Tumbuka Prosody: Between Tone and Stress[*]

1. Introduction

Since McCawley (1978) observed that the tone systems of Proto-Bantu and many synchronic Bantu languages have both tonal and accentual – i.e., stress-like – qualities, a tradition of research has investigated where the prosodic systems of particular languages fit on a typological continuum from more tonal to more stress-like. One goal of this research is to determine what properties define the two types of prosodic systems. As it is assumed that the direction of change in Bantu prosody has been from Proto-Bantu's more tonal system to a more stress-like one, another research goal is to determine what systemic factors favor the change from a more canonical tonal to a more stress-like tonal system. (See Clements & Goldsmith 1984; Hyman 2006; Odden 1999.) As Gussenhoven (2006) observes, in pursuing both goals, it is the languages that lie between tone and stress that prove most instructive.

This paper takes as case study an analysis of the prosodic system of Tumbuka (N.20), where tone realization is mostly predictable, except in the substantial ideophonic lexicon. After presenting a sketch of Tumbuka prosody in section 2, section 3 shows that Tumbuka tonal distribution has both tonal and stress-like properties, as defined in Hyman (2012, 2014). That is, its prosodic system lies between tone and stress. Section 4 takes up the question of how Tumbuka's phrasal tone system fits into a historical scenario linking it to the more canonically tonal Proto-Bantu system. It is proposed that phrasal High

tone realization is the triggering factor leading to loss of tonal contrasts. Section 5 concludes the paper.

2. Sketch of Tumbuka prosody

Tumbuka (Bantu N.21) is one of the three national languages of Malawi (with Chichewa N.31 and Yao P.21). The data presented come from my fieldwork on the language. (There is no grammar of the language, as far as I know, though there are some dissertation-length studies: e.g., Chavula (2016), Mphande (1989), and Vail (1972).)

2.1. Words in isolation – non-ideophones

As shown by the data in (1) and (2), cited from Downing (2008, 2012), there are no lexical or grammatical tonal contrasts in the non-ideophonic lexicon of Tumbuka. (We turn to ideophones in section 2.3, below.) Vowel length is also not contrastive: the penult of every word in isolation is lengthened and its first half bears a High tone:

(1) No tonal contrasts in nouns

	Singular	*Gloss*	*Plural*
a.	múu-nthu	'person'	ŵáa-nthu
b.	m-líimi	'farmer'	ŵa-líimi
c.	m-zíinga < *-dìngà	'bee hive'	mi-zíinga
d.	m-síika	'market'	mi-síika
e.	khúuni < *-kúnì	'tree'	ma-kúuni
f.	báanja	'family'	ma-báanja
g.	ci-páaso	'fruit'	vi-páaso
h.	ci-ndíindi	'secret'	vi-ndíindi
i.	nyáama < *-nyàmà	'meat, animal'	nyáama
j.	mbúuzi < *-búdì	'goat'	mbúuzi

(2) No tonal contrasts in verbs or verb paradigms

(a)	ku-líima < *dìm-	'to farm'
	ti-ku-líima	'we farm'
	ti-ka-líima	'we farmed'
	t-angu-líima	'we recently farmed'
	n-a-ŵa-limíira	'I have farmed for them'
	ŵ-a-líima	'they have farmed'
	wa-zamu-líima	's/he will farm'

(b)   ku-zéenga < *jèng-   'to build'   zéenga!   'build!'
        ti-ku-zéenga   'we build'
        nyúumba yi-ku-zengéeka   'the house is being built'
        ŵa-ka-zéenga   'they built'
        ŵa-ka-ku-zengéera   'they built for you sg.'
        ŵa-ka-mu-zengeráa-ni   'they built for you pl.'
        n-a-zéenga   'I have built'
        wa-zamu-zéenga   's/he will build'
        ŵa-zamu-zengeráana   'they will build for each other'

To put these Tumbuka prosodic patterns into a wider perspective, penult lengthening (especially phrase-penult), is considered a correlate of stress and is very common cross-Bantu (see, e.g., Doke 1954; Downing 2010b; Hyman 2013; Philippson 1998). It is also very common cross-Bantu for contrastive High tones to be attracted to the penult (see, e.g., Kisseberth & Odden 2003; Philippson 1998). And it is attested (though it is not clear how widespread this is) for other languages of the northern Lake Malawi region to have what have been called restricted or predictable tone systems: all words must have a High tone (Odden 1988, 1999; Schadeberg 1973). For example, Odden (1988) characterizes HiBena (a Bantu language spoken in SW Tanzania) as having a predictable tone system because every noun must have a High tone, realized on either the penult or the pre-stem vowel, and most verb forms require a High tone on the penult:

(3) HiBena (Odden 1988: 236)

(a) *Nouns*   (b) *Verbs*
    mú-goosi   'man'   kwaamíle   'put to pasture'
                                              (subjunctive)
    hí-fuva   'chest'   ndi-líma   'I will cultivate'
                                              (near-future)
    mu-guúnda 'field'   ndaa-limága 'I used to cultivate'
    lu-fwiíli   'hair'   ndaa-limiíge 'I was cultivating'
    li-fulúha   'cloud'   ndihaa-limíle 'I cultivated'
                                              (intermediate past)
                                 ndaa-limíle   'I cultivated'
                                              (far past)
                                 hu-limíla   'to cultivate for'

Is Tumbuka, then, another predictable tone language?

2.2. Tumbuka phrasal prosody

Tumbuka words have the isolation pronunciation illustrated in (1) and (2) only when they are final in a phrasal domain. That is, penult lengthening and a High tone on the initial mora of the lengthened penult are phrase-level properties, not word-level ones, as only some words in a sentence have this prosody. (See Gordon 2014 for recent discussion of the issue of disentangling word-level from phrase-level prosody.) Evidence that the relevant prosodic domain is the Phonological Phrase is that, as Downing (2006, 2008, 2010a, 2012, 2017) shows, neutral prosodic phrasing in Tumbuka is conditioned by the right edge of NP. Subject NPs and Topics are phrased separately from the rest of the clause. A verb plus its first complement form a single phrase, and following complements are generally phrased separately:

(4) Tumbuka prosodic phrasing (parentheses indicate phrasing)

a.   (ti-ku-phika   síima)
      we-TAM-cook   9.porridge
      'We are cooking porridge.'

b.   (ŵ-áana)   (ŵa-ku-ŵa-vwira   ŵa-bwéezi)
      2-child   2SBJ-TAM-2.OBJ-help   2-friend
      'The children help the friends.'

c.   (ti-ka-wona   mu-nkhúungu)   ku-msíika).
      we-TAM-see   1-thief   LOC-3.market
      'We saw a thief at the market.'

d.   (m-nyamáata)   (wa-ka-timba   nyúumba)   (na   líibwe).
      1-boy   1-TAM-hit   9.house   with   5.rock
      'The boy hit a house with a rock.'

e.   (ŵa-líimi)   (ŵa-luta   ku-múunda)
      2-farmer   2-go   LOC-fields
      'The farmers have gone to the fields.'

In short, in the non-ideophonic vocabulary, tone is predictable and non-contrastive. Instead, it could be considered a correlate of phrasal stress – that is, intonational level pitch-accent – as High tones consistently occur on the first mora of penult syllables that are lengthened as another correlate of phrasal stress. (See Downing 2017

for detailed discussion of Tumbuka intonation.) For these reasons, Kisseberth & Odden (2003) and Vail (1972) classify Tumbuka as a stress language, suggesting that it has lost all Proto-Bantu tonal contrasts.

2.3. Tone is contrastive in ideophones

Even though it is true for much of the Tumbuka lexicon that High tone is analyzable as a predictable correlate of phrasal stress, it is not true that High tone is entirely predictable because tone is contrastive in the ideophonic lexicon. This has been extensively documented by Mphande (1989), Mphande & Rice (1995), and Vail (1972).

A couple of the minimal pairs listed in Vail's and Mphande's work that I have re-elicited in sentences are cited in (5). Notice that while ideophones are restricted to occur in phrase-final position – the position where we find predictable High tone on non-ideophonic words – the tone of ideophones is not predictable. As illustrated by the data below, we find contrastively level High and Low-tones on the ideophones, rather than the predictable pattern of a falling tone over a lengthened penult:

(5) Contrastive tone in Tumbuka ideophones (Downing elicitation notes); ideophones underlined

(a) (Ku-díindi) (ku-ka-βa   yíí) (sóno   ni-la   na wóofi)
     LOC -cemetery LOCSBJ-TAM-be IDEO so   I-was   with fear
     'At the cemetery it was <u>deserted-quiet</u>, so I got scared.'

cf. tonal minimal pair:
(b) (Ntcheŵe yíithu) (yi-ka-tchimbirira ku-ma-kúuni)
      9.dog   9.our   9SBJ-TAM-ran to LOC-4-wood
     (Namíise) (ti-ka-ŵona   kuti yi-kwiza   yáayi)
      Evening   we-TAM-see that 9SBJ-come   not
     (Yi-li   ku-zyeβa   yìì)
     9SUBJ-BE INF-Lost   IDEO
     'Our dog ran into the woods. In the evening we saw that it was not coming. It got lost <u>completely</u>.'

(c) (Jéeni) (wa-ku-líira.)   (Maso   yáake) (ya-li   cèè)
     1.Jane   1SUBJ-TAM cry   4.eye   4.her   4.SBJ-COP IDEO
     'Jane is crying. Her eyes are <u>red</u>.'

cf. near minimal pair:
(d) (ŵa-ka-mu-kora   mu-nkhúungu) (wa-kw-iβa   ngóoma)
    2SBJ-TAM-1OBJ-catch 1-thief   1SBJ-TAM-steal 10.maize
    (zúuβa) (li-li   ngéé)
    5.sun   5SUBJ-COP   IDEO
    'They caught the thief stealing maize in <u>broad daylight</u>.'

While the ideophones in (5) are monosyllabic, Mphande (1989) amply demonstrates that ideophones can be longer and can have any combination of High and Low tones. Note that vowel length is also contrastive:

(6) Sample Tumbuka ideophones (Mphande (1989: 154-155)

a.	khùù	'blowing of wind'
b.	mwàà	'of being scattered like sand'
c.	yíí	'of absolute silence or desertedness'
d.	bí	'of being very dirty'
e.	pípí	'of pungent smell'
f.	bulí	'appearing suddenly'
g.	wunjí	'of being gathered together'
h.	khwapú	'of a trap suddenly released'
i.	zotó	'of hitting and denting a surface'
j.	chwúbi	'of plunging into a liquid'
k.	lóólii	'of staring stupidly'
l.	kóti	'of stopping weakly'
m.	gáli	'of sudden flash of light'
n.	lípwííti	'of being completely non-stiff'
o.	nyuŋumu	'of sneaking away unnoticed'
p.	vyálakáta	'of sitting down in an exhausted way'
q.	thélelele	'of sliding off a slippery surface'
r.	kíkíkí	'of laughing in a shrill [way]'

It is important to point out that ideophones form a large subset of the lexicon: Mphande's study (1989) investigates the grammatical properties of some 500 Tumbuka ideophones. As we can see from the examples above, the ideophones are not simply onomatopoeic words, though most do have some kind of depictive quality, said to be typical of ideophones (Dingelmanse 2012). This number and range of functions are typical: Childs (1994: 179) shows that ideophones make up a large and productive part of the lexicon in many African languages. They therefore cannot be considered a marginal part of the language.

To sum up this section, the fact that contrastive tone is characteristic of the substantial ideophonic lexicon makes it misleading to characterize Tumbuka as a purely stress language, as Kisseberth & Odden (2003) and Vail (1972) do.

3. Evaluating Tumbuka prosodic properties

Hyman (2009, 2012, 2014) argues, in fact, that it is a misleading shortcut in general to classify languages in terms of monolithic categories like stress language or tone language. He develops a property-driven approach to prosodic typology, which has the goal of characterizing the "same and different ways that *individual properties* are exploited within phonological systems." I show in this section how this approach allows us to define precisely which canonical stress and tone properties are exploited in the Tumbuka prosodic system.

3.1.   Stress-like properties

In order to evaluate the stress-like and tone-like properties of the Tumbuka prosodic system, one first needs to adopt an explicit set of canonical properties. I begin by evaluating the stress-like properties of Tumbuka prosody, adopting Hyman's (2012, 2014) definition of a canonical stress system, cited below. Properties a. and b. are proposed to be definitional of stress systems:

(7) Canonical stress properties (Hyman 2014: 61)

a.   obligatory: all words have a primary stress
b.   culminative: no words should have more than one primary stress
c.   predictable: stress should be predictable by rule
d.   autonomous: stress should be predictable without grammatical information
e.   demarcative: stress should be calculated from the word edge
f.   edge-adjacent: stress should be edge-adjacent (initial, final)
g.   non-moraic: stress should be weight-insensitive
h.   privative: there should be no secondary stresses
i.   audible: there should be phonetic cues of the primary stress

To put Tumbuka in perspective, I evaluate its canonical stress properties in parallel with those of Swahili and English in the table in (9). I assume that readers of this article are familiar with the English stress system. Swahili is another Bantu language, and the prosody of

words in isolation is very similar to that of Tumbuka. Words have a lengthened penult vowel, realized with falling intonation: see (8a) – (d). However, unlike Tumbuka, words in phrase-medial position also have lengthened penults and, often, a High tone – see (e) and (f):

(8) Swahili stress prosody (Ashton 1947: 5; Mohamed 2001: 14; Polomé 1967)

a. nê:nda   'go!'
b. ni-ta-ku-pî:ga   'I shall hit you'
c. jî:ko   'kitchen'
d. jikô:ni   'in the kitchen'
e. sí:na hakî:ka   'I am not sure.'
f. kija:na anau:mwa kidô:go.   'The youth is a bit unwell.'

As we can see in the table in (9), since the potential correlates of stress – High tone along with penult lengthening – are phrase level properties, Tumbuka actually has no word level stress properties:

(9) Stress-like distribution of High tones in Tumbuka?

Property	Tumbuka		Swahili	English
	word level	phrase level	word level	word level
obligatory		√	√	√
culminative		?	√	√
predictable		√	√	
autonomous			√	
demarcative		√	√	√
edge-adjacent		penult	penult	
non-moraic		√	√	
privative		?	√	
audible		√	√	√

Recall that the canonical, defining property for a stress system is that all (phonological) words should be stressed. Tumbuka thus contrasts with Swahili, which has a perfect canonical stress system. Surprisingly, as Hyman (2014) demonstrates, even though stress is a central phonological property of English, the stress system of English is far from canonical.

In sum, even though High tones have a stress-like distribution, the fact that stress correlates like High tone and penult lengthening are only phrase-level properties makes Tumbuka a non-canonical stress language, since stress is by definition a word-level property.

3.2. Tone-like properties of the Tumbuka prosodic system

Hyman (2006: 229), citing Welmers (1959, 1973), defines the following canonical property of a tone language:

(10) A language with tone is one in which an indication of pitch enters into the lexical realization of at least some morphemes.

Even though High tone is a predictable correlate of non-ideophonic words in a position to be assigned phrasal stress, Tumbuka still satisfies this definition of a tone language because, as we saw in section 2.3, above, tone is contrastive in the substantial ideophonic lexicon.

While ideophones often have special phonology (Newman 2001, Dingelmanse 2012), this is no reason to dismiss them as the kind of morpheme that can provide evidence that Tumbuka prosody has some tonal properties. As Newman (2001) argues, the special phonology of ideophones can only be considered to 'stretch' the grammar of the prosaic language; it does not disregard it. Recent work by Shih & Inkelas (2015) on Mende tone patterns, for example, shows that ideophones in that language "operate within fairly conservative parameters of the overall Mende tonotactics grammar." Echoing this viewpoint, Dingelmanse's (2012:657) recent survey article concludes: "…if ideophones flout the rules, it is in orderly ways. They form a coherent system of their own, building on the regular system but orthogonal to it." Indeed, Mphande (1989) argues that contrastive tone in one area of the Tumbuka grammar (ideophones) is more likely if tone is active in the phonology in general. In stress languages like Swahili, for example, it is not reported that ideophones have contrastive tone (Ashton 1969: 313ff; Lodhi 2004).

As Sharon Rose and Thilo Schadeberg (p.c.) point out, it is not surprising that the ideophonic lexicon is the area of the Tumbuka lexicon that preserves Proto-Bantu tonal contrasts. Ideophones typically must be pronounced with a particular prosody. Furthermore, in all the data I have collected, ideophones always come in phrase-final position, the position of phrasal stress where tone contrasts might be expected to be protected from neutralization. (See work like Beckman (1997), Harris (2004) and Steriade (1995), and references therein, on the correlation between stressed position and the realization of phonemic contrasts.) We return to these points in the next section

To sum up, while Tumbuka's prosodic system uncontroversially has tonal properties – e.g. contrastive tone in the substantial ideophonic lexicon – Tumbuka is certainly a non-canonical tone language because only the ideophonic lexicon exhibits tonal contrasts. Elsewhere, High tone is a predictable correlate of phrasal stress. Since stress is a phrasal property of Tumbuka, not a lexical one, this aspect of its prosodic system is also non-canonical: stress is canonically a property of words, not just of phrase-level phonology (Hyman 2012, 2014, though see Gordon 2014).

4. The path to Tumbuka's prosodic system

The question naturally arises of how Tumbuka's prosodic system might have developed from Proto-Bantu's more canonically tonal one, reconstructed with a two-tone contrast (H vs. ø) for all lexical morphemes (Meeussen 1967). The analysis builds on the observation that, in a number of synchronic Bantu tone systems High tones surface on or near the stressed phrase penult syllable, whatever their input position. (See e.g., McCawley 1978; Clements & Goldsmith 1984; Philippson 1998; Kisseberth & Odden 2003; Downing 2010b.) What I propose is that phrasal tone realization can lead to a loss of tonal contrasts because the input source of the High tone becomes ambiguous when High tone realization takes a phrasal domain.

The first step in the development of a Tumbuka-like prosodic system from Proto-Bantu could be a language like Digo (Bantu E.73; Kisseberth 1984). If a verb word contains a single High tone, it surfaces on the (stressed) penult syllable, no matter which syllable in the word sponsors the High tone. These generalizations are illustrated in (11) with verbs in the -na- tense-aspect; the form of the verbs is SBJ-na-STEM:[1]

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[1]
    I follow Kisseberth (1984) in characterizing the tone pattern of Digo as illustrating attraction of a High tone to the penult, even though, as we can see, Kisseberth transcribes the resulting tone pattern as a rise-fall over the final two syllables (except when the final syllable begins with a voiced consonant). Also, note that I am simplifying other complexities of the distribution of High tones in Digo in order to highlight the similarities with the Tumbuka system.

(11)   Digo High tone shift to penult of a toneless verb stem
       (Kisseberth 1984: 112, fig. (12)); underlyingly High-toned
       subject prefix is underlined

a.   <u>a</u>-na-vuguúrâ   's/he is untying'
       cf. ni-na-vuguura   'I am untying'
b.   <u>a</u>-na-βukuúsâ   's/he is shelling corn'
       cf. ni-na-βukuusa   'I am shelling corn'
c.   <u>a</u>-na-ramuúkâ   's/he is waking up'
       cf. ni-na-ramuuka   'I am waking up'
d.   <u>a</u>-na-onjerééza   's/he is adding to'
       cf. ni-na-onjereeza   'I am adding to'
e.   <u>a</u>-na-raβííza   's/he is insulting'
       cf. ni-na-raβiiza   'I am insulting'

Following work like Clements & Goldsmith (1984) and Philippson
(1998), one could posit the following steps in deriving a positionally
restricted tone system like that of Digo from Proto-Bantu:

(12) Diachronic steps from Proto-Bantu to Digo

(a) Loss of Proto-Bantu vowel-length contrast; predictable penult
    lengthening (stress).
(b) Pre-penult High tones are attracted to the stressed penult.
(c) Delinking of High tones from all syllables except the penult makes
    the connection between the input source of the High tone and its
    output position of realization surface opaque.

Digo is not Tumbuka, though. In Digo, High tone is contrastive – see
the verbs with first person vs. third person subject prefixes in (11),
above. However, just as in Tumbuka (non-ideophonic lexicon), the
position of realization of High tone is not contrastive: it consistently
targets the penult. To account for the loss of contrastive High tone, I
would like to take up Philippson's (1998) suggestion that languages
where High tones have a phrasal domain of realization hold one key to
this development. Digo is such a language.

As shown by the data in (13), in Digo verb-object combinations, the
High tone from one word (e.g., the verb) can be realized on the penult
of the following word (e.g., a noun object). That is, the domain for
High tone realization is the phrase, not the word. As a result, the same
word can be realized with High tone or Low tone depending on the
phrasal tonal context – cf. (13b) vs (13c). This makes it
syntagmatically opaque which word contributes the High tone to the

output because a verb+object phrase can have the same tone pattern whether the High tone's source is the verb or the noun:

(13) Digo verb+noun combinations (Kisseberth 1984: 162ff)
a. *Low toned verb + High toned noun*
    ku-saga ma-p<u>e</u>émbâ   'to grind maize'
    ku-vugura f<u>u</u>úndô   'to untie a knot'
    ni-na-tsora chi-d<u>a</u>áfû   'I am picking a young coconut'
b. *High toned verb + Low toned noun*
    ku-<u>o</u>nyesa njiírâ   'to show the way'
    ku-<u>a</u>funa nyaámâ   'to chew meat'
    ni-na-<u>e</u>zeka baándâ   'I am thatching a shed'
    <u>a</u>-na-henza mu-gaángâ   's/he is looking for a doctor'
c. *Low toned verb + Low toned noun*
    ku-henza mu-gaanga   'to look for a doctor'
    ku-saga mu-haama   'to grind millet'

The similarity in the tone of the Digo phrases in (13a, b) with the Tumbuka verb+object phrases illustrated in (4) is striking.

I propose that the phrasal domain of tone realization in languages like Digo can lead to misanalysis of the source of the High tone, and favor reinterpreting the occurrence of High tone as predictably linked to phrase penult position rather than linked to a particular morpheme or word in the phrase. To make this idea formally concrete, in OT terms, Digo High tones satisfy a constraint optimizing associating the High tone with a phrase penult syllable:[2]

(14) AlignR(H, PhonPhrase):
    Align every High tone with the right edge of a Phonological Phrase.

Since input lexical contrastive High tones are maintained in the output, Faithfulness constraints on the realization of input High tones must be high-ranked:

(15) Faith-H
a. Max-H: Every input High tone must have a correspondent in the output, and

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[2] An additional constraint, Nonfinality, must outrank this alignment constraint to optimize realizing the High tone on the penult. I omit this constraint from the tableaux as it is never outranked in the languages under consideration here.

b.   DEP-H: Every output High tone must have a correspondent in the input.

However, High tones are not faithfully realized in their input position. Therefore, a Faith constraint on the position of the High tones must be ranked below the alignment constraint in (14):

(16) FAITH-POS(ITION)
a.   MAX-POS: Every input TBU must have the same High tone in the output, and
b.   DEP-POS: Every output TBU must have the same High tone in the input.

The constraint ranking for Digo is summarized below:

(17) Ranking 1: Digo attraction of High tones to phrase penult

  FAITH-H >> ALIGNR(H, PHONPHRASE) >> FAITH-POS

As a result of this constraint ranking, the occurrence of a High tone on a phrase final word is not predictable from the input tone of the phrase final word. This point is exemplified in (18), where a High tone contributed by the verb optimally surfaces on the penult of the following low-toned noun to satisfy the alignment constraint in (14):

(18) Digo analysis

á-na-henza mu-gaanga	FAITH-H	ALIGNR (H, PHONPHRASE)	FAITH-POS
á-na-henza mu-gaanga		*!	
√a-na-henza mu-gaángâ			*

However, as shown in (19), the lexical tone contrasts on verbs and nominal complements is preserved, as it is not optimal to insert a High tone to satisfy (14):

(19) Input tonal contrasts preserved

ku-henza mu-gaanga	FAITH-H	ALIGNR (H, PHONPHRASE)	FAITH-POS
√ ku-henza mu-gaanga			
ku-henza mu-gaángâ	*!		

In spite of the similarity found in some contexts, Digo phrasal prosody is not identical to that of Tumbuka because in Digo lexical tone contrasts are consistently maintained. To optimize the obligatoriness

of High tones in Tumbuka (non-ideophonic) phrasal domains, we need an additional alignment constraint, the mirror image of (14), which is satisfied if every Phonological Phrase is right-aligned with a High tone:

(20) ALIGNR(PHONPHRASE, H):
Align the right edge of every Phonological Phrase with a High tone.

It is this second alignment constraint which is the driving force behind the reanalysis of the relationship between a High tone and its phrasal domain: from High tone taking a phrasal domain of realization (to satisfy (14)), to High tone being an obligatory marker of a phrasal domain (to satisfy (20)).[3] The relative rankings of (20) with FAITHFULNESS constraints define a factorial typology of High tone realization in phrasal domains that connects Digo and Tumbuka.

ALIGNR(PHONPHRASE, H) is obviously low-ranked in Digo, since High tone contrasts are maintained. If DEP-H (15b) is ranked below (20), then we derive a prosodic system where it is optimal to insert a High tone in order to satisfy the constraint in (20):

(21) Ranking 2: obligatory phrasal High tone

MAX-H >> ALIGNR(H, PHONPHRASE), **ALIGNR(PHONPHRASE, H) >> DEP-H**, FAITH-POS

Under this ranking, High tone realization takes a phrasal domain to satisfy the alignment constraints; lexical tone contrasts can be realized in the output. Like Digo, the position of High tones within the phrase is predictable. In contrast to Digo, a High tone obligatorily occurs on the penult of a Phonological Phrase, due to the ranking ALIGNR(PHONPHRASE, H) >> DEP-H, even when no lexical High tones are found in the input. Some dialects of Shingazidja (Bantu G.44; Cassimjee & Kisseberth 1998; Patin 2017) illustrate this type of prosodic system.[4]

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[3]
I thank one of the anonymous reviewers for stating this point so clearly.

[4]
I am abstracting away from the details of the very complex Shingazidja phrasal tone realization system in order to highlight the aspects that are similar to Tumbuka. See Cassimjee & Kisseberth (1998), Patin (2007, 2017) and Philippson (2005) for detailed discussion and analysis.

The tableaux in (22) exemplify how the ranking in (21) optimizes obligatoriness of phrasal High tone while maintaining some tonal contrasts. As we can see in (22b), even phrases without an underlying High tone optimally have one on the surface. Digo data is used here for ease of comparison; these data are to be considered Digo':

(22) Shingazidja-like language analysis, using Digo' data

a. High tone in the input

á-na-henza mu-gaanga	MAX-H	ALIGNR (H, PHONPH)	ALIGNR (PHONPH, H)	DEP-H	FAITH-POS
á-na-henza mu-gaanga		*!	*		
a-na-henza mu-gaanga	*!		*		
√a-na-henza mu-gaángâ					*

b. No High tone in the input

ku-henza mu-gaanga	MAX-H	ALIGNR (H, PHONPH)	ALIGNR (PHONPH, H)	DEP-H	FAITH-POS
ku-henza mu-gaanga			*!		
√ ku-henza mu-gaángâ				*	

Even though high-ranked MAX-H optimizes maintaining all the input High tones in the output, the constraint ranking in (21) increases the opacity of the phrasal tone system. A High tone on the phrase penult vowel might have its source in the input of either of the words in the phrase – or in neither.

In Tumbuka, High tone is obligatory at the phrase level, and tonal contrasts are lost in the non-ideophonic lexicon. This type of prosodic system is optimized by ranking all of the FAITHFULNESS constraints below the ALIGNMENT constraints:

(23)   <u>Ranking 3: Tumbuka, obligatory and non-contrastive phrasal High tone</u>

ALIGNR(H, PHONPHRASE), **ALIGNR(PHONPHRASE, H) >> FAITH-H, FAITH-POS**

When both Alignment constraints are high ranked, High tone realization not only takes a phrasal domain, High tone also ceases to be contrastive. A High tone occurs obligatorily on the phrase penult, even when no lexical High tones are found in input. This is illustrated in the following tableaux, where, again, Digo' data is used for ease of comparison:

(24) Tumbuka analysis with Digo' data

a. Input High tone

á-na-henza mu-gaanga	ALIGNR (H, PHONPH)	ALIGNR (PHONPH, H)	FAITH-H	FAITH-POS
á-na-henza mu-gaanga	*!	*		
a-na-henza mu-gaanga		*!	*	
√a-na-henza mu-gaángâ				*

b. No input High tone

ku-henza mu-gaanga	ALIGNR (H, PHONPH)	ALIGNR (PHONPH, H)	FAITH-H	FAITH-POS
ku-henza mu-gaanga		*!		
√ ku-henza mu-gaángâ			*	

What drives the re-ranking of FAITHFULNESS constraints, I propose, is the ambiguity of analysis of High tones that take a phrasal domain. When High tones optimally shift long distance and a High tone obligatorily occurs at the edge of every Phonological Phrase, the input source of the High tone, if any, is not syntagmatically recoverable. This favors reinterpretation of High tones as predictable correlates of Phonological Phrase edges, rather than as contrastive tones realized in a phrasal domain.

So far, the analysis does not account for why ideophones, unlike other lexical categories, maintain lexical tone contrasts in Tumbuka. Recall from the discussion in section 3.2, above, that it is a defining property of ideophones that they must be realized with a particular prosody. In OT terms, this generalization could be formalized as a FAITH-PROSODYIDEOPHONE constraint, which is never outranked. (See Shih

& Inkelas 2015 and Smith 2011 for discussion and analysis of lexical-category specific phonological effects, including category-specific FAITHFULNESS.) Since ideophones always end a Phonological Phrase, an alignment constraint (ALIGNIDEO) is necessary to optimize that requirement. The analysis is exemplified with the hypothetical example below where word 2 is an ideophone:

(25) Word 2 (nyuŋumu) is an ideophone; | indicates a Phonological Phrase boundary

á-na-henza nyuŋumu	FAITH-IDEO	ALIGN-IDEO	ALIGN(H, PHONPH)	ALIGN (PHON PH, H)	FAITH-H	FAITH-POS
á-na-henza nyuŋumu |			*!	*		
a-na-henza nyuŋúumu |	*!					*
√a-na-henza nyuŋumu |				*	*	

Clearly more work on the prosody of ideophones in Bantu languages, especially in languages with reduced tonal contrasts in other areas of the lexicon, is needed in order to see how (a-)typical the Tumbuka system is in maintaining tone contrasts just in the ideophonic system.

5. Conclusion

To sum up, I have made the following two proposals about the Tumbuka prosodic system. First, Tumbuka High tone realization has both stress-like and tone-like properties, as defined in Hyman (2006, 2009, 2012, 2014). As a result, Tumbuka cannot be classified as a purely stress language, as Kisseberth & Odden (2003) and Vail (1972) suggest. It is at best a non-canonical stress language. Second, the synchronic Tumbuka prosodic system plausibly evolved from a Digo-like and/or Shingazidja-like prosodic system through a process – formalizable as an OT factorial typology – which made phrasal prosody more transparently predictable by eliminating tonal contrast except in the non-ideophonic lexicon: i.e., the area of the lexicon where FAITHFULNESS constraints are least susceptible to low ranking.

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