

Do All Languages Have Word Accent?

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1. Introduction

The purpose of this paper is to address the question: Do all languages have word accent?¹ By word accent (henceforth, WA), I intend a concept a bit broader than the traditional notion of word-level stress-accent, as so extensively studied within the metrical literature. I will thus use the term as follows:

- (1) Word accent refers to the phonological marking of one most prominent position in a word.

The question in my title is thus intended to mean the following:

- (2) Do all languages phonologically mark one most prominent position per word?

As defined, WA is designed to be more descriptive and inclusive than word stress, which refers to a common type of prominence marking, typically analyzed as the headmost syllable of a metrical structure (cf. §2). Even so, the claim has been made that all languages have word stress, and thus necessarily WA.²

- (3) A considerable number (probably the majority, and according to me: all) of the world's languages display a phenomenon known as *word stress*. (van der Hulst 2009: 1)

On the other hand, a number of scholars have asserted that specific languages lack word stress, if not WA in general. This includes certain tone languages in Africa, but also languages without tone:

- (4) [In Bella Coola there is] ... no phonemically significant phenomena of stress or pitch associated with syllables or words.... When two or more syllabics occur in a word or sentence, one can clearly hear different degrees of articulatory force. But these relative stresses in a sequence of acoustic syllables do not remain constant in repetitions of the utterance. (Newman 1947: 132).

In fact, many languages do not provide unambiguous evidence of WA—or even words (Schiering, Bickel and Hildebrandt 2010). In many cases the interpretations have been theory-dependent and highly personal: Some people see (or hear) stress where others don't. Given this

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² Harry van der Hulst has since indicated to me via personal communication that he meant “word accent” in the more general sense intended in this study.

fact, it will be extremely difficult to demonstrate to the satisfaction of all that WA either is or isn't universal.

The strategy which will be adopted in attempting to answer the question in (2) is as follows. We will start in §2 by defining stress-accent and then discuss what the properties of a "canonical" stress-accent system might be. In §3 we will then consider languages which diverge in one or another way from the canons established in §2. In §4 I ask whether other distributional effects of positional prominence qualify as WA, followed by cases of co-occurring tone and WA in §5. A brief discussion in §6 concludes the study.

2. Defining stress-accent

In this section I will be concerned with how to define stress-accent (or *stress* for short), given the tremendous variation one finds in metrical stress systems (see especially Halle and Vergnaud 1988 and Hayes 1995). Let us start with the more basic question: How does one recognize stress when one encounters it? To answer this, consider what the most unambiguous stress system might look like? It might be a language with the following properties:

- (5) a. stress location is not reducible to simple first or last syllable (which could simply represent a boundary phenomenon)
- b. stressed syllables show positional prominence effects
 - i. consonant-, vowel-, and tone contrasts are greater on stressed syllables
 - ii. segments are strengthened in stressed syllables (e.g. Cs become aspirated or geminated, Vs become lengthened, diphthongized)
- c. unstressed syllables show positional non-prominence effects
 - i. consonant-, vowel-, and tone contrasts are fewer on unstressed syllables
 - ii. segments are weakened in unstressed syllables (e.g. Cs become lenited, Vs become reduced)
- d. stress shows cyclic effects (including non-echo secondary stresses)
- e. stress shows rhythmic effects lexically/postlexically (cf. the English "rhythm rule")
- f. lexical stresses interact at the postlexical level, e.g. compounding/phrasal stress
- g. lexical stress provides the designated terminal elements for the assignment of intonational tones ("pitch-accents")
- h. other arguments that every syllable is in a metrical constituent which can be globally referenced

The above stress system sounds a lot like English, which we can therefore take it to be. What makes metrical stress so unambiguous in English is that is multiply invoked throughout the phonology: English "cares" a lot more about stress than many other languages. The key notion here is *phonological activation*:

- (6) ... features are specified in a given language only to the extent that they are needed in order to express generalizations about the phonological system. (Clements 2001: 2).

As a result of the thorough-going phonological activations in (5), it would be folly to attempt to analyze English without stress. At best, major generalizations would be missed. Let us therefore

assume that there is no disagreement of interpretation, that all researchers agree that English has word stress. The issue of interpretation may become more relevant when approaching systems which, unlike English, show only a mild interest in stress. Thus, compare Hungarian, where “stress does not play a significant role in the word level phonology...” (Kenesei, Vago and Fenyves 1998: 428) and Turkish, where stress can be identified mostly on the basis of f_0 (Levi 2005), but not a single phonological constraint or rule refers to it.³ We thus have a cline in terms of activation: Some languages such as English make stress the central issue of their word-level phonology and morphology, while stress can be quite marginal in other languages such as Hungarian and Turkish.

Many scholars have been impressed with the more extensive effects of stress in Western Germanic as opposed to, say, Spanish (cf. the elusive “stress- vs. syllable timed” distinction). Thus, van Coetsem (1996: 39) speaks of two kinds of prominence: “dominant” vs. “non-dominant”. Although the distinction is sometimes presented as one of realization (e.g. concerning whether or how much stressless syllables are “reduced”), the alternative is to view the putative differences more generally in terms of the degree of phonological activation. Languages which exploit metrical structure for multiple purposes, as in (5), will exhibit the kind of “metrical coherence” found in Germanic (Dresher and Lahiri 1991), van Coetsem’s “dominant” type of prominence.⁴ Languages such as Hungarian or Turkish seem different because their metrical structure has little or no relevance outside the stress system itself. The contrast with English, whose phonology cares so much about stress, is quite striking. At the other extreme, Bella Coola cares so little that we can’t even determine if it has word stress at all.

Of course all of the above assumes that we can adequately define what is vs. is not a stress system. Approaches to defining stress-accent have been of three types:

(i) The phonetic approach is concerned with the realization and perceptibility of stress. The typical question is how stress is phonetically manifested. The acoustic properties of f_0 , duration and intensity are typically investigated, as are the articulatory gestures involved in enhancing the properties of stressed syllables (cf. Lehiste 1970, Beckman 1986, Levi 2005).

(ii) The functional approach typically focuses on the communicative motivations of stress-accent (cf. Garde 1968, Martinet 1954, 1961). The obligatory and culminative parameters of “one and only one primary stress per word” are said to communicate the number of words that are present. If primary stress is “fixed” on the same syllable in every word, e.g. first or last, it assumes also a “demarcative” function, indicating where the actual word boundaries are. Especially when “echo stress” iterates, such rhythmic marking enhances the other functions, as syllables build up to or away from the primary stress.

(iii) The formal approach is interested in stress in terms of its organizational or structural properties. Although not opposed to the other approaches, it is possible to study the formal

³ Pointing out that the phonetic realization of WA bears some resemblance to Japanese, Basque and Serbo-Croatian, Levy (2005:94) in fact claims that Turkish should be called a “pitch-accent language”. As in Beckman (1986) this assumes a typology based on phonetic implementation rather than linguistic function. For a critique of the practice of forcing languages into types and the resulting incoherence of the concept of “pitch accent”, see Hyman (2009, 2012) and below.

⁴ Hyman (2009: 217) presented the multi-activated system in (5) as a possible prototype for stress, since it has almost everything except the proverbial kitchen sink. While the extensive stress marking of English might serve as a practical reference point for comparison with other potential stress systems, the fact that so much of the system has been lexicalized does not make it a good candidate for prototypicality. Instead an attempt to define what might be a “canonical” stress system is provided in (10) below.

properties of stress without addressing communicative or phonetic implications. In this sense, we could also refer to such approaches as “phonological” or perhaps better “grammatical”, as phonology is a component of grammar. In this approach emphasis is on the construction of metrical constituents (e.g. feet), often with regard to other aspects of grammar (cf. Halle and Vergnaud 1987, Hayes 1995 etc.).

Despite considerable overlap in actual practice, the questions raised by each of the three approaches can be quite different: What are the acoustic correlates of stress across languages? What is the relative perceptibility of the different acoustic correlates of stress-marking across languages? What is the range of structural rules assigning stress across languages? All of this assumes that we know stress when we see/hear it. In Hyman (2006: 231, 2009: 217) the following, generally accepted definition of stress was presented:

- (7) A language with stress-accent is one in which there is an indication of word-level metrical structure meeting the following two central criteria:
 - a. *obligatoriness* (OBLHEAD): every lexical word has AT LEAST one syllable marked for the highest degree of metrical prominence (primary stress)
 - b. *culminativity* (CULMHEAD): every lexical word has AT MOST one syllable marked for the highest degree of metrical prominence
- (8) In addition to meeting both of these criteria, another inviolable property of stress systems is that the stress-bearing unit is the syllable.... (Hyman 2009: 217)

As a result of combining the properties in (7a,b), every lexical word must have ONE AND ONLY ONE (primary) stress, the prosodic head of that word. The above seems to be a very workable definition characterizing a common and recognizable prosodic type known as stress-accent. (8) further specifies that the stress-bearing unit must be the syllable (cf. Hayes 1995: 49). As a definition, (7) and (8) represent a MINIMUM that any system must meet in order to be stress-accent. Much more can of course be said about what to expect of a stress system—and, as we shall see, there are word-prosodic systems that don’t quite meet one or another of the above definitional requirements. Finally, note that these criteria only establish whether a language has a stress-accent system. They have nothing to say about whether it also has tone, an independent parameter, as in Swedish and Mandarin.

In order to address the question of whether all languages have stress-accent (or some more generalized notion of WA), it is helpful to ask in advance why one might even suspect such a potential universal. It is in this connection that Grev Corbett’s “canonical approach to typology” comes in handy:

- (9) The canonical approach means that I take definitions to their logical end point, enabling me to build theoretical spaces of possibilities. Unlike classical typology, only then does one ask how this space is populated with real instances. The canonical instances, that is, THE BEST, CLEAREST, INDISPUTABLE (the ones closely matching the canon) are unlikely to be frequent.... Nevertheless, the convergence of criteria fixes a canonical point from which the phenomena actually found can be calibrated, following which there can be illuminating investigation of frequency distributions. (Corbett 2007: 9; my emphasis—LMH)

While the combination of properties in the system presented earlier in (5) might be considered to be the most “indisputable” case of stress-accent in the sense of having the most activations, it is not functionally canonical. Following the Prague School view (Jakobson 1931, Trubetzkoy 1939, Martinet 1954, Garde 1968), let us assume that the core function of stress-accent is to identify and mark off major category words within utterances. In order to be able to tell how many words there are in the utterance and where the word boundaries are, canonical stress should therefore be:

- (10) a. obligatory : all words should have a primary stress
 b. culminative : no word 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-independent
 h. privative : there should be no secondary stresses
 i. audible : there should be a phonetic cue(s) of the primary stress

The two properties in (10a,b), obligatoriness and culminativity, were already presented as definitional in (7): If metrical structure does not define one and only one primary stress, then the system is not stress-accent. The properties in (10c-h) are canonical, designed to enhance the proper function of word demarcation within an utterance. For this purpose stress-accent should be predictable (10c), i.e. assigned by general rule, rather than lexically idiosyncratic. As this might include reference to morphology, (10d) further stipulates that grammatical information should not be required in the canonical case. Since the function is to mark off words, the predictable stress should be demarcative (10e), i.e. calculated from a word edge. Given that there could be varying numbers of prefixes and/or suffixes in different words, assigning primary stress instead to the root syllable would not be canonical.

(10f) stipulates that the primary stress should not only be calculated from the edge, but also be edge-adjacent: Initial and final stress are more canonical than peninitial or penultimate.

(10g) says that stress should be assigned without regard to syllable weight (moras)—or any phonetic or phonological criterion. Weight sensitivity has the potential to result in cases where one cannot unambiguously determine the word segmentation from the output. To illustrate less than perfect demarcation, Martinet (1961: 87) cites the sequence *bónacalígula*, which has two possible parsings: *bóna Calígula* (the correct one) and **bónaca lígula*.

(10h) identifies secondary stresses as non-canonical. Most egregious would be cases of unpredictable secondary stresses, as in English *ínsèct* vs. *súbject*. While it might seem that building iterative feet could be an enhancement of the primary stress, the potential would be there for a secondary stress of one word to detract from the primary stress of an adjacent word. It might therefore be most effective to have not only one primary, but one total stress per word.⁵

⁵ This is perhaps the most debatable property in (10). While incorporating all syllables within a hierarchized metrical structure might better indicate the internal morphological structure of the word, the proposal in (10h) is that a simple contrast between primary vs. no stress better satisfies the canonical function of stress, which is to be demarcative. I take no position as to whether this means a single

Finally, (10i) simply says that the primary stress should be phonetically detectable.

Taken together, the canons conspire to impose “biuniqueness” on stress-accent: One should be able to predict the primary stress from the word boundaries, just as one should be able to predict the word boundaries from the stress. What this means is that perfect demarcative stress is canonical, and anything else represents a divergence from one or more of the canons. In support of this Praguian position, Hyman (1977, 1978) and Bybee, Chakraborti, Jung, and Scheibman (1998) argue that languages first develop demarcative stress, historically, which then can be subjected to further restructuring. Thus, unpredictable primary or secondary stress would diverge from the core function of demarcation and is hence less canonical. As in canonical typology in general, few, if any languages will meet all of the canons at once. Thus, Bybee et al also point out that it is in languages where stress is not fully predictable that multiple phonetic marking of stress tends to occur. Where stress is canonically demarcative and edge-adjacent, packaging and recognition will be more transparent; where it is unpredictable, more extensive effects and greater non-canonicity is observed.

Turning to the question of universality, the Praguian functional approach gives us a window into why languages might require some form of WA: van der Hulst’s position in (3) comes down to a claim that all languages need to mark off words, in other words that it is impossible for all positions (e.g. syllables) in a word to be of equal prominence. Not to have a primary stress means not to be a word. It turns out that other systems are more seriously non-canonical in the sense of violating the definitional properties in (7), (8) and (10a,b), to which we now turn.

3. Divergences from definitional stress-accent

If we attempt to generalize the definition of stress-accent to all kinds of potential WA, problems arise having to do each of the following five elements mentioned in (7) and (8):

- (11) a. stress-accent is obligatory
- b. stress-accent is culminative
- c. the stress-bearing unit is the syllable
- d. the accentual domain is the word
- e. stress-accent represents metrical prominence

First, there are languages which satisfy (11a) but not (11b), and vice-versa (Hyman 2006, 2009). Second, the obligatory or culminative property in such languages typically involves a fixed H(igh) tone, and possibly nothing else, thereby making it hard to show in some cases that this H is actually a realization of metrical prominence. Third, in some of these languages, the obligatory or culminative H tone is assigned to the mora, while the stress-bearing unit is generally assumed to be the syllable (cf. Hayes 1995: 49). In fact, in such languages, two kinds of “accent” contrast within a syllable: if the H goes on the first mora, the result will be a [HL] falling tone; if it goes on the second mora, the result will be a [LH] rising tone (which in some languages may be flattened to a phonetic H pitch). As an illustration, consider the following examples from Kinga, a Bantu language in which all words must have a H tone (Schadeberg 1973):

unbounded foot per word, or whether stressless syllables may fall outside a single bounded foot encoding primary stress.

- | | | | |
|---------|---------------|---------------------|-------------|
| (12) a. | ukúheka | ‘to laugh’ | [H] |
| | ukúvala | ‘to count’ | |
| | ukugeendélela | ‘to walk around’ | |
| b. | ukugéenda | ‘to go’ | (HØ → [HL]) |
| c. | ukuhwaánana | ‘to become similar’ | (ØH → [H:]) |

In the infinitive a /H/ is assigned to the antepenultimate mora (vowel). This results in a simple [H] in (12a), where the antepenultimate mora also constitutes a short CV syllable. In (12b) and (12c), however, where the /H/ is assigned to the first vs. second mora of a bimoraic CV: syllable, the result is a contour tone. A similar result is found in Somali, where /H/ is culminative, but not obligatory, e.g. most subject nouns and verbs are realized without H: *inan wáa dhaʕay* ‘the boy fell’ (Hyman 1981, Saeed 1999). While terms such as “pitch-accent” are often applied in such cases, the larger question is whether obligatory or culminative /H/ tone should be equated with accent. Finally, in some languages the obligatoriness or culminativity is effected not at the word, but rather at phonological phrase level. This is the situation in Chimwiini, which exhibits both obligatory H and culminative vowel length at the phrase level (cf. (19)-(20) below).

Such problems have led some to distinguish two kinds of WA: stress-accent, which meets the criteria in (7) and (8), and “pitch-accent” which meets either a subset of the properties of stress-accent or exhibits a set of related properties (cf. Hualde 2006: 4). One could, for example, stipulate that pitch-accent refers to a tone that has to be either obligatory or culminative, and whose accent-bearing unit can be either the syllable or the mora. However, as I argue in Hyman (2006, 2009), this would yield a rather loose set of “pitch-accent” systems, with relatively little in common: obligatory vs. culminative vs. obligatory/culminative, syllable vs. mora, word vs. phrase etc. The problem gets even worse if we consider other “evidence” for WA, e.g. designating positions which show greater consonant- or vowel contrasts as “accented” (cf. §4 below). It is doubtful that a culminative “at most one” aspirated or glottalized stop per word can make a language “accentual”.

The approach that I advocate is what I call “property-driven typology”. Whereas word-prosodic typology has been concerned with pigeon-holing languages and giving them names such as “tone”, “stress-accent” and “pitch-accent” (see Hyman 2009 for a critique of this practice), there are two immediate problems: First, some languages have both tone and stress. Second, there are languages which lie on the border between such claimed “types” (recall Levi’s 2005 decision to call Turkish a “pitch-accent language”). The approach of property-driven typology is to eschew the concern of naming languages or systems and typologize on the basis of the individual properties. We then ask two separate questions: Do the properties of Language X meet the explicit definition, e.g. of stress-accent and/or tone? If so, to what extent do these properties not meet the individual canons?

While *stress-accent* is a coherent notion, namely the prosodic type defined by (7) and (8), the more general concept *word accent* is not—or at least has not been shown to be coherent. Recall from the Kinga examples in (12) that cases where an obligatory and/or culminative /H/ is assigned to a particular mora (rather than syllable) cannot be assumed to represent stress-accent, at least not without changing the syllable requirement in (8). An even more serious challenge to the universality of (8) comes from another aspect of Bella Coola, where according to Bagemihl (1991), all syllables must contain a vowel or sonorant consonant. However, there are full words and utterances that consist solely of voiceless obstruents, e.g. *xʔpʰχʷhtʔtʰs kʷc* ‘then he had

had in his possession a bunchberry plant' (Nater 1984: 5, cited by Shaw 2002: 1). In addition Hyman (1985: 26-32) claims that there are no syllables in Gokana at all (cf. Hyman 2011 for an updated statement). If we insist that stress-accent can only be assigned to syllables, and if these studies are correct, then either some words (Bella Coola) or all words (Gokana) can lack stress-accent.

A similar problem would arise in any language which could be demonstrated to lack (phonological) words (cf. Schiering, Bickel and Hildebrandt 2010), or where stress appears to be phrasal, as often claimed for French. Consider the following variations in word- and phrase-based penultimate stress in Yowlumne (Newman 1944: 28-9, Archangeli 1984-5: 112):

- (13) a. [ʔóhom] [maʔ níim hiʔ] [dab wíyen] [mókyi] 'you, then, will not tell my
 b. [ʔohóm maʔ] [níim hiʔ] [dab wíyen] [mókyi] wife'
 c. [ʔohóm maʔ] [nim hiʔ dab] [wíyen] [mókyi]
 d. [ʔohom maʔ níim hiʔ] [dab wíyen] [mókyi]
 not you my will then tell.FUT wife

As Newman (1944: 28) put it:

- (14) A group of words composing a phrase is pronounced as a stress unit, taking the stress on the penultimate syllable. Nouns and verbs tend to keep their word stress unmodified in the phrases, largely by acting as the phrase nucleus in drawing to themselves any preceding unaccented words.... However, the grouping of words into phrases is extremely plastic.... In faster speech the phrases tend to be longer and the stresses, as a result, fewer in number.

The multi-word bracketings in (13) are consistent with Bickel, Hildebrandt and Schiering's (2009: 64) observation that "stress-related domains tend to be universally larger than other domains."

One of the claims made by Schiering et al (2010) is that the phonological word may be non-distinct from the phonological phrase in certain "monosyllabic" languages. Their example is Vietnamese. The one we will consider here is Kuki-Thaadow, whose mostly monosyllabic words exhibit the following syllable and tone contrasts:

(15)		/H/ (→ LH)	/HL/	/L/	
CVV	:	mũu 'hawk'	vâa 'bird'	khàa 'body lice'	
CVD:	:	kăm 'mouth'	nôw 'seedling'	mòl 'stick'	
CVVD	:	dăay 'dew'	kêeŋ 'leg'	vàan 'sky'	
CVʔ	:	phěʔ 'mat'	tsêʔ 'brick'	vòʔ 'pig'	
CVT	:	----	----	kòt 'door'	
CVVT	:	----	khûup 'knee'	-----	

In the vast majority of cases a Kuki-Thaadow word is monomorphemic and monosyllabic. The shapes of these monosyllables are indicated in the first column of (15), where T = /p, t/; D = /w, y, l, m, n, ŋ/, VV a long vowel or one of the two diphthongs, /ie/ and /uo/. The three underlying tones are /H/, /HL/ and /L/. As indicated, /H/ is realized LH in isolation (Hyman 2010). The question is whether there is evidence that all (or certain) monosyllabic words are stressed.

One possible relevant fact is that a rule of vowel shortening affects /CVV/ words within phrases, e.g. when a noun is followed by a modifier:

- (16) *vâa* ‘bird’ *mũu* ‘hawk’ *khàa* ‘lice’
 vá lien ‘big bird’ *mù lien* ‘big hawk’ *khà lien* ‘big lice’
 vá thũm ‘three birds’ *mú thũm* ‘three hawks’ *khà thũm* ‘three lice’
 vá thâa ‘bird’s strength’ *mú thâa* ‘hawk’s strength’ *khà thâa* ‘lice’s strength’

While I will ultimately reject the following interpretation, someone who is concerned that all languages should have word stress might claim that the phrases in (16) are phonological words with final stress. That is, CVV → CV is a “reduction” process due to lack of stress on the initial nouns in (16). However, against this interpretation I would present the following arguments:

(i) The derived CV behaves exactly like other syllables. Other than the shortening, there is no segmental or tonal reduction. The tonal alternations on the shortened versions of /*vâa*/, /*múu*/ and /*khàa*/ seen in (16) are exactly the same as those which are found on CVT, CVVT, CVD, and CVVD. This includes the obligatory simplification of contours on all non-final syllables.

(ii) Length is not affected (“reduced”) in closed syllables, e.g. *vàan lien* ‘big sky’. The shortening rule is specific to underlying /CVV/ which does not contrast with /CV/.

(iii) Shortening can apply to several CVV words in a row. In the following examples, /*hòo*/ is a plural marker:

- (17) *vâa* + *hlàa* + *gùu* + *hòo* → *vá hlà gù hòo* ‘bird’s wing-bones’
 múu + *lúu* + *khâa* + *hòo* → *mú lú khá hòo* ‘hawk’s head lice’

It would seem counterintuitive to claim that the forms on the right constitute quadrisyllabic phonological words (as opposed to phonological phrases).

(iv) There are some CVV words which fail to shorten because they derive historically from *CV? (present-day CV? derives from earlier *CV(V)k and *CV(V)r). A minimal pair is shown in (18).

- (18) *nàa* + *màn* → *nà màn* ‘work price’
 nàa + *màn* → *nàa màn* ‘leaf price’ (cf. Hakha Lai *nă?* ‘leaf’)

It is of course possible to analyze ‘work’ as /*nàa*/ and ‘leaf’ as /*nàC*/, making it identical with other CVC forms, but why should /CVV/ show a tendency to stresslessness while /CVC/ and /CVVC/ do not? If word stress is obligatory, one would have to say that every non-CV syllable is “stressed”. At best, this would be redundant.

Two additional problems for the universal WA hypothesis come from Chimwiini (Kisseberth 2009). The first is that the “accentual” criteria do not line up. Chimwiini has two culminative properties: (i) vowel length, which can be realized only on the penultimate or antepenultimate syllable; (ii) H tone, which can be realized only on the penultimate or final syllable. The two culminative properties produce the four combinations in (19), only one of which shows the two coinciding:

- (19) *antepenultimate V:* *penultimate V:*
 final H *na:-ku-já* ‘you sg. are eating’ *ji:lé* ‘you ate’

- (23) a. kíkóloombe ‘cleaning shell’
 kíkólombe chaángu ‘my cleaning shell’
 b. naa-kálaangĩte ‘I fried’
 naa-kálangĩte chóolya ‘I fried food’

As seen in ‘I fried food’ the prefixal part of the verb is not affected by the shortening process, possibly because its length is derived (/ni + a/ → *naa*). The question is whether such phrasal restrictions on length should be identified with stress?

A very interesting variation on vowel length constraints is found in Ngangela:

- (24) ... une voyelle ne peut être longue que si toutes les voyelles qui suivent jusqu’à la pénultième comprise sont également longues. (Maniacky 2002: 20)

As in Cokwe, vowel length is automatically realized in penultimate position. However, unlike Cokwe, Lunda, and Chimwiini, vowel length is not culminative: A pre-penultimate long vowel can surface as long as all vowels that follow it up to and including the penult are also long. Thus consider the following verb forms:

- | | | | | |
|---------|-------------------|----------------------------|--------------|--------------------------------|
| (25) a. | -teetááŋga | ‘partager’ | cf. -tééta | ‘couper’ |
| | -teetaaŋgééni | ‘partagez! (pl.)’ | | |
| | b. -vuulwííθa | ‘rappeler, remémorer’ | cf. -vulúka | ‘se rappeler’ |
| | -taambwííθa | ‘distribuer’ | cf. -tambúla | ‘recevoir’ |
| | -ʃaambwííθa | ‘infecter, contaminer’ | cf. -ʃambúka | ‘être contaminé’ |
| | c. -pulááŋga | ‘couper en tranches’ | cf. -púla | ‘couper au couteau’ |
| | -holwééθa | ‘refroidir (tr.), calmer’ | cf. -holóka | ‘refroidir (intr.), se calmer’ |
| | -aʃááŋga | ‘atteindre plusieurs fois’ | cf. -áʃa | ‘lancer’ |
| | d. ŋgóombe yáaŋge | ~ ŋgómbe yáaŋge | | ‘my cow’ |

In (25a) not only is the penultimate long, but so are the preceding vowels in each form. The forms in (25b) look rather similar, with the vowel length of the initial syllable being licensed by the long penultimate [íí]. However, note that the vowels are short in the corresponding related forms to the right. It is these that show that the first syllables are underlyingly /vuu/, /taa/ and /ʃaa/, which must be shortened before the short penult in *vulúka* etc. Not only must the penult be long, but there cannot be an interruption in the chain of long vowels: CVV.CVV.CVV.CV is well-formed, but CVV.CV.CVV.CV is not. (25c) shows that this is not length agreement, as the first syllables remain short before long penultimate vowels. While such licensing of pre-penultimate length appears to be mostly word-bound, (25d) shows that part or more of the noun phrase (and perhaps other constituents) may form “prosodic groups” in which the first word optionally undergoes shortening. Maniacky (2002: 20) thus observes:

- (26) Pour finir, signalons que la perte de longueur vocalique est assez aléatoire au niveau post-lexical. La position pénultième dont on doit tenir compte est celle du mot, et non celle de l’énoncé tout entier. Dans notre étude tonale, nous définirons un groupe prosodique qui correspond au syntagme nominal. Dans ce cas-là, l’abrègement est plus sensible à l’ensemble de l’énoncé, sans vraiment être systématique.

While the (ante-) penultimate length effects definitely indicate that all positions are not treated equally in such languages, two points should be noted: First, different positions may be privileged for tone vs. length. Besides the non-overlap we saw in (19) from Chimwiini, the Nguni languages show penultimate lengthening, but rightward attraction of a H to antepenultimate position. Second, these positions do not usually have segmental effects, whether on the inventory of contrasts or on the phonetic realizations. An exception to this comes from the variety of Makonde described by Liphola (1999, 2001). As seen in the following examples, Makonde has the familiar process of root-controlled vowel height harmony found in many Bantu languages. It also has penultimate lengthening which in the following examples applies to the applicative suffix /-il-/:

- (27) a. /ku-pelivilil-il-a/ → ku-pevelelel-eel-a ‘to not reach a full size for’
 b. /ku-kolumul-il-a/ → ku-kolomol-eel-a ‘to cough for’

As seen, the triggers of vowel harmony are the root vowels of /pel/ and /kol/. This much is unsurprising. What is unusual, however, is that pre-penultimate mid vowels may optionally “reduce” to [a]:

- | | | | | |
|---------|--------------------------------|----|----------------------------|----------------------|
| (28) a. | ‘to not reach a full size for’ | b. | ‘to cough for’ | |
| | /ku-p <u>e</u> livilil-il-a/ | | /ku-k <u>o</u> lumul-il-a/ | |
| | ku-pevelelel-eel-a | | ku-kolomol-eel-a | (no vowel reduction) |
| | ku-pavelelel-eel-a | | ku-kalomol-eel-a | (one application) |
| | ku-palavelelel-eel-a | | ku-kalamol-eel-a | (two applications) |
| | ku-palavalelel-eel-a | | ku-kalamal-eel-a | (three applications) |
| | ku-palavalal-eel-a | | | (four applications) |

This apparent reduction process does not require the penult vowel to be long (the process applies even when the verb has a short penult in phrase-internal position) or even a mid vowel ([e] and [o] can reduce to [a] even if the penultimate vowel is /a/). There are two facts that point to the penult as a prominent position: First, whether long or short, penult [e] and [o] cannot themselves reduce to [a]. Second, the reduction of pre-penultimate mid vowels to [a] cannot be interrupted by [e] or [o]. Thus, forms such as *ku-pavelelel-eel-a and *ku-kolomal-eel-a are ungrammatical. What this means is that there is a cline building up to the penult: a vowel further to the left (and hence lower on the cline) cannot fail to reduce if a vowel further to the right (and hence higher on the cline) doesn’t. We now see the relation to Ngangela, where an earlier pre-penultimate vowel cannot be long if a later (penultimate or pre-penultimate) vowel is short. The further a syllable is away from the penult, the more likely it is to undergo vowel shortening in Ngangela and vowel reduction in Makonde.

To summarize the above, we have seen that a number of problems arise in equating the traditional features of pitch (tone) and duration (vowel length) with WA. In the next section I present and ask whether other cases of “positional prominence” should be interpreted as WA.

4. Positional prominence and word-accent

The Ngangela and Makonde examples are quite interesting in that there appears to be a gradual cline in prominence up to the penultimate position. If such effects are “accentual”, however, the penult does not seem to have Dresher and Lahiri’s “metrical coherence”. In most Bantu languages including Makonde the root-initial syllable contrasts more vowels than other positions, including the penult (see (31) below). We would like to know not only how widespread such positional prominence effects are cross-linguistically, but also whether they necessarily cohere with WA in a single position.

A limited such case may be provided by Leggbó (Hyman and Udoh 2007). The relevant phenomenon is illustrated in (29).

(29) a.	CV	du	‘beat’	du-ε	‘beat him’	du-ɔ́	‘beat you’
b.	CVV	zoo	‘find’	zoo-ε	‘find him’	zoo-ɔ́	‘find you’
c.	CVC	dum	‘bite’	dum-ε	‘bite him’	dum-ɔ́	‘bite you’
d.	CVC-i	bini	‘carry’	bini-ε	‘carry him’	bini-ɔ́	‘carry you’
e.	CVC-a	tùma	‘stop’	tùùm-εε	‘stop him’	tùùm-ɔ́ɔ́	‘stop you’
				/tùma+ε/		/tùma+ɔ́/	

The forms in (29) show how the two pronominal enclitics *-ε* ‘him/her’ and *-ɔ́* ‘you sg.’ are realized after verb stems of different shapes. Everything is straightforward in (29a-d). In (29e), however, we see that the final /a/ of *tùma* ‘stop’ fuses with the enclitics, producing long *-εε* and *-ɔ́ɔ́*. This much also is straightforward. What is not expected is that the root vowel also lengthens—and only in this context. While Hyman and Udoh consider various analyses, including an otherwise unattested process of length harmony, given Ngangela and Makonde, this may not seem so far-fetched: A less prominent non-root vowel can be long only if the more prominent root vowel also is. Whereas Ngangela shortens a less prominent long vowel if followed by a more prominent short vowel, Leggbó appears to lengthen the more prominent short vowel to agree with the less prominent long vowel.⁶ As Hyman and Udoh lament, Leggbó does not provide appropriate longer stems to test whether lengthening might be iterative. Stems are generally mono- or bisyllabic and can be trisyllabic only when a verb root occurs with the pluractional suffix *-azi*—which unfortunately does not end in /-a/.

What can be tested, however, is whether the root syllable is in fact prominent in other ways. The table in (30) presents the consonant contrasts in stem-initial, stem-medial, and stem-final position:

⁶ This and the previous examples are reminiscent of other cases where high sonority tends to line up with the head of a stress foot (cf. de Lacy 2004).

How should WA be characterized in such languages? Stem-initial? Penultimate? One primary, one secondary? One word-level, one phrase-level? Once again, as in the case of Chimwiini tone vs. vowel length, the criteria do not line up—and both are assigned exactly within the same phonological phrase domain (Kisseberth 2009). The “accents” of Chimwiini are not only phrasal, but also lack of metrical coherence.

Despite the fact that most current-day Bantu languages maintain at least some of the Proto-Bantu distributional asymmetries in (31), descriptive statements about stress placement in Bantu are largely geographical: Stem-initial stress has mostly been posited for Northwest Bantu languages, e.g. Duala, Kukuya, Bobangi, Ntomba, Bolia, Tetela, while claims of penultimate stress mostly concern Eastern and Southern Bantu, e.g. Kinande, Chichewa, Shona, Xhosa. Many descriptions of Bantu languages fail to mention stress, or claim there is no stress. Besides Luganda in Eastern Bantu, consider the more westerly Lomongo and Ngombe:

(33) ...l'accent dynamique [in Lomongo] est entièrement éclipsé par la marcation bien plus essentielle des tons. (Hulstaert 1934: 79)

...even [those Ngombe speakers] who readily recognize the position of tone in the words of their own language, find it difficult to decide where the stress of a given word lies. (Price 1944: 28)

To this we can add that Hulstaert (1961: 129) ran experiments showing that there is no stem-initial stress in Lomongo, which is however a NW Bantu language.

5. Systems with tone and word accent

The above characterization of Ngombe speakers brings us back to formal vs. phonetic approaches to stress: The formal (metrical) approach insists that stress-accent is abstract and not necessarily detectable in terms of consistent phonetic features. As Lehiste (1970: 150) put it several decades ago:

(34) It appears probable that word-level stress is in a very real sense an abstract quality: a potential for being stressed. Word-level stress is the capacity of a syllable within a word to receive sentence stress [read: a “pitch-accent”] when the word is realized as part of the sentence.

Of course certain phonetic properties tend to accompany stress, e.g. effects on consonants and vowels. A curious reversal of strategy is to go directly from these expected phonetic properties to claims about stress: Many descriptions of stress are impressionistic, with possible interference from English or other languages. The logical extreme of this occurs when the realizational features of stress are exploited for distinctive purposes, e.g. intensity:

(35) ...stress in Nilotic is privative, a feature with binary opposition.... a word may be stressed or not. The stress in itself may function as a morpheme in some cases and stress may occur on any of the three level tones. (Gilley 2004: 100)

Shilluk examples of alleged distinctive stress are cited in (36).

- | | | | | | | |
|------|-----------------|---------------|---------|-----------------|---------------|---------|
| (36) | <i>singular</i> | <i>plural</i> | | <i>singular</i> | <i>plural</i> | |
| a. | 'dít | diêt | 'bird' | b. álàt | á'lět | 'cloth' |
| | 'tòok | tòok | 'mouth' | péèm | 'pèém | 'chest' |

Gilley (2004: 117) describes the phonetics of distinctive stress as follows:

- (37) Phonetically, stress in these Nilotic languages is characterized by a shortening of vowel length, and by an increased intensity or level of force on the syllable.

The problem is that this interpretation leaves Shilluk with many unstressed words, in contradiction to the definition of stress-accent in (7).

It is occasionally remarked that pitch and duration may be more restricted or less likely cues for WA in languages with contrastive tone and length, respectively (cf. Wetzels 2002: 627). Stress is often elusive and is usually assumed to be absent in West African languages with tone, e.g. in Igbo, Yoruba, Nupe, Ewe, Akan.⁷ However, Africanists do appreciate that a language can have tone and stress. Besides the kind of segmental asymmetries seen above in Legbo, tonal distributions and realizations may also be sensitive to root-affix distinctions. Thus, Noonan (1992: 42) describes Lango, another Nilotic language, with root-initial WA:

- (38) Primary stress in Lango is invariably placed on the root syllable.... Where the root is longer than one syllable — only possible in nouns — the first vowel receives stress.... Stressed vowels in Lango are somewhat louder and slightly longer than unstressed vowels. The difference between stressed and unstressed vowels is not as pronounced as in English; instead, the relation between them is closer to that found in syllable-timed languages such as Spanish.

As evidence that stress is playing an active role in the phonology, Noonan describes the following stress-sensitive tone rule:

- (39) Following a H, L's become H's up to and including the next stressed L, or until a H is encountered, the last L to be affected becoming HL. The rule may apply across word boundaries. (p.51)

Examples of the operation of this rule are seen in (40).

- | | | | | | |
|---------|----------------------------|---|-----------|---------------------|--------------------------|
| (40) a. | / ^h dóg 'gwènò/ | → | dóg gwénò | 'a chicken's mouth' | ('mouth' + 'chicken') |
| b. | / ^h píg à'bòlò/ | → | píg ábólò | 'plantain juice' | ('juice' + 'plantain') |

In all of the above I have been assuming that stress-accent is a type of WA, the latter being perhaps more permissive. One issue that was addressed with respect to Kinga in (12) is that a language may assign an obligatory and culminative /H/ to moras rather than to syllables. In

⁷ Russell Schuh (personal communication, 2010) confirms that he has never seen any need to posit word stress in Chadic languages, all of which are tonal. This is not to say that foot structure is irrelevant for other purposes, e.g. tone or even vowel harmony (cf. Leben 1996, Pearce 2006, 2007).

Kinga a word must have a H on either the antepenultimate, penultimate, or pre-stem mora (Schadeberg 1973: 23). What this means is that there will be exactly one H tone per word, as in the case of primary stress-accent. Contrast this with Somali, where the /H/ which can be assigned to either the penultimate or final mora is culminative (“at most one”) but not obligatory (“at least one”). Thus, in the sentence *inan wáa dhaſay* ‘the boy fell’, neither the subject noun *inan* nor the verb *dhaſay* has a H tone. (*wáa* is an inflectional particle.) Since many words will be toneless, one cannot know how many words there are by the number of H tones, i.e. the biuniqueness test referred to above fails. This raises the question of how functional culminative, but non-obligatory H or HL tone is in languages like Somali and Tokyo Japanese.

The same question arises in systems where /H/ is obligatory, but not culminative. As a case in point Michael (2010: 10) analyzes Iquito with both metrical structure and an obligatory but non-culminative H:

- (41) All prosodic words in Iquito bear at least a single H tone, and if a given prosodic word lacks lexically specified high tones (a common occurrence), a high tone is assigned to the syllable bearing primary stress [= the penultimate mora].

The examples in (42) illustrate a minimal pair between lexical and default H tone:

- (42)
- | | | | | |
|----|--|---------------------|-----------------|--|
| | | <i>-ya</i> ‘plural’ | <i>kí-</i> ‘my’ | |
| a. | lexical initial H : /túuku/ túuku ‘tumpline’ | túuku-ya | kí-túuku | |
| b. | default penult H : /tuuku/ tuúku ‘ear’ | tuukú-ya | kí-tuúku | |

In (42a) there is a lexical /H/ on the first mora of /túuku/ ‘tumpline’ which remains in place when followed by the toneless suffix *-ya*. When preceded by the H tone prefix *kí-*, two H tones are observed in the word ‘my tumpline’, showing that H tone is not culminative in Iquito. In (42b), the toneless word /tuuku/ ‘ear’ receives a H on its penult in isolation, but on its final mora when suffixed by *-ya*. Since there is already a /H/ on the prefix of *kí-tuuku* ‘my ear’, a default H is not assigned. As shown in (43) Michael proposes a right-to-left construction of bimoraic trochees. As expected, default H is assigned in (43a,b), but not in (43c). (43d,e) however show that default H will be blocked only if a lexical /H/ occurs in the last four moras (two feet; colon) of the word:

- (43)
- | | | | | | |
|----|---------------------|---|----------------------|-------------------------|--------------------|
| a. | /pirusu/ | → | (pi)(rúsu) | ‘electric eel’ | (moraic trochees) |
| b. | /pirusu-ka/ | → | (piru)(súka) | ‘electric eels’ | |
| c. | /kí-pirusu/ | → | (kípi)(rusu) | ‘my electric eel’ | (no penultimate H) |
| d. | /kí-pirusu-ka/ | → | kí(piru)(súka) | ‘my electric eels’ | |
| e. | /kí-pirusu-ka-hata/ | → | kí(piru)(suka)(háta) | ‘with my electric eels’ | |

In other words, H is obligatory (but not culminative) within the last four moras of the word.

As summarized in (44), a privative H tone can be obligatory, culminative, both, or neither:

- (44)
- | | | | |
|-----------------------|--------------------|------------------------|--|
| | <i>culminative</i> | <i>non-culminative</i> | |
| <i>obligatory</i> | Kinga | Iquito | |
| <i>non-obligatory</i> | Somali | Haya | |

(44) thus demonstrates that obligatory and/or culminative H tone by itself may not be stress-accent. The question is whether it should be identified as some other kind of accent, e.g. “pitch accent”? Such a decision comes with baggage. As Gussenhoven (2004: 42) points out:

(45) “Accent”... is an analytical notion and cannot be measured. [It is] thus different from stress, which is typically an observable phenomenon, and different also from tone, whose existence is equally measurable...

We thus note the following: While some languages must be analyzed with stress, others with tone, and some with both, no language MUST be analyzed as a third prosodic type called “pitch accent”. A tonal interpretation is always possible. In some cases, a so-called pitch-accent language has both stress and tone; in other cases, its tone are simply restricted, e.g. obligatory, as in Iquito, or culminative, as in Somali.

An additional reason to reject the identification of restricted-tone systems with “accent” is that tone can do things that stress-accent cannot. As an example, consider Urarina (Olawsky 2006: 127-8), whose words generally have a single final H in isolation, but belong to the four classes in (46).

- (46) *class tone pattern determined by A-D class of the phrase-initial word*
- A first word = L; H is assigned to initial syllable of following word
 - B first word = L; H is assigned to 3rd syllable of following word
 - C first word = L; H is assigned to last syllable of final word of phrase
 - D first word keeps its final H tone when a word follows, all the rest = L

Examples are given in (47).

- | | | | | | | |
|------|---|------------|--------------------|---|------------------------|--|
| (47) | A | raaná | ‘peccary
(sp.)’ | → | raana rú.a.kaa | ‘he has carried the white-lipped
peccary’ |
| | B | obaná | ‘peccary
(sp.)’ | → | obana r̥.a.káa | ‘he has carried the collared
peccary’ |
| | C | reemaé | ‘dog’ | → | reemae r̥.a.kaá | ‘he has carried the dog’ |
| | D | makusajarí | ‘pepper’ | → | makusajarí
r̥.a.kaa | ‘he has carried the pepper’ |

The important point is that stress systems do not have the property of the restricted /H/ in Urarina: No language has a set of four classes of words which correspondingly assign different stress patterns to the following word. This is something which tones do! Again note from the examples in (47) that H is obligatory only at the phrase level in Urarina, which is also not an expected property of stress systems.

Since tones may be assigned by metrical principles, let us briefly consider the issue of when metricality should be equated with stress. As was pointed out early in its development, the functions of metrical phonology can be to count and locate positions or to construct constituents. When performing the latter, there can again be two separate functions:

- (48) The construction of bounded metrical constituents performs two separate functions. On the one hand, it subdivides the string into substrings of two (resp. three) elements each; on the other hand, it marks a particular element in the substring as its head by assigning it an asterisk that is then interpreted as stress. (Halle and Vergnaud 1987: 58)

What makes the head-marking so convincing in a stress-accent language is the globality factor: Headed, i.e. stressed syllables can have multiple effects throughout a system, as outlined in (5) above. Where metrical tools are needed to locate or place H tones, this globality is typically absent. As a result, it is totally adequate to characterize such cases as “restricted tone systems” (Voorhoeve 1973). Their metricality may be reminiscent of stress-accent, but everything else is like a tone system.

5. Conclusion

In the preceding sections we defined stress-accent as word-level metrical structure identifying one obligatory and culminative head syllable per lexical word. Among the problems addressed were that some languages may have words without syllables or maybe no syllables at all, while other languages assign metrical structure at the phrase level. A property-driven typology will of course ask what the relevant feature-bearing unit is, in what domain the generalizations hold, and so forth. However, since the possibilities are numerous and sometimes contradictory, it makes little sense to invoke a third category of “pitch-accent”. Even as a practical label, it tells us little: We need to know the specific properties.

To determine the relevant properties, I have invoked Clements’ notion of phonological activation in (6). Languages may “care” a lot about stress in the sense of multiple activation, or relatively little, perhaps not at all. As a comparison, consider nasality: While some languages care a great deal about the feature [nasal], allowing it to characterize not only consonants but also vowels, making it into a prosody or harmony, nasality is more restricted in most languages (e.g. as a segmental feature on consonants), or even absent entirely (e.g. in several Lakes Plain languages of New Guinea). And so it is with stress. A language without stress would be one in which syllables are undifferentiated from each other, showing none of the classical signs of stress. If such a language makes it so hard to find the stress, one naturally has to ask whether stress is phonologically activated at all. The English system in (5) presents a stress system at one end of the spectrum. Towards the other end of the spectrum, recent psycholinguistic work has found that speakers of languages with only slight marking of stress may exhibit “stress-deafness” (Peperkamp and Dupoux 2002), e.g. French, Hungarian, and Finnish vs. English and Polish. The logical endpoint is languages without convincing word-level stress at all. This last possibility will not be welcome by all. Goedemans and van der Hulst (2009: 238), for instance would like to include stress under a broader, universal notion of “accent”:

- (49) A comprehensive typology of accent manifestation remains to be developed, but given the broad area of cues and functions it is likely that many more languages may have word accent than just those in which accent is manifested as “pitch” or “stress”. As a working hypothesis, we might assume that all languages have accent.

Although considering the notion of “accent” to represent a spectrum of properties is very appealing, it will be useful only to the extent that we are clear as to what counts as accent and

what does not. As we have seen in several cases, a language may have two (more?) accentual properties which conflict, e.g. by picking out different positions to mark as “heads” for vowel length vs. tone. While one may intuit that all of the above is accentual, there seems to be little advantage in doing so.

This leads us to the following final question which I also raised in Hyman (2011): What’s so great about being universal? Why does it matter? If no language can exist without word stress, one might want to make cognitive claims, but even if only MOST languages have word stress, wouldn’t we have to ask the same question of why? Would it change the goals of StressTyp, for instance? Even if universality would mean that stress-accent is “innate” and widespread frequency would mean “highly unmarked”, phonologists would still be left with the task of sorting out the tremendous complexities and variations in all systems that have ever been called “accentual”. It seems reasonable at this stage of the enterprise to suggest a shift: Rather than focusing on universality (and innateness), the real issue, following Evans and Levinson (2009), is to map out and address the extraordinary diversity found in prosodic systems and in phonology in general. Only then will we have a full picture of what is possible in human language.

References

- Archangeli, Diana. 1984-5. “Extrametricity in Yawelmani,” *The Linguistic Review* 4.101-120.
- Bagemihl, Bruce. 1991. “Syllable structure in Bella Coola,” *Linguistic Inquiry* 22, 589-646.
- Beckman, Jill N. 1997. “Positional faithfulness, positional neutralization and Shona vowel harmony,” *Phonology* 14, 1-46.
- Beckman, Mary E. 1986. *Stress and non-stress accent* (Dordrecht: Foris).
- Bennett, Patrick R. 1978. “The role of stress and intonation in Early Proto-Bantu.” Ms. (University of Wisconsin-Madison).
- Bickel, Balthasar, Kristine Hildebrandt, and René Schiering. 2009. “The distribution of phonological word domains: a probabilistic typology” in J. Grijzenhout and B. Kabak (eds.), *Phonological Domains: Universals and Deviations* (Berlin: Mouton de Gruyter), 47-75.
- Bybee, Joan L., Paromita Chakraborti, Dagmar Jung, and Joanne Scheibman. 1998. “Prosody and segmental effect: some paths of evolution for word stress,” *Studies in Language* 22, 267-314.
- Clements, G. N. 2001. “Representational economy in constraint-based phonology” in T. Alan Hall (ed.), *Distinctive feature theory* (Berlin: Mouton de Gruyter), 71-146.
- Coetsem, Frans van. 1996. *Towards a typology of lexical accent: stress accent and pitch accent in a renewed perspective* (Heidelberg: Winter).
- Cole, Desmond T. 1955. *An introduction to Tswana grammar* (London Longmans & Green).
- Corbett, Greville G. 2007. Canonical typology, suppletion, and possible words. *Language* 83, 8-42.
- de Lacy, Paul. 2004. “Markedness conflation in optimality theory,” *Phonology* 21, 145-199.
- Dresher, Elan B. and Aditi Lahiri. 1991. “The Germanic foot: Metrical coherence in Old English,” *Linguistic Inquiry* 22, 251-286.
- Evans, Nicholas and Stephen C. Levinson. 2009. “The myth of language universals: Language diversity and its importance for cognitive science,” *Behavioral and Brain Sciences* 32, 429-448.
- Eynde, Karel van den. 1960. *Fonologie en morfologie van het Cokwe* (Leuven: Universiteit te Leuven).

- Fortune, G. 1980. *Shona grammatical constructions* (Salisbury, Zimbabwe: Mercury Press), Part 1.
- Garde, Paul. 1968. *L'accent* (Paris: Presses Universitaires de France).
- Gilley, Leoma. 2004. "The feature of stress in Nilotic," in Rose-Juliet Anyanwu (ed.), *Stress and tone: the African experience. Frankfurter Afrikanistische Blätter* 15, 99-120.
- Goedemans, Rob and Harry van der Hulst. 2009. "StressTyp: A Database for Word Accentual Patterns in the World's Languages," in Martin Everaert, Simon Musgrave and Alexis Dimitriadis (eds.), *The use of databases in cross-linguistics research* (New York/Berlin: Mouton de Gruyter), 235-282. .
- Gussenhoven, Carlos. 2004. *The phonology of tone and intonation* (Cambridge, UK: Cambridge University Press).
- Gussenhoven, Carlos and Natasha Warner (eds.), *Laboratory Phonology 7*. Berlin: Mouton de Gruyter.
- Halle, Morris and Jean-Roger Vergnaud. 1987. *An essay on stress* (Cambridge, MA: MIT Press).
- Hayes, Bruce. 1995. *Metrical stress theory: Principles and case studies* (Chicago: University of Chicago Press).
- Hayward, R. J. 1997. "External sandhi in the Saho noun phrase," *Afrikanistische Arbeitspapiere* (Institut für Afrikanistik, Universität zu Köln), vol. 50, 53-80. .
- Hualde, José Ignacio. 2006. "Remarks on word-prosodic typology", ms. to appear in *Proceedings of the 32nd Annual Meeting of the Berkeley Linguistic Society*.
- Hubbard, Kathleen. 1994. "Duration in moraic theory," unpublished PhD thesis, University of California, Berkeley.
- Hulst, Harry van der. 2009. "StressTyp: A Database for Word Accentual Patterns in the World's Languages," ms. University of Connecticut.
- Hulstaert, G. 1934. Les tons en lonkundo. *Anthropos* 29, 57-97, 399-419.
- Hulstaert, G. 1961. *Grammaire du Lomongo, Première Partie, Phonologie* (Tervuren: Musée Royal de l'Afrique Centrale).
- Hyman, Larry M. 1977. "On the nature of linguistic stress" in Larry M. Hyman (ed.), *Studies in Stress and Accent* (Los Angeles: University of Southern California), 37-82.
- Hyman, Larry M. 1978. "Tone and/or accent" in Donna Jo Napoli (ed.), *Elements of tone, stress and intonation* (Washington D.C.: Georgetown University), 1-20.
- Hyman, L.M., 1981. "Tonal accent in Somali," *Studies in African Linguistics* 12, 169-203.
- Hyman, Larry M. 1985. *A theory of phonological weight*. (Dordrecht: Foris). Reprinted (Stanford: CSLI, 2003).
- Hyman, Larry M. 2006. "Word-prosodic typology," *Phonology* 23, 225-257.
- Hyman, Larry M. 2007. "Length harmony in Leggbó—a counter-universal?" in Peter Austin and Andrew Simpson (eds.), *Linguistische Berichte, Sonderheft 14, Endangered Languages*, 73-92.
- Hyman, Larry M. 2009. "How (not) to do phonological typology: the case of pitch-accent," *Language Sciences* 31, 213-238.
- Hyman, Larry M. 2010. "Kuki-Thaadow: An African tone system in Southeast Asia," in Franck Floricic (ed.), *Essais de typologie et de linguistique générale* (Lyon, France: Les Presses de l'Ecole Normale Supérieure), 31-51.
- Hyman, Larry M. 2011. "Does Gokana really have no syllables? Or: What's so great about being universal?" *Phonology* 21, 55-85.

- Hyman, Larry M. 2012. "In defense of prosodic typology: A response to Beckman and Venditti," to appear in *Linguistic Typology* 16.
- Hyman, Larry M. and Kemmoye C. Monaka. 2011. "Tonal and non-tonal intonation in Shekgalagari" in Sonia Frota, Gorka Elordieta and Pilar Prieto (eds), *Prosodic categories: production, perception and comprehension* (Dordrecht: Springer Verlag), 267-290.
- Jakobson, Roman. 1931. "Die Betonung und ihre Rolle in der Wort- und Syntagmaphonologie." *Travaux du Cercle Linguistique de Prague* 4, 164-182. Reprinted in Roman Jakobson, *Selected Writings* (The Hague: Mouton), vol 1, 117-136.
- Kenesei, István, Robert Michael Vago, Anna Fenyvesi. 1998. *Hungarian* (London: Routledge).
- Kisseberth, Charles W. 2009. "The theory of prosodic phrasing: the Chimwiini evidence," paper presented at the 40th Annual Conference on African Linguistics, University of Illinois, Urbana-Champaign, April 9-11, 2009.
- Leben, William R. 1996. "Tonal feet and the adaptation of English borrowings into Hausa," *Studies in African Linguistics* 25, 139-154.
- Lehiste, Ilse. 1970. *Suprasegmentals* (Cambridge, MA: MIT Press).
- Levi, Susannah V. 2005. "Acoustic correlates of lexical accent in Turkish," *Journal of the International Phonetic Association*, 35, 73-97.
- Liphola, Marcelino M. 1999. "Neutralizing vowel reduction in Shimakonde," ms. Department of Linguistics, Ohio State University.
- Liphola, Marcelino M. 2001. "Aspects of the phonology and morphology of Shimakonde," unpublished PhD thesis, Ohio State University.
- Maniacky, Jacky. 2002. "Tonologie du ngangela", unpublished PhD dissertation, Institut National des Langues et Civilisations Orientales, Paris.
- Martinet, André. 1954. "Accents et tons," *Miscellanea Phonetica* 2, 13-24.
- Martinet, André. 1961. *Eléments de linguistique générale* (Paris: Colin).
- Michael, Lev. 2010. "The interaction of stress and tone in the prosodic system of Iquito (Zaparoan)," to appear in Frantome Pacheco and Leo Wetzels (eds.), *The structure of Amazonian languages II* (Leiden: Brill).
- Nater, H. F. 1984. *The Bella Coola language* (Ottawa: National Museums of Canada). National Museum of Man Mercury Series. Canadian Ethnology Service Paper 92.
- Newman, Stanley. 1944. *The Yokuts language of California* (New York: The Viking Fund Publications in Anthropology).
- Newman, Stanley. 1947. "Bella Coola I: Phonology," *International Journal of American Linguistics* 13, 129-134.
- Noonan, Michael. 1992. *A grammar of Lango* (Berlin: Mouton de Gruyter).
- Odden, David. 1990. "Syntax, lexical rules and postlexical rules in Kimatuumbi," in Sharon Inkelas and Draga Zec (eds.), *The phonology-syntax connection* (Stanford: CSLI), 259-277.
- Olawsky, Knut J. 2006. *A grammar of Urarina* (Berlin: Mouton de Gruyter).
- Pearce, Mary. 2006. "The interaction between metrical structure and tone in Kera," *Phonology* 23, 259-286.
- Pearce, Mary. 2007. "The interaction of tone with voicing and foot structure," unpublished PhD dissertation, University of London.
- Peperkamp, Sharon and Emmanuel Dupoux. 2002. "A typological study of stress 'deafness'." In Gussenhoven and Warner, 203-240.
- Price, E. W. 1944. "The tonal structure of the Ngombe verb," *African Studies* 3, 28-30.
- Saeed, J., 1999. *Somali* (Amsterdam: John Benjamins).

- Schiering, René, Balthasar Bickel and Kristine A. Hildebrandt. 2010. "The prosodic word is not universal, but emergent," *Journal of Linguistics* 46.657-709.
- Selkirk, Elisabeth O. (1986). "On derived domains in sentence phonology," *Phonology [Yearbook]* 3, 371-405.
- Shaw, Patricia. 2002. "On the edge: Obstruent clusters in Salish," *Proceedings of the Workshop on the Structure and Constituency of the Languages of the Americas (WSCLA 7)*. University of British Columbia Working Papers in Linguistics 10.119-136.
- Trubetzkoy, N. 1939. *Grundzüge der Phonologie*. *Travaux du Cercle Linguistique de Prague* 7.
- Voorhoeve, J., 1973. "Safwa as restricted tone system," *Studies in African Linguistics* 4, 1-22.
- Wetzels, W. Leo. 2002. "Field work and phonological theory: Comments on Demolin, Grabe and Low, Hualde et al., and Remijsen," in Gussenhoven and Warner, 615-635.