

## 13. Tone

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### 1. Introduction

All languages make use of variations in the musical pitch of the voice as part of their sound systems, but they differ in the ways in which modifications of pitch are used and how many different types of functions are served by pitch variations. Linguists distinguish between two of the major uses of pitch as *tone* and *intonation*. **Intonation** is the term that is used to describe sentence types, such as question versus statement, or to indicate whether a speaker has finished or intends to continue speaking, or to show which parts of an utterance present new or highlighted information versus old or less significant information.

**Tone** is the term used to describe the use of pitch patterns to distinguish individual words or the grammatical forms of words, such as the singular and plural forms of nouns or different tenses of verbs. In the simplest cases, each syllable of a language with tones will have its own characteristic tonal pattern, which may be a relatively flat pitch at a particular level, or may involve the pitch rising or falling over the duration of the syllable. When the pitch has a moving pattern of this sort, the tone is described as a **contour tone**.

Many of the languages of East and Southeast Asia, including all varieties of Chinese as well as Vietnamese and Thai, have tone systems that include contour tones. In Thai, for example, full syllables have one of five tones, of which three are basically flat at high, mid, and low pitch levels, and the remaining two are rising and falling in shape. The syllable shape /k<sup>h</sup>aa/ thus corresponds to five different words depending on the tone — /k<sup>h</sup>áá/ with high tone means ‘to trade’, /k<sup>h</sup>āā/ with mid tone means ‘to get stuck’, /k<sup>h</sup>àà/ with low tone means

'galangal', /k<sup>h</sup>àá/ with rising tone means 'leg', and /k<sup>h</sup>áà/ with falling tone is a declarative politeness particle used by female speakers. Contour tones occur in other parts of the world, particularly in Mexico and Central America, but languages in which it is only necessary to speak of level tones are more common. Yoruba (Defoid, Niger-Congo; Nigeria) has lexical distinctions between three level tones, as in the three verbs /bí/ 'give birth', /bī/ 'ask', /bì/ 'vomit', while Navajo (Athapaskan; Arizona etc.) has a contrast between high and low levels, as in the words /t'áá/ 'just, only' and /-t<sup>h</sup>àà/ 'father'. Contour tones are generally found in languages which have a larger number of tone contrasts. When the language makes only two or three tone distinctions, the tones are usually all level.

## 2. Definition and distribution of the categories

The first distinction made in this chapter is between languages with and languages without tones. For most languages it is easy to determine if the language does or does not make use of tone, but there are surprisingly sharp disagreements in certain cases. For example, Dar Fur Daju (Nilo-Saharan; Sudan) is reported as non-tonal in one source but transcribed with three tone levels in another. Ket (Yeniseian; northern Siberia) is described as having zero, two, four or eight tones by different authors (there are some differences in the dialects being described, but this does not account for the differences of opinion on the tonal status of the language). Both these languages have been counted as non-tonal in the present chapter since the opinion that they lack tones seems to be the most well-supported (see Thelwall 1981 and Feev 1998 respectively). Other languages have clear word-level pitch phenomena but with limited function, or with roles that look more like stress in that they highlight a particular syllable of a word. Norwegian, Japanese, Ainu and Oneida (Iroquoian; New York State) are among languages of this kind.

These languages are classified here as tonal, but are perhaps only marginally so.

Of the 526 languages included in the data used for this chapter, 306 (58.2%) are classified as non-tonal. This probably underrepresents the proportion of the world's languages which are tonal since the sample is not proportional to the density of languages in different areas. For example, from the large Niger-Congo family of Africa there are 68 languages in the sample, 5 of which are nontonal (Swahili, Diola-Fogny, Koromfe, Wolof, and Bisa) and the remainder tonal. The *Ethnologue* (Grimes 2000) lists 1489 Niger-Congo languages, so less than 5% of the Niger-Congo languages are included. Of the Indo-European languages of western and central Europe, 16 are included (5 Romance, 3 Germanic, 3 Slavic, 2 Celtic, 1 Baltic, Greek, and Albanian). In these Indo-European groups the *Ethnologue* lists a total of 145 languages (7 Celtic, 58 Germanic, 48 Italic, 18 Slavic, 7 Greek, 4 Albanian, and 3 Baltic languages), so that over 10% of the Western European languages listed are included, only two of which are tonal or marginally so and the rest non-tonal. If, correspondingly, 10% of the Niger-Congo family had been included, 80 additional tone languages would have been included.

@	1. No tones	306
@	2. Simple tone system	132
@	3. Complex tone system	88
	total	526

Languages without tones predominate in the western part of the Eurasian landmass, including South Asia, in the more southerly regions of South America, and in the coastal area of northwestern North America. In this last area great genealogical diversity exists among the indigenous languages, but tone is almost entirely absent. In addition, no Australian language has been reported to be tonal.

The languages with tones are divided into those with a simple tone system — essentially those with only a two-way basic contrast, usually between high and low levels — and those with a more complex set of contrasts. About a quarter of the languages (132, or 25.1%) have simple tone systems. This includes 12 languages which appear to meet the definition of being tonal only marginally. With better information a few of these might end up being classed as non-tonal. Less than a fifth (88, or 16.7%) have complex tone systems. Tone languages have marked regional distributions. Virtually all the languages in Africa are tonal, with the greater number having only simple tone systems, although more complex systems are not unusual, especially in West Africa. Languages with complex tone systems dominate in an area of East and Southeast Asia. Several clusters of languages with tones occur in South, Central and North America. A number of the languages of New Guinea are also tonal, or at least marginally so.

### **3. Relationships to other phonological properties**

It is interesting to examine whether there is a relationship between tonal complexity and other measures of phonological complexity. Comparisons were made with the number of consonants, the number of vowel qualities and the complexity of syllable structures, as described in chapters 1, 2 and 12 respectively. The number of languages involved in these comparisons is 522 for consonant inventories and 523 for vowel quality inventories.

The mean number of consonants rises with increasing tonal complexity, as shown in Table 1. A simple test of the statistical difference between these means shows that only the difference between languages with complex tone systems and languages with no tones is significant. Two geographical areas show a relatively high coincidence of larger consonant inventories and tone, Africa and East and Southeast Asia.

**Table 1.** Mean number of consonants by tone system

<b>Tone system</b>	<b>Number of consonants</b>
Complex (n = 88)	26.0
Simple (n = 132)	23.3
None (n = 302)	22.1

There is also a correlation between increasing degrees of elaboration of the tone system and an increase in the mean number of vowel qualities in the languages sampled (all pairwise comparisons are highly significant using a simple comparison of means). Table 2 shows these results. As noted in chapter 2, Africa and the eastern part of Asia are also areas where larger than average vowel inventories dominate. On a smaller geographical scale, within New Guinea the presence of tone and larger vowel inventories are also correlated. Australia is a stronghold of small vowel systems and non-tonality. In the Americas and the remaining areas of Eurasia the relationship between tone and number of vowel qualities is unsystematic.

**Table 2.** Mean number of vowel qualities by tone system

<b>Tone system</b>	<b>Number of vowel qualities</b>
Complex (n = 87)	7.05
Simple (n = 130)	6.28
None (n = 306)	5.58

Tables 1 and 2 indicate that tonal complexity and complexity of segment inventory tend to go hand in hand across the set of languages surveyed. In contrast, elaboration of tonal contrasts tends to be inversely related to complexity of syllable structure as defined in chapter 12. There are 471 languages in the survey for which data on both tone system and syllable structure is present. The results are shown in Table 3, which gives the raw numbers of languages which combine a particular

pairing of tone and syllable categories. The percentage of the row total is also shown for each cell, so that the proportion of languages belonging to each tone category which fall into each of the syllable complexity categories can be readily appreciated. For each tone class moderate syllable structure is most frequent, as the middle column shows, but as tonal complexity decreases the proportion of languages with moderate syllable complexity declines going down the column, from just over three quarters to just under a half. On the other hand, the proportion of languages with complex syllable structure increases as tone complexity decreases. Thus it is clear that complex tone systems are strongly correlated with the occurrence of moderate rather than complex syllable structure, whereas non-tonal languages are considerably more likely to have complex syllable structure; languages with simple tone systems fall in between. Tone category does not, however, show any consistent relationship to the occurrence of simple syllable structure, but there are rather few languages concerned.

**Table 3.** Contingency table of tone system categories (down) and syllable complexity categories (across)

Tone system	Syllable			Row total
	Complex	Moderate	Simple	
Complex	8 (10.4%)	58 (75.3%)	11 (14.3%)	77 (100%)
Simple/Marginal	23 (19.3%)	75 (63.0%)	21 (17.6%)	119 (100%)
None	112 (40.7%)	135 (49.1%)	28 (10.2%)	275 (100%)
Column total	143	268	60	471

The pattern shown by Table 3 has a major geographical basis in the high frequency of languages with complex syllable structures in the western part of Eurasia and in the northwest of North America, both areas with few languages having tone. Complex tone systems in Asia are in an area where moderately complex syllable structure dominates.

Each of the Tables 1–3 examines a simple overall correlation between the types of tone systems found and another phonological property across all the languages sampled, but it should be borne in mind that this type of analysis does not address the question of whether any of the correlations found are due to fortuitous overlaps of inherited and areally–spread properties or represent systematic design features of languages. These results do, however, suggest that tonal complexity might be differently related to segment inventory complexity than it is to syllabic complexity, and that further analysis of these patterns would be worthwhile.