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How (not) to do Phonological Typology: The Case of Pitch-Accent

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ABSTRACT

In this paper I argue for a property-driven approach to phonological typology. Rather than seeking to classify or label languages, the central goal of phonological typology is to determine how different languages systematize the phonetic substance available to all languages. The paper focuses on a very murky area in phonological typology, word-prosodic systems. While there is agreement that certain properties converge to characterize two prosodic prototypes, tone and stress (Martinet 1960, Garde 1967, Hyman 1977a, 2006, van der Hulst & Smith 1986, Hayata 1999, Ding 2006 etc.), the term "pitch-accent" is frequently adopted to refer to a defective tone system whose tone is obligatory, culminative, privative, metrical, and/or restricted in distribution. Drawing from a database of ca. 600 tone systems, I show that none of these properties is found in all systems claimed to be accentual and that all five are amply attested in canonical tone systems. Since all one can say is that alleged pitch-accent systems exhibit "significant constraints on the pitch patterns for words" (Bybee et al 1998:277), they do not constitute a coherent prosodic "type". Rather, alleged "pitch-accent" systems freely pick-and-choose properties from the tone and stress prototypes, producing mixed, ambiguous, and sometimes analytically indeterminate systems which appear to be "intermediate". There thus is no pitch-accent prototype, nor can prosodic systems be treated as a continuum placed along a single linear dimension. The paper concludes that the goal of prosodic typology should not be to classify languages, but rather the properties of their subsystems (cf. McCawley 1978).

Key words: typology, prosody, tone, stress, pitch-accent, tonal density, culminativity, privativity, metrical structure

1.   Introduction

The goal of this paper is to argue for what I will term PROPERTY-DRIVEN TYPOLOGY, particularly as it applies to phonology, which I will illustrate via some of the claims made about so-called pitch-accent languages. Within the literature, there have been two ways of talking about typology (and by extension, phonological typology). The first defines the goal of typology as the classification of languages according to their properties. Thus, for Hagège (1992:7), typology strives to provide "...a principled way of classifying the languages of the world by the most significant properties which distinguish one from another." Vajda (2001) takes a similar position with respect to phonological typology: "...it is possible to classify languages according to the phonemes they contain.... typology is the study of structural features across languages. Phonological typology involves comparing languages according to the number or type of sounds they contain." A second way of talking about typology is with direct reference to the properties themselves. As Plank (2001:1399) puts it, "Typology, thus, is not so much about the classification of languages as about the distributions of individual traits—units, categories,

constructions, rules of all kinds—across the linguistic universe; these distributions, not languages as such, are the primary objects of comparison." Both ways of talking about typology seems always to be available: "...all synchronic typologies have this Janus-like nature in that the same data can be utilized either for a typology of linguistic properties or a typology of individual languages" (Greenberg 1974:14). The question is whether it makes a difference. I believe it does.

Consider, briefly, what it has meant to be identified as a "P language", where P is some property. In the case of "click language", this means the PRESENCE of at least one click in the consonant inventory. In the case of "open syllable language", this means the ABSENCE of even one coda in the syllable inventory. (One could, of course, invent the term "coda language" instead.) A basic question is whether "click language" and "open-syllable language" are "types" or just practical labels to designate presence vs. absence in inventories? If they are types, then other things ought to follow from them, i.e. we should expect other properties to correlate with them. This of course assumes, following Hagège, that we have correctly chosen "the most significant properties which distinguish one [language] from another." Since the designation is recognized by linguists, being a "click language" is apparently felt to be more significant than being, say, an "implosive language" or "flap language", even though we cannot draw inferences about cooccurence tendencies given the limited geographical distribution of clicks in the world's languages. We might have more luck with "open-syllable language", but why not "oral language" (a language which has no nasality in its consonant or vowel inventory) or "mellow language" (a language which has no fricatives)? Finally, what about a language which has one marginal click, or another which has marginal closed syllables (e.g. derived by a late deletion of final /i/)? Does it make sense to talk about continua such that a language with multiple clicks is a "very click language" and one with few closed syllables is an "almost open-syllable language"? Of course we can always find a way to quantify properties such that the languages in which they occur can be placed along a linear continuum. For intance, since all languages have oral stops, one can scale languages by the number of stop vs. non-stop phonemes in their underlying inventories or by calculating the percentage of stops in the lexical entries or in texts. On one end, the score may be 100% if the consonant system of Central Rotokas is analyzed as /p, t, k, b, d, g/ rather than /p, t, k, β, ɾ, g/ (Firchow & Firchow 1969, Maddieson 1984). Depending on the analysis, Rotokas could be referred to as a "stop language" or a "high stop language". At the other end might be one of the 13 three-stop languages in the UPSID database (Maddieson & Precoda 1990). For example, Aleut is analyzed with only /t, k, q/ among a system of 24 consonant phonemes and might therefore be designated a "low stop language".

While designations such as "high stop language" and "low stop language" may cause amusement, this is exactly what the field has been subjected to in the area of word-prosodic typology—but with a difference: Whereas I have indicated one or another quantitative method to represent all languages along a linear stop continuum, those opining that there is a continuum from stress to pitch-accent to tone typically fail to provide an explicit methodology which would place languages along a single dimensional scale. Of course, it would be possible to take a single prosodic property and scale it. For example, if languages were mapped according to their "tonal density (Gussenhoven 2004:35), i.e. the percentage of syllables (or perhaps words) that require a tone feature, we might get something like the continuum in (1).

(1)   English----------W. Basque-----------Tokyo Japanese-----------Luganda-----------Mandarin

On the one end is English, where no syllables have a lexical tone vs. Mandarin at the end where only certain "neutral" tone syllables lack a lexical tone. In subsequent discussion I will have occasion to comment further on the scale in (1), but note here that such claims of a continuum are typically not based on a single property, e.g. tonal density, but rather on a combination of properties, which, when all is said and done, may actual contradict each other, depending on whether we count syllables or words. For example, a language in which every word has to have a high tone may still have a greater percentage of toneless syllables than another language in which a word need not have a high tone. In any case, a rigorous quantitative study of [±tone] on either syllables or words has, to my knowledge, not been done. Instead, the use of the term "continuum" usually refers to the fact that there are languages that somehow fall in between the clear notions we associate with the endpoints of the scale in (1): English is a "stress language", while Mandarin is a "tone language". What about the intermediate languages? For some, one or more of these fall into an "accentual" category with English. Among the three intermediate languages in (1), there is a common feeling that W. Basque is the least tonal, while Luganda is most tonal. However, in the absence of explicit criteria and argumentation, where one draws the line between accent and tone becomes largely a matter of opinion—which, in turn, is no way to do typology.

In this study I present further evidence for the position that there is no pitch-accent prototype (Hyman & Wilson 1992, Hyman 2001a,b, 2006). Rather, intermediate languages such as those in (1) "pick and choose" various properties which tend to cluster in prototypical stress vs. tone systems. In other words, if stress systems typically have the four properties S1-S4 and tone systems typically have the four properties T1-T4, the intermediate systems may have various combinations of these, for example [S1, S2, T3, T4], [S1, T2, S3, T4], and [S1, T2, T3, S4], each of which exhibits two stress and two tone properties. It is these properties that constitute the object of study in property-driven typology and which allow us to come up with an objective characterization of a prosodic system. I begin in §2 by first providing definitions and prototypes of stress and tone systems. In §3 I show that a definition of a "pitch-accent system" is too vague to be useful and that a prototype cannot be established. Four potential properties of so-called pitch-accent systems are shown to be available to canonical tone systems as well: obligatoriness, culminativity, privativity, metricality. I conclude in §4 with some final remarks about phonological typology and prosodic systems.

2. Stress and tone systems

A common tripartite word-prosodic typology recognizes the three kinds of systems in (2).

(2) a. stress system   : a language with word-level metrical structure, e.g. English
     b. tone system   : a language with word-level pitch features, e.g. Mandarin
     c. pitch-accent system : a language with word-level WHAT?

As seen, widely accepted definitions are also provided in (2a,b), where stress is identified with abstract metrical structure and tone with pitch features present at the word level. Stated this way, stress and tone have virtually nothing inherently in common: Stress is a structural property in which syllables are metrically hierarchized as relatively strong vs. weak, while tone is a featural property referring to contrastive relative pitch. The question is: How do we define pitch-accent?

To paraphrase McCawley (1970), is it a system that comes close to one of the other two but doesn't quite make it, perhaps having an incomplete metrical structure or only slight need for pitch features? Alternatively, might pitch-accent refer to a language which has both a stress and tone system? Either way, it would not be a third category in the sense of having a totally independent definition, as stress and tone have.

Lehiste (1970) once stated that "...a certain degree of vagueness seems to characterize most discussions of prosodic features." Concerning word-prosodic typology, a lot of the vagueness and confusion has stemmed from the lack of an explicit distinction between what constitutes a DEFINITION vs. a PROTOTYPE. A definition provides a minimum requirement that all instances of the phenomenon must meet: If a language does not have word-level metrical structure, it does not have a stress system (as so defined). If it does not have word-level pitch features, it does not have a tone system. In this sense definitions are categorical: Depending on the actual definition, something is vs. is not a stress system, and similarly with respect to tone system. Viewed this way, the question is what must be present in a language to constitute a pitch-accent system (rather than something else).

A prototype, on the other hand, provides a cluster of properties found in the "best" or "clearest" case of the category. Before proposing what a prototypical stress or tone system might look like, let us consider in (3) the tone vs. stress properties that are often cited (Martinet 1960, Garde 1967, Hyman 1977a, van der Hulst & Smith 1986 etc.).

(3)	*form*	*function*	*system*	*P-bearer*	*level*	*domain*
stress	structural	contrastive	syntagmatic	syllable	lexical	output word
tone	featural	distinctive	paradigmatic	mora	URs	input morpheme

We have already mentioned the structural vs. featural distinction, which is definitional of stress vs. tone. The remaining stress properties are also definitional. Adopting Prague School terminology, the function of stress is constrastive in the sense that its presence on one stress-bearing unit implies its absence elsewhere. In other words, a stress system is syntagmatic. The stress-bearing unit is necessarily the syllable, as it is not possible for stress to contast on the first vs. second mora of a long vowel. Since stress is often predictable, there is no requirement that it be present in underlying representations. Rather, stress must be present at the lexical level, i.e. the output of the lexical phonology. Finally, the domain within which stress must be present is the output word: By definition, if a language has a stress system, every word has a primary stress.

Turning to the characterization of tone in (3), all but the first property represent a prototype and are not definitional. Like segmental features, tone typically exhibits a distinctive function in the sense that one asks for each tone-bearing unit (TBU) what its tone is, e.g. H(igh), L(ow), or M(id). In other words, a tone system is paradigmatic. In (3) I have suggested that the prototypical TBU is the mora, where the understanding is that each vowel (and possibly sonorant consonant) will carry a distinctive tone. In the prototypical situation, tone will be present in underlying representations as a property of input morphemes.

The comparisions in (3) reveal that all of the properties are definitional of stress, but only the first is required of tone. This partly accounts for the presence of intermediate systems. In some prosodic systems tone may have a contrastive syntagmatic function, and the TBU may be the syllable. In addition, in cases where tone has only a grammatical function, tones may be

introduced by morphological rules rather than being features on concatenated input morphemes. For example, it could be argued that the Somali noun roots in (4) are underlyingly toneless:

(4) root   masculine   feminine
   a. /inan/   ínan   'boy'   inán   'girl'
      /naʕas/   náʕas   'stupid man'   naʕás   'stupid woman'
      /goray/   góray   'male ostrich' goráy   'female ostrich'
   b. /darmaan/   darmáan 'colt'   darmaán 'filly'
      /ʕeesaan/   ʕeesáan 'young he-goat' ʕeesaán 'young she-goat'
      /dameer/   daméer 'he-donkey'   dameér 'she-donkey'

As seen, in this declension class of nouns the masculine morpheme assigns a H tone (´) to the penultimate vowel, while the feminine morpheme assigns a H tone to the final vowel (Hyman 1981, Saeed 1999). Other vowels are toneless, produced on a relatively low or mid pitch. In the case of the long vowels in (4b), Somali distinguishes rising [aá] and falling [áa] pitches. Since there is at most one H tone per word, which is limited to the penultimate or final vowel and is largely predictable from morphological features, Somali is far from anyone's ideal or prototypical tone system—in fact, it is one of the "intermediate" languages which has sometimes been called "accentual".

While (3b) establishes a baseline for prototypical tone, another approach to establishing the "best" or "clearest" tonal prototype might be to accumulate properties that make an accentual interpretation unappealing, if not impossible. As a concrete example consider a tone system which has the properties in (5).

(5) a. three (or more) level tones: /H/, /M/, /L/
    b. three (or more) floating tones/tonal morphemes: [H], [M], [L]
    c. all possible contours of these levels on one TBU: HM, HL, MH, ML, LH, LM
    d. rules of H-, M- and L-tone spreading: /H-L/, /M-L/, /L-H/ → H-HL, M-ML, L-LH
    e. other arguments that every TBU must have a tonal specification (100% tonal density)

Since, as we shall see, the controversial or ambiguous cases typically involve languages which have only two contrastive tone heights, the proposed prototype is one where three or more tone levels are distinguished. Since one of the tones, e.g. M, might be analyzed as absence of tone, as Pulleyblank (1986) and Akinlabi (1985) originally proposed for Yoruba, thereby affecting the tonal density as discussed above, the prototypical tone system is one where no tone can be "zeroed out". This would be quite hard to do if all three levels occur as floating tones and combine to form all six tonal contours, as in Mɔnɔ [Ubangi] (Kamanda-Kola 2003, Olson 2005), or if all three tones trigger tone spreading, as in Gwari (Hyman & Magaji 1970). In short, the clearest or least ambiguous tone system is one where there are multiple arguments that every tone has to be featurally specified and that every TBU has to carry a tone. Defined this way, languages such as Somali are obviously quite far from the tonal prototype. As a result, scholars still feel compelled to address the question originally raised by Klingenheben (1949): Ist das Somali eine Tonsprache?

On the other hand, there is considerably less controversy concerning what constitutes a stress system. A widely accepted definition of a language with stress is one in which there is an indication of word-level metrical structure meeting the two core criteria in (6).

(6)   a.   OBLIGATORINESS: every lexical word has AT LEAST one syllable marked for the highest degree of metrical prominence (primary stress)

       b.   CULMINATIVITY: every lexical word has AT MOST one syllable marked for the highest degree of metrical prominence

The two properties in (6) are often combined in a single statement to the effect that every lexical word has ONE AND ONLY ONE primary stress. In addition to meeting both of these criteria, another inviolable property of stress systems is that the stress-bearing unit is the syllable: Syllables which are claimed to contrast two kinds of "accent" (e.g. with rising vs. falling pitch) are not to be analyzed as having primary stress on their first vs. second mora. Instead, tone is always involved, as in the Somali examples *darmáan* 'colt' vs. *darmaán* 'filly'. Treating the Somali system as tonal is consistent also with the fact that verbs usually occur without a H tone, as do most nouns in subject position: *inan wáa dhaʕay* 'a boy fell'. The /H/ of Somali thus satisfies culminativity (6b), but not obligatoriness (6a).

       Before moving on to consider such "intermediate" systems, let us address the question of what the prototype of a stress system might be. While earlier studies have suggested that word stress originates at domain edges (Hyman 1977b, Bybee et al 1998), the so-called demarcative function is not a good prototype candidate in the sense of being unambiguous. A number of initial- or final-stress languages might be amenable to an analysis with boundary tones rather than metrical structure per se. Some of the systems which van Coetsem (1996:39) calls "non-dominant prominence" might fall into this category, i.e. languages where the stress has little or no effect on the segmental phonology, e.g. Finnish, Hungarian, and especially Turkish (Levi 2005). The prototype might therefore be a "dominant prominence" stress system which has the properties in (7).

(7)   a.   stress location is not reducible to simple first/last syllable

       b.   stressed syllables show positional prominence effects

            i.   consonant-, vowel-, and tone oppositions 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 oppositions 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 prototype sounds a lot like English, which has an accumulation of properties that make a non-stress (e.g. tonal) interpretation unappealing, if not impossible. Thus, it would be

hard to capture the facts of English if the underlying system were analyzed with a prelinked H tone on the first vs. second syllables of *cónvert* vs. *convért*.

The above prototypes clearly identify unambiguous tone vs. stress systems. No reasonable linguist would attempt to analyze Mɔnɔ or Gwari with accents in the place of tone or English with tones in the place of stresses. There are, however, systems which are so distant from both prototypes that they are grouped together in a third category termed "pitch-accent". These systems are the subject of the next section.

3. "Pitch-accent" systems

In this section I address the nature of word-prosodic systems which have been said to have "pitch-accent", "tonal accent" or simply "accents". As stated by Salmons 1992:21), "the notion of 'pitch accent' languages has long been vague...." The most widely cited example has been Tokyo Japanese, which has presented a problem of interpretation. As seen in (8), Tokyo Japanese has been analyzed both accentually and tonally (McCawley 1968, 1978, Haraguchi 1979, Poser 1984, Pierrehumbert & Beckman 1988 etc.).

(8)

		'pillow' + nom.	'heart' + nom.	'head' + nom.	'fish' + nom.
a.	accentual	ma$^\downarrow$kura ga	koko$^\downarrow$ro ga	atama$^\downarrow$ga	sakana ga
b.	tonal	makura ga | H	kokoro ga | H	atama ga | H	sakana ga
c.	output	mákùrà gà	kókórò gà	átámá gà	sákáná gá
d.	output w/%L	mákùrà gà	kòkórò gà	àtámá gà	sàkáná gá

In (8a) the accent is represented by the down arrow ($^\downarrow$), which indicates the place where there is a pitch drop from H to L. As seen, there can be at most one such drop per word, which in the case of *atama$^\downarrow$ga* 'head (nom.)' is realized on the nominative enclitic *=ga*. Since words such as *sakana* 'fish' do not exhibit a pitch drop, the so-called accent meets only the culminativity criterion in (6b), but not the obligatoriness criterion in (6a). As seen in (8b), a tonal analysis is, however, also possible. In the analysis represented in (8b), a prelinked H tone is linked to the mora said to be accented in the (8a) analysis. As seen in the output in (8c), all moras following this H are pronounced L, while those which precede the H are pronounced H. (8d) shows the approximate realization after the a %L boundary tone.

Let us assume for the moment that Tokyo Japanese warrants being placed into a third category. How, then, might we define "pitch-accent". For Ding (2006:1), "a 'pitch-accent system' [is] one that generates tonal patterns through different placement of a marked tone on a syllable/mora in an underlying domain, which is independent of both the syllable and the word." This covers Tokyo Japanese and Somali, but not Osaka Japanese (Haraguchi 1977), where one also needs to know if a word begins L or H, or Fasu (May & Loeweke 1964) and Dadibi (MacDonald & MacDonald 1974), where one syllable per word contrasts /H/ vs. /L/ tone, remaining syllables being /Ø/ (cf. also Prinmi in §3.3 below). Other definitions have assumed a superclass including stress-accent and pitch-accent and focused on the realization of the latter in terms of a fixed pitch:

"In a tonal or pitch-accent system (like Japanese, for instance), in addition to the abstract accent, there is a constant physical property [i.e. a tone] associated with the accent...." (Hyman 1977a:4)

"Hypothesis: Stress accent differs phonetically from non-stress [pitch-] accent in that it uses to a greater extent material other than pitch." (Beckman 1986:1)

"Pitch accent languages must satisfy the criterion of having INVARIANT TONAL CONTOURS on accented syllables, since tone is a lexical property. This is not so for pure stress languages, where the tonal contours of stressed syllables can vary freely, being determined postlexically by the intonational system...." (Hayes 1995:50)

While other systems analyzed as pitch-accent clearly combine stress and tone, Somali and Japanese are best summed up by the following: "A pitch-accent system is one in which pitch is the primary correlate of prominence and there are significant constraints on the pitch patterns for words..." (Bybee et al 1998:277). In other words, "pitch-accent" often means the same thing that Voorhoeve (1973) had in mind by the term "restricted tone system," a system in which tones are subject to "significant constraints" e.g. culminativity, as in Somali and Japanese.

In this section I would like to make the following claims concerning pitch-accent: (i) Some languages must be analyzed with a stress system (e.g. English), some with a tone system (e.g. Yoruba), and others with both, e.g. Texmelucan Zapotec (Speck 1978). However, NO LANGUAGE MUST BE ANALYZED WITH PITCH-ACCENT. A tonal analysis is always possible. (ii) Pitch-accent is not a coherent notion, rather a "pick and choose" among the properties that characterize prototypical tone vs. prototypical stress-accent (Hyman 2001a,b). (iii) THERE IS NO PITCH-ACCENT PROTOTYPE. This is because the intermediate systems are not a coherent class. Consider for example Donohue's (2005:40) attempt at identifying a pitch-accent prototype:

"I take the following characteristics as being the defining ones for a prototypical pitch accent system:
1. lack of metrical iteration;
2. relative pitch heights specified phonologically in the lexicon, not prosodically;
3. possibility of a contrast on monosyllabic (/monomoraic) words;
4. possibility of the entire system being described with automatic phonological processes and maximally one single diacritic assigned lexically...."

The first three characteristics are typical properties of tone, while the third falls within Voorhoeve's notion of a "restricted tone system". In any case, one cannot define a prototype negatively ("lack of metrical iteration") or in terms of optional "possibilities". For this it must be shown that they have something *positive* in common. My impression from the literature is that there are in fact two kinds of systems that are identified as "pitch-accent": (i) systems which combine stress and tone, particularly those where a tonal contrast is found only on stressed syllables, which is presumably the only reason why Hollenbach's (1988) description of the five-level tone system of Copala Trique [Mixtecan; Mexico] is included in a collection on pitch-accent; (ii) systems which simply fail to have enough of the prototype properties for certain researchers to feel comfortable identifying them as tone, e.g. W. Basque, Tokyo Japanese, and Somali. The tones of these latter languages, which do not have stress, fall at the low end of the tonal density scale in (1) and may have syntagmatic properties reminiscent of stress (e.g. the

culminative pitch drop in Tokyo Japanese). There is, however, no reason to think that even these reflect a single class of accentual systems as opposed to restricted tone systems varying along certain parameters.

Given the difficulty of defining pitch-accent in terms of something that they and only they have, and the impossibility of establishing a positive prototype that includes both Copala Trique and Tokyo Japanese, there is every reason to doubt the coherence of such a category. Reviewing the literature suggests that the terms "accent" and "pitch-accent" have been used to refer to defective or restricted tone systems whose mark (say, H tone) is characterizable in one or more of the ways in (9).

(9) a. obligatory ("at least one per word")
    b. culminative ("at most one per word")
    c. privative (e.g. /H/ vs. /Ø/ rather than /H/ vs. /L/)
    d. metrical (e.g. positionally restricted, subject to reduction/subordination in compounding or when out of focus)

The problem, however, is that each of the properties in (9) can be found in unambiguous tone systems. To see this, I will consider each in turn, starting with obligatoriness.

3.1. Obligatoriness (OBLIG)

As seen in the following tonal distributions in (10), Chuave [Trans-New Guinea] requires that all words have a H feature in them (Swick 1966; Donohue 1997:355):

(10)

schema:	/H/	/HL/	/LH/	/HLH/	/LHL/
1σ =1	H				
2σ =3	H-H	H-L	L-H		
3σ =7	H-H-H	H-H-L H-L-L	L-H-H L-L-H	H-L-H	L-H-L
4σ =15	H-H-H-H	H-H-H-L H-H-L-L H-L-L-L	L-H-H-H L-L-H-H L-L-L-H	H-H-L-H H-L-H-H H-L-L-H	L-H-H-L L-H-L-L L-L-H-L

Whether words have one, two, three or four syllables, all combinations of H and L are observed except an all-L pattern. Since there are so many tone patterns (e.g. 15 out of 16 possibilities on four-syllable words), it is highly unlikely that this is a "pitch-accent" system. Rather, it is a tone system that happens to have a restriction that no word can be all L. In fact, as seen in (11), there are many tone systems which require at least one [H] feature per word (other interpretations have been offered in some cases):

(11) a. /H, LH/   Manding (general) (Creissels & Grégoire 1993:109), Foe (Rule 1993), Hup (Epps 2005)
     /H, HL/   Crow (Kaschube 1954), Acoma (Miller 1965), Kaure? (Dommel & Dommel 1991), Kham? (Watters 2002)
     /H, HLH/   Choctaw (Ulrich 1989)
    b. /H, HL, LH/ Dom (Chida 2001), Yuhup (Ospina Bozzi 2002), Prinmi (Ding 2001)

    c.   /H, HL, LH,   Kairi (Newman & Petterson 1990), Dogon-Jamsay (Heath 2006),
        LHL/   Barasana (Gomez & Kenstowicz 2000), Wanano (Stenzel 2007)

One restriction that can therefore be placed on a tone system is that every word must have at least one [H] feature. It is however not clear that this automatically means that the [H] is accentual. Consider in (12) the word tone distributions in Tanimuca [Tukanoan; Colombia] (Keller 1999):

(12) $2\sigma = 3$

H-H	H-L	L-H				*L-L

        $3\sigma = 6$

H-H-H	H-H-L	H-L-H	L-L-H	L-H-H	L-H-L	*L-L-L, *H-L-L

As seen, there are no all-L words. However, there also are no words of the shape *H-L-L. The correct generalization may therefore be that no word can end in two low tones (*L-L#), which would automatically rule out all-L words. (There are no monosyllabic words in the language.) If correct, we might refer to Tanimuca as exhibiting "accidental obligatoriness".

      Another problem is distinguishing what would be an obligatory H "accent" from an obligatory H boundary tone. In Choctaw [Muskogean; Oklahoma], every word ends in a /H/ tone (Ulrich 1989:163). In addition, some words also have an additional /HL/ assigned to either their antepenultimate or penultimate syllable. As a result, words may have the shapes L^n-H, L^n-H-L-H or L^n-H-LH (the last having undergone a rule whereby final HL-H → H-LH). This produces a system where the final /H/ is obligatory, and the additional /HL/ culminative. Since the two can co-occur, Choctaw words potentially violate OBLIG(H).

      Finally, it should be noted that tones appear to constitute the only contrastive feature that can be obligatory at the word level. For example, no language requires all words to have a contrastively long vowel or nasal feature. As seen in the next subsection, tone is not the only feature than can be culminative.

3.2. Culminativity (CULM)

Turning to culminativity, (13) displays the word-tone patterns of Tinputz [Austronesian; Papua New Guinea] (Hostetler & Hostetler 1975).

(13) schema

	1σ	2σ	3σ	4σ
/L/	L	L-L	L-L-L	L-L-L-L
/LH/	H	L-H	L-L-H	L-L-L-H
/LHL/			L-H-L	L-H-L-L
				L-L-H-L

As seen, all-L words are possible in Tinputz, but CULM(H) restricts words to a single /H/. In addition, words may not begin with a H, unless monosyllabic, which I have analyzed as /LH/. Other languages with culminative, but non-obligatory /H/ include Somali (and several related Cushitic languages), Agiribi Kiwai (Wurm 1973, Donohue 1997), Yucatec Mayan (Gussenhoven 2007), and Ocaina [Witotoan; Peru] (Agnew & Pike 1957). While /HL/ but not /H/ is culminative in Obokuitai [Lakes Plain; Indonesia (Papua)] (Jenison & Jension 1991), both /H/

and /HL/ (and /LH/ if the word is monosyllabic) are culminative in Puinave [isolate; Colombia] (Guirón Higuita & Wetzels 2007), as seen in (14).

(14) tone:	1σ	2σ	3σ
/H/	H	H-L L-H	H-L-L L-H-L L-L-H
/HL/	HL	HL-L	
/LH/	LH		
/Ø/	L	L-L	L-L-L

The fact that there is a contrast between H-L and HL-L suggests the need for underlying /H/ and /HL/ Puinave, where the L feature is contrastive, even though "plain" [L] is analyzed as the default tone of /Ø/ TBUs. However, other than their distributional limitations, there is no reason to believe that /H/, /HL/ and /LH/ are somehow accented, even if the culminative H feature is "marked" with respect to L. As Creissels & Grégoire (1993:117) put it, "... le fait d'interpréter l'un des deux termes d'une opposition tonale binaire comme une marque et l'autre comme l'absence de marque n'implique nullement d'abandonner la notion de ton pour celle d' 'accent'."

Still, it is interesting to note how H tones come to be more restricted than Ls, ultimately being limited to one H per domain. First, H tones are generally more subject to phonological constraints than L tones. Consider, for example, the obligatory contour principle (OCP), which prohibits two identical tones from occurring in sequence. OCP(L) effects are observed in several /L, Ø/ systems, e.g. Malinke (Kita) [Mande; Mali] (Creissels & Grégoire 1993), Galo [Tibeto-Burman; NE India] (Post 2007), Munduruku [Tupi; Brazil] (Picanço 2005), and the closely related Witotoan languages Bora (Weber & Thiesen 2000) and Miraña (Seifart 2005), spoken in Peru, Colombia, and Brazil. (To these I would add Tonga [Bantu; Zambia] which, like Malinke (Kita), inserts Hs to keep underlying /L/s apart.) In addition, Peñoles Mixtec [Mixtecan; Mexico], whose underlying system is /H, L, Ø/, also shows long-distance OCP(L) effects (Daly & Hyman 2007). There are, however, many fewer /L, Ø/ than /H, Ø/ privative systems, many of which show OCP(H) effects. To see how OCP(H) almost produces a culminative H system, consider the following word-tone patterns in Amahuaca [Panoan; Peru] (Russell 1959:136-140), which has an underlying /H, Ø/ contrast with default L:

(15) 2σ = 2	L-H	H-L		
3σ = 4	L-L-H	H-L-L	L-H-L	H-L-H

As seen, /H/ is obligatory in Amahuaca. However, while we observe the expected two tone patterns on bisyllabic words, there are four (not three) patterns on three-syllable words. Since H-L-H is also possible, it is difficult to consider /H/ to be accentual in the culminative sense. Rather, the system in (15) is due to two restrictions: (i) OBLIG(H); (ii) OCP(H). In other words, while all-L words are ruled out by obligatoriness, H-H, H-H-L, L-H-H and H-H-H would all be possible in principle if it were not for the word-level OCP constraint against two H tones in sequence. (At the phrase level, when a word ending H-L is followed by another H, H tone plateauing can result in the L (i.e. /Ø/) being raised to H (Russell 1959:152)).

Another constraint which seems more often to target H is what Zoll (2003) terms CLASH: the prohibition against mapping a single tone to multiple successive TBUs. Again, CLASH(H)

appears to be more common than CLASH(L). Thus, consider the possible word-tone patterns in Fore [Trans-New-Guinea] (Scott 1990) in (16), where (^{H}, ^{L}) = floating tones:

(16)

schema	1σ	2σ	3σ	4σ
/L/	L	L-L	L-L-L	L-L-L-L
/H/	H	H-H	H-H-H	H-H-H-H
/LH/	L^H	L-H	L-L-H	L-L-L-H
/HL/	H^L	H-L	H-L-L	H-L-L-L
/LHL/		L-H^L	L-H-L	L-H-L-L
/HLH/		H-L^H	H-L-H	H-L-L-H
/LHLH/			L-H-L^H	L-H-L-H
/HLHL/			H-L-H^L	H-L-H-L

As seen, there are no sequences of H tones if a L is present in the input. Scott (1990) summarizes the system as follows:

> "The simplest system which may be hypothesized for Fore is one in which only changes between high and low tone are recognised as being contrastive" (p.141)

> "There are no contrastive contours." (p.147)

> "...tones appear to spread by increasing the domain of the L tones in preference to the spreading of H tones.... From this it appears that H tones are to be considered as peaks of prominence or pitch targets...." (p.147)

It is not clear that we can attribute the dispreference of sequences of H TBUs to the OCP, since multiple linking would also be possible. Rather, as pointed out by Zoll (2003), some languages are like Fore and prefer sequences of Ls, while others prefer sequences of Hs. Although Fore prefers L TBUs in this way, it will take further erosion of Hs for /H/ to be culminative, since it presently allows all H words as well as single Hs interrupted by Ls.

Besides such mapping preferences, a tendency toward culminativity can also be observed in /H, Ø/ systems which have H deletion rules. Consider for example the possible tone patterns on nouns in Haya [Bantu; Tanzania] (Hyman & Byarushengo 1984) as they are realized in utterance-initial subject position (vowels lacking a tone mark are pronounced with default L):

(17)

1σ stem		2σ stem		3σ stem	
o-mu-zi	'root'	o-mu-limi	'farmer'	o-mu-zigaijo	'first born'
o-mu-tí	'tree'	o-mu-kázi	'woman'	o-mu-lúmuna	'younger brother'
		o-mu-humé	'blind person'	o-mu-tamí:le	'drunkard'
				o-mw-i:sikí	'girl'

Each noun in (17) consists of the article-like "augment" morpheme *o-*, the noun class prefix *mu-* and a noun stem, which, as seen, can have only one underlying /H/. The citation forms of these nouns are similar except that underlying final /H/ is realized instead on the penult (*o-mú-ti*, *o-mu-húme*, *o-mw-i:síki*), and penultimate /H/ is realized as a HL falling tone (*o-mu-kâzi*, *o-mu-tamî:le*). When first eliciting nouns in isolation, one might, therefore, initially conclude that H is

culminative in Haya. However, this is incorrect, both of underlying and surface forms. As seen in (18), the noun 'tree' is realized with all eight combinations of H and L tone in context (Hyman & Byarushengo 1984:56):

(18)	a.	L-L-L	o-mu-ti gwa: káto	'Kato's tree'
	b.	L-L-H	o-mu-tí gwange	'my tree'
	c.	L-H-H	o-mú-tí káto	'a tree, Kato!' (Kato = vocative)
	d.	L-H-L	o-mú-ti	'tree'
	e.	H-L-L	a-ka-gul' ó-mu-ti gwa: káto	'he bought Kato's tree'
	f.	H-L-H	a-ka-gul' ó-mu-tí gwange	'he bought my tree'
	g.	H-H-H	a-ka-gul' ó-mú-tí káto	'he bought a tree, Kato!'
	h.	H-H-L	a-ka-gul' ó-mú-ti	'he bought a tree'

The underlying form of 'tree' is /ó-mu-tí/, whose citation tones [ò-mú-tì] appear to be inverted. Since Haya deletes a H tone on a post-pause vowel, the augment /ó-/ is realized L in (18a-d). The H of the stem /-tí/ is deleted in (18a,e) when the noun occurs as the head of a genitive construction. In (18c,d,g,h) the phrase-final H of /-tí/ spreads onto the penult, which is accompanied by the lowering of H before pause in (18d,h), perhaps the effect of an utterance-final L% boundary tone. Despite the fact that nouns can have only one surface H in isolation, Haya does not respect culminativity, which can be seen also on many verb forms, e.g. *bá-ka-mu-bôn-a* 'they saw him'.

The point of these examples is to expose an asymmetry between H and L tones: While there is little that a H can do that a L cannot (Hyman 2001b), prohibitions on initial or final lexical L tones are less common than on lexical H tones. (Recall the absence of initial H also in Tinputz in (13).) The result is that isolation forms will have fewer H tones than forms in context. By analogizing the citation forms to new contexts, languages may come to have fewer Hs, as has happened in Bantu.

The conclusion that can be drawn from the preceding is that Hs tend to be subject to more distributional constraints than Ls, either by position (*initial H, *final H) or by juxtaposition (e.g. OCP(H)). The most extreme case is positional culminativity, as found in Somali, where a /H/ is permitted only on the penultimate or last vowel (*darmáan* 'colt', *darmaán* 'filly', not **dármaan*). The view expressed here is that culminativity is not a reliable criterion for accent. First, note that a headed metrical structure is not required to account for the Somali facts. Let us assume that Somali nouns all have a final H% boundary tone, as Choctaw apparently has for all words (Ulrich 1989). If the final mora is extrametrical in the masculine nouns in the declension class represented in (4) above, creating a contrast between *darma(an)* 'colt' and *darmaan* 'filly', the boundary tone will automatically link to the penultimate vowel of masculines vs. the last vowel of feminines. Similarly, in another declension class masculine *-e* and feminine *-o* are extrametrical: *waraáb-e* 'hyena', *abeés-o* 'poisonous snake (sp.)'. In other words, rather than having an accentual H, the culminative and non-obligatory tone of Somali can be analyzed as grammatically conditioned boundary H% tones. This, of course, would make Somali quite different from Tokyo Japanese, where the lexical Hs are generally not predictable. In both cases, however, there is little reason to think we are dealing with anything but restricted tone.

A final problem with culminativity as a criterion for accent is that stress and tone are not the only properties that can be culminative. Examples are listed in (19).

(19) a.   aspiration and glottalization in Cuzco Quechua (Parker 1997:2)
        b.   length in Mam [Mayan; Guatemala, Mexico] (Willard (2004:7)
        c.   mid vowels in Punu [Bantu] (Kwenzi Mikala 1980:8, Fontaney 1980:55)
        d.   nasalized vowels in Karo [Tupi; Brazil] (Gabas 1999:42n)

Should we thus speak of aspirated or glottalized consonant accents, length accent, mid-vowel-height accent, and nasalized-vowel accent? While vowel length appears the most "accent-like", it should be noted that length and stress do not always coincide in Mam. A similar point is made by Kisseberth (2005) concerning the phrasal domain in Chimwiini [Bantu; Somalia], where culminative vowel length can be penultimate or antepenultimate, while culminative H tone can be penultimate or final.

3.3. Privativity

Many of the systems discussed in preceding sections lend themselves to a privative /H/ vs. /Ø/ rather than binary /H/ vs. /L/ interpretation. In the 1980s, a number of phonologists, myself included, flirted with the idea that privativity was sufficient to call a system accentual. (This appears to be the only reason why Clark's (1988) treatment of Zulu [Bantu; South Africa] appears in a collection on pitch-accent: "...Zulu is a tonal pitch-accent language with the tonal melody 'H'." (p.56). The intuition is that an accent is present vs. absent, whereas a tone should be fully specified with pluses and minuses. The proposal that such accents might be represented by a diacritic asterisk placed on appropriate TBUs, as Goldsmith (1984) proposed for Tonga, and which I unfortunately applied to Somali (Hyman 1981), was shown by Pulleyblank (1986) to have undesirable consequences. However, one might still view the H of a /H, Ø/ system as accentual by virtue of its privativity—vs. the H of a /H, L/ system.

A major problem with such a position is that it is not always clear whether the non-H tone of a two-level system should be analyzed as /L/ or /Ø/. In addition, different phonologists have taken the position that there should be full specification in underlying representations, in which case some other mechanism would be needed to distinguish accent-like /H/ from purely tonal /H/. Another problem is that we have counterexamples of two types:

First, there are languages which show accentual properties but which require /L/ to be present. In (14) we saw that there are two different culminative tones in Puinave, /H/ and /HL/. Guirón Higuita & Wetzels (2007) analyze Puinave with underlying /H/, /HL/, /Ø/ and marginal /LH/, which is found only on monosyllabic words. Assuming that this analysis is correct, if we wanted to call Puinave accentual, it would not be the absence of a L feature that is criterial, but rather the presence of a sizeable number of toneless TBUs. The same is seen in Prinmi [Tibeto-Burman; China] (Ding 2001), which I have reanalyzed in (20) as having a system of /H/, /HL/ and /LH/:

(20) schema

schema	1σ	2σ			3σ		
/H/	H	H-Ø	→	H-H	H-Ø-Ø	→	H-H-L
		Ø-H	→	L-H	Ø-H-Ø	→	L-H-H
					Ø-Ø-H	→	L-L-H
/HL/	HL	HL-Ø	→	H-L	HL-Ø-Ø	→	H-L-L
		Ø-HL	→	L-H (ᴸ)	Ø-HL-Ø	→	L-H-L
					Ø-Ø-HL	→	L-L-H (ᴸ)
/LH/	LH	LH-Ø	→	L-H	LH-Ø-Ø	→	L-H-L
		Ø-LH	→	L-LH	Ø-LH-Ø	→	L-L-H
					Ø-Ø-LH	→	L-L-LH

As seen, one syllable per word is marked for one of three underlying tones: /H/, /HL/ or /LH/. (Other than carrying a tonal specification, there is no reason to think that the toned syllable is stressed.) As indicated, the underlying /H/ spreads one syllable to the right, while the H of /HL/ instead assigns its L to the next syllable. (There are no falling tones in the language. The floating L indicated in parenthesis will be assigned to a following TBU.) This /H/ vs. /HL/ distinction replaces Ding's (2001) use of a diacritic feature [±spread] to characterize the difference. The third tone, /LH/, assigns its H to the following TBU, a process perhaps conflatable with the H tone-spreading rule. When occurring finally, /LH/ is realized as a rising tone. As indicated in the outputs in (20), default L tone is assigned to remaining toneless TBUs.

What Prinmi reveals is that privativity has less to do with whether [H] and [L] features contrast than with the existence of /Ø/ TBUs. In other words, it again relates to the issue of tonal density. In the case of Haya /H, Ø/, we saw in (17) and (18) that output conditions result in the non-realization of input Hs, e.g. on pre- and post-pause vowels. As analyzed by Schadeberg (2000), Ekoti [Bantu; Mozambique] shows that tonal density is controlled by INPUT conditions. Consider in (21) the observed patterns on nouns as they are realized in non-prepause position:

(21)

a.	input	output	b.	5μ-input	5μ-output	c.	6μ-input	6μ-output
1μ	H	H		Ø-H-Ø-Ø-Ø	L-H-H-L-L		Ø-H-Ø-Ø-Ø-Ø	L-H-H-L-L-L
2μ	Ø-H	L-H		Ø-Ø-H-Ø-Ø	L-L-H-H-L		Ø- Ø-H-Ø-Ø-Ø	L-L-H-H-L-L
3μ	Ø-H-Ø	L-H-H		Ø-H-Ø-H-Ø	L-H-L-H-H		Ø-Ø-Ø-H-Ø-Ø	L-L-L-H-H-L
4μ	Ø-H-Ø-Ø	L-H-H-L					Ø-H-Ø-H-Ø-Ø	L-H-L-H-H-L
							Ø-H-Ø-Ø-H-Ø	L-H-H-L-H-H
							Ø-Ø-H-Ø-H-Ø	L-L-H-L-H-H

As seen, the underlying opposition in Ekoti is privative /H, Ø/. There is a H tone spreading rule that doubles an input H onto the next mora. Remaining /Ø/ moras are realized with default L. If one were look only at the tonal distributions on nouns of 1-4 moras in (21a), one might conclude that /H/ is both obligatory and culminative: in each case there is only one input pattern with a single /H/. However, there are three different patterns on five-mora nouns and six patterns on six-mora nouns. Schadeberg (2000:601-2) accounts for these distributions as in (22).

(22) "Each mora may carry a distinctive Hi tone, subject to the following restrictions, in decreasing order of priority:

(i)   Two Hi tones shall not be on adjacent moras.   ["holds throughout the language"]
(ii) Each noun shall have at least one Hi tone.   ["obeyed by all nouns"]
(iii) No Hi tone shall be on the first mora.   [violated by monomoraic nouns]

(iv) No Hi tone shall be on the last mora.   [violated by mono- & bimoraic nouns]
(v) The only Hi tone shall not be on the penultimate mora."   [violated by /Ø-H-Ø/]

Whereas optimality theory has focused on the relative ranking of output conditions, Schadeberg's conception clearly is that (22i-v) are ranked constraints on INPUTS. To show this, I have relabeled the five constraints as OCP(H), OBLIG(H), *INIT(H), *FIN(H), and *[$Ø^n$-H-L] in the tableau in (23), which reveals why Ekoti allows only one out of the eight logical tonal inputs on nouns of three moras:

(23)

	OCP(H)	OBLIG(H)	*INIT(H)	*FIN(H)	*[$Ø^n$-H-L]
H-H-H	*!		*	*	
H-H-Ø	*!		*		
Ø-H-H	*!			*	
Ø-Ø-Ø		*!			
H-Ø-H			*!	*	
H-Ø-Ø			*!		
Ø-Ø-H				*!	
☞ Ø-H-Ø					*

As seen, the most harmonic input candidate is /Ø-H-Ø/, which violates only the lowest-ranked constraint, *[$Ø^n$-H-L], which also is the only constraint whose motivation is unclear. Considering the other inputs in (22a), monomoraic /H/ necessarily violates *INIT(H) and *FIN(H), and /Ø-H/ wins out over /H-Ø/, since *INIT(H) outranks *FIN(H). The quadrimoraic input /Ø-H-Ø-Ø/ satisfies all of the constraints, as do the three five-mora inputs in (22b) and the six six-mora inputs in (22c).

When the full range of data are taken into consideration, we see that although Ekoti has the privative contrast /H, Ø/, H is clearly not culminative on nouns in inputs or outputs. Nor is /H/ obligatory, since verbs can be toneless (as in Somali). Of course, it may be that H tones are more restricted by position in a privative /H, Ø/ system as opposed to a binary /H, L/ one, but this hardly means that we are dealing with a third "pitch-accent" category. Rather, syntagmatic constraints and processes are simply more frequent and potentially operate within larger domains in privative vs. binary systems. In a number of works, Charles Kisseberth has shown that an underlying H tone of a verb can be displaced onto the following word. While the (i) examples in (24) consist of a toneless verb + toneless noun object, the /H/ of the verb root shifts onto the same toneless nouns in the (ii) examples—to the final in Digo, and to the penult in Giryama and Zigula:

(24) a. Digo (Kisseberth 1984:162, 168)
          (i) ku-henz-a mu-ganga 'to look for a doctor'
          (ii) ku-<u>ih</u>-a   mu-gangá 'to call a doctor'   (→ [ku-ih-a mu-găngâ])

      b. Giryama (Philippson 1998:321; cf. Kisseberth & Volk 2007)
          (i) ku-tsol-a ki-revu   'to choose a beard'   /-tsol-/ 'choose'
          (ii) ku-<u>on</u>-a   ki-révu   'to see a beard'   /-ón-/   'see'

   c.   Zigula (Kenstowicz & Kisseberth 1990:175; cf. Kisseberth 1992)

      (i)   ku-guh-a ma-tunguja 'to take tomatoes'   /-guh-/ 'take'

      (i)   ku-fi̱s-a   ma-tungúja 'to hide tomatoes'   /-fís-/ 'hide'

Such phrasal displacement is apparently possible only in languages which have an underlying /H, Ø/ contrast. Thus, except for the docking of floating tones, tonal displacement has not been documented in any /H, L/ or /L, Ø/ system. Since words can have more than one H tone in such languages, we are not dealing with "accent" in the culminative sense. Rather, such long-distance mobility is a logical endpoint of syntagmatic tonology, which constrains tones at the phrase level. While the draw of the penultimate or final syllable may be viewed as "attraction to accent" (Goldsmith 1987:99, Cassimjee & Kisseberth 1992:30), this at best shows that tone can peacefully co-exist with a metrical system, i.e. stress. That tone can have metrical properties has also suggested that it might form a natural "accentual" class with stress, as addressed in the following subjection.

3.4. Metricality

The final kind of system to be considered is one where tones are placed or otherwise affected by metrical processes. We have already cited systems where H tones are located at or near the right edge, e.g. the penultimate or final H of Somali, the obligatory word-final H of Choctaw, the right-displaced Hs of Giryama, Zigula and Digo. We hypothesized that the right-oriented H is a suffix in Somali and a boundary tone in Choctaw. This leaves the Bantu cases in (24), which are subject to two interpretations: The first is that an input H is attracted to a metrically strong position to the right of its input. The other is that that the H is aligned with the right edge of a domain (modulo nonfinality). In either case, a common assumption among Bantuists is that word- or phrase-level tone displacement derives from a combination of spreading + delinking (Cassimjee & Kisseberth 1992:31, Philippson 1998:321).

     Tones may also be restricted to the left edge of a domain. In Mayo [Uto-Aztecan; Mexico], a /H/ is restricted to occurring on either the first or second syllable of a word (Hagberg 2006). Toneless TBUs are pronounced L when they occur between the last H and pause, otherwise they are pronounced M. As seen in (25), the placement of the /H/ is usually a lexical property of roots:

(25) a. Initial H   b. 2nd Syll H

chúpnake	'will harvest' (tr.)	ponnáke	'will play' (tr.)
hí-chupnake	'will harvest' (intr.)	hi-pónnake	'will play' (intr.)
hí-hi-chupnake	'will always harvest (intr.)	hi-hí-ponnake	'will always play' (intr.)

In (25a), the root *-chup-* 'harvest' assigns first-syllable H, while in (25b) the root *-pon-* 'play' assigns second syllable H. In each case the H tone migrates to the left as prefixes are added. While other Uto-Aztecan languages assign stress from the left edge of the word, e.g. Rarámuri (Caballero 2005), Hagberg analyzes Mayo with a floating H tone whose placement is determined by roots: "While most theories allow for lexically contrastive stress, they do not allow lexical accent to float, and yet this is clearly what happens. Since floating tone is incontrovertibly attested in a number of other languages, I conclude that Mayo has underlying autosegmental tone, not accent." (p.7) (Hagberg discusses the possibility of initial extrametricality; another possibility would be to distinguish /H/ vs. /LH/ roots whose tone(s) are mapped left-to-right at

the word level.)

Demers et al (1999) describe a similar system in closely related Yaqui, which has two main differences: (i) the initial or peninitial /H/ spreads to the end of the word. (ii) a long vowel is shortened in a syllable that either precedes or follows the H tone syllable. They assume initial extrametricality and interpret vowel shortening as follows: "We propose that the mora loss rule is part of prominence marking in Yaqui. That is, vowel duration is a competing marker of prominence (perhaps analogous to stress clash) and in order to maximize the prominence of the first syllable bearing a high tone, a mora is dropped in adjacent syllables containing two moras." (p.46) In other words, although the mark of prominence is H tone, it may be accentual because it has an effect on neighboring syllables which we do not expect of "ordinary" H tones. Taking the two languages together, we seem to have behavior that is unbecoming both to stress (Mayo) and to tone (Yacqui).

It would seem unreasonable to invoke metrical structure in Yaqui, if not in both languages, which determines the placement of the one underlying /H/ per word and conditions the vowel shortening in adjacent syllables in Yacqui. There is nothing incompatible about a language with tone and metrical structure. Pearce (2006, 2007) shows that Kera [Chadic; Chad, Cameroon] requires iambic feet for the purpose of mapping /H/ and /L/ tones as well as determining vowel height harmony: "Kera illustrates that, even without stress at the word level, there are languages which have an interaction between the foot and a number of other phenomena, including tone." (Pearce 2006:283) The question is whether metrical structure = stress (as I have assumed), or whether stress = metrical structure + something additional.

In Hyman (1977:5) I distinguished between "tone which is dependent on stress" vs. "stress which is dependent on tone". The first situation has already been alluded to and concerns languages where a tonal contrast is possible only on stressed syllable. (The second concerns cases where stress is allegedly assigned based on the tonal composition of a word, something to which de Lacy 2002 has brought recent attention.) A rather intricate example of tone depending on stress, i.e. metrical structure, is found in Seneca [Iroquoian; US, Canada] (Chafe 1977, 1996; Melinger 2002). Following Melinger's recasting of Chafe's analysis, Seneca metrical structure and H tones are assigned as in (26).

(26) a. mark the first syllable extrametrical
     b. build bisyllabic trochees left-to-right
     c. assign a H tone to the first syllable of a trochee iff either syllable is closed

While (26a,b) are not unusual, the H tone assignment process in (26c) is. In order to see this, consider the schematic tone assignments in (27), where each hypothetical word has an initial extrametrical syllable followed by two (non-final) trochees:

(27) a. <σ> (CáC.Ca) (CaCa)...
     b. <σ> (Cá.CaC) (CaCa)...
     c. <σ> (Cá.CaC) (CáC.Ca)...   (*Culm(H))
     d. <σ> (Ca.Ca) (Ca.Ca)...   (*Oblig(H))

In (27a), a H tone is assigned to the head syllable of the first trochee, since it is closed. No H tone is assigned to the second trochee which consists of two open syllables. In (27b), again, the first trochee receives a H on its initial syllable, since its second syllable is closed. In (27c), each

trochee has one closed syllable, and hence two H tones are assigned to this word in violation of CULM(H). Finally, there are no closed syllables in (27d), so no H is assigned, in violation of OBLIG(H)).

If we turn to the question of how Seneca should be typologized, it is clear that although its H tone is privative, it fails to meet the more accent-like properties of obligatoriness and culminativity. The trochaic metrical structure, on the other hand, does appear to be obligatory, judging from the different behavior of final trochees. As Wallace Chafe (personal communication) has carefully explained to me, whether a penultimate vowel is lengthened or not can be affected by whether it is in an even- vs. odd-numbered syllable, or, in metrical terms, depending on whether it is in the initial vs. second syllable of the trochee. In (28), I have marked the metrical and syllable constituents on examples provided by Chafe:

(28) a. <oʔ> (ge:.gëʔ)   'I saw it'

  b. <oʔ> (sha.go:) gëʔ   'I saw her'

  c. <ho> (yë:s.döh)   'he's attractive'

  d. <ho> (díyës) döh   'they're attractive'

(28a,b) show that the vowel of a penultimate open syllable will lengthen in either position of a trochee. A penultimate vowel will also lengthen (and block H tone assignment) in a closed syllable if the latter is trochee-initial, as in (28c), but not if the vowel is in the second syllable of the trochee, as in (28d). While lengthening is blocked if a vowel is followed by a laryngeal consonant, and there are subsequent sound changes which partially obscure the original structure, the trochaic structure is clearly implicated in both H tone assignment and vowel lengthening. (Cf. Hayes' 1995:222-5 treatment of closely related Cayuga, whose metrical structure affects the segmental phonology.)

To summarize thus far, we have seen systems which have obligatory or culminative H but little or no evidence for metrical structure at the word level vs. Seneca, whose H is neither obligatory nor culminative H, but requires word-level trochaic footing. Another metrical property is one whereby the prominent features are "subordinated" (e.g. reduced or deleted) in phrasal contexts, typically on the head word of a compound or head-complement construction. In the Haya forms in (29a), for example, we observe that a verb may have one or more H tones in phrase-final position:

(29)		a.	'they tie up' (etc.)	b.	'they tie up Kato' etc.
	Present habitual		ba-kóm-a		ba-kom-a káto
	Past$_1$		bá-á-kôm-a		ba-a-kom-a káto
	Past$_2$		ba- kom-íl-e		ba-kom-il-e káto
	Past habitual		ba-a-kóm-ag-a		ba-a-kom-ag-a káto
	Future$_1$		ba-laa-kôm-a		ba-laa-kom-a káto
	Future$_2$		ba-li-kóm-a		ba-li-kom-a káto

These H tones are deleted, however, when the same verb forms are followed by a complement, here the proper noun *Káto* (Hyman & Byarushengo 1984:69). While it is tempting to attribute H reduction to being out of focus, it should be noted that the head noun of a genitive construction also undergoes H deletion: *o-mu-kôno* 'arm' → *o-mu-kono gw' ó-mukâzi* 'the woman's arm'. A

more accurate characterization is that the head word undergoes tonal reduction in the appropriate HEAD+COMPLEMENT construction.

It is tempting to identify Haya's deletion of H tones as accentual, perhaps similar to cases of stress subordination which occurs in the absence of phrasal accent. However, recall from (17) and (18) that Haya has a full tone system whose Hs are not obligatory, culminative, or metrical. The same is true of Nara [E. Sudanic; Eritrea], where the mora (μ) is a vowel or sonorant consonant. The tonal distributions in (30) are extracted from Hayward (2000:255), where patterns in parentheses are expected, but not exemplified in the data:

(30)

schema	μ	$\mu\mu$	$\mu\mu\mu$	$\mu\text{-}\mu$	$\mu\mu\text{-}\mu$	$\mu\text{-}\mu\mu$	$\mu\text{-}\mu\text{-}\mu$	$\mu\mu\text{-}\mu\text{-}\mu(\mu)$
/L/	(L)	LL	(LLL)	(L-L)	LL-L	(L-LL)	L-L-L	LL-L-L
/H/	H	HH	(HHH)	H-H	HH-H	(H-HH)	H-H-H	(HH-H-H)
/LH/		LH	LLH	L-H	LL-H	L-LH, L-HH	(L-L-H)	LL-L-H
/HL/	HL	HL	HLL	H-HL	HL-L, HH-L	H-LL	H-H-L	(HH-L-L)
/LHL/			LHL	(L-HL)	LH-L	L-HL	L-H-L	LL-L-HL

As indicated in the left column, Hayward (2000:256) isolates five tonal schemas, adding: "...attention is directed towards an obvious assymmetry with regard to the distribution of the two tones, for we do not find a HLH contour as a counterpart to the LHL contour...." As in Haya, the head of a construction may lose its underlying H tone(s). However, since Nara is a head-final language, it is the second word (W_2) in COMPLEMENT+HEAD constructions which undergoes a change to all L in the cells indicated in (31).

(31) $W_1\downarrow$ /$W_2 \rightarrow$

	/L/	/H/	/LH/	/HL/	/LHL/
/L/					
/H/			L		L
/LH/			L		L
/HL/		L	L	L	L
/LHL/		L	L	L	L

What these cells have in common is that they convert input $[...H\text{-}L^n\text{-}H^n...]$ sequences to $[...H\text{-}L^n\text{-}L^n...]$, e.g. H-L # H-H $\rightarrow$ H-L # L-L, H-H # L-H $\rightarrow$ H-H # L-L. Hayward (2006) characterizes the generalization as "one high only" (OHO): Assuming multiply linked tones, there can only be one /H/ per domain. As a result, once there is a pitch-drop from H to L within a word or COMPLEMENT+HEAD construction, one cannot rise again to H—a statement similar to the one sometimes made for Japanese "accent",

However, (30) has clearly established Nara as much more tonal than Tokyo Japanese. Rather than accent, the changes indicated in (30) are better attributed to a sequential constraint on tones, *HLH (Cahill 2002, 2007), which Yip (2002:137) refers to as *TROUGH. Nara "repairs" input *HLH violations by lowering the second H. A more common response is for the intervening non-H TBU(s) to be raised, such that a H tone plateau is created. In some languages, the process is limited to a single L TBU wedged between Hs, e.g. Kihunde [Bantu; Democratic Republic of the Congo] (Goldsmith 1990:36) and Mamaindé [Nambiquaran; Brazil] (Eberhard 2007:297). In other languages, e.g. Amahuaca [Panoan; Peru] (Russell & Russell 1959:152) and

Luganda [Bantu; Uganda] (Stevick 1969, Hyman et al 1987) multiple TBUs may undergo plateauing. The inputs in (32a) establish that each constituent has a H to L pitch drop in isolation:

(32) a.   y-a-láb-à 'he saw'   bi-kópò 'cups'   by-aa= Walúsììmbi 'of Walusimbi'
              H L   H L   H L

      b.   y-a-láb-á́ bí-kópó́ by-áá= Wálúsììmbi   'he saw the cups of Walusimbi'
              H ------- H ---------------- H L
                      L   L
                      ↓   ↓
                      Ø   Ø

In (32b), however, we see that the Ls of the first two words are deleted, accompanied by H plateauing from the first to last H of the construction. In fact, where closely related Haya deletes H tones, Luganda instead deletes Ls and derives a H plateau.

While *HLH is widespread in tone systems (Cahill 2002, 2007), it can be violated. Thus, as seen in (33), Siane [Trans-New-Guinea] has a /HLH/ schema, but not */LHL/ (James 1994:126):

(33) schema   σ   σ–σ   σ–σ–σ

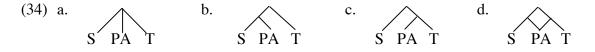| /L/	12	6	2	
/H/	19	128	66	
/LH/	17	74	36	[L-L-H]
/HL/	2	119	87	[H-L-L]
/HLH/	Ø	130	108	

As indicated, there are relatively few lexical entries with /L/ tone, without which Siane H would be obligatory (but not culminative). As indicated to the right, /LH/ and /HL/ are realized with maximization of L, as in Fore in (16). However, given the /HLH/ schema, regarding H as an "accent" would be quite problematic.

From the foregoing we draw two interim conclusions, both of raise a question in turn: First, tone can be very dependent on metrical structure, as in Seneca. The question is whether the metrical structure should be identified as "stress", or whether stress is a KIND of metrical structure (cf. §4). The second conclusion is that the tonal modifications which occur in close-knit phrasal constituents are not necessary accentual. They may be domain-based, as in the *HLH cases. The question is whether H tone reduction or plateauing tends to occur more in privative systems than in unambiguous /H, L/ systems. Both Haya and Luganda have been analyzed with privative /H, Ø/, although in both cases a third L value is introduced (within the lexical phonology in Luganda, at the phrase level in Haya). Except for the restricted occurrence of short HL falling tones, Nara might also be amenable to a privative interpretation. We thus come back to the relevance of tonal density, an issue which taken up again in §4.

4.   Summary and conclusions

In the preceding sections we have seen that it is possible to define "tone" and "stress", as well as propose unambiguous "prototypes" for each. In contrast, we have not been able to provide an independent definition of "pitch-accent" which was said to characterize systems which either combine stress and tone or place "significant constraints" on the distribution of their tones. We

also suggested that there is no pitch-accent prototype, and that no language must be analyzed as pitch-accent: A tonal analysis is always possible. In §3 we considered four properties which may create the impression that a system is accentual: obligatoriness, culminativity, privativity, and metricality. This permitted us to look at a number of "intermediate" tone systems which have one vs. another of these properties, but which we were not able to assign to a third prosodic type. Take the oft-made suggestion that a pitch-accent language is one in which the tonal contrasts can be indicated with by a presence vs. absence of a single mark per word, as in W. Basque, Somali, and Tokyo Japanese. While these languages seem to group together in this way, do they form a class with Osaka Japanese and Luganda which require two marks to indicate where the H begins and where it ends, or Fasu and Prinmi, which require one mark for location and another to choose from two or three contrasting tones? Finally, how does Seneca fit into this? The basic system does not require any marks, rather first builds trochaic feet, some of which then are assigned a H to their first syllable. Should some of these (or comparable) languages be folded in with stress systems (Seneca) and others with tone (Luganda, Prinmi)?

To see what is wrong with this kind of thinking, let us for the moment accept that there are three types of prosodic systems (stress, pitch-accent, tone) and ask the following question: What is the relation between them? Let us contrast three possibilities. The first, shown in (34), is that their relation can be represented in terms of trees:

(34) a.   b.   c.   d.

       S PA T   S PA T   S PA T   S PA T

In (34a), stress (S), pitch-accent (PA) and tone (T) are assumed to be three independent types of prosodic systems. In (34b), stress and pitch-accent are considered to be two types of accentual system as opposed to tone, while (34c) shows just the reverse: pitch-accent and tone are two types of pitch systems vs. stress. Of the three, (33b) seems to mirror the traditional terminology "stress-accent" vs. "pitch-accent" (Hyman 1977) or "stress-accent" vs. "non-stress accent" (Beckman 1988). (34a-c) fail, however, to capture the intuition that pitch-accent systems are somehow intermediate between stress and tone systems. This is shown in (34d), where pitch-accent belongs both to the class of accentual languages and the class of pitch languages.

While questionable when applied to restricted tone systems, (34d) might seem most appropriate for systems which have both metrical structure (stress) and tone. This possibility is also captured in what Voorhoeve (1973) calls the "box model", where languages are typologized by specific criteria. Returning to the definitions of word level stress and tone in §2, we can "box" languages according to whether they meet one, both, or neither definition (cf. Hyman 2006:237):

(35)

	Stress	No Stress
Tone	Seneca, Fasu, Mayá, Copala Trique...	Yoruba, Igbo, Hakha Lai, Skou...
No Tone	English, Russian, Ojibwe, Swahili...	Bella Coola, French, Tamazight...

Unlike the conception in (34), this approach makes no claim as to whether the (tone) languages in the first row are more similar to each other than the (stress) languages in the first column. Nor is there any suggestion that the prosodic systems which fit each value of {Stress, Tone} will seem correctly placed once the full typology is fine-tuned by the addition of other properties. In

other words, some languages will be closer to the prototypes, providing unambiguous multiple evidence for stress vs. tone, while others will diverge from these prototypes in different ways.

Of course, this leaves unresolved the question of how to do deal with ambiguous or indeterminate cases. Some scholars will not be happy with the claim that the languages in the right column of (35) do not have word stress. Goedemans and van der Hulst (to appear), for instance, would like to include stress under a broader, universal notion of accent: "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." The issue has already come up as to whether all metrical structure = stress. If so, how might we view a language which invokes metrical structure only in its prosodic morphology?

The second problem concerns controversial systems such as W. Basque, Tokyo Japanese, and Somali, which could easily be analyzed with tone, metrical structure, or both. In Hyman (2001a, 2006) I have emphasized a definition of a tone system as "one in which an indication of pitch enters into the lexical realization of at least some morphemes." The intention is to abstract away from analyses which use diacritics (e.g. asterisks) to simply indicate pitch and recognize that this is just another way to say that these are VERY reduced tone systems. These systems may also be metrical, but that needs to be demonstrated other than by the intuitition that culminativity = accentual. The goal has to be to set up an explicit and comprehensive set of criteria which can be applied to different systems in a linguistically sigificant way. For example, word stress is both obligatory and culminative and targets syllables, and word tone is obligatorily a property of morphemes.

It is in this last connection that the third approch to word-prosodic typology falls flat. A number of scholars have used the term "continuum" to refer either to the relation between stress and pitch-accent, between tone and pitch-accent, or between all three. The claim has even been made that criteria may themselves be continua, not binary as presented in Hyman (2006) and above. In the abstract to his paper, Hualde (2006) takes the position that along the continuum there may even be multiple intermediate prototypes:

> Typological classifications of prosodic systems based on binary features (such as presence vs. absence of lexical tone, presence vs. absence of contrastive stress, etc.) can be very useful as a first approximation to linguistic diversity in this domain.... In this talk, I will argue that a more useful approach may be in terms of *a number of recognized prosodic prototypes*. A statement such as "language L is like Swedish except that x" may provide us with a more clear picture of the prosody of language L than its classification in terms of binary features." [my emphasis]

Of course linguistic properties may converge and produce similarities or identity in prosodic systems. Hualde et al (2002:548) thus assign Northern Biskaian Basque to what they call a "T(okyo)-type pitch-accent language". But what does it mean to say that such "prototypes" fall along a a stress—pitch-accent—tone CONTINUUM? In other words, how do we obtain a continuum such as the one in (36), repeated from (1):

(36) English----------W. Basque-----------Tokyo Japanese-----------Luganda-----------Mandarin

While the above languages show various degrees of tone from zero (English) to a lot (Mandarin), where does a metrical tone system such as Seneca fit in? Stacey (2004:41) makes the same point with respect to Creek: "...metaphorical linearity of the continuum poses great difficulties when trying to classify a language such as Creek, which implements tone under a metrical system.... Furthermore, the continuum is unable to account for different manifestations of the same system...."

I can think of three ways to derive a single-dimensional continuum such as in (36). The first would be to appeal to a single continuous or quantitative property. In §1 I suggested tonal density about which Gussenhoven (2001:15296) states the following:

> "A phonological typology of tone might be based on tonal density: how many locations are specified for tone, that is, have tonal associations? In other words, languages differ in the selection of the tone bearing unit: in the 'densest' case they specify every mora for tone, and in the sparsest case they just mark the phrasing. When more than one tone is associated with a syllable, like HL or LH, the combination is known as a contour tone, while a single tone is a level tone."

There is no doubt that a tonal density coefficient could be devised for each language which would result in our ability to list all the languages of the world from least to most tonally dense. Let us assume that we all agree on analytical choices concerning the levels and domains to be examined and the methodological problem of how to count. While the endpoints would be clear, the question, however, is whether there would be any internal organization to the intermediate languages. In other words, would tonal density simply give us a continuum, or would we gain insight into the typologically diverse intermediate systems? Suggestion: Someone should do a pilot study and see what it yields.

Since Hualde (2006) did not advocate a single dimension such as tonal density, but rather examined the kinds of criteria considered in this paper (e.g. obligatoriness and culminativity), a second way that a discrete continuum could conceivably be obtained is if the criteria fell into a subset relation, as represented in (37a).

(37) a. *Continuum*

	L_1	L_2	L_3	L_4	L_5
P_1	+	-	-	-	-
P_2	+	+	-	-	-
P_3	+	+	+	-	-
P_4	+	+	+	+	-
	4	3	2	1	0

b. *Pick-and-Choose*

	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	L_9	L_{10}	L_{11}	L_{12}	L_{13}	L_{14}	L_{15}	L_{16}
P_1	+	-	+	+	+	+	+	+	-	-	-	+	-	-	-	-
P_2	+	+	-	+	+	+	-	-	+	+	-	-	+	-	-	-
P_3	+	+	+	-	+	-	+	-	+	-	+	-	-	+	-	-
P_4	+	+	+	+	-	-	-	+	-	+	+	-	-	-	+	-
	4		3					2					1			0

In (37) I have posited four stress-like properties (P_1-P_4) which are in a subset relation in the sense that P_1 implies P_2, P_3, P_4; P_2 implies P_3, P_4; and P_3 implies P_4. Since the systems so defined fall into a scalar hierarchy, the five possible languages can be ranked from a value of 4 (L_1= the most stress-like) down to a value of zero (L_5 = the least stress-like). There is exactly one combination of properties that defines each step on the continuum.

The question is whether there are in reality four properties, P_1-P_4, which occur in such a subset relation or whether the properties are in fact independent from each other. If the latter, we obtain the "pick-and-choose" distributions in (36b). The values are the same (4-0), but this time four combinations give a value of 3 and 1, while six combinations give a value of 2. If P_1-P_4 = obligatoriness, culminativity, privativity, metricality, we can easily see in (37) that the top two are in fact independent (Hyman 2006:245):

(38)   +CULM(H)   -CULM(H)   Hyman (2006:245)

	+CULM(H)	-CULM(H)
+OBLIG(H)	Kinga	Creek
-OBLIG(H)	Somali	Seneca

Since all four combinations of OBLIG(H) and CULM(H) are attested, the two properties are not in a subset relation and hence do not define a continuum. This leaves one remaining possibility: weighting of properties.

Assuming a possible score of 100 (= very stress-like) vs. 0 (= not stress-like at all), we can assign either the same (i.e. 25) points to P_1-P_4, or a weighted amount to each, for example P_1(40) + P_2(30) + P_3(20) + P_4(10). Systems which satisfy P_1 completely would receive 40 points, while those in the mid range of satisfying P_1 might receive 20 points. This could be a way, then, of quantifying what Hualde (2006) has in mind in stating that obligatoriness is itself a continuum (i.e. multivalued). His example is that languages differ in the degree to which they tolerate unaccented/toneless grammatical elements, e.g. the definite (but not indefinite) article in Spanish. Languages clearly do differ in "stress density": Some languages treat grammatical elements as stressless clitics and particles, while others require them to be treated the same as lexical words and gebce receive stress. The idea is that languages could be placed on a continuum according to their degree of non-prosodified (stressless, toneless) elements, which might result in W. Basque being placed near certain stress languages (e.g. Spanish), rather than in a box with the tone systems in (34).

The notions of tonal density, stress density, and weighted criteria appear to be attempts to come to terms with the multidimensional nature of the problem: There isn't just one structural property involved in characterizing prosodic systems, but most of these properties affect prosodic density. We thus see the difficulty of placing languages along a continuous scale, let alone naming them. In practice those interested in word-prosodic typology are all engaged in determining how phonologies function AS SYSTEMS. Typology should be PROPERTY-DRIVEN, whether one chooses to ask "what's possible?" or 'what's where why?'" (Bickel 2007:239). To see how this might be done in word-prosodic typology, let us consider what has been said about nasality. The typological question is how the phonetic feature of nasality is structured in phonological systems. As seen in (38) there are at least five nasal "types", which are listed in (38) in the order of relative frequency in the world's languages (Cohn 1993, Clements & Osu 2003):

(39) Nasality may be underlyingly constrastive:

    a. on consonants only: /m, n, ŋ/   e.g. Lahu
    b. on vowels and consonants: /ĩ, ũ, ã/, /m, n, ŋ/ e.g. Bambara
    c. on vowels only   /ĩ, ũ, ã/   e.g. Klao
    d. on whole morphemes   /CVC/^{N} e.g. Barasana
    e. absent entirely   e.g. Lushootseed

As is well known, nasality is a consonant feature in most languages. Contrastive nasality on vowels is not rare, but does tend to cluster in certain areas, e.g. West Africa. Nasal prosodies on whole morphemes are less common, and are especially well-known from Amazonian languages. Finally, approximately a dozen languages have been reported to lack nasality in any form, including Lushootseed, Quileute, Pirahã, Central Rotokas, and several Lakes Plains languages of Indonesia (Papua): Doutai, Iau, Obokuitai, Sikaritai and Kirikiri. In addition to examining how or why these common/rare or geographically skewed distributions are found, the above distinctions allow other questions to be raised, such as: Why is it that there are underlying systems with nasality contrasting only on vowels, as in (39c), but no surface system where nasality is REALIZED only on vowels? Note, finally, that although five different "types" are attested, there doesn't seem to be a need to give each one a name, or to ask which ones are the more closely related to each other? (If asked, I'd suggest (39c,d).)

      This is the property-driven approach that I believe should be followed in word-prosodic typology as well, as we attempt to transcend the temptation to see typology as "classifying languages". I thus agree with McCawley (1978:127): "For each of the languages discussed in this section, one can ask the question, 'Is it a pitch-accent language or a tone language?' However, I think that that is a stupid question to ask..." Phonological typology should characterize languages by P1, P2, ... Pn, not by labels. The questions we should ask therefore are:

(40) Which languages have word-level metrical structure ("stress")? What are its properties?
      (i.e. what do languages DO with metrical structures?)

      Which languages have word-level pitch features ("tone")? What are its properties?
      (i.e. what do languages DO with pitch features?)

The first question would lead to a typology of metrical functions as well a metrical realizations. It would include the well-known range of stress systems (Hayes 1995), but also Seneca, where the main realization of left-to-right iterative trochee-formation is the assignment of H tones. The second question would lead to a typology of tones sytems and their realizations. It would include the well-known range of systems from such overviews as Hyman (2001a) and Yip (2002), but could be extended to include systems which exploit pitch features at the phrase level (Ladd 1996, Gussenhoven 2004) or which combine lexical and phrasal tones (Pierrehumbert & Beckman 1988; also the papers in van der Hulst 1996).

      A prerequisite to answering the above questions is to first establish what is meant by stress and tone. If stress is equivalent to underlying or abstract metrical structure, when is it appropriate to posit metrical structure, and the same for lexical pitch features? Even if we agreed on this, there could still be ambiguous or indeterminate systems. Kinga (Schadeberg 1973) and Nubi (Gussenhoven 2006) both have an obligatory and culminative H tone on each word. We can conclude that Kinga's is not a stress system, since the Hs are assigned directly to moras and produce rising and falling tones (as in Somali). However, the TBU is the syllable in Nubi. As

Gussenhoven suggests, it may be that Nubi is "pivotal": its H may be seen as metrical prominence (= stress) or it may simply be a severely restricted (obligatory, culminative) tone. Whatever Nubi is, we must ask how it is the same vs. different from stress systems whose cues are primarily pitch, e.g. Turkish (Levi 2005). In conclusion, the need for a third category of pitch-accent has not been established, and in any case, would seem more interpretive than demonstrable. As Gussenhoven (2004:42) puts it: "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." (Gussenhoven 2004:42) Whether dealing with a language with obligatory or culminative tone, a language with metrical tone, or a language with both stress and tone, we would do well to avoid using the term "pitch-accent" as a catch-all in favor of direct reference to the properties what we all recognize to be a diverse collection of intermediate word-prosodic systems.

Acknowledgements

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