

New Perspectives in Word-Prosodic Typology

The study of word prosody is in flux. The typology determined by the word-prosodic systems of the world's dominant languages is being challenged by an increasing number of exceptional languages. This research project focuses on one of these exceptional types: a hybrid word-prosodic system featuring contrastive lexical stress in addition to distinctive tone. The results will enrich our understanding of the form languages can take.

Research >
General

By Bert Remijsen

In the study of speech, it is useful to make a distinction between segmental and prosodic features. The vowels and consonants that make up utterances constitute the segmental part of speech. Prosody, on the other hand, comprises the properties of speech that are unpredictable on the basis of the sequence of vowels and consonants. The prosodic properties are fundamental frequency (f_0 , the acoustic correlate of perceived pitch), duration, intensity (the acoustic correlate of perceived loudness) and, to some extent, vowel quality. These prosodic parameters serve a wide range of functions in speech communication: flagging word boundaries, encoding pragmatic differences, such as statement versus question, expressing emotion, and so forth.

At the word, or lexical, level, prosodic properties encode lexical tone, lexical stress, and lexical pitch accent, briefly explained as follows. The function of lexical tone is to distinguish words from one another, and it does so by means of f_0 . The Papuan language Iau, for example, has a tone system with eight lexically contrastive (or phonemic) f_0 -patterns. In this language, the syllable /be/ means 'fire' when f_0 is low

level, 'snake' when it is high and rising, and 'path' when it is low and rising, etc. Apart from lexical tone, there is lexical accent. In languages with this word-prosodic feature, one syllable per word is made prominent by (some combination of) the above-mentioned prosodic properties. This is the accented syllable, which stands out from the other (unaccented) syllables in the word. The location of the accent in the word can be unpredictable, in which case the accent can be used to distinguish words. This is the case in English, where we find minimal pairs such as /'pervert/ (noun) vs. /pɜr'vert/ (verb). More often than not, however, the location of accent is predictable, e.g. fixed on the first syllable, like in Czech. A speaker of Czech can infer word boundaries from the lexical accents.

Within the category of lexical accent, it is useful to make a further distinction between lexical pitch accent and lexical stress. A language features lexical pitch accent when the lexical accent is made prominent by means of a single, specific f_0 -pattern. This is the case in Japanese, where the syllable that carries the lexical pitch accent is marked by a fall in f_0 . Lexical stress, on the other hand, is lexical accent encoded by prosodic parameters other than f_0 . A case in point is English, where the first syllable in /'pervert/ stands out from the second syllable in that word by the fact that it has a longer duration, a less schwa-like vowel, and higher intensity. Depending on its position in an utterance, the stressed syllable may also feature an f_0 -pattern, but if it does, this f_0 -pattern is a matter of utterance-level prosody (intonation), often with a pragmatic function. In general, in languages that feature lexical stress the stressed syllable can be marked by intonational f_0 -patterns.

The above brief overview of word-prosodic features follows the typology reflected in landmark studies such as Trubetzkoy's *Grundzüge der Phonologie* (1939) and in Beckman (1986). However, there are languages with word-prosodic systems that do not match any of these types exclusively. And while some of these atypical configurations have been known for decades, others have been discovered only in recent years. From the clear-cut distinctions of the above-mentioned typology, new data are leading to a considerably less restricted word-prosodic typology.

The best known of these 'atypical' configurations straddles the fence between lexical tone and lexical pitch accent. That is, a considerable number of languages have lexical tone contrasts that are restricted to a single syllable in the word. In such languages, the syllable to which the tonal contrast is limited stands out from among the other syllables in the word, just as is the case with lexical accent. For example, the Austronesian language Ma'ya features a three-member tonal contrast that is limited to the final syllable of content words (Remijsen 2002). Such systems show that there is a continuum between lexical tone and lexical pitch accent: lexical tone contrasts can be less or more restricted to certain syllables within the word.

Secondly, there appear to be languages that feature none of the three above-mentioned word-prosodic features. French, Indonesian, and possibly Tamil fall in this category. These languages have no lexical stress, lexical pitch accent, or lexical tone. In Indonesian, for example, there is no regular encoding of lexical prominence. And whereas intonational pitch-accent is aligned with lexically accented syllables in languages that feature lexical stress, their association is more random in languages like Indonesian (Goedemans and Van Zanten, publication pending).

Thirdly, recent research suggests that there are lexical stress languages in which stressed syllables do not carry intonational pitch accents. Both for the Niger-Congo language Wolof (Rialland and Robert 2001) and for the Papuan language Kuot (Lindstrom 2002), it has been reported that emphasis is not marked by intonational accents on stressed syllables, and that the intonational contours are not anchored to lexically prominent syllables in any way. No detailed phonetic analyses have yet been carried out to determine whether the encoding of stress in these languages is the same as in 'traditional' stress systems such as English, where stressed syllables do tend to carry intonational pitch-accent.

Finally, there are to be hybrid word-prosodic systems, which combine lexical stress with lexical tone or lexical pitch accent. In most of these, stress is fixed, but at least two of these hybrid systems feature contrastive stress. One of these is the above-mentioned Ma'ya language: Ma'ya features lexically contrastive stress in addition to the three-toneme tone system. Examples of minimal pairs for lexical tone and lexical stress in Ma'ya are listed in tables 1 and 2, respectively. It has been demonstrated (Remijsen 2002) that in Ma'ya stress and tone each have their own acoustic encoding: as expected, the tonal contrast is encoded by f_0 . Additionally, stress is encoded by duration and vowel quality. The other hybrid word-prosodic system with contrastive lexical stress is the Creole language Papiamentu, whose prosodic system has not yet been subjected to a detailed phonetic analysis.

There is a striking similarity between Ma'ya and Papiamentu: both have developed in a contact situation where members of different language families share linguistic features. Ma'ya lies on the geographic boundary between the Austronesian language family and the Papuan languages of New Guinea; Papiamentu is the result of contact between West-African languages and Indo-European languages. In both cases, one (group of) source language(s) involved in the contact situation has contributed the lexical stress feature, and another has given rise to the tonal contrast. In other words, the limited data available suggest that hybrid word-prosodic systems with contrastive stress cannot develop through spontaneous language-internal development, but only through contact between languages with stress and languages with a tonal feature.

Hybrid word-prosodic systems with lexical stress are interesting because they show to what extent languages can exploit prosody: without evidence that such systems exist, one could assume that lexical stress, lexical pitch accent, and lexical tone are mutually exclusive. The main focus of this project is to determine exactly how Ma'ya and Papiamentu use prosody. For example, is it possible for such languages to encode intonational contrasts, in addition to the two word-prosodic contrasts they feature? Also, research will also be carried out on other atypical word-prosodic systems (e.g. the Papuan language Kuot), in cooperation with descriptive linguists.

In conclusion, the discovery of more and more 'atypical' patterns in recent years constitutes a challenge to word-prosodic typology: we will need to move beyond classifying such systems as atypical and arrive at a new synthesis of what kinds of word-prosodic systems are possible in languages of the world. To arrive at that stage, however, we need detailed phonetic studies on the word-prosodic systems of less-studied languages. Obviously, the typology outlined above reflects the world's dominant languages, and that is its limitation. But now that a laptop and a microphone can constitute an adequate speech lab, there is no reason to exclude such analyses from fieldwork research on minority languages, which is where the surprises will be found. In short, it is impossible to know what word-prosodic typology will be like twenty years from now, but it will be a very different picture from the one outlined above. <

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Table 1: Minimal set examples of lexical tone in Ma'ya. Lexical tone is transcribed numerically after the vowel with which the tone is associated. The range from 1 to 4 represents the tonal range of the speaker from low to high. I.e., ³ is a high tone, ¹² a rising tone, and ²¹ a falling tone.

High	Falling	Rising
'sa ³	'sa ²¹	'sa ¹²
'to climb'	'one'	'to sweep'
'na ³	'na ²¹	'na ¹²
'sugar palm'	'belly-3sg.'	'sky'

Table 2: Minimal pair examples of lexical stress in Ma'ya. Stress is marked by a ' preceding the stressed syllable.

Penultimate stress	Final stress
'tala ³	ta'la ³
'banana'	'k.o. plant'
'mana ³	ma'na ³
'light (of weight)'	'grease'

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