

Tone Languages

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The term *tone language* has traditionally been used to refer to those languages which use the feature of tone to distinguish between lexical items. Most of the languages of the world which are tone languages by this definition use tone in a systematic way to express grammatical distinctions as well, and it would be just as appropriate, tradition notwithstanding, to cast the net a bit wider, and accept under the rubric of tone language all languages which use tone in a systematic fashion to express either lexical or grammatical distinctions.

By either definition, tone languages represent a major part of the world's languages. The modern literature includes detailed studies of the tonal systems found in a large proportion of the languages of such families as Oto-Manguean in Mexico and Central American; Niger-Congo, Nilotic, and Cushitic languages in Africa; and Sinitic, Tibeto-Burman, and Austroasiatic languages in Asia.

1 Methods of tone marking

The two principle schemes for marking tone involve the use of accent diacritics and the use of numbers. In the first, used by Africanists, a high toned vowel is marked with an acute accent (á); a low toned vowel with a grave accent (à); and a mid toned vowel with a macron (ā), with a vertical stroke, (ǎ), or with no marking at all. In the second system, a number between 1 and 5 is used to mark the tone level, with scholars of Asian languages marking the lowest tone as '1', and New World language scholars

marking the highest tone as '1'. In both cases, the tone number(s) is indicated with a superscript (e.g., li^2). Rising and falling tones are marked with combinations of these symbols; thus a falling tone will be marked \hat{a} , a^{5-3} , and a^{3-5} , respectively.

2 How do tone languages differ from non-tone languages?

The tone melody of an utterance (realized in the rise and fall of pitch, or fundamental frequency) plays a role in every spoken language, but languages differ greatly as to just what that role is. Tone languages differ from other languages in three ways. (A) The length of the span of each tone melody is roughly the size of a word in a tone language, whereas in a non-tone language, its size ranges between that of a syntactic phrase and that of a sentence. In the Igbo (Nigeria) sentence $\acute{o} \acute{d}i \acute{m}m\acute{a}$ /acute over first m, vertical stroke over a; dots under o, i] the tonal melody of the sentence is the sum of the tonal melodies of each individual word; the word $\acute{m}m\acute{a}$ bears the tones High and Mid inherently; it differs from the word $\acute{m}m\grave{a}$ 'knife', which (unless affected by a tone rule of the language) will always be realized with a high tone on the first syllable, and a low tone on the second, its inherent tones. (B) The tone melody of an utterance in a tone language is composed of the tone melodies that are directly contributed by the lexical items in the utterance, and to a slightly lesser extent by the syntactic constructions present in the sentence, whereas the tone melody of an utterance in a non-tone language is generally determined by the information structure of the sentence, so that it helps primarily to specify what information in the utterance is presupposed, what is taken to be new, and so forth. (C) Tone languages generally have phonological rules that modify the tone

melodies depending on the tones found around them as well as on the syntactic structure in which they occur. The changes that these *tone rules* give rise to may consist either of modifying the actual shape of the tone melody, or of shifting the relationship in time between the tone melody and the syllables that comprise the utterance.

3 General characteristics of tone languages

3.1 When the domain that is relevant to tone assignment is large (three or more syllables), there is opportunity for considerable temporal realignment of tones and syllables. Among the tone languages of Africa (especially the Niger-Congo languages), for example, a large number contain words composed of as many as five or more syllables (due to derivational suffixes and inflectional prefixes on verbs, for example, in Bantu languages). In such cases, it is not at all uncommon to find phonological rules that shift the location of a tone over a rather great distance within a single word. In Digo, for example (Bantu, Tanzania), a High tone which is underlyingly associated with the 3rd person sg. subject marker *a* will be realized on the final two syllables of the word due to a general phonological rule (*a na ramúkâ* SUBJ-TENSE-STEM 's/he is waking up'; this contrasts with, for example, a word formed with the 1st sg. marker *ni-* (*ni na ramuka* SUBJ-TENSE-STEM 'I am waking up') (see Kisseberth 1984).

3.2 Floating tones and tonal morphemes

The basic building blocks of language which form the scaffold linking form and meaning are, of course, the lexical and grammatical formatives, and in all spoken languages, these are largely composed of consonants and vowels. In many tone

languages, however, we find grammatical (though not lexical) formatives whose only phonological substance is tonal. From a morphological point of view, what is special about these *tonal morphemes* is that they are composed solely of tones; such a tonal morpheme is typically realized on a specific syllable within the syntactic structure containing the tone. For example, many Niger-Congo languages have a High tone that is placed between two words in an "associative" construction; in Igbo, for example, both *àbhà* 'jaw' and *èṣwò* 'monkey' have two low toned syllables underlyingly, but in an associative construction, a High tone is placed (or "docks") onto the second syllable of the first word: thus *àbhá èṣwò* 'monkey's jaw'. (Green and Igwe 1963; Welmers 1963). The term *floating tone* is often used to describe such tonal morphemes, but that term also is used to refer to those tones which are a part of the underlying representation of a lexical item when the tone is regularly realized on a syllable in a neighboring word, rather on the word itself. That is, when a floating tone of this sort is present, a specific lexical item will impose (or contribute) a tone to a neighboring word, an effect which is due to a surfeit of tones by comparison with the syllables in the word. In San Miguel El Grande Mixtecan (Oto-Manguen, Mexico), for example (see Pike 1948), a large class of nouns replace the tone of the first following syllable with a High tone; this High tone is a floating tone of the word on the left which *reassociates* to the first syllable of the following word.

3.3 Tone rules

Even relatively closely related tone languages may differ with regard to whether they allow combinations of tones on a single syllable (that is, rising or falling tones). Among those tone languages that do permit such combinations of tones, it is common to find rules that create such tones by assimilation, changing a low toned syllable to a falling tone when a high tone precedes, for example. Phonological analysis can also reveal that a tone language permits contour tones at a deeper level of analysis, while eliminating them on the surface; KiHunde (Bantu, Zaire) is such a case, where contour tones are permitted on the surface only in phrase-penultimate position, while at a deeper level of analysis, they may appear at any position in the utterance.

3.4 Synchronic and diachronic tonal stability

Phonological rules of elision, deleting a vowel, typically do not affect the tone of the vowel; the tone will be realized on a nearby syllable, generally the closest one. For example, in Kirundi (Bantu; Burundi), when *umugoré* 'woman' is followed by the verb *ararima* 'cultivates', the final vowel of the subject is elided, but the high tone emerges on the remaining vowel: *umugorárarima* 'the woman cultivates'. This phenomenon is called *tone stability*, and is also reflected in diachronic processes, whereby the tone of a vowel that is definitively lost historically remains in later stages of the language, realized on a different vowel.

3.5 Interaction of other features with tone

Many tone languages in widely separate areas of the world show interactions between tone and certain features of consonants, generally the features of the consonants

produced, like tone, in the larynx; such features include those responsible for consonant voicing, breathy voice, creaky voice, and glottal stops. In a number of African languages, voiced obstruents behave tonologically as if there bore a Low tone, while in general voiced consonants are intimately linked to low tones, and voiceless consonants to high tones.

4. Dimensions along which tone languages vary

The tonal systems of tone languages vary considerably. The most important dimensions along which languages vary are the following:

4.1. The number of distinct tonal levels to be found in the language.

Many tone languages make only two tonal distinctions, referred to simply as High and Low, though the phonetic realization of these two tonal levels may vary considerably depending on the phonological context. Languages with three, four, five and even six levels of tone have been discussed in the literature (five levels have been reported for Copala Trique, Kporo, and others; six have been reported for Chori (Plateau, Nigeria)).

4.2 Level vs Contour

There is general consensus that in both tone languages and non-tone languages, the tone melodies that are present are best analyzed as consisting of sequences of one or more level tones (generally called High, Mid, and Low). In almost all cases, the rising and falling tones encountered on a single syllable (known generally as *contour tones* or *dynamic tones*) are best analyzed as being either allophonic variants of level tone, or, more commonly, as being the realization of a sequence of two level tones. For example,

the rise in the question "Tea?" is composed of a sequence of a Low and a High tone; the two tones are separated when produced with a bisyllabic word such as "Coffee?", in which the first syllable has a low pitch and the second a high pitch. It has been argued in the case of a smaller number of languages that rising and falling tones may occur in some languages as indivisible tonal atoms that cannot be further decomposed into level tones (see Newman 1986 for such an argument concerning the West African language Grebo).

4.3 Size of the tonal domain

In analyzing a tone language, we must determine whether it is the morpheme, the word, or some other size unit which contributes independently to building up the tonal melody that is found. In some languages, each individual morpheme may contribute one or more tones, while in other languages, there is no natural sense in which any unit smaller than the word can be associated logically with a tone or tonal melody. Once we have logically analyzed the source of the tone pattern, we may determine what size the unit is to which the tonal melody is mapped, for while the most frequent pattern is to map a tonal melody onto a phonological word, it is not uncommon for this pattern to be distorted in either direction: either by linking the tones of a particular morpheme directly to the syllables of that morpheme, or by spreading a tonal melody over a larger span than an individual word.

5. Connections between tone languages and non-tone language

5.1 Tone and accent.

Accental systems are systems which distinguish among the prominence of the syllables of a word in one of several ways. An accented syllable may be *louder* and/or *longer* than an unaccented syllable; it may also be phonetically signaled by being at the *pitch peak* (or, less commonly, the pitch trough) of the pitch melody found on that word. Accent is realized in all three ways in English. It has been argued that a number of tone languages also utilize an accental system, one in which the accented syllable attracts a tone (typically a High tone) to it from nearby syllables.

A number of tone languages distinguish in the tone-bearing ability of syllables on the basis of syllable weight, defined in a way strikingly similar to the distinction made in quantity-sensitive stress accent systems. A number of Asian and African languages have been described in which a syllable whose rhyme consists only of a short vowel can bear only a level tone, whereas a syllable with a long vowel can bear more than one tone, i.e., a rising or falling tone (in some languages, a sonorant or a voiced obstruent in the coda will also enable the syllable to support a second tone).

5.2 Tone and intonation

Intonational systems generally map a simple tonal melody onto the string of words that compose the intonational phrase (although the factors involved in determining the expanse of such an intonational phrase may be quite complex). This process of mapping is in some cases quite similar to the mapping relation found in tone languages, in those cases where the tonal domain onto which the tone melody is mapped is relatively large.

In both cases, the tonal melodies tend to be mapped according to a one-tone-per-syllable fashion, with contour tones being the exception rather than the rule.

6. How has our knowledge of tone languages developed?

The study of tone languages has played a central role in the development of phonological theory over the past fifty years. The work of J.R.Firth and his students in developing the "London school" was influenced by the study of tone in Thai, Tibetan, and other tone languages. The development of autosegmental representation since the mid-1970s was also heavily influenced by the study of African, and later, Asian tone systems (see Goldsmith 1992 on the development of both Firthian and autosegmental models). There was been a great deal of work done on Central American tone languages, especially Otomangean languages, most of it under the auspices of the Summer Institute of Linguistics.

References:

Short overviews can be found in:

Tone in East Asian Languages, by Moira Yip, in *Handbook of Phonological Theory*, 1994, Blackwell's;

Tone in African Languages, by David Odden, in *Handbook of Phonological Theory*, 1994, Blackwell's.

The classic study is *Tone Languages*, by Kenneth Pike (infra).

On Firthian and autosegmental treatment of tonal systems, and the relation between the two, see 'A Note on the Genealogy of Research Traditions in Modern Phonology' by John Goldsmith, *Journal of Linguistics* 8: 149-163.

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