16. Weight Factors in Weight-Sensitive Stress Systems

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1. Phonological weight

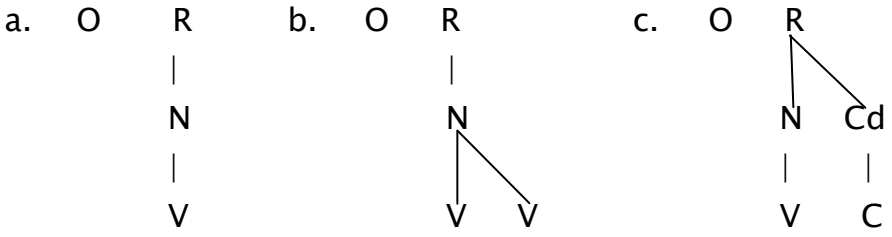
This map is concerned with the notion of **phonological weight**. In the two preceding chapters, we have made a distinction between several types of weight:

(1) a. intrinsic weight (due to properties of the syllable)
b. rhythmic weight (due to rhythmic footing)
c. diacritic weight (due to lexical marking of 'accents')

Diacritic weight equals lexical marking. Rhythmic weight was assumed for **count systems** (cf. chapter 15, §2.2). The first-mentioned category, **intrinsic weight**, needs some further comment. The intrinsic properties that determine weight can differ from one language to the next. An important determinant of weight is **vowel length**, closely followed by **syllable closure**. In principle, the two factors are independent, but often both long vowels and closing consonants will cause syllables to be heavy for primary and/or secondary stress in one and the same language, leaving the light category for open, short-voweled syllables. Vowel length and syllable closure are sometimes referred to as **quantitative weight**.

It is generally assumed that syllables are divided into an **onset** (prevocalic part) and a **rhyme** (the rest), and that the latter part has a **nucleus** (vocalic part) and a **coda** (post-vocalic consonant). This can be shown by the following representations, which are relevant for the purposes of quantity:

(2)



The most common types of heavy syllables are (2b) and (2c), which both have two rhyme units, or, to use a more common term, **moras**. Broadly defined, a mora is a unit of weight, which light syllables have one of, and heavy syllables two.

Our "type 5" languages involve another weight factor, called *prominence*, which we discuss in more detail in §4.4.

2. Defining the values

@	1.	No weight, or weight factor unknown	261
@	2.	Long vowel: long vowels are heavy for stress	65
@	3.	Coda consonant: closed syllables are heavy for stress	18
@	4.	Long vowel + Coda: long vowels *or* closed syllables	35
@	5.	Prominence: other factors are heavy for stress	41
@	6.	Lexical: lexical stress, diacritic weight	38
@	7.	Combined: two of the above factors determine weight	42
		total	500

2.1. No weight. In about half of the sample languages (261), syllable weight plays no role for word stress. (This is less than

the corresponding figure (281) in chapter 15 because there we looked only at weight-sensitivity for *primary* stress.)

Weight-sensitive languages are subdivided into five different types. The following five values are shown on the map:

2.2. Long vowel. In this type, only a long vowel makes a syllable heavy. An example of this comes from Iraqw (Southern Cushitic; Tanzania): *ba'ʔeeso* 'bushbucks', *'wawitmo* 'king'. Notice how the closed syllable in the second example does not draw stress onto itself.

2.3. Coda consonant. These are mostly languages that have no long vowels. Hence, only a coda consonant can make syllables heavy. An example of such a language is Amele (Madang, Trans-New Guinea; Papua New Guinea): *'nifula* (kind of beetle), *iti'tom* 'righteous'. Amele stresses the first heavy syllable (second example) or the first syllable (first example). Languages that have long vowels but still use only codas for weight are extremely rare or absent (see discussion in §4.2).

2.4. Long vowel + Coda. For languages that do count codas for weight, and which do have long vowels, the default option is that either one can make a syllable heavy by itself. An example of this type is Hopi (Uto-Aztecan; Arizona). If the first syllable is light, stress falls on the second: *ho'nani* 'badger', but if the first is heavy, it is stressed: *'sipmasmi* 'silver bracelet', *'naatɪhota* 'to hurt oneself'.

2.5. Prominence. Prominence systems form somewhat of a mixed collection. There are several non-quantitative salient syllabic properties that can form the basis of heavy-light distinctions. One of the most common is the opposition between full and reduced vowels, as in Chuvash (Turkic; Russia), which stresses the last full vowel or else the first reduced one: *sarla'ka* 'widely', *'ĕslĕpĕr* 'we shall work'. To save space here, we count

rhythmic weight systems (1b) among the prominence systems. For further discussion of possible theoretical motivations for counting rhythmic beats as prominence factors, see Goedemans (1996).

2.6. Lexical marking. Lexical marking yields systems with unpredictable stress by definition. Because stress is lexical, it can be a distinctive property, as we see in these Pashto (Iranian; Pakistan and Afghanistan) examples: *'guta* 'knot', *gu'ta* 'pochard'.

2.7. Combined. This category is a mixed bag of no less than 15 different combinations of two of the above weight factors. Combinations can occur if the stress rules are sensitive to different heavy-light distinctions in different positions or circumstances. The large size of the group has no typological meaning, since the systems contained in it are very diverse. We represent them as a single group only because they do not fit the other types, and have the "dual nature" in common. Theoretically, these combination systems are very interesting, so in that respect, the large size of the group is quite relevant. A discussion of this, though, is far beyond the scope of this chapter.

3. Geographical distribution

We notice a number of broad generalizations:

(i) We find no lexical stress in South America and Australia.
(ii) Quantitative weight is found in all areas and families.
(iii) We find a relative high frequency of prominence systems in Austronesian languages (where the contrast is between reduced vowel and full vowel).
(iv) In Europe, the north shows more quantitative weight, while the south shows more prominence.

4. Theoretical issues

4.1. Is the onset always irrelevant for weight? The fact that onsets are irrelevant for weight seems to be a linguistic universal. There are some apparent counter-examples to this claim, to wit: some Australian languages, like Arrernte and Alyawarra (and the Amazonian language Banawá), which stress the second syllable if the first has no onset; Madimadi, which stresses the second syllable if both the first and second are light and the second has a coronal onset; Puluwat (Oceanic; Micronesia), which stresses the first syllable starting with an /h/; and Pirahã (Mura; Brazil), which seems to have an intricate stress rule depending on presence and voicing of the syllable onset. Some examples are given in (3).

(3) Arrernte (Pama-Nyungan; Northern Territory, Australia)
ˈlelan,tinama 'to walk along' *iˈbatja* 'milk'

Madimadi (Pama-Nyungan; New South Wales, Australia)
ˈwuga,ti 'take.IMP.' *ˌwiˈridab* 'whirlwind'

The Australian languages form the largest group. For all these languages it can easily be shown that the apparent onset-sensitive stress rule is the result of a historical development (called "Initial Dropping") in which the word-initial consonant was lost, taking with it the first vowel in case it was short, while shortening the vowel in case it was long. Stress subsequently shifted to the next syllable (also in the case where a vowel still remained), creating the illusion of an onset-sensitive stress rule. Two words from Mbabaram illustrate the process.

(4) Mbabaram (Pama-Nyungan; Australia)
a. *ˈbamba→ ˈmba* b. *ˈwaːŋal →aˈŋal*

If we appeal to extrametricality (cf. chapter 14, §4.1) for the "stranded" initial vowels (these are defective syllables by Arandic standards and can be said to reject stress), then we see that these languages do not have an onset-sensitive stress rule after all, but rather show a relatively regular quantity-insensitive left-edged trochaic pattern.

Madimadi is an Australian language with a truly "forbidding" surface stress pattern. Coronal second syllables seem to attract stress. A closer look, however, reveals that stress is really just located on the final syllable of the first morpheme in the word, which can be mono- or bisyllabic. In case it is bisyllabic, the medial consonant has been lenited to a coronal in a historical process. Together these phenomena create the impression of onset-sensitive stress. See Goedemans (1997) for further details.

The two remaining cases are Pirahã and Puluwat. The stress patterns in these languages are either too intricate (Pirahã) or too sketchy (Puluwat) to discuss in detail here. Suffice it to say that the patterns are either not fully described or open to more plausible reanalyses, like the ones above. See Goedemans (1996; 1998) for in-depth overviews regarding onset sensitivity in stress systems.

To date, the only case of true onset sensitivity we know of is found in Pattani Malay, where word-initial geminates attract stress, as shown in (5).

(5) Pattani Malay

ˌɟaːˈlɛː 'street/path' *ˈɟːaːˌlɛː* 'to walk' (← /*bɨ*+*ɟalɛ*/)

This pattern, which is introduced in Hajek and Goedemans (2003), involves onset geminates, which means that here completely different structures are involved than those shown in (2).

We uphold the claim that unequivocal onset-sensitive stress rules do not exist, and follow mainstream metrical theory

in focusing only on the rhyme part of the syllable when dealing with matters of weight. In that case, (2a) is always light. In some languages (2b) may be heavy while (2c) is light, in which case only vowel length plays a role. In other quantity-sensitive languages, (2c) may be heavy as well.

4.2. Quantity and vowel length. StressTyp contains at least 20 weight-sensitive languages that lack long vowels. Thus, having vowel length is not a necessary condition for having quantitative weight-effects. But what if vowel length is present? It is common to claim that in quantity-sensitive systems long vowels must be heavy **if present**. A potential counter-example to this claim is Dutch (and German), where only closed syllables act as heavy. To differentiate between the various possibilities one might adopt the idea that stress rules can "look at" different aspects of the rhyme:

(6) Options for quantity-sensitivity
- Branching of nucleus only = vowel length (2b)
- Branching of rhyme only = syllable closure (2c)
- Branching *in* rhyme = vowel length and closure (2b,c)

However, it remains to be seen whether cases like Dutch truly ignore vowel length for weight purposes. It could very well be that the alleged long vowels are not long at all, but rather tense (cf. van Oostendorp 2000).

4.3. Variability of coda weight. When codas can contribute to weight it does not mean that all consonants in coda position do so, nor that consonants that can contribute weight do so in all positions in the word.

The cross-linguistic variability in coda weight involves cases in which only certain coda consonants count as “weightful”. For example, in Inga only sonorant consonants make heavy syllables, while syllables ending in an obstruent are light. The

final syllable is stressed if it is heavy; otherwise stress is penultimate. Some examples are given in (7).

(7) Inga (Quechuan; Colombia)

ya'war	'blood'	*'kančis*	'seven'
apa'muy	'to bring'	*kam'kuna*	'you.PL'

Languages with other heavy-light divisions among the set of possible codas exist as well. Quite often these involve the glottal stop. In Mam (Mayan; Guatemala), for instance, weight is assigned according to a scale (a phenomenon we find often) in which syllables with long vowels are the heaviest, followed by syllables that have a glottal stop in the coda. Syllables closed by any other consonant than glottal stop are at the bottom of the scale.

In addition, it may happen that primary stress and secondary stress differ in terms of their sensitivity to quantity (cf. Rosenthal and van der Hulst 1999). In some of these cases, consonants are weightful only in certain positions of the word. In others, the exact weight type is different for main and secondary stress.

4.4. Prominence. In type 5 languages, non-quantitative factors determine intrinsic syllable "weight". These factors are often referred to as prominence factors. In this section, we mention some of the different options. The first prominence factor that we discuss is (high) pitch. In languages that have contrastive high- and low-pitched syllables (i.e. tone languages), stress may be sensitive to such distinctions and, for example, be located on the leftmost or rightmost high-pitched syllable in the stress window. Look at the Northern Haida (Na-Dene; British Columbia) examples in (8), in which the last high-toned syllable is stressed, or else the last syllable.

(8) Northern Haida

ˌguuding'ee ‘giant purple urchin’
ˌʔadlaˌdajan'dáálˌgang ‘jump.up.ITER.along.PRES’

Another prominence factor concerns vowel aperture, or more generally vowel quality. If aperture is relevant, more open vowels will count as heavy, as opposed to closed vowels. The Yindjibarndi (Pama-Nyungan; Western Australia) examples in (9) show initial stress unless the second syllable contains a low long vowel.

(9) Yindjibarndi
'martuurˌraa ‘twilight’ *nyi'laarti* ‘native mead’

This behavior reflects a general tendency among prominence factors. Many of these divide up syllables such that the more sonorous ones are heavy while the others are light (recall Inga, which is basically also a prominence system in which only sonorant codas make syllables heavy). If overall vowel quality is relevant, the opposition typically is reduced (light) as opposed to full (heavy) vowels. For examples, see the Chuvash words in §2.5. More on prominence distinctions among different codas and vowels can be found in Zec (1988) and Kenstowicz (1994).