17. Rhythm Types

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1. The separation of primary and secondary stress

Assuming that the phonemes that make up words are organized into syllables, modern linguistic theory claims that **rhythm** is a manifestation of the fact that syllables are further grouped into constituents called **feet**, which are usually binary groupings of syllables. Standard Metrical Theory takes the grouping of syllables into feet as fundamental for the assignment of bounded primary stress. StressTyp, however, is based on a separation of the treatment of **primary** and **secondary stress**, and the latter (but not the former) primarily has to do with rhythm-based stresses. Such a separation has been proposed and defended on theoretical grounds by van der Hulst (1996). We offer several arguments here.

First, in our discussion of bounded systems (chapter 15, §2.1) we have seen that weight-sensitive primary stress locations within the two-syllable window can take four different forms (at each edge of the word). **Rhythm types**, however, fall into just two categories, due to the fact that a rhythmic foot cannot contain two heavy syllables (because every heavy syllable constitutes a rhythmic beat). This difference, then, may make it necessary to describe primary and secondary stress patterns separately.

A second argument for the separation can be found in systems in which secondary stress starts at the edge that is opposite to the location of primary stress; we refer to such systems as *polar*. An example is given in (1).

(1) Garrwa (Garawan; Northern Territory, Australia): initial main stress, secondary stress on the penult and alternates before it.

('nari)ŋin(,mukun)(,jina)(,mira) 'at your own many'

In Table 1 we see exactly how many languages this argument is based on (data in tables 1–4, and figure 1, are based on the *complete* StressTyp sample of 510 languages).

Table 1. Frequencies of languages with left- or right-edged main stress, cross spliced with direction of footing

	Starting edge of footing (secondary stress assignment)	
Main stress domain	Left	Right
Left	63	12
Right	27	53

In total, 39 languages (8% of all the languages in StressTyp) assign main and secondary stress from opposite directions. It would seem that the subset of languages for which we need separate direction parameters for main stress and rhythm is large enough to provide serious support for the separation of primary and secondary stress.

A third argument for the separation of primary and secondary stress is formed by languages in which the rules for main stress and rhythm do not agree in their usage of weight, or, more intricately, in the way in which they use it. In Kayardild, for instance, main stress is initial, regardless of weight, but long vowels receive a secondary stress, whereas short vowels do not (simplified for expositional purposes).

(2) Kayardild (Tangkic; Queensland, Australia)
'kuɲja 'little' *'ma,laa* 'sea'

Table 2 shows the number of languages in which main stress is weight-sensitive and secondary stress is weight-insensitive, or vice versa. The last column in Table 2 shows the languages in

which main and secondary stress disagree in their definition of what constitutes a heavy syllable. In such languages, closed syllables may, for instance, be heavy for stress but not for rhythm.

Table 2. Mismatches in quantity-sensitivity between primary and secondary stress (weight-sensitive languages for which we have no information on rhythm were not taken into account)

Both weight-sensitive	Primary weight-sensitive, Secondary weight-insensitive	Primary weight-insensitive, Secondary weight-sensitive	Both weight-sensitive, but differently
40	32	17	8
41%	33%	18%	8%

In total, we need separate quantity statements for primary and secondary stress in 57 languages (11% of all the languages in StressTyp). All in all, 17% of the languages in StressTyp support the separation hypothesis (Tables 1 and 2 combined, 10 overlapping languages).

A fourth argument for separating primary and secondary stress assignment lies in the fact that whereas lexical marking is quite normal for primary stress, even in systems that have dominant rule-governed locations, secondary stresses are never a matter of lexical marking. In this statement, we ignore so-called "cyclic stresses", i.e. secondary stresses that correspond to primary stress locations in embedded morphemes in complex words.

2. Defining the values

For the languages for which we have information on rhythm, the following types are shown on the map.

@	1.	Trochaic: left-hand syllable in the foot is strong	153
@	2.	Iambic: right-hand syllable in the foot is strong	31
@	3.	Dual: system has both trochaic and iambic feet	4
@	4.	Undetermined: no clear foot type	37
@	5.	Absent: no rhythmic stress	98
		total	323

2.1. Trochaic rhythm. The prototypical rhythm pattern stresses every odd syllable from the left in languages with initial main stress, and every even syllable from the right in languages with penultimate main stress. This is achieved with trochaic feet, as in Ono (Trans-New Guinea; Papua New Guinea): *('mesi)(,kene)* 'you will sit', *('ari)(,mage)(,ake)* 'he always goes'.

2.2. Iambic rhythm. Languages with iambic rhythm typically stress even syllables from the left or odd syllables from the right, as in Mapudungun (Araucanian; Chile): *(e'lu)(mu,yu)* 'give us', *(ki'mu)(fa,lu)(wu,lay)* 'he pretended not to know'.

2.3. Dual rhythm. This type is difficult to find. One needs to look at all the data of a language carefully to discover that one foot type is not sufficient to cover all cases. An example of such a language is Yuwaalaraay (Pama-Nyungan; New South Wales, Australia): *(ga,lu)(ma'ya)* 'grandson', *('gidul)(,gara)* 'snail'.

2.4. Undetermined rhythm. These languages do have secondary stresses, but the patterning falls into none of the above types. Languages like Malayalam (Dravidian; India) which place secondary stress on long vowels only fall under this type: *'pukavaɳʈi* 'train', *'muta,laaɭi* 'boss'.

2.5. No rhythm. Languages that have main stress but no rhythm abound. An example is Gorowa (Southern Cushitic; Tanzania): *giram'booda* 'snuff', *oro'mila* 'because'. It remains an open question whether the "no rhythm" languages do have a foot type grouping but lack a clear phonetic manifestation of this grouping; in some cases such "silent" grouping can be detected because it conditions other aspects of the phonology of a language.

3. Geographical distribution

We observe the following tendencies:

(i) Iambic rhythm occurs mostly in North and South America.
(ii) South America and Australia always seem to have clear rhythmic patterns.
(iii) Africa, on the other hand, shows little evidence for rhythmic patterns.

As was noted in chapter 14, we find an unequal division of languages over the two foot types that we use to describe the rhythmic properties of stress systems. In general, languages prefer the trochaic foot over the iambic foot. Note again that we divide languages into trochaic or iambic systems on the basis of their *secondary stress* properties. Unfortunately, that means that many languages in StressTyp are left out of the equation, simply because we do not have any secondary stress data for these languages. Statistics for the languages for which we do know something about secondary stress can be found in figure 1.

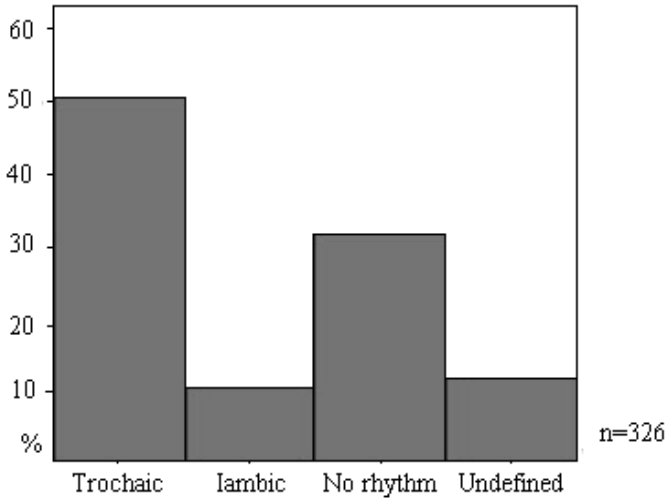

Figure 1: Rhythm types

The hugely skewed distribution between trochaic and iambic systems in Figure 1 is hard to miss even in a cursory look at the typology of stress systems. Though it has never been quantified in this way before, the scarcity of iambic systems has already led some researchers on the path to total denial of the iamb's existence as an abstract metrical entity. Hayes (1995) dispenses with all quantity-insensitive iambs, while among the most drastic of these studies, van de Vijver (1998) claims that *all* iambic systems can be reanalysed as trochaic ones (cf. van der Hulst 1999b for discussion). In StressTyp we choose no sides in this obviously highly theoretical debate. We will continue to offer the iambic foot as an option, because there are enough languages, in our view, whose stress patterns are clearly more straightforwardly described with the help of these iambic feet.

4. Theoretical issues

4.1. Correlations between rhythm type and edge. A correlation that has been noted many times in the past concerns the foot type used in secondary stress assignment and the edge at which this assignment starts. The claim is that languages with an

iambic rhythmical pattern assign rhythm from left-to-right, as in Mapudungun in §2.2 (cf. Kager 1993). An example that makes this clear is given in (3).

(3) Mapudungun
(e'lu)(a,e)new 'he will give me'

Rhythm assignment from right-to-left would have given us *elu'ae,new*. (In this example we note that a left-over syllable, here on the right side, is not footed and hence has no rhythmic beat; this is a quite common phenomenon, and it has been argued that "degenerate", i.e. monosyllabic, feet are uncommon or universally banned in quantity-insensitive languages.)

The reverse claim, that languages with trochaic rhythm start footing at the right edge, is not commonly deduced from the observation with respect to iambic languages. Linguists seem hesitant to claim anything in this case. We present the data for both types in Table 3.

Table 3. Differences in preference for direction of footing for both foot types

	Starting edge of footing	
Foot Type	Left	Right
Trochaic	83	58
Iambic	22	8

We observe that the correlation between iambic rhythm and left-to-right footing is indeed quite high. It turns out to be even higher when we remove some "suspicious" cases from the list of right-to-left iambic languages. It appears that in many of these languages the choice between iambic and trochaic feet is not easily made, and where the descriptive source mentions that the language is iambic, this choice is often based on superficial evidence. For only 3 of these cases can we be quite certain that rhythm is iambic.

For trochaic patterns, we note that most trochaic languages start foot assignment at the left instead of the right edge. Yet the difference is not large enough to speak of a clear correlation in this case. We may conclude, therefore, that the choice to state a correlation between foot type and direction for iambic systems is justified only in hindsight, by the StressTyp data.

4.2. Correlation between rhythm type and relevance of weight. Hayes (1995) suggests as another correlation, this time between rhythm type and weight-sensitivity, the so-called **iambic-trochaic law**. According to this "law" weight-insensitive languages (grouping units of equal weight, so to speak) are (preferred to be) trochaic. The reverse claim, that weight-sensitivity leads to iambic grouping, is less obvious, although one idea is that weight-differences based on quantity favor iambic patterns, while weight differences based on "intensity" favor trochaic patterns. However, it is not clear what intensity is (prominence?); moreover, many weight-sensitive trochaic patterns are based on quantity (cf. Rice 1992, Kager 1993 and van der Hulst 1999b for discussion). The following table indicates the relationship between the presence of weight-sensitivity and the rhythmic foot type:

Table 4. Correlation between weight and foot type in StressTyp

	Weight	
Foot Type	no	yes
Trochaic	103	51
Iambic	11	17

4.3. Iterative and non-iterative secondary stress. So far we have assumed that the rhythmic structure of a word comprises the whole word. However, rhythm assignment can be 'non-iterative', which means *only one* secondary-stress foot is formed, as in the Ngalkbun (Australian) example in (4); here only

one secondary stress occurs at the opposite edge from the main stress, though the word is long enough to allow more.

(4) Ngalkbun
ˌŋaʔyenjyenjtjuˈŋiyan 'I will talk'

StressTyp reveals that the iterative option is clearly favored. 70% of the languages for which we have secondary stress information choose this option, while only 18% reveal non-iterative rhythm (no iterativity information for 12%). For the sake of completeness we mention here that 6 of the iterative secondary stress languages show **ternary stress** (the rhythm beat is followed, or preceded, by *two* unstressed syllables); cf. Rice 1992.

4.4. Foot typology. The precise grouping of syllables into feet is subject to theoretical discussion. In the classical theory, one heavy and one light syllable could be grouped together in a foot, but in later versions of the theory (the so-called Revised Theory) heavy syllables form feet by themselves. A choice on this issue does not, however, influence whether a language is classified as iambic or trochaic. We refer to Hayes (1995) and van der Hulst (1999b) for discussion of this issue.