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*Unified representations for stress and the syllable**

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We argue that there is no need to split phonological representations into two worlds: one syllabic and another in which word stress is calculated. We show that both syllable- and stress-related phenomena can be accounted for with a single set of representations, if traditional syllabic analysis is modified in one central respect: what is traditionally taken to be a coda–onset cluster is interpreted as two independent onsets enclosing an empty nucleus. Accordingly, our proposal may be understood as a development of the idea that underlies classical metrical grids, i.e. that stress-relevant units project to higher levels and are therefore visible for stress. The units in the proposal made here, however, are uniformly nuclei. Contentful nuclei are always projected, while their empty counterparts (i.e. codas in traditional approaches) may or may not be. The weightlessness of onsets directly follows from this approach.

1 Introduction

Since Liberman & Prince (1977), the study of stress has been explicitly conducted without reference to the syllable node. Representations that encode syllabic information and those that deal with stress have been viewed as separate. The establishment of two independent representational areas was based on the fact that stress algorithms do not count syllables, but evaluate the structure of rhymes. Therefore, alongside syllable structure, all current models have independent representations that are organised into feet, prosodic words, metrical grids and the like.

In this article, we argue that there is no need to split representations into two worlds: one syllabic and another in which word stress is calculated. We show that both syllable- and stress-related phenomena can be accounted for with a single set of representations, if traditional syllabic analysis is modified in one central respect: what is traditionally taken to be a coda–onset cluster is interpreted as two independent onsets enclosing an

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empty nucleus (see (1a.ii) below). Following this line of argument, our proposal may be understood as a development of the idea that underlies classical metrical grids, i.e. that stress-relevant units project to higher levels and are therefore visible for stress. The units in the proposal to be made here, however, are homogeneous and predictable: nuclei and only nuclei. Contentful nuclei are always projected, while their empty counterparts (i.e. codas in traditional approaches) may or may not be projected.

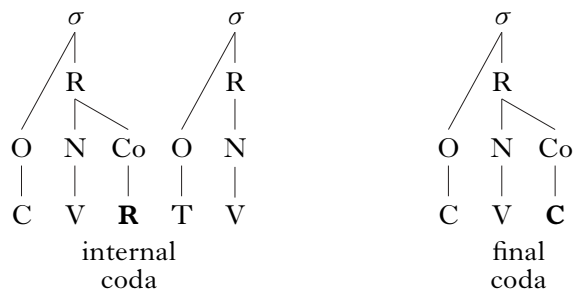
The unifying perspective that we develop deals only with syllable structure and word stress. The classical prosodic hierarchy recognises a number of levels above the syllable which account for various phenomena, including clash resolution (*thirtéen vs. thìrteen mén*) and rhythmic structure (iambic *vs.* trochaic). Word stress is only one of these. In this article, we remain agnostic as to whether additional structure is needed in order to account for prosodic phenomena other than word stress. Although we hope that other prosodic events may also be described by the bare syllabic model which we are advocating, we do not make any serious attempt to look into this question here, leaving it open to further research (see §7.5).

The issue of structural unification aside, two additional benefits fall out from our approach. For one thing, the classical formulation of the stress algorithm in Weight-by-Position languages ('all vowels and codas count for stress assignment') is replaced by one that makes only reference to nuclei: all nuclei count, whether contentful ('vowels') or empty ('codas'). This is because codas are no longer defined as a particular position in the syllabic tree (i.e. the sister of the nucleus), but in lateral terms: coda consonants occur before an empty nucleus. That is, the codahood of a consonant is not defined by looking up into the syllabic tree; rather, it follows from an adjacency relation – i.e. a lateral relation – with the following nucleus: the consonant has to look to its right. This situation is illustrated in (1).[1]

(1) *Equivalences between classical syllabic representations and the alternative involving empty nuclei*

a. *coda*

i. *classical arboreal definition:* a coda consonant belongs to a constituent which is the sister of the nucleus



[1] In this article, T denotes any obstruent, R any sonorant.

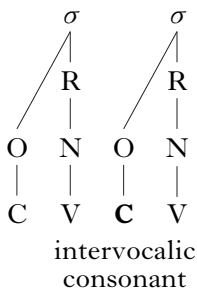
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ii. *lateral definition:* a coda consonant is a consonant that occurs before an empty nucleus

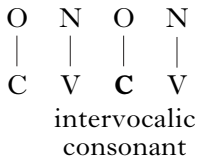


b. *onset*

i. *classical arboreal definition:* an onset consonant is not the sister of the nucleus



ii. *lateral definition:* an onset consonant occurs before a filled nucleus



On the definitions in (1a.ii) and (1b.ii), when it appears that a language is counting codas, what in fact is being counted are empty nuclei. The set of objects that stress algorithms operate on is thus perfectly homogeneous: stress is an exclusively nuclear matter.[2] Accordingly, the

[2] Stress is only one property that may be assigned by counting relevant units (moras, feet, etc., in classical analyses). Counting mechanisms may also be involved in assigning other segmental or suprasegmental properties, such as glottalisation and tone. It may therefore appear tempting to design a theory of counting mechanisms that is able to cover all related phenomena. This stance, however, is seriously undermined by the empirical work of Gordon (1999, 2004), who shows that in many cases stress, tone and other counting mechanisms rely on contrasting weight patterns in the same language (see §2.2). Gordon's arguments appear to be well founded and thus suggest that we should not attempt to design a single mechanism for all counting phenomena. Irrespective of this, the question of whether the analysis presented can or should be extended to other counting mechanisms is quite orthogonal to our present purposes, which concern stress alone. Another element of Gordon's (1999, 2004) work is the claim that stress always falls on vowels (or syllabic consonants, which are functional vowels), while other properties which are distributed by counting mechanisms may target

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cross-linguistic variation known as Weight by Position (Hayes 1989a) is not a parameter regarding the metrical relevance of codas. Rather, it describes the visibility of empty nuclei, which may (Weight by Position) or may not (no Weight by Position) be counted by the stress-assigning algorithm.[3]

The second benefit concerns the cross-linguistically pervasive fact that onsets are irrelevant for stress assignment: this falls out automatically from the assumptions made here (relevant evidence from the literature on alleged cases of onset weight will be discussed below). Regular approaches to stress do no more than encode the observation that onsets are metrically irrelevant. They could just as well characterise an upside-down world in which it is onsets that sometimes count for stress assignment, but in which codas never do. By contrast, the system developed here provides a *reason* why onsets are invisible for stress; the upside-down pattern could not be described. That is, coda consonants occur before empty nuclei, while onset consonants by definition are found before filled nuclei (see (1b.ii)). Since stress looks only at nuclei and vowels are metrically relevant in all systems, the nuclei following onsets are automatically counted. There can be no parameter which can demote them from their stress-relevant status. By contrast, empty nuclei may or may not be counted. And their presence defines coda consonants: a consonant belongs to a coda if and only if it occurs before an empty nucleus. Therefore, 'codas' may or may not count, but onsets can never be metrically relevant.

An obvious issue that arises is the representation of branching onsets. Although proposals have been made to the effect that constituent structure boils down to a strict sequence of non-branching onsets and non-branching nuclei (by Lowenstamm 1996, Scheer 1999, 2004, Szigetvári 1999, 2001, Dienes 2000, among others), we take no position on the question of branching onsets here. Several options may be conceived of, all of which are compatible with our claim that coda–onset clusters are separated by an empty nucleus. This issue will be taken up as the discussion unfolds (§6.2).

Finally, we assume that long vowels are made up of two (skeletal) units which enjoy a certain degree of independence: *contra* Hayes (1995: 49f), we show that there are cases where it makes a difference which of the two

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consonants as well (glottalisation). The analysis developed here makes no claim regarding the (nature of the) landing site which receives the property in question. It is only concerned with the units that are counted in order to achieve this result: (empty) nuclei, rather than moras, grid marks or feet.

[3] This is not to say, of course, that it is any better or more accurate *in itself* to express Weight by Position as a parameter on empty nuclei. Every theory has its own specific units and vocabulary. If, as is suggested below, counting nuclei (rather than moras, grid marks or feet) is appropriate, the parameter does not become inexpressible; it simply needs to be reformulated in terms of the new landscape. Hence, as long as there *is* a way to encode Weight by Position, the particular way in which this is done by different theories cannot be used in order to determine their comparative merit. The expression of the variation under discussion is a function of the basic assumptions that are made by each theory.

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parts of a long vowel is stressed. As a consequence, we treat long vowels as two distinct constituents associated to one single chunk of melody.

Our approach is quite similar to the standard moraic account: if moras are equated with nuclei, the only difference is that the mora of moraic codas does not identify a consonantal object, but an unpronounced vocalic object – an empty nucleus. Even though the two approaches encode the same insight, they are not equivalent, since different predictions are made. Indeed, if weight-contributing codas are identified by a following empty nucleus, onset weightlessness is automatic: onsets are followed by filled, not by empty nuclei, and hence could not be moraic in any event. No prediction of this kind is made in the moraic approach, because the distribution of moras is based merely on observation and is thus only conventional: no property of the theory excludes the existence of a language where onsets are assigned a mora. Also, the *raison d'être* of moras is the fact that they represent something that regular syllabic constituency cannot express: all and only those units that are relevant for suprasegmental phenomena. If codas are defined by a following empty nucleus, though, this argument no longer holds: the units that are relevant for suprasegmental purposes form a single syllabic constituent, the nucleus.

This article thus aims at introducing a new player in the field of stress theory. As is typical of new approaches, it may perhaps not achieve the same empirical coverage as those theories which have guided empirical work over recent decades. We do not produce any new data. Rather, well-established patterns are discussed and given a new interpretation. We submit that the conceptual advantages mentioned are reason enough for our proposal to be considered as a serious player. In any event, it is only once alternatives are known that they can enter into competition of the Popperian kind.

The paper is organised as follows. We first define our object of study (word stress) in the realm of the more general field of stress assignment (§2). In the same section, relevant cross-linguistic variation is introduced: both the patterns dictated by Weight by Position and a third pattern, which involves the sonority of coda consonants. §3 shows how the two traditional approaches to word stress, grid theory and moraic theory, handle the parametric variation under discussion. Another pervasive cross-linguistic generalisation is introduced in §4: onset weightlessness. We discuss its empirical validity (which is challenged by the rare cases of onset weight that have been reported) as well as the position that a theory of syllable weight should adopt. It is shown that grid-based and moraic approaches are neutral with respect to onset weight: they may or may not accommodate weight-contributing onsets and hence are unable to explain onset weightlessness. §5 concludes the empirical survey by raising a question that is not usually asked: how is it that some consonants (codas) sometimes behave like vowels? Should it not be a homogeneous set of units which is counted in stress assignment? §6 introduces our assumptions on syllable structure, whose centrepiece is the existence of an empty

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nucleus between the two members of what is traditionally interpreted as a coda–onset cluster. In §7, we show how stress assignment works in this syllabic environment (§7.1), and how Weight by Position is expressed (§7.2). We then show the benefits of the presence of empty nuclei: the metrical irrelevance of onsets is inbuilt (§7.3), the set of counted units is uniform (only nuclei; §7.4) and syllabic and prosodic generalisations are expressed by the same structure (§7.5). Finally, §8 is concerned with additional cross-linguistic variation, extrametricality (§8.1) and the pattern in which the sonority of coda consonants is relevant to stress assignment (§8.2). Concluding remarks are provided in §9.

2 Word stress and relevant cross-linguistic variation

Classically, the module of phonological theory devoted to stress uses metrical grids (Liberman 1975, Prince 1983). The interpretation of stress in these terms is fairly uncontroversial: it includes the construction of hierarchised phonological structure in the suprasyllabic area. On most (though not all) analyses that use some version of the grid, the relevant units are feet, phonological words and phonological phrases. The empirical field characterised by metrical grids includes rhythmic properties of the utterance (iambic and trochaic structure) and stress. Significant steps towards the theory as it stands today have been taken by Liberman & Prince (1977), Selkirk (1980, 1984), McCarthy & Prince (1986, 1990), Halle & Vergnaud (1987) and Idsardi (1992), among many others. Halle (1998) and Hayes (1995) provide a summary of the evolution of grid theory.

In this article, we are concerned with a subset of the pool of issues that are related to stress, i.e. word stress and syllable weight. §§2.1 and 2.2 below introduce the relevant typological variation that is found across languages, and single out those parameters which may condition the assignment of word stress.

2.1 The major parametric division: CVC syllables light or heavy

The assignment of word stress makes crucial reference to an aspect of syllabic organisation that has been known as SYLLABLE WEIGHT since the nineteenth century. The transmission of this information to higher structure (i.e. the grid, prosodic constituency) is effected by two concurrent approaches to syllable structure: moraic theory on the one hand and classical theories referring to the skeleton on the other. There is a great deal of literature on both approaches. The former was founded by Hayes (e.g. 1980, 1989a, b, 1995) and Hyman (1985) (see also Bickmore 1995, Hyman & Katamba 1999 and many others). The latter builds on classical syllabic theory, acknowledging familiar subsyllabic constituents such as onsets, rhymes and codas. It assumes that the minimal timing units are

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skeletal slots, which occur at the intersection of syllabic and segmental representations. This kind of structure is used in order to transmit syllabic information to higher areas by McCarthy (1979), Clements & Keyser (1983), Levin (1985), Halle & Vergnaud (1987), Idsardi (1992), Halle & Idsardi (1995) and Halle (1998), among others.

Both approaches hold that the syllable node is not a relevant unit for the purpose of stress assignment: it is not the fact of being a syllable that is important. Rather, stress algorithms take into account the number of skeletal slots that are dominated by the rhyme. This conclusion has been forced on phonology by the impressive typological corpus of stress systems that was gathered in the 1970s and 1980s, primarily in the work of Bruce Hayes. A typologically oriented summary is available in Hayes (1995) (see also Bailey 1995).

One major cross-linguistic generalisation that is supported by these data concerns syllable weight: many stress systems distinguish between light and heavy syllables. Typically, the latter 'attract' stress, while the former are only stressed by default, in the absence of an eligible heavy unit. Cross-linguistically, it appears that the overwhelming majority of languages where syllable weight plays a role distinguish between light and heavy syllables in one of the two ways in (2) (see for example Halle & Vergnaud 1987, Hayes 1989a: 256ff, 1994: 61f, 1995: 50ff).

(2) *Typology of syllable weight: the two major patterns*

	CVV	CVC	CV
a. Syllables are heavy iff they contain a long vowel (e.g. Khalkha Mongolian, Lardil, Malayalam).[4]	heavy	light	light
b. Syllables are heavy iff they contain a long vowel or a rhymal consonant (e.g. Arabic, English, Latin).	heavy	heavy	light

Languages that exhibit the pattern in (2b) are sometimes called 'rhyme-weight languages', while those in (2a) are referred to as 'nucleus-weight languages' (Hayes 1995). The only difference between the two systems is the status of closed syllables (CVC): either they count as heavy (as in Latin and English) or they are treated as light (as in Malayalam and Lardil). Since Hayes (1989a), the phenomenon whereby CVC syllables are heavy has been referred to as Weight by Position.[5]

[4] That these languages belong to the 'CVC-always-light' pattern is demonstrated by Broselow *et al.* (1997: 50f) for Malayalam and Zec (1995: 94ff) for Khalkha Mongolian and Lardil (native Australian).

[5] The notion has a long history in grammar, from early Indian grammarians through the Greeks, who labelled certain vowels 'long by position' (Allen 1965: 91f); cf. also Donatus, *Ars Maior*, book 2, chapter 3 (Keil 1857–80, vol. 4: 386–389).

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2.2 A third parametric situation: distinctive coda sonority

A third line of division between heavy and light syllables has been reported in the literature: closed syllables are heavy only if the rhymal consonant is a sonorant; if it is an obstruent, its syllable counts as light. This pattern has been identified most clearly in native American Wakashan languages, particularly Kwakwala and Nuuchahnulth (Boas 1947, Wilson 1986, Zec 1988, 1995: 103ff, Gordon 2002: 923f).[6] In Kwakwala (Zec 1995: 103ff), stress falls on the leftmost CVV or CVR syllable of the word; if there is no such item, the word is oxytonic. Significantly, the oxytonic pattern is also produced if a word does not contain any CVR or CVV syllable, but features a CVT syllable in non-final position. It can therefore be concluded that heavy syllables attract stress according to the pattern in (2b), but CVT syllables do not count as heavy.

Cases of a CVT *vs*. CVR distinction conditioning stress placement appear to be rare. In order to establish this, let us first consider the question whether stress is necessarily assigned by the same weight criteria as other suprasegmental properties in a given language.

Gordon (1999, 2004) shows that, contrary to common belief, the stress and tone systems of a given language can obey different weight patterns: cases of conflicting weight criteria are anything but rare or exceptional. This finding invalidates the regularly assumed 'moraic uniformity hypothesis' (a notion coined by Gordon) according to which languages follow one and only one weight pattern for the purpose of all processes (stress, tone, poetic metrics, minimal word requirements and so forth). Gordon therefore concludes that phonological theory must provide for a mechanism of stress assignment which is independent from tone and other phenomena: each process makes its own selection of weight criteria. These may occasionally coincide, but need to be kept distinct at the theoretical level. We follow Gordon's (1999, 2004) argument in this article.

Gordon also provides a cross-linguistic survey of the weight patterns that govern various processes. He examines some 400 languages, but finds only three cases where the distinction between CVT (patterning with CV) and CVR (patterning with CVV) is relevant for stress placement. On the other hand, the variation described under (2) is consistently relevant for the distribution of stress.

> Stress systems are almost equally split between the CVV heavy and the CVV, CVC heavy criteria, with a very small number of CVV, CV[+son] heavy languages. Tone, on the other hand, rarely observes the CVV, CVC heavy criterion and is almost equally divided between

[6] Prince (1983: 57f) also refers to this pattern, and Hayes (1995: 270) writes: 'coda consonants license an additional mora in some languages, via a rule of Weight by Position. This rule can vary in its structural description, sometimes only assigning a mora to a subclass of coda consonants'. However, neither author provides an illustration.

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> languages with the CVV heavy criterion and those with the CVV, CV[+son] heavy criteria. Particularly instructive is the comparison of the CVV, CVC heavy and the CVV, CV[+son] heavy criteria for stress and tone: the CVV, CV[+son] criterion is quite common for tone but vanishingly rare for stress, whereas the converse is true for tone. On the other hand, the CVV, CVC heavy criterion is strikingly rare for tone, but is very common for stress (Gordon 2004: 283).

We are thus confronted with a rather interesting (near) complementary distribution at the cross-linguistic level that constitutes strong evidence against the existence of a single mechanism for the assignment of stress and tone. The Kwakwala pattern appears to be very rare, but real. In those languages where it has been described, it represents a phonological situation that should be taken seriously by metrical theory.

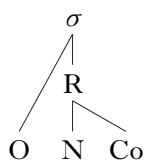
Gordon's typological work provides a safe basis for building a theory of stress on the basis of the weight distinctions discussed. The three patterns discussed exhaust the possibilities found in natural language (disregarding distinctions within the class of vowels). The following pages show how metrical grids and moraic approaches handle the threefold typology; our own analysis is presented in §8.2.

3 Grid-based and moraic accounts of Weight by Position

3.1 Weight by Position and metrical grids

Let us first look at how the major distinction in (2) is implemented. In what follows, we assume the classical structure of the syllable in (3):

(3)



However, the syllable as such does not play any role. The only thing that counts for whether it is light or heavy is its rhymal structure. If the nucleus node branches, the syllable is invariably heavy. If the rhyme node branches, the syllable may be heavy, as in Latin and English, or may not, as in Malayalam and Lardil. A syllable that has neither a branching rhyme node nor a branching nucleus node is always light.

Let us use Latin for the sake of illustration. Stress in Latin falls on the antepenultimate syllable unless the penultimate is closed or contains a long vowel, in which case it falls on the penultimate.[7]

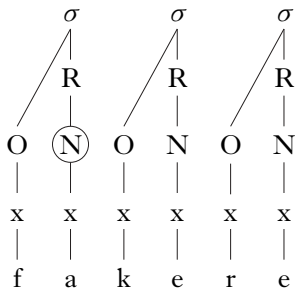
[7] This is the heart of the Latin stress system. The overall picture is more intricate, because of extrametricality and cliticisation. The former issue is discussed in §8.1; the latter is ignored in this paper. Note also that the above generalisation of course concerns only trisyllabic and larger words. Stress is always penultimate in bisyllabic

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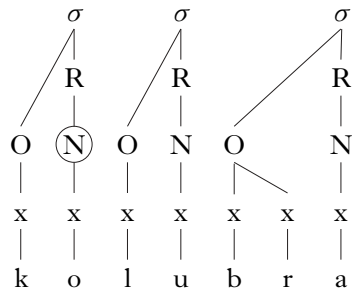
(4) shows how the Latin pattern is represented in classical syllable structure.[8]

(4) *Latin stress system: syllabic account*

a. *proparoxytons: light penult*

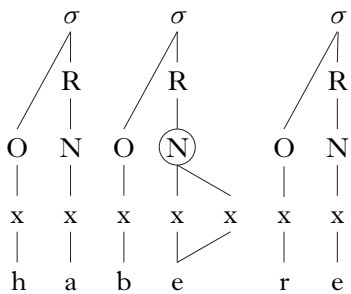


fácere 'make'

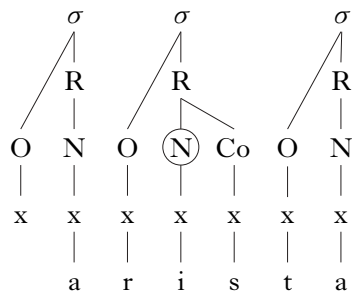


cólubra 'blindworm'

b. *paroxytons: heavy penult*



habḗre 'have'



arísta 'ear (of corn)'

On these assumptions, the relevant distinction thus concerns rhymal structure: if the rhyme of the penultimate syllable hosts some branching structure, as in (4b), a paroxyton is produced, while a proparoxyton occurs in case the rhyme of the penultimate syllable lacks any branching structure, as in (4a).

This insight is translated into a formal system by projecting stress-bearing units (i.e. vowels and, depending on the language, syllabic consonants) onto what is called line 0 of the grid. In a subsequent stage of the derivation, rules (or constraints) decide which line 0 projections are grouped together (giving a bracketed grid) and how this clustering is achieved. 'Syllable-marking rules', which are sensitive to rhymal

items and on the only syllable in monosyllabic ones. The Latin pattern is very well known and can be inspected in, for example, Allen (1973), Jacobs (1989) and Mester (1994).

[8] Stress is transcribed with an acute accent. The stressed nucleus is circled.

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information (e.g. Halle 1998), are responsible for distributing brackets, and determine whether or not a line 0 unit is projected onto line 1. Stress is calculated on the grounds of line 1 marks (which on some accounts coincide with feet). In (5) we show the representation of two bisyllabic English words which contrast with respect to the weight of their last syllable. In the system of Halle (1998), this difference produces different bracketings, which in turn derive the contrasting stress patterns.

(5) *Effect of syllable-marking rules on the grid*

a. vílla	b. divíne	
*	*	line 1
(* *	* (*	line 0
v ɪ l ə	d ɪ v aɪ n	

The rule that creates bracketing is sensitive to rhymal structure: if the rhyme of the last syllable is complex (i.e. if it dominates at least two skeletal slots), a monosyllabic foot is constructed through the insertion of a line 0 bracket on the lefthand side of the syllable in question, as in (5b). If, on the other hand, the rhyme contains no branching structure, a bracket is inserted on the lefthand side of the line 0 unit that represents the preceding syllable, as in (5a). This procedure produces a binary foot. In the next step, line 0 units are projected onto line 1 if they bear a bracket on their lefthand side. Line 1 represents feet, and stress falls on every foot.

The details of the mechanism discussed are more complicated than just outlined, but this is irrelevant for the purpose of the present discussion. The only thing that needs to be borne in mind is that the information regarding syllable weight is not an inherent property of grid structure, but is added to it: all and only stress-bearing units are transmitted to line 0. This projection is effected regardless of rhymal information. Syllable weight is introduced subsequently by a rule (or a constraint) that creates clusters of stress-bearing units on line 0 via bracketing.

3.2 The moraic analysis of the Latin pattern

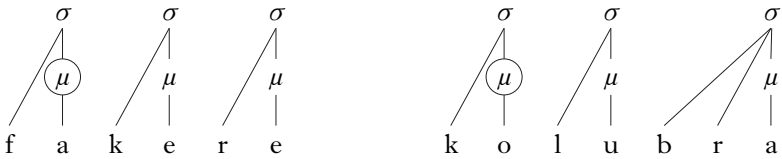
Moraic theory has a different view of stress assignment. Its basic claim is that timing units which differentiate short and long 'objects' must be identical to those which represent syllable weight. In classical syllabic theory, the basic timing units are skeletal slots; moraic theory does away with the skeleton altogether. Classical timing units are replaced by, or rather conflated, with, the basic unit that represents syllable weight: the mora (μ). Moras build representations that are subsyllabic but supramelodic. They are associated directly to the syllable node. Moraic structure may be read off directly from the syllable weight of each segment: a segment is associated to a mora of its own if and only if it contributes to syllable weight. Hence, in the Latin example discussed, all vowels and

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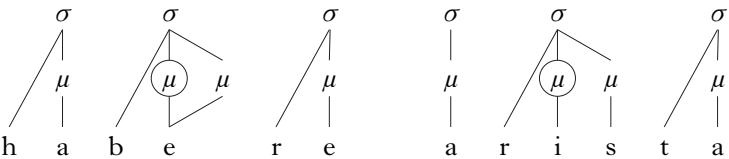
rhymal consonants will be moraic. Classical moraic representations of the Latin words in (4) are given in (6).

(6) *Latin stress system: moraic account*

a. *proparoxytons: monomoraic penult*



b. *paroxytons: bimoraic penult*



A feature of moraic representations is the absence of any constituent other than the mora (and the syllable). Given the structures in (6), then, stress falls on the penultimate syllable if and only if it is bimoraic. Otherwise, the antepenultimate syllable is stressed. In a more comprehensive formulation, stress falls on the third mora counting from the right edge of the word; this is circled in (6).

3.3 Grid-based systems, moraic systems and the three-way typology

Let us now look at how grid-based and moraic analyses could implement the existence of the third typological pattern discussed in §2.2, i.e. that in which CVV and CVR syllables are heavy, but CV and CVT syllables are light.

In a grid-based analysis, the difference between coda-counting languages such as Latin, (2b), and those systems that take only vowels into account, (2a), is the presence of syllable-marking rules in the former as opposed to their absence in the latter. Since syllable-marking rules cause a structural change on the grounds of a structural description in terms of rhymal properties, they alone are responsible for the attraction of stress to heavy rhymes. In the absence of such rules, the Malayalam picture in (2a) is automatically produced.

The Kwakwala pattern, where the sonority of the coda consonant determines the weight of closed syllables, will therefore be expressed in the same way: the structural description of the relevant syllable-marking rule makes reference only to sonorant codas.

In contrast to grid-based approaches, moraic theory implements the crucial rhymal information directly into its basic representations: all and

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only those segments which contribute to syllable weight are moraic. No reference to skeletal or rhymal structure is made, because moras are not created by rule or by constraint. They are present from the point at which syllable structure is created.

On this account, the typological difference embodied by the Malayalam and Latin systems is simply the fact that coda consonants are moraic in the latter, but not in the former. The same principle applies when the weight of CVC syllables depends on the sonority of the coda consonant (the Kwakwala pattern): according to Zec (1995: 115f), in such cases a constraint excludes non-sonorant consonants from being moraic.

4 Onset weightlessness

4.1 The empirical situation and theoretical consequences

Before evaluating the approaches discussed, we wish to consider another major empirical generalisation that has excited some debate in the past: onsets never contribute to syllable weight. This statement is true for the overwhelming majority of languages. Only a few cases have been reported where onsets seem to influence stress placement. These are discussed in Everett & Everett (1984a, b), Everett (1988) and Davis & Napoli (1990, 1996), for example. Davis (1988) provides a general survey of the evidence. The distributional facts of many of these languages indeed suggests that onset-sensitivity is involved. Their actual functioning, however, is poorly understood. Hayes (1995: 285ff), for example, examines one of the relevant languages, Pirahã (Mura group, Brazil), and points out that other properties of the Pirahã stress system, unrelated to putative onset weight, are also puzzling. Takahashi (1999) analyses Western Aranda (Central Australia), another language in which onsets allegedly influence stress assignment, and shows that there are alternative interpretations of the data.

In his dissertation, which is entirely devoted to the question of putative onset weight, Goedemans (1998) reviews relevant evidence in detail. He concludes (1998: chs 5–6) that all languages which have been claimed to violate the principle of onset weightlessness can be reanalysed without any reference to onset influence. In the chapter on syllable weight of a reference book on the stress patterns of the world, he writes 'we believe that onset weight does not exist' (Goedemans 1996a: 129; see also Goedemans 1996b).

Hayes (1995) also considers this problem in some details. On various occasions in his survey of stress systems, he reviews the evidence (Hayes 1995: 51f, 271, 306), and makes a number of firm statements against the relevance of onset weight:

> Crucially, in no language is a mora licensed by an onset consonant, which accounts for the universal absence of syllable quantity

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distinctions based on onsets (for discussion of apparent exceptions, see §7.1, §7.4) (Hayes 1995: 52).

Onset consonants never license a mora, accounting for the characteristic pattern that the presence or length of an onset makes no difference to weight (Hayes 1995: 270).

However, elsewhere his conclusions are more moderate:

> What is common to both systems is the principle that prevocalic segments in the syllable (i.e. onset segments) are **prosodically inert**: that VC is prosodically equivalent to CVC and CCVC, V: to CV: and CCV:, and so on. While this claim is not fully valid at the observational level (§7.1, §7.4), it is so well supported across languages that it serves as the central observation for formal theories of syllable weight (Hayes 1995: 51; emphasis in original).

We believe that phonological theory should make onset weightlessness a consequence of some formal property, rather than treating it as an accidentally distributed typological option. We therefore take it for granted that onset weightlessness is a major generalisation regarding stress, which ought to play an important role in the assessment of competing theories. Following Goedemans (1998), we thus believe that an adequate theory of stress must provide a reason for onsets being weightless.

4.2 Observation encoded *vs*. explained

How, then, is the asymmetric effect of onsets and codas expressed by grid-based and moraic theories? The rule component of grid-based approaches simply does not contain any syllable-marking rule which is sensitive to onsets, while moraic theory does not assign any mora to syllable-initial consonants, which are directly linked to the syllable node. In fact, therefore, both approaches do no more than translate the relevant observation into a formal vocabulary. There is no specific reason other than the facts observed that would prevent syllable-initial consonants from being moraic. No property of the theory restricts the distribution of moras in any way. If onsets contributed weight, moraic theory could happily 'declare' that onsets are moraic, and eventually make this a language-specific parameter.

The same holds true for grid-based theories. Syllabic information is transmitted to the level where stress is computed by means of rules (or constraints). There is no answer to the question 'why are there no syllable-marking rules that are sensitive to onsets?' other than 'because we observe that onsets do not contribute to syllable weight'.

In short, neither grid-based theory nor moraic theory predicts the non-existence of putative languages in which onsets count for stress assignment, but codas do not. By contrast, we show in §7.3 below that onsets are necessarily weightless if it is assumed that (i) there is an empty nucleus enclosed within coda clusters, and (ii) the units that are counted by stress algorithms are nuclei.

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5 Why do some consonants behave like vowels?

We consider finally the following question: given that stress is a vocalic property, how is it that the pool of units that are counted is heterogeneous (i.e. nuclei and sometimes coda consonants)? Gussenhoven & Jacobs (1988: 160), observing this strange state of affairs, put it this way: 'significantly, a consonant in the rhyme is often counted as if it was a vowel'.

As we have seen, Hayes (1989a) has called the fact that rhymal consonants may be moraic 'Weight by Position'. This label is explicit: because of their inherent properties, vowels are the only regular moraic units. Consonants may acquire moraic status, but this is an exceptional quality for them. They never access the moraic world on the basis of their inherent properties. It is only in recognition of their particular position in a coda that they can acquire moraic status.

As in the case of onset invisibility, current theories do not explain this property of stress systems. Instead, the existence of codas that behave like vowels has to be recorded as such in the theory.

In sum, we believe that the data and analyses which have been reviewed thus far raise the following relevant questions.

(7) *Questions about stress*

a. Why should phonology be split into two different worlds that account for prosodic *vs.* syllabic events? Wouldn't it be interesting to conceive of a theory where both empirical fields are covered by the same principles and identical representations?

b. Why are onsets weightless?

c. How is it that some consonants sometimes condition a phenomenon that is fundamentally vocalic?

Goedemans (1998) discusses (7b) extensively, primarily from a phonetic point of view. In the remainder of this article, we show that onset weightlessness is an automatic consequence of the assumption that coda clusters are separated by an empty nucleus (§7.3). We also address the two other questions: (7a) in §7.5 and (7c) in §7.4.

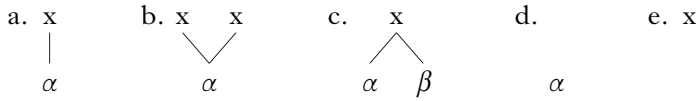
6 Syllable structure modified

6.1 A consequence of autosegmentalism

The idea that phonological representations contain elements that are linked by association lines to mark their temporal simultaneity is quite widely accepted in current phonological thinking. If we also accept the existence of a phonological skeleton, which is responsible for temporal sequencing and made up of bare slots lacking any phonetic property, the configurations in (8) are all theoretical possibilities for associations (or lack thereof).

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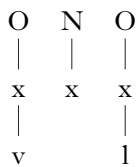
(8) *Possible skeleton–melody associations*



The biunique relationship of (8a) and the many-to-one and one-to-many relationships of (8b, c) are supplemented by the options of having some phonetic property without an associated skeletal slot, (8d), usually referred to as floating melody, as well as the opposite case, a skeletal slot without any melody associated to it, (8e). Since we know of no principled way to exclude any of the above possibilities from the theory, we assume that each must have a role in representations. Consequently, phonological representations must contain bare skeletal slots.

The next issue to tackle concerns the interpretation of the configuration in (8e). The option of not pronouncing such a skeletal slot at all is obviously available. The danger of allowing unpronounced empty skeletal slots in the phonological representation is clear: unless their appearance is constrained, such objects may flood the representation, making it totally meaningless and indeterminable from the surface. Nevertheless, one case in which positing an unpronounced vocalic position in the representation seems reasonable is that of vowel epenthesis or syncope. In an alternation like the English [frɪvləs] ~ [frɪvələs] *frivolous*, it is not unreasonable to claim that the intervocalic cluster is underlyingly represented as in (9).

(9) *Representation of the word-medial* vl *cluster in* frivolous



A theory that does not accept the presence of the unpronounced nucleus between the two consonants will have to posit two different syllabic representations for the freely variable forms, [frɪvləs] and [frɪvələs], with the [v] forming the coda of the first syllable in the former, and the onset of the second in the latter. If, on the other hand, we allow for the presence of such an empty nucleus (∅), identical structures ([frɪ.v∅.ləs] and [frɪ.və.ləs]) can be assigned to both forms, their difference being only interpretational: in one the nucleus is not pronounced, in the other it is. The crucial difference between the two approaches is whether syllable structure of this type is seen as a superficial phenomenon existing 'on the phonetic level' (Kahn 1976: 20) or as part of grammar (as in e.g. Lowenstamm 1981).

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Vowel–zero alternations of this kind occur in C __ CV environments.[9] The observation is encoded by Kaye *et al.*'s (1990) theory as a condition on the non-pronunciation of empty nuclei: they remain unpronounced when they are 'governed' (cf. also Kaye 1990, Charette 1991, Harris 1994, etc.),[10] i.e. when they are followed by exactly one consonant and a pronounced vocalic position: cf. [frɪ.v<ə>.ləs] *vs.* *[trav<ə>l] *travel* or *[kav<ə>lri] *cavalry*.[11] The following pronounced nucleus is claimed to govern the empty nucleus, thus allowing it to remain unpronounced. It is stipulated that government of this kind is directional, proceeds uniformly from right to left and is local: it can affect only the adjacent nucleus.

Before we proceed, let us introduce a simplification: syllabic constituents will be merged with skeletal slots. That is, a nucleus will be represented by the symbol V and an onset (or rather, a consonantal slot) by C, instead of by skeletal slots labelled N and O respectively. Though the merger is not merely notational, the theoretical consequences will not be discussed here; the interested reader is referred to Szigetvári (1999: 87ff).

6.2 Consonant clusters

While a given cluster may exhibit synchronic alternation in certain words (e.g. *gen<ə>ral*, *sev<ə>ral*), in other words no such alternation is attested (e.g. **Hen<ə>ry*, **ev<ə>ry*), at least not in the particular dialect under investigation, Standard Southern British English, as described by Wells (1990). There also exist clusters in which a vowel–zero alternation is never found, e.g. [mp] or [st] (again in a given system, in this case English).

Nevertheless, it may prove useful to entertain the idea that such non-alternating clusters also enclose an unpronounced vocalic position. One reason again involves vowel–zero alternations: the fact that syncope typically occurs before single consonants but not before consonant clusters calls for an explanation. Recall that the non-pronunciation of vocalic positions was explained above by government. If any consonant cluster encloses an empty and necessarily unpronounced vocalic position, this nucleus is unable to govern the preceding one, hence syncope is predicted to be impossible before a consonant cluster: v_1 cannot alternate with zero. The situation is shown in (10) (by convention, empty vocalic positions are labelled with a lowercase v; government is represented by an arrow and its impossibility by a dashed arrow).

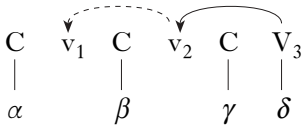
[9] Languages may impose further restrictions on the process, but the details are irrelevant here. Constraints for Standard British English are collected in Szigetvári (2002).

[10] Empty nuclei also feature in e.g. Anderson (1982), Spencer (1986), Burzio (1994), Dell (1995).

[11] It is possible to pronounce a syllabic liquid in each of these words ([frɪvl̩əs], [travl̩], [kavl̩rɪ]), but the total loss of syllabicity as in [frɪvləs] is attested only in the __ CV context. Angled brackets indicate syncopated material.

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(10) *No syncope before a consonant cluster*



The consonant cluster $\beta\gamma$ inhibits the pronounced vocalic position V_3 from governing the empty vocalic position labelled v_1, because it cannot reach further than the empty nucleus v_2. Being unpronounced, v_2 itself is not capable of governing v_1. The impossibility of syncope in word-final syllables is also predicted: there is no potential governor to the right of such a vowel.

If all consonant clusters were treated uniformly, the difference in the stress placement of *cólubra vs. arísta*, as well as many other syllable-based contrasts, could not be captured. Therefore obstruent–liquid clusters must be treated in a special way. Several solutions are compatible with the analysis presented here, and we do not wish to take a stand on which is to be preferred over the others. In fact, we can imagine that more than one of these representations can be found within the same language, i.e. the set of what used to be analysed as branching onsets is not uniform (Ségéral & Scheer, in press). Obstruent–liquid clusters could be treated as contour segments, i.e. two melodic branches linked to the same skeletal slot. This option is advocated, for example, by Hirst (1985), Steriade (1994), Rennison (1998), Lowenstamm (2003) and Rennison & Neubarth (2003). The acceptance of this approach removes obstruent–liquid sequences from the set of consonant clusters, and treats them as equivalent to single consonants. For simplicity's sake, we are going to adopt this analysis in the representations below. However, obstruent–liquid clusters could also be seen as regular bipositional objects that are dominated by a single consonantal constituent, an analysis which more closely corresponds to the mainstream view. None of our arguments is affected by whichever choice is made.

A third option is that obstruent–liquid clusters are like other consonant clusters, i.e. separated by an empty vocalic position. This view is defended by Scheer (1999, 2004: §14) and Szigetvári (1999), for example. On this view, the point we have made regarding onset weightlessness holds only for simplex onsets.[12] In any event, though, it does hold, since classical accounts cannot explain the metrical irrelevance of either simplex or complex onsets (cf. §7.3).

The idea of positing an empty vocalic position between *any* two superficially adjacent consonants in no way weakens the theory. In fact, such a theory is much more constrained that one in which syllabic constituents are allowed to branch freely, without any principled way of limiting the

[12] Szigetvári (in press) argues that – at least in English – branching onsets do not behave significantly differently from syncope-created consonant clusters with respect to stress placement, therefore their separate treatment is not justified.

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number of segments that can be sisters within a constituent. Our approach explains why there is a limit on consonant clusters: the intervening empty vocalic positions have to be silenced. Clearly, government cannot be the only way to silence a vocalic position, since this would, for example, predict that three-member consonant clusters could not exist. It would, however, go well beyond the limits of this paper to introduce a full-fledged model of phonotactics; here we can only direct the reader to Scheer (1999, 2004), Szigetvári (1999) and Dienes (2000) for further details.

The definition of coda consonants as being followed by an empty nucleus may be extended to word-final consonants (see (1)). Although such an extension does not strictly follow from what has been claimed above,[13] it does enjoy some popularity (see e.g. Kaye 1990, Kiparsky 1991, Burzio 1994, Harris 1997), and in our analysis we will adhere to it. That is, we conceive of any word as ending in a nucleus, pronounced or empty.

The definition of what is traditionally referred to as a coda, then, is recast in terms of an adjacency relation: a coda consonant occurs before an empty nucleus. An onset consonant, on the other hand, occurs before a contentful nucleus.

6.3 Long vowels and diphthongs

As will be clear from the preceding discussion, our fundamental claim is that the traditional term mora stands for a CV pair on the skeleton. Accordingly, bimoraic syllables must be made up of two CV pairs.

Hayes (1995: 49f) claims that the only stress-bearing unit is the syllable, rejecting the possibility that anything smaller, i.e. the mora, could bear stress, as argued by Halle & Vergnaud (1987: 49, 61, 193). Hayes dismisses counterexamples to his claim, such as Ancient Greek, by saying that 'these cases have traditionally been analyzed as **pitch accent** languages', i.e. 'they can be treated as involving tonal representations within the word phonology' (1995: 49; emphasis in original). Hayes (1995: 24ff) gives four criteria to distinguish stress from both tone and pitch accent. Of these, three show that the Ancient Greek accentual system involves stress: (i) it is culminative, i.e. 'each word has a single strongest syllable bearing the main stress' (enclitics provide exceptions), (ii) it is rhythmic, i.e. evenly distributed, and clashes are avoided (in cliticisation at least one unstressed mora must separate two stresses) and (iii) it fails to exhibit any kind of assimilation. We are unable to determine whether Ancient Greek stress is also hierarchical, thus meeting Hayes' fourth criterion. Crucially, none of the criteria shows that Ancient Greek accent should be anything but stress. This justifies claiming, with Halle & Vergnaud, that stress is a property of moras, i.e. in our interpretation, of pronounced vocalic positions, not of syllables.

Steriade (1988) distinguishes three accentual classes in Ancient Greek: suffix-accented, predesinentially accented and recessive words. Only the

[13] Opposing views appear in Polgárdi (1998), Szigetvári (1999) and Dienes (2000).

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last category is relevant for us, since the other two have lexically fixed positions for stress. Let us first examine the paradigm of κέραμος [kéramos] 'potter's clay' in (11). Vowel clusters represent diphthongs and long vowels. The nominative plural ending [-oi] counts as monomoraic, the long diphthong [ɔɔi] is bimoraic (cf. Allen 1974: 80f). The transcriptions render Allen's (1974: 74) reconstructions for 5th century B.C. Attic.

(11) *The paradigm of* κέραμος [kéramos] 'potter's clay'

	singular	*plural*
nom	kéramos	kéramoi
acc	kéramon	kerámuus
gen	kerámuu	kerámɔɔn
dat	kerámɔɔi	kerámois

Stress is antepenultimate only when the last vowel is short, otherwise stress falls on the penult. The paradigm of οἶκος [óikos] 'house' is given in (12). Here we give the traditional Byzantine orthography to introduce stress marking.

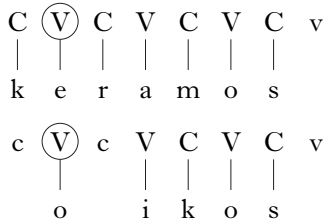
(12) *The paradigm of* οἶκος [óikos] 'house'

	singular		*plural*	
nom	óikos	οἶκος	óikoi	οἶκοι
acc	óikon	οἶκον	oíkuus	οἴκους
gen	oíkuu	οἴκου	oíkɔɔn	οἴκων
dat	oíkɔɔi	οἴκῳ	oíkois	οἴκοις

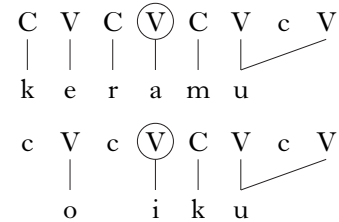
Both [kéramos] and [óikos] are recessive words; the latter, however, does not have an antepenult. It is clear that the stress falls on the first half of the stem diphthong when the suffix contains a monomoraic vowel, indicated by a circumflex accent in the spelling, and on the second half when the suffix contains a bimoraic vowel, indicated by an acute accent.

This situation is predicted by the representations in (13) for the nominative and genitive singular forms. As before, the stressed vocalic position (or mora) is circled.[14]

(13) a. *nominative singular*



b. *genitive singular*



[14] Notice that in the consonant-final nominative forms stress is on the fourth V from the right, and in the vowel-final genitive forms on the third V from the right. The reason is that Ancient Greek is not a Weight-by-Position system and empty nuclei are ignored (see §7.2), cf. ἤλεκτρον [eélektron] 'electron', where stress is *before* the heavy penult. In all these words stress falls on the third pronounced V position.

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The parallel behaviour of the two pairs can be clearly seen.[15]

Many Ancient Greek dialects also exhibit vowel contraction: hiatus is resolved by merging the two vowels into a long vowel or diphthong. The resulting bimoraic vowel will not be stressed if neither of the two vowels was stressed, it will carry stress on its first mora if the first of the two vowels was stressed and on its second if the second of the two vowels was stressed, as shown in (14).

(14)	tiíma.e	τίμαε	→	tiímaa	τίμα	'honour'	IMP 2SG
	tiimá.ete	τιμάετε	→	tiimáate	τιμᾶτε		IMP 2PL
	tiima.étɔɔ	τιμαέτω	→	tiimaátɔɔ	τιμάτω		IMP 3SG

What we observe is that the outcome of contraction, the single bimoraic syllable [maa], has three possible stress patterns, unstressed [maa], what, based on the Byzantine spelling practice, we here call acute stressed [maá] and circumflex stressed [máa]. Such variability is not available for monomoraic syllables; they are either (acute) stressed or unstressed. We will thus represent long vowels and diphthongs as VcV sequences on the skeleton. We do not introduce evidence for the presence of the empty consonantal position in this sequence, since its presence or absence has no bearing on our present arguments.

Unlike Ancient Greek, many systems do not distinguish two stress patterns on long vowels. For example, the stress of Latin *fā́bula* 'story' falls on the second mora of the long antepenultimate vowel. Together with standard moraic theory, we stipulate that in the Latin type of systems [aá] and [áa] are interpreted identically, as [á:]. The point we wish to make here is that there do exist languages like Ancient Greek which have a stress difference involving the two halves of stressed long vowels.[16]

[15] Stress may be antepenultimate before a long penult though: ἄνθρωπος [ántʰrɔɔpos] 'man', which then regularly 'moves' on the second mora of the penult as in the previous cases: ἀνθρώπου [antʰrɔ́puu] (GEN SG). We will not comment on this case, since we are not giving an account of the Ancient Greek stress algorithm here, but merely showing that long vowels and diphthongs may carry stress on either of their moras.

[16] A further obvious case supporting the existence of systems with bimoraic vowels whose two parts are independently accessible is the fact that 'in Southern Paiute and some other languages, syllables with short rimes contribute a single unit for purposes of foot construction, whereas syllables with long or complex rimes contribute two units for foot construction. Moreover, in Southern Paiute a foot may begin or end in the middle of a syllable' (Halle 1998: 543). Hayes (1995: 122f) rejects such evidence, on the grounds that Southern Paiute long vowels are derived from disyllabic CV+V sequences. This is true for contraction in Ancient Greek, but not for the recessively stressed nouns. He further argues that if a theory allows moras to be stressed, this should also show for closed syllables; between light syllables a heavy syllable ought to be stressed without interrupting the alternation of the stress pattern. Hayes claims that such systems appear to be unattested.

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7 The consequences of the model

7.1 The analysis of antepenultimate stress in Latin

In a language like Latin, where closed syllables are heavy, there are four relevant configurations for stress assignment. Given the interpretation of syllable structure introduced in the preceding section, the configurations are as in (15).

(15) *Latin stress system*

a. *proparoxytons: monomoraic penult*



b. *paroxytons: bimoraic penult*



As can be seen, stress falls on the vowel that is associated with the third nucleus from the right edge of the word.[17]

In was mentioned in §6.2 that we do not favour any particular representation for obstruent–liquid clusters. The representation of the *colubra* pattern in (15a) gives one possible solution, treating the cluster as a contour segment. If Latin obstruent–liquid clusters are real branching onsets, in which two distinct skeletal slots are daughters of an onset node, the same generalisation can be made as before: stress falls on the vowel that is associated with the antepenultimate nucleus.

It is only when obstruent–liquid clusters are considered to be two independent onsets which enclose an empty nucleus that this generalisation no longer holds, since the antepenultimate nucleus in *colub∅ra* is then the one filled by *u*. In this case, a distinction needs to be made between governed empty nuclei and ungoverned empty nuclei: the former are enclosed within coda clusters and occur at the end of consonant-final words, while the latter separate obstruent–liquid clusters. The generalisation, then, is as before, except that ungoverned empty nuclei are invisible for the stress

[17] Notoriously, word-final heavy syllables do not obey this generalisation (on any account, not just on ours): the final empty nucleus of *dóminus∅* does not contribute to weight, and the final long vowel of *fáciō* does not count as two units. These facts are classically interpreted as instances of extrametricality. We discuss this issue in §8.1.

The case of items like *fórmula* 'frame, rule' also raise certain questions. Here our rule places stress on an empty nucleus, the one between *r* and *m*. One question which arises is how stress precedes the *r* (*fórmula*), rather than following the *m* (**formúla*). The standard moraic account is also in trouble here, since stress lands on the coda *r* (**fórmula*). Clearly, we need a mechanism to push stress one nucleus to the left. A patch-up mechanism of this sort is not unreasonable: stress can only be manifested on pronounced nuclei.

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algorithm. This line of reasoning does not need to be pursued here, since it bears on the overall architecture of the grammar, i.e. on the identity of obstruent–liquid clusters, rather than on the particular issue of stress assignment. The question is discussed at length in Scheer (2004: §§14, 517). Although we do not want to make a firm commitment here, it is clear that the facts from stress do not argue in favour of the solution involving two independent onsets.

Be that as it may, this section has shown that just as in grid-based and moraic approaches, the modified syllable structure where an empty nucleus separates the members of coda clusters can express the Latin regularity in a uniform fashion. That is, stress is assigned to the 'ante-penultimate' item in the same way as in moraic theory, except that the nature of the unit in question is different: the mora or the nucleus.

7.2 Weight by Position: the visibility of empty nuclei

Let us now turn to the distinction between the two stress patterns of (2): how can the parameter known as Weight by Position be expressed in our system? The answer can be read directly off the representations in (15): closed syllables, i.e. CVC∅ strings (see §6.2), are heavy if the stress-assigning mechanism takes the empty nucleus that follows the coda consonant into account. In this case, both the V and the ∅ of the CVC∅ string are counted, and hence are treated on a par with a long vowel $CV_i∅V_i$, which also consists of two counted (contentful) nuclei.

On the other hand, if the empty nucleus of a CVC∅ string is ignored, closed syllables are light, and count as equivalent to a short open syllable CV: both strings contain one metrically relevant nucleus.

Table I summarises how the parameter regarding the weight of closed syllables is implemented in the different approaches reviewed.

	closed syllables are heavy	closed syllables are light
a. metrical grids	there is a syllable-marking rule that transports rhymal information to higher levels	there is no such rule
b. moraic theory	codas are moraic	codas are not moraic
c. CVCV theory	empty nuclei are counted	empty nuclei are not counted

Table I

The Weight by Position parameter on closed syllables.

7.3 Onset weightlessness explained

Let us now consider why onsets are irrelevant for stress assignment. In contrast to grid-based and moraic approaches, there is a theory-internal

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answer to this question in the system in (15): onsets never contribute to syllable weight because they are followed by a filled, not an empty nucleus. Indeed on the analysis of §6, the usual arboreal and consonantal definition of the coda ('a rhymal consonant') has become lateral and vocalic: coda consonants occur before an empty nucleus.[18] Now recall from the previous section that empty nuclei may or may not count for the purpose of stress assignment. By contrast, filled nuclei always count in all languages. Therefore, the nucleus following an onset consonant already contributes weight. If onsets were moraic, one would need to make their nucleus count twice, which is of course out of the question.

This is why, when looking at the metrical relevance of consonants, codas may or may not count, while onsets never do. The linguistic reality behind this is simply the fact that codas can mobilise their empty nucleus, while onsets do not have any similar strategy available, as their nucleus is already mobilised.

7.4 Sensitivity to a homogeneous set of units

The system developed here has another advantage over the classical approach: consonants never count, because the only things that stress sees are nuclei.

The illusion that some consonants (codas) are sometimes visible to stress, while others (onsets) are never counted, stems from the fact that codas are commonly defined as consonants which occupy a certain position in the syllabic arboreal structure. If, as suggested in §6.2, codas are not defined with respect to arboreal structure but according to the melodic status of the following nucleus, no consonant is moraic in any circumstance. It is the nucleus that follows the coda which is counted (in Weight-by-Position languages) or not (in non-Weight-by-Position languages).

As a result, it is only nuclei, contentful or empty, which determine syllable weight. We take this to be a significant achievement, since stress is an overtly nuclear phenomenon: only vowels (and syllabic consonants) can bear stress. Therefore, the picture which we are confronted with when looking at the superficial data is rather strange: why should an exclusively nuclear phenomenon sometimes take certain consonants into account? When looking at the same state of affairs through the glasses of §6.2,

[18] Except of course if obstruent–liquid clusters are two independent onsets that are separated by an empty nucleus. On this analysis the question arises why the obstruent does not count as a coda (since it satisfies the definition 'coda consonants occur before empty nuclei'). This, however, is just a side-effect of the more general question of why vowels followed by obstruent–liquid clusters should stand in an open syllable in the first place. Scheer (2004: §14) and Szigetvári (1999: 111ff) discuss this issue at length and develop a solution.

Note, however, that even if the status of obstruent–liquid clusters were left unresolved, there would still be an advantage on the side of the analysis that is presented here: simplex onsets are predicted to be weightless no matter which representation for complex onsets is favoured.

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however, everything falls into place: in cases where a coda appears to make a syllable heavy, what is in fact being counted is the following empty nucleus. Accordingly, the set of objects that stress algorithms look at is perfectly homogeneous: stress is an exclusively nuclear matter.

7.5 A uniform structure for syllabic and prosodic generalisations

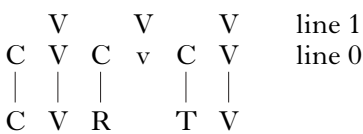
The structures in (15) have another interesting property: all information which is required in order to compute stress assignment is already present in the basic representation, i.e. the bare sequence of onsets and nuclei. No additional objects, such as 'μ', '*' or 'syllable-marking rules', are required.

In other words, there is no distinction between the structure that accounts for syllabic effects and the one that is responsible for stress. Both empirical fields are represented and controlled by the same objects: filled and empty onsets and nuclei. This is where the title of this article stems from: word stress, at least, can be characterised with a single set of representations. The common split between a syllabic and a metrical world can be dispensed with.

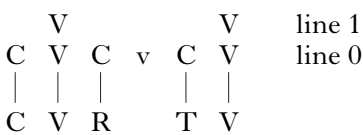
Beyond this specific issue, however, our proposal can be interpreted as a refinement of the intuition embodied by grid-based models. True, we offer a principled way of defining the set of projectable units (codas, but not onsets), which is also uniform (only nuclei). Classical approaches cannot do this. But our strictly alternating Cs and Vs and the traditional dots and asterisks obviously represent the same reality; in addition, projection itself is as much an issue now as it was before; what we have called visibility (of empty nuclei) is but another word for the same thing. Hence there is nothing to prevent drawing representations in the spirit of grids, where nuclei (rather than diacritics, which were enforced by the non-homogeneous set of projecting items) pile up on a higher level. The representations in (16) place our proposal more obviously within the canon of common assumptions about stress.

(16) *Projection of nuclei along the lines of metrical grids*

a. *in a coda-counting language*



b. *in a language where codas are not counted*



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Stress, then, counts Vs on line 1. If pursued in the familiar way, this kind of representation can also deal with stress class (*thirtéen vs. thìrteen mén*) along the lines of the analysis that is classically assumed (demotion of a grid column in the presence of an adjacent grid mark on the same line).

While all this is possible – and we indeed believe that our proposal follows in the footsteps of metrical grids – we wish to stress that (16) and additional representational tools such as lines and V columns may be a convenient way of providing graphic illustrations of what we want to say – but it has no linguistic or cognitive reality. Recall that we set out to do away with unnecessary diacritics such as '*', 'μ' and the like. These are needed in classical models precisely because we would rather not assume that stress algorithms count both apples (nuclei) and pears (codas): stress-relevant units must be somehow uniform. Since in the basic representations they are not, uniformity must be achieved by projecting diacritics. Diacritics are no longer needed, because the uniform set of stress-relevant units is already present in the basic representations. Therefore we doubt that structures such as those in (16) represent any linguistic reality – they merely serve the purpose of illustration.

8 Additional cross-linguistic variation

8.1 Extrametricality

Let us now turn to extrametricality, a notion which is required in the analysis of many languages. It describes the fact that word-final or word-initial objects do not behave as they should. For the sake of illustration, we continue to use Latin, which shows a typical extrametrical pattern: heavy word-final items, i.e. long vowels and closed syllables, count as monomoraic even though the opposition light *vs.* heavy, as has been shown above, is pervasive elsewhere in the language. That is, *dóminus* 'lord' and *fáciō* 'I make' have antepenultimate stress even though the last syllable is heavy (bears two moras) and thus should produce the penultimate pattern **domínus*, **facíō*.

The classical reaction to these facts is to grant an extrametrical interpretation to the offending word-final segments which should count for stress, but do not. Like extrasyllabicity, extrametricality simply means that the relevant parsing mechanism, here the stress-assigning algorithm, does not 'see' the objects in question. The Latin pattern falls into place when the last syllable is declared extrametrical across the board for all words (e.g. Hayes 1994: 67, 1995: 56ff); this captures both the irrelevance of the final consonant and the monomoraicity of final long vowels. Hence *dóminus* and *fáciō* are submitted to the stress-assigning algorithm as *domi*<*nus*> and *faci*<ō> (where segments in angled brackets are extrametrical). Discounting the extrametrical string, then, stress is penultimate unless the last syllable is closed or contains a long vowel, in which case it is final. Hence we have moved from an 'antepenultimate'

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mechanism to a 'penultimate' algorithm that takes extrametricality into account.

According to the analysis in §6.2, word-final consonants are followed by an empty nucleus. In a language like Latin, then, empty nuclei are counted everywhere except in word-final position. Hence in our syllabic environment 'last consonant is extrametrical' translates as 'final empty nucleus is extrametrical'. However, the fact that word-final long vowels do not contribute two moras either raises a problem for our approach: the expression of the regular statement 'last syllable is extrametrical' is a problematical, since the 'last syllable' ranges over the two last CV units (<*nus*∅> in *domi*<*nus*> and <∅*o*∅*o*> in *faci*<*ō*>), which cannot be addressed as such in our system, because there is no syllable node. Therefore, the theory predicts that word-final consonants and word-final long vowels can only pattern together by accident: they must constitute two units which can be addressed independently by the counting mechanism. In other words, there are two independent parameters, one regulating the metrical relevance of word-final consonants and the other regulating that of world-final long vowels.[19]

Many languages treat internal CVC and CVV syllables as well as final CVV# syllables as heavy, while final CVC# syllables count as light. Estonian and Colloquial Cairene Arabic, as described by Hayes (1995: 56f, 67ff), are cases in point; others are frequently discussed in the literature (e.g. Hayes 1980, 1994, Broselow *et al.* 1997). The classical description of this situation is 'word-final consonants are extrametrical'. As was mentioned above, this equates in our system to 'final empty nuclei do not count'. Kiparsky (1991), Burzio (1994), Harris (1997) and others have demonstrated the advantage of supposing the existence of a metrically relevant object to the right of word-final consonants: it may be visible for the stress-assigning mechanism. That is, these authors are dealing with cases where final empty nuclei are counted. In the Estonian and Cairene patterns, on the other hand, final empty nuclei are invisible. In Kiparsky's (1991) terms, the latter situation, i.e. consonant extrametricality, is the logical opposite of the former, which he calls catalexis.[20]

We may thus take for granted that a parameter accounting for the visibility of final empty nuclei (FEN) is needed in the description of some languages. Since the weight of final long vowels is also cross-linguistically variable, a second parameter is needed: even though they occupy

[19] What still escape our analysis are words in CC# and VVC#. Most of the former are too short (mono- or bisyllabic), and hence do not affect the analysis. Those which are long enough (at lease three syllables, e.g. *fáciunt, párticeps*) are either 3rd person plural verbs or end in *s*. VVC# words exceptionlessly end in *s* in Latin.

[20] The existence of a parameter on the visibility of final empty nuclei comes as no surprise: we know independently that this nuclear category is special, among other things, because of its parametrised governing ability (Charette 1991, 1992, Scheer 2004: §524).

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two nuclei, long vowels may count as either mononuclear or binuclear objects.

Table II shows the parametric space characterised by the two parameters under consideration.

			parameters			
	CVC#	CVV#	FEN count	VV# counts for	regular description	example
a.	light	light	no	one	*σ*#is extrametrical	Latin
b.	heavy	light	yes	one	—	non-existent
c.	light	heavy	no	two	C# is extrametrical	Estonian
d.	heavy	heavy	yes	two	no extrametricality	trivial

Table II

The typology of right-edge extrametricality in Weight-by-Position languages.

The pattern under (b) cannot exist, because it violates peripherality: the fact that only constituents at edges can be extrasyllabic, extrametrical, extrapedal, etc. is well established empirically (see e.g. Harris 1983, Milliken 1988, Clements 1990: 290, 1997, Roca 1994: 213, Hayes 1995: 7f). Contrary to this principle, however, the long vowel, but not the final consonant, of a word-final VVC# sequence would have to be extrametrical in a language with (b). The Latin picture in (a) is produced when both final empty nuclei and final long vowels show impaired behaviour as compared to their internal counterparts. The Estonian situation discussed earlier corresponds to (c), and the remaining pattern in (d) describes the trivial situation of languages where no extrametricality is encountered at all.

In sum, therefore, the absence of a unit corresponding to the syllable node in our theory makes a prediction which may appear trivial to practitioners of word stress, but which is not really self-evident: the metrical relevance of word-final consonants and word-final long vowels, although marshalled by peripherality, is determined independently. True, the Latin situation, in which both objects are extrametrical, may be covered by the unified statement 'final syllable is extrametrical'. While this may appear to be an advantage when looking at the Latin situation alone, cross-linguistic evidence shows that two independent parameters are needed anyway. The Latin pattern merely instantiates one possible setting.

Hence, the solution offered by our system is no more costly on the conceptual side than the traditional two-pattern analysis: 'word-final consonants are extrametrical' and 'word-final syllables are extrametrical'. It simply replaces these statements by 'word-final empty nuclei are extrametrical: yes/no' and 'word-final long vowels are mononuclear/binuclear'.

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8.2 Sensitivity to coda sonority

Recall from §2.2 that the two situations covered by Weight by Position need to be augmented by a third parametric situation, which is represented by the Kwakwala pattern (Wilson 1986, Zec 1995). In this language, closed syllables are heavy only if their coda is a sonorant.

Recall also from §3.3 that grid-based and moraic approaches have no problem in implementing this situation, since their expressive power is not restricted in any way. For example, they could also express the reverse pattern, where obstruent codas contribute to weight, but sonorant codas do not. All that would be required is to write a syllable-marking rule whose structural description makes reference to obstruents, rather than to sonorants (grid-based theories), or to constrain possible mora-bearing consonants to obstruents (rather than to sonorants).

Such a pattern does not exist, of course, and it is fairly safe to say that it is not possible, since sonorants and vowels constitute a natural class but obstruents and vowels do not. This point is also made by Zec (1995). Contrary to what she says, however, it is not true that her formal system (she operates with constraints on possible mora-bearing units) disallows the existence of a filter that would restrict moraic consonants to obstruents.

Pretheoretically speaking, the difference between sonorants and obstruents, whatever its reality at the level of melodic primes, has a number of syllable-relevant manifestations. The most fundamental consequence for syllable structure of course is sonority sequencing: syllable structure is a direct function of the sonority slope of consonant clusters. Another cross-linguistically recurrent feature is the restriction of certain syllabic positions to a particular subset of segments. Typically, the subsets in question are defined along the lines of sonority. For example, in some languages only sonorants can occupy codas: Diola Fogny (West Atlantic) is a case in point (Sapir 1965). Further evidence regarding coda restrictions is discussed in Itô (1986: 26ff) and Piggott (1999), for example; Blevins (1995: 227ff) offers a survey of the relevant literature.

Another incidence of the relevance of sonority to syllable-related processes, but one which is less well established, can be observed in lenition systems. Cross-linguistic data show that there are two strong positions: in many languages, consonants are protected from lenition and/or strengthen if they occur word-initially or after a coda. In *SPE*-type notation, this disjunction identifies as {C, #} __. On the other hand, consonants are weak in the mirror-image context __ {C, #}, which characterises the coda, and also in intervocalic position. The distribution of strength and weakness with respect to the five syllabic positions mentioned is discussed at length in Szigetvári (1999), Scheer & Ségéral (2001) and Scheer (2004: §110), where the strong position is referred to as the Coda Mirror.

The pattern relevant for the present discussion is a subregularity which is found within this general frame. In languages with Coda Mirror effects, i.e. where consonants in the {C, #} __ context are significantly stronger

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than in other positions, the strength of consonants in post-coda position may depend on whether the preceding coda is occupied by a sonorant or an obstruent (Ségéral & Scheer, forthcoming). The pattern under discussion, i.e. 'strong after obstruents, weak after sonorants', has long been recognised, and is called a 'protected' environment in Lass & Anderson (1975: 163). Three cases in point are English (Harris & Kaye 1990, Harris 1994: 217ff), Finnish (Pöchtrager 2001) and Greek (Seigneur-Froli 2001, 2003). For instance, in London English [t] is glottalised, while in New York English it is flapped foot-internally, except if an obstruent precedes (compare *win*[ʔ]*er*/*win*[ɾ]*er* with **mis*[ʔ]*er*/**mis*[ɾ]*er*).[21] Another example which has received quite some attention in the literature is Finnish consonant gradation (e.g. Kiparsky 1993), e.g. the alternation between the nominative singulars *kulta* 'gold' and *ranta* 'beach' and their corresponding genitives *kulla-n* and *ranna-n*; the concatenation of the genitive marker triggers lenition of the final consonant of the stem, which in the case of RT clusters results in the loss of the obstruent and the expansion of the preceding sonorant. That we are indeed dealing with lenition here can be seen when looking at the spirantising effect of the genitive on simplex intervocalic stops: *leipä* 'bread (NOM SG)' comes out as *leivä-n* in the genitive. Significantly, post-coda obstruents are shielded from damage if the preceding coda is an obstruent as well: the genitive of *matka* 'journey' is *matka-n*, not **matta-n*.

Finally, another prominent syllabic effect that is based on the division between sonorants and obstruents can be observed in the behaviour of syllabic consonants. In most languages where consonants can have a vocalic function, only sonorants can be syllabic. A stronger claim, that obstruents may never be syllabic in any language, is disputed.[22] In any event, there is an implicational relationship: if syllabic obstruents occur in a language, then syllabic sonorants will also be found, while the reverse is not true.

The usual way of representing syllabic consonants relies on their functional status: since they behave like vowels, they are found in nuclei. This, however, violates a fundamental autosegmental principle, according to which vowelhood and consonanthood are not determined by any melodic specification in the featural make-up of a segment. Rather, a high front

[21] Actually, while [t] is glottalised in London English, it is not flapped in New York English after [l], but this detail does not significantly alter the robustness of the pattern.

[22] Candidate languages with syllabic obstruents are extremely rare. Bell (1978) provides cross-linguistic statistics, which however are corrupted by the way the data were collected (compilation of grammars) and the generous definition (to say the least) of what counts as a syllabic consonant. More convincing cases of syllabic obstruents that have been reported in the literature include Berber (Dell & Elmedlaoui 1985, 1988, 2002), the Salish family (native American Northwest languages; e.g. Bagemihl 1991, Bates & Carlson 1992, Czaykowska-Higgins & Willett 1997) and the Mon-Khmer family (Austro-Asiatic; Sloan 1988). Bagemihl (1991: 593ff) offers a discussion of the cross-linguistic occurrence of and motivation for syllabic obstruents, concluding that syllabic consonants are universally restricted to sonorants.

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articulation will be interpreted as [j] if it belongs to a consonantal constituent, but as [i] if it is associated to a nucleus. Therefore, something that belongs only to a nucleus could not, physiologically speaking, be a consonant. This, however, is precisely the challenge raised by syllabic consonants: they fulfil a vocalic function while still being consonants physiologically.

An alternative that does justice to both the function and the material reality of syllabic consonants is explored in a growing body of literature, including Wiese (1986, 1996), Hall (1992: 35f), Harris (1994: 224f), Rowicka (1999: 261ff, 2003), Szigetvári (1999: 117ff), Blaho (2001, 2004) and Scheer (2004: §240, in press). In this approach, syllabic consonants, like all other consonants, occupy onsets; their syllabic behaviour stems from the fact that they branch onto a neighbouring nucleus, which is how they acquire vocalic properties.

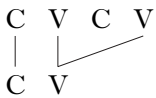
We believe that the branching solution can readily account for the contrasting behaviour of post-coda consonants after sonorant *vs.* obstruent codas (Pöchtrager 2001: 64), and for syllabic consonants. We submit that it also produces the correct result when applied to the Kwakwala pattern, the topic under discussion in this section. If it is true that only sonorants can be syllabic, then this translates as an inherent ability to branch onto neighbouring nuclei, something which is denied to obstruents. Hence sonorants and vowels constitute the natural class that is relevant for the Kwakwala pattern: they can be associated with nuclei.

In Kwakwala, where sonorant codas count but obstruent codas do not, this difference can thus be understood as one of branching. Recall that all codas are followed by an empty nucleus. In Kwakwala, then, sonorants branch onto this empty nucleus, but obstruents do not. This produces the representations in (17).

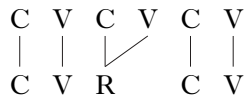
(17) *The Kwakwala pattern: sonorant codas count; obstruent codas do not*

heavy

a. *syllable with a long vowel*



b. *closed syllable with a sonorant coda*

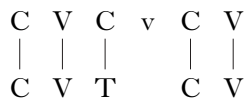


light

c. *syllable with a short vowel*



d. *closed syllable with an obstruent coda*



It can be seen that in this case the melodic material of a CVR string occupies two nuclei, (17b), and therefore weighs just as much as a long vowel, (17a). A CVT sequence, (17b), on the other hand, patterns with short vowels, (17b), since its melodic material fills one single nucleus.

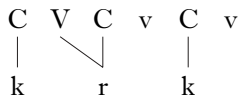
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Note also that unlike in moraic and grid-based approaches, a prediction is made to the effect that the reverse situation is impossible: a language where obstruent codas contribute to weight but sonorant codas do not supposes that obstruents, but not sonorants, can branch onto neighbouring nuclei. We know independently, however, that there is a strict implicational relation for the branching of consonants onto neighbouring nuclei: the presence of syllabic obstruents in a language implies the existence of syllabic sonorants, while the reverse is not true. This means that a situation where obstruent codas contribute to weight, but not sonorant codas, is impossible: if obstruents can branch onto the following nucleus, so can sonorants.

Finally, it is worth mentioning that syllabic consonants and the kind of sonorants that branch onto the following empty nucleus in the Kwakwala pattern are two distinct phonological objects. In both cases, sonorants branch onto a neighbouring empty nucleus, but (18) shows that this does not lead to identical structures.

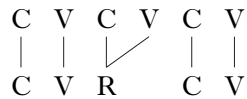
(18) *Branching sonorants*

a. *syllabic consonant*



(e.g. Czech *krk* 'throat')

b. *Kwakwala pattern*



The specific take on the representation of syllabic consonants, where the sonorant branches onto the preceding, rather than the following empty nucleus, is irrelevant for the present discussion (the reverse has also been argued for; see the literature cited above).[23] The only thing that we wish to point out here is that in no event can the two structures be confused: the nucleus preceding a branching sonorant is always empty when the sonorant is syllabic, while it is occupied by a vowel in the Kwakwala pattern. Therefore, no prediction is made to the effect that languages with syllabic consonants behave like Kwakwala with respect to stress.

Coming back to Kwakwala, its stress-assigning algorithm does not have Weight by Position: empty nuclei are not counted. The overall picture thus leaves us with two parameters that nothing *a priori* prevents from interacting: empty nuclei may or may not be counted (Weight by Position), and sonorant coda consonants may or may not branch onto the following empty nucleus. Table III identifies the four patterns that are produced by this typology.

[23] Among other things, the left-branching analysis builds on the fact that synchronically syllabic consonants often alternate with a [əC] sequence, but never with [Cə] (e.g. English *button* [bʌtən] ~ [bʌtn̩], etc.) and diachronically speaking they always take over the syllabic function of a preceding, not of a following vowel that has faded away (e.g. Czech *krk* < Common Slavic *kъrkъ* 'throat'). Scheer (2004: §260, in press) discusses this issue at length.

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		empty nuclei count	sonorants branch	example
a.	Weight by Position off	no	no	Malayalam
b.		no	yes	Kwakwala
c.	Weight by Position on	yes	no	Latin
d.		yes	yes	Latin

Table III
Typology of weight distinctions.

Note that the effect of configurations (c) and (d) on weight is identical: if empty nuclei count (i.e. in Weight-by-Position languages), it does not matter whether or not there is also a sonorant coda branching onto the following empty nucleus. The syllable will be heavy in any case. This, however, does not mean that there is no difference between the two configurations. In areas where weight plays no role, the branching or non-branching of sonorants may be critical. We leave open here the question of whether a contrast of the kind that is predicted exists.

9 Conclusion

In this paper, we have proposed an apparently minor modification in autosegmental representations, i.e. that coda consonants are not defined arboreally as being the sister of the nucleus, but laterally as being followed by a nucleus which remains unpronounced. We hope to have shown that at least three hitherto unexplained robust generalisations regarding stress follow from this: (i) onset weightlessness, (ii) unified representations for stress and the syllable and (iii) the homogeneous character of the units that are counted by stress algorithms (only nuclei). Onsets cannot possibly contribute a mora, since they are by definition followed by a pronounced nucleus, which is in itself moraic. Codas, on the other hand, are followed by an unpronounced nucleus, which may or may not be moraic, i.e. it is the following nucleus, not the coda, that contributes the mora in Weight-by-Position languages. Our system thus does not necessitate the explicit introduction of moras: their function is already fulfilled by nuclei. Although we consider our proposal to be a development of the idea that grounds metrical grids (see §7.5), the same holds true for grid-specific diacritics ('*', lines): were it not for the purpose of graphic illustration, they could be dispensed with, since all relevant information is contained in the bare syllabic representations.

We also argue that stress can fall on either of the two moras of long vowels and diphthongs; whether the two patterns are interpreted differently or not is a language-specific choice. Our analysis includes a version of the traditional notion of extrametricality involving two independent

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parameters (word-final consonant extrametricality and the monomoraicity of word-final long vowels), which mirror the standard account. In the view introduced here, the possibility that sonorant codas may be moraic to the exclusion of obstruent codas can also be explained in a non-stipulative way: drawing on the obvious parallel with syllabic consonants, sonorants, but not obstruents, can branch onto a nuclear position, and are therefore eligible for being moraic, which is an exclusively nuclear matter, while obstruents are not.

Stepping back from theory-internal questions and comparing the parametric variation exhibited by empty nuclei, two interesting parallels appear.[24] For one thing, empty nuclei are a possible parametric choice for languages (in languages where all syllables are open, no empty nuclei are found), and their behaviour with respect to stress is also subject to parametric evaluation (they may or may not count). Also, their ability to occur at the end of words is subject to cross-linguistic variation (some languages allow for consonant-final words, others do not), as is their invisibility for stress in this position (extrametricality). This coincidence of properties of empty nuclei and stress may be construed as an argument in favour of an approach where the former provide support for the latter.

Many issues remain open in this paper. The scope of the discussion is limited to word stress. We take no view on the existence of prosodic structures above the 'syllabic' level (e.g. feet): the examination of issues such as stress clash and rhythmic properties (iambic *vs.* trochaic feet) is beyond the scope of this paper. There is also no mention of lexically stressed items, or of stress algorithms which take vowel quality into consideration. Our goal has not been to give a full account of stress-related phenomena, but rather to examine a pattern and to show how it can be expressed in such a way that certain welcome consequences follow which have hitherto eluded principled explanation.

We believe that the existence of 'trade-offs' in a paper like ours is natural: new approaches in science usually start out from an idea that makes advances in some sector. It can hardly be expected that a new competitor is superior to previous systems in 100% of the area under consideration, especially within the context of a paper. Science is made of debate, and debate needs alternatives: we want to be able to compare and perhaps discover evidence for or against one or the other competing hypotheses. We do not pretend that our approach is superior in all respects – we merely wish to establish a new player in the overall game: one which offers advantages which are real enough to demand attention, but which encounters difficulties in specific areas.

The same holds for empirical coverage: it rarely happens that a new competitor does exactly as well as a theory which has been around for decades, covers exactly the same data and in addition does better in some area and/or covers more data. Rather, it recurrently happens that known data are looked at through a different prism, offering improvements in the

[24] This line of reasoning has been suggested to us by an anonymous reviewer.

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analysis in one area, while losing generalisations and empirical coverage in others. New players often come along with a strong conceptual idea (minimalism would be an example from syntax), which may 'lose' some data, but be judged promising enough to be taken seriously. In subsequent work, then, predictions are evaluated and hypotheses are put forward as to how the basic structure could be amended to cover more data. Hence we believe that in the case of an article like this, which is largely concerned with the conceptual aspects of our proposal and in which no new data are provided, the most important question is whether the conceptual advantages claimed for the proposal are real and can stimulate discussion among the audience.

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