Dagbani Verb Tonology

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As in most African tone languages, the study of verb tonology necessarily involves the several steps in (1).

(1)   The necessary steps in doing verb tonology

    a.   determine underlying representations of individual morphemes (e.g. is there an underlying tonal opposition on verb roots?)

    b.   determine the morphological tone assignment rules—e.g. a specific featural combination of tense, aspect, mood etc. may assign a specific tonal melody to the verb form, which may override (i.e. neutralize) a tonal opposition on verb roots

    c.   determine any lexical phonology which may modify underlying and morphological assigned tones (including alternations that can be highly "morphologized")

    d.   determine any postlexical phonology which may further alter the input tones from the lexical phonology

In actual practice, the deciphering of a complex verbal tonology will in fact be done in reverse: One typically has to first factor out the postlexical tone rules to arrive at the lexical and morphological tones. Since the nominal tonology is usually more transparent and, hence, often analyzed first, it typically can be used as a guide to unraveling the verbal tonology. This is particularly true in the case of Dagbani, a Gur language spoken in Northern Ghana: For this language, we are fortunate in having several detailed studies of the postlexical tonology of nouns as they alternate both within and across noun phrases (Wilson 1972, Hyman 1993, Olawsky 1999). In this study, we propose to use this information—mostly by factoring out the effects of the postlexical (or phrasal) phonology—to arrive at an understanding of the lexical tonology of the Dagbani verb.

As seen in (2), where forms are cited as they appear after the homorganic nasal infinitive prefix, Dagbani contrasts L and H tone verb roots. We also note the following observations in (3).

(2)   Dagbani verb stems, as they appear before pause, preceded by the N- infinitive prefix

		L verbs		**H verbs**	
a.	CV	lù	'fall'	dú	'go up'
		tò	'pound'	nyé	'put down'
		ŋmè	'hit, beat'	kú	'kill'
b.	CVN	wùm	'hear'	ném	'grind'
		dèm	'play'	yém	'yawn'
		kòŋ	'lose'	cháŋ	'go'
c.	CVC(i)	làbì	'return' (intr.)	sábí	'write'
		tàgì	'exchange'	lábí	'throw'
d	CVV(i)	gùùì	'run'	gbááí	'catch'
		yòòì	'open'	lóóí	'cross'

e.	CVCC(i)	zàgsì	'refuse'	wálgí	'divide'
		zìlsì	'wander'	sírgí	'go down'
		làbsì	'return' (tr.)	tábsí	'touch'
f.	CVC(i)C	kàrìm	'read'	dáhím	'taste'
		làgìm	'meet'	yóhím	'deceive'
		bàlìm	'request'		

(3) Observations

    a. Morphological structure: A Dagbani verb stem can consist of the bare root or of a root plus a suffix, e.g. /lab/ 'return' (intr.) vs. /lab-si/ 'return' (tr.), where /-si/ is a causative suffix[1]

    b. Syllable structure: On the surface, verb stems can be monosyllabic (CV, CVN, CVV) or bisyllabic (CVCi, CVVi, CVCCi, CVCim), the only permissible word-final consonants being /m/ and /ŋ/ in (2b).

    c. Second syllable [i] is predictable: It occurs after final oral consonants in (2c,e) and long vowels in (2d), and between an oral consonant and /m/ in (2f).[2]

    d. The root structures of the verbs in (2) are thus /CV/, /CVN/, /CVC/, /CVV/, and /CVCC/. The different placement of second syllable [i] in (2e, f) is thus predictable; both can be argued to be underlyingly CVCC, e.g. /zags/, /karm/, where /s/ and /m/ may be (frozen) suffixes.

With the above established, we now turn to consider the realization of verb tones in the paradigms we had at our disposal in (4).

(4) Verb paradigms for which systematic tonal data was collected

Tenses	**Aspects**	**Clause type**	**Polarity**
Present (0)	Perfective (Perf)	M(ain) C(lause)	A(ffirmative)
Today Past (P1)	Imperfective (Imperf)	R(elative) C(lause)	N(egative)
General Past (P2)			
General Future (F)		hence: MCA, MCN, RCA, RCN	
Incip(ient) 'about to'			

We thus have 5 tenses which occur in both perfective and imperfective aspects, which are then studied in main and relative clause affirmative and negative.

By systematic study of these paradigms, we first established four different tone patterns that are distributed as seen in the table in (5).

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[1]There may, in fact, be up to 2 suffixes when imperfective /-r/ is added—see below.
[2]There actually is some variation. First, CVV roots do not take a final [i] if the root vowel is /ii/, e.g. pii 'choose', and there appears to be dialect variation if the root vowel is /ee/, e.g. tee ~ teei 'remember'.

(5)   Tone Patterns in Dagbani Verb Paradigms

	MCA		MCN		RCA		RCN	
	Perf	Imperf	Perf	Imperf	Perf	Imperf	Perf	Imperf
0	LH	LH	HL	LH	Lex	LH	HL	LH
P1	LH	LH	HL	LH	Lex	LH	HL	LH
P2	LH	LH	HL	LH	Lex	LH	HL	LH
F	H	H	H	H	(H)	(H)	H	H
Incip	HL	LH	HL	LH	HL	LH	(HL)	(LH)

(Lex = lexical tone of verb root; tones in parentheses are extrapolated)

The verb tone patterns indicated in (5) are identified in (6):

(6)   The verb tone patterns (to be illustrated and accounted for one at a time below)

    a. H   : H tone pattern, merger of L & H lexical root tones of CV & CVC stems
    b. LH : LH tone pattern, merger of L & H lexical root tones in all stems
    c. HL : HL tone pattern, merger of L & H lexical root tones except on CV & CVC stems
    d. Lex   :   L and H lexical root tones realized on each stem syllable, as in (2)

There is what we call the H tone pattern in (6a), the LH pattern in (6b), the HL pattern in (6c), and the Lexical tone pattern in (6d). In a moment we will illustrate and account for each pattern. First, however, we list in (7) the generalizations concerning the tone pattern assignments within the verb paradigm.

(7)   Generalizations re tone pattern assignments within the verb paradigm

    a. Future tense forms receive the H pattern independent of lexical tone, clause type, aspect, or polarity

	MCA		MCN		RCA		RCN	
	Perf	Imperf	Perf	Imperf	Perf	Imperf	Perf	Imperf
0	LH	LH	HL	LH	Lex	LH	HL	LH
P1	LH	LH	HL	LH	Lex	LH	HL	LH
P2	LH	LH	HL	LH	Lex	LH	HL	LH
F	H	H	H	H	(H)	(H)	H	H
Incip	HL	LH	HL	LH	HL	LH	(HL)	(LH)

    b. Except in the future, Imperfective forms receive the LH pattern

	MCA		MCN		RCA		RCN	
	Perf	Imperf	Perf	Imperf	Perf	Imperf	Perf	Imperf
0	LH	LH	HL	LH	Lex	LH	HL	LH
P1	LH	LH	HL	LH	Lex	LH	HL	LH
P2	LH	LH	HL	LH	Lex	LH	HL	LH
F	H	H	H	H	(H)	(H)	H	H
Incip	HL	LH	HL	LH	HL	LH	(HL)	(LH)

c. Except in the Future and Imperfective, Negative and Incipient forms receive the HL pattern

	MCA		MCN		RCA		RCN	
	Perf	Imperf	Perf	Imperf	Perf	Imperf	Perf	Imperf
0	LH	LH	HL	LH	Lex	LH	HL	LH
P1	LH	LH	HL	LH	Lex	LH	HL	LH
P2	LH	LH	HL	LH	Lex	LH	HL	LH
F	H	H	H	H	(H)	(H)	H	H
Incip	HL	LH	HL	LH	HL	LH	(HL)	(LH)

d. Remaining Main Clause Perfectives receive the LH pattern

	MCA		MCN		RCA		RCN	
	Perf	Imperf	Perf	Imperf	Perf	Imperf	Perf	Imperf
0	LH	LH	HL	LH	Lex	LH	HL	LH
P1	LH	LH	HL	LH	Lex	LH	HL	LH
P2	LH	LH	HL	LH	Lex	LH	HL	LH
F	H	H	H	H	(H)	(H)	H	H
Incip	HL	LH	HL	LH	HL	LH	(HL)	(LH)

e. Remaining Relative Clause Perfectives receive the Lexical pattern (also infinitives in (2))

	MCA		MCN		RCA		RCN	
	Perf	Imperf	Perf	Imperf	Perf	Imperf	Perf	Imperf
0	LH	LH	HL	LH	Lex	LH	HL	LH
P1	LH	LH	HL	LH	Lex	LH	HL	LH
P2	LH	LH	HL	LH	Lex	LH	HL	LH
F	H	H	H	H	(H)	(H)	H	H
Incip	HL	LH	HL	LH	HL	LH	(HL)	(LH)

What the order of presentation in (7) tentatively suggests is that there is a hierarchy of paradigmatic verb tone assignment, as indicated in (8).

(8)   Hierarchy of paradigmatic verb tone assignment

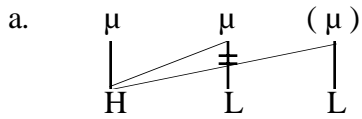| **Future**		**Imperf**		**{Neg, Incip}**		**MC Perf**		**RC Perf**
H	>>	LH	>>	HL	>>	LH	>>	Lex

Although we believe this approach to be essentially correct, there are at least two issues that need to be addressed with respect to the hierarchy in (8). The first concerns the question of whether the hierarchy should be seen as morphological or phonological in nature. That is, should it hierarchize the morphological features which assign tone—or the tone patterns themselves? While we could imagine either of these situations obtaining, note that, as analyzed in (8), the hierarchy cannot be stated simply as a phonological one. This is because the LH pattern falls into two groups, necessitated by the fact that the imperfective LH overrides Negative and Incipient HL, but Negative and Incipient HL overrides the Main Clause Perfective LH. What this could mean is that we must use a combination of morphological features and tone in the hierarchy, as is done in (8). However, note that the tones are actually superfluous to the hierarchy, which, instead, could be stated in strictly morphological terms. But why should the future tense override the more pervasive and intersecting features of aspect, polarity and clause type? Similarly, why should the incipient ('about to') forms have the same HL tone pattern as negatives?

The second issue concerns the rather modest role that lexical root tone plays in the overall paradigm. As seen, it is restricted to non-main clause, affirmative, perfective verbs—including the infinitive forms in (2). Why should this be?

We should like to resolve both issues now by suggesting that the one-to-one tabular patterns we have thus far established are themselves subject to reanalysis, and that this reanalysis will, in turn, affect the hierarchy. In order to show this—and especially to justify the tonal representations we shall propose—we have to back up and briefly present the general postlexical tone rules of the language.

There are essentially two rules that need to be considered. The first, High Tone Spreading (HTS), is schematized in (9a).
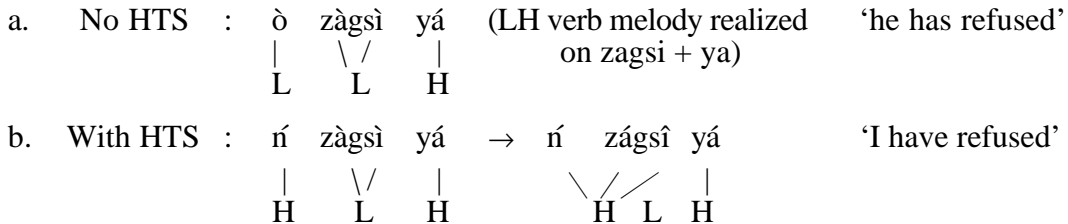
(9) **High Tone Spreading (HTS)   Low Tone Spreading (LTS)**

[-stress]

a.   μ   μ   (μ)   b.   μ   μ

        | ‡ | | ‡
        H   L   L   L   H   X   (where X ≠ pause)
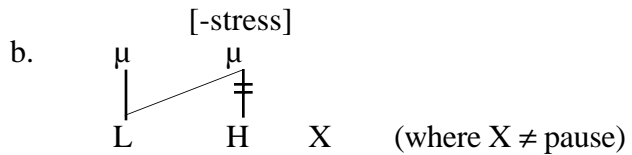
As discussed in great detail in Hyman (1993) and Olawsky (1999), an underlying H tone will spread to the right, delinking an immediately folloiwing L. The parentheses in (9a) are meant to indicate that HTS will affect two successive L tone-bearing units, if available, delinking the first L and forming a HL falling tone with the second. This is illustrated in (10).
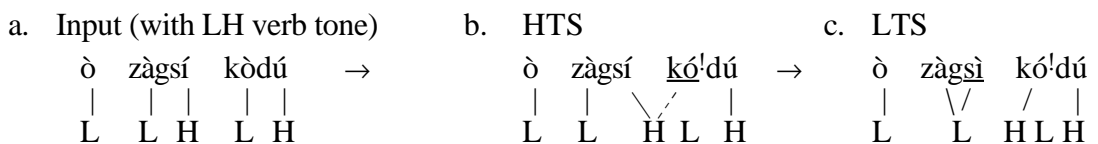
(10) Illustration of HTS

    a.   No HTS   :   ò   zàgsì   yá   (LH verb melody realized   'he has refused'
                         | \ / | on zagsi + ya)
                         L   L   H

    b.   With HTS :   ń́   zàgsì   yá   →   ń́   zágsî   yá   'I have refused'

                         | \/ | \ /́ |
                         H   L   H   H́ Ĺ   H

As seen in (10a), the subject pronoun ò is L tone, and the verb *zàgsì* receives a LH melody which is realized on the *zagsi* plus the perfective marker *ya* (which is needed when nothing follows the verb). In (10b), where the same verb appears after the H tone subject pronoun ń́- 'I', this H spreads onto the two syllables of zagsi, thereby creating a H plus HL falling sequence.

The second postlexical tone rule in (9b), L tone spreading, spreads a L onto a following stressless H tone-bearing unit, delinking it. This reduction process applies whenever the sequence is not utterance-final. We see the application of this rule in (11).

(11) Illustration of LTS: /ò zàgsí kòdú/ 'he has refused a banana'

    a. Input (with LH verb tone)   b. HTS   c. LTS

        ò   zàgsí   kòdú   →   ò   zàgsí   kó́dú   →   ò   zàgsì   kó́dú
        | | | | | | | \ ́| | | \/   / |
        L   L H   L H   L   L   H́ Ĺ H   L   L   H L H

Starting with the LH verb tone assigned by the Main Clause Affirmative non-future perfective in (11a), first HTS applies in (11b), followed by LTS in (11c). As seen, the noun object *kòdú* 'banana' has a floating L tone wedged between linked Hs, which thereby conditions a downstepped H tone.[3]

With this established, let us now consider each of the four verb tone patterns. We begin with the H pattern obtained in future forms, illustrated in the Main Clause Affirmative in (12).

(12) MCA Future Perfective ("H tone pattern") : verb + /kòdú/ 'banana'

a. **L Tone Verb Roots** b. **H Tone Verb Roots**

ò-n tó kó!dú 'he will pound...'	ò-n nyé kó!dú 'he will put down...'
ò-n tág kó!dú 'he will exchange...'	ò-n láb kó!dú 'he will throw...'

ò-n zágsí kó!dú 'he will refuse....'	ò-n tábsí kôdú 'he will touch....'
ò-n bálím kó!dú 'he will request...'	ò-n dáhím kôdú 'he will taste...'
ò-n píí kó!dú 'he will choose...'	ò-n gbáá kôdú 'he will catch...'
ò-n kóŋ kó!dú 'he will lose...'	ò-n ném kôdú 'he will grind...'

As seen, verbs are realized with all H tone in the future, but with an interesting complication. In the examples above the line, where the verb roots are CV or CVC, L and H tone verbs merge. In the examples below the line, where the roots are bisyllabic, CVV or CVN, L and H tone verbs do not merge. We see this in the different realization of the object /kòdú/ 'banana', which is underlyingly L-H. In order to get these forms to come out right, we need the following tonal configurations in (13a,b), just prior to H tone spreading:

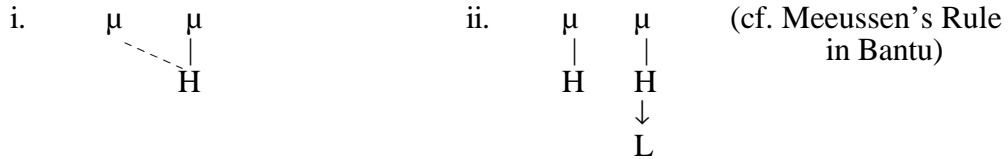(13) Tones needed at the output of the lexical phonology—i.e. just before postlexical HTS (9a) applies

L Tone Verb Roots **H Tone Verb Roots**

a. ò-n tó kòdú 'he will pound...' ò-n nyé kòdú 'he will put
      | | | | | | down...'
      H   L H (→ kó!dú)   H   L H   (→ kó!dú)

b. ò-n zágsí kòdú 'he will refuse....' ò-n tábsì kòdú   'he will
        \/ | | | | | | touch...'
        H   L H   H L L   H

c. ⇒ zágsí kó!dú   by HTS (9a)   ⇒ tábsí kôdú   by HTS
        \ / ˌˊ | \ ˌˊˌˊ| | (9a)
        H   L H   H L L H

As seen, there must be a single H on the monomoraic verbs in (13a), and a doubly linked H on the bimoraic L tone verb zagsi in (13b). As seen in the left column of (13c), these H's will spread once to the right, delinking the L of /kòdú/, thereby producing the indicated downstep. A complication is, however, seen in right column of (13b), where the bimoraic verb tabsi must have a H-L sequence so that HTS can apply twice, producing the HL falling tone on kôdú in (13c). Even if we were to assume that the future is marked by a replacive H tone pattern, how do we get L tone *zagsi* to have a doubly linked H and H tone *tabsi* to have a H-L sequence?

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[3]Although not shown in our transcriptions, when occurring directly before pause, the sequence H-!H is simplified to H-L, hence: ò zàgsì kódù.

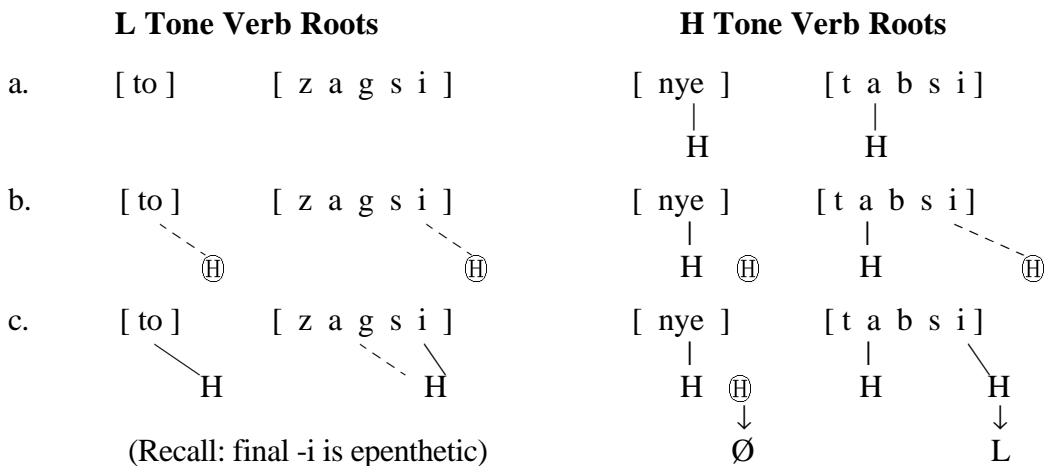The solution to tone assignment in the Future ("H pattern") is outlined in (14).

(14) a. L tone verbs are underlyingly toneless: /to/, /zagsi/; not /tò/, /zàgsì/
      b. H tone verbs have a H prelinked to the first mora only: /nyé, tábsi/; not /tábsí/
      c. The future assigns a H suffix
      d. This H suffix links to the final toneless mora of a verb (if there is one)
      e. Two early lexical rules apply, as in the nominal tonology (Hyman 1993, Olawsky 1999); cf. also Kenstowicz et al (1988) for the same processes in other Gur languages

i.   μ   μ   ii.   μ   μ   (cf. Meeussen's Rule
              | | | in Bantu)
              H   H   H
                                                      ↓
                                                      L

      f. The H suffix is deleted when it cannot link, i.e. when the verb is monomoraic and /H/

To account for this, we propose, first, that L tone verbs are underlyingly toneless, not prelinked to L, while H tone verbs have a H linked only to their first vowel, as seen in (15a), that is, not to the final /s/ of /tabs/, to which an epenthetic [i] will be added.
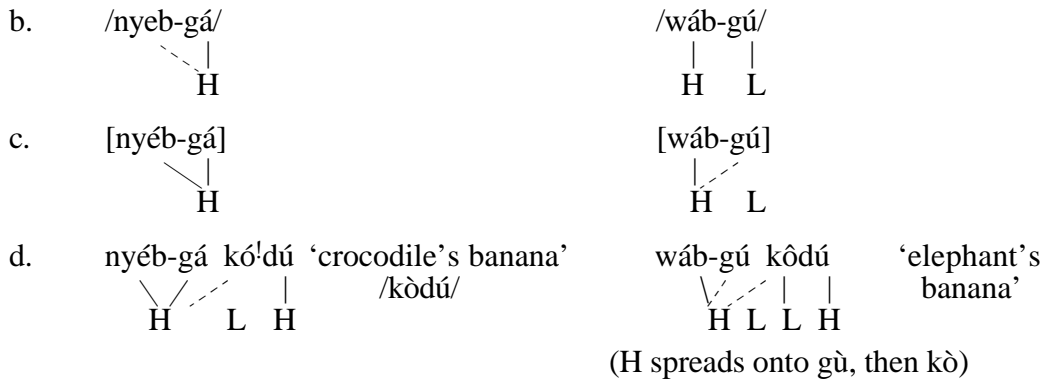
(15) Derivation of verb tones in the Future, Ⓗ = suffixal H pattern)

L Tone Verb Roots   **H Tone Verb Roots**

a.   [to]   [z a g s i]   [nye]   [t a b s i]
                                            | |
                                            H   H

b.   [to]   [z a g s i]   [nye]   [t a b s i]
              ⦿   ⦿ | ⦿ | ⦿
              Ⓗ   Ⓗ   H   Ⓗ   H   Ⓗ

c.   [to]   [z a g s i]   [nye]   [t a b s i]
              H   H | Ⓗ | H
                                         H   ↓   H   ↓
                                              Ø   L

              (Recall: final -i is epenthetic)

In (15b), the suffixal H of the future links to the final toneless mora of a verb, if there is one. It thus links to the toneless mora /to/ and to the second mora of *zagsi* and *tabsi*. It can not link to the H tone monomoraic verb /nye/, since there is no available toneless mora. Three things happen in (15c). First, the suffixal H spreads onto the first mora of /zagsi/ by a general rule that also affects the noun 'crocodile', which begins with a zero+H representation in (16a) and undergoes leftward H tone spreading in (16b).

(16) The same lexical tone rules applying to nouns (Hyman 1993)

      a.   /nyeb-gá/   'crocodile'   /wáb-gú/   'elephant'
                    | | |
                    H   H   H

b.   /nyeb-gá/   /wáb-gú/

          H   H   L

c.   [nyéb-gá]   [wáb-gú]

          H   H   L

d.   nyéb-gá kóˈdú 'crocodile's banana'   wáb-gú kôdú   'elephant's
                       /kòdú/   banana'
       H   L   H   H L L H

                                  (H spreads onto gù, then kò)

The word 'elephant' begins with two H tones in (16a), the second of which becomes L. H tone spreading then applies in (16c), delinking the L. Although both nyébgá and wábgú are pronounced H-H in isolation, we see in (16d) that they are different: the noun /kòdú/ is realized as a H plus downstepped H after nyéb-gá, but as a falling HL tone + H tone [kôdú] after wábgú, since there are two L tones following the spreading H tone. The outputs in (16d) are therefore identical with the verbal realizations in the last line of (13).
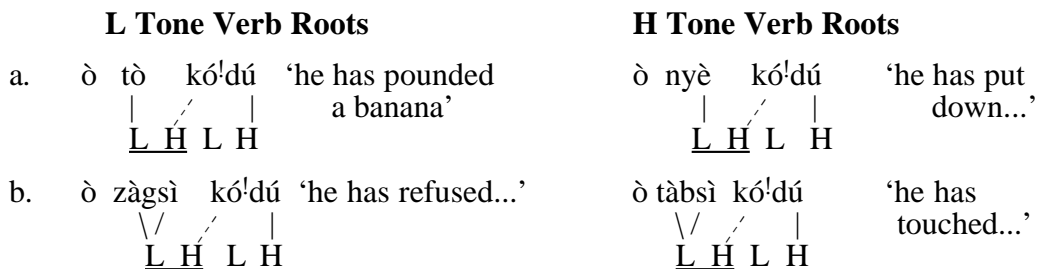
We turn now to the LH verb tone pattern, which is introduced by morphological rule and illustrated in (17).

(17) MCA Present Perfective ("LH tone pattern") :   verb + /kòdú/ 'banana'

    a.   **L Tone Verb Roots**   b.   **H Tone Verb Roots**

      ò tò kóˈdú   'he has pounded...'   ò nyè kóˈdú   'he has put down...'
      ò tàg kóˈdú   'he has exchanged...'   ò làb kóˈdú   'he has thrown...'
      ò zàgsì kóˈdú   'he has refused....'   ò tàbsì kóˈdú   'he has touched....'
      ò bàlìm kóˈdú   'he has requested...'   ò dàhìm kóˈdú   'he has tasted...'
      ò pìì kóˈdú   'he has chosen...'   ò gbàà kóˈdú   'he has cought...'
      ò kòŋ kóˈdú   'he has lost...'   ò nèm kóˈdú   'he has ground...'

As seen, both L and H tone verbs have identical tones throughout. As shown in (18), the L of the LH melody is realized on the one or two moras of each verb stem, while the H is realized on the following word, producing the by now familiar H + downstep sequence on /kòdú/.

(18) Assignment and realization of (underlined) LH verb tone pattern—which replaces lexical tones

           L Tone Verb Roots   **H Tone Verb Roots**

a.   ò tò   kóˈdú 'he has pounded   ò nyè   kóˈdú   'he has put
                   a banana'   down...'
      L H L H   L H L H

b.   ò zàgsì   kóˈdú 'he has refused...'   ò tàbsì kóˈdú   'he has
                                  touched...'
      L H L H   L H L H

In contrast with the relative simplicity of the LH pattern, the HL pattern illustrated in (19) shows certain complications:

(19) MCN Present Perfective ("HL tone pattern") :   verb + /kòdú/ 'banana'

a. **L Tone Verb Roots**   b.   **H Tone Verb Roots**

ò bɔ́ tó kôdú	'he hasn't pounded...'	ò bɔ́ nyé kó'dú	'...put down ...'
ò bɔ́ tág kôdú	'he hasn't exchanged...'	ò bɔ́ láb kó'dú	'...thrown...'

ò bɔ́ zágsí kôdú	'he hasn't refused....'	ò bɔ́ tábsí kôdú	'...touched...'
ò bɔ́ bálím kôdú	'he hasn't requested...'	ò bɔ́ dáhím kôdú	'...tasted...'
ò bɔ́ píí kôdú	'he hasn't chosen...'	ò bɔ́ gbáá kôdú	'... caught...'
ò bɔ́ kóŋ kôdú	'he hasn't lost...'	ò bɔ́ ném kôdú	'...ground...'

Once again, as seen by the line in (19), there is a need to separate the monomoraic and bimoraic verb forms. In (12) we saw that lexical tones contrast only on bimoraic verb forms in the H tone pattern. This time, however, it is only in <u>monomoraic</u> verbs above the line that we find a lexical contrast with the HL pattern. This in itself is a rather curious fact, which we propose to account for as in (20).

(20)   The solution to tone assignment in the MCN present perfect ("HL pattern")

a.   All verbs start with their lexical tone, i.e. toneless vs. H

b.   The "HL pattern" consists of assigning a H to the first mora of bimoraic toneless verbs, i.e. /zags/, /balm/, /pii/, /koŋ/ → /zágs/, /bálm/, /píi/, /kóŋ/

c.   This causes a merger with bimoraic H verbs, whose H is prelinked only to their first mora: /tábs/, /dáhm/, /gbáa/, /ném/

d.   Default L is assigned to toneless moras

e.   Postlexical tone rules apply, e.g. HTS (9a)

First, all verbs start with their lexical tones, i.e. they are either toneless or have a H tone prelinked to their first mora, as we have established. Second, as indicated in (20b), the "HL pattern" consists of assigning a H to the first mora of bimoraic toneless verbs. This, of course, causes these verbs to merge with bimoraic H tone verbs. We then assign default L and apply the postlexical tone rules, as seen in (21).

(21)   Assignment of (underlined) prefixal H and realization of "HL verb tone pattern"

L Tone Verb Roots   **H Tone Verb Roots**

a.   o   bɔ́   to   kòdú   'he hasn't pounded...'   ò   bɔ́   nyé   kòdú   'he hasn't
         | | | | | | | put down...'
         H   L   H   H   H   L H

       ò   bɔ́   tò   kòdú
         | ⋮ | |
         H   L̲   L   H   (L̲ = default)

       ò   bɔ́   tó   kôdú   ò   bɔ́   nyé   kó'dú
         |⁄⁻⁻⁻| | | |⁄ |
         H   L̲   L   H   H   H   L   H

b. o bɔ́ zagsi kòdú   'he hasn't   ò bɔ́ tábsi kòdú   'he hasn't
    | | | refused...' | | | | touched...'
    H   L H   H H   L H

    o bɔ́ zágsí kòdú   ò bɔ́ tábsì   kòdú
    | ┊ ┊ | | | | ┊ | |
    H   H̲ L̲ L H   (L̲ = default)   H H L̲   L H

    o bɔ́ zágsí kôdú   ò bɔ́ tábsí   kôdú
    | |╱‾‾‾| | | |╱‾‾‾ | |
    H   H̲ L̲ L H   H H̲ L̲ L H

The underlying tones are given in the first line of (21a) and (21b). In the second line of (21a) we assign default L tone (underlined). As seen, this creates a sequence of H followed by two L tones. Thus, H spreads two syllables to the right in the third line of (21a), delinking the default L of the verb and forming a contour tone on [kôdú]. This differs from the output in the right column of (21a), where HTS can affect only the L of /kòdú/, which is delinked, thereby creating a downstep.

In the bimoraic verb forms in (21b), we begin with a toneless verb on the left and a H prelinked to the first mora on the right. In the second line, a H is assigned to the first mora of the toneless verb on the left, since it is bimoraic. Then, default L is assigned to the second mora of both verbs. As seen in the third line, HTS can now affect both Ls that follow the H of zágsì and tábsì.

Going back to (21a), note that we cannot assign a morphological H to <u>monomoraic</u> toneless verbs or they would incorrectly merge with underlying H monomoraic verbs. We shall return to this issue when we reanalyze the HL pattern below.

The last tonal paradigm we have to consider is what we have identified as "lexical tone", which we present in (22).

(22)   RCA Present Perfective ("lexical tone pattern") : verb + /kòdú/ 'banana'

a. **L Tone Verb Roots**   b. **H Tone Verb Roots**

    ŋùn tò kòdú   'who has pounded...'   ŋùn nyé kó!dú   '...put down...'

    ŋùn tàg kòdú   'who has exchanged...'   ŋùn láb kó!dú   '...thrown...'
    _____
    ŋùn zàgsì kòdú   'who has refused....'   ŋùn tábsí kôdú   '...touched....'

    ŋùn bàlìm kòdú   'who has requested...'   ŋùn dáhím kôdú   '...tasted...'

    ŋùn pìì kòdú   'who has chosen...'   ŋùn gbáá kôdú   '...caught...'

    ŋùn kòŋ kòdú   'who has lost...'   ŋùn ném kôdú   '...ground...'

As seen, there are no complications in (22a), where default L is assigned to the verb and the L-H of /kòdú/ is not modified. In (22b), we see that /kòdú/ has a H + downstep realization after monomoraic H verbs, but a falling HL + H sequence after bimoraic H tone verbs. This is easily accounted for as in (23).

(23) a. ŋùn nyé kó¹dú   by HTS (9a)   b.   ŋùn tábsí kôdú   by HTS
         |╱⁻ | |╱ ╱⁻| | (9a)
         H L H   H L̲ L H

In (23a), the H of the verb /nyé/ spreads and delinks the following L. In (23b), the initial H
of /tábsi/ spreads twice, once delinking the default L (underlined), then joining the L of
/kòdú/ to make a HL falling tone. What we see in (23b), then, is further evidence that the H
of H tone verbs is prelinked only to the first mora, and that the second mora receives a
default L before HTS applies.

        Having distinguished and exemplified the four verb tone patterns, we now make the
important observations in (24).

(24) Observations

    a. The HL pattern and the lexical pattern are in complementary distribution

        i.   The HL pattern occurs only when there is a preceding H tone "auxiliary"
             marker, specifically: negative bɔ́ , incipient /yèn´/

        ii. The lexical tone pattern occurs only where is no such preceding "auxiliary"
H

    b. The HL pattern can therefore be conflated with and identified as the same as the
        lexical pattern

    c. The H inserted onto the first mora of toneless bimoraic verbs can be seen as a
        morphologically conditioned rule of H tone spreading (an earlier rule to be
        distinguished from general HTS)

                    [μ   μ   ]verb
                   ╱⁻⁻⁻   (H belongs to preceding Neg or Tense marker)
              H
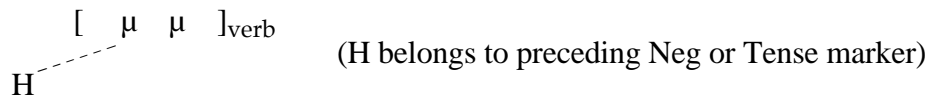
Recall that in the so-called HL pattern, a H was inserted onto the first mora of toneless
bimoraic verbs. Since there is always a preceding H tone marker, we now instead view this
as the morphologically conditioned rule of H tone spreading in (24c), i.e. a lexical rule
which must precede and be distinguished from the postlexical HTS rule in (9a).

        Given this reanalysis, the table of tone patterns in Dagbani verb paradigms originally
seen in (5) can thus be modified as in (25).

(25) Tone Patterns in Dagbani Verb Paradigms [revised]   (the changes are shaded)

	MCA		MCN		RCA		RCN	
	Perf	Imperf	Perf	Imperf	Perf	Imperf	Perf	Imperf
0	LH	LH	Lex	LH	Lex	LH	Lex	LH
P1	LH	LH	Lex	LH	Lex	LH	Lex	LH
P2	LH	LH	Lex	LH	Lex	LH	Lex	LH
F	H	H	H	H	(H)	(H)	H	H
Incip	Lex	LH	Lex	LH	Lex	LH	(Lex)	(LH)

Finally, consider the implications of this relabeling for the hierarchy of paradigmatic verb tone assignments seen earlier in (8) and repeated below:

(8)   Hierarchy of paradigmatic verb tone assignments

Future		**Imperf**		**{Neg, Incip}**		**MC Perf**		**RC Perf**
H	>>	LH	>>	HL	>>	LH	>>	Lex

Recall the problems we had with this hierarchy. First, the analysis in (8) essentially treats the hierarchy as a morphological one, the tonal exponents being secondary, even irrelevant to the hierarchy itself. We see this particularly in the case of the LH pattern, which must occur in two different places, since imperfective LH overrides the negative and incipient tones, which in turn override the main clause perfective LH pattern. Finally, in the original table in (5) there were only three cells in the relative clause affirmative realized with default lexical tone.

Our discovery that the HL pattern is really the lexical default in disguise allows us to rethink the hierarchy as in (26).

(26) Hierarchy of paradigmatic verb tone assignments

Future		**{Imperf, MC Perf}**		
H	>>	LH	>>	Lexical (default)

As before, all future forms will receive the H pattern, and the same imperfective and main clause affirmative perfectives will receive LH, and the lowest ranked (or default) tone pattern is still the lexical pattern, although this now includes the former HL pattern. In (26) we have been able to accomplish two things: First, we have now been able to place the LH pattern in one position in the hierarchy. Second, although provided for clarity in (26),we can actually dispense with the morphological features that define the three patterns (since LH now appears in one place only). In other words, the hierarchy can be stated in strictly phonological terms. Whether this is correct or even desirable is an interesting question. We, of course, still need the grammar to assign tone patterns according to morphological features in a disjunctive manner

To summarize, we have provided a description and analysis of the verb tones in Dagbani. We have discovered that a number of factors are involved in determining the actual tone pattern that one encounters on verbs on the surface, listed in (27).

(27) Factors involved in determining surface verb tones in Dagbani

  a. underlying lexical tone (e.g. on verb roots: H vs. Ø)
  b. morphologically assigned tones (e.g. H suffix, LH pattern)
  c. lexical tone rules: special H spreading rule; anticipatory HTS & H-H dissimilation in (14e)
  d. postlexical tone rules: HTS (9a), LTS (9b)

Also important is the number of tone-bearing units in the lexical verb tonology. We have seen that the monomoraic verbs in (28a) count as single tone-bearing units, at the point where tones are assigned:

(28) a. **Monomoraic** (oneTBU)   b.   **Bimoraic** (two TBUs)

Medially	*Before Pause*	*Medially*	*Before Pause*
to, nyé	to, nyé	koŋ, ném	koŋ, ném
tag, lab	tag-i, láb-í	pii, gbáá	pii, gbáá-í
		zags-i, tábs-í	zagsi, tábs-í
		balim, dáhím	balim, dáhím

The curious fact is that CVC verbs count as single tone-bearing units, while CVN count as two—despite the fact that CVC verbs take a final -i before pause, while CVN verbs do not. One possibility would be to analyze Dagbani verbs without this final -i, but to consider both final nasals and the second consonant of CVCC clusters as tone-bearing units. This is one possible approach, though there is doubtless much more to be said about this curious aspect of the tone system—and about syllable and word structure in Dagbani in general (cf. Olawsky 1999).

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