** in the middle, hence [σσ-σσ], though this is not the only possible location Even Fulfulde borrowings like `té:médérè` ‘hundred’ tend to be pronounced with a slight drop in pitch on the second syllable (without becoming truly L-toned). In other words, an initial string of three or more H-toned syllables (as occurs in most Fulfulde nominal borrowings of four or more syllables) in a quadrisyllabic noun can be articulated with a hint of trochaic meter, as [sw][s…]. For crypto-compounds with odd numbers of syllables, the location of the prosodic juncture is unpredictable (and perhaps motivated historically).

In the list (xx1) of features suggesting a compound juncture, (xx1.a-b) are impressionistic and would reward instrumental study, and (xx1.c) is subject to exceptions, while the others are categorical.

(xx1)

a. **slight pitch drop**, especially in HHHL-toned words, heard as HMHL with a drop (to “mid” tone) in V_2 ;

b. (slight) increase in stem-final **consonant duration**, before another consonant;

c. **noninitial long vowel**, especially in final syllable, or in third syllable of multisyllabic noun (most long vowels are in stem-initial syllables including monosyllables);

d. **adjacent vowels**, separately articulated (with or without intervening phonetic glottal stop);

e. a **final short-voweled Cv** syllable is not segmentable as a stem (there are no `-Cv` finals) and is therefore to be grouped with the penultimate syllable;

f. discontinuity in **vowel-harmonic** patterns, where one stem has at least one vowel from the set {`e o`} and the other stem has at least one vowel from the set {`ɛ ɔ`};

g. discontinuity in **consonantal nasalization**, where an unnasalized {`w y r`} is separated only by a vowel from a preceding nasal or nasalized consonant (violating Nasalization-Spreading).

In addition to (xx1.e) on the lack of short-voweled `Cv-` finals, I can add that this shape is also very rare in initials. In addition to a few compounds beginning in `yà-` or `yè-` ‘woman’ (§5.1.11), the examples are `jì-nî:` ‘sleepiness’ with initial reduced from `jìní`, `bɔ̀-túmó` ‘buttock’ where `bɔ̀-` is reduced from `bɔ̀ró` ‘rear’, `wɔ̀-túmó` ‘small mound’ with obscure initial, and `pè-díŋé` ‘clove’ and `té-kɔ̀ɣórɔ̀` ‘Tribulus vine’ with both initial and final obscure. Note the vocalic disharmony between first and third syllable in some of these compounds.

Multisyllabic nouns beginning with two or more L-toned monomoraic Cv̀ syllables, e.g. Cv̀Cv̀Cv̀Cv́ or Cv̀Cv̀Cv́Cv̀ quadrisyllables, may have no audible junctures (unless there happens to be a vowel-harmonic or consonantal-nasalization discontinuity). However, given (xx1.e) and the productivity of nominal compounds with L-toned initials, the natural break is after σ_2, e.g. Cv̀Cv̀-Cv̀Cv́.

Adjectives and numerals have compounds similar to those of nouns, but they are all at least reasonably transparent rather than cryptic.

3.3 Consonants

The consonantal segments are shown in (xx1). Those in single parentheses are now fairly common, but are associated with Fulfulde and other loanwords. Those in double parentheses are very marginal, occuring infrequently in loanwords, and/or occurring in semi-linguistic "uh-huh!" interjections like ɔ́ⁿʔɔ̀ⁿ 'no!'. Semivowels are here included in the "labial" and "alveopalatal" rows though this is oversimplifying phonetically.

(xx1) Consonants

	1	2	3	4	5	6	7	8	9
labial	p	b	m	(f)		w	w^n		
alveolar	t	d	n	s	l	r	r^n		
alveopalatal	c	j	ñ	((š))		y	y^n		
velar	k	g	ŋ						
laryngeal								(h)	((ʔ))

c is IPA [tʃ], j is [dʒ], š is [ʃ], ñ is [ɳ], y is [j].

key to columns: 1. aspirated voiceless stops (c is affricated); 2. voiced stops; 3.nasals, 4. voiceless fricatives (including sibilants); 5. laterals; 6-7. respectively unnasalized and nasalized sonorants; 8-9. laryngeals

Major **positional restrictions** of the unparenthesized consonants in the table are summarized in (xx2). For clusters, see the relevant sections below.

(xx2) a. **initial** position, and syllable-initially after a distinct consonant

stops, nasals (except ŋ), s, l, unnasalized sonorants, and h occur freely;

nasalized sonorants {w^n r^n y^n} are not allowed;

r rare, two Fulfulde verb loans (e.g. rɔ́ŋkɛ́- 'fail');

ŋ rare, one fauna terem (ŋátà 'crocodile')

b. **intervocalic** position

no general restrictions (but Nasalization-Spreading must be respected)

c. **final** position, and more generally syllable-final position
verbs:
no final consonants (except kùn- ‘be in’);
nouns (and other stems), except due to Syncope:
nasals (except ñ), semivowels, and l are very common;
alveopalatals {c j ñ} are not allowed;
laryngeals {h ʔ} are not allowed;
a few stops and fricatives are attested in interjections or recent loans.

Examples of final consonants follow. Nasals: àtɛ̂m ‘customs’, tùgûn ‘ladle’, àjǎn ‘forked stick’. Semivowels and lateral: dɛ̀rɛ̂w^{n} ‘ratel (mammal)’, àjǎy^{n} ‘planting in manure pits’, cɛ̂w ‘all’, tílây ‘obligation’, sɔ̀bɔ̌l ‘gourd’. Stops/sibilants (very rare, all known examples given): lók (intensifier for túrú ‘one’), bâg ‘ferry’ (French *bac*), fés (‘[not] at all’ interjection, dialectal).

3.3.1 Alveopalatals (c, j, ñ)

These stops require a following vowel in order to be released, and do not occur in syllable-final position except in the occasional intervocalic geminated cc or jj cluster.

3.3.2 Voiced velar stop g and g-Spirantization (g→ɣ)

What is arguably a single phoneme g has two allophones, [g] (the ordinary voiced velar stop) and [ɣ] (voiced velar fricative).

The [ɣ] allophone can be analysed as a case of **spirantization** (lenition of stop to homorganic fricative). It occurs **intervocalically** in the **onset of the second syllable** of a bisyllabic or longer stem, whenever it is flanked by any combination of back low vowels from the set {a ɔ}. Most cases involve a…a or ɔ…ɔ, as in àɣá ‘husband’, dàɣá- ‘leave’, dɔ̀ɣɔ̀- ‘Dogon (compound initial)’, wàɣà-já- ‘cause to remain’, and ɔ̀ɣɔ̌-n ‘chief’. The combination ɔ…a occurs in Perfectives like jɔ̀ɣ-â:- from jɔ̀ɣó- ‘be shattered’. I know of no a…ɔ sequences within stems or in stem-suffix combinations. Note that o is not conducive to spirantization: dògó- ‘finish’ and Resultative dòg-â:- ‘be finished’ have unspirantized g, as does kógójó- ‘cough’.

The **tones** of the preceding and following vowels have no effect on spirantization; thus àɣá ‘husband’ and its possessed form áɣà both have [ɣ]. Likewise, **vowel-length** is irrelevant: a long flanking vowel on either side is treated just like a short vowel, so we get spirantization in dà:ɣá [dà:ɣá] ‘night’ and in dáɣà: ‘a little’.

g-Spirantization does not occur when either flanking vowel is other than {a ɔ}. This can be seen most clearly in alternations involving a single stem. For example,

dàɣá- ‘leave’ has a verbal noun dàg-ú, where the suffixal u prevents spirantization. Spirantized ɣ flanked by ɔ, and g flanked by o, contrast in the compound ɔ̀ɣɔ̀-yógó ‘ostrich’.

In compounds and derivatives, spirantization occurs when the g is in the indicated position within **any component stem**. It therefore takes place in the two paired direction terms dù-dáɣá ‘east’ and tɛ̀n-dáɣá ‘west’, which compete with uncompounded dû: ‘east’ and tɛ̌ŋ ‘west’, and in gàn-káɣà ‘quandary’ (literally “between-squeeze”). However, spirantization does not take place in ànsà:rà-gǎ:ⁿ ‘cashew tree’ (lit. “white.man-fig”), because the g of the compound final gǎ:ⁿ is recognizably stem-initial (cf. gǎ:ⁿ ‘sycomore fig tree’). In frozen compounds, spirantization is occasionally useful as a diagnostic for morphological structure, as in the plant name té-kɔ̀ɣórɔ̀ ‘Tribulus vine’, which is morphologically segmentable although the initial and final components do not occur otherwise. Likewise with place names such as pɛ́:-tàɣà ‘Petaga (village)’.

In trisyllabic and longer stems that are not compounded or suffixally derived, spirantization fails to affect intervocalic g at the onset of the third syllable: dɔ̀rɔ̀gɔ́- ‘ransom [verb]’, àlàgárà ‘wide boubou (garment)’, kàdàgá ‘peer group’. I suggested in §3.2.2, above, that there is an abstract default metrical structure for stems or two or more syllables, such that the second syllable is the weak one. Therefore in [dɔ̀rɔ̀][gɔ́], [àlà][gárà], and [kàdà][gá], the g is in a strong syllable and fails to spirantize. Similarly, iterations of g-initial stems, as in gɔ̀ŋɔ́-gɔ̀ŋɔ́- ‘turn, spin’ fail to spirantize the medial g, and there is no spirantization across word boundaries even with tightly-knit cognate object-verb sequences like gɔ́lɔ́rɔ́ gɔ̀lɔ̀rɔ́- ‘snore (a snore)’ and gɔ́: gɔ̌:- ‘dance (a dance)’.

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(xx1) **g-Spirantization** (g→ɣ)

> g→ɣ when a) it is intervocalic, b) it is flanked by low back vowels from the set {a ɔ}, and c) it is in the (metrically weak) second syllable of a stem or word.

It appears that g-Spirantization can be blocked under certain conditions. Consider the verb ɔ́gɔ́rɔ́-, which can be intransitive ‘become hot (fast)’ or factitive ‘heat, make hot (or fast)’. Although flanked by spirantization-friendly vowels, this verb was heard with unspirantized g. I interpret this as due to a close “analogical” association with the underlying adjective ɔ́gù ‘hot, fast’.

I regard this as **incipient lexicalization** (phonemicization) of the g/ɣ opposition. This lexicalization is **asymmetrical**, since while word-families based on a simple stem with g seem able to generalize g throughout, to judge by ‘hot’, there is no parallel generalization in word-families based on simple stems with ɣ, like dàɣá- ‘leave’,

where we continue to find alternations of ɣ and g depending on vocalic environment (after suffixation).

g-Spirantization is not always extended to new borrowings from French, e.g. bagarre ‘dispute’. It does seem to apply to Fulfulde loans, at least those that are widely used in Jamsay, e.g. tóɣórɔ̀ ‘namesake’.

3.3.3 Velar nasal (ŋ)

ŋ is very rare word- or stem-initially. I can cite only ŋátà ‘crocodile’ (the creature is present in the Niger River and in some large ponds Dogon country). ŋ is fairly common intervocalically, e.g. pàŋá ‘strength’, túŋó- ‘kneel’. The homorganic clusters ŋk and ŋg are fairly common. ŋ can occur finally: jûŋ ‘hump’.

3.3.4 Voiceless labials (p, f)

p is a well-established native consonantal phoneme.

f occurs in loanwords: màlfâːⁿ ‘rifle’, fúː ⇒ ‘all’. There appear to be dialectal variants with p instead of f (màlpâːⁿ, púː). Persons who have taken literacy classes have been taught that there is no f in Dogon, and I have had informants who self-corrected their pronunciations accordingly to this “rule,” while slipping back into f in natural speech.

3.3.5 Laryngeals (h, ʔ)

h is not a native Jamsay phoneme, but it occurs stem-initially in quite a few Fulfulde loanwords: hóggò ‘animal pen’, haːjɛ̀ ‘need’ (ultimately <Arabic). It also occurs intervocalically in ɔ̀ⁿhóⁿ ‘yes!’.

ʔ occurs in cʼⁿʔɔ̀ⁿ ‘no!’, and in gúrúʔáːnà ‘Coran’ (<Arabic). It is also inconsistently heard at compound boundaries to separate vowels.

3.3.6 Sibilants (s, š)

There is no clear s/š opposition. The single native sibilant phonene is usually pronounced s, with occasional š-like articulations especially before i. š does seem to be regular in a few borrowings: šínwâːⁿ ‘Chinese person’ (French *chinois*), šínwáːrù ‘lotion for lips or nostrils’. The only syllable-final example is the dialect fɛ́s ‘(not) at all’ interjection.

3.3.7 Nasalized sonorants (rⁿ, wⁿ, yⁿ)

Jamsay, like several other Dogon languages, has three **nasalized sonorants**. Within stems, all three occur intervocalically, and the two nasalized semivowels may occur stem-finally. Nasalized sonorants are most common in the vicinity of back vowels such as a and ɔ, but there are no rigid constraints on compatibility with vowel qualities.

Sequences like vrⁿv have often been misanalysed in previous Dogon scholarship, and are represented in current practical orthographies, as sequences of the type aⁿra with nasalized vowel followed by r, orthographically often "anra" or the like. However, with {rⁿ wⁿ yⁿ} the nasalization is centered on the consonant. It nasalizes adjacent vowels in both directions, and (like nasal consonants) it can spread nasalization across a vowel to a following {r w y}, see Nasalization-Spreading (§3.5.1.1).

The phonemic status of these segments is illustrated by the oppositions in (xx1).

(xx1) a. opposition {rⁿ r n}

rⁿ : kárⁿá- 'do', pórⁿɔ́- 'blow nose', tórⁿó- 'squat', ùrⁿɔ́ 'hole';
r : kárá- 'make incision in', kɔ̀rɔ́ 'neck', úrɔ̀ 'boundary';
n : mánà 'on', bɔ̀:nɔ́ 'spoil (child)', múnɔ́- 'braid'.

b. opposition {wⁿ w ŋ}

wⁿ : dɔ̀wⁿɔ́ 'totem', kùwⁿá 'crowned crane', cìcéwⁿɛ̀ 'mosquito';
w : ɔ́wɔ́- 'brood (on egg)', dùwâ:w 'blessing', éwɛ́- 'buy';
ŋ : jɔ̀ŋɔ́ 'hare', jùŋɔ́- 'bob head', dɛ̀ŋɛ́ 'anvil'.

c. opposition {yⁿ y}

yⁿ : dɔ̀yⁿɔ́ 'ashes', kùwⁿá 'crowned crane', cìcéwⁿɛ̀ 'mosquito';
y : ɔ̀yɔ́ 'grass', kùwⁿá 'crowned crane', cìcéwⁿɛ̀ 'mosquito';

wⁿ and yⁿ, can also occur finally, as can unnasalized w and y. Final yⁿ occurs both in simple stems like jéyⁿ 'forked stick', and in apocopated bisyllabic verbal nouns (whose underlying suffix -ú is often deleted after an intervocalic sonorant) like mà-ýⁿ 'building' (verb má:-) and gŭyⁿ-∅ 'stealing' (verb gùyⁿɔ́-). My examples of wⁿ are all from apocopated verbal nouns, e.g. kŏwⁿ-∅ 'squeezing (VblN)' (cf. verb kówⁿó-).

rⁿ, like unnasalized r, does not occur syllable-, stem-, or word-finally in lexically basic representations. When rⁿ becomes syllable-final due to Post-Sonorant Syncope, it assimilates to the following consonant.

Nasalized sonorants play a role in the phonological rule **Nasalization-Spreading**, both as instigators and as targets. Nasalized sonorants count as "nasal" consonants as

sources of spreading to the right. In addition, within (uncompounded) stems, and in words consisting of a stem and its suffixes, underlying {r w y} is nasalized to {r^n w^n y^n} when separated from a preceding nasal consonant only by a vowel. For example, if N is any nasal consonant and V is any vowel (long or short), NVwV is realized as NVw^nV. This rule accounts for the nasalized y^n in Verbal Noun mà-ý^n 'building' cited above (verb má:-), compare the parallel Verbal Noun pɔ̀-ý 'picking fruits' (verb pɔ́:-).

3.3.8 Consonant clusters

Stem-internal lusters as a whole occur in a small minority of native Dogon vocabulary, so no single cluster is genuinely common. Fulfulde is the major source of borrowings and since it has many clusters, many specific clusters are at least attested in Jamsay, but often only in a handful of forms, and there are some apparent gaps that are best considered accidental.

Since stems (other than verbs) may be consonant-final, and the great majority of all stems are consonant-initial, clusters are common across morpheme boundaries in compounds (including many long noun stems that may have originated as compounds but are no longer transparently composite), and at word boundaries (for example, noun plus adjective combinations). Some additional clusters are created by Syncope.

3.3.8.1 Initial CC clusters

Initial clusters are largely absent. However, Fulfulde has some nouns with initial nasal-stop sequence, and of these njâ:l 'bastard' at least has found its way into Jamsay.

3.3.8.2 Medial geminated CC clusters

No cases of geminate ww, w^nw^n, r^nr^n, or ññ can be cited. From a Jamsay-internal perspective these are probably accidental gaps (i.e. if they occurred in a foreign word borrowed into Jamsay the cluster would be preserved). The absence of ww is related to the fact that the main source of loanwords, Fulfulde, has bb or gg (lexical choice) rather than #ww as its geminated counterpart of w. The attested geminates are given with one example each in (xx1). The number of monomorphemic stems in my working lexicon containing the cluster, counting each word-family only once, is given in parentheses.

(xx1) Medial geminates

bb (2): dɛ́bbàlɔ́bbɔ̀ 'bush sp.' (<Fulfulde 'pretty woman')
cc (1): háccíllɛ̀ 'mind, intelligence' (Fulfulde)

dd (4): púddù ‘henna’ (regional word)
gg (2): júggá:rɛ̀ ‘vulture sp. (Fulfulde)
jj (3): híjjù ‘pilgrimage to Mekka’ (Arabic via Fulfulde)
kk (4): jákkà ‘zakat (Islamic tithe)’ (Arabic via Fulfulde)
ll (31): málɛ̀ ‘brown cow with black and white spots’ (Fulfulde)
mm (1) : támmà ‘a colonial coin’ (regional word)
nn (5): júnná:jò ‘djinn, sprite’ (Arabic via Fulfulde)
ŋŋ (1): káŋŋà ‘gold (metal)’ (regional word, perhaps from Soninke)
ññ (0): —
pp (2): síppɛ̀ ‘description’ (Arabic via Fulfulde)
rr (3): bárrây ‘dark brown cow’ (Fulfulde)
$r^n r^n$ (0): —
tt (5): sáttéllè ‘bauhinea tree’ (Fulfulde)
ww (0): —
$w^n w^n$ (0): —
yy (1): láyyá:rù ‘Feast of the Ram’ (Fulfulde)

The marginal phonemes f, š, h, and ʔ are also unattested in geminated form.

3.3.8.3 Medial non-geminate CC clusters

It will again be noted that most of the examples are “cultural” vocabulary, whether or not the original source language is known. One example is given for each attested cluster; many of them are attested only with one or a few loanwords. It is difficult to identify the systematic (as opposed to accidental) gaps, but many of the gaps in the data involve a semivowel as first and/or second member. For purposes of clustering, w^n is combined with w and y^n with y. (There are no cases of r^n in a cluster.)

(xx1) Medial non-geminate clusters

a. nasal plus homorganic stop
mb (9): déŋémbɛ́:rɛ̀ ‘Zornia herb’ (Fulfulde)
mp (5): kúmpâm ‘anxiety’ (<Fulfulde)
nd (13): cɛ̀ndɔ̀:rɔ́ ‘bunting (bird)’
nt (8): tóntɛ̀ ‘collective feast’
ŋg (15): jáŋgé- ‘study’ (Fulfulde)
ŋk (8): táŋkà ‘a colonial coin’ (regional word)

b. nasal plus nonhomorganic stop:
mg (1): jámgâl ‘wooer’ (Fulfulde)
mk (1): àlàm-kây^{n}kây^n ‘Datura grain’ (crypto-compound)

ng (0): —
nk (1): gánkɔ̀ ‘Celtis tree’

c. nasal plus nonhomorganic nasal
nm, nm̃, nŋ (0): —
mn (13): nɛ̀mnɛ́ ‘scorpion’.
mñ:(3) námñú ‘sesame’
mŋ (0): —
ŋn, ŋm, ŋñ (0): —

d. nasal or liquid plus fricative or sibilant
mf, nf, ŋf (0): —
lf (1): màlfâːⁿ ‘rifle’ (regional)
rf (0): —
ms (2): námsɛ̀gɛ̀ ‘grasshopper sp.’
ns (1): ànsáːrá-n (var. ànìsáːrá-n)‘white person’ (<Arabic)
ls (2): àlsémélé ‘epics sung with tomtoms’
rs (3): gúrsóːjɛ̀ ‘Grewia tree’

e. liquid {l r} plus stop
lb (4): cɛ́lbì ‘muzzle-guard to prevent suckling’ (Fulfulde)
lc (0): —
ld (2): júldâːn ‘end-of-Ramadan holy day’ (Fulfulde)
lg (1): pàlgú ‘channel dug for rainwater’
lj (1): áljúmáːrɛ̀ ‘Friday’ (Arabic via Fulfulde)
lk (2): bàlkórɔ́ ‘gum tree’
lp (3): bàlpóː ‘calabash drum’
lt (1): áltínɛ́ːrɛ̀ ‘Monday’ (Arabia via Fulfulde)
rb (4): àlàrbá-n ‘Arab or Tuareg’ (Arabic)
rc (3): àrcɛ́wɛ́ ‘stirrup’ (Arabic via Fulfulde)
rd (1): cárdù ‘silver’
rg (10): sírgírì ‘black cow with white face and throat’ (Fulfulde)
rj (1): cícérjù ‘grass sp.’
rk (6): tɛ́rkây ‘light brown cow’ (Fulfulde)
rp (0): —
rt : sártì ‘deadline’ (Arabic via Fulfulde)

f. liquid {l r} plus nasal or other liquid
lm (2): bálmáːrɛ̀ ‘cow black on top, white below’ (Fulfulde)
ln, lŋ, lñ (0): —

lr (0): —
rm (6): sèrmèñém ‘fig tree sp.’.
rn (2): bérnè ‘anthrax’
rñ (1): pérñé- ‘graze, brush against’
rŋ (0): —
rl (0): —

g. semivowel plus stop
wb, wc, wd, wj, wp (0): —
wg (1): ñáwⁿgá ‘herb sp.’
wk (1): téw-kògórò ‘herb sp.’ (crypto-compound, note vocalic disharmony)
wt (1): sáwté- ‘be sick and tired of’ (Fulfulde)
yb (1): háybé- ‘watch over’ (<Fulfulde)
yc, yg, yp (0): —
yd (1): háyⁿdè- ‘amazing thing’ (<Fulfulde)
yj (1): yèyjê: ‘morning’
yk (1): àlàm-kâyⁿkâyⁿ ‘Datura grain’ (crypto-compound)
yt (2): séytâ:n ‘demon’ (Arabic via Fulfulde).

h. semivowel plus nasal
wm (0): —
wn (0): — (but see triple cluster wnd, below)
ym (0): —
yn (1): màyná- ‘take heart’

i. semivowel plus liquid
wl (2): máwlûld ‘Maouloud (holy day)’ (Arabic via Fulfulde)
wr (2): dáwrù ‘telling fortunes’
yl (1): gàylé ‘a little’
yr (2): yàyrú ‘blanket’.

j. semivowel plus nonhomorganic semivowel
wy (0): —
yw (0): —

k. semivowel plus fricative or sibilant
wf (0): —
yf (0): —
ws (0): —
ys (0): —

l. nasal or liquid plus semivowel {w y}

lw (2): sílwâl ‘herb sp.’

ly (0): —

nw : sínwâːⁿ ‘Chinese person’ (<French)

ny (0): —

mw, my, ŋw, ŋy (0): —

3.3.8.4 Medial triple CCC clusters

I can cite líwndù ‘herder’s staff’ and séwndɛ̀ ‘(water) spring’, both from Fulfulde. wnd is the “easiest” triple cluster one could find, with a semivowel followed by a (syllable-initial) homorganic nasal-stop cluster (arguably a prenasalized stop).

3.3.8.5 Final CC clusters

Excluding Fulfulde and French loans not in common use, like máwlûld ‘Maouloud (Muhammad’s birthday)’, there are no final clusters, except for combinations of clitic ≡ỳ (‘it’s…’) with a preceding word ending in y or yⁿ, which are heard as geminated …y≡ỳ and (with Nasalization-Spreading)…yⁿ≡ỳⁿ, respectively.

3.4 Vowels

The vowel phonemes are given in (xx1).

(xx1)

short oral	long oral	nasalized
u	uː	uːⁿ
o	oː	(oːⁿ)
ɔ	ɔː	ɔːⁿ
a	aː	aːⁿ
ɛ	ɛː	ɛːⁿ
e	eː	eːⁿ
i	iː	iːⁿ

The qualities {ɛ ɔ} and {e o} constitute **harmonic sets**; see §3.4.5, below. Minimal pairs that illustrate the phonemic oppositions are bé:- ‘take place’ versus bɛ́ː ‘excrement’, céjé- ‘encounter’ versus céjɛ́- ‘cut’, òròwó ‘juube (fruit)’ versus òrɔ̀wɔ́ ‘pond scum’, and gó:- ‘go out’ versus gɔ́ː- ‘dance [noun]’.

3.4.1 Short and (oral) long vowels

Since Jamsay favors Cv and Cv: syllables, with relatively few consonant clusters (except in compounds and noun-adjective combinations), vowel length oppositions are common and are generally easy to hear. A minimal pair is jèré- ‘harvest [verb]’ versus jè:ré- ‘bring’.

Long vowels in **nonfinal syllables** within stems (and words) are common in all word classes. Examples of short and (oral) long nonfinal vowels are given in (xx1).

(xx1)	quality	short-V ex.	gloss	long-V ex.	gloss
	u	dúdúrúm	‘trash heap’	bú:dù	‘money’
	o	bómó	‘outside’	bò:mó-	‘be stupid’
	ɔ	yɔ̀rɔ́-	‘be soft’	yɔ̀:rɔ́-	‘cook on fire’
	a	játɛ́-	‘calculate’	wá:tɛ̀	‘oath’
	ɛ	sɛ́rɛ́-	‘copulate’	sɛ́:rɛ̀	‘witness’
	e	péjé-	‘pound grain’	pé:jú	‘sheep’
	i	síñɛ́-	‘sniffle’	sí:ŋɛ̀	‘dark grey cow’

For medial position, note e.g. dùdú:rú ‘gourd’ versus dúdúrúm ‘trash heap’.

All verb stems of more than one syllable end in a short vowel in their basic form. Nouns, adjectives, and other stems may end in a short or long vowel (or in a consonant) regardless of the number of syllables, but final long vowels are less common than final short vowels even for nouns and adjectives if the stem has more than one syllable. Some noun stems with final long vowel are these: dìdɛ́: ‘shield’, lìlé: ‘fear’, àsê: ‘Saturday’, bà:bî: ‘rubber sandal’, bɛ̀rù-àjí: ‘billy-goat’, bàlpó: ‘calabash drum’, and bùtó: ‘Mitragyna tree’. Additional cases of final long oral vowel are created by morphonological rules, e.g. Imperfective verbs (type yɔ̀:rɔ̂: ‘will cook on fire’).

Monosyllabic stems, other than nouns and adjectives that end in a consonant, have a shape Cv: with long vowel. All monosyllabic verbs are of this type. Examples are the verbs yă: ‘go’, dɔ́:- ‘insult’, and bă:- ‘learn’, and the nouns dú: ‘burden’, dě: ‘father’, and bɛ́: ‘excrement’. No short-voweled Cv verb, noun, or adjective stems occur.

Word-final super-heavy syllables of the shape Cv:C are attested but somewhat uncommon. The final C is a sonorant (nasal, semivowel, or l), as in àcě:ŋ ‘agama lizard’. Many if not all of these cases involve historical loss of a word-final high vowel, cf. cè:ŋú ‘agama lizard’ in some other Dogon languages. The same syllable type occurs on the surface in apocopated verbal nouns of the shape Cv̌:C-∅ associated with Cv:Cv- verbs whose final consonant is one of the relevant sonorants, e.g. ñɛ́:-wⁿɛ́- ‘feed’, VblN ñɛ̌:-wⁿ-∅ ‘feeding’ (apocopated from /ñɛ̀:-wⁿ-ú/).

3.4.2 Nasalized vowels

It is necessary to distinguish vowels that are redundantly nasalized by a preceding nasal (or nasalized) consonant, and independently nasalized vowels that constitute a phonemic set. On the former see under Nasalization-Spreading, below.

The **independently nasalized vowels** are represented with a following superscripted ⁿ. They are phonetically long and are therefore also represented with the length diacritic :. Independently nasalized vowels constitute a five-, rather than a seven-vowel system. Nasalized vowels are most common in monosyllabic stems, where the vowel length could be attributed to the requirement of at least two moras. Examples are in (xx1).

(xx1)	vowel	example	gloss
	u:ⁿ	kú:ⁿ	‘head’
	ɔ:ⁿ	gǒ:ⁿ-	‘take out’
	a:ⁿ	gǎ:ⁿ	‘fig tree’
	ɛ:ⁿ	tɛ̌:ⁿ	‘friend’
	i:ⁿ	tí:ⁿ	‘send’

There are a few cases of an independently nasalized vowel, either nonfinally or (much more often) finally in an uncompounded stem of two or more syllables. When such vowels do occur, they are phonetically long, showing that length is not simply due to minimal moraic requirements (xx2).

(xx2)	vowel	nonfinal	gloss	final	gloss
	u:ⁿ	—		bànàkû:ⁿ	‘cassava’
	ɔ:ⁿ	—		—	
	a:ⁿ	—		màlfâ:ⁿ	‘rifle’
	ɛ:ⁿ	—		—	
	i:ⁿ	sì:ⁿlɛ́	‘disease’	àtî:ⁿ	‘bird trap’

check *sìsê:ⁿ* *‘herb sp.’*

Only final a:ⁿ is at all common in multisyllabic stems; in addition to ‘rifle’ I can also cite pùkâ:ⁿ ‘solder metal’ and perhaps šínwâ:ⁿ ‘Chinese person’, though the latter might alternatively be analysed as šínwⁿâ: with nasalized wⁿ due to Nasalization-Spreading. As for i:ⁿ, it occurs in many (synchronic or frozen) compounds containing the common compound final -î:ⁿ ‘child (of)’ (§5.1.10), e.g. sà:j-î:ⁿ ‘bird’.

Nasalized vowels contrast with combinations of vowel plus nasal consonant. The latter are exemplified by àjǎŋ ‘forked stick’ and wǎn ‘Anogeissus tree’, whose final syllables are clearly distinct from that of e.g. màlfâːⁿ ‘rifle’.

In addition to the phonemically nasalized vowels described above, vowels are routinely nasalized phonetically under the influence of a preceding or following nasal (or nasalized) consonant. See the discussion of Nasalization-Spreading, below. There are no phonemic neutralizations in this context; in particular, phonetic [eⁿ] is distinguishable from phonetic [ɛⁿ], and phonetic [oⁿ] is distinguishable from phonetic [ɔⁿ]. I do not indicate this low-level nasalization except in narrow phonetic transcription. Example: bárméɾⁿè ‘injury’ is phonetically [bárméⁿrⁿèⁿ], while jíjéwⁿé ‘mud-dauber wasp’ is phonetically [dʒídʒéⁿwⁿéⁿ].

3.4.3 Initial vowels

As noted above, the typical syllables of Jamsay are Cv and Cvː, while Cvːⁿ, CvC, and CvːC are also found. All of these are consonant-initial. However, word-initially the C position may be unfilled. For example, initial a is common in both native words and (e.g. Arabic) borrowings: ámà ‘God’, ǎn ‘man’, àná ‘village’, álárbáːrè ‘Wednesday’. Examples of stems beginning with other short vowels are újúró ‘ask’, ònùrⁿú ‘smooth’, óñó- ‘suck’, èndèkónó ‘rock hyrax (mammal)’, èjú ‘field’, and írù ‘female breast’.

Examples of initial long vowels in stems of at least two syllables: úːñùm ‘Cleome herb’, òːgú ‘sweat [noun]’, óːrⁿò ‘waterskin’, àːŋá ‘how much?’, éːñú ‘shame’, ɛ́ːrɛ́ ‘peanuts’, íːrⁿɛ́ ‘iron’. Monosyllabic cases are mostly stems consisting of just a long vowel (óː- ‘give’, áː- ‘catch’, ěː ‘moon, month’, ɛ́ː- ‘see’, ɛ́ːⁿ- ‘weep’ and its homonym ɛ́ːⁿ- ‘get tight’), but there are also a few cases with final n : ǎːn ‘swelling’, ûːn ‘forest’, ǔːn ‘monitor lizard’.

3.4.4 Stem-final vowels

There are no restrictions on final vowels in nouns or adjectives. For inflected verb stems, there is a constraint against final high vowels and another constraint against long vowels.

(xx1) **Constraint against Final High Vowel in Verb Stem**

> An inflectable verb stem of more than one syllable may not end in a high vowel i or u. However, monosyllabic Ciː- and Cuː- are allowed.

Examples of monosyllabic high-voweled verb stems: tíː- ‘send’, núː- ‘enter’.

(xx2) **Constraint on Length of Final Vowel in Verb Stem**

a. In its basic (lexical) form, an inflectable verb stem of more than one syllable must end in a short vowel.

b. Except for a handful of defective "quasi-verbs" (generally limited to the unsuffixed Perfective and to special, irregular negative forms), an inflectable monosyllable verb stem must end in a long vowel.

The quasi-verbs that do not respect (xx2.b) are sà- 'have', human wɔ̀- and nonhuman kɔ̀- 'be', and kùn- 'be in'. The latter is the only verb that ends in a consonant.

A verb with a final short vowel can end up with this vowel lengthened after morphological and phonological processes apply. For example, the unsuffixed Imperfective is expressed by grafting an F-tone to the final mora of the verb, and if there is a zero pronominal (or Participial) suffix this vowel must be lengthened to allow the contour tone to be articulated (Contour-Tone Mora-Addition, §3.7.4.1). Example: bɛ̀rɛ́- 'obtain', bɛ̀rɛ̂:-∅ 'he/she will obtain'.

Nouns, and to a lesser extent adjectives and numerals, are treated more liberally. There are plenty of these words, including those of two or more syllables, that end in a high vowel. u is common in all of these word-classes: èjú 'field', ɛ̀jú 'good', pɛ́rú 'ten'.

It is a different matter with i. I have no examples of final i in adjectives (versus many in final u), or in numerals. For nouns, uncompounded stems of more than one syllable ending consistently in short i are rare and limited to Fulfulde borrowings: a run through my working lexicon yields only sállígì 'ablutions', sártì 'deadline', sírgírì 'black cow with white face and throat', wákátì 'time'. A few other nouns waver between final u and i (lácírì or lácírù 'couscous', from Fulfulde). The Fulfulde adverb já:tì 'exactly' is used to some extent in Jamsay. Excluding compounds ending in -î:^{n} 'child', or nouns ending in î:^{n} that may be suspected of having once contained this element (e.g. kɔ̀r^{n}î:^{n} 'intestine'), I can cite a few cases of final long î:, namely fárnî: 'donut' (<Bambara), sàrî: 'plow' (<French), wálî: 'holy man, seer' (<Arabic), yà:jí: 'marriage' (perhaps originally containing yà:- 'woman'), zàndàrmèrî: 'gendarmerie' (<French).

Nouns of more than one syllable may end in a long vowel: bàlpó: 'calabash drum', màlfâ:^{n} 'rifle'. I have no examples of such shapes with adjectives or numerals. Final consonants are common in nouns, adjectives, and numerals: kúsêl 'small piece', sɔ̀bɔ̌l 'gourd', jém 'black', kúróy 'six'. Nouns and adjectives ending in Sg -n or Pl -m greatly increase the number of cases.

3.4.5 Vocalic harmony

Although the situation is clouded somewhat by the many verbs borrowed from Fulfulde (usually with final ɛ, less often final e), the clearly productive sequences of vowel qualities (disregarding length) in Jamsay verbs of two or three syllables are those in (xx1).

(xx1) a. sequences of identical non-high vowels

ee	eee
ɛɛ	ɛɛɛ
aa	aaa
ɔɔ	ɔɔɔ
oo	ooo

b. harmonic vowel sequences

ie	iie
iɛ	iiɛ
uo	uuɔ
uɔ	uuɔ

All of the combinations in (xx1) are abundantly attested. Examples, starting with identical vowels: bisyllabic céjé- ‘encounter’, dɛ̀gɛ́- ‘lick’, ná:ná- ‘put up on’, pójó- ‘pop’, yò:ró- ‘lie in wait for’; trisyllabic cégéré- ‘listen to’, mèŋèrⁿɛ́- ‘roll between hands’, ájárá- ‘sew’, sóŋórⁿó- ‘decorate’, and bògòró- ‘(billygoat) bellow’. Harmonic high-low sequences: bisyllabic círé- ‘fly away’, íjɛ́- ‘stand’, bùgó- ‘be in water’, dùró- ‘heave (spear)’; trisyllabic jìgìré- ‘shake’, dìgì-rɛ́- ‘align’, jùgùró- ‘shake’, dùgù-nɔ́- ‘become fat’.

Verb stems that do not fit into the identical-vowel or harmonic-vowel sets as given above are a small minority. One type that is closely related to the harmonic type is one with a medial u flanked by identical mid-height vowels, the attested cases being ɛ_ɛ and ɔ_ɔ. The examples known to me are in (xx2).

(xx2)	stem	gloss	related form
	ɛ́jú-nɛ́-	‘make good’	ɛ̀jú ‘good’
	mɔ̀ñù-nɔ́-	‘make bad’	mɔ̀ñú ‘bad’

Here an adjective ending in u has a factitive derivation (suffix -nv-) that gets its vowel quality from the first-syllable vowel. This shows that an initial-syllable mid-height vowel overrides an intervening u in determining suffixal vowel features. I have no examples involving i (no non-monosyllabic adjective ends in i).

There remain a modest number of cases involving final ɛ (xx3).

(xx3)		stem	gloss	related form or source
	a.	bámbɛ́-	‘carry (child)’	<Fulfulde
	.	júkkɛ́-	‘fine (sb)’	<Fulfulde
		póttɛ́-	‘participate’	<Fulfulde
		tóryɛ́-	‘pester’	<Fulfulde
	b.	bárkínɛ́-	‘thank’	<Fulfulde causative
		jáŋgínɛ́-	‘teach’	<Fulfulde causative

The cases in (xx3.a) are simple Fulfulde borrowings. tóryɛ́- has a variant tórró- with identical vowels; likewise, póttɛ́- has a variant póttó-. It appears that disharmonic mixes of mid-height vowels, notably [ɔ ɛ] , tend to be nativized to identical-vowel sequences [ɔ ɔ] (presumably [o ɛ] would also tend to be nativized as [o o]). However, [a ɛ] and [u ɛ] sequences in Fulfulde borrowings seem to be stable.

The verbs in (xx3.b) are borrowings involving Fulfulde Causative formative -in-. The Jamsay forms have the usual final ɛ, resulting in a [aiɛ] vocalic sequence. Such stems appear to be stable phonologically in Jamsay.

The situation for verbs can be summarized in (xx4).

(xx4) **Vocalic Harmony (Verb Stems)**

Vowel sequences allowed are:

a. identical mid-height or low vowels:
[e e (e)], [ɛ ɛ (ɛ)], [a a (a)], [ɔ ɔ (ɔ)], [o o (o)]

b. harmonic sequence of one or more identical high vowels and a final mid-height vowel with the same [±back] and [±rounded] features:
bisyllabic [i e], [i ɛ], [u o], [u ɔ];
trisyllabic [i i e], [i i ɛ], [u u o], [u u ɔ]

c. identical mid-height vowels separated by u
[ɛ u ɛ], [ɔ u ɔ] (theoretically also [e u e], [o u o])

d. some other combinations with final ɛ
[a ɛ] in deadjectival derivatives with -nv- suffix;
[a ɛ], [a i ɛ], [u ɛ], and marginally [ɔ ɛ] in borrowings

Noun, adjective, and numeral stems are subject to a looser set of harmonic principles. Combinations of a and/or u with mid-height vowels (front or back) are common: noun àlɛ́gù ‘front part of loincloth’, adjectives bùkâm ‘lukewarm’ and

Nouns have more flexible harmonic constraints. Combinations of a, i, and/or u occur in e.g. tìnìŋú ‘Dichrostachys tree’ and bíbárú ‘wooden post above door’. a and/or a high vowel {i u} may co-occur with a mid-height vowel, as in àlɛ́gù ‘front part of loincloth’, àdúrⁿó ‘world’, àjérù ‘wrestling’, bísôm ‘acacia tree’, bòròdíyà ‘banana’, cámbôl ‘nasal disease’, cɛ̀ntɛ̀gú ‘lunch’. Therefore the only harmonic principle generally respected by nouns is that in (xx5).

(xx5) **Vocalic Harmony (Noun Stems)**

> Distinct mid-height vowels from the set {e ɛ o ɔ} do not co-occur within (uncompounded) stems

Aside from some poorly assimilated Fulfulde and French borrowings, the apparent counterexamples to (xx5) are nouns (generally of three or more syllables) that may have originated as compounds. In a case like ɛ̀ndɛ̀kónó ‘rock hyrax (mammal)’, one suspects an original segmentation *ɛ̀ndɛ̀-kónó, with harmony applying within the initial and within the final but not across the division. Likewise, in a stem like wɔ̀-túmó ‘small mound’, aside from a possible vague synchronic connection to túmó ‘stone’, the very fact that we get ɔ and o together suggests a break wɔ̀-túmó, even though the initial is not recognizable (or glossable).

Lexical adjectives show less variation than nouns. Aside from monosyllables (e.g. jó: ‘many’), and longer stems with identical vowels (e.g. kàná ‘new’), there are many adjectives with one mid-height vowel plus u (ɛ̀jú ‘good’, érù ‘sweet’, mɔ̀ñú ‘bad’, no example known with o), one case of [o u u] (ɔ̀nùrⁿú ‘smooth’)

3.5 Segmental phonological rules

All phonological rules other than tonal (and other prosodic) processes are described here.

3.5.1 Trans-syllabic consonantal processes

3.5.1.1 Nasalization-Spreading

Within an unsegmentable stem, the constraint (xx1) is applicable.

(xx1) a rhotic or semivowel must be nasalized if it is immediately preceded by a nasal or nasalized segment N, or if it is separated from a preceding N only by a vowel

Examples: noun nɔ̀wⁿɔ́ 'meat', adjective mǎyⁿ 'dry', numeral nǔ:yⁿ 'five', verb nàrⁿá- 'bear [s child]'. I am aware of one exception (for some speakers): déméré 'stout, thick', dialectally démérⁿé.

The constraint also applies to combinations of a verb stem with AN and/or pronominal-subject suffix(es), and of any word plus Focus or 'it is' clitic ≡ỳ. To implement this constraint, I posit a rule of Nasalization-Spreading working from left to right. It may be repeated until the end of the word (including a clitic if present) is reached. The rule does not apply to a sequence like …ŋkawa, because here the ŋ is separated from the potential target w by a nonnasal consonant k.

Within **compounds**, there is no spreading of nasalization from the initial to the final. Thus nàŋà-yǎ: 'cow' ("bovine-female"), with unnasalized y. It likewise fails to apply across word-boundaries within even tightly-knit phrases such as [noun + adjective], e.g. nàŋà wàl-gú 'lazy cow'.

However, derivational suffixes (e.g. Causative allomorph -wv- and Reversive -rv-), pronominal-subject suffixes (e.g. 1Pl -y and 2Sg -w), and clitic ≡ỳ 'it is', are all eligible targets for spreading. Examples: Reversive -rv- (páɣá-rá- 'untie') becomes -rⁿv- in náŋá-rⁿá- 'remember'; 1Pl subject suffix -w (páɣá-ẁ 'we tie') is nasalized to wⁿ in náŋá-ẁⁿ 'we forget'; and Focus or 'it is' clitic ≡ỳ (béré≡ỳ 'it's a stick') is nasalized to ≡ỳⁿ in tùmó≡ỳⁿ 'it's a stone'. The clitic can also directly follow a nasalized consonant, and of course it is nasalized here as well, as in ɔ̌ yⁿ≡ỳⁿ 'it's a starling'. Double application (recursion) is observed in náŋá-rⁿá-ẁⁿ 'we remember' from /naŋa-rv-w/.

The following section on consonantal metathesis includes discussion of suffixal derivatives like súgó- 'go down', causative súnú-ŋó- 'take down'. These are somewhat opaque, but one possibility is this: Causative allomorph -nv́- would regularly produce /súgú-nó-/ (see Suffixal Vowel-Spreading, §3.5.2.1), which could become /súnú-gó-/ by metathesis. One further modification would be needed: an extension of Nasalization-Spreading to convert /g/ to ŋ after a syllable beginning in n.

In the lexicon, I can find no unsegmentable stems with a Nvgv sequence (N = any nasal or nasalized consonant), except for the loanword ñùgú, which denotes a vegetable from southern Mali that Jamsay farmers have recently begun planting. There are many stems with a sequence Nvŋv, e.g. nàŋá 'cow', mǔŋ 'knot', ómóŋó- 'be puffed up', ñà:ŋà-èñé 'bird sp.' (with èñé 'chicken') It seems, then, that *Nvgv to Nvŋv may have been an authentic historical shift, whose most obvious synchronic residue is in the handful of suffixally derived verbs like súnú-ŋó-. Though the

derivation of such forms is no longer transparent, I will include /ɡ/ to ŋ in the formulation of the rule (xx2).

(xx2) **Nasalization-Spreading**

> Within a verb stem, inflected verb form, or suffixal derivative of a verb, a consonant from the set {r w y ɡ} separated from a preceding nasal or nasalized consonant only by a vowel, or directly following it, is nasalized to {r^n w^n y^n ŋ}

3.5.1.2 Consonantal metathesis in suffixal derivatives of verbs

A comparatively small set of stems show unusual consonantal changes in suffixal derivatives, either verb-to-verb or verbalizations of adjectives.

First, there are some alternations with inputs with **medial rhotic** r or r^n. Several adjectives have an inchoative and/or factitive verbalization (§9.6) with n…$-r^n$. All known examples with this alternation are given in (xx1). To my knowledge, all bisyllabic adjectives with medial r fit this pattern, which can therefore be described as productive. In the one case where the adjective has a long vowel (‘bitter’), this vowel is shortened in the derivative. Many adjectives end in u, and here this final u is disregarded for purposes of Suffixal Vowel-Spreading (§3.5.2.1).

(xx1) r to n…r^n

gloss	adjective	inchoative/factitive
‘fresh’	ɔ̀rú	ɔ́nɔ́-r^nɔ́-
‘long’	gùrú	gùnù-r^nó-
‘sweet, sharp’	érù	éné-r^né-
‘bitter’	jé:rù	jènè-r^né-
‘big’	gàrá	gànà-r^ná-

The usual inchoative-factitive derivational suffix is -nv́- (§9.6). This suggests an underlying r…n sequence that undergoes **metathesis** to n…-r, which then feeds Nasalization-Spreading to produce the observed n…$-r^n$.

Two Cvrv- or Cvr^nv- inputs, and one Cvŋv- input, have causatives of the form Cv̀:-nv́- (xx2).

(xx2) vrv or vŋc to v:n

gloss	simple verb	causative

a.	‘pass by’	gàrá-	gà:-ná-
	‘come together’	mɔ̀rⁿɔ́-	mɔ̀:-nɔ́-
b.	‘sit down’	dìŋé-	dè:-né-

The long vowels in the causatives suggest that an original *C$\grave{v}$$C_2$$\grave{v}$-C$\acute{v}$- lost its C_2, with the resulting VV-cluster contracting to a long vowel. Both -r$\acute{v}$- and -n$\acute{v}$- are attested as minor allomorphs of the Causative suffix. The phonology is therefore particularly obscure here. The simplest solution is to take the suffix as -nv- and allow lexically idiosyncratic deletion of C_2. If the suffix were instead taken to be underlying -rv-, more complex derivations would be needed. In (xx2.a), taking the underlying forms of the causatives as /gàrà-rá-/ and (after Nasalization-Spreading) /mɔ̀rⁿɔ-rⁿá-/ would suggest a dissimilation of the suffixal /r/ to the stem-medial rhotic, or perhaps a bidirectional shift of r…-r and rⁿ…-r to n…-n. In either case, this would be followed by idiosyncratic deletion of the stem-medial C_2 and contraction of the resulting sequence of identical vowels.

A possible analogue to (xx2.a) in nominal morphology are the cases of ă-n ‘man’ (cf. plural àrⁿ-úm) and î-n ‘child’ (cf. Plural úrⁿ-ùm), where an original medial *rⁿ seems to have been lost. But for ‘child’ there is also a nonhuman counterpart î:ⁿ that clouds the picture (§4.1.2). One adjective has a similar alternation: gàrà ‘big, adult’, human Sg gàrí-n or contracted gă-n (cf. plural gàrú-m), see §4.5.1. In all three of these nominal and adjectival cases, only the form with Sg suffix -n is contracted, not the form with Pl -m. Note that causatives gà-ná- and mɔ̄:-nɔ́- also have a suffix (Causative allomorph -n$\acute{v}$-) with n. It would seem that the sequence …rvnv or …rⁿvnv is disfavored, probably for articulatory reasons.

There are also some possible metatheses involving Cvjv- and Cvgv- (including Cvŋv-) inputs. In (xx3), input j corresponds to a g…-j sequence in the output. There is a minor Causative allomorph -g$\acute{v}$-, making a metathesis analysis possible (underlying j…-g surfacing as g…-j). Only two cases are attested, one a deverbal causative and the other a denominal inchoative or factitive.

(xx3) j to g…j

	gloss	simple verb	causative
a.	‘be left over’	wàjá-	wàŋà-já-
	gloss	noun	inchoative/factitive
b.	‘craziness’	wéjè	wègè-já-

For input Cvgv-, in three cases the derivative has a n…-ŋ sequence (xx4). The attestations are two deverbal causatives and one deadjectival inchoative or factitive. These two derivational categories are closely connected formally.

(xx4) g or ŋ to n…ŋ

	gloss	input	derivative
a.	'become'	táŋá-	táná-ŋá- 'transform'
b.	'go down'	súgó-	súnú-ŋó- 'take down'
	'be finished'	dògó-	dònò-ŋó- 'finish (sth)'
c.	'distant'	wàɣá	wànà-ŋá- 'become/make …'

While these cases are less than transparent, I incline to take the suffix here as underlying -nv́-, which is attested as a minor Causative allomorph and as a fairly productive deadjectival verbalizer (§9.2, §9.6). If so, underlying n…ŋ metathesizes to n…ŋ in (xx4.a). Similarly, underlying g…n metathesizes in (xx4.b-c) to n…g. The g then surfaces as ŋ, by Nasalization-Spreading (§3.5.1.1).

The cases of possible metathesis covered in this section can be summarized in (xx5), but the qualms voiced above should be kept in mind.

(xx5) **Metathesis in Suffixally Derived Verbs**

a.	/r…-n/	>	n…-r^{n} (via /n…-r^{n}/)
b.	/j…-g/	>	g…-j
c.	/ŋ…-n/	>	n…-ŋ
	/g…-n/	>	/n…-g/ (eventually n…-ŋ)

Of course the two metatheses in (xx5.c) can be unified, since ŋ and g (including ɣ) are the two voiced velar consonants.

Again, these metatheses are lexically restricted rather than productive. Note, for example, that /Cvŋv-nv́-/ materializes as Cv:-nv́- in the case of dìŋé- 'sit down', causative dè:-né- 'make sit' (xx2.b, above), or as metathesized Cvnv-ŋv́- as in táŋá- 'become', causative táná-ŋá- 'transform' (xx4.a, above).

3.5.2 Vocalism of suffixally derived verbs

The major derived verb categories are expressed by adding a suffix with unspecified vowel (Reversive –rV́–, Causative –wV́– and other allomorphs, pseudo-causative –wV̀) to the input stem (which is usually a verb, occasionally an adjective or a noun).

These derivatives must respect the constraints on verb stems described above: stem must end in a non-high short vowel, and the stem-wide vocalism must involve either identical vowels or an acceptable harmonic sequence.

To account for the derived verbs in terms of traditional phonological rules, we assume that the suffixal vowels are underspecified, and recognize the processes in (xx1).

(xx1) a. Suffixal Vowel-Spreading
b. Presuffixal V_2-Raising

The two processes must be ordered as given.

For the tones of suffixally derived verbs, which are generally predictable from the tones of the input simple verbs, see §3.7.3.1, below.

3.5.2.1 Suffixal Vowel-Spreading

When the input verb stem has a single vowel quality throughout, most of the derivational suffixes just copy this vowel quality (except for monosyllabic high-vowel stems Cu:– and Ci:–). Simple causative examples are in (xx1); many similar examples involving causatives, reversives, and pseudo-causatives are given throughout Chapter 9.

(xx1)		input	gloss	derivative	gloss
	a.	táɣá–	‘put on shoes’	táɣá–wá–	‘put shoes on (sb)’
	b.	nó:–	‘drink’	nò:–wⁿó–	‘give drink to’

Inflected verb stems, however, are subject to a **constraint against stem-final high vowels** (i u}, except in monosyllabic Ci:– or Cu:– (ní:– ‘sleep’, nú:– ‘enter’). This applies to the final vowel of underived verbs, and to the suffixal vowel of a derived verb.

This requires an adjustment to the vowel-spreading rule, whereby i and u stem vowel qualities are copied onto suffixes as e and o, respectively. Thus nú:– ‘enter’ has a causative nú:–wⁿó– ‘make enter’, not #nú:–wⁿú–. The few Ci:– verbs do not happen to have causatives in common use, but the same phonology applies to the productive pseudo-causative form used in ‘before’ clauses (§9.3, §15.2.4.2), and here ní:– ‘sleep’ becomes ní:–wⁿè instead of #ní:–wⁿì.

An additional issue is posed by inchoative and/or factitive derivatives of adjectives ending in short u (there are no adjectives of more than one syllable ending in i). In some cases, the u is retained in the derivative, but is not a factor in determining suffixal vowel quality, which is based instead on the first-syllable vowel

(xx1.a). In other cases, in addition to this, the u is replaced by a copy of the first-syllable vowel in the derivative (xx1.b-d).

(xx1)		gloss	adjective	inchoative/factitive
	a.	‘good’	èjú	èjù-nɛ́-
		‘bad, ugly’	mɔ̀ñú	mɔ̀ñù-nɔ́-
	b.	‘hot, fast’	ɔ́gù	ɔ́gɔ́-rɔ́-
	c.	‘fresh’	ɔ̀rú	ɔ́nɔ́-rⁿɔ́-
		‘long’	gùrú	gùnù-rⁿó-
		‘sweet, sharp’	érù	éné-rⁿé-
	d.	‘sleek’	ònùrⁿú	ónórⁿó-

For metathesis in (xx1.c), see §3.5.1.2. The derivative in (xx1.d) has lost one syllable, making it difficult to model phonologically (is the suffix underlying /-nv́-/, triggering another metathesis, or /-rv́-/ ?).

The rule applicable to vowels can be formulated as (xx2). The heart of the process is (xx2.b). (xx2.a) is a pre-derivational modification of the input, while (xx2.c) is a modification of the output to make it conform to a constraint on final vowels of verb stems.

(xx2) **Suffixal Vowel-Spreading**

a. In some (but not all) adjectives ending in u, before a verbalizing suffix the u is replaced by a copy of the first-syllable vowel (e.g. ɔ́gù becomes /ɔ́gɔ̀/ as input to derivation); this precedes (b).

b. In suffixally derived inflectable verb stems (reversive, causative, pseudo-causative, passive, deadjectival), the unspecified short vowel of the suffix adopts the quality features of (the underlying form of) the preceding vowel, except that noninitial u in the input, if still present after (a), is disregarded.

c. To satisfy the constraint against stem-final high vowel in nonmonosyllabic verb stems, suffixal i and u that have spread to the suffix by (a) are immediately converted into the nearest non-high vowels, e and o respectively.

3.5.2.2 Presuffixal V_2-Raising

There is a further problem in bisyllabic (but not longer) stems, when the input has a high vowel in the first syllable, and a mid-height vowel (with the same frontness value) in the second syllable, so that the vowel sequence is from the set [i e], [i ɛ], [u o], and [u ɔ]. In this case, the vowel of the second input syllable determines the features of the suffixal vowel. However, the second input syllable then raises its own vowel to become identical to the first-syllable vowel. The four input patterns just mentioned therefore have suffixal derivatives with vowel sequences [i i e], [i i ɛ], [u u o], and [u u ɔ], respectively.

(xx1)

	input	gloss	derivative	gloss
a.	píté-	'be inflated'	pítí-wé-	'inflate'
b.	jìmnɛ́-	'become blind'	jìmnì-w^nɛ́-	'make blind'
c.	kúnó-	'put'	kúnú-w^nó-	'allow to put'
d.	jùgɔ́-	'know'	jùgù-wɔ́-	'inform'

Consider now cases where a bisyllabic input stem has a first-syllable high vowel, and a second-syllable mid-height vowel with the opposite backness and rounding features, i.e. a sequence from the set [i o], [i ɔ], [u e], and [u ɛ]. These sequences do not occur in native Jamsay bisyllabic verb stems because of harmonic pressures. The only testable cases are therefore half-assimilated verbs borrowed from Fulfulde that have [u ɛ] sequences. From júkkɛ́- 'fine (sb)', a causative júkkɛ́-wɛ́- (not #júkkí-wɛ́-) 'cause to fine' was elicited. The failure of the second-syllable ɛ to raise to i shows that the raising only applies within bisyllabic stems that respect harmony.

(xx2) **Presuffixal V_2-Raising**

In bisyllabic verb stems, if the first syllable has a high vowel, and the second syllable has a mid-height vowel with the same backness and rounding features, hence [i e], [i ɛ], [u o], or [u ɔ], when a verbal derivational suffix (including the pseudo-causative) is added, the [+high] feature spreads from the first-syllable vowel to the second-syllable vowel, resulting in [i i] and [u u].

3.5.3 Vocalic rules sensitive to syllabic or metrical structure

3.5.3.1 Epenthesis

Epenthesis (insertion of a "helping" vowel) is not widespread in Jamsay. However, there are occasions where a consonantal suffix or clitic is added to a stem or word

ending in a consonant. Since final consonant clusters are not allowed, something must give.

3.5.3.2 Post-Sonorant Syncope (verbs)

There are a number of processes that have in common the effect of weakening or deleting a short vowel in the environment #(C)vC$_2$_C$_3$v, i.e., in a second syllable (counting from the left) when the short vowel is flanked by single consonants. The flanking consonants as well as the metrical position are important factors in how these rules work. These processes are applicable only to verbs (and their Verbal Nouns).

One process applies to (C)vC$_2$v verb stems when followed by a a suffix-initial coronal consonant. It has some similarity to the word-final type of u-Apocope (§3.5.4.2, below), but applies to all vowel qualities and has some other distinguishing features. As a productive process, the rule can be summarized as (xx1). Some lexically restricted extensions are considered below.

(xx1) **Post-Sonorant Syncope (verbs)**

A short vowel is deleted (syncopated) if…

a) it is in the metrically weak second syllable of a (C)vCv stem;

b) it is preceded by a (coronal) rhotic {r r^n};

c) it is followed by a suffix-initial coronal {t d n s l} or y, or by Linker tí;

d) the first syllable of the (C)vCv stem has a short vowel

Condition (xx1.a) relates to the comments about abstract metrical structure in §3.2.2, above. Condition (xx1.d) is less a dynamic condition than a constraint on syncope designed to prevent adverse consequences, since syncopating the second vowel of (C)v:Cv would create a superheavy syllable. The inclusion of suffix-initial y as a conditioning factor for verbs only in (xx1.c) is interesting, but also somewhat circular, since the suffix in question (Perfective -yè-/-yà-) is itself an allomorph that can only be added to a bisyllabic stem if this is a syncopating rhotic-medial stem (the suffix can also be added to Cv:- monosyllabic stems, §10.1.2.3).

While Post-Sonorant Syncope is almost always implemented in conversational speech, in formal elicitation I have recorded unsyncopated variants with suffixes other than Perfective -yè-/-yà-.

Most examples involve AN suffixes. However, syncope can also occur when a verb is followed by Linker tí in a verb- or VP-chain (§15.1.16), as in … kán tí mèy ⇑ ‘make … (and …)’ from kár^{n}á- ‘do, make’.

The process does not apply in nominal compounds: tɔ̀rɔ̀-tùmó ‘mountain boulder’.

Post-Sonorant Syncope feeds two other rules that disguise the identity of an underlying rhotic. **Derhoticization** (§3.5.5.1) converts r^{n} (which cannot occur syllable-finally) to n. **Rhotic-Assimilation** (§3.5.5.2) assimilates r totally to the following coronal consonant, resulting in a geminate, as already seen in (xx1), above. Therefore the outputs are nC from underlying /r^{n}vC/, and geminate C: from underlying /rvC/, where C is the coronal. Note that e.g. t: resulting from Syncope can only be interpreted as deriving from /rt/, since Syncope does not apply between two underlying t's: játɛ̀ játé-tì-∅ 'he did a calculation'.

Examples of Post-Sonorant Syncope are gǎy-yà 'pass.Perf' from gàrá- and yèl-lí- 'not come.Perf' from yɛ̀ré- (see next paragraph). There are many such (C)vC$_2$v- verbs with r or r^{n} as C$_2$, and there are plenty of coronal-initial AN (aspect-negation) suffixes that can follow them (Perfective -tì-, Resultative -sà-, Recent Perfect -jɛ̀-, Experiential Perfect -tɛ́rɛ̀-, Imperfective -tóɣɔ̀-).

In the case of yɛ̀ré- **'come'**, Post-Sonorant Syncope is irregularly accompanied by a change in vowel quality from ɛ to e. Thus unsuffixed Imperfective yɛ̀rɛ̂:-∅ 'he/she will come', Imperfective Negative yɛ̀rɛ̀-gó-∅ 'he/she will not come', but suffixed Perfective yěy-yà-∅ 'he/she came', yèl-lí-∅ 'he/she did not come', etc. No similar vocalic change occurs with e.g. bɛ̀ré- 'get'.

The phonological scope of Post-Sonorant Syncope seems to be expanding, but in a lexicalized way. One expansion is in the direction of **including nasal** n along with {r r^{n}} as the preceding consonants that licence Syncope. While most Cvnv- stems do not allow Syncope, the important verb kúnó- **'put'** does optionally syncopate before the same coronal-initial suffixes: kúnó-tì- or kún-tì- 'put.Perf'. This may have been suggested by the phonologically similar verb kúr^{n}ó- 'wear (garment)', which regularly syncopates like other Cvr^{n}v- stems: Perfective kún-tì 'wear'. Because of Derhoticization, the syncopated forms of 'put' and 'wear' are homophonous as [kún-]. There is no compelling practical need to distinguish 'put (object)' from 'wear (garment)', which overlap lexically in many languages (English *put* and *put on*, French *mettre*).

Syncopated variants were also occasionally observed with únó- **'put down'** (Perf ún-tì- varying with únó-tì-) and mùnó- 'braid' (Imperfective mun-tóɣɔ̀-). Note that kúnó-, únó-, and mùnó- share a segmental shape (C)uno- with u in the first syllable. I did not observe syncope with e.g. nànà- 'chase away', páná- 'butcher', sáná- 'undo hair', or píná- 'shut door'.

A second extension is in the direction of allowing the first stem syllable to have a **long vowel**. There is one Cv:rv- verb that syncopates, namely jɛ̀:ré- **'bring'**. The verb appears in syncopating suffixal environments as /jěr-/, which invariably undergoes Rhotic-Assimilation, as in Perfective jět-tì-. The **long vowel is shortened** from ɛ: to ɛ. It may be that the central irregularity is that jɛ̀:ré- is shortened to /jɛ̀ré-/ in syncopating environments; this then undergoes regular Post-

Sonorant Syncope. However, there is no shortening of jɛ̀:rɛ́- in negative forms (e.g. Imperfective Negative jɛ̀:rɛ̀-gó-). That syncopation of jɛ̀:rɛ́- 'bring' is lexicalized is demonstrated by the failure of the homonym jɛ̀:rɛ́- 'criticize' to syncopate: jɛ̌t-tì- 'bring-Perf' versus jɛ̀:rɛ́-tì- 'criticize-Perf'. The other case like jɛ̀:rɛ́- is the combination of AN suffix -á:rà- with following (stative) Negative -lá- (§11.4.3). A form like bé:-rà-lá-∅ 'it doesn't happen' optionally syncopates to bê:-l-lá-∅.

There is one other (optionally) syncopating verb that has both medial n (like kúnó- 'put') and a long vowel (like jɛ̀:rɛ́- 'bring'), namely mɔ̀:-nɔ́- **'bring together'** (also 'gather, assemble'). For example, syncopated Perfective mɔ̌:-n-tì- varies freely with unsyncopated mɔ̀:-nɔ́-tì-. Unlike jɛ̀:rɛ́-, mɔ̀:-nɔ́- **does not shorten its long vowel** when it syncopates. mɔ̀:-nɔ́- is the causative of mɔ̀rⁿɔ́- 'come together', which of course also syncopates.

Extended exemplification of regular and irregular Post-Sonorant Syncope with verb-suffix combinations is given in (xx2), using Perfective -tì- or -yà-. Rhotic-Assimilation is also seen in (xx2.a-b), and Derhoticization is at work in (xx2.c).

(xx2)	gloss	basic form	Perfective
a. Cvrv-			
	'clap'	péré-	pét-tì- [pét:ì]
	'cook'	síré-	sít-tì- [sít:ì]
	'groan'	dùró-	dǔt-tì- [dǔt:ì]
	'find'	bɛ̀ré-	bɛ̌s-sà- [bɛ̌s:à]
	'get pregnant'	lóró-	lóy-yà- [lój:à]
	'come'	yɛ̀ré-	yɛ̌y-yà- [jɛ̌j:à]
	'pass'	gàrá-	gǎy-yà- [gǎj:à]
	'go up'	ùró-	ǔy-yà- [ǔj:à]
b. exceptional cases with long vowel (Cv:Cv-)			
	'bring'	jɛ̀:ré-	jɛ̌t-tì- [dʒɛ̌t:ì]
c. with /rⁿ/			
	'beat drums'	bàrⁿá-	bǎn-tì-
	'summon'	bɔ̀rⁿɔ́-	bɔ̌n-tì-
	'sell'	dɔ̀rⁿɔ́-	dɔ̌n-tì-
	'swallow'	mìrⁿé-	mǐn-tì-
	'ululate'	sírⁿé-	sín-tì-
	'(rain) fall'	mìrⁿé-	mǐyⁿ-yⁿà-
	'assemble'	mɔ̀rⁿɔ́-	mɔ̌yⁿ-yⁿà-

d. exceptional case with medial n (Cvnv-)

‘put’	kúnó-	kún-tì-

e. exceptional case with long vowel and medial n (Cv:nv-)

‘bring together’	mɔ̀:-nɔ́-	mɔ̌:n-tì- (= mɔ̀:-nɔ́-tì-)

Post-Sonorant Syncope does not apply when C_2 is a consonant (even a sonorant) other than a rhotic, aside from the few cases of n just mentioned. In particular, if C_2 is l, syncope does not occur: kálá-tì- ‘swindle.Perf’, sálá-tì- ‘pray.Perf’. Likewise, if C_2 is non-coronal, syncope does not apply before a cororal C_3, hence gɔ̀ŋɔ́-tì- ‘spin.Perf’. With the exception of jɛ̀:rɛ́- ‘bring’, the rule does not apply to Cv:Cv- stems or to trisyllabic stems even if all other factors are favorable: gà:rⁿá-ti ‘mix.Perf’, jì:rɛ́-tì- ‘mix.Perf’, sógóró-tì- ‘(unseen object) make a noise.Perf’, gàmàrⁿá-tì- ‘divide.Perf’.

However, there is a single bisyllabic verb with a medial velar nasal that undergoes optional syncope when the suffix (or pronominal subject clitic) also begins with a velar. The verb is táŋá- **‘happen’**, and the triggering morpheme is either Imperfective Negative -gó- or (in the unsuffixed Imperfective) Nonhuman subject pronominal ≡kɔ̀.

(xx3) a. táŋá≡kɔ̀ = táŋ≡kɔ̀ ‘it will happen’

b. tàŋà-gó-∅ = tàŋ-gó-∅ ‘it will not happen’

Since the flanking consonants in táŋ≡kɔ̀ and tàŋ-gó-∅ are in each case a homorganic (velar) nasal-stop pair, there is a clear similarity between this and examples involving coronals in (xx2), especially kún-tì- in (xx2.d). Syncope does not occur when the suffix begins in a non-velar C, such as 3Pl táŋá-bà.

I have been unable to find examples of Post-Sonorant Syncope involving **labials**. The candidates would be verbs like kámá- ‘toss (cowries)’ with 3Pl subject suffix -bà. However, informants insisted on e.g. imperfective kámá-bà ‘they toss (cowries)’, and I never heard syncopated forms of the type #kám-bà.

Another context where Post-Sonorant Syncope occurs is in suffixal derivation of verbs, when Reversive suffix -rv- is added to a Cvrv- stem (I have no Reversive examples from Cvrⁿv- inputs). Here the output of Syncope is modified by yet another CC-cluster adjustment, this time /rr/ appearing as ll, see **Rhotic-Cluster Lateralization** (§3.5.5.3, below). In (xx4.a), the unsyncopated form of the Reversive is illustrated. In (xx4.b), we see Post-Rhotic Symcope and Rhotic-Cluster Lateralization. For more on reversives, see §9.1.

(xx4)

	input	gloss	Reversive	gloss
a.	páɣá-	‘tie’	páɣá-rá-	‘untie’

b.	píré-	‘get stuck’	píl-le-	‘get unstuck’
	kóró-	‘hang up, hook’	kól-ló-	‘unhook’

Some apparent cases of syncope can be explained in other ways. For example, if tém-né- ‘make (sth) wet’ is interpreted as the causative of témé- ‘become wet’, it would seem that syncope has occurred. However, tém-né- is more reasonably explained as a direct verbalization from adjective tém ‘wet’.

3.5.3.3 VblN V_2-Lenition

This process is most clearly observable in the Verbal Noun (suffix -ú replacing the stem-final vowel, with L-tone on the preceding syllables). In fairly careful speech, we get i for front vowels, and u from back vowels including a. The tendency is to generalize u to all cases. However, it is difficult to distinguish i from u, since a common pronunciation in allegro speech is as ə (schwa). Examples are in (xx1).

(xx1)		gloss	verb stem	VblN careful style	allegro style
	a.	‘brush against’	pɛ́réñé-	pɛ̀rì̀ñ-ú	[pɛ̀rə̀ñú]
		‘become white’	píní-rⁿé-	pì̀nì̀-rⁿ-ú	[pì̀nə̀rⁿú]
		‘trim (branch)’	léréwé-	lèrì̀w-ú	[lèrə̀wú]
	b.	‘make soft & wet’	ónó-rⁿó-	ò̀nù-rⁿ-ú	[ò̀nərⁿú]
		‘inflate’	ómóŋó-	òmùŋ-ú	[òmə̀ŋú]
	c.	‘untie’	páɣá-rá-	pàgù-r-ú	[pàgə̀rú]
	d.	‘snore’	gɔ̀lɔ̀rɔ̀-wó-	gɔ̀lùrù-w-ú	[gɔ̀lərəwú]

A medial front vowel is targeted in (xx1.a), a back vowel is targeted in (xx1.b), and a is the target in (xx1.c). (xx1.d) is a rare quadrisyllabic Verbal Noun, based on the causative of a trisyllabic stem. The rule is formulated as (xx2).

(xx2) **VblN V_2-Lenition**

In a tri- or quadrisyllabic verbal noun, medial-syllable vowels are raised to high vowels, with front {i e ɛ} becoming i, and back {u o ɔ a} becoming u ; the tendency is to generalize u ; in allegro speech the high vowel is centralized and lenited to schwa.

A similar vocalic lenition sometimes takes place with bisyllabic adjectives (and participles) ending in Sg -(i)n or Pl -(u/i)m when followed by the postconsonantal clitic allomorph ≡î: or ≡ì: 'it is'. Even without the clitic, there is some fluctuation between i and u especially in the plurals, and one hears intermediate articulations like front rounded [y] (i.e., ü) and [ə] (schwa). This lenition is accentuated when the clitic is added. Thus for 'it is wet ones' I recorded tèm-ə́m≡î: with schwa-like vowel, and for 'it is a skinny one' I heard dɔ̀ŋə́-n-≡î:. When a suffixal i follows homorganic y, as in Sg pɛ̀y^{n}-ín 'old', it is hard to hear any trace of the i with the clitic, the combination being pronounced pɛ̌y^{n}-n≡î: or something very close to it. With tap r, I heard the plural participle gárù-m 'those who carry out cousinhood (joking relationship)' with the clitic as gárə̀-m≡î: or even as gâr-m≡î:, with no clearly articulated vowel after the tap. For re-linking of stranded tones in examples such as the last two, see §3.7.4.5.

3.5.4 Deletion of final u (u-Apocope)

3.5.4.1 Word-Final u-Apocope (Verbal Nouns)

Final u in bisyllabic words is subject to deletion. The deletion of a word-final vowel is called **apocope**. The process is somewhat ragged, and it is necessary to distinguish how the phenomenon works in isolated words from the way it works at word boundaries.

At **word-level**, apocope as a synchronic process is visible in the **Verbal Noun** of bisyllabic verb stems with unclustered medial sonorant C. Again we see that the second syllable is the metrically weak position. The VblN suffix in the relevant cases is -ú, requiring L-tone on the preceding stem. Here we observe variation between e.g. bisyllabic Cv̀(:)C_2-ú and Cv̌(:)C_2-∅. The rising LH tone sequence is preserved in the form of the R-tone of the surviving syllable in the apocopated variant. Apocope is not affected by the length of the preceding vowel. However, the particular C_2 of the stem does play a role. Consider the data in (xx1).

(xx1)		gloss	verb stem	VblN
	a.	'adorn'	sáŋá-	sàŋ-ú, sǎŋ-∅
		'drag'	bùmó-	bùm-ú, bǔm:-∅
		'pound lightly'	jàŋá-	jàŋ-ú, jǎŋ-∅
		'massage'	mɔ̀ŋ́-	mɔ̀ŋ-ú, mɔ̌ŋ-∅
		'put on'	ná:ná-	nà:n-ú, nǎ:n:-∅
	b.	'heal'	bàyá-	bày-ú, bǎy-∅
		'rob'	gùy^{n}ó-	gùy^{n}-ú, gǔy^{n}-∅
		'rot'	ɔ́yɔ́-	ɔ̀y-ú, ɔ̌y-∅

c.	‘buy’	ɛ́wɛ́-	ɛ̀w-ú, ɛ̌w-∅
	‘greet in A.M.’	ná:-wⁿá-	nà:-wⁿ-ú, nǎ:-wⁿ-∅
d.	‘swindle’	kálá-	kàl-ú
	‘knock down’	járá-	jàr-ú
	‘summon’	bɔ̀rⁿɔ́-	bɔ̀rⁿ-ú
e.	‘inform’	jùgù-wɔ́-	jùgù-w-ú
	‘shout’	ká:gíné-	kà:gìn-ú
	‘arrange’	dànàŋá-	dànùŋ-ú
		[VblN rarely jùgǔ-w-∅, kà:gĭn-∅, mɔ̀ñǔ-n-∅]	
f.	‘tie’	páɣá-	pàg-ú
	‘calculate’	bátɛ́-	bàt-ú
	‘card (cotton)’	há:sɛ́-	hà:s-ú
g.	‘lift’	íllé-	ìll-ú
	‘agree’	háwrɛ́-	hàwr-ú

In (xx1.a), C_2 is a nasal (other than ñ, which does not occur word-finally). In true verbal noun function, both apocopated and full variants are generally elicitable, though in some cases a high-frequency verbal noun has in practice generalized the apocopated variant. In (xx1.b), we see a similar pattern with C_2 = y or yⁿ and in (xx1.c) C_2 is w or wⁿ. In (xx1.c), I Cv̌w and Cv̀wú are difficult to distinguish phonetically, since a word-final semivowel is articulated almost like a vowel, especially with R-tone. (The same is true of nouns like dǎyⁿ ‘boundary, limit’ with a vowel-semivowel syllabic nucleus and R-tone.) In (xx1.d), we see that liquids do not allow apocope at word-level. This makes most sense for rhotics, which are taps in Jamsay, so that there is a natural vocalic release, and there are no word-final rhotics in the vocabulary. l, however, does (rarely) occur word-finally in other vocabulary: hâl ‘until’. (xx1.e) illustrates apocope with trisyllabic verbs. Here the apocopated versions were accepted as variants in elicitation, but did not occur in recorded texts. Instead, the medial vowel is weakened (and raised to u, often with schwa-like articulation). (xx1.f) shows that apocope does not occur after obstruents, while (xx1.g) shows that it does not occur after a consonant cluster.

(xx2) **Suffixal u-Apocope (VblN)**

Word-final u is optionally deleted in Verbal Nouns after an unclustered sonorant, excluding l and sonorants that cannot occur word-finally

{r rⁿ n}; the process is common in bisyllabic stems, rare in longer stems.

3.5.4.2 Inter-Word u-Apocope

In addition to these word-internal examples, there are frequent instances of u-Apocope at **word boundaries**, when the following word begins with usual Cv…. These instances of apocope have a **syncope-like flavor**, since the environment for deletion is of the type vC_#Cv straddling the word boundary #. u-Apocope is not obligatory in these cases. When it does occur, **Stranded-Tone Re-Linking** may be necessary (often resulting in an R- or F-tone on the pre-apocope syllable, §3.7.4.5, below). I will describe two basic subtypes, then discuss morphosyntactic restrictions on them.

In one basic subtype, u at the end of a bisyllabic word is apocopated **between velar stops**. In (xx1.a), the noun tògú 'kind' is followed by kâ:ⁿ 'each'. In (xx1.b), sàgú 'entrusting (someone)' is followed by gá:- 'say'.

(xx1)		full form	apocopated	gloss
	a.	tògú kâ:ⁿ	tǒg kâ:ⁿ	'each kind' **2004.3.1**
	b.	sàgú gá:-	sǎg gá:-	'say words of entrusting' **2004.3.11**

A common source of the relevant phonological environment is the combination of a noun with following Definite kùⁿ. Example: tógù kùⁿ 'the (same) shed', often apocopated to tóg kùⁿ.

This apocope does not occur in the final syllable of a **trisyllabic** noun: yùrùgú 'fox', yùrùgù kâ:ⁿ (not #yùrùg kâ:ⁿ) 'each fox'. This suggests that metrical factors are at work (§3.2.2, above).

Another construction favorable to u-Apocope between velars is the predicate adjective construction with Nonhuman subject, e.g. [ADJ≡kɔ̀] 'it is ADJ'. Optional u-Apocope is observed with ógù 'fast' before velar stop, hence óg≡kɔ̀ 'it is fast' (phonetic [ók:ɔ̀]. Similarly, ò:gú gó:-yè-m 'I sweated' (noun ò:gú 'sweat', gó:-yè-m 'I went out') is often apocopated to ǒ:g gó:-yè-m.

The sequence /gk/ produced by apocope in some of the examples above, e.g. (xx1.a), is frequently pronounced kk.

While the apocopated vowel is normally u, I have also recorded jùg-gó-w 'you-Sg do not know' as a variant of jùgɔ̀-gó-w. The high-frequency combination jùgó- 'know' and Imperfective Negative -gó- can also be idiosyncratically contracted to jɔ̀:-gó-, so this verb is not a reliable guide to regular phonology.

Apocope of u between homorganic stops (or nasals) at a word boundary is uncommon when the consonants are not velars. I have noticed no instances involving labials. The noun bú:dù 'riyal (currency unit)' tends to reduce to bû:d before a

numeral beginning with a stop or nasal (not necessarily homorganic). These are high-frequency combinations, several of which can be considered to be names of coins. Examples: bû:d nǔ:yⁿ ‘five riyals’ and bû:d pérú ‘ten riyals’. Apocope between palatoalveolars is uncommon, but I can cite gǔj-jêm ‘black-skinned’ as a variant of gùjú-jêm (a bahuvrihi compound), and cèj-∅-cèj-ú as a variant of cèj-ù-cèj-ú ‘for cutting’, a compound (used as an adjective) consisting of an iterated VblN of céjé- ‘cut’.

The second major subtype is an inter-word counterpart to Post-Sonorant Syncope (which applies word-internally as formulated above). In the inter-word variety, a bisyllabic word loses its final u if this is preceded by an unclustered r. Elsewhere rⁿ patterns phonologically like r, but this time it does not; informants rejected apocope of words ending in …rⁿu. For example, contrast èrⁿú≡kɔ̀ ‘it is plump’ with the very common ér≡kɔ̀ (from érù) ‘it is sweet’. Were …rⁿu to apocopate, it would presumably be realised as …n by Derhoticization (§3.5.5.1), as happens word-internally after Post-Sonorant Syncope. Speakers seem to resist Derhoticization in inter-word cases.

The most frequent cases involve 2nd and 3rd person **dative pronominals** ending in -rú, when followed directly by a verb. Apocope is most common when the verb begins with another coronal, but I have several textual examples where the u is apocopated before a nonhomorganic consonant. 3Sg Dative wɔ̀-rú becomes wɔ̌-r before t in (xx2.a), a very common result, but (xx2.b) shows that the same 3Sg Dative form at least occasionally apocopates to wɔ̌-r before g, and (xx2.c) shows a similar apocope of yìrú ‘garment, clothes’ before b.

(xx2) a. [bèr-î:ⁿ nè] wɔ̌-r tímé-sà-∅
[goat-child now] 3Sg-**Dat** resemble-Perf-3SgS
‘A small goat resembles it (=scorpion).’ (wɔ̀-rú)

b. sèllɛ-lú:-∅ wɔ̌-r gá-ẁ
be.healthy-Perf.Neg-2SgS 3Sg-**Dat** say.Impf-2SgS
‘You-Sg will tell her that you’re sick.’ (wɔ̀-rú) **2004.3.3**

c. cín dɔ̀ɣɔ̌-m yǐr bɛ̌t-tɔ́ɣɔ̀-bà
thus Dogon-Pl **clothes** get-Impf-3PlS
‘That [focus] is how Dogon people get clothes.’ (yìrú, bèré-)
2004.3.14

In (xx2.a), wɔ̌-r is pronounced [wɔ̌t] with r assimilated to the initial t of the following word, though (for the sake of morphemic transparency) I transcribe the pre-assimilation form.

Apocope does not occur with **trisyllabic** stems. For example, I have never observed apocope with dógúrú ‘time’, hence dògùrù kâ:^{n} (not #dògùr kâ:^{n}) ‘each time’.

The two dative pronominals not ending in -rú are 1Sg mǐ-n and 1Pl èmě-n. Perhaps these were once *mì-rú and *èmè-rú, or rather (with Nasalization-Spreading) *mì-r^{n}ú and *èmè-r^{n}ú. If so, for these first person datives, the original apocopated variants mǐ-n and èmě-n (with n replacing the disallowed syllable-final r^{n}) have now generalized.

Adjective predicates with Nonhuman subject provide additional cases of apocope after the rhotic: òrú ‘fresh’ and predicative ǒr≡kɔ̀ ‘it is fresh’; érù ‘sweet’ and predicative ér≡kɔ̀ ‘it is sweet’. Note that k is not homorganic to r. The relationship of this type of u-Apocope to Post-Sonorant Syncope is brought out by the failure of long-voweled jé:rù ‘bitter’ and of trisyllabic ònùr^{n}ú ‘smooth, sleek’ to apocopate: jé:rú≡kɔ̀ ‘it is bitter’, ònùr^{n}ú≡kɔ̀ ‘it is smooth’.

In compounds, the boundary between the initial and the final is usually treated as a word boundary phonologically. u-Apocope (and Rhotic Assimilation) may become lexicalized in common combinations. An example is bɛ̀n-ná: ‘she-goat’, cf. bɛ̀rú ‘goat’.

Having described the two major subtypes of Inter-Word u-Apocope, I now consider the morphosyntactic environments in which they regularly occur (xx3). It should be noted that no inflected verb, or bare verb stem, ends in u, so no combinations beginning with a verb are candidates for apocope.

(xx3)
a. compound
b. [word + verb]
c. [noun/adjective + adjective]
d. [noun/adjective/numeral + numeral]
e. [noun/adjective/numeral + NP-final morpheme]
f. [noun/adjective/numeral + quasi-verb]
g. [noun/adjective/numeral + discourse-particle]
h [inalienable possessor noun + possessed noun]

Examples of (xx3.a-e), in sequential order, are in (xx4). Bear in mind that except in well-established compounds, Inter-Word u-Apocope is optional (unapocopated variants are not shown here).

(xx4) a. compound

bɛ̀rú ‘goat’, ná: ‘body’	bɛ̀n-ná: ‘goat’

b. [word + verb]

bè-rú ‘3Pl-Dative’, té:ré- ‘show’	běr té:ré-
yìrú ‘garment’, té:ré- ‘show’	yǐr té:ré-
tárú ‘egg’, tárá- ‘lay’	tár tárá-

c. [noun/adjective + adjective]

bèrú ‘goat’, cètɛ́ ‘runty’	bèr cètɛ́
pírú ‘white’, nà:rⁿá ‘easy’	… pìn nà:rⁿá
bórù ‘(sb’s) uncle’, túmnó ‘one, sole’	mì bòt túmnó (‘my …’)

d. [noun/adjective/numeral + numeral]

bèrú ‘goat’, túrú ‘one’	bɛ̌r túrú
dùgú ‘fat’, kúróy ‘six’	… dŭg kúróy
pérú ‘ten’, tă:n ‘three’	pét-tà:n (‘thirty’)
túrú ‘one’ (distributive iteration)	tút-túrú (‘one by one’)

e. [noun/adjective/numeral + NP-final morpheme]

tògú ‘kind’, kâ:ⁿ ‘each, any’	tòg kâ:ⁿ
dùgú ‘fat’, kâ:ⁿ ‘each, any’	… dùg kâ:ⁿ
dùgú ‘fat’, kùⁿ Definite	… dŭg kùⁿ

f. [noun/adjective/numeral + quasi-verb]

ɔ́gù ‘fast’, kɔ̀ ‘be (nonhuman)’	ɔ́g≡kɔ̀

g. [noun/adjective/numeral + discourse-particle]

bórù ‘(sb’s) uncle’, nɛ̀ ‘now’	mì bón nè (‘my …’)

h. [inalienable possessor noun + possessed noun]

bórù ‘(sb’s) uncle, tíríwɛ̀-n ‘grandchild’	mì bór tíríwɛ̀-n

Regarding (xx4.d), complex numerals are compound-like sequences subject to lexicalization of the morphophonology. In decimal terms (‘10’ to ‘90’), which begin with pérú- ‘ten’, apocope occurs in pét-tà:n ‘thirty’ but not in pèrù-sûyⁿ ‘seventy’. What may be happening here is that numerical adjacency (as reinforced by out-loud counting) is the mother of phonological similarity. ‘70’ shares an aversion to apocope with the ’60, ‘80’, and ‘90’, while ‘30’ shares a receptivity to apocope with ‘20’, ‘40’, and ‘50’. These two subseries of decimal terms also differ in tones (§4.7.1.3).

The strongest aversion to apocope is at the boundary between two NPs (excluding the case where the first is an inalienable possessor). Apocope between ‘uncle’ and ‘shed’ was therefore rejected in (xx5). Contrast this with (xx4.h), above, where the same [mì bórù] ‘my uncle’ does apocopate when it functions as inalienable possessor, i.e. as a kind of loose compound initial.

(xx5)

[mì	bórù]	tógù	tógó-tì-∅
[1SgP.L	**uncle.HL**]	shed	build.shed-Perf-3SgS

‘My paternal uncle built a shed.’

My assistant also rejected apocope between ‘one’ and ‘show’ in (xx6), although a number of other cases of [word + verb] do apocopate, as indicated above.

(xx6) [úró túrú] té:ré-tì-∅
[house **one**] show-Perf-3SgS
‘He/She showed one house.’

The problem here may be that túrú ‘one’ is bracketed with ‘house’. In the other cases where a word apocopates directly before a word, it is a cognate nominal, a simple noun, or a dative pronominal; all of these are liable to function either like compound initials or like (pronominal) proclitics.

My assistant also rejected apocope before discourse marker sǎy ‘only’, and before sà- ‘have’ (in the negative form sà:-rá-, which can directly follow an object noun). Therefore he did not accept apocope in (xx7), even in sentences where the elements shown are logically bracketed together.

(xx7) a. bè-rú sǎy
3Pl-Dat only
‘only to them’

b. [mì bórù] sǎy
[1SgP.L **uncle.HL**] only
‘only my uncle’

c. yìrú sà:-rá-m
garment have-Neg-1SgS
‘I have no clothing.’

So the rule, leaving out some fine-print detail in the discussion above, can be summarized as (xx8).

(xx8) **Inter-Word u-Apocope**

Final u in a bisyllabic compound initial, in a bisyllabic word immediately preceding a verb, in a bisyllabic word followed by a ‘be’ quasi-verb, or in a bisyllabic nonfinal word in a phrase, is optionally deleted, primarily…
…between velar stops
or: …after r, especially before a coronal

3.5.5 Local consonant cluster rules

3.5.5.1 Derhoticization (/rⁿ/ to n)

When /rⁿ/ is immediately followed by a coronal C, the /rⁿ/ appears as n. This is consistent with the lack of #rⁿC clusters.

(xx1) **Derhoticization**

/rⁿ/ → n before C or word-finally

The rule is needed to account for cases where Post-Sonorant Syncope (§3.5.3.2, above) has deleted a short vowel after rⁿ before a coronal. Thus dɔ̀rⁿɔ́- 'sell', Perf dɔ̌n-tì-, Perf.Neg dɔ̀n-lí.

The only other combination where /rⁿ/ is clustered with a following consonant, at any stage in derivations, is when the same Post-Sonorant Syncope rule applies before y. This is handled not by Derhoticization, rather by Rhotic Assimilation, see just below.

I know of no cases where /rⁿ/ is clustered with a following consonant other than a coronal or y, at any stage in derivations.

tǐn-∅ '(fire-)wood', in form a Verbal Noun, cf. cognate noun-verb sequence tǐn-∅ tírⁿé- 'go gather firewood', shows that rⁿ also shifts to n when word final. Other verbs reject Word-Final u-Syncope in such cases and therefore avoid the problem. There are a few nouns and adjectives with final n that historically reflects word-final *rⁿ, e.g. bán 'red'.

3.5.5.2 Rhotic Assimilation

With a few exceptions in borrowings, such as bɛ́rnɛ̀ 'anthrax' and cárdù 'silver', both immediately from Fulfulde, clusters of r plus a coronal are converted to geminated versions of the second consonant. The rule is rigorous in verbal morphology, where the clusters are produced by Post-Sonorant Syncope. The rule also applies, normally but less rigorously, across nominal compound boundaries and in interword combinations.

A variant of this rule, limited to verbal morphology, assimilates a rhotic to a following y, except that the resulting geminate semivowel preserves the nasality feature of the rhotic.

(xx1) **Rhotic Assimilation**

a. in verbal morphology, often also in compounds and between words:
   /rC$_x$/ → C$_x$C$_x$ (C$_x$ = coronal consonant, not a rhotic)

b. in verbal morphology only:
   /ry/ → yy

/rⁿy/ → yⁿyⁿ

Example of (xx1.a) in verbal morphology: bèrɛ́- ‘get’ has AN-inflected forms Perfective bɛ̌t-tì-, Resultative bɛ̌s-sà-, and Perfective Negative bèl-lí-. Parallel cases with nasalized rⁿ instead of r undergo Derhoticization (to n) rather than Rhotic Assimilation; see just above.

As an example of (xx1.a) in compounds, note bèn-ná: ‘goat’, cf. bèrú ‘goat’. An exception is pèr-sûyⁿ ‘seventy’, where pɛ́rú ‘ten’ loses its final u by apocope, but the r fails to assimilate to the s.

Interword examples of (xx1.a): tárú tárá- ‘lay egg’, with ú optionally apocopated (the result usually pronounced tát tárá-); distributive iteration túrú túrú ‘one by one’, usually pronounced tút túrú ; 3Pl dative bè-rú plus verb bè-rú té:ré- ‘show to them’, often apocopated and assimilated as bɛ̌-t té:ré-.

Examples of (xx1.b), which occurs only with verbs that take Perfective allomoprh -yà/-yɛ̀, are gàrá- ‘pass by’, Perfective gǎy-yà-, and mɔ̀rⁿó- ‘come together’, Perfective mɔ̌yⁿ-yⁿà-.

3.5.5.3 Rhotic-Cluster Lateralization (/rr/→ll)

After Post-Sonorant Syncope, certain Reversive derived verbs (§9.1) would be expected to have an rr cluster. Instead, we get ll, as in (xx1). This happens when a (C)vrv- stem undergoes the derivation, which involves suffix -rv-.

(xx1)	input	gloss	reversive	gloss
	gòró-	‘cover’	gòl-ló-	‘uncover’
	kóró-	‘hang up’	kól-ló-	‘take down (sth hanging)’
	píré-	‘get stuck’	píl-lé-	‘get unstuck’

It is not clear, historically or synchronically, whether the shift to l preceded or followed Syncope. I know of no native Jamsay stem or word-form with the sequence …rvr…, i.e., with two rhotics separated by a short vowel. (r is also abent word-initially in native vocabulary.) It is therefore possible that original *…rvr… shifted one or both rhotics to *l prior to the syncopation of the vowel. It is also possible that Syncope occurred first, and the shift was from the geminate cluster *rr (a trill) to ll. In fact, the phonetic difference between rr (a trill) and rvr can be difficult to hear unless the vowel quality differs from that of the preceding vowel. In the absence of decisive evidence, I formulate the rule as applying after Syncope.

(xx2) **Rhotic-Cluster Lateralization**

at the boundary between a verb stem and a derivational suffix:
/rr/ → ll

Rule (xx2) does not apply outside of verbal morphology. I know of no native stem with geminated rr (or $r^n r^n$), but Fulfulde loanwords yárré- 'agree, consent', tórró- 'pester', and bárrây 'dark brown cow' are recorded and have stable rr. Clearly (xx2), which has little phonetic motivation, is morphologized.

I have no evidence as to how /$r^n r^n$/ due to Syncope in the same verb-suffix combinations would be realized. That is, I have found no reversive verb based on a Cvr^nv- input. (For what it's worth, I would expect nn.)

3.5.6 Vowel-vowel and vowel-semivowel sequences

3.5.6.1 Hiatus between adjacent vowels

Jamsay is remarkable in that most vowel-vowel sequences that come together at boundaries do not contract. This is emblematic of the strong tendency of stems to be phonologically autonomous of adjacent stems or words, except for categorially controlled tonal overlays.

Examples of VV combinations at boundaries that do not contract are: possessor pronoun plus noun, e.g. má ìjú 'my dog' or wó èjú 'his/her field'; object or subject pronoun plus verb, e.g. kó ɛ́:-sà-m 'I saw it' or kó mì ɛ̂:-∅ 'when I saw it'; noun plus verb, e.g. pé:jú ó:- 'give a sheep' or síñè áŋá- 'hear noise'; and noun plus adjective, e.g. màŋgòrò érù 'a sweet mango'.

Most nominal compounds show the same avoidance of contraction. Examples are gàsègɛ̀-úró 'herd (lit. "house") of sheep and goats' and tìrɛ̀-àr^{n}á 'male ancestor'.

3.5.6.2 VV-Contraction

Contraction of adjacent vowels does occur in the cases in (xx1).

(xx1)
a. in non-monosyllabic Verbal Nouns with suffix -ú (§4.2.2.1)
b. in a subset of compounds with final -î:^{n} 'child' (§5.1.10)
c. when C_2 in a CvCv stem is idiosyncratically deleted
d. when 3Pl subject -ba deletes b after a Negative -Cv- AN suffix
e. in adjective plus Augment -í: or -: (§4.5.3)
f. with copular 'it is' or Focus clitic ≡î: (§11.2.1)
g. verb stem plus Habitual AN suffix -á:rà- (§10.1.2.11)

In **Verbal Nouns** (§4.2.2.1) based on stems of more than one syllable, the suffix is -ú (subject, in bisyllables, to Word-Final u-Apocope (§3.5.4.1, above). Example: íjɛ́- 'stand', Verbal Noun ì̀j-ú. Since all verbs that can take this suffix end in a short vowel, we must assume a contraction (xx2).

(xx2) v + -ú > -ú

In some, but not all, compounds where final -î:^{n} **'child'** (§5.1.10) is added to a stem ending in a vowel, this vowel is deleted. In others, both vowels are pronounced. Compound initials before -î:^{n} undergo tone-dropping in either case. The recorded examples of deletion after a recognizable compound initial are in (xx3); fortunately, they give a good range of stem-final vowel qualities.

(xx3)	noun	gloss	compound	gloss	comment
	ì̀jú	'dog'	ì̀j-î:^{n}	'puppy'	also ì̀jù-î:^{n}
	námñú	'sesame'	nàmñ-î:^{n}	'sesame seed'	
	nàŋá	'cow'	nàŋ-î:^{n}	'calf'	
	àñú	'roselle'	àñ-î:^{n}	'roselle seed'	
	ɛ̀ñɛ́	'chicken'	ɛ̀ñ-î:^{n}	'chick'	

The process can be summarized as (xx4).

(xx4) v + -î:^{n} > î:^{n}

Non-contraction is observed in a larger number of examples, e.g. jàràwà-î:^{n} 'blade of hoe', jì̀rè-î:^{n} 'eyeball', nùmò-î:^{n} 'finger', and jɔ̀ŋɔ̀-î:^{n} 'young hare' (the initials are 'hoe', 'eye', 'hand', and 'hare', respectively).

A number of nouns ending in î:^{n} are probably frozen compounds whose initial is no longer identifiable. In cases like kàr^{n}î:^{n} 'bamboo' and àsàrî:^{n} 'sedge sp.', if they are in fact etymologically compounds they must have involved VV-Contraction (since rhotics are not found stem-finally).

Idiosyncratic **C_2-Deletion** occurs in a handful of CvCv verb stems in specific suffixed derivational or inflectional forms. The full set of examples known to me is in (xx5).

(xx5)		stem	gloss	contracted form	category
	a.	jùgó-	'know'	jɔ̀:-gó-	Imperfective Negative
				[alongside jùgɔ̀-gó-]	
	b.	gàrá-	'pass by'	gà:-ná-	causative
		mɔ̀r^{n}ɔ́-	'come together'	mɔ̀:-nɔ́-	causative

dìŋé- ‘sit down’ dè:-né- causative

jò:-gó- is a high-frequency form used in e.g. ‘I don’t know’. The other three are a set of rather marked causatives where C_2 is irregularly deleted (§9.2). For the two cases where the flanking vowels are not identical, ‘know’ and ‘sit down’, the quality of the second vowel is expressed by the contracted vowel. It may be significant, however, that the first vowel is in both cases a high vowel, while the second vowel is a mid-height vowel.

Tone is orthogonal to this particular contraction process, since the tones in the contracted forms are independently predictable. Stem-tones are always dropped before Imperfective Negative -gó- (xx5.a). Causatives based on LH-toned inputs regularly have LLH tones, so after contraction of the first two syllables we would expect LH as seen in (xx5.b).

The contraction process may be summarized as in (xx6).

(xx6) v_1 + v_2 > v_2:
[+high] [-high]

A somewhat similar problem arises in verbal morphology, when 3Pl subject suffix -ba obligatorily loses its b after Perfective Negative -lí- or Imperfective Negative -gó-. The results are -l-á and -j-é, respectively, as in yà:-l-á ‘they did not go’ and yà:-j-é ‘they will not go’. The deletion of b does not occur after positive AN suffixes or after verb stems: yă:-yè-bà ‘they went’, yà:-bà ‘they went’ (defocalized unsuffixed Imperfective). There is also no deletion of b with 2Pl subject suffix -be.

The immediate underlying form for -l-á is probably /-lú-bá/ after Atonal-Suffix Tone-Spreading (§3.7.3.5). For the u-vowel, compare Perfective suffix -tì-, 3Pl -tù-bà (§10.1.2.3, §10.2.1). With the idiosyncratic loss of /b/, the shift of /í-á/ to -á is straightforward (xx7.a), but that of /ó-á/ to -é involves combining the height features of o with the [-round] feature of a, entailing a further shift to [+front] since the only Jamsay vowel satisfying these height and rounding features is e (xx7.b).

(xx7) a. v_1 + v_2 > v_2 (-l-á)
[+high] [+low]

b. v_1 + v_2 > v (-j-é)
[-high] [+low] [-high]
[-low] [-low]
[+round] **[-round]** [-round]
[+back] **[+front]**

There is a suffixal **Augment** with adjectives (§4.5.3), realized as -í: after a consonant or a short u, and as vowel lengthening (-:) after non-high vowels (no

adjective ends in short i). Examples: pírú ‘white’, augmented pír-í:, wóró ‘deep’, augmented wóró-:. All of the inputs involving a final non-high vowel happen to end in H-tone; I tried, but failed, to elicit an augmented form of a bahuvrihi compound kó:-kórò ‘fresh-footed’ to take advantage of the overlaid H(H…)L tone of the final adjective (here kòró ‘fresh’). There is no parallel elsewhere in Jamsay to the -: variant that could give us guidance as to how it should be analysed phonologically. One could argue for /-í:/ as the underlying basic form in all cases, but the realization as -: after non-high vowels diverges from the contraction pattern seen in compounds of -î:^{n} (above), where we get output -î:^{n} even after a non-high short vowel. One could therefore recognize two allomorphs of the Augment, -í: and -:, where the latter is modeled as underlying -v́ (underspecified vowel, long or short). The contraction process can then be summarized as (xx8).

(xx8) a. u + -í: > -î:

b. $\acute{v}_1$ + v_2 > $\acute{v}_1$:
[-high] [undersp]

The **‘it is’** clitic (also the Focus clitic), whose phonology is covered in detail just below (see also §11.2.1, §13.1), has allomorphs ≡ỳ (with surface variant ≡ỳ^{n} by Nasalization-Spreading) and ≡î: (with surface variant ≡ì: after final F-tone). Of interest here is the fact that the vocalic allomorph occurs after a consonant or a short u, and in the latter case the u disappears: tógù ‘shed’ and tóg≡ì: ‘it’s a shed’; tárú ‘egg’ and tár≡î: ‘it’s an egg’. The tone of the deleted /u/ is a factor in the output tone, as it amalgamates with the tones of the clitic (<HHL> simplifies regularly to <HL> while <LHL> reduces idiosyncratically in this clitic to <L>). See discussion of Clitic <LHL>-Reduction (§3.7.4.7, below).

(xx9) a. ú + ≡î: > ≡î:
b. ù + ≡î: > ≡ì:

There are two **AN suffixes** on verbs that participate in contraction with a preceding verb. The Habitual suffix could be represented either as -á:rà- or as -árà-. I cite it as -á:rà-. It never occurs after a consonant, so it always undergoes contraction with the final vowel of the verb stem (which is long in monosyllabic stems, otherwise short). Monosyllabic stems like nɔ̌:- ‘drink’ and dé:- ‘carry’ combine with -á:rà- to give e.g. nɔ̌:-r^{n}à- and dé:-rà-, so here the suffix-initial vowel is effectively obliterated. By contrast, when -á:rà- is added to a nonmonosyllabic stem, the stem-final (and necessarily short) vowel is obliterated: bìré- ‘work’ and dɔ̀ɣó- ‘finish’ have suffixed forms bìr-á:rà- and dɔ̀ɣ-á:rà-.

(xx10) a. v_1: + á(:) > v_1:
b. v_1 + á(:) > a:

There is also a Perfective allomorph -â:- with clearly long vowel. It is not used after monosyllabic stems, but it behaves like -á:rà- with nonmonosyllabic stems: dɔ̀ɣɔ́- 'finish', Perfective dɔ̀ɣ-â:-.

The various VV-Contraction subrules considered above do not converge onto a single formalization. The data are summarized in (xx11).

(xx11) **VV-Contraction**

a. **length** (when both input vowels are clearly short)
output vowel is …
… short (VblN -ú, 3Pl -ba)
… long (C_2-Deletion)

b. **quality** features (when v_1 and v_2 diverge)
output vowel has quality features of …
… v_2 (VblN -ú, 'child', C_2-Deletion, 'it is', -í: Augment allomorph, AN suffix after nonmonosyllable, 3Pl -ba after high vowel)
… v_1 (-: Augment allomorph, AN suffix after monosyllabic)
… height features from v_1, backness and rounding features from v_2 (3Pl -ba after mid-height vowel)

c. **tones** (when v_1 and v_2 diverge)
output vowel has tone of …
… v_2 (VblN -ú, 'child', -í: Augment)
… amalgam of v_1 and v_2 ('it is')

I view the C_2-Deletion cases as the purest play on VV-Contraction phonology. It is largely unsullied by the "functional" factors (preservation of morphemic information) that complicate the suffixal and clitic cases. Fortunately, the C_2-Deletion cases provide useful evidence about both length and quality features. However, C_2-Deletion affects only four verb stems, and the process sheds no light on the contraction treatment of front-back or disharmonic input vowel combinations, nor on tones.

3.5.7 Local vowel-consonant interactions

3.5.7.1 /i/ > u before labial

The pronominal-subject suffixes -ba (3Pl), -be (2Pl), and -m (1Sg) induce a shift from preceding Perfective allomorph -tì- to -tù-, and of preceding Perfective Negative -lí- to -lú-. In the case of -be, the shift is optional (probably because of the front vowel e). The same shift applies before 2Sg -w, but in this case the /uw/ sequence must undergo Monophthongization (see below).

For the full paradigms of -tì- and -lí- see §10.2.3.

3.5.7.2 Monophthongization (/iy/ to i:, /uw/ to u:)

This rather natural process converts tautosyllabic homorganic vowel-semivowel sequences into long vowels. It applies within suffix clusters, and within conjugated forms of the ≡ỳ 'it is' clitic.

The clearest case of Monophthongization is in combinations of high-voweled AN suffixes with 1Pl subject -y or 2Sg subject -w. A portion of the paradigm of Perfective allomorph -tì-, extracted from §10.2.3, is given in (xx1).

(xx1)

3Sg	-tì-	
1Sg	-tù-m	
1Pl	-tì:-∅	(< -tì-y)
2Sg	-tù:-∅	(< -tù-w)

There is a parallel set of forms for Perfective Negative -lí- (3Sg -lí-∅, 1Sg -lú-m, 1Pl -lí:-∅, 2Sg -lú:-∅). -tì- and -lí- are the only two high-voweled AN suffixes.

3Sg -tì- and -lí- with zero pronominal suffix suggests that the basic forms of the suffixes are -tì- and -lí-. A shift /i/ to u occurs before a labial consonant in 1Sg -tù-m and -lú-m. Given 1Pl subject suffix is -y and 2Sg subject suffix -w, we expect 1Pl Perfective #-tì-y and 2Sg #-tù-w (assuming that w is treated as a labial). That Monophthongization takes place in the 2Sg forms, hence -tù:-∅ and -lú:-∅, is shown by (xx2), where -lú:-∅ is followed by the Focus clitic.

(xx2) sèllè-lú:-∅≡ỳ
be.healthy-Perf.Neg-2SgS≡Foc
'it is (that) you are not healthy (= 'sick')'

The Focus or 'it is' clitic has postvocalic and postconsonantal allomorphs, and here we have the postvocalic allomorph ≡ỳ. If the word were treated phonologically as ending in #…-lú-w, we would have gotten #…lú-w≡î: with the postvocalic clitic allomorph ≡î: (§3.6.1, §11.2.1). We cannot use this clitic test for 1Pl -tì:-∅ and

-lí:-∅, since the “postvocalic” clitic allomorph ≡ỳ also happens to be used after word-final y. However, the 1Pl forms are pronounced with long i:, and the forms are obviously parallel to the 2Sg ones, so I transcribe -tì:-∅ and -lí:-∅.

In addition, when the ‘it is’ clitic is conjugated, among the pronominal-subject forms after a consonant (other than y) are 1Sg ≡ûm, 2Sg ≡û:, and 1Pl ≡î:. As shown in §11.2.1.2, the 1Sg form is derived as /≡î:-m/ > /≡m̀/ > ≡ûm. The 2Sg and 1Pl are likewise, at the stage corresponding to ≡ûm, representable as /≡ûw/ and /≡îy/, and require only Monophthongization to produce the correct outputs.

(xx3) **Monophthongization**

> In a tautosyllabic homorganic vowel-semivowel sequence within a suffix sequence or within a conjugated clitic, the semivowel vocalizes and becomes the final mora of a long vowel:
>
> iy > i:
> uw > u:

Monophthongization does not apply across a clitic boundary, i.e. in the sequence …i≡ỳ, as in wákátì≡ỳ ‘it is (a) time’. The rule is not applied after a Ci:- or Cu:- verb, as in tí:-y ‘we will send’ or nú:-ẁⁿ ‘you-Sg will enter’. (There are no nonmonosyllabic verb stems ending in i or u, so the only relevant verbs are monosyllabic.) Likewise, conjugated predicate adjectives like gùrù-w in yǒ:-jǐn gùrù-w ‘how are you-Sg tall?’ do not monophthongize.

In these cases, I should qualify “does not apply” by explaining that the rule does not apply systematically, though in allegro speech I am often unable to hear the difference between e.g. iy and i: word-finally. However, when nú:-ẁⁿ ‘you-Sg will enter’ is followed by the ‘it is’ (or Focus) clitic, the latter has its postconsonantal allomorph (xx4). This shows that there is a real difference between monophthongized and un-monophthongized homorganic vowel-semivowel sequences.

(xx4)

nú:-wⁿ≡ì:	là:	dèy
enter.Impf-2SgS≡**it.is**	Neg	if

‘unless you-Sg will go in’

3.6 Cliticization

The clearest case of cliticization is ≡ỳ (allomorph ≡î:) ‘it is’, also used as a Focus marker. It can be added to any of a wide variety of words and phrases, but shows phonological interactions (both tonological and segmental) with the word it is attached to, in contrast to the phonological autonomy of particles, pronouns, and the like.

In certain morphosyntactic contexts, the ‘be’ quasi-verbs kɔ̀ (nonhuman) and wɔ̀- (human) behave phonologically like clitics, though here the interactions with the preceding word are tonological only.

The symbol ≡ is used for the boundary between a clitic and a preceding word. In the case of kɔ̀ and wɔ̀-, I will use this symbol only in those morphosyntactic contexts where they appear to function as clitics.

3.6.1 Phonology of ≡ỳ clitic

The clitic meaning ‘it is’, also used as a Focus clitic, has the primary allomorphs in (xx1), subject to further modification by phonological rules.

(xx1)

after consonant or short u	after other vowel or y (yⁿ)
≡î: (≡ì:)	≡ỳ

The nonsyllabic allomorph ≡ỳ is always L-toned. The only further phonological modification that it can undergo is Nasalization-Spreading, which converts it to ≡ỳⁿ after yⁿ, a nasalized vowel, or a syllable beginning with with a nasal or nasalized consonant. In the cases of …y≡ỳ and …yⁿ≡yⁿ, the final semivowel is audibly prolonged. Examples of ≡ỳ and ≡ỳⁿ are in (xx2).

(xx2)

	gloss	without clitic	with clitic (‘it is …’)
a. unnasalized			
	‘house’	úró	úró≡ỳ
	‘mongoose’	sɛ̌:	sɛ̌:≡ỳ
	‘small bowl’	pɛ́:rɛ̀	pɛ́:rɛ̀≡ỳ
	‘woman’s wrap’	yà:lɛ̌y	yà:lɛ̌y≡ỳ
	‘duty’	tílây	tílây≡ỳ
b. nasalized			
	‘boubou (robe)’	àrⁿàkɔ̌yⁿ	àrⁿàkɔ̌yⁿ≡ỳⁿ
	‘water’	ní:	ní:≡ỳⁿ
	‘usefulness’	nɛ̀wⁿɛ́	nɛ̀wⁿɛ́≡ỳⁿ
	‘soldering metal’	pùgâ:ⁿ	pùgá:ⁿ≡ỳⁿ

For ‘soldering metal’, see Contour-Tone Stretching (§3.7.4.2, below).

The syllabic allomorph ≡î: is subject only to tonal modifications. Modifications affecting a preceding stem-final contour-toned syllable are covered below under Contour-Tone Stretching (§3.7.4.2) and Final-Tone Resyllabification (§3.7.4.3). The one idiosyncratic feature of ≡î: is that, for this clitic only, Final-Tone Resyllabification pushes the L-tone component of a preceding C-final F-toned syllable

through to the end of the clitic (or at any rate deletes the usual H-toned onset of the clitic). The clitic therefore appears as ≡ì: after such stems (xx3.c).

(xx3)

	gloss	without clitic	with clitic (‘it is …’)
a. stem ends in simple H- or L-toned syllable			
	‘deaf one’	mú:mò-n	mú:mò-n≡î:
	‘spleen’	cɛ̀nɛ̀-pá:làm	cɛ̀nɛ̀-pá:làm≡î:
	‘root’	bɔ̀rɔ̀-cé:ŋ	bɔ̀rɔ̀-cé:ŋ≡î:
b. stem ends in R-toned syllable			
	‘monitor lizard’	ǔ:n	ù:n≡î:
	‘pants’	pɔ̌n	pɔ̀n≡î:
	‘chief, Hogon’	ɔ̀ɣɔ̌-n	ɔ̀ɤɔ̀-n≡î:
c. stem ends in F-toned syllable			
	‘thicket’	û:n	ú:n≡ì:
	‘memorial feast’	pídâ:w	pídá:w≡ì:

In the **conjugated** forms of the clitic, which combine the clitic with a following pronominal-subject suffix, some idiosyncratic phonological contractions take place. In combination with 1Sg -m, 2Sg -w, and 1Pl -y, the clitic allomorphs ≡ỳ and ≡î: are segmentally deleted, but their tone survives as the tone of the previously atonal pronominal suffix. An example is postvocalic 1Sg form ≡m̀ from /≡ỳ-m/. See §11.2.1.2 for details.

3.6.2 ‘Be’ quasi-verbs (kɔ̀, wɔ̀-) and kùn- ‘be in’ as clitics

In their primary function as existential or locational quasi-verbs, kɔ̀ ‘be (nonhuman)’ and wɔ̀- ‘be (human)’ show no special phonological interactions with the preceding word, and I do not take them to be cliticized. There are, however, three constructions where they do interact phonologically with the preceding word. These are listed in (xx1), along with a mention of the relevant phonological interactions

(xx1)

a. [adjective + ‘be’] (positive adjectival predicate, §11.4.1)
—tonal interaction (Rightward H-Spreading, §3.7.4.4)

b. [unsuffixed Imperfective verb + Nonhuman ≡kɔ̀] (§10.1.1, §10.1.2.8)
—L-tone of Imperfective realized on kɔ̀ (Tone-Grafting, §3.7.3.3)

c. [Existential yɛ́ + ‘be’] (positive existential predicate, §11.2.2.1)
—idiosyncratic rounding assimilation (yɔ́≡kɔ̀, yɔ́≡wɔ̀-)

In (xx1.b), ≡kɔ̀ is parallel in function to the human pronominal-subject suffixes like 1Sg -m and 2Pl -be. For syntactic reasons, kɔ̀ cannot be taken as a suffix like -m or -be (for example, kɔ̀ but not pronominal suffixes occurs in participles based on these unsuffixed Imperfective verbs).

The shift of Existential yɛ́ to yɔ́ also takes place before kùn- 'be in', hence yɔ́ kùn- (§11.2.3), so I treat this combination as cliticized also.

Perhaps sà- 'have' is also a clitic, but I can identify no concrete phonological interactions between it and a preceding word.

3.7 Tones

Monomoraic Cv syllables with short vowel can be either H[igh] or L[ow] in tone but cannot have contour tones. Bimoraic CvC and Cv: syllables can be H, L, F[alling] = <HL>, or R[ising] = <LH>. Trimoraic Cv:: (note the double lengthe mark) and Cv:C syllables can be H, L, F, R, or bell-shaped <LHL>. Bell-shaped tones involve a mix of lexical and (overlaid) grammatical tone patterns, or require the presence of a nominal suffix (Sg -n or -m). All **contour tones** are readily analysable as sequences of H and L **tone components**. Each such component must be linked to one or more moras.

Angled brackets <…> indicate contour tones on a single syllable, though I will often use the convenient labels F and R as short for <HL> and <LH>, respectively. Without angled brackets, sequences like HF, RL, LLLH, and HL are to be interpreted as indicating one tone (contour or simple) per syllable, so that LLLH is understood to be a tone pattern for quadrisyllabic stems or words. Squiggly brackets as in {H} and {LH} represent independent tone sequences that are mapped onto stems in the autosegmental analysis proposed below.

3.7.1 Lexical tone patterns

3.7.1.1 At least one H-tone in each stem

The most important generalization is that all stems have **at least one high tone** (or tone component). This constraint applies to the basic lexical form of verb, noun (including adverb), adjective, and numeral stems. I would argue that it also applies to quasi-verbs that normally appear in an L-toned unsuffixed Perfective form, hence wɔ́- 'be' and sá- 'have', though the H-toned forms appear only in lexical-stem pseudo-participial clauses, e.g. sá-n 'having' (§15.2.1.3). H-toned forms are also basic for personal pronouns, since their L-toned counterparts are limited to preverbal subject function, inalienable possessor function, and combinations with a few particles and universal quantifiers.

(xx1) **Constraint Against All-L-Toned Stems**

> A verb (including quasi-verb), noun, adjective, numeral, or pronoun stem may not be all-L in its basic lexical form.

Importantly, this insures that **tone-dropping**, by which the entire stem shifts to L-tone, always has an audible effect. Tone-dropping is widely used in Jamsay morphosyntax: with nouns (as relative-clause heads, or before adjectives); with adjectives (before other adjectives); with pronominals (as preverbal subjects in relative and other subordinated clauses, as inalienable possessors, and before some discourse markers); and with verbs (e.g. before Negative suffixes or when AN categories are defocalized).

Below, I will suggest a reformulation of this constraint, in the context of an autosegmental interpretation of Jamsay tones, to the effect that the basic lexical form of each stem has **exactly one H tone-component** (§3.7.1.7).

3.7.1.2 Lexical tone patterns for verbs

For **verb** stems, at the level of the basic lexical form there are only two possible tonal patterns for any given CV-structure: a) all H-tones, b) all L-tones except for a single H-tone on the final mora, i.e., L(L...)H. A few examples for each syllable count will now be given.

Regular monosyllabic verbs have the shape (C)v:– can be R- or H-toned. R: yă:– ‘go’, wŏ:– ‘kill’. H: gá:– ‘say’, gó:– ‘go out’, and tí:– ‘send’.

Bisyllabic verbs can be HH or LH. HH: pɛ́rɛ́– ‘strike (match)’, ká:rá– ‘rip’, káwgá– ‘separate’. LH: gòjó– ‘treat differently’, gòró– ‘cover with blanket’, jɛ̀:rɛ́– ‘bring’, dɔ̀mnɔ́– ‘console’.

Trisyllabic verbs can be HHH or LLH. HHH: émé–wⁿé– ‘make spacious’, ɛ́ŋɛ́rⁿɛ́– ‘restrain’, káŋárⁿá– ‘shine’. LLH dìgì–rɛ́– ‘align’, dɔ̀rɔ̀gɔ́– ‘ransom’, gàmàrⁿá– ‘divide’.

Quadrisyllabic verbs are rare, being limited to infrequently occurring causatives of trisyllabic verbs, e.g. HHHH káŋárⁿá–wⁿá– ‘cause to shine’, LLLH gɔ̀lɔ̀rɔ̀–wɔ́– ‘cause to snore’. I know of no five-syllabled inflectable verb stems, though the quadrisyllabic verbs just mentioned can occur in the pseudo-causative nominal form (in ‘before …’ clauses) with a further suffix –wɔ̀.

Tabulations based on a working lexicon containing some 720 monomorphemic regular verbs are given in (xx1). Since the length of the final vowel depends on syllable count (monosyllables have a long vowel, others end in a short vowel), and since there are no final syllables ending in a consonant, only syllable count and tone are considered.

(xx1)	tone pattern	#	% of syllable-count type
a. monosyllabic (C)v:–			
	H	63	80

R	16	20
total	*79*	

b. bisyllabic (C)vCv-, (C)v:Cv-, (C)vCCv-

all-H	287	59
LH	196	41
total	*483*	

c. trisyllabic (C)vCvCv-, etc.

all-H	65	64
LLH	36	36
total	*101*	

The percentage of all-H-toned verbs has been increased by the large and increasing number of bi- and trisyllabic **Fulfulde verbs** borrowed into Jamsay. These verbs, often ending in ɛ and often showing medial consonant clusters, have all-H tone in their basic forms: júkkɛ́- 'fine', jáŋgínɛ́- 'teach' (with Fulfulde Causative -in-), and many others.

3.7.1.3 Lexical tone patterns for unsegmentable noun stems

For **nouns**, a wider range of possibilities is present. Monosyllabic noun stems, which have two or more moras, can be H, F (<HL>), or R in their basic (i.e. unpossessed) form. H: bɛ́: 'excrement', dɔ́n 'price', bí:ⁿ 'Sclerocarya tree', cé:ŋ 'root'; R: dě: 'father', bě̌n 'tomtom', dǐ:ⁿ 'place', gŭ:n 'pot cover'; F: dô: 'Striga herb', jɛ̂: 'swaying', û:n 'thicket'. The rare bell-shaped <LHL> type is attested in gɔ̌ɔ̀ⁿ-n 'member of drum-beating griot caste', a stem that requires Sg -n Pl -m suffix.

Fulfulde noun borrowings of up to three syllables are predominantly H(H)L if the stem ends in a short vowel, H(H)F if the stem ends in a bimoraic syllable. In other words, these borrowings are H-toned except for one final L-toned mora: dáwrù 'fortune-telling', ɛ́ndâm 'kinship', dɔ́:rá:jì 'a breed of sheep', dórówôl 'whip'. Fulfulde borrowings of more than three syllables are usually also pronounced in this fashion. Alternatively, they can be treated as (crypto-)compounds, as in dɛ́ŋɛ́mbɛ́:rɛ̀ or: dɛ́ŋɛ́m-bɛ́:rɛ̀ 'Zornia herb'. In the crypto-compound form, there may be a slight pitch drop or other subtle prosodic cue at the end of the compound initial.

A tabulation based on about 1000 apparently monomorphemic noun stems gives the numbers in (xx1) and other tables below. I exclude obvious compounds, compound initials and finals, and suffixal derivatives (Verbal Nouns). For inalienable nouns, only the basic lexical form (used in absolute function) is considered. Human nouns requiring a suffix (Sg -n or Pl -m) are classified by their shape minus the suffix, although when such a noun ends in a contour-tone syllable the suffix is needed to permit expression of both (or all three) tone components.

The tabulations will feed into the autosegmental analysis to follow.

(xx1) Monosyllabic Nouns

shape	tone type	#	% of shape	comment
Cv	H	1	25	cé ‘possession’
	F	1	25	î-n ‘child’
	R	2	50	ă-n ‘man’, ñĕ-n ‘woman’
	total	*4*		
(C)v:	H	20	37	
	F	14	25	
	R	20	38	
	<LHL>	1	2	requires suffix -n, -m
	total	*55*		
(C)vC	H	22	22	
	F	20	20	
	R	56	57	
	<LHL>	0		
	total	*98*		
(C)v:C	H	4	25	
	F	6	38	
	R	6	38	
	<LHL>	0		[see under Cv:]
	total	*16*		

Bisyllabic noun stems ending in a short vowel can easily be HH, HL, or LH. Examples: HH béré ‘stick’, dá:ŋá ‘water jar’; HL pɛ́:rɛ̀ ‘small bowl’, búgù ‘gunpowder’; LH bàtá ‘box’, bɛ̀:rú ‘nightjar’. A bimoraic first syllable makes RL also possible: the two instances noted are sămnà ‘soap’ and dăwrù ‘strategem’ (both likely reflect trisyllabic *Cv̀Cv́Cv̀ etyma). A human noun that takes Sg -n and Pl -m suffixes can also be HF or LR with a final contour tone. There are three LR cases, ɔ̀ɣɔ̌-n ‘chief, Hogon’, sùrgɔ̌-n ‘weaver (caste)’, and dɔ̀ɣɔ̌-n ‘Dogon’, and one HF case, bárgâ-n ‘left-handed person’.

A minimal trio (HH, LH, HL) is ɛ́:rɛ́ ‘peanuts’, ɛ̀:rɛ́ ‘Boscia bush’, and Fulfulde loanword ɛ́:rɛ̀ ‘white cow with black spots’. More minimal pairs are LH ɔ̀:rⁿɔ́ ‘monkey’ versus HL ɔ́:rⁿɔ̀ ‘waterskin’, and HH círⁿé ‘nose’ versus LH cìrⁿé ‘bone’..

A tabulation is given in (xx2). In addition to the exclusions mentioned above, Cì- reduplications are omitted.

(xx2) Bisyllabic Nouns (short-vowel-final)

shape	tone type	#	% of shape	comment
(C)vCv	HH	56	19	
	HL	61	21	
	LH	172	59	
	LR	2	1	requires suffix -n, -m
	total	*291*		
(C)v:Cv	HH	26	25	
	HL	45	43	includes many loanwords
	LH	34	32	
	FL	0		
	FH	0		
	RL	0		
	RH	0		
	total	*105*		
(C)vCCv	HH	8	14	
	HF	1	2	requires suffix -n, -m
	HL	36	63	includes many loanwords
	FL	0		
	FH	0		
	RL	1	2	
	RH	0		
	LH	10	18	
	LR	1	2	requires suffix -n, -m
	total	*57*		
(C)vCCCv	HL	2	100	
	all others	0		
	total	*2*		
(C)v:CCv	HH	0		
	HL	2	67	
	LH	1	33	
	all others	0		
	total	*3*		

If the second syllable of a bisyllabic noun stem has more than one mora, that syllable can have a contour tone R or F. Examples involving final Cv: syllables: HH dídé: 'shield' (only example); HF jámâ: 'crowd', jípî:^{n} 'Maerua tree'; LF

pùgâːⁿ ‘soldering metal’, màlfâːⁿ ‘rifle’; LH bàlpóː ‘calabash’, pùːpáː ‘bellows’; LR yɛ̀sǎː ‘sister’ (only example). HR and HL are unattested.

(xx3) Bisyllabic Nouns (long-vowel-final)

shape	tone type	#	% of shape	comment
(C)vCvː	HH	1	4	
	HF	7	26	4 loans; 2 possible -îːⁿ ‘child’ cpds
	HR	0		
	HL	0		
	LF	13	48	7 possible -îːⁿ ‘child’ cpds and 2 French loans
	LH	5	19	
	LR	1	4	
	total	*26*		
(C)vCCvː	HH	0		
	HF	2	29	
	HR	0		
	HL	0		
	LF	3	43	
	LH	2	29	
	LR	0		
	total	*7*		
(C)vːCvː	HH	0		
	HF	3	38	
	HR	0		
	HL	0		
	LF	2	25	1 possible -îːⁿ ‘child’ cpd
	LH	3	38	
	LR	0		
	total	*8*		

Roughly similar patterns occur in bisyllabic stems ending in CvC. Examples: HH gúlúm ‘piece’, kúdáy ‘stock’, LH (kàrúm ‘horse’s mouth bit’, only unreduplicated example; HF púpûn ‘colubrid snake sp.’, cɛ́llâl ‘health’; HR jíːlŭm ‘leech’, only example; HL píːlòm ‘bladder’, úːñùm ‘Cleome herb’ (only two examples); LF wìlwîl ‘giraffe’, tùgûn ‘ladle’; LR pìnăm ‘powder’, sɔ̀bɔ̌l ‘gourd with neck’.

Unsuffixed HL-toned Cv́CvC and Cv́CCvC (with L-tone on the bimoraic final syllabic) are unattested, and Cvː CvC has only the two attestations just given. This suggests that the H-tone of the first syllable generally pushes a following L onto the

stem-final mora, resulting in HF rather than HL. HL is also attested in two nominal compound finals, cɛ̀nɛ̀-pá:làm ‘spleen’, cìrⁿè-bérùm ‘nose cartilage’. However, in such compounds one cannot exclude the possibility of a tonal overlay, and indeed HL rather than HF tone is typical of tonal overlays.

Here are the tabulations for bisyllabic consonant-final nouns.

(xx4) Bisyllabic Nouns (consonant-final)

shape	tone type	#	% of shape	comment
(C)vCvC	HH	6	15	
	HF	18	45	includes many loans
	HR	0		
	HL	0		
	LH	1	3	
	LF	11	28	
	LR	4	10	
	total	*40*		
(C)vCCvC	HH	0		
	HF	6	75	loanwords
	LF	1	13	
	LR	1	13	
	all others	0		
	total	*8*		
(C)v:CvC	HH	1	10	
	HF	3	30	
	HR	1	10	
	HL	2	20	
	LH	0		
	LF	1	10	
	LR	2	20	
	total	*10*		
(C)vCv:C	HH	0		
	HF	3	75	
	LF	1	25	
	all others	0		
	total	*xx*		
(C)vCCv:C	HH	0		
	HF	3	100	loanwords
	all others	0		
	total	*3*		

(C)v:CCvC, (C)v:Cv:C [unattested]

Trisyllabic nouns with final short vowel can have the following tone patterns: HHH (béjéré ‘shroud’), HHL (kɔ́pɔ́rɔ̀ ‘colonial coin’), LHL (jɛ̀ŋɛ́rⁿɛ̀ ‘tamarind seed’), LLH (ɛ̀gɛ̀sɛ́ ‘sneeze’), and marginally HLL and LHH. HLL is limited to two (C)vCCvCv nouns, námsɛ̀gɛ̀ ‘grasshopper sp’ and the borrowing máŋgòrò (or màŋgòlò) ‘mango’. LHH is attested only in àdúrⁿɔ́ ‘world of the living’ (<Arabic) and àkɔ́rɔ́ ‘(water) well’. It is possible that à- is segmentable as a suffix, which would reduce these two cases to the uncontroversial bisyllabic HH. This is potentially important for tonal analysis.

A tabulation for trisyllabic nouns ending in a short vowel is in (xx5). Data are spotty for some shapes.

(xx5) Trisyllabic Nouns (short-vowel-final)

shape	tone type	#	% of shape	comment
(C)vCvCv	HHH	27	28	
	HHL	20	20	
	HLL	0		
	HLH	0		
	LHH	2	2	both with à…, 1 loan
	LHL	11	11	
	LLH	36	37	
	total	*98*		
(C)v:CvCv	HHH	0		
	HHL	5	100	all loanwords
	all others	0		
	total	*5*		
(C)vCv:Cv	HHH	1	6	
	HHL	10	59	many loanwords
	LHL	4	24	all loanwords
	LLH	2	12	all loanwords
	all others	0		
	total	*17*		
(C)v:Cv:Cv	HHH	0		
	HHL	3	100	all loanwords
	all others	0		
	total	*5*		
(C)vCCvCv	HHH	0		
	HHL	10	45	loans

	HLL	2	9	1 loan
	LHH	4	18	
	LHL	2	9	
	LLH	4	18	
	all others	0		
	total	*22*		
(C)vCCvCCv	HHH	0		
	HHL	5	83	loans
	LHL	1	17	loan
	all others	0		
(C)vCCv:Cv	HHH			
	HHL	12		loans
	LHH	1		loan
	LLH	1		

Trisyllabic nouns with final long vowel can also have a final F (in theory, also R, but no examples). In fact, final F occurs in all known examples, again supporting the view that a H-tone pushes a following L-tone to the final mora. The full set of known examples: LLF àsàrî:ⁿ ‘sedge sp.’, bànàkû:ⁿ ‘cassava (manioc)’, ñàmàkû: ‘ginger root’ (the latter two probably from Bambara); HHF sɔ́:pú:pâ: ‘Sesbania shrub’.

(xx6) Trisyllabic Nouns (long-vowel-final)

shape	tone type	#	% of shape	comment
(C)vCvCv:	LLF	3	100	2 loans, 1 frozen -î:ⁿ cpd
	all others	0		
	total	*3*		
(C)v:Cv:Cv:	HHH	0		
	HHF	1	100	
	all others	0		
	total	*1*		

(C)vCv:Cv:, (C)v:CvCv: unattested

Final F and R are also possible with trisyllabic stems endng in a CvC syllable. Examples of the attested tone patterns: HHH dúdúrúm ‘trash heap’ (only example), HHF dórówôl ‘whip’, HLF pípìlîm ‘butterfly’; LHF kàrákâw ‘wooden bed’ (only example, probably a frozen compound *kàrá-kâw, cf. Fulfulde karga ‘wooden bed’ and other regional cognates), LLH sàɣàrám ‘gravel’, LLF bàràmîn ‘lever’ (only example), RLF sěrmèñêm ‘fig tree sp.’ (only example, quadrisyllabic

variant sɛ̀rúmɛ̀ñɛ̂m), LLR ì jùbǎy ‘ground’. As usual when there is a bimoraic final syllables, HHL is very rare, I can cite only sáppérùm ‘tree sp.’

(xx7) Trisyllabic Nouns (consonant-final)

shape	tone type	#	% of shape	comment
(C)vCvCvC	HHH	1	6	
	HHF	5	28	4 probable loans
	HHR	0		
	HHL	0		
	HLH	0		
	HLF	1	6	
	HLR	0		
	HLL	0		
	LHH	0		
	LHF	1	6	probable frozen cpd
	LHR	0		
	LLH	5	28	
	LLF	1	6	
	LLR	4	22	
	total	*18*		
(C)vCCvCvC	HHH	0		
	HHL	1	25	
	HLF	2	50	
	RLF	1	25	
	all others	0		

(C)vCv:CvC, (C)vCCv:CvC, etc. unattested

Quadrisyllabic and longer nouns that are not obviously compounded are in most cases at least arguably crypto-compounds in the sense that there is a break point in the middle. A scan of the data in the 1000-noun sample brings out no new patterns. There is one additional problematic …HLL stem to add to the HLL stems mentioned above: kórúkàjà ‘tree locust’.

The most important point about the statistical data is tha support they give for the view that a lexical H-tone tends strongly to push a following L-tone to the rightmost mora in the stem, which in the case of a stem ending in bimoraic syllable results in final F-tone. There are a handful of counterexamples involving …HLL, or …HL with a final bimoraic syllable. To the HLL examples given above, quadrisyllabic kórúkàjà ‘tree locust’ can be added. To the previous examples of …HL with final bimoraic syllable, add quadrisyllable sàmàlɔ́wɔ̀n ‘marabou stork’. Against these are arrayed a much larger number of …HF and …LF stems, for which I count 77 bisyllabic and 14 trisyllabic stems. The data therefore provide statistical, though not absolute, support for the view that a lexical H-tone spreads as far to the right as it can

without eliminating a following L-tone, within the lexical form of stems. See Rightward H-Spreading (§3.7.4.4, below).

3.7.1.4 Lexical tone patterns for adjectives and numerals

Adjectives resemble mono- and bisyllabic nouns in their patterning. Examples: monosyllabic H wá: ‘spacious’ and jém ‘black’; F ây^{n} ‘slightly bitter’, tôm ‘cold’; R dǒŋ ‘skinny’ and sǐ: ‘pointed’; bisyllabic HH pírú ‘white’; HL érù ‘sweet’ (or ‘sharp’); LH kànáˊ ‘new’ and gàrá ‘big’. Overall the LH (including R) type is most common for adjectives. Bisyllabic adjectives end in short vowels, so there are no final contour tones. A list is given in §4.5.1.

Numerals are similar to adjectives. Monosyllables: R lěy ‘two’; F sûy^{n} ‘seven’. The absence of H-toned monosyllables is probably an accidental gap, since there is only a small inventory of numerals. Bisyllables: HH pɛ́rú ‘ten’, HL gá:rà ‘eight’, LH mùñú ‘thousand’. Most (uncompounded) bisyllabic numerals end in short vowels, except for HH kúróy ‘six’, so there are no compound tones on final syllables (except in the French lona míly$\hat{o}$:^{n} ‘million’).

The data for mono- and bisyllabic stems, in their basic lexical forms, can be summarized in (xx1). A check √ indicates that the pattern is attested, while — indicates that it is not.

(xx1)

	verb	noun	adjective	numeral
a. monosyllabic				
H	√	√	√	—
R	√	√	√	√
F	—	√	√	√
b. bisyllabic				
HH	√	√	√	√
HL	—	√	√	√
LH	√	√	√	√
LF	—	√	—	—
RL	—	√	—	—
LR	—	√	—	—

3.7.1.5 Default final H, or autosegmental mapping?

Given this constraint, one could consider the possibility that one or another of the attested lexical tone patterns is a default, applied to underlying L-toned stems in order to satisfy the constraint. I do not favor this (pure) constraint-satisfaction model, but if I did I would suggest final-mora H-tone as the default. In this view, which I will call the **default-final-mora-H** analysis, verbs with (monosyllabic) R, bisyllabic LH, trisyllabic LLH, and so forth, are reinterpreted as having no lexical L-tone, with the

final mora secondarily acquiring H-tone to satisfy the constraint. The same would apply to nouns, adjectives, and numerals that have L-tone up to a final H-toned mora.

Possible evidence for this applicability of the default-final-mora-H approach to nouns is provided by a small numer of human nouns that normally (and in some cases exclusively) occur with Sg `-n` or Pl `-m`. The stems in question have a final R-tone in these suffixed forms, and the suffixal nasal is required to permit expression of the H-tone component of R (i.e., <LH>). The three known examples are `ɔ̀ɣǒ-n` 'chief, Hogon', `dɔ̀ɣǒ-n` 'Dogon (person)', and `sùrgǒ-n` 'weaver' (plurals `ɔ̀ɣǒ-m`, `dɔ̀ɣǒ-m`, `sùrgǒ-m`). 'Chief' has an unsuffixed form `ɔ̀ɣɔ́` 'leader (e.g. of animal pack)', with final H-tone replacing R-tone, and 'Dogon' has an unsuffixed form `dɔ̀ɣɔ́` meaning 'Dogon language', while 'weaver' does not occur without suffixes. In the default-final-mora-H analysis, these stems are underlying all-L /ɔ̀ɣɔ̀/, /dɔ̀ɣɔ̀/, and /sùrgɔ̀/, and the final mora secondarily acquires H-tone both in unsuffixed `ɔ̀ɣɔ́` and in suffixed `ɔ̀ɣǒ-n`, `dɔ̀ɣǒ-n`, and `sùgǒ-n`.

I am not convinced by this argument, for empirical and theoretical reasons. A strong empirical objection is that there is one short-vowel-final stem with final F-tone that is likewise expressible only with the help of a nominal suffix, namely `bárgâ-n` 'left-handed person'. The lexical form here must be /`bárgâ-`/, demonstrating that a lexical contour tone on a final short vowel is possible. One might also mention `î-n` 'child' (human) in this connection, though here the morphological structure is complicated (§4.1.2).

A theoretical objection is that e.g. unsuffixed `ɔ̀ɣɔ́` 'leader' can also be derived from /`ɔ̀ɣǒ`/ by a simple, albeit idiosyncratic, tone rule; see Final-Cv R-to-H Reduction, §3.7.4.6, below.

Additional grist for this debate comes from tonal relationships between underived and suffixally derived stems; see below, §3.7.3.1.

In the sections that follow, I will suggest an **autosegmental model** for Jamsay tone, while acknowledging the existence of a few counterexamples to the rules proposed. In its strongest form, an autosegmental model of tone separates the **segmental tier** from the **tonal tier**. Strictly speaking, the segmental tier must itself be organized into syllables, moras, and feet, but since these are derivable from the segment string I will speak loosely of these as elements of the segmental tier.

A stem, or a word, consists of non-null strings of segments and of **tone-components**. Curly brackets {…} will be used for strings of H and L components at this level. For example, `úró` 'house' consists of `uro` at the segmental level and {H} at the autosegmental level, while its tonal locative `úrò` 'at the house' has the same segments but a bitonal {HL} tone pattern. Both the segmental and tonal tiers may be morphemically complex.

For this model to work perfectly, there must be rigorous **association** processes that connect the tone components H and L to the correct syllables and/or moras. These processes are easy to formulate when the tonal tier is monotonal, i.e. just {H}, since of course in this case the H component will associate to all syllables (and moras) at the segmental level; i.e., it will spread throughout the stem or word. The rules are also easy to formulate when the number of tone components, the number of syllables, and

the number of moras are all identical, for example bitonal {LH} with a CvCv stem. The difficulties start when there are bi- or trimoraic syllables, since then the association rules have to decide whether to deal with syllables or with moras. The challenges increase to the extent that the number of tone components is mis-matched with the number of relevant segmental-tier units (syllables or moras). For Jamsay, no pure autosegmental model will work perfectly for all word-classes. However, it is possible to develop a model that works more or less perfectly for verbs, and that accounts for significant statistical regularities in nouns.

3.7.1.6 Tone-Component location for bitonal noun stems

Applying either the default-final-mora-H analysis or the autosegmental {LH} analysis to nouns is more problematic. Either would gain attractiveness if all **bitonal** {HL} or {LH} stems could be accounted for in a uniform fashion. In the rest of this section I will review tone patterns for bitonal nouns with an eye toward an autosegmental analysis.

Regarding **{HL} trisyllabic nouns**, I have already pointed out the strong tendency of a lexical H-tone to spread to the right, confining a following L to the final mora, hence HHL with trisyllabic stems ending in monomoraic syllable, and HHF with those ending in a bimoraic syllable. Although this pattern is not absolute, and there are a handful of cases with final bimoraic L-toned syllable, the pattern provides statistical support for an autosegmental analysis with {HL} tone sequence on a separate tier. For most nouns, the L is then linked to the final mora. For a tiny minority, it is linked to the final syllable, making it structurally parallel to the linking process for {LH} stems. In either case, the H then fills out the remainder of the stem.

Turning to **{LH} trisyllabic nouns**, the difficulty begins with the fact that both **LHH and LLH** stems are attested. This means that a default-final-mora-H analysis would work for LLH but that LHH stems would need lexically marked tones, so there is little net gain in descriptive economy. Likewise, an autosegmental model for {LH} nouns would have to pre-link tones to syllables on a lexical basis for one or the other of LLH or LHH, taking the other (presumably LLH) as the phonologically regular default.

However, there are some interesting asymmetries between LHH and LLH that make this empirical problem less severe. Drawing on the tabulations above, the data are summarized in (xx1).

(xx1)

	LHH	LLH
(C)vCvCv	2	36
(C)vCvvCv	0	2
(C)vCCvCv	4	4
(C)vCCvvCv	1	1
(C)vCvCvC	0	5

We see a strong preponderance of LLH over LHH. There are 2 cases of LHH-toned (C)vCvCv; as noted above, these stems arguably have a prefix à- and are

therefore really HH bisyllables. The remaining cases of LHH are all stems that begin with a bimoraic (C)vC syllable. Stems of this shape are candidates for status as crypto-compounds, since (C)vC, unlike (C)v, is a viable shape for a noun stem (or nominal compound initial). Since compound initials are often L-toned, the difference between L-HH and L-LH would reduce to the familiar difference between HH and LH bisyllabic nouns (here as compound finals).

However, we have not yet dealt with the distinction between **L(L)H and L(L)R** in bi- and trisyllabic stems ending in a bimoraic syllable. Since R is <LH>, the difference between L(L)H and L(L)R is that the final H-tone component occupies the entire final syllable in L(L)H, but only the final mora in L(L)R. Again, we must review data extracted from the preceding tabulations.

(xx2)

	L(L)H	L(L)R
a. bisyllables with final long vowel		
(C)vCv:	5	1
(C)vCCv:	2	0
(C)v:Cv:	3	0
total	*10*	*1*
b. bisyllables with final CvC		
(C)vCvC	1	4
(C)vCCvC	0	1
(C)v:CvC	0	2
total	*1*	*7*
c. trisyllables with final CvC		
(C)vCvCvC	5	4

The relevant trisyllables, all of which end in CvC, are evenly divided. The potential for crypt-compounding here is high, since (C)vCv- and -CvC are viable shapes for nouns (and therefore for compound initials and finals). Taking (C)vCv- as an initial (with the usual tone-dropping) would reduce the distinction to the nonproblematic one between H and R monosyllabic finals.

Among the bisyllables, which give us a purer play, we find a near-categorical distinction between those with final long vowel, which overwhelmingly show L(L)H, and those that end in a CvC syllable, which strongly favor L(L)R. In the consonant-final case, the exceptional LH nouns is kàrúm ‘horse’s bit’. I have no explanation for this. In the vowel-final case, the only exceptional LR stem is yèsǎ: ‘sister’. This belongs to a small set of inalienable nouns. The members of this set that lack suffixes (Sg -n, Pl -m) all have basic lexical forms (used in the absence of an overt possessor) that are either all-H (tɔ́wⁿɔ́ ‘comrade’ is the only example, and it is the one non-kin term in the set) or have just one final-mora H (dě: ‘father’, àɣá ‘husband’, àsàrⁿá

‘brother’, etc., total 13, all kin terms). yèsǎ:, the one non-monosyllabic kin term with a final long vowel, fits this pattern.

All in all, there is fairly considerable support for the following summary (with some unexplained exceptions) for uncompounded {LH} nouns: the H-tone component is realized on the final mora in bisyllabic or longer stems ending in CvC, on the final syllable in bisyllabic or longer stems ending in a long vowel, and (ambiguously) on the final syllable which is coextensive with the final mora on bisyllabic or longer stems ending in a short vowel. Note that instead of three processes to choose from, there are really just two, and the choice between them is moot in one set of examples.

3.7.1.7 Tone-Component location for tritonal noun stems

To complete the empirical basis for an autosegmental analysis of tone association it is necessary to consider tritonal sequences. Nouns with more than three tones are almost certainly crypto-compounds.

The two logically possible tritonal sequences are of course **{HLH}**, which includes HLH and other trisyllables and both FH (= <HL>H) and HR (= H<LH>) bisyllables, and **{LHL}**, which includes LHL and other trisyllables and both RL (= <LH>L) and LF (= L<HL>) bisyllables. As it happens, {HLH} is virtually nonexistent in Jamsay noun (or other) stems. I can cite only jí:lǔm ‘leech’ (HR bisyllable). I am tempted to suggest a crypto-compound here, and indeed both Cv:– and –CvC are reasonable shapes for compound segments, but a H-R tone contour would be unusual for a nominal compound, so I recognize jí:lǔm as a genuine unsegmentable {HLH} noun.

Disregarding this exception, a further constraint on lexical tones has emerged (xx1). In fact, this constraint can be formulated to as to replace the constraint against all-L-toned stems given above (§3.7.1.1).

(xx1) **One H-Tone Autosegment Per Stem**

Each stem, in its basic lexical form, is associated with an autosegmental tonal sequence that contains exactly one H-tone component (which may be preceded and/or followed by one L-tone component)

As a result, the only viable tritonal sequence is {LHL}. From the tabulations given above, the data in (xx2) can be drawn together.

(xx2)

tones	#	comment
a. monosyllabic		
<LHL>		
Cv̌̀:–	1	requires suffix: Sg –n, Pl –m
b. bisyllabic		
RL		

CV̌CCV̀ 2

LF

CV̀CV̂: 13
CV̀CCV̂: 3
CV̀:CV̂: 2
CV̀CV̂C 11
CV̀CV̂:C 2
CV̀CCV̂C 1

c. trisyllabic

LHL

CV̀CV́CV̀ 11
CV̀CV́:CV̀ 4

These data make the positioning of the three tone components (LH) easy to describe. The second L of {LHL} associates to the final mora. The initial L and H associate, if possible, so that they are **separated by a syllable boundary**. This is seen in CV̀:CV̂:, CV̀CCV̂C, and CV̀CV́:CV̀, all of which involve shapes with more than three moras, so a priori there is a choice as to where to locate the break between the initial L and the H (it did not have to be at a syllable boundary). CvCCv, however, has only three moras, so in the rare case where this shape has {LHL} tones, the output is CV̌CCV̀ with the initial LH expressed on the bimoraic first syllable. The alternative would have been to put the syllable break after the first L, resulting in #/CV̀CCV̂/, which could then lengthen its final vowel to accomodate the contour tone. But this would then be learned and lexicalized as a CV̀CCV̂: stem, there being no evidence for an underlying final short vowel.

The autosegmental analysis for verbs and nouns (adjectives, numerals, and adverbials are noun-like) can be summarized as (xx3). As indicated in detail above, it is something of an idealization as applied to nouns.

(xx3) Autosegmental Model of Lexical-Stem Tones

a. tones are on a separate tier with no pre-associations

b. tones for verbs:
   monotonal {H}
   bitonal {LH}
   tones for nouns (etc.):
   monotonal {H}
   bitonal {HL}, {LH}
   tritonal {LHL}, rarely {HLH}

c. associate monotonal {H} over entire stem
   associate final H (preceded by L) to the …

i. … **final mora** (monosyllables, nonmonosyllabic …CvC, tritonal …Cv:, all verbs)

ii. …**final syllable** (bitonal nonmonosyllabic …Cv:)

iii. …final syllable = final mora (nonmonosyllabic …Cv)

associate final L (preceded by H) to the **final mora**

in tritonal contours, associated the first and second tone components so that they are separated by a **syllable boundary**

It remains to be seen whether the autosegmental association rules given here for basic forms of stems also work for overlaid stem-wide grammatical tone contours, or for stem-final grammatical tone modifications (tonal locatives, unsuffixed Imperfectives). For example, is the H(H…)L tone overlay another case of {HL}, or does it have different properties? This and related matters will be addressed below, after an initial rapid survey of the types of grammatical tones applicable to various word-classes.

3.7.1.8 Tones of clause-final particles

Particles that occur at the end of clauses (or subordinated VPs) include those in (xx1).

(xx1)
a. dèy, déy (dé) 'if', chapter 16;
b. mèy^{n}, méy^{n} 'and' (VP-chains), §15.1.14;
c. Quotative gá, gà, §17.1.5;
d. Quotative wá, wà, §17.1.3;
e. Purposive lé, lè, §17.6.1;
f. interrogative or disjunctive má (mà), §7.2, §13.2.1.1.

The variants given in (xx1) are L-toned, but these particles are heard variably with high or low pitch and it is difficult to establish a basic (lexical) tone. Some of the variation is due to intonational pitch modifications (§3.8, below) or to carryover of the final tone component of the preceding word. Brief comments on each morpheme are given here, but see the relevant sections for fuller detail.

dèy is most often L-toned when clause-final. However, when followed by another clause-mate particle, it appears in combinations like dé nè (§16.1.3), suggesting a possible lexical H-tone. When dèy follows a pseudo-participle, it carries over the final tone component of the pseudo-participle (§15.2.1).

mèy^{n} is often heard with L-tone, and I take this as basic. However, since it occurs in nonfinal VPs in chains, it necessarily anticipates a following VP or clause, and therefore often has higher pitch. I normally transcribe the high-pitched variant as mèy^{n} ⇑, attributing the pitch rise to intonation rather than to tone per se.

For Quotative wá (wà) in particular, the final tone of the preceding morpheme is usually carried over (progressive tone assimilation). The tone of quotative gá (gà), on

the other hand, does not correlate closely with the final tone of the preceding morpheme.

Purposive lé and lè occur in a number of more-or-less purposive clause types (§17.6.1). In one, the uninflected verb stem drops tones but is followed by H-toned lé. In a second type, the verb is inflected and has unsuffixed Imperfective form (hence ends in F-tone), followed by L-toned lè. In a third, the uninflected verb stem raises tones to all-H, followed by H-toned lé. In the second and third types, the tone of lé (lè) is carried over from the preceding tone, but this is not the case in the first type. As postposition (semantically locative or instrumental) with NP complement, we also get variation between lé and lè, but lé is used only in a modest number of fixed adverbial phrases (which may also require tone-raising on the noun stem), while lè is regular in all other combinations regardless of preceding tone (§8.2.1-2).

Interrogative and disjunctive má (mà) are subject to intonational modification, resulting in prolongation of the vowel, with variable pitch.

3.7.2 Grammatical tone patterns

Grammatically controlled modifications of lexical tones are basically of two kinds: **Tone-Grafting** (to the end of the stem), and **stem-wide tone overlays**. Grafting does not erase lexical tones, while overlays do. There are many overlaid tone contours in Jamsay morphosyntax, while grafting is limited to the tonal locative of nouns and to the unsuffixed Imperfective of verbs.

Overlays themselves are of two kinds. In one type, the overlay on the stem is automatically triggered by a following suffix. In the other, the overlay is controlled syntactically, though of course this too represents a kind of dependence on the presence of other elements.

The beauty of the lexical tones, with at least one H-tone element in every regular noun, verb, adjective, and numeral, is that one can always audibly express a morphosyntactic category by converting all tones in the stem to L (**tone-dropping**). This happens systematically with nouns (before a modifying adjective or demonstrative, as head of relative clause, and as initial in some compound types), adjectives and numerals (as final word in a NP that heads a relative clause), pronouns (preverbal subject function, possessor with inalienable kin terms, before some particles like Topic ké), and verbs (before Negative suffix, unsuffixed Perfective after focalized constituent).

There are other tone overlays, the most common being H(H…)L, which occurs in the unsuffixed Perfective of verbs when used in relative clauses, in the final of some nominal compounds, and in possessed forms of inalienable nouns. There is an all-H overlay in imperatives of most CvCv- and Cv:- verbs, and in the final of some compounds.

It is no exaggeration to say that grammatical tone changes (along with grammaticalized intonation) are the central motor of Jamsay morphosyntax.

I will now do a brief summary of the grammatical tone processes applicable to verbs, nouns, and other word-classes. Then I will provide technical formulations of the

relevant grammatical tone processes. The section on tonology will conclude with discussion of a number of low-level tone rules.

3.7.2.1 Grammatical tones for verb stems

Verbs have their pure lexical form when noninitial in verb (VP) chains. They also have this form when followed by positive, segmentally nonzero AN inflectional suffixes (not including the unsuffixed Imperfective, which is expressed by a tonal grafting).

There are a number of –Cv́– suffixes that derive verbs from simple verbs (reversive, causative, a few cases of passive), and in some cases from adjectives or nouns; see Chapter 9 passim for lists of examples. As noted above, simple verbs have either {H} or {LH} tone patterns, the latter with a single final H-toned mora. The same pattern is extended to the derivatives. For the phonology see §3.7.3.1, below. The derivatives, once formed, function like underived verbs as potential inputs to inflections that may induce tone changes, see below.

Tone overlays occur as indicated in (xx1).

(xx1) Tone Overlays for Inflectable Verb Stems

a. **tone-dropping** (all-L)
   when medial in a chain of three or more verbs (§15.1.1);
   when nonfinal in some types of iteration (§11.6.2);
   before Negative AN suffixes (§10.1.3);
   before Hortative suffix –m (§10.4.3);
   before Verbal Noun suffix –ú or –ý (§4.2.2.1);
   when the AN category is defocalized in a main clause, in the unsuffixed Perfective (§10.1.2.2);
   as compound initial when final is a nominalized verb (§5.1.2-4, §5.1.8-10).

b. **H(H…)L**
   unsuffixed Perfective participle in a relative clause (§14.1.3);
   (for participles as agentive compound finals, and for H-toned verb stems before Pseudo-Causative –wv̀, see under nouns).

c. **H(L…)L**
   when initial in one type of iteration (§11.6.3).

d. **all-H**
   Imperative stem for most Cv:– and CvCv– verbs (§10.4.1);
   (for participles as agentive compound finals, see under nouns).

Example: bɛ̀rɛ́– ‘get’: bɛ̀rɛ́ noninitially in a chain; tone-dropped bɛ̀rɛ̀– as unsuffixed Perfective (e.g. after another focalized constituent), in Imperfective

Negative bèrè-gó-, and in Verbal Noun bèr-ú ; H(H…)L unsuffixed Perfective bérè- in relative clauses; and all-H Imperative béré.

For the difference between the two {HL} overlays, H(H…)L and H(L…), see §3.7.2.3, below.

Tone-dropping can also apply at word-level, i.e. to the unit consisting of a verb plus its AN and/or pronominal suffixes. This is observable with Imperfective Negative -gó- and Perfective Negative -lí-, which (like the positive unsuffixed Perfective) can appear in a word-level L-toned form (i.e. with -gò- or -lì-) when aspect is defocalized. Similarly, participles that include lexical or grammatical H-tone components drop these tones before modifying elements that regularly force tone-dropping on a preceding modified noun, e.g. kâːⁿ ‘any, each’.

There is one Tone-Grafting process for verbs.

(xx2) Tone-Grafting for Verbs

> **unsuffixed Imperfective** (positive): floating (unassociated) L-tone is added after the final segment of verb stem (before inflectional suffixes)

Inflectable verb stems are monosyllabic Cv́ː- or Cv̌ː-, or longer stems ending in …Cv́-. The unsuffixed Imperfective equivalents are Cv̂ː- (F-tone), Cv̌̀ː- (<LHL> tone), and /…Cv̂-/, respectively; the latter is lengthened to …Cv̂ː- before a zero suffix by Contour-Tone Mora-Addition (§3.7.3.5).

The general formula for an inflected verb is [verb + AN + pronominal-subject], where AN is aspect-negation. The pronominal suffixes themselves have no intrinsic tones. Instead, the tone of the preceding vowel extends into the pronominal suffix. The same is true of (nonzero) Participial suffixes, which are simply the usual nominal suffixes (Sg -n, Pl -m). For the phonology, see Atonal-Suffix Tone-Spreading (§3.7.3.5, below).

3.7.2.2 Grammatical tones for noun stems

The addition of (human) Sg -n or (human) Pl -m to a noun does not change the tone. Lexical nouns therefore have no suffixally controlled tone overlays. The tone of the preceding vowel is carried through to the end of the syllable: ànsáːrá-n ‘a white person’, jémɛ̀-n ‘blacksmith’. For a handful of nouns, the Sg or Pl suffix allows a final contour tone (F or R) on a stem-final short vowel to be expressed, with the suffixal nasal providing the needed extra mora; see the treatment of lexical tones of nouns, above.

Verbal Nouns (nominalizations of lexical verbs) have a suffixally controlled **L(L…)H** pattern, with H on the VblN suffix -ú (§4.2.2.1). The suffix is apocopated in some cases, especially with bisyllabic stems, resulting in R-toned monosyllables.

Lexical nouns, and derived nominals such as Verbal Nouns, undergo the tone overlays in (xx1), omitting patterns confined to unproductive compound types. Agentive participles are included as “nouns” for this purpose.

(xx1) Tone Overlays for Nouns

a. **tone-dropping** (all-L)
before modifying adjective or demonstrative (§6.3-4);
before kâ:ⁿ ‘each, any’ (§6.8.1);
as initial of some compounds (§5.1.2-4, §5.1.9-10);
as head of relative clause (§14.1.3).

b. **H(H…)L**
inalienable kin term after possessor (§6.2.2);
as final in some compound types (§5.1.5);
pseudo-causative nominalization from verb (§9.3).

c. **all-H**
as participial final in some agentive compounds (§5.1.9);
a few unaffixed deverbal nouns (§4.2.4);

Tone-dropping is seen in úró ‘house’, ùrò jɛ́m ‘(a) black house’ with modifying adjective, and ùrò ù ɛ̂:-∅ ‘the house that you-Sg saw’ in a relative clause. Tone-dropping of a noun is not triggered by a following numeral or postposition: ànsá:rá-n túrú ‘one white man’, jɛ́mɛ̀-n lɛ̀ ‘to/for the blacksmith’. The same noun úró drops its tones as a compound initial in ùrò-dǐŋ-∅ ‘neighboring family’ and ùrò-dú: ‘family’.

H(H…)L is seen with inalienable kin term ɔ̀wⁿɔ́ ‘(a) parent-in-law’ in possessed forms like ú ɔ́wⁿɔ̀ ‘your parent-in-law’. This overlay occurs in the compound final of ànáɣɔ̀-n ‘village chief’. For the detailed phonology of the H(H…)L overlay, see §3.7.3.2, below.

The all-H contour does not apply to a lexical noun as such, rather to the participialized verb in agentive compounds of the type [x̀ v́-Ppl], as in àsɛ̀gɛ̀-háybɛ́-n ‘animal custodian’ (verb háybɛ́- ‘watch over’).

There is one Tone-Grafting process (xx2).

(xx2) Tone-Grafting for Nouns

tonal locative: L-tone added to final segment of noun

Examples: úró ‘house’, locative úrò ‘in the house, at home’; ká: ‘mouth’ and kâ: ‘in the mouth; nùmó ‘hand’ and nùmô: ‘in the hand’; gɔ̌: ‘granary’ and gɔ̌ː ‘in the granary’; gŭn ‘back (body)’, postposition gŭnǹ ‘behind’. A fuller set of forms is given in §8.1. For the phonology, which is distinct from that at work in the unsuffixed Imperfective of verbs, see §3.7.3.3, below.

3.7.2.3 Grammatical tones for adjectives and numerals

Adjectival suffixation (not applicable to cardinal numerals) involves the same (human) Sg -n and (human) Pl -m suffixes just mentioned for nouns, and again the nasal consonants in these suffixes simply carry forward the tone of the preceding vowel. Examples: pírú 'white' in nonhuman ùrò pírú 'white house', human Sg ì-n pírí-n 'white (light-skinned) boy', and human Pl ùr^{n}-ùm pírí-m 'white children'; érù 'sweet', Sg ér-ìn, Pl ér-ùm. Adjectives often end in a consonant, in which case the suffixed forms have a high vowel i or u (often interchangeable, or phonetically ambiguous), and the resulting change in syllabic structure permit contour-toned monosyllabic adjective stems to express the two tone segments in different syllables: gǒn 'crooked', Sg gòn-ín, Pl gòn-úm ; ôy 'rotten', Sg óy-ìn, Pl óy-ùm.

Lexical adjectives undergo the tone overlays in (xx1). Most of the tone-dropping cases are the same as those for nouns, since they apply to the final word (noun or adjective) in a core NP.

(xx1) Tone Overlays for Adjectives

a. **tone-dropping** (all-L)
before modifying adjective or demonstrative (§6.3.3.1);
before kâ:^{n} 'each, any' (§6.8.1);
as head of relative clause (§14.1.3);
as predicate (unsuffixed Perfective), when aspect is defocalized (§11.xxx);
as predicate, in comparatives (§12.xxx).

b. **H(H…)L**
in modifying function, in comparatives (§12.1.3);
as final in bahuvrihi compounds (§5.2.1).

Numerals share some of these processes with adjectives. Numerals undergo tone-dropping when this is induced by the wider syntactic context, namely in NPs that head relative clauses. Numerals have an Ordinal suffix -nɛ́ that forces tone-dropping on the stem. Numeral stems, like adjectives, can function as finals in bahuvrihi compounds and in this case take the H(H…)L tone overlay. More interestingly, there is an unusual **tone-dissimilation** process applicable to pɛ́rú- 'ten' as initial in decimal numerals; see §3.7.3.4, below.

3.7.3 Tonal morphophonology

3.7.3.1 Autosegmental tone association (verbs)

The suffixal derivations (e.g. reversive, causative) involve addition of a final -Cv́- suffix, adding one monomoraic syllable to the stem (§9.xxx). A handful of lexical idiosyncracies in tone relationships are observed, but the productive tonal relationships of input to suffixal derivative are those in (xx1). The hyphen in the right-hand column corresponds to the stem-suffix boundary in the derivative.

(xx1)		input	derivative
	a.	H	H-H
		HH	HH-H
		HHH	HHH-H
	b.	R	L-H
		LH	LL-H
		LLH	LLL-H

In other words, if the input stem is all-H, so is the derivative. If the input stem has only a final-mora H, so does the derivative (entailing a "jump" of this H-tone from the final syllable of the underived stem to the suffixal syllable). An example of the latter: bùró- 'be revived', causative bùrù-gó- 'revive (someone)'.

This problem can be easily resolved within either the default-final-mora-H analysis (mentioned but not endorsed in §3.xxx, above), or the autosegmental model that I prefer. In the former, the verbs in (xx1.b) are underlyingly L-toned. Both the simple stem and the derivative undergo a late rule creating an H-tone for the final mora, in order to satisfy the constraint against all-L stems.

In the autosegmental model, the difference between (xx1.a) and (xx1.b) is that the autosegmental level has (lexically specified) {H} in the first case and bitonal {LH} in the second. It is then necessary to specify that the H is associated to the final mora of a verb stem, as already stipulated in **(xxx) in §3.xxx**, above. The interesting point is that this association is post-derivational; that is, it applies to suffixally derived stems in the same way as to underived stems. There is no evidence for cyclical application. The derivations of bùró- 'be revived' and its causative are as in (xx2), omitting detail not relevant here.

(xx2)		'be revived'	'revive (someone)'	comment
	a.	buro-, {LH}	buro-, Caus, {LH}	lexical input
	b.	—	buru-go-	causative derivation
	c.	bùró-	bùrù-gó-	tonal association

3.7.3.2 Phonology of H(H…)L and H(L…)L tone overlays

There are two {HL} tone overlays, the widespread H(H…)L and the special pattern H(L…)L that occurs in the first stem in one type of verb iteration. The two overlays

can therefore be distinguished only with verbs of three or more syllables. Take, for example, gàmàrⁿá- ‘divide, share’. The H(H…)L overlay results in HHL in the unsuffixed Perfective gámárⁿà- in relative clause participles. In the relevant iteration pattern (§11.xxx), HLL appears in the first part of gámàrⁿà-gàmàrⁿà.

The existence of two distinct {HL} overlays is obviously a problem for an autosegmental approach to Jamsay tones, and perhaps to any other “phonological” approach. However, there is a clear asymmetry. H(H…)L occurs widely in Jamsay, turning up in multiple grammatical contexts involving all lexical word classes.

The H(L…)L pattern occurs in one verb-stem iteration pattern that may involve up to three L-toned stem iterations following the initial H(L…)L occurrence (§11.xxx). For example, a trisyllabic verb with two iterations has a tone pattern HLL-LLL-LLL. The iterations have clearly undergone tone-dropping, erasing lexical tones, but one can argue that the tone-dropping begins with the second syllable of the first occurrence, hence H[LL-LLL-LLL]. This, plus the initial H-tone (which is not lexical), suffice to characterize the tones of this iteration construction. This is a unique, global tone pattern overlaid on the entire sequence of stems, not a stem-specific overlay like that for all of the H(H…)L overlays. Moreover, this iteration pattern is highly marked stylistically, being typical of narrative style, unlike the stylistically prosaic constructions that require H(H…)L overlays.

Given that **H(H…)L** is clearly the regular instantiation of {HL} in tone overlays, the question arises whether the association rules for this overlay are the same as those for basic stems of autosegmental type {HL} as described above. The basic generalization for tone-component association for stems, extracted from **(xxx) in §3.xxx**, above, is repeated here as (xx1).

(xx1) associate final L (preceded by H) to the final mora

For example, the basic lexical forms of {HL} noun stems with a final bi- or trimoraic syllable are overwhelmingly …F rather than …L in form. For example, the (C)vCvC segmental shape has 18 cases of HF (C)v́Cv̂C against zero cases of HL #C)v́Cv̀C (§3.xxx, above). The asymmetry extends to trisyllabic stems, e.g. of shape (C)vCvCvC, where we get a total of 8 …F stems including 5 HHF (C)v́Cv́Cv̂C against zero …L stems.

To see whether the grammatical H(H…)L overlay is consistent with this, we must review how it applies to mono-, bi-, and trimoraic stems. To do this, we must piece together an overall picture from facts gleaned from the individual subtypes.

For inflected verb stems, the H(H…)L overlay occurs in **unsuffixed Perfective participles** (in relative clauses). The input-output relations are indicated in (xx2). The overlay is limited to stems, disregarding pronominal-subject suffixes (which have no intrinsic tones and so will eventually acquire their surface tone by low-level rules). All inflected verb stems of more than one syllable end in a Cv́ syllable (not Cv́ː or Cv́C), so we do not have a full range of syllabic types. The lexical tones of the inputs are irrelevant to the outputs so they are not indicated here.

(xx2) basic form of verb unsuffixed Perfective participle

a. monosyllabic

Cv:-	Cv̂:-

b. bisyllabic

Cv(C)Cv-	Cv́(C)Cv̀-

c. trisyllabic

Cv(C)CvCv-	Cv́(C)Cv́Cv̀-

d. quadrisyllabic

Cv(C)CvCvCv-	Cv́(C)Cv́Cv́Cv̀-

In the monosyllabic case, no choice of association patterns is available, since bitonal {HL} must associate its two components to the two available moras, respectively. In the non-monosyllabic cases, we cannot determine whether the final L tone-component is associated with the final syllable or with the final mora, since the two converge in every case. The quadrisyllabic case shows that the H can extend into the third syllable from the left. Example: gɔ̀lɔ̀rɔ̀-wɔ́- ‘cause to snore’, Perfective participle gɔ́lɔ́rɔ́-wɔ̀-, as in dɔ̀gùrɔ̀ gɔ́lɔ́rɔ́ mí wɔ̀ gɔ́lɔ́rɔ́-wɔ̀-∅ ‘when he/she made me snore’. Since no known verb has more than four syllables, it appears that once the L-tone is associated with the final syllable/mora, the H-tone fills up the remainder without limit.

Inalienable kin terms have H(H…)L when possessed, but their basic lexical form when absolute (§6.xxx). Representative data are in (xx3).

(xx3)

	gloss	absolute	possessed
a. monosyllabic			
	‘father’	dě:	dê:
b. bisyllabic			
	‘husband’	àɣá	áɣà
	‘(man’s) sister’	yɛ̀sǎ:	yɛ́sâ:
c. trisyllabic			
	‘(woman’s) brother’	àsàrⁿá	ásárⁿà
	‘sister’s child’	léjéwé-n	léjéwè-n
	‘grandchild’	tíríwɛ̀-n	tíríwɛ̀-n

Again, in the monosyllabic case there are no choices to be made; when possessed, the {HL} tone pattern can only be expressed using both input moras, so we get a F-toned monosyllable. In the bisyllabic cases, ‘husband’ with its monomoraic syllables can only come out as HL when possessed. However, ‘(man’s) sister’ does provide some new information: for a CvCv: stem, the H component spreads into the onset of the second syllable, resulting in a HF pattern (yɛ́sâ:). The trisyllabic cases

do not extend the H into the third syllable, even in ‘sister’s child’ and ‘grandchild’ where the Sg -n suffix would make a HHF tone pattern possible. However, if the domain of H(H…)L is the stem, disregarding the suffix, ‘sister’s child’ and ‘grandchild’ are (C)vCvCv- stems of the same type as ‘(woman’s) brother’, and there is no reason to expect a final-syllable contour tone in the possessed form.

Modifying adjectives following **comparative** gá:rá ‘more, most’ have H(H…)L contours. Some examples are in (xx4).

(xx4)	gloss	regular form	as modifying after gá:rá
a. monosyllabic			
	‘black’	jɛ́m	jɛ̂m
b. bisyllabic			
	‘bad’	mɔ̀ñú	móñù
c. trisyllabic			
	‘smooth’	ɔ̀nùrⁿú	ónúrⁿù

Again, the H(H…)L tone overlay applies to stems, disregarding suffixes. Thus gùrú ‘long’ has an H(H…)L form gúrù, from which (adding Sg -n) we get human Sg HL-toned gúrì-n (not HF-toned #gúr-î:n).

Bahuvrihi compounds have H(H…)L finals. The tones of these finals are consistent with what we have seen so far in this section. A useful datum is that HH-toned numeral kóróy ‘six’ appears as HF -kórôy in e.g. mírⁿé-kúrôy ‘having six voices’. This is parallel in tonal pattern to possessed HF-toned yɛ́sâ: ‘sister’ mentioned above.

This leaves nominal **compounds** whose finals have H(H…)L tones. The data are consistent with what we have seen in the preceding types. Examples are in (xx5).

(xx5)	gloss	regular form	as compound final
a. monosyllabic			
	‘load’	dú:	-dû:
b. bisyllabic			
	‘sesame’	námñú	-námñù
c. trisyllabic			
	‘cat’	nì-nìwⁿé	-ní-níwⁿè

To test for tone patterning with trisyllabic stems ending in a bimoraic syllabic, I elicited a term for (nonexistent) ‘wild cassava’, with the productive initial èjú- ‘field’ or ‘bush, outback’, which is used in several ‘wild X’ terms. ‘Cassava’ is

bànàkû:ⁿ (Bambara loan). The elicited compound came out as èjú-bánákû:ⁿ. There is a possibility that the word for ‘cassave’ is a crypto-compound (bànà-kû:ⁿ), which is in fact etymologically correct (in the Bambara source), so we must be circumspect about assessing this datum. However, on the face of it, èjú-bánákû:ⁿ does suggest that the H in the H(H…)L overlay can spread into the onset of a bimoraic third syllable. If so, this strongly supports the view that the H(H…)L overlay has the same set of realizations as autosegmental {HL} in lexical stems as documented above. I conclude that the **H(H…)L overlay reduces to autosegmental {HL}**.

3.7.3.3 Phonology of Tone-Grafting

There are two grammatical contexts calling for Tone-Grafting. These are the tonal locative of nouns, and the unsuffixed Imperfective of verbs. In both cases, a L-tone is grafted onto the end of the stem. However, the phonology differs subtly in the two cases.

Tonal locatives can be formed from a limited number of noun stems. A few noun-like spatial postpositions are also tonal locatives in form. A tonal locative cannot be followed by a suffix, so there is no further phonology to worry about beyond the formation of the tonal locative itself.

As it happens, there are no stems with lexical …HL or …F tone that have tonal locatives. If they did, the tonal locative would be homophonous with the simple stem. In addition, no uncompounded noun stem of two or more syllables ending in a bi- or trimoraic syllable has a tonal locative. As a result, the phonological range of inputs is rather limited: H- and R-toned Cv: (xx1.a-b), R-toned Cv̌n (xx1.c), and longer stems ending in H-toned …Cv́ (xx1.d-e).

(xx1)		noun	tonal locative	comment
	a.	Cv́:	Cv̂:	
	b.	Cv̌:	Cv̌ˀ	Cv̌ˀ = trimoraic Cv̀v́v̀
	c.	Cv̌n	Cv̌nˀ	Cv̌nˀ = trimoraic Cv̀ńǹ
	d.	…CvCv́	…CvCv̀	
	e.	…Cv̀Cv́	…Cv̀Cv̂:	

Examples: ká: ‘mouth’ and kâ: ‘at the mouth; gǒ: ‘granary’ and gǒˀ ‘in the granary’, gǔn ‘back (body)’ and postposition gǔnǹ ‘behind’, úró ‘house’ and úrò ‘in the house, at home’, bòró ‘bottom’ and bòrô: ‘at the bottom’.

In (xx1.a) and (xx1.d), there is no increase in moras. (xx1.a) goes from long H-toned vowel to long F-toned vowel. (xx1.d) goes from …HH (last two syllables H-toned) to …HL. However, in the other three cases the final syllable grows an extra mora. In (xx1.b), tonal locative Cv̌ˀ is, properly speaking, Cv̀v́v̀ with a bell-shaped tone requiring three moras (the extra duration is audible). (xx1.e) likewise goes from

final monomoraic Cv́ to final bimoraic Cv̂ː. In (xx1.c), the final n is noticeably lengthened, and a phonetically more revealing transcription would be Cv̀ńǹ.

These additional moras are needed to give audible expression to the central feature of tonal locatives, namely an extra L-tone grafted onto the end of the noun. To understand the phonology, it is necessary to recognize that the input Cv́ː in (xx1.a) has a single H autosegment spread over both moras of the long vowel, and that the input in (xx1.d) has a single H autosegment spread over (at least) the last two syllables. In these cases, the grafted L occupies the final mora, without completely erasing the existing lexical H. In (xx1.b-c,e), if the grafted L simply occupied the final mora, the existing lexical H would be completely erased. This is not allowed, so the only solution is to extend the final segment, creating an additional mora to accomodate the grafted L. This is taken care of by a low-level rule, Contour-Tone Mora-Addition, see §3.xxx, below.

For the **unsuffixed Imperfective**, things are subtly different. The phonologically relevant typology of inputs is this: H- and R-toned Cvː-, and longer stems ending in H-toned short vowel (…Cv́-). (The one consonant-final quasi-verb, kùn- 'be in', has no imperfective forms.) The input-output relationships are as in (xx2).

(xx2)	verb	unsuffixed Imperfective	comment
a.	Cv́ː-	Cv̂ː-	
b.	Cv̌ː	Cv̌ː̀-	if -∅ suffix, Cv̌ː̀-∅ = Cv̀v́v̀
c.	…Cv́Cv́-	…Cv̀Cv̂-	if -∅ suffix, …Cv̂ː-∅
d.	…Cv̀Cv́-	…Cv̀Cv̂-	if -∅ suffix, …Cv̂ː-∅

Examples: tíː- 'send' and tîː-, yǎ.- 'go' and yǎː̀-, páɣá- 'tie' and /páɣâ-/, jùgóː- 'know' and /jùgôː-/.

Unlike the case with tonal locatives, the H-tone component is never deleted on the final input vowel, even when, as in (xx2.c), it is part of an autosegment extending over at least the last two syllables. This is the crucial phonological difference between the unsuffixed Imperfective and the tonal locative.

The unsuffixed Imperfective is followed either by pronominal-subject suffixes (e.g. 1Sg -m, 3Sg -∅, 3Pl -ba) or, in relative clauses, by Participial suffixes (Nonhuman -∅, Sg -n, Pl -m). These suffixes may have the shape -∅, -C (nasal), or -Cv, and all of them are atonal (they lack intrinsic tones of their own). The tone patterns of the -∅ and -C cases can be handled by simple, lower-level tone rules. With -∅ suffix, the final vowel of the unsuffixed Imperfective must be prolonged by an extra mora where necessary to permit all tone components to be expressed; this is the case in (xx2.b-d) but not (xx2.a); see Contour-Tone Mora-Addition, §3.xxx. With -C suffix, the contour tone is realized over the entire resulting bi- or trimoraic syllable; see Rightward H-Spreading, §3.xxx.

The atonal -Cv suffix is more interesting phonologically. The two suffixes in question are 3Pl -ba and 2Pl -be. Consider the data in (xx3).

(xx3)		gloss	lexical	3Sg Impf	1Sg Impf	3Pl Impf
	a.	‘send’	tí:-	tî:-∅	tî:-m	tí:-bà
	b.	‘go’	yǎ:-	yǎ̀:-∅ [= yàáà-∅]	yǎ̀:-m [= yàá-m̀]	yǎ:-bà
	c.	‘know’	jùgɔ́-	jùgɔ̂:-∅	jùgɔ́-m̀	jùgɔ́-bà

For all three verbs in (xx3), the 3Pl unsuffixed Imperfective (rightmost column) expresses the grafted L exclusively on the 3Pl suffix, so the preceding syllable is H- or R-toned as per its lexical form. In the cases of (xx3.b-c), it would be possible to first graft the L onto the stem-final syllable, allow the L to spread to the suffixal syllable by Atonal-Suffix Tone-Spreading (§3.xxx, below), and then simplify the stem-final syllable to R in (xx3.b) and to H in (xx3.c) on the grounds that these syllables do not have enough moras to express their respective contour tones, see Contour-Tone Simplification (§3.xxx, below).

Objection: there is no purely phonological reason why /tî:-bà/ ‘they will send’ should reduce its stem tone from F to H to produce tí:-bà. We do in fact get a surface F-tone before 3Pl -bà in combination with Perfective allomorph -â:-, as in náŋ-â:-bà ‘they have forgotten’. Since a long F-toned vowel can be pronounced before a -Cv̀ suffix, I reject a derivation of H-L tí:-bà via F-L /tî:-bà/. This suggests that Tone-Grafting onto the stem-final syllable does not, as such, take place when a nonzero suffix is present; rather, the L is simply positioned between the stem and the suffix, and will attach itself to the suffix (i.e. to the right) rather than to the stem. Thus the correct derivation of tí:-bà is (xx4.a), not (xx4.b).

(xx4) a. /tí:- L -ba/

tí:-bà	Tone-Grafting (onto suffix)

b. /tí:- L -ba/

/tî:-ba/	Tone-Grafting (onto stem)
/tî:-bà/	Atonal-Suffix Tone-Spreading
tí:-bà	Contour-Tone Simplification (??)

The same process occurs when ≡kɔ̀ ‘be (nonhuman)’, marking Nonhuman subject, follows the unsuffixed Imperfective: tí:≡kɔ̀ ‘it will send’.

The Tone-Grafting processes can be summarized as (xx5).

(xx5) **Tone-Grafting**

a. an L-tone component is positioned at the end of the stem

b. integration:

tonal locative:

this L occupies by itself the final mora, unless this would entirely erase an existing lexical H, in which case the L is co-linked along with this H to the final moraic segment.

unsuffixed Imperfective:

i. if a nonzero pronominal-subject suffix (necessarily atonal and monomoraic) or a following Nonhuman subject clitic ≡kɔ̀ is present, the L occupies the suffixal mora;

ii. if not, the L occupies by itself the final mora of the stem, unless this would entirely displace an existing lexical H from the final syllable, in which case the L is co-linked along with this H to the final moraic segment of the final syllable.

3.7.3.4 Tone-Dissimilation (decimal numerals)

Decimal numerals from ‘20’ to ‘90’ are composites of pérú- ‘ten’ plus a single-digit numeral. (xx1) presents data; for further discussion see §4.xxx.

(xx1)	gloss	form
a.	‘10’	pérú
b.	‘20’	pél-lèy
	‘30’	pét-tà:n
	‘40’	pén-nàyⁿ
	‘50’	pén-nù:yⁿ
c.	‘60’	pèrù-kúróy
	‘70’	pèrù-sûyⁿ
	‘80’	pèrù-gá:rà
	‘90’	pèl-lá:rúwà (or: pèl-lá:rwà)

In ‘20’ through ‘50’, the single-digit numeral is R-toned, though it appears as L-toned when phrase-final but preceded by a compound initial or a modified noun. In any event, these single-digit numerals (‘2’ to ‘5’) begin with a L-tone component. On the other hand, numerals ‘6’ to ‘9’ begin with a H-tone component.

The unusual feature of the decimal numerals is that the tone of pérú- (reduced to pér- in ’20-50’ and in ‘90’ by Post-Sonorant Syncope, §3.xxx), is the opposite of the initial tone component of the final. Since the underlying form is H-toned pérú, it suffices to drop the tones when it is the initial in ’60-90’.

(xx2) **Tone Dissimilation**

In decimal numerals beginning with pérú- ‘ten’, this morpheme drops its tones when the following single-digit numeral begins with a H-tone

I know of no other tone dissimilation process in Jamsay.

3.7.3.5 Atonal-Suffix Tone-Spreading

There are a number of suffixes with no intrinsic tone of their own that can be added to nouns, adjectives, and verbs. The relevant phonological shapes are -∅ (zero), -C (-n or -m, i.e. always a nasal), and syllabic -vC or -Cv.

The **nasals** are phonologically straightforward for nouns and verbs, since the relevant stems are vowel-final and these vowels carry tones. These tones are simply spread over the resulting bi- or trimoraic syllable in a natural way. If the tone is simple H or L, it just spreads to the nasal. If it is a contour tone, the final tone component is realized on the nasal; see Contour-Tone Stretching, §3.xxx, below.

There are two morphological combinations, however, where an atonal suffix is added to a tone-specified stem (xx1).

(xx1) a. Sg -in or Pl -um after C-final adjective
b. 3Pl -ba or 2Pl -be in inflected verb

In both cases, there are some issues involving stems that end in a contour tone; these will be taken care of in connection with Final-Tone Resyllabification (§3.xxx, below). For present purposes it suffices to point out that the final tone of the stem is spread into the previously atonal suffixal syllable. This is seen most clearly when the final syllable of the unsuffixed stem is monotonal H or L. For adjectives, only H-tone occurs (xx2).

(xx2) jɛ́m ‘black’
Sg jɛ́m-ín, Pl jɛ́m-úm

For verbs, both H- and L-tones can be adduced (xx3).

(xx3) a. yà:- ‘go’ (unsuffixed Perfective)
3Pl yà:-bà, 2Pl yà:-bè

b. yà:-gó- ‘go’ (Imperfective Negative)
3Pl yà:-gó-bá, 2Pl yà:-gó-bé

(xx4) **Atonal-Suffix Tone-Spreading**

an atonal suffix acquires its tone by spreading from the final preceding tone

This process does not apply to 3Pl -ba and 2Pl -be in the unsuffixed Imperfective. In this case, Tone-Grafting (§3.xxx) has already provided these suffixes with a tone, by associating the L-tone (sole marker of the unsuffixed Imperfective) with the suffixal mora.

3.7.3.6 Pronominal-Suffix Tone-Raising

When an atonal pronominal-subject suffix is preceded by a verb (or verb plus AN suffix) whose final tone component is L, the suffix normally gets L-tone by Atonal-Suffix Tone-Spreading (§3.xxx, above).

However, in the unsuffixed Perfective, under some conditions the subject suffix can "grow" a H-tone. When asked to pronounce unsuffixed Perfectives in isolation, informants sometimes showed suffixal H-tone: 1Sg làɣà-ḿ, 2Pl làɣà-bé. This H-tone was not observed in texts when the unsuffixed Perfective is clause-final (as it usually is). However, when it is followed by clitic ≡ỳ 'it is' or some other postverbal element, the H-tone for syllabic suffixes was audible in many textual examples, though not consistently. Examples are in (xx1).

(xx1) a. [kó bírɛ́] ɛ́: mèyⁿ kò-rú yɔ̀wɔ̀-bá≡ỳ
[NonhP work] see and Nonh-with accept.Perf.L-**3PlS.H**≡it.is
là: dèy kó dènè-l-á
Neg if NonhO like-Perf.Neg-3PlS
'Instead of seeing how it (=plow) worked and accepting it, they didn't like it.' **2004.3.7**

b. [á ànáˊ] dà:ⁿ-ẃⁿ kâ:ⁿ
[2SgP village] sit.Perf.L-**2SgS.H** even
'even if you are sitting in your village' **2004.3.24**

c. [bé ɔ̀ɣɔ̌-m] yɛ́ dà:ⁿ-bá jì:ⁿ
[3Pl chief-Pl] PlS be.sitting.L-**3PlS.H** Past
'They the (colonial) leaders, they were sitting (=living) here?' **2004.4.22**

What I suspect is going on here is that, under some morphosyntactic conditions and in isolation, the Constraint Against All-L-Toned Stems (§3.xxx) has come into play, this time at word- rather than stem-level. The principle is disregarded in clause-final unsuffixed Perfectives, but is activated in combination with clitic ≡ỳ or other post-verbal morpheme.

The same speaker who gave (xx1.a), above, also raised the tone of ≡ỳ itself, spoken in isolation, after the zero-suffix 3Sg verb form in (xx2).

(xx2) yɔ̀wɔ̀-∅≡ý
accept.Perf.L-**3SgS**≡it.is
'(instead of) he/she accepting (it)'

To model this form, one might suggest adding a floating H-tone at the end of the verb form (before the clitic), and allow the tone to be expressed audibly on the clitic (in the absence of a mora-bearing suffixal segment).

If this analysis is correct, the occasional H-toned pronominal-subject suffix (following an L-toned stem) does not represent the underying tone of the suffix, rather is due to an inconsistently applied process based on the constraint mentioned.

Somewhat similar problems arise with particles like dèy 'if' and clause-chaining mèy^{n}, which are typically L-toned, but appear with high pitch (with varying degrees of systematicity) in some constructions. Here, however, there is a strong intonational element that is difficult to tease apart from strictly tonological factors.

3.7.4 Low-level tone rules

3.7.4.1 Contour-Tone Mora-Addition

In Jamsay, a contour tone can only be expressed in a syllable that has at least one mora for each tone component; F and R require two moras, while <LHL> requires three. There are clear cases where word-final F (i.e. <HL>) and <LHL> force addition of an extra mora on the final syllable. There are no such examples of lengthening to accomodate an R-tone, and in fact there is one apparent (but debatable) case where a final R-tone simplifies to H-tone.

Consider the unsuffixed Imperfective, and the (marked) Perfective, of nùmó- 'fall' (xx1). Pronominal suffixes of the form -C (nasal), -Cv, and -∅ are shown.

(xx1)		Imperfective	Perfective	comment
	stem	/nùmó- L/	/nùmó-â:/	
	1Sg	nùmó-m̀	nùm-â:-m	= nùmó-m̀, nùm-á:-m̀
	3Pl	nùmó-bà	nùm-â:-bà	
	3Sg	nùmô:-∅	nùm-â:-∅	

The Perfective has a long -â:- throughout. Phonetically, what I transcribe as 1Sg nùm-â:-m is realized as [nùmá:m̀] with the final pitch drop on the nasal, so a minor rule (Contour-Tone Stretching, §3.xxx) will be needed.

The unsuffixed Imperfective stem is expressed by adding an L-tone component after the stem. I have argued above that the L is directly grafted onto a following nonzero suffix, hence 1Sg nùmó-m̀ and 3Pl nùmó-bà.

The remaining form to account for is 3Sg nùmô:-∅. Here the suffix is zero, so there is nothing on its right for the L to associate with. It therefore co-links with the moraic segment to its left. At this point, the o of nùmó- is linked to a bitonal HL sequence (nùmô-∅). This cannot be pronounced as such. The solution is to add an

extra mora, lengthening the final vowel to allow the contour tone to be pronounced: nùmô:-∅, i.e. nùmóò-∅.

There are also cases where a bimoraic long vowel with R-tone must be expanded to trimoraic to accomodate an additional grafted L-tone component, resulting in bell-shaped <LHL>. For example, R-toned yǎ:- 'go' has a 3Sg unsuffixed Imperfective composed of /yǎ:- L -∅/. It is realized as yǎ̀:-∅, i.e. as trimoraic yàáà-∅, with a vowel that is noticeably longer than that of simple R-toned yǎ:-.

I formulate the basic rule as (xx2).

(xx2) **Contour-Tone Mora-Addition**

a. A word-final monomoraic vowel with F-tone is lengthened to bimoraic.
b. A word-final bimoraic long vowel with a bell-shaped tone (<LHL>) is lengthened further to trimoraic

This rule applies only to word-final vowels. Word-medially, when there are too many tone components for a syllable, we get Contour-Tone Simplification instead (§3.xxx, below).

All of the examples given involve F (i.e. <HL>) or <LHL> tones. In effect, the extra mora is always added to accomodate a final L-tone component. This may be an accidental result of the fact that there do not happen to be any R-toned short vowels in any specific derivation. However, it is possible that R-tones fail to cause addition of a mora.

Consider òɣǒ-n 'chief, Hogon'. This is one of the handful of bisyllabic noun stems ending in a monomoraic syllable that have a final R or F tone. The contour tone is expressible, thanks to the fact that these stems normally require a suffix, Sg -n or Pl -m, which provide the needed extra mora. However, for òɣǒ-n, there is an unsuffixed nonhuman counterpart, òɣó 'leader (e.g. of animal pack)'. Parallel to the F-toned cases considered above, we might have expected #òɣǒ: with an extra mora to permit the full R-tone to be expressed, but no lengthening occurs. This suggests that a **final R-tone does not force Contour-Tone Mora-Addition**. For the tone reduction, see Final-Cv R-to-H Reduction (3.xxx, below).

3.7.4.2 Contour-Tone Stretching

An F-toned syllable always has the drop in pitch (i.e. the L tone component) on the final mora of a CvC or Cv:C syllable.

This may require stretching of the H tone-component. The clearest examples are when a noun (or other word) ending in a long, F-toned vowel is followed by the 'it is' or Focus clitic ≡ỳ (xx1).

(xx1)	gloss	simple form	with ≡ỳ clitic
a.	'soldering metal'	pùgâ:^{n}	pùgá:^{n}≡ỳ^{n}

b. ‘owner of X’ X bâːⁿ X báːⁿ≡ỳⁿ

Assuming an autosegmental analysis, the tones are on a separate tier. An HL sequence is associated with the bimoraic final syllable of each input stem in (xx1.a). When the clitic is added, the L component shifts to the now syllable-final semivowel, allowing the H component to spread into the second mora of the syllable.

There is no stretching when the noun already ends in CvC, namely in Cvy, when clitic ≡ỳ is added. Thus tílây ‘duty, obligation’ combines with the clitic as tílây≡ỳ, which is pronounced just like tílây except for a prolongation of the semivowel.

In verbs, the stretching rule is needed for Sg or Pl perfective participles of monosyllabic stems. With the H(H…)L tone overlay that such participles require, monosyllabic stems have the form Cv̂ːC. When Sg –n or Pl –m is added, stretching applies. Example: verb áːC ‘catch’, H(H…)L unsuffixed Perfective form âːC, Sg participle âːCn (pronounced [ááⁿ]), Pl participle âːCm (pronouned [ááᵐ]). In the section just below on Final-Tone Resyllabification, I show that the latter rule precedes (and bleeds) Contour-Tone Stretching. In unsuffixed Imperfective forms with nasal suffix, e.g. áːC ‘catch’, 1Sg unsuffixed Imperfective áːCⁿ, my analysis involves a floating L-tone between stem and (atonal) suffix, hence /áːC L –n/. Although the output áːCⁿ is compatible with Contour-Tone Stretching, I prefer to posit an earlier rule for associating floating tones; see Tone-Grafting (§3.xxx). This accounts for the difference between unsuffixed Imperfective and unsuffixed Perfective forms in Final-Tone Resyllabification.

There are no morphological contexts where an R-toned final syllable precedes an H-toned sonorant suffix or clitic. However, lexical stems like nŭːyⁿ ‘five’ (a phonetically better transcription would be nùùýⁿ) do respect the stretching principle by holding off the pitch rise until the final mora.

(xx2) **Contour-Tone Stretching**

> The final tone-component of a contour tone is associated one-to-one with the final mora of its syllable, allowing a preceding tone-component to spread through the middle of the syllable.

If we were to disregard R-toned lexical stems here, and confine Contour-Tone Stretching to F-tones, the rule could perhaps be merged with Rightward H-Spreading, see below.

3.7.4.3 Final-Tone Resyllabification

As we have seen, an R- or F-tone in a stem-final CvC or CvːC syllable is articulated with the final L-tone component associated with the final C. There are a few cases, however, where a vowel-initial clitic or suffix is added. This leads immediately to resyllabification, whereby the stem-final sonorant becomes the onset of the syllable

containin the clitic or suffix. For example, R-toned [CV̌C] is a normal bimoraic syllable in isolation, but adding a suffix -vC forces resyllabification to [CV̌][C-vC]. This is problematic since the first syllable is now monomoraic but carries a two-part contour tone.

The relevant morphological combinations are: a) C-final adjective plus syllabic postconsonantal suffix allomorphs, usually Sg -in and Pl -um (§4.xxx); b) any word (usually a noun) plus syllabic allomorph ≡î: of the 'it is' or Focus clitic (§11.xxx).

Consider first the **adjectives** in (xx1). Here I show both the unsuffixed stem, used in modifying function for nonhuman referents and (for any referent) as a predicate, and a suffixed Sg form for human singular referents. In (xx1.c) I include a long-voweled adjective, in fact the only Cv:C adjective in my lexicon. A moraic transcription showing mora-by-mora tone associations, and syllabification with brackets, are given in addition to regular transcriptions.

(xx1)		gloss	stem		Sg form	
	a.	'firm'	déŋ	= [déŋ́]	déŋ-ín	= [dé][ŋ-íń]
	b.	'squeezed'	ěm	= [èḿ]	èm-ín	= [è][m-íń]
	c.	'cold, slow'	tôm	= [tóm̀]	tóm-ìn	= [tó][m-ìǹ]
		'newborn'	bâ:yⁿ	= [bááỳⁿ]	bá:yⁿ-ìn	= [báá][yⁿ-ìǹ]

The suffixes are atonal (they lack an intrinsic tone). Atonal suffixes acquire their tones by Atonal-Suffix Tone-Spreading (§3.xxx), which extends the final tone of the preceding morpheme into the suffix.

Since (xx1.a) is all-H-toned, resyllabification in the suffixed forms requires no tonal modifications. However, in the contour-toned cases (xx1.b-c), resyllabification has left behind a monotonal medial syllable. The stem-final sonorant is now the onset of the word-final syllable. As syllabic onset, it is non-moraic, and the tone it brings with it to the final syllable cannot be directly expressed. However, this is moot since Atonal-Suffix Tone-Spreading has already copied the tone in question onto the nucleus of the final syllable.

Examples of postconsonantal allomorph ≡î: **'it is' clitic** are in (xx2).

(xx2)		gloss	stem		'it's ...'	
	a.	'like that'	cín		cín≡î:	
		'spleen'	cènɛ̀-pá:làm		cènɛ̀-pá:làm≡î:	
	b.	'tomtom'	běn	= [bèń]	bèn≡î:	= [bè][n-íì]
		'cotton'	nă:m	= [nààḿ]	nà:m≡î:	= [nàà][m-íì]
	c.	'parasol'	ílíwâl	= …[wál̀]	ílíwál≡ì:	= …[wá][lìì]

‘forest’ û:n = [úúǹ] ú:n≡ì: = [úú][n-ì ì]

In (xx2.a), the syllable preceding the clitic is monotonal H or L. Resyllabification of the stem-final consonant has no tonal effect on the stem-final syllable. In (xx2.b-c), on the other hand, resyllabification deprives the stem-final syllable of its second tone-component, which is relocated into the final syllable. The output bèn≡î: with F-toned clitic instead of #bèn≡ǐ ̀: with final <LHL> is handled by Clitic <LHL>-Reduction (§3.xxx, below). For this to work, however, it is first necessary to specify that a tone component associated (after resyllabification) with a syllable-initial consonant is transferred to the nucleus of that syllable.

Of particular interest is the way resyllabification applies to relative-clause participles ending in Sg -n or Pl -m. Such a participle can have a final-syllable contour tone under two conditions. First, since all verbs end in a H-toned mora in their lexical form, the floating L-tone added to the end of the stem to form the unsuffixed Imperfective ends up being expressed on the suffixal nasal. Thus /á:- L -m/ ‘catch.Impf-Ppl.Sg’ with floating L-tone and Pl Participial -n is realized as á:-m̀. Adding the ‘it is’ clitic ≡ỳ (postconsonantal allomorph ≡î:), we get á:-m≡ì:, via the derivation (xx3).

(xx3)

a.	/[á:- L -m] ≡î:/	underlying
b.	/á:-m̀] ≡î:/	floating L docks on suffixal mora
c.	/[á:]-[m̀≡î:]/	clitic induces resyllabification
d.	/[á:]-[m≡ǐ ̀:]/	Final-Tone Resyllabification produces <LHL> tone on clitic
e.	á:-m≡ì:	Clitic <LHL>-Reduction

Consider now the unsuffixed Perfective participle corresponding to the unsuffixed Imperfective participle á:-m̀ just described. With H(H…)L tone overlay, we get â:-m. Although I distinguish Imperfective á:-m̀ and Perfective â:-m in transcription, they are homophonous. However, the phonological distinction is apparent when the ‘it is’ clitic is added. Whereas Imperfective á:-m̀ appears as á:-m≡ì: as just seen, Perfective â:-m appears as â:-m≡î:. The derivation of this form requires that both tone components of the stem’s F-tone (i.e. <HL>) be associated with the stem vowel rather than with the suffixal nasal when the clitic induces resyllabification. This entails ordering resyllabification before Contour-Tone Stretching, which is therefore bled (=prevented from applying) (xx4).

(xx4)

a.	/[â:-m] ≡î:/	underlying (after tone overlay)
b.	â:-m≡î:	clitic induces resyllabification
c.	" "	Contour-Tone Stretching fails to apply

We may now formulate the rule affecting the tone of a syllable-final nasal in the wake of resyllabification (xx5).

(xx5) **Final-Tone Resyllabification**

When a tone-bearing syllable-final consonant becomes syllable-initial by resyllabification, its tone shifts to the right and becomes the first tone of the nucleus of that syllable.

3.7.4.4 Rightward H-Spreading (adjective plus ‘be’)

The tendency for an H-tone to shift to the right, pushing an L-tone ahead of it, is also observable in combinations of adjectives that end in a L-toned vowel or in an F-toned bimoraic syllable, followed by ≡kɔ̀ ‘be (nonhuman)’ or ≡wɔ̀- ‘be (human)’, which here function phonologically as clitics. Examples with ≡kɔ̀- are in (xx1).

(xx1)

	gloss	form	with ‘be’ verb
a.	‘hot, fast’	ógù	ógú≡kɔ̀ (also syncopated óg≡kɔ̀)
	‘sweet’	érù	érú≡kɔ̀ (usually syncopated eŕ≡kɔ̀)
b.	‘slow’	tôm	tóm≡kɔ̀
c.	‘bitter’	jé:rù	jé:rú≡kɔ̀

Likewise, with ‘be (human)’, ógú≡wɔ̀-∅ ‘he/she is fast’, etc.

As existential-locational quasi-verbs, kɔ̀ and wɔ̀- induce no tonal changes on preceding words or phrases, for example locational PP’s in locational function (§11.xxx). I do not take them to be cliticized in these functions, except when preceded by Existential yɛ́.

(xx2) **Rightward H-Spreading**

An autosegmentally {HL} adjective spreads its H-tone component to its final more before a cliticized ‘be’ quasi-verb ≡kɔ̀ or ≡wɔ̀-.

The original stem-final L component presumably merges with the L of the quasi-verb.

No similar process occurs e.g. when an {HL} noun is followed by Anaphoric kù^{n}, as we see in tógù kù^{n} ‘the shed’ and kóŋɔ̀ kù^{n} ‘the dust’.

3.7.4.5 Stranded-Tone Re-Linking

There are two distinct types of tone de-linkage that can lead to re-linking of a stranded tone. One involves tautosyllabic re-linking. The other case involves re-linking to an adjacent syllable (exosyllabic re-linking) in the wake of syncope.

Tautosyllabic re-linking occurs as the result of VV-Contraction. This is actually a hodgepodge of vaguely similar processes applying in various morphological contexts. In most cases, when /v_1-v_2/ contracts, the quality and tone features of v_2 prevail in the contracted vowel, so in some cases there is no audible trace of v_1 at all. However, there is one type of contraction where the tone of v_1 is a factor in the output tone. Repeating from §3.xxx, the outputs when a noun ending in /u/ combines with ≡î: allomorph of the 'it is' and Focus clitic are given in (xx1).

(xx1) a. …ú + ≡î: > ≡î: i.e., H≡HL > HL (=F)
b. …ù + ≡î: > ≡ì: i.e., L≡HL > LHL (> L)

In (xx1.a), the H-tone of the stem-final vowel simply merges with the H-toned onset of the (F-toned) clitic. In (xx1.b), however, the L-tone of the stem-final vowel must amalgamate with the tones of the clitic, resulting in a <LHL> tone. This bell-shaped tone is then idiosyncratically reduced, for this clitic only, to L-tone by Clitic <LHL>-Reduction (§3.xxx, below). The important point for the present section is that the L de-linked by the deletion of /ù/ is re-linked to the tautosyllabic clitic vowel.

Exosyllabic re-linking occurs when a monomoraic Cv syllable loses its vowel (and its only mora) by Post-Sonorant Syncope (§3.xxx) or by one of the apocope rules (§3.xxx).

A **de-linked H re-links to the left**. Re-linking is vacuous when the preceding syllable ends in an H-tone (the two H's simply merge). It is audible when the preceding syllable is L-toned. This is very common in both apocope and syncope. For example, bisyllabic Verbal Nouns of the shape CvC-ú or Cv:C-ý are subject to optional apocope when the medial C is a nasal or semivowel, the result being R-toned CvC-∅ or Cv:C-∅ (§3.xxx). An example involving Word-Final u-Apocope is: dìŋ-ú 'sitting down' with apocopated variant dǐŋ-∅. An example involving Inter-Word u-Apocope is 3Pl Dative bè-rú in combinations like bě-r gá-ẁ 'you-Sg will say to them' and bě-r tè:rè-lí-∅ 'he/she did not show to them'. We get a similar leftward re-linking of a deleted H in connection with Post-Sonorant Syncope, as in dùró- 'groan', syncopated Perfective dǔt-tì-. Leftward re-linking is independent of the tone of the following syllable, which may begin with a H or L tone (as these examples show).

There are fewer cases where an L-tone is audibly re-linked. For one thing, in adjectival cases like érù 'sweet', ér≡kɔ̀ 'it is sweet', the /u/ deleted before the clitic is actually H-toned, as the unapocopated variant érú≡kɔ̀ demonstrates; see Rightward H-Spreading (§3.xxx). However, there are some legitimate cases where an HL bisyllable does lose its final L-toned vowel. (xx2) shows two representative examples, without and with apocope.

(xx2) a. [nì: ógù] kún-tù-bà
" ôg " "
[water.L **hot**] put-Perf-3PlS
'They put the hot water (in).'

b. tógù kùⁿ
tóg "
shed Def
'the shed'

In (xx2.a), the HL adjective ógù 'hot' optionally loses its final vowel by Inter-Word u-Apocope. When it is lost, we get an F-tone on the resulting ôg, showing the that H has re-linked to the left. On the other hand, in (xx2.b), when the final vowel of tógù 'shed' is lost, it disappears without a trace. The difference between (xx2.a) and (xx2.b) correlates with the initial tone of the following word; kún- with H-tone, kùⁿ with L-tone. In other words, the de-linked L-tone is audibly realized (to the left) only when followed by a H-tone. I assume that it would also be audibly realized in the case of a word-final deletion before a pause, but there is no morphological context where a L-toned final short vowel is deleted in this context.

The formulation in (xx3) accounts for the audible cases of re-linking, but also allows for vacuous leftward re-linking of H to H and of L to L, where the two like tones will simply be conflated.

(xx3) **Stranded-Tone Re-Linking**

a. tautosyllabic.
in VV-Contraction involving the 'it is' or Focus clitic ≡î:, the tone of the contracted stem-final vowel amalgamates with the tones of the clitic.

b. exosyllabic
in other deletions (apocope, syncope), …
… a stranded L re-links to the preceding syllable if followed by H-tone;
…a stranded H re-links to the preceding syllable.

Apocopated forms with re-linked tone push the envelope phonetically, since they often force speakers to articulate a contour tone on a CvC syllable ending in a stop, as with ôg from ógù 'hot' in (xx2.a).

3.7.4.6 Final-Cv R-to-H Reduction

The combination of suffixed ɔ̀ɣɔ́-n 'chief, Hogon' and nonhuman ɔ̀ɣɔ́ 'leader (e.g. of animal pack' has been mentioned above (along with dɔ̀ɣɔ́-n 'Dogon' and dɔ̀ɣɔ́ 'Dogon language'). I take the stem for 'chief, Hogon' to be /ɔ̀ɣɔ́-/, with an unusual co-linking of L and H to the single mora of the final Cv syllable. When a nasal suffix (Sg -n, Pl -m) is added, the H is associated with the nasal and there are no further problems. In the unsuffixed form, one might have expected that an additional mora

would be added, hence #òɣǒː (i.e. #òɣòó). Instead, the R-tone is reduced to H-tone, giving òɣó.

Another possible example of this process is Presentative nùkǒy (‘look!’), which has an optional, slightly irregular variant nùkó- in nùkó≡kò with cliticized nonhuman ‘be’ quasi-verb. This varies with nùkǒy≡kò and with nùkók≡kò.

Is the conversion of /òɣǒ-/ ‘chief’ to òɣó a quirk, or is there a productive tone-reduction rule applying to final R-toned syllables? This is actually difficult to determine, since few stems share all of the relevant features: monomorphemic (excludes suffixed Verbal Nouns), vowel-final, having final R-tone, and capable of occurring in an unsuffixed form. In my inventory of monomorphemic noun stems, the only bisyllabic stems of this type are ‘chief’ and yèsǎː ‘sister’. The latter belongs to the set of inalienable kin terms, almost all of whom have lexical tones of autosegmental type {LH} with a single final-mora H. There is no reason to think that yèsǎː has an underlying short final vowel, i.e. /yèsǎ/. In fact, the H(H…)L-toned form used after a possessor, yésâː (rather than #yésà) demonstrates that the lexical representation has a final long vowel.

The rarity of nonmonosyllabic L…R-toned vowel-final stems suggests that this combination is out of synch with the phonological pattern of the language. This encourages me to think that the putative reduction of R-tone to H-tone in unsuffixed òɣó ‘chief’ is phonologically reasonable, even if no other precisely analogous alternation can be adduced.

(xx1) **Final-Cv R-to-H Reduction**

A short R-toned (i.e. <LH>) vowel at the end of a non-monosyllabic stem is reduced to H in the absence of a suffix.

As to why <LH> reduces to H rather than to L, note that this allows òɣó to satisfy the Constraint Against All-L-Toned Stems (§3.xxx, above), the main effect of which is to guarantee that tone-dropping (e.g. before a modifier or as head of a relative clause) is audible.

3.7.4.7 Clitic <LHL>-Reduction

The ‘it is’ or Focus clitic, in the postconsonantal allomorph ≡îː, would be expected to surface with <LHL> tone (requiring an extra mora of duration by Contour-Tone Mora Addition, §3.xxx) in two situations (xx1).

(xx1) a. after Final-Tone Resyllabification with R-tone
e.g. CvǒC≡îː > CvòC≡ǐ꞉ (= CvòC≡ìíì)

b. after VV-Contraction with stem-final L-tone
e.g. Cv́ːCv̀≡îː > Cv́ːC≡ǐ꞉ (= Cv́ːC≡ìíì)

In both cases, we expect <LHL> because a stem-final L-tone component has become de-linked from the stem itself and has presumably been pushed to the right. In (xx1.a), Monomoraic Contour-Tone Simplification de-links a L-tone component because, after resyllabification triggered by the clitic, the stem-final syllable now has only one mora and cannot support a contour tone. In (xx1.b), a stem-final L-toned short vowel is lost by contraction.

In fact, we never get a trimoraic <LHL> syllable in the 'it is' or Focus clitic. In the situations described, instead of <LHL> we get monotonal L. In effect, the H sandwiched between two L's is deleted, in this clitic only (xx2).

(xx2)	gloss	without clitic	with clitic
a.	'milk'	ɛ̂m	ɛ́m≡ì:
b.	'errand'	bé:rù	bé:r≡ì:

The derivations are given in (xx3), using moraic-syllabic transcription.

(xx3)	'it is milk'	'it is an errand'	comment
	[ɛ́m̀] + ≡ỳ	[béé][rù] + ≡ỳ	
	[ɛ́m̀]≡íì	[béé][rù]≡íì	allomorphy and cliticization
	—	[béé][r̀]≡íì	VV-Contraction, leaving de-linked L tone behind
	[ɛ́][m̀≡íì]	[béé][r̀≡íì]	resyllabification
	[é][m≡ìíì]	[béé][r≡ìíì]	Final-Tone Resyllabification (clitic now has 2 moras and 3 tones)
	[é][m≡ìì]	[béé][r≡ìì]	Clitic <LHL>-Reduction

3.8 Intonation contours

3.8.1 Phrase and clause--final nonterminal contours (⇑, ⇒, ⇒↑, ⇒↘)

In normal conversational speech, there is a general **downdrift** of pitch toward the end of clauses. Tonal oppositions are less important functionally in the final word or two of most clauses, and phonetic expression of tone oppositions is less clear here. For example, a negative verb form like yɛ̀rɛ̀-gó-∅ 'he/she won't come' has a less prominent pitch rise on the final syllable when it occurs at the end of a long utterance. It is sometimes difficult to distinguish the effects of this downdrift from those of grammatically controlled tone-dropping.

Clause-final pitch modulation, and prolongation of final syllables or segments, are used for intonational purposes in a manner familiar from other languages. For example, there are characteristic **nonterminal contours** that suggest that the utterance is not yet complete. This can be used for nonfinal elements in lists (whether these

elements are words, phrases, or clauses), and for nonfinal VPs in the chains that are so characteristic of Jamsay speech.

In tape transcriptions, I use the symbols and symbol combinations in (xx1) at the end of intonational units (usually clauses) to indicate pitch and duration on the final syllable or segment of the unit.

(xx1)

⇒	prolongation with no unusual pitch change
⇑	higher-than-usual pitch with no prolongation
⇒↑	prolongation with higher-than-usual pitch
⇒↘	prolongation with a gradual drop in pitch

Of course, pitch and duration are gradient rather than categorical in nature. Still, however crude these symbols are, they give some idea of how clauses and phrases are related to each other intonationally.

⇒, ⇑, and ⇒↑ are broadly interchangeable, as all can function to indicate that more is to come. ⇒↘ is used with má (mà), chiefly in its function as an interrogative marker. ⇒↘ is somewhat like the dying-quail intonation (symbol ∴) described below, but involves a higher initial pitch.

(xx2) is a portion of an extended sequence of clauses illustrating list intonation, with the final syllable of each clause lengthened, while maintaining terminal pitch at a higher than normal level. The rhetorical point is that all sorts of gear are taken to the hunt. The English equivalent would involve putting extra stress on the nouns.

(xx2)

màlfǎ:ⁿ	jǎ:-bà ⇒↑,	
rifle	take.Impf-3PlS,	
sárú	jǎ:-bà ⇒↑,	
knife	take.Impf-3PlS.	
béré	jǎ:-bà ⇒↑,	
stick	take.Impf-3PlS,	
[mànà bè tâ:ⁿ]	nám	yǎ:-bà ⇒↑, …
[slingshot]	owners	go.Impf-3PlS, …

'They take rifles, they take knives, they take sticks, people with slingshots go, …'

3.8.2 Adverbs and particles with lexically specified prolongation (⇒)

A number of **particles and expressive adverbs** are typically pronounced with exaggerated prolongation of the final segment. Not accidentally, they are all H-toned, so it is difficult to determine whether any specifically intonational increase in pitch is present. I will therefore transcribe them with ⇒ rather than ⇒↑, though a case can be made for the latter. Some of the particles and expressive adverbs have ordinary lexical senses, but are interjection-like phonologically.

The ⇒ intonation is audible when the forms in question occur when they are free of clitics, i.e., when they are clause- or phrase-final, or used as free adverbs within a clause. However, the expressive adverbs can also be **predicative**, with a following

cliticized ‘be’ quasi-verb (nonhuman kɔ̀, human wɔ̀-), and in this case there is no unusual prolongation of the final segment, so I omit the ⇒.

The most important of the forms are listed in (xx1) with cross-references to the relevant section.

(xx1)

form with ⇒	gloss
a. expressive adverbials	
dém ⇒	‘directly, straight (to a destination)’ (§8.xxx)
pó: ⇒	‘directly, straight (to a destination)’ (§8.xxx)
sé:^{n} ⇒	‘(looking) straight (at sth)’ (§8.xxx)
déy^{n} ⇒	‘apart, separate(ly), distinct’ (§8.xxx)
yó: ⇒ gó: ⇒	‘negligently, carelessly, sloppily’ (§8.xxx)
àbádá: ⇒	‘eternally’ (§8.xxx)
b. emphatic particles (modifying preceding NP or other phrase)	
té: ⇒	‘precisely, specifically’ (§8.xxx)
pá: ⇒	‘precisely’ (§8.xxx)
c. universal quantifier	
fú: ⇒	‘all; completely’ (§6.xxx)

In dém ⇒, the nasal m is prolonged: [déḿ::]. Likewise, déy^{n} ⇒ has a prolonged semivowel, though here the break between e and y^{n} is less sharply defined.

In the case of fú: ‘all’, my impression is that there is a wide phonetic range ranging from ordinary Cv: articulation to a conspicuously prolonged fú: ⇒. I am less confident of intonational marking with this form than with the others.

3.8.3 Dying-quail word-final intonation (∴)

3.8.3.1 On both coordinands in NP conjunction

This intonation pattern occurs at the end of both coordinands in NP conjunction (‘X and Y’), and at the end of a nonpronominal NP modified by a following fú: ‘all’. This contour is characterized by exaggerated prolongation of the final segment (vowel or sonorant), accompanied by a protracted, slow drop in pitch lasting up to one second.

The dying-quail intonation contour reminds me of the prosodic pattern of American high-school cheerleaders calling out the letters of their school at sporting events, through their bullhorns.

In the case of NP conjunction, the dying-quail intonation is most conspicuous with conjuncts that are phonetically short (xx1).

(xx1) a. [wó ∴ kó ∴]
[3Sg Nonh]
'he/she and it'

b. [tǒy ∴ wàrà-nǎm-∅ ∴ àyǎyⁿ ∴]
[sowing farm(verb).L-step.on-VblN sowing.with.manure]
yó≡kɔ̀
exist≡be.Nonh
'There is ordinary sowing (of millet), plant-and-step (for marginal areas of fields), and manure-sowing'. **2004.3.6**

Phonetically, (xx1.a) is [wóōò, kóōò]. In (xx1.b), the final syllables of the conjuncts are phonetically [tòǰǰ̀ …nàḿm̀m̀ …jàǰⁿǰ̀ⁿǰ̀ⁿ].

As the conjuncts become longer, the conspicuousness of the dying-quail contour typically descreases. It is still audible in most cases, but when a conjunct is heavily laden with relative clauses or other bulky material the final ∴ can eventually become inaudible.

The dying-quail intonation has a phonetic resemblance to two other phenomena. First, the interrogative particle má (mà), which is often prolonged (⇒), is occasionally heard with a falling pitch (more often, the pitch is relatively flat, whether high or low). I represent the falling-pitch case as má ⇒↘. The overall pitch level, both at starting and endpoints, seems to me to be higher in má ⇒↘ than in e.g. wó ∴ in (xx1.a).

Secondly, there are two tonal locatives (§8.xxx) of stems ending in a consonant, both of which function as postpositions: gǎnǹ (= gàńǹ) 'between' and gǔnǹ (= gùńǹ) 'behind'. These tonal locatives involve grafting of an extra final L-tone onto CvǏn stems, and the extra tone triggers Contour-Tone Mora-Addition, which here adds an extra mora to the final nasal. I have difficulty hearing the difference between the final nasal in e.g. gǎnǹ 'between' and that in the dying-quail form ǎ-n ∴ 'man' (as coordinand in e.g. 'a man and a woman'). A phonetic convergence may also be favored by the fact that 'between' very commonly has scope over a conjoined NP, as in (xx2).

(xx2) [ǎ-n ∴ ñɛ̌-n ∴] mà gǎnǹ
[man-Sg woman-Sg] Poss between
'between a man and a woman'

Given the high expressive quality of the dying-quail intonation in such conjunctions, when combined with following gǎnǹ the effect is rather incantational, and this may encourage a blurring between the dying-quail intonation and the tonal-locative for nasal-final stems.

A further interesting fact about gǎnǹ 'between' is that it appears with Focus or 'it is' clitic ≡ỳ (allomorph ≡î:) as gàn≡î:, with unlengthened nasal consonant. (For the tone change, see Final-Tone Resyllabification, §3.xxx, above). If the lengthening

of the nasal were attributable to a spatial case-marking device, it is not clear why it should be undone before a clitic. On the other hand, special final intonational patterns, including ⇒, are commonly suspended (e.g. with expressive adverbials) before clitics.

Tonal locatives involving **vowel-final stems** (the great majority, including all tonal locatives not specialized as spatial postpositions) are clearly distinct from the dying-quail forms of the same stems. The dying-quail pattern always conspicuously prolongs a final vowel, more so than even those tonal locatives where a contour tone requires addition of a mora. Some tonal locatives are simple …HL words with short final L-toned vowel (derived from …HH nouns), but a dying-quail version of a …HL stem has a noticeably lengthened final vowel. We can therefore always detect dying-quail intonation, even when the final L-toned vowel starts off with a relatively low base pitch, which makes the dying-quail pitch arc less noticeable than with a higher starting pitch. In (xx3), for example, the most conspicuous phonetic cue to dying-quail intonation is the prolongation of the final u-vowels; there is also some pitch decline, but from a low starting point.

(xx3) [mì bórù ∴] [mì léjù ∴]
[1SgP.L Fa.Br] [1SgP.L Mo.Br]
'my paternal and maternal uncles'

3.8.3.2 Before fú: 'all'

fú: 'all' is the only morpheme that induces dying-quail intonation on the final syllable of the preceding word. In (xx1), fú: is NP-final.

(xx1) [àjày^{n}-ùr^{n}ó ∴ fú:] lè
[sowing.with.manure.L-hole **all**] in
'in every pit (where seeds have been sown with manure)' **2004.3.6**

When fú: follows a pronoun, it forces tone-dropping: èmè fú: 'all of us'. There is usually no special intonation, though infrequently we do get dying-quail-like effects on the pronoun; see §6.xxx.

In (xx2), fú: is clause-final, with clausal scope (substituting for an 'if' particle, §17.xxx), but still imposes its intonational effect on the preceding verb.

(xx2) [dògùrù kó ù láɣá-tì-∅ ∴ fú:]
[time.L NonhO 2SgS.L hit.Impf-Perf-Ppl.Nonh **all**]
'When you are finally done with beating it (=hide).' **2004.3.17**

There is no special intonation associated with the other universal quantifier cêw 'all'.

3.8.3.3 Greeting reply ó: ∴

The standard reply to a called-out greeting including the basic greeting word pó: ⇒ is phonetic [ô::], i.e. [óōò], with the prolongation and slowly falling pitch of the dying-quail intonation. I am unable to determine the lexical tone since the form does not occur without this intonation, but ó: is a possibility (ô: would also work).