In this provocative new work, Luigi Burzio argues that many common assumptions within stress theory, and phonological theory more generally, are in fact rather arbitrary. He proposes radical departures from recent tradition. In Part I he analyzes stress in the underived English lexicon, arguing that the basic accentual groups or "feet" are not monosyllabic or bisyllabic, as often assumed, but rather bisyllabic or trisyllabic. This analysis brings significant simplifications to other recent theorizing, including the elimination of standard extrametricality and all rules of destressing. In Part II Professor Burzio deals with morphologically complex words, and argues that various phenomena of stress preservation, including the apparent stress "neutrality" of a class of affixes, are all predictable reflexes of a single principle of Metrical Consistency. In addition to a superior account of stress, the proposed metrical theory yields a unitary account of a wide spectrum of vowel-length alternations, in an overall conception of phonology which is modular, like that of contemporary syntax. This new book makes a major theoretical contribution to the analysis of English word stress and to phonological theory.

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PRINCIPLES OF ENGLISH STRESS

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Contents

Preface

This work had a long gestation period. My interest in things phonological began at Harvard, where, with very little preparation, I attempted to teach a course in Italian phonology, in the Spring of 1986. I am grateful to the participants of that course, not too numerous to mention. Andrea Calabrese, Elvira DiFabio and Daniel Radzinski showed remarkable patience with my amateurish efforts. Those efforts led among other things to the conviction that there must be some simple way to analyze Italian stress, which led in turn to intensified contacts with my former mentor at MIT Morris Halle, benefitting from his generous tutoring in the theory of stress over many individual appointments. Morris was instrumental in motivating me to undertake a serious study, but his contributions as a scholar and a tutor extend far beyond any one piece of research. They are the types of things that make this field worth being in. The mildly "rebellious" tone of the ensuing pages should not be misconstrued as any lack of gratitude towards him.

In my eager reading of the manuscript version of Halle and Vergnaud's *An Essay on Stress* obtained from Morris at that time, my instinct for finding cracks in the foundation gradually prevailed over my amazement at the size of the building, and I found myself searching for a different way of doing things, more congenial to my syntactician's intuitions. This prompted a switch from Italian to English, which seemed a more suitable obstacle course on which to race opposing theories. The central ideas behind chapters 2-4 of this work developed then shortly, in the summer of 1986, and were presented in a few lectures in the ensuing months, and in Burzio (1987).

The project was temporarily shelved in 1987, pending the outcome of a quest for funding which might enable me to pursue it more systematically and take time off from teaching. That outcome took the form of NEH Fellowship for University Teachers FA-27660-88, for the academic year

1988-89, which played a most essential role, and for which I am most grateful.

As the interim had spawned other projects, there was some delay in switching gears, but by the summer of 1989 I had worked out the analysis of vowel length of chapter 5 (and Burzio 1990). In the Fall of 1989 I moved to Johns Hopkins, where I was welcomed by a generous exemption from teaching in the first semester, and found a most congenial environment for continuing my effort. That the effort was turning into a book became clear late that Fall, when the ideas about stress and suffixation now underlying Part II emerged.

Writing a first draft took most of 1990 and 1991, slowed by a painstaking review of some of the data, in which, however, Fudge's (1984) book was of great help. The comments and suggestions of two anonymous reviewers for Cambridge University Press, to whom I am grateful, have greatly contributed to the final form of the product.

For encouragement and support at various points in the process, I am grateful to Paola Benincà, Noam Chomsky, Dante Della Terza, Michael Kenstowicz, Alan Prince, Donca Steriade, and to my friends and colleagues at Johns Hopkins, Alfonso Caramazza, Mike McCloskey, Michael Brent, Brenda Rapp. For many useful discussions I am particularly thankful to Bill Badecker, and for keeping up the good spirits over the last two years without ever sacrificing intellect, to Raffaella Zanuttini. I thank Steve Anderson for his encouragement and his example, and for taking a serious interest in this work in the face of my unforgivable ignorance of much important work in phonology, including his.

1 *General introduction: overview and caveats*

1.1 A different approach

This work divides the task of analyzing English word stress into its two logical subparts: morphologically simple and morphologically complex words. There is general agreement that in English as in most languages the position of stress stands in a fairly regular relation to phonetic structure. It is also clear, however, that morphologically related words tend to influence each other's stress. So, the stress pattern of *napòleónic* partly mirrors that of *napóleon*, while that of *américanist* mirrors that of *américa(n)*. By studying morphologically simple words first, as we do in Part I, we attempt to identify the principles of stress-assignment in the absence of morphologically driven interference. In Part II we determine the nature and extent of that interference.

The proposed analyses draw substantially from previous work, but also stand at a considerable measure of disagreement with that work. The list in (1) is a sample of formerly accepted or popular views which we either reject or sharply revise (% = "in disagreement with").

(1) a. %Words like *américa* have a final extrametrical syllable.
 b. %Stress is assigned by a set of ordered rules.
 c. %After being assigned, some stresses are removed (via stress deletion, stress "conflation," stress erasure "conventions" or other).
 d. %Stress assignment is controlled by the principle of the "cycle."
 e. %"Stress-placing" affixes are attached at "level I," while "stress-neutral" ones are attached at "level II."
 f. %Phonological properties of affixes do not correlate with their position in morphological structure, since there are "bracketing paradoxes."

The extent of the above disagreements should cause no particular concern or surprise. The reason is that, although some understanding of stress mechanisms has been achieved since the ground-breaking work of Chomsky and Halle's *The Sound Pattern of English* (*SPE*; 1968), through the many contributions of Halle and his associates, the important work of Liberman, Prince, Hayes and others, many common assumptions within stress theory, and in fact linguistic theory generally, are sharply underdetermined by the empirical evidence. As work has proceeded, alternative assumptions have tended to be possible all along the way, but have often remained unexplored. This work represents a modest attempt to pursue what seem reasonable alternatives to recent views and underscore their relative viability.

Among the assumptions we will challenge, some are not without motivation, especially within the context in which they were first introduced, which may account for their relative popularity. Popularity, however, has a way of reinforcing ideas beyond their legitimate appeal. For instance, the very popular hypothesis, introduced in Hayes (1981), that feet are maximally binary (aside from "unbounded" ones), is indeed consistent with the facts of many languages, at least within Hayes' general approach, and may seem to capture a genuine generalization. Its near universal adoption, however, seems not fully justified, when we consider that languages no more unfamiliar than English or Italian, have indeed many words like *ar(tí.cu.la)tòry*, *phe(nò.me.no)lógic*, *sen(sì.bi.li)tá*, etc., with ternary groupings not only at the edges, where they could be analyzed as binary next to an "extrametrical" syllable, but word-medially as well.[1] The equally common view that suffixes neatly partition into neutral and restressing, as for instance in *inhábit/inhábit-able* versus *accúse/àccus-átion* does provide a degree of approximation to the empirical evidence, but is also inconsistent with some important facts. For instance, otherwise neutral *able* shifts the main stress in *círcumvènt/cìrcumvént-able*, while in *amèrican-iz-átion* the stress of the inner stem *amèrican* is maintained, notwithstanding a long sequence of unstressed syllables, and the generally restressing character of *ation*. Analogously, the long-standing claim, implicit in virtually all studies of the past twenty years, that stress-neutrality of affixes is a diagnostic of "level II" phonology is supported by some degree of correlation between stress and other

1 Ternary feet have been acknowledged to exist in more exotic languages, however, like Cayuvava (Colombia). See Halle and Vergnaud (1987a, pp. 25ff.) and references.

phonological phenomena, but not by conspicuous classes of cases where the correlation is lacking. For instance, a suffix like *ist*, which is generally neutral, behaves for segmental phonology just like any "level I" suffix, as in *semanti*[k]/*semanti*[s]-*ist*, *teleph*[ow]*ne*/*teleph*[ə]*n-ist* and so forth.

Others of the assumptions we will challenge appear to have been introduced quite arbitrarily and to have simply been consolidated by tradition. One of these is the assumption that long vowels in final syllables in English are always stressed, which was introduced in *SPE.* That assumption implies for instance that words like *alúmn*[ay], *sát*[ay]*re* must have a secondary stress on the bracketed long vowels (phonetic diphthongs). There is clearly no direct empirical evidence for that conclusion, since if the latter vowels were simply long but *un*stressed, they would be pronounced just as they are. As it turns out, there is also no indirect (theory internal) evidence either, and in fact no evidence at all for that view. Yet it has played a role in all major analyses of English stress so far. A rather similar case is that of words like *adirónDACK*, which have consistently been thought to have stress on the final syllable, whence – it was presumed – the unreduced vowel. Once again, there is no direct evidence to that effect, since all one observes is the unreduced vowel. There is, in a sense, *in*direct evidence. It comes from the assumption that vowel reduction and lack of stress stand in a biconditional relation with one-another. If that were true, then of course non-reduction would mean lack of stress. But there is nothing further behind the latter assumption. That is, the chain of inference is just a circle. While there is some reason to take vowel reduction to imply lack of stress, there is in fact no reason to take the opposite conditional (no reduction → stress) to hold. It may perhaps seem natural that it should, but that is not sufficient. The latter position was again taken in *SPE* without discussion. The phenomenon was then examined in greater detail in the important study of Ross (1972), but still without addressing the crucial issue, which is whether stress is involved. Since then, the *SPE* position was simply never challenged.

The traditional employment of "rules" in phonology must also be regarded as largely arbitrary, Bromberger and Halle's (1989) defense notwithstanding. The reason is that, in much of the work in which rules have been proposed, alternatives to rules have not been shown to be inadequate, but have simply not been considered.

In sum, given the present state of affairs and the much advanced but still rather tentative understanding of matters related to stress and general sound structure, disagreement is to be expected, and innovation is desirable. Excessive orthodoxy is rather what needs to be feared.

1.2 Foot types

In fundamental respects, our approach is still quite in line with contemporary views. As many others, we take segmental material to be organized into syllables, and syllables into feet, each foot carrying one stress, by definition. Feet are then taken to be further organized into prosodic words. These three different levels: syllables, feet, words, represent progressively higher levels of modulation of the speech signal, apparently one of the important ways in which meaning is mapped into sound. Higher levels of modulation, corresponding to phrasal categories, also exist, but will not be addressed in this study.

We take syllables to come in three different varieties: heavy (H), light (L) and weak (W). The first two are standardly defined as having a two-position and a one-position rime, respectively. The third will be defined by exhaustive listing (p. 16, 3.6 below), and speculatively, pending further study, in terms of some common acoustic weakness. Since the existence of such a class of "weak" syllables in English is a theory-independent matter, as we will see, one must bear in mind that it and the question of its exact definition will not be contingencies of our particular analysis.

We further accept that feet are, parametrically, either left-dominant (trochaic) or right-dominant (iambic), but differ from other theories on how many syllables they may contain. We take them to be either binary or ternary, never monosyllabic, while we remain agnostic, not having sufficiently studied the matter, on the existence of "unbounded" feet. In English, descriptively monosyllabic feet are found only at word edges, where we argue they are in fact bisyllabic containing empty structure. Two important pieces of evidence support this conclusion. We will see in Part II that stress is always preserved under affixation if it yields a well-formed foot. However, it is in fact never preserved when it would yield a monosyllabic one, e.g. *infórm*/**in*(*fòr*)*mátion*, indicating that such feet are not possible. Furthermore, in the context of Latinate affixation, long vowels always shorten, unless preservation of stress inhibits that shortening (as is the case when the foot is binary, see Chapter 10 below). In that case, the shortening obtains variably, e.g. *de*(*sí:rou*)*s* vs. (*áspiran*)*t*. When a long vowel would stand in a monosyllabic foot, however, Latinate affixation induces shortening quite regularly, e.g. *defá:me/dèfamá:tion*, not **de(fà:)má:tion*, etc. We interpret this regularity of shortening to mean that preservation of stress is not even an option in those cases, which in turn indicates again that monosyllabic feet are not available.

If monosyllabic feet are not part of the English inventory, then they do not seem likely to be in the universal inventory either. The reason is that there are in English large bodies of facts consistent with monosyllabic feet, witness all past analyses routinely employing such feet to describe those facts. If monosyllabic feet were an option, then those facts should constitute sufficient trigger for the child (as they did for many linguists), and hence induce adoption of monosyllabic feet. This, however, is not the case.

In providing a detailed analysis of one language, this work pursues a strategy different from the important one initiated by Hayes (1981) and now typical of much contemporary work, which is based on broad cross-linguistic surveys (Hayes 1985b, 1987; Prince 1983; Halle and Vergnaud 1987a; Idsardi 1992). No conclusion should be drawn *a priori* from either the lack of cross-linguistic scope of this analysis, or the lack of language-specific detail of others. Both strategies are valuable in their own right, and in general equally worth pursuing. Not having undertaken to analyze a broad enough group of languages, however, we are not in a position to commit firmly to a specific hypothesis on the range of variation of foot types. Our discussion below suggests, however, that feet range over a certain scale of "weight," where the weight of a foot reflects the weight of its component syllables, but especially of the head. It is our view that languages like English which, as we will argue, employ, in a trochaic pattern, either binary feet headed by a heavy syllable, namely ($H\sigma$): *a(gén.da)*, or else ternaries with a light median, namely ($\sigma L\sigma$): *a(mé.ri.ca)*, do so because they select a window of weight encompassing those two types to the exclusion of others, specifically the types ($L\sigma$), which would be too light, and ($\sigma H\sigma$), which would be too heavy (although other factors, such as the ability of stress to fall on a heavy syllable, also play a role in selecting foot types, see 5.4 below). Languages excluding ternary feet altogether are presumed to define their foot weight in a lower range. It is conceivable that differences in the choice of foot weight may follow from gross differences in the distribution of syllable types, although further study is needed to assess this possibility. In particular, in languages in which heavy syllables are common, binary feet will on the average be of relatively large weight for containing those syllables, hence plausibly forcing selection of a weight window high enough on the scale to also include ternary feet. Correspondingly, in languages in which heavy syllables are rare, the average weight of a binary foot will be relatively low, plausibly selecting a lower point on the scale, hence excluding ternaries.[2] Since unary feet are altogether excluded in this system, there is no "quantity sensitivity" in the sense of unaries built on a heavy syllable (whether "moraic" or syllabic: Hayes 1987; Prince 1991a; and others). The "quantity-sensitive" systems are here the ones that permit ternary feet, the choice between binary and ternary being quantity-sensitive, for the above reasons. The "quantity-insensitive" systems, on the other hand, are simply the ones that exclude ternaries, and for that reason use binaries uniformly.

Note that the unary feet built on heavy syllables of other frameworks straightforwardly predict sequences of adjacent stresses wherever sequences of heavy syllables arise. It is well known, however, that adjacent stresses are rather rarely attested (except at word edges, where our approach can accommodate them; see below). While existence of any such case will clearly force the present framework to make additional assumptions (specifically aimed to analyze apparent monosyllabic structures as bisyllabic), their rarity poses corresponding challenges to the alternative view, bearing in mind that the common appeal to "destressing under clash" is only a statement of the problem, and not a solution.

1.3 The regular, the irregular and the abstract

One of the distinguishing features of our analysis will be its treatment of certain deviations from the more common stress patterns. For instance, English nouns generally stress a heavy penultimate if there is one and an antepenultimate otherwise, as in *agénda*, *américa*. However, cases like *vanílla*, *giráffe* and many others seem to deviate from that pattern.

2 A comparison of Italian and Spanish, for instance, would seem to support this general correlation. Both languages have penultimate as well as antepenultimate stress, corresponding to a binary and a ternary foot, respectively, in our analysis. However, Spanish seems to have a greater tendency towards penultimate stress (binary foot) than Italian does. This correlates with the fact that Spanish has a smaller incidence of heavy syllables than Italian does, for having lost geminate consonants, unlike Italian.

SPE argued that such cases in fact do *not* deviate, since *vanilla* has a geminate *l* and *giraffe* has both a geminate *f* and a final vowel (at the relevant level of representation), hence both are stressed rather normally on a heavy penultimate. At first sight, this analysis may seem disturbing, since it in fact regularizes the stress pattern only at the cost of "irregularizing" the underlying representation, with the introduction of abstract elements. Many linguists, in the wake of Kiparsky (1968, 1973), have objected to this type of analysis, precisely on these grounds. We find, however, that the *SPE* solution was essentially correct. The much debated issues of abstractness seems to us, at least in this connection, to be quite spurious.

Consider again the now rather standard view that feet result from parsing syllables, and syllables from parsing segments, as schematically indicated in (2).

(2) Feet > > Syllables > > Segments

Given (2), there will then be three logical possibilities to deal with any exceptional stress pattern, listed in (3).

(3) a. There are exceptional feet.
 b. There are exceptional syllables.
 c. There are exceptional segments.

To implement (3a), we could say that the normal range of feet, which we will argue to be *(Hσ)/(σLσ)* giving normal *a(génda)/a(mérica)*, is exceptionally extended to *(Lσ)* as well as to *(H)*, hence also giving *va*[ní.la] and *gi*[ráf], respectively.[3] But we may as well pursue (3b) instead, and take a syllable such as *ni* to exceptionally count as heavy, yielding again *va*[ní.la], but now without distorting foot structure. We could also take a syllable with *no* phonetic structure to be exceptionally possible, along with the normal ones that have full phonetic structure, hence giving *gi*[ráf.ϕ], again without recourse to exceptional feet. Alternatively still, we may pursue (3c), and say that phonetically simple consonants like *l* or *f*, which normally fill *one* unit of syllable structure, can exceptionally fill

3 For the purpose of this brief discussion, extrametricality can be seen as part of (3a). Exceptional application of extrametricality will correspond to a foot which is exceptional in the sense of standing in a different relation to the word edge. We will argue below, however, that there is variation in how extrametricality applies, while there is no instance of (3a) proper.

two, resulting in ambisyllabicity, as in *va(nil.la)*, which now has both regular syllable structure and regular foot structure. We could say in addition that a "vowel" can exceptionally not have phonetic content and still enter into syllable structure just as if it did, giving *gi(raf.fϕ)*, where the *f* can now receive the same treatment as the *l* of *vanilla*. Details aside, the latter solution is very much that of *SPE*. We will argue that it is the correct one, and that, rather generally, (3c), rather than (3a) or (3b), is true, as we state more explicitly in (4).

(4) The system of mental representation has the ability to deviate from the canonical representation of segments. It does *not* have the ability to deviate from the canonical representation of syllables or feet.

The important point here is that any theory has to choose among the alternatives in (3), and that none of those alternatives is preferable to the others *a priori*.[4] In particular, all three are equally as abstract. The reason why, for instance, null segments may seem abstract is that segments (defined as units of syllable structure) are normally overt. But if we take feet to be normally binary/ternary, then a unary one will also be abstract, just as a null segment, for the same reasons. Surely feet are abstract entities to begin with, no less abstract than segments. Hence abstractness, even assuming it is ever relevant, will make no distinction here. The choice among the possibilities in (3), namely the determination of the exact locus of variation or apparent idiosyncrasy in the relation between accentual and segmental-phonetic structure is thus an entirely empirical matter. The reason why we will maintain that *SPE* was on the right track and that (3c)/(4) is correct is that there is independent evidence to support that view. There is no independent evidence for either of (3a, b).

1.4 The notation for stress: trees, grids, or . . .?

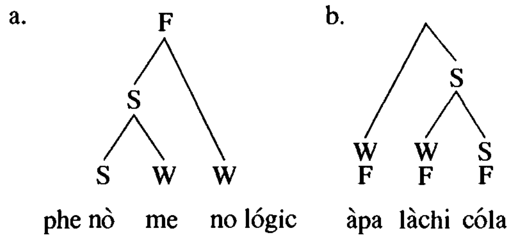
Our analysis will make no use of either trees or grids. We take metrical structure to consist essentially of feet and hence foot boundaries, which we represent with brackets. The position of stresses with respect to feet is determined by their left- or right-headedness, English parametrically

4 It also makes no difference which set of cases one takes to be the regular and which the irregular. The point is that there is apparent variation to be accounted for.

choosing left. We recognize two levels of word stress, primary and secondary, which we annotate, respectively, with acute and grave accents. In analogy to foot structure, we could also mark the left and right boundaries of word prosody by a superordinate set of brackets, and then attribute the position of primary stress to the right dominance of that structure, hence placing it on the rightmost foot. However, since words are all that we will deal with, word brackets seem superfluous, and will thus be left out. Also, their role in defining the position of primary stress is limited, since the latter falls not on the rightmost foot, but rather on the rightmost *non-"weak"* foot, as we see below (p. 16). The principle is still rather simple, however, and will be stated once and for all early on, but using no particular notation to implement it. No other notational resources would seem required. The representations we will typically employ will then be like *(àri)(zó:na)*.

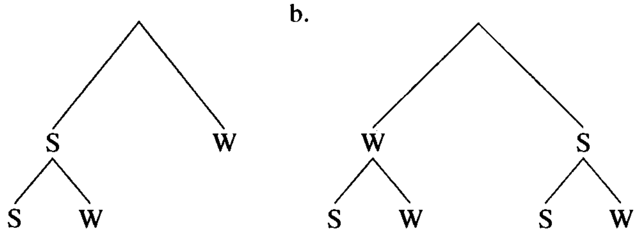
Like our bracket notation, the tree notation that dominated the scene in the aftermath of Liberman and Prince (1977) (but as further developed in Prince 1980; Selkirk 1980) also maintained that words are parsed into feet, but made the further claim that all structures larger than binary

(5)



contained binary substructures, as for example in (5), where F is a foot. One finds little evidence, however, that the sequences *no.me* of (5a) and *(lachi)(cola)* of (5b) are metrical constituents. The binary branching of Liberman and Prince's style of trees seems rather to have been introduced as a less than fully motivated carry-over from the study of compounds. As they showed, the stress of compounds needs to be calculated on the basis of the kinds of binary-branching structures illustrated in (6).

(6) a. b.



law degree requirements   law degree requirement changes

That, however, is transparently because compounds (in English) are internally binary-branching. The trees thus simply represent the structure of the compound, which is apparently relevant for stress. In moving from compounds to simple words, however, there is no particular reason to maintain the binary-branching trees, since there is no reason to believe words (like those in (5)) have comparable internal structure. Binary-branching trees as a means to describe word-stress were in fact abandoned explicitly by one of their original proponents. Prince (1983) introduced a theory that had no trees, and only a "grid," made up of columns expressing the level of relative prominence of each syllable, as in (7) (where the bottom line of marks simply identifies the stressable elements).

```
(7)              *                     *
             *      *           *    *    *
          *  *   *  *  *        *  * *   * *
     a. phenòmenológic   b. àpalàchicóla
```

Response to Prince's theory has been largely to adopt it, but with one important modification: reintroducing feet. Hayes (1985b), Al-Mozainy *et al.* (1985) in particular argued for this conclusion (see also Kenstowicz 1990a). The same conclusion is also implicit in our analysis and our interpretation of "Quantity Sensitivity" mentioned above. Consider that the grid theory was originally intended to yield a binary pattern. Our view of English and other languages is, however, that a ternary pattern also obtains: our foot ($\sigma L \sigma$). In light of this, one could attempt to simply redefine the grid to give a ternary pattern. However, the latter pattern does not obtain over a heavy syllable: our foot ($H\sigma$). One may then further suppose that the grid pattern is overridden by heavy syllables, which attract stress (as in fact in Prince's formulation of the "QS rule"). The problem, now, is that not all heavy syllables are stressed, witness *(ásteRIS)k*, *(párliaMEN)t*, *(pàrliaMENT)tárian*, *(càTAS)(tróphic)*, etc. As yet a further countermeasure, one can then imagine excluding stress in the first two of these cases by means of final-syllable extrametricality, and in the second two by means of some "clash avoidance." We will argue, however, that extrametricality as would be relevant to those cases does not exist, and that absence of stress clashes merely reflects the non-existence of monosyllabic feet. In conclusion, heavy syllables appear to be either stressed or unstressed depending on their position within the foot, which will imply that there must be feet. Once foot structure is present, however, the function of the grid becomes less obvious. The "bracketed grid" framework of Halle and Vergnaud (1987a) employs both foot boundaries *and* the grid, the latter because it has operations compiling and modifying grids. Our framework, however, does not. Correspondingly, it assigns no theoretical status to the grid. The latter could still be employed as a purely notational device. Since our proposed notation contains all the information of final grids in bracketed grid representations, it could then, trivially, though also pointlessly, be mapped into those representations, in the manner of (8).

(8)

```
                                *        line 2
                          (*    *)       line 1
                          (* *)(* *)     line 0
   a.  (àri)(zó:na) ⇒ b.   ari zo:na
```

It is easy to see that all the structure in (8b) is predictable from (8a).

More levels of stress than just two will arise when one goes beyond words and considers the stress of compounds and phrases. These further levels can of course be expressed by adding marks on the grid. But they can also in principle be expressed in other ways, so that this fact alone will still not promote the grid from notational convention to substantive part of the theory. Other facts might, but since we are not concerned here with phrasal stress, we will put the issue aside.

In sum, within our approach, there is good motivation for foot structure, but little for the grid as opposed to any other system of diacritics that distinguished two levels of stress.

1.5 Rules versus constraints

Our theory will make crucial use of interactive well-formedness constraints, and is in this respect similar in its conception to the one developed in McCarthy and Prince (1993) and Prince and Smolensky (1993) (see also Coleman forthcoming). We will see that different constraints will sometimes impose conflicting demands on representations. Resolution of such conflicts will be attained by ranking the constraints on a hierarchy, so that the higher-ranked may prevail over the lower-ranked.

We will argue extensively against the traditional idea that stress is assigned by phonological rules, and maintain instead that it is checked by constraints on derived representation. The argument we will give to this effect is, in its succinct form, the canonical one: there are generalizations that rule-based approaches cannot capture. It appears in particular that morphologically simple and morphologically complex words differ only minimally and yet crucially in their stress patterns. Rule-based systems, such as the theories of Lexical Phonology and of "Cyclic" Phonology, could easily account for strictly identical stress patterns, by making the stress rules insensitive to the morphology, for instance by ordering them after all morphological operations. Yet strict identity is not what we find. Rule systems can also express a divergence in the stress patterns of simple and complex words, and have in fact done so by interleaving morphology and phonology in "cyclic" fashion. The problem for this view is that derived and underived words will now have radically different derivational histories, which loses the account of the close similarity in the stress patterns.

A constraint-based approach, on the other hand, can capture the similarity in terms of a common set of foot templates applying to all words, and at the same time it can also capture the differences, in terms of a small degree of flexibility in the basic foot templates, which is exploited by a principle of preservation or "consistency" of metrical structure, at work in word-formation. Schematically, this conception is as in (9).

(9)

		Morphologically complex	*Morphologically simple*
a.	Basic foot templates	active	active
b.	Metrical consistency	active	_____

The reason for the difference between simple and complex words is that (9b) is at work in one case but not in the other. The reason why the difference is small is that (9a) as a set of constraints ranks higher than (9b), and that the degree of flexibility inherent in (9a) is small. What makes this approach superior, and not just a restatement of the rule-based approach, is that the degree of flexibility that one needs to account for morphologically complex words is independently attested in variations, sometimes principled, sometimes idiosyncratic, observable in morphologically *simple* words. Hence little needs to be said about the principle of Metrical Consistency itself, other than it exists. In contrast, much would need to be said about how the principle of "cyclic" application of rules works, as we will see below.

PART I

The stress of underived items

The analysis we are about to present is driven by two main intuitions that have eluded past accounts. One is that the mechanisms that assign stresses to final and non-final portions of words, resulting, for example, in the two stresses of *wìnnepessáukee*, cannot be independent or unrelated. Given the availability of one mechanism that organizes the final portion of a word into a foot, there is every reason to believe that that same mechanism would be available to construct all other feet. The second intuition is that there cannot be rules of "destressing." In the conceptual structure of a theory of stress, the need for destressing only stands to indicate that the stressing mechanisms are incorrect, which should prompt a search for the correct ones. As we will argue, both the need to have more than one parsing mechanism operating across the word, and the need for destressing rules, which have characterized past analyses, are contingencies of a certain hypothesis about word edges, generally known as "extrametricality." We will argue that that hypothesis, which has been useful in important respects and duly influential, is nonetheless incorrect in its specific implementation. Our framework will introduce a different, though still partly related, hypothesis about word edges, which we will show does not incur the two above problems.

The analysis we will propose is rather simple, and can be given in its essentials in this brief introduction. It has two main components, one of which is the typology of possible feet given in (1) with relevant examples, where "H/L" stand for heavy/light syllables respectively, and vowels followed by colons are long (phonetically diphthongized).

(1)	*Possible feet*	*Non-rightmost*	*Rightmost*
a.	(H σ)	mo(nòn ga)hé:la	àri(zó: na)
b.	(σ L σ)	(wìnnepes)sáukee	a(mé ri ca)

The binary/ternary foot typology of (1) appears to be applicable to various other languages, including Latin and Italian. In contrast to the foot typology, the second component of our analysis is in certain ways very specific to English. It has to do with the existence of a special class of syllables, which we refer to as "weak" (W), whose characteristic is that they may or may not be metrified, in the manner illustrated in (2), where the weak syllables are italicized.

(2)	a.	a ris(to cra *cy*)	/	(ca lum)*ny*, (ac cu ra)*cy*
	b.	ob(jec *tive*)	/	(ad jec)*tive*, (no mi na)*tive*
	c.	ad(ven *ture*)	/	(a per)*ture*, (tem pe ra)*ture*
	d.	e(xam *ple*)	/	(car bun)*cle*, (ve ge ta)*ble*
	e.	de(cem *ber*)	/	(cha rac)*ter*

The stress pattern of the words on the right-hand side is descriptively exceptional, but reduces to the one of the words on the left which in turn conforms with the foot typology in (1), if we take the final syllable to be extrametrical. This analysis thus also employs a notion of extrametricality, like others. As we will see, however, the latter notion is crucially different from the homonymous one alluded to previously and due to Hayes (1981, 1982). Rather, it harks back to its immediate predecessor – the extrametricality of Liberman and Prince (1977, pp. 292ff.), confined to special syllables.

A further property of weak syllables, beside being extrametrical as in (2), is that of yielding peculiar feet when *not* extrametrical. Such feet, which we also term "weak," fail to attract primary stress, in the manner illustrated in (3).

(3) a. (órtho)(dò*xy*)
b. (ínno)(và:*tive*)
c. (árchi)(tèc*ture*)
d. (púmper)(nì*ckel*)
e. (álli)(gà:*tor*)

Feet appear to be weak in this sense when they are binary, hence feet ($H\sigma$), and also contain a weak syllable, hence in effect feet (HW). Weak feet thus minimally distort the general right-dominance of English word prosody, as expressed by the italicized portion of (4).

(4) *Primary stress*
Primary stress falls on the rightmost *non-weak* foot.

We tentatively attribute both properties of weak syllables, namely their ability to be extrametrical and their role in yielding weak feet, to their acoustic weakness. This characteristic is rather transparent for the weak syllables in (2d, e), (3d, e), which have consonantal (sonorant) nuclei. It also seems independently established for the other cases, involving high vowels *i*, *u*, since as is well known (Lehiste 1970, pp. 120f.) high vowels have a lower acoustic output. Metrical "weakness" must, however, also depend in part on peripherality, since weak syllables do not occur word-internally, or do so only in special cases, as we will see.

The above account, based on the foot typology in (1) and the notion of weak syllable, will now extend to a larger class of cases, like those in (5) below, if we postulate that, in some abstract sense, all English words end in a vowel – a requirement which cannot be very peculiar since it is overtly satisfied by various other languages, for example Italian and Japanese. We take English to differ minimally from those languages in allowing satisfaction of the final-vowel requirement by overt as well as "null" vowels, namely phonetically empty skeletal units, parsed as *bona-fide* syllable nuclei. We will argue below that the latter requirement can in fact be linked rather naturally to general syllabification principles.

(5) a. ro(bús tϕ) / (éar nes)tϕ, (fré quen)ce
    b. de(vé lo pϕ) / (ás te ris)kϕ

Postulating the null vowels "ϕ" in (5) accommodates the left-hand cases within the foot typology of (1) directly. And it accommodates the right-hand cases via the further assumption, which is automatically true under the proposed "acoustic" criterion, that syllables with null vowels are "weak," and hence allowed to be extrametrical. The variation in (5) is thus reduced to the one of (2) above – two completely unrelated phenomena in all past analyses. This view now predicts that syllables with null vowels should also give rise to weak feet, like other weak syllables, as is indeed the case, witness (6a, b) and many other similar cases.

(6) a. (cáro)(lì:ne)
    b. (désig)(nà:te)

The cases in (6) and others like them are now quite parallel to those in (3), again a step forward from past analyses, which had settled for separate treatments.

In the ensuing chapters, we will see that this relatively simple apparatus, summarized in (7) below, provides a satisfactory characterization of the superficially rather complex patterns of English stress when further supplemented by only a small number of additional assumptions, and has significant advantages over previous accounts, mostly based on systems of rules.

(7) *Basic foot parse*
  a. Well-formed feet: (Hσ)/(σLσ)
  b. Extrametricality: none/W

We can already see how the system in (7) would satisfy the two intuitions mentioned earlier. It achieves the unity of rightmost and non-rightmost feet, in the manner illustrated in (1). It also overcomes the need for "destressing." The reason for this is that, as we will see, that need arises systematically when assigned stresses are adjacent to one another. Since (7) does not admit unary feet, it will never give rise to adjacent stresses, and hence never require destressing.

In the course of our discussion, we will compare our proposal with others, in particular the authoritative analysis of Halle and Vergnaud (1987a) (henceforth "HV"), as well as the cited work of Hayes' that the latter is closely related to.

2 *Null vowels and extrametricality*

2.1 Introduction

The hypothesis that prosodic mechanisms can compute null vowels or syllables, on which our analysis is based, is comparable to the rather well established claim that syntactic mechanisms can detect empty categories. Like the latter, it is in line with the general thesis that mental representation is rich and abstract, and has properties that elude superficial observation.

Variants of the null-vowel hypothesis have been proposed in the past. As we have already seen, one variant, in the form of a final *e* that deletes in the course of the derivation, was proposed in *SPE*, to regularize the stress pattern of words like *giráffe*, or *ellípse*, *eclípse* and others (see esp. pp. 45, 161). *SPE* further proposed an underlying final glide for words like *fréquence*, parallel to the *y* of *frequency*, as a way to account for the spirantization of *t* (compare *frequen*[t]). Spirantization would of course also be induced by the above final *e*, hence accounting for *ellíp*[s]*e*, *eclíp*[s]*e*, versus *ellíp*[t]*ic*, *eclíp*[t]*ic*. Ross (1972, p. 270) extended the final *e* hypothesis of *SPE* to all penultimately stressed verbs, such as *devélop*(*e*), *exámine*, whose systematically short stressed vowels contrast with the often long ones of nouns, such as *pí:rate*, *bó:nus*. In his analysis, the final *e* served to reduce the short vowel of the verbs to that of ordinary cases of "trisyllabic shortening." While bearing some similarity to those early proposals, our view more closely resembles the "zero syllable" thesis of Giegerich (1981, 1985), especially as pursued in Iverson (1990). In a study of English and German, Giegerich hypothesizes that metrical structures are minimally bisyllabic, which implies that apparent monosyllables in effect contain a zero syllable. He notes that the syllable forming such apparent monosyllables have greater duration than others, arguing that the lengthening is to compensate for the following "zero" syllable. He also takes zero syllables to account for the apparently "extrasyllabic" consonant that one finds word-finally (e.g. *pre.ven.T*, see below. See also Iverson 1990). Much of this will be consistent with our analysis below.[1] The latter will also be consistent in part with recent work in "Government Phonology" such as in particular Kaye (1990), Charette (1991). We concur with that line of work at least by sharing the general idea that apparent irregularities in syllable structure are to be interpreted as due to the presence of null segments. We are presently uncommitted on matters of further detail, concerning the exact distribution of null segments.

Although the idea that there are segments that are computed by some aspects of mental representation but have no phonetic correlates was expressable in earlier versions of phonological theory, e.g. as in *SPE*, by postulating the underlying presence of a segment, later deleted, that idea becomes more natural within the contemporary autosegmental approach to the representation of sound structure. Within that approach, which postulates relative independence of feature structure from temporal organization, a null segment is simply one of the points of maximal independence: one time cell with no features (or at least not enough features to result in actual phonetic content). In our discussion, we will often refer to a postulated null segment as a null "vowel." No particular stipulation to that effect is implied, however. Its function as a vowel will follow from its position in syllable structure.

The specific contribution that the present work aims to make to the study of null segments is to show the consequences that their presence has for the notion of extrametricality, and in turn for the determination of the typology of metrical feet. One can appreciate those consequences directly, by comparing the analyses in (1), cast in the framework of pp. 15–18 above, in which extrametricality is confined to weak syllables, with those in (2), in which extrametricality applies to a final consonant or to a (non-weak) syllable, as in Hayes (1981, 1982), and much subsequent work.

(1)	a.	a(mé ri ca)	(2)	a.	a(mé ri)<ca>
	b.	ari(zó: na)		b.	ari(zó:)<na>
	c.	(ás te ris)kϕ		c.	(ás te)<risk>
	d.	op(pó: nen)tϕ		d.	op(pó:)<nent>
	e.	in(há bi tϕ)		e.	in(há bi)<t>
	f.	pre(vén tϕ)		f.	pre(vén)<t>

1 For a more extensive overview of Giegerich (1985), as well as a critique, which, however, does not extend to our framework, see Hayes (1986).

We can see that in (1) feet are binary or ternary, while in (2) they are unary or binary. In this chapter, we consider the general motivation for null vowels and other evidence supporting the binary/ternary feet of (1) over the binary/unaries of (2).

2.2 Arabic

According to McCarthy and Prince (1990) and much other literature, most dialects of Arabic assign stress in the manner described by (3a, b, c) when these apply disjunctively and in that order.

(3) a. Superheavy final, if there is one, or
 b. Heavy penultimate, if there is one, or
 c. Antepenultimate

In (3a), "superheavy" refers to a syllable which is larger than a heavy one by exactly one final consonant. The generalizations in (3) are illustrated in (4), also from McCarthy and Prince (1990).

(4)	a. SuperH final	b. H penultimate	c. Antepenultimate
	ya.qúul	ya.qúu.lu	ká.ta.ba
	qaa.núun	ya.kúl.na	ká.ta.bat
	sir.ħáan	qáa.lat	ká.ta.bu
	ḍa.rábt	dír.ham	
	tar.jámt		

It is clear that (3a) above can be equivalently stated by saying that stress treats superheavy finals like heavy penultimates, as in (5a) below. It is also clear, and well known, that superheavy syllables, in Arabic and many other languages, only occur in word-final position, as stated in (5b).

(5) a. Superheavy finals behave (for stress) like heavy penultimates.
 b. Superheavy syllables occur only word-finally.

It is now easy to see that the conjunction in (5) simply indicates that, in fact, there are no superheavy syllables in Arabic. For if we take that view, and presume there are no exceptions to normal syllable structure, then the final consonant in (4a) will have to be part of a further syllable, hence followed by a vowel, evidently null. This will then immediately reduce the stress pattern of (4a) to that of (4b). To put it differently, while any theory will have to admit that word-ends in Arabic are peculiar given (5b), it is only if this peculiarity is interpreted as in (6) that both (5a) and (5b) are accounted for simultaneously.

(6) In word-final position, vowels can be null.

The solution in (6) is thus a subcase of (3c) in 1.3 above: "there are exceptional segments." Neither of the other two logically possible approaches – "exceptional syllables," "exceptional feet" – will do, since the former could characterize (5b) but not (5a), and the latter conversely. Only (6) handles both.[2]

The above argument for a null segment is entirely parallel to standard ones for empty categories in syntax. For instance, certain infinitives function syntactically like full clauses despite the apparent lack of a subject, (i) in appearing in many of the same environments, and (ii) in allowing reflexives that refer to the subject (e.g. *[to see oneself on tv] is unusual*). One *could* maintain that the two facts are independent and unrelated, but the logical conclusion is rather that infinitives *do* have a subject, evidently null. Only this both gives them clausal status and provides them with an antecedent for reflexives, simultaneously.

On the above analysis, then, the foot typology $(H\sigma)/(\sigma L\sigma)$ of (1) will analyze the facts of Arabic as in (7).

(7) a. ya(qúu lϕ)
b. ya(qúu lu)
c. (ká ta ba)
c′. (ká ta bat)

Since ϕ in (7) is fully predicted by syllabification once we admit (6), then only the assumption in (8) will be required to yield the stress facts of Arabic in full, within our system.

2 Actually, there is one variant of the "exceptional syllable" approach that can handle both (5a, b). It is the one of McCarthy (1979, p. 453), who argues that a final extrasyllabic C functions in a sense as a separate syllable, causing the preceding heavy to become in effect a penultimate. A major empirical difference between this and our text approach is that the latter can turn an apparent final into a penultimate not only in the case of superheavies, but also in the case of simple CVC sequences as in (1e) above or in the case of Tiberian Hebrew that we see next. Aside from this difference, McCarthy's approach would end up being very similar to ours to the point of being hard to distinguish from it. In particular, it would have the same range of consequences for extrametricality as ours, if comparably pursued. That is, the consonantal appendix would have to be extrametrical in some cases, like *asterisk* of (1c) - a provision non-distinct from our "weak syllable" extrametricality, and hence undercutting Hayes' notion of extrametricality for the same reasons.

(8) Stress does not distinguish between null and non-null vowels.

This account, based on (6) and (8), is irreducible. With regard to (6), it is irreducible because any theory has to account for "superheavy" syllables. With regard to (8), it is irreducible because some languages much like Arabic in having "superheavy" syllables, including English, have different stress patterns, indicating that (8) is a parameter.

In contrast, the foot typology $(H)/(\sigma L)$ of (2) will yield the analyses in (9), requiring that extrametricality apply as indicated on the right.

(9)		*Extrametricality*
a.	ya(qúu)<l>	C
b.	ya(qúu)<lu>	σ
c.	(ká ta)<ba>	σ
c′.	(ká ta)<bat>	σ

Consider, however, that if extrametricality can in general apply either to a syllable or to a consonant, there is in fact little reason why it should apply exactly as in (9). In particular, there is no reason why C extrametricality could not apply in (9c′). Distinguishing (9a) from (9c′) requires looking at what precedes the target of extrametricality. Doing that, however, can also distinguish (9b) from (9c), and yet that distinction is not exploited. In other words, unlike (8), which represents one out of only two logical possibilities, the range of choices for extrametricality in (9) represents one out of sixteen logical possibilities (i.e. 2^4). Furthermore, since extrametricality is allowed to apply both to a syllable and to a consonant, there seems no reason why it could not apply also to a vowel, thus raising the number of logical possibilities to thirty-two. Although some of the other possibilities may be of use for other languages, we doubt that too many of them actually are. Note too that there is no way to predict extrametricality from syllable structure. While the extrametrical consonant in (9a) is the one extraneous to normal syllable structure, the extrametricality of (9b, c, c′) applies to well-formed syllables, showing that there is no possible reduction along those lines.[3]

In conclusion, the account of final "superheavy" syllables in terms of null vowels, as in (6) above, yields an optimal account of the main

3 Also shown by the fact that English (2c, d) above have a final extrasyllabic consonant and yet no C extrametricality.

generalizations of Arabic stress, requiring only the further language-specific statement in (8). This contrasts with the arbitrary collection of extrametricality markings required by the alternative.

2.3 Tiberian Hebrew

Halle and Vergnaud (1987a, pp. 63ff.) give the data in (10) as representative of stress in Tiberian Hebrew.

(10)	a.	qamtém	b.	qáamuu	c.	kaatbúu
		qamtén		qámtii		kaatbáa
		kaatáb		qáamaa		
		k'tabtém		kaatábtii		
		k'tabtén				

They also argue, following Prince (1975) and Rappaport (1984), that in the cases in (10c) a process of syncope has applied, as in *kaatabuu* → *kaat'buu*, and that for this reason the apparently final stress is in a sense penultimate – merely shifted to the nearest stress-bearing element under syncope. Slightly adapting their account here, we suppose that the effect of syncope is that of replacing a full vowel with a null one, maintaining the overall foot structure, as in *kaa(tabuu)* → *kaa(tϕbuu)*. Strict necessity will then cause the foot, otherwise left-dominant (trochaic), to become right-dominant (iambic), given the obviously non stress-bearing character of the null element. This interpretation in fact mirrors in part the one suggested on p. 16 above for the stress "shift" with weak feet in English, e.g. *(cáro)(lì:ne)*, where we viewed primary stress as being deflected minimally away from a foot that is too weak to bear it. If this view is correct, and if the cases in (10c) thus instantiate penultimate stress as HV argue, then the factual generalizations of Tiberian Hebrew reduce to those in (11) (disjunctively ordered as usual).

(11) a. Closed final, if there is one, or
  b. Penultimate

The question is whether any further reduction is possible. HV give a negative answer here, claiming that, while (11b) reflects the normal stress rules, (11a) is due to the special provision in (12), where "line 1 asterisk" implies stress in their system.

(12) "a general rule that is ordered before the stress rule and supplies word-final closed syllables with a line 1 asterisk." (HV, p. 64)

Note that (12) is, in essence, a subcase of (3a) of 1.3 above, i.e. "there are exceptional feet." Again we will argue for the "exceptional segment" approach instead. Specifically, we take (11a) to be a reflex of the condition in (13) holding in Tiberian Hebrew.

(13) All words end in a vowel

If (13) holds, and supposing Tiberian Hebrew is like Arabic with respect to (6) above (permitting final vowels to be null), then words in (10a) must have a null final vowel. This will directly reduce (11a) to (11b), and make Tiberian Hebrew stress uniformly penultimate, instantiating binary feet ($\sigma\sigma$). Tiberian Hebrew must thus be different from Arabic or English, to which we attribute binary/ternary feet, but that conclusion will hold on any approach (recall discussion of "quantity sensitivity" in 1.2 above).

Hence, both HV's (12) and our (13) account for (11a). But, while (12) seems quite arbitrary, in selecting "word-final closed syllables," the condition in (13) has independent motivation, since it is overtly attested in a number of languages. A well-known case is of course Italian, in which (essentially) all native words end in a vowel. Another is Malayalam, discussed in Mohanan (1989). In this language, a final ə appears with all the words that do not end in another vowel, whence *paṇṭə* "ball," *cāraṭə* "string," etc., and the pronunciation *beltə*, *powerə*, etc., for English borrowings *belt*, *power*, etc. (Mohanan 1989, p. 591).[4] Similar vowel-final requirements hold in Kannada (Aronoff and Sridhar 1983), and Diyari (Prince 1991b), Japanese, Desano, Lingala, Vata (Kaye 1990).

In Burzio (1987), we have proposed that word-final vowels reflect a more general condition that requires that consonants syllabify as onsets to the maximal extent possible, or "onset maximization." The latter condition, which holds quite generally, ruling out, for example, the syllabification **am.er.ic.a*, will work to eliminate codas. The asymmetry between word ends, where this effect seems to succeed, eliminating closed syllables, and word-internal positions, where closed syllables

4 This insertion is parallel to insertion of final *e* with borrowings or acronyms like *fiat* → *fiate*/*fiatte* by Italian speakers. The vowel-final condition has rather similar exceptions in both Malayalam and Italian. Final *m* and *n* in the former (see Mohanan 1989, p. 591), final sonorants in the latter (see Burzio 1989, p. 52).

remain, as in Italian *a.GOS.to* "august," Malayalam *AP.sa.r̄a* "nymph," seems to reflect a greater freedom with which word ends are manipulated in general, as independently revealed by processes of apocope or epenthesis. We lack a more precise account of this fact, however.[5] We may note here that, when the condition in (13) became operative in the history of Italian, at least in the version that requires *overt* vowels, it was satisfied sometimes via epenthesis, as in *sum* → *sono* "I am," sometimes via apocope, as in *amat* → *ama* "he/she loves."

While the nature of the word-final/word-internal asymmetry just noted is not very clear in general, for the cases in which (13) is satisfied by null vowels, as in Tiberian Hebrew, we may perhaps simply attribute it to an asymmetry in the distribution of null elements. Specifically, we may suppose that empty structure beyond word edges (but not word-medially) is available for syllabification, as we did for the case of Arabic. The condition in (13) above will now result from the fact that among the syllabification principles, there is one of "onset maximization." The ability of the latter to force recourse to null elements must obtain only language-specifically, however, lest Arabic *kátabat* be incorrectly analyzed as **ka(tábatφ)*. We must then presume that only the more general constraints on syllable structure hold in Arabic, and – we suppose – universally, thus inducing null vowels in *darabtφ*, etc., while (13) obtains only in some languages. In addition, (13) must be supposed to have language-specific variants as noted, so that in Italian it will be satisfied only by *full* vowels, in Malayalam by any non-null vowel including schwa, and in Tiberian Hebrew by any vowel including null ones. In a sense, the case of Arabic, in which (13) does not seem to hold in any form, is the next and last point on the same scale, going from full vowel to schwa, to null vowel, to no vowel position at all.

In conclusion, the hypothesis that final vowels can be null in Tiberian Hebrew just as they can in Arabic (as stated in (6) above), in conjunction with the requirement in (13) that all words end in a vowel, which holds overtly in several other languages (though not at all in Arabic), will reduce (11a) to (11b), and all cases to penultimate stress. Hence the "exceptional segment" approach prevails again, because supported by

5 Mohanan actually argues that, in a certain sense, all syllables are open in Malayalam, and that geminates, as well as clusters, are syllabified tautosyllabically with the following vowel. But this conclusion is in fact motivated, at least in part, by the assumption that there is no asymmetry between word-final and word-internal syllables, which we do not adopt.

the independent existence of the V-final condition (13). In contrast, the "exceptional stress (= exceptional foot)" approach of (12) has no independent support.

2.4 Latin, Italian and Spanish

Latin stress obeys the well-known generalizations in (14).

(14) a. Heavy penultimate, if there is one:
roma̍:nus, amántis
b. Otherwise, antepenultimate:
pópulus

A system based on the unary/binary typology $(H)/(\sigma L)$ will apply syllable extrametricality to all lexical items. This will be systematically equivalent to simply applying our postulated feet, $(H)/(\sigma L\sigma)$, directly. Our approach must, however, postulate the setting of the parameter in (8) opposite that of Arabic, taking syllables with null vowels to be systematically extrametrical, as in *can(tá:ban)tϕ*. There is then further equivalence of the two systems, both applying extrametricality systematically.

Note that, with regard to the treatment of null vowels, we must then have two parameters, yielding four cases, as in (15).

(15) a. *Extrametricality of weak syllables*
(i) + e.g. Latin: *can(tá:ban)tϕ*[6]
(ii) – e.g. Arabic: *da(rábtϕ)*
b. *Exclusion of word-final codas*:
(i) + e.g. Tiberian Hebrew: *kaa(tábϕ)*
(ii) – e.g. Arabic: *(kátabat)*

Before considering the facts of Italian, we note that, in English, syllable/consonant extrametricality serves as a diacritic marking the distinction between such pairs as *prevént/oppónent* in the manner of (2) above. In contrast, in the other languages so far reviewed, namely Arabic,

6 Null vowels must be presumed not extrametrical in Latin monosyllables, e.g. *(dúxϕ)* (compare discussion of Italian monosyllabes below). This "exception" is parallel to the one required by syllable extrametricality, which must - obviously - fail with monosyllables, while applying to all other cases.

Note that the setting of (15b) may not always be decidable. For instance in a language like Latin we have no way of deciding betwcen *can(tá:bat)* and *can(tà:ba)tϕ*.

Tiberian Hebrew and Latin, stress is entirely predictable from segmental structure, requiring no particular lexical diacritic or marking. This potential function of extrametricality is thus unutilized in those languages. Now, superficially, Italian would seem to be like English in requiring *some* lexical marking, given the facts in (16).

(16)	a.	agósto	b.	lodáto	c.	pópolo
		cappéllo		subíto		súbito
		studénte		ancóra		áncora

Lexical marking seems required in particular by the cases in (16b, c), which would seem underlyingly identical and yet have different stresses. A system based on $(H)/(\sigma L)$ as possible feet and syllable extrametricality may then seem adequate, in the manner illustrated in (17).[7]

(17) a. a(gós)<to>/a(gósto) b. lo(dáto) c. (pópo)<lo>

But note now that vowels in stressed open penultimates such as those in (16b), while underlyingly short, are in fact phonetically long (Vogel 1982, p. 39 and references; Botinis 1989, p. 57 and references), hence *lodá:to.* This seems to require a lengthening rule applying in this specific environment, as no other vowels surface as long. The analysis in (17) would then imply that vowels lengthen in open syllables which head binary feet. This, however, is unsatisfactory for two reasons. One is that it would fail to relate the derived heavy penultimate of (17b) to the underlying one of (17a), where unaries rather than binaries require a heavy syllable. The other is that the analysis in (17) would incorrectly predict lengthening in (17c) as well. As argued in Calabrese (1985), there is good reason to believe that only open *penultimates* and not *ante*penultimates lengthen their vowels under stress. As Calabrese notes, the phenomenon of rising diphthongization that historically affected lax *e*, *o*, produced *m*[yé]*le*, *f*[yé]*no*, [wó]*mo*, *b*[wó]*no*, but not **m*[yé]*dico*, **p*[yé]*cora*, **p*[wó]*polo*. This is reminiscent of English trisyllabic shortening, and not by accident, as we will see later on.[8]

7 Den Os and Kager (1986) postulate uniformly binary feet in conjunction with variable application of syllable extrametricality. The ensuing prediction is that there should be a class of cases with a heavy penultimate but antepenultimate stress. We find this generally incorrect, despite a handful of such cases (e.g. *mándorla* "almond").

8 Vincent (1987) presents evidence from various Italian dialects which also supports this distinction between stressed penultimates and antepenultimates, although it also reveals a further distinction between stressed antepenultimates and unstressed syllables.

In contrast to the above difficulties, an adequate account of vowel length is achieved if one postulates that the lexical marking distinguishing (16b, c) is not extrametricality, but rather stress itself, and that the notion of well-formed foot applies as a condition on derived structure. From that point of view, the lengthening and consequent heavy penultimate in *lodá:to* will simply reflect the independent fact that stress only falls on penultimates if heavy, as in *agósto* versus *súbito*. This type of analysis could still be implemented in terms of unary/binary feet $(H)/(\sigma L)$, and fixed one-syllable extrametricality, as in (18).

(18) a. a(gós)<to> b. lo(dá:)<to> c. (pópo)<lo>

The vowel lengthening in (18b) would then be due to the fact that a unary foot uniformly requires a heavy syllable. But, exactly as for Latin, binary/ternary feet $(H\sigma)/(\sigma L\sigma)$, with no syllable extrametricality, would do just as well, as in (19).

(19) a. a(gósto) b. lo(dá:to) c. (pópolo)

Our conclusion is thus that, just like Latin, Italian provides no support for syllable extrametricality. Italian is of further significance, however, since it does require some lexical marking, for which syllable extrametricality may have seemed well suited, but in fact is not.

Italian is also significant because it decides between the two possible interpretations of stress: (i) assigned by rule; (ii) checked by output conditions. In essence, a rule-based account is excluded for Italian because it would result in an ordering paradox. Consider that a stress rule would correctly treat the penultimate of (19b) *lo(dá:to)* like that of (19a) *a(gósto)*, only if vowel lengthening preceded stress. However, the correct distribution of long vowels is only obtained if lengthening in fact *follows* stress, since only stressed vowels (in penultimate syllables) lengthen, whence the paradox. In contrast, an output condition requiring the structure $(H\sigma)/(\sigma L\sigma)$ will appropriately constrain both the position of stress and vowel lengthening simultaneously, yielding no paradox. Note here that other languages, like Latin, which are consistent with stress by rule, are in fact also consistent with stress-checking. This suggests stress-checking is the correct approach altogether. That view will in fact yield an optimal account of the difference between Latin and Italian (which we presume maintains the metrical system of Proto-Romance). Both Latin and Italian can be taken to observe the same foot templates $(H\sigma)/(\sigma L\sigma)$ as output conditions. The basic difference between them will be that whereas Latin did not permit changes in vowel length in the course of the derivation, but rather fixed vowel length underlyingly (i.e. distinctively), Italian, having lost that underlying distinction, does permit such changes. It is in fact the adjustment in vowel length that enables it to preserve the Latin stress. No major overhaul in the accentual system as traditionally suggested needs to be postulated. The basic foot templates remain identical. The apparent "unpredictability" of Italian stress follows from the loss of distinction in underlying vowel length.[9] We will see in chapter 5 below that English is significantly more like Italian than like Latin, also requiring, rather than just allowing, underlying stress and stress-checking.[10]

The above account of Italian stress extends with minor changes to Spanish, whose main generalizations are illustrated in (20), (21) (in part from Harris 1983).

(20)	a.	carámba	b.	pistóla	c.	epístola
		arbústo		perdída		pérdida
		torménta		sabána		fábrica
(21)	a.	guitárt	b.	señór	c.	ámbar
				civíl		móvil
				mercéd		césped

9 This leaves open the question of how Latin could meet the prescribed foot conditions in the case of bisyllabic words, e.g. *fava*, the Italian equivalents of which lengthen the first vowel. There exist two possibilities in principle. One is that Latin in fact also allowed vowel lengthening in this particular environment (i.e. by default of other means to construct well-formed feet). The other possibility is that metrification availed itself of empty structure, parsing a null syllable in these cases (again as a last resort, and as with monosyllables (cf. fn. 6)). We have no evidence for deciding between these interpretations. Note that the second possibility would not be available in cases like *(ámantϕ)* lest they would instantiate the ill-formed structure *(*σHσ*). However, we will argue below for English that the structure (*LH*) is in fact permitted word-initially, as in (*hónes*)*t*. Latin *amant* would then be amenable to the same analysis, i.e. (*áman*)*t*.

10 The question is whether there is *any* language whose stress could not be accounted for by well-formedness conditions on derived structure, namely a language in which generalizations relative to stress only hold at intermediate levels and not in derived representation. Tiberian Hebrew may seem to be such a language, since stress seems regular only *prior* to the syncope that affects stressed penultimates, as we discussed in connection with (10c) above, and irregular after. However, the specific interpretation we gave of the syncope and the assumption that it preserves foot structure will make it in fact compatible with stress checking. On that interpretation, all feet in Tiberian Hebrew, including those affected by syncope, would check as binary.

The data in (20a, b, c) are parallel to the Italian ones in (16a, b, c), respectively, and we suppose they are amenable to exactly the same analysis. The data in (21a, b, c) are parallel to their counterparts in (20), differing systematically by the lack of a final vowel (although the case in (21a), with a final cluster, is rare). It is then obvious that (21a, b, c) reduce to (20a, b, c), respectively, if we suppose that Spanish is like Italian and Tiberian Hebrew with respect to (13) requiring that all words end in a vowel, but in fact like the latter in allowing final vowels to be null.

Note that the thus hypothesized null vowels generally become overt in plurals, as in *señórϕ* → *señóres*, showing that null vowels are primarily an "edge" phenomenon (although there are special conditions under which this will not occur, e.g. *frak* → *fraks*, which we will not attempt to characterize here; see Contreras 1977; Harris 1987). We may note that this analysis reduces the stresses of (21) to those of (20) in a manner quite similar to that of Harris (1969) based on *e*-elision applying after stress in (21) (which in turn mirrors the English *e*-elision of *SPE*). At the same time, however, it also enables us to maintain, with Saltarelli (1970), Contreras (1977), Harris (1987), that the *e* of plurals like *señores* is in fact epenthetic, thereby explaining why it is the same as the epenthetic *e* of other contexts, e.g. the initial one of *estudiante*, etc., not explained in Harris (1969).

In sum, we are maintaining that the lexical marking distinguishing the otherwise identical cases in (b), (c) in each of (20), (21) is stress itself, as in the comparable Italian cases, and that Spanish stress also reduces to the usual two feet $(H\sigma)/(\sigma L\sigma)$. This implies that the stressed vowel in (20b), (21b) must lengthen under stress, just as in Italian – a view that seems consistent with the data we have available, such as Gili y Gaya (1940), Borzone de Manrique and Signorini (1983) (see also Otero 1986, fn. 31 and references cited; Botinis 1989, p. 57 and references cited), although we lack data comparing the stressed penultimates of (20b), (21b) with the antepenultimates of (20c), (21c).[11]

We must note that, while amply attested, the patterns of both (20c) and (21c) are nonetheless relatively rare compared with those of (20b), (21b) (Harris 1983). On the one hand this underscores the parallelism between (20) and (21) which our analysis captures, but on the other it suggests that

11 However, in contrast to Italian, the rising diphthongization that affected lax *e*, *o* occurred in both open and closed syllables in Spanish, whence Spanish *fiesta*, *puerco*, compared with Italian *festa*, *porco*, suggesting lengthening in Spanish obeys somewhat different modalities. We are unable to assess the exact nature of this difference at this point.

Spanish is somewhat intermediate between Tiberian Hebrew, which exhibits binary feet – penultimate stress – consistently, and Italian or Latin, in which antepenultimate stress is quite normal.[12] Still, antepenultimate stress in Spanish also occurs with a small number of consonant-final items, exemplified in (22).

(22) a. síntesis b. régimen
análisis ínterin
sócrates

For those in (22a), we suppose that the "vowel-final" condition is suspended with a certain class of items ending in *s* (mostly of Greek origin: Harris 1983, p. 85). This suspension is in fact also required by plural *s*, which does not in general cause stress shifts, as in (*céspedφ*) → (*céspede*)*s*, not **ces*(*pédesφ*). If we suppose further that plural *s* is excluded adjacent to *s* (or simply that some degemination occurs), we then account for the invariability of these words, as in *análisis* → *análisis*, versus normal *compás* → *compáses* (see also Harris 1980). For Harris' (1983, p. 85) "erudite" cases in (22b), we suppose that the final weak syllable is extrametrical. The stress shifts in plural *regímenes*, *intérines* will then follow directly from the fact that the formerly weak syllable is no longer weak once *e* is inserted, thus requiring metrification.[13] For a different analysis see Roca (1988); see also HV.

To sum up again, Spanish is like Tiberian Hebrew in supporting the null-vowel hypothesis, which has the virtue of reducing the patterns of (21) to those of (20). In addition, it is like Italian in supporting the notion of underlying stress, required to distinguish (20a)/(21a) from (20b)/(21b), respectively.[14]

12 The overall smaller size (or "weight") of feet in Spanish compared with Italian is also consistent with the claim of Botinis (1989, p. 57) and of the references he cites that in Spanish stressed vowels lengthen less than they do in Italian.

13 Stress also shifts in *carácter* → *caractéres*, although not in *cadáver* → *cadáveres*. We regard the former case as idiosyncratic, perhaps related to the noted preference for penultimate over antepenultimate stress in Spanish.

14 Our discussion has left out glide-final words such as *convóy*, which receive final stress nearly invariably. This fact suggests the glide is metrically like a geminate consonant, thus both requiring a final null vowel and closing the preceding syllable. While the final vowel does indeed show up overtly in plurals like *convóyes*, we have no independent motivation for the "geminate" status of the glide. Occasional cases like *dísney*, noted in Roca (1988), would follow from non-metrification of the final null vowel in the manner of (we presume) equally exotic (*régime*)*nφ*, discussed above.

2.5 Against monosyllabic feet

The facts of Italian and Spanish discussed so far make syllable extrametricality superfluous, since they follow directly from the two options $(H\sigma)/(\sigma L\sigma)$, as we have shown. However, they could be accounted for in terms of unary/binary feet $(H)/(\sigma L)$ and some appropriate application of extrametricality. Other facts to which we now turn, however, are not amenable to this type of account, and indicate explicitly that unary feet are not an option.

Consider that, in Italian, all oxytones fail to pluralize, as in *caffé* → *caffé* versus paroxytonic *cáne* → *cáni*, with normal pluralization. As argued in Burzio (1987), this fact follows directly if unary feet do not exist. On that view, the only possible representation for an item like *caffé* with the given stress will be with a null final syllable, so as to sustain a *binary* foot. The noted invariance will then follow from the simple fact that plural formation involves a change in the quality of the final vowel (*o*→*i*/*a*→*e*/*e*→*i* being the normal cases). Since in oxytones the final vowel and whole syllable is null, it will rather naturally fall beyond the scope of the pluralization rule. Note that this kind of hypothesized null vowel and syllable is somewhat different from the others encountered above. In those other cases, the null element had parallel motivations coming from stress and from syllabification facts. Here, the latter type of motivation is lacking. The final overt syllable here appears to be just a normal open syllable.[15] Here, on the above account, there is rather morphological evidence for the null elements, along with the stress evidence, to sustain our analysis. See, however, in 3.2 below, the discussion of English oxytones (e.g. *kangaróo*) which provide no comparable morphological evidence.

The existence of empty structure with Italian oxytones is also revealed by other morphological processes beside pluralization, such as various cases of suffixation. Thus, compare normal *dónna*/*donn-ÓNA* "woman/

15 Since the overt final vowel is in an open syllable, and in a binary foot, one might expect it to lengthen, like the stressed penultimate vowels discussed above. According to Vogel (1982, p. 39 and references), this is not the case, final stressed vowels registering approximately the same length as unstressed ones, or stressed ones in closed syllables. The study in Vayra (1992) suggests evidence of glottalization in such final vowels - the presence of some incipient gottal stop. This might account for the shortness of the vowel (though it would violate the vowel-final requirement (13) above), but the data in Vayra's study also indicate, on our reading of them at least, that the vowel is to some degree lengthened. We must leave these issues unresolved.

big woman," *ventiquáttro/ventiquattr-ESIMO* "twenty-four/twenty-fourth," where suffixation truncates the stem, with oxytonic *caffé/caffett-ÓNE* "coffee/big coffee," *ventitré/ventitre-ESIMO* "twenty-three/twenty-third," etc., where the stem is not truncated, and sometimes even augmented instead. Given these facts, in oxytonic cases the "final" vowel must clearly not be final from the point of view of the morphology.

Further evidence for empty structure comes from the pattern of paragoge in various dialects, like *peró* → *peróne*, but not *péra* → **pérane* in the Grosseto dialect (Sluyters 1990, p. 75; Rohlfs 1969; Fonetica, pp. 467ff.). This pattern, privileging oxytones, follows from supposing that paragoge simply fills in the otherwise empty structure.

In contrast to the above account, in a system employing unary feet there is little reason for any of these phenomena, such as the non-pluralization of oxytones. In that system, final stress would only imply non-application of extrametricality, which seems unrelated to pluralization. Note that attempts are sometimes made to establish such a correlation. Specifically, it is proposed that extrametricality is confined to the portion of the word called "class marker" – the same portion which is targeted by pluralization (e.g. Den Os and Kager 1986, p. 47). If this view were tenable (aside from its obvious lack of cross-linguistic generality – consider English), then lack of extrametricality would imply lack of a "class marker," in turn correctly implying lack of pluralization. The idea that one could give an adequate independent definition of "class marker" seems illusory, however. For instance, there is no independent sense in which words like *tre* "three" and *quattro* "four" differ with respect to the presence of a "class marker." The only independent difference is that one is a monosyllable, and hence oxytonic, while the other is not. Morphology just seems to detect that difference (above examples). On the other hand, words like *cínema*, *fóto*, *móto*, and others like them would quite plausibly seem to lack a "class marker," since they are clearly truncations and do not pluralize. Extrametricality should then fail and these should have final stress, but they do not. Extrametricality must therefore apply to these cases as well, which means there can be no connection between it and pluralization, hence no account of failed pluralization of oxytones in a theory that has unary feet. Truncated words which are normally stressed present no problem for our view, which only implies that if a word has final stress there will be empty structure, but not *vice versa.* We can thus suppose that the latter words are lexically represented with some empty structure, essentially corresponding to the truncated portions, i.e. the capitalized portions of *cinemaTOGRAFO*, *fotoGRAFIA*, *motoCICLETTA*, etc. (which also have currency in the language). Non-pluralization will then follow just as with oxytones, while the stress pattern can be interpreted as preserving the stress of the non-truncated variants *cìnematógrafo*, *fòtografía*, etc., and under the usual foot conditions $(H\sigma)/(\sigma L\sigma)$.

The above analysis of Italian oxytones is confirmed by Spanish, some dialects of which exhibit the so-called "double" plurals, as in *café* → *café-se-s*, in contrast to normal *hómbre* → *hómbre-s*. As noted in Harris (1980), double plurals occur only with oxytones. This fact is straightforward from our point of view: double plurals result from filling in the empty syllable that oxytones must have. This phenomenon further supports the view that empty structure privileges prosodic edges, since the fill-in only occurs when the empty structure is internalized. However, in standard dialects of Spanish which pluralize as in *café* → *café-s*, empty structure must occur even internally, as we must presume it does in occasional cases like *frak* → *fraks* noted above (which do not insert the *e*, in contrast to normal *señor* → *señores*), or for that matter even in English, as in *rentϕ* → *rentϕ*s, to be discussed in 3.5 below.

The above discussion thus essentially leads to the conclusion that monosyllables can only be clitics. Words that constitute independent prosodic domains must be minimally bisyllabic. This explains why minimal words are in fact overtly bisyllabic in various languages. One of these is the already noted Grosseto dialect, in which, for instance, Italian *fu* "was" becomes *fune* (Sluyters 1990). Another is Malayalam, in which, according to Mohanan (1989), English "monosyllables" *cup*, *bus*, *pen* become [kʌppə], [bʌssə], [pennə], etc. Yet another well-known case is Yidin^y, in which "no stem may be monosyllabic" (McCarthy and Prince 1990, p. 233; Dixon 1977) and Mohawk (Michelson 1988).

The non-existence of metrical monosyllables is also supported by the "Monosyllabic head effect" of Macedonian, discussed in Franks (1989), Kenstowicz (1990b). In Macedonian, stress is normally antepenultimate. This holds as well for words which result from a certain type of compounding, so that *preku+zima* yields *prekúzima*. This generalization, however, has one set of exceptions: when the second word is a monosyllable, the resulting stress is penultimate, rather than *ante*penultimate, as in *okolú+rid*. Monosyllables thus behave in this respect like sequences of two syllables. From our point of view, there is a simple explanation: they are. We thus suppose that the normal foot in Macedonian is ternary, whence antepenultimate stress, and that the minimal foot is – as usual – binary. Apparent monosyllables will thus have to be disyllables metrifying a null vowel, as in *(rídϕ)*. When appearing in compounds, they will make normal antepenultimate stress look like penultimate stress, as in *oko(lúridϕ)*.[16]

Non-existence of monosyllabic feet is further confirmed by the fact that theories that do not exclude them in principle often need to eliminate them by means of specific "destressing" rules. The literature on stress seems to be in agreement that – cross-linguistically – adjacent stresses are rather generally disallowed, except at word edges. If our approach is correct, then superficially monosyllabic feet should be observable at word edges, because of the availability of empty structure, but not word-medially, hence accounting for the general absence of adjacent stresses word-medially.[17]

In contrast to our principled exclusion of adjacent stresses, HV, while surveying a considerable number of languages, also invoke a destressing rule to eliminate adjacent stresses in a considerable number of instances, which we take the liberty of listing in (23).

(23)	*Language*	*Destressing rule, HV*
a.	Garawa	p. 19; p. 221
b.	Yidin^y	p. 24
c.	Winnebago	p. 31
d.	Aklan	p. 46
e.	Creek	p. 60
f.	Tiberian Hebrew	p. 69
g.	Chamorro	p. 206
h.	Lenakel	p. 217

16 As both Franks and Kenstowicz note, when the monosyllable is preceded by a disyllabic stem, there is vacillation between penultimate and antepenultimate stress, as in *prekú + rid/préku + rid*. For us, this means that the final weak syllable here may remain unmetrified under certain conditions - evidently exhaustive parsing of the word, corresponding to initial stress, as in *(prékuri)dϕ*.

17 Among the languages that apparently exhibit adjacent stresses are Tübatulabal (Prince 1983 and references; HV, pp. 183ff.), Yupik (Halle 1990), Ojibwa (Kaye 1989, p. 140). While a detailed study of these languages is beyond the scope of this work, we find most reported instances of adjacent stresses in those languages to be either at word edges, where we have a way to account for them as stated in the text, or to involve only syllables with long vowels rather than all heavy syllables. It is conceivable that long vowels may be metrically bisyllabic in certain languages, like sequences of different vowels in English.

To these must be added the numerous cases in which destressing is required in English, which we will examine separately in chapter 4 below.[18]

While a destressing rule will correctly capture the empirical generalization that there are no adjacent stresses, it is clear that it is a liability, because of its coexistence with another mechanism – the one that constructs feet ("constituents," in HV's terms), which has the rather similar function of providing an alternating pattern of stress. The redundancy between the two is made evident by considering that, in a sense, "destressing" is empirically equivalent to the rule of "perfect grid" of Prince (1983). For, if we simply imagine an initial representation with a full rather than an empty grid, eliminating adjacent stresses by destressing will yield stress on every other syllable, just like Prince's "perfect grid." And, although the latter is not the only component of Prince's grid theory, it is nonetheless the core of it – there is no other device independent of perfect grid which gives alternating stresses in that theory. Thus, while we find empirical reasons to depart from Prince's grid theory, mainly related to its exclusion of ternary feet and its adoption of syllable extrametricality, we find its conceptual structure parsimonious, and hence correspondingly *un*parsimonious that of the theory that has both an algorithm for compiling feet and rules of destressing. Hence, while we will not attempt to provide alternative analyses for the languages in (23), we take the need for destressing in each of those cases to further suggest non-existence of monosyllabic feet.

2.6 For ternary feet

Theories that employ syllable extrametricality use it to account for the antepenultimate stress of Latin, Italian, Spanish and other languages, and correspondingly exclude direct construction of ternary feet. This account faces two difficulties. One is that ternary feet appear in other portions of the word as well, beyond the scope of extrametricality. The other is that, in certain cases, extrametricality fails to provide an adequate account even of antepenultimate stress. Beginning with the former case, ternary feet appear in many languages, including those in (24).[19]

18 Destressing is also resorted to in Halle (1990) for both Manam and Yupik.

19 The sources for some of (24) are as follows: Dutch, Polish: Rubach and Booij (1985); Spanish: Harris (1983); Chamorro: Chung (1983); Lenakel: HV; Indonesian: Cohn (1989).

(24) a. English (wìnnepes)sáukee
b. Dutch (ìnfini)tiéf
c. Polish (sàksofo)nísta
d. Italian (tèmpera)túra
e. Spanish (gènera)tívo
f. Chamorro (pùtamu)néda
g. Lenakel (kə̀namar)gə́nim
h. Indonesian (xàtulis)tíwa

In theories that exclude direct construction of ternaries, these cases are usually derived from the concatenation of a unary and a binary, via destressing, i.e. from structures like *(wín)(népes)sàukee*; see for example Hayes (1985, pp. 179f.), HV (pp. 241ff.). On this view, the ternary is the result of a conspiracy of two different factors: foot construction and destressing. The problem with this approach is that a number of other, similar, conspiracies never materialize. Thus, in English, none of the apparently parallel *(mò)(nònga)héla* → **(mònonga)héla*; *(pèr)(sònifi) cátion* → **(pèrsonifi)cátion*; *(à)(méri)* <*ca*> → **(ámeri)* <*ca*> obtains. And, while one can surely add conditions to the destressing rule that prevent these derivations, there is little reason why precisely those conditions, among the many conceivable, should hold. In contrast, from our point of view, the above facts follow directly from the usual foot typology, which excludes ($\sigma H \sigma$), whence **(mònonga)héla*, and quadrisyllabic feet, whence **(pèrsonifi)cátion*, and **(ámerica)*. Note, too, that the "derivative" account of the ternaries in (24) does not extend to other cases of ternaries, like the already noted *per(sònifi)cátion*, and the similar ones in (25).

(25) a. ar(tícula)tòry, an(tícipa)tòry
b. phe(nòmeno)lógic
c. per(sònifi)cátion
d. as(sìmila)bílity

The reason is that the analysis of (24) relies on the "degenerate" unary constructed in word-initial position, which will obviously not obtain in (25). Again, appropriate devices can be set up to deal with the cases in (25), but these are likely to remain unrelated to the ones invoked for (24). Note that, here too, ternaries ($\sigma H \sigma$) are excluded as we predict, as shown by *com(pénsa)tòry/*(cómpensa)tòry*, *la(rỳngo)lógic* – **(làryngo)lógic*, *ad(jùsta) bílity* – **(àdjusta)bílity*.

As we noted above, the framework of Prince (1983) is in certain respects more elegant than alternatives in not requiring "destressing." In particular, the pattern in (24) arises in that framework as a by-product of the notion of "perfect grid," which excludes adjacent stresses in general. The initial stress, assigned by a special "end rule," will require the ternary grouping just to avoid stress adjacency. Other noted difficulties arise in this framework just as well, however. Thus, aside from the fact that some further device, other than the "end rule," is needed for (25), nothing seems to distinguish the noted **ámerica*, **mònongahéla*, **cómpensatòry* from the well-formed cases in (24), (25), any more than in the theories based on destressing.

As we will see later on, there is no question that non-final ternary feet occur only under specific circumstances – essentially exhaustive parsing, as in (24), and stress preservation, as in (25) (respectively from *artículàte*, *phenòmenólogy*, *persónify*, *assímilable*). That fact must be captured in any theory, including the present. However, excluding ternary feet from the basic typology does not appear to be the best move, given what is involved in reintroducing them.

Turning now to antepenultimate stress, for us word-final ternary feet, we consider Polish. While normal stress in Polish is penultimate, a certain group of items has *ante*penultimate stress, as in (26) (see Rubach and Booij 1985; Franks 1985; HV, pp. 57f.).

(26) a. gramátyk-a
b. uniwérsytet

From our standpoint, Polish will be not unlike Spanish, which exhibits a clear preference for binary feet over ternaries, but to some degree still allows ternaries, like Latin, Italian and English. We take words like those in (26) to form a special metrical class, in which the standard preference for binary feet is overridden. This account is merely descriptive. It provides no explanation for why these particular words rather than some others have antepenultimate stress, and no explanation for why Polish is, for example, not more like Latin in using antepenultimate stress freely. These are limitations shared by all other analyses. The ones that disallow ternary feet, however, are unable to provide even such a simple description. As HV (pp. 57f.) note, normal syllable extrametricality as an account of antepenultimate stress will only work for (26b). The reason is that the final syllable in (26a) contains the nominative singular morpheme *-a*, which must *not* be extrametrical in general, given the penultimate stress of (27a) below. Furthermore, it is also not possible to suppose that it is the *stem*-final syllable which is extrametrical in (26) (along the lines of the analysis of Spanish in Harris 1983) since that would incorrectly predict *ante*penultimate stress in (27b).

(27) a. hippopotám-a
b. gramátyk

HV (p. 58) thus propose for (26b) (mirroring a similar proposal in Franks 1985) that "certain noun stems are represented in the lexicon with a final extrametrical syllable," hence *uniwérsy*<*tet*>, but for (26a) that "Polish has a special rule that supplies extrametricality to the syllable following certain marked stems." The nominative singular suffix *-a* will thus be extrametrical in (26a), hence *gramátyk*<*-a*>, but not in (27a), hence *hippopotám-a*. This will seemingly yield the right facts, but only at the cost of introducing the notion of "extrametricality by proxy" for (26a) *gramátyk-a*, and thereby taking the two phenomena in (26a, b) to be essentially unrelated – the cost of excluding trisyllabic feet.

Rubach and Booij (1985) observe further that, on closer scrutiny, the latter type of account faces additional complications. The apparently monosyllabic sequence following the stem in (28) must *not* be extrametrical, lest the stress be incorrectly assigned to the antepenultimate, just as in (26a) *gramátyk-a*.

(28) gramatýcz-n-ość

As they note, however, there are reasons to suppose that the suffixal sequence in (28) is in fact *bi*syllabic. For the morpheme *-n* turns out to be underlyingly /in/, derived by deletion of the vowel: "yer"-deletion. Hence, if one supposes that extrametricality applies prior to yer-deletion and affects only the final syllable, then (28) will follow correctly, as in *grama*(*týcz-in*)<*-osc*>.[20] However, introducing yers into the computation of extrametricality will now turn (27b), (26b) into (29a, b), respectively, since it appears that nominative singular forms have underlying yers (italicized) as well.

20 Their execution, however, is slightly different, and has been recast here for the sake of exposition.

(29) a. gramátyk-/*i*/
b. uniwérsytet-/*i*/

On this further assumption, the case in (29a) will now continue to follow correctly since the stem will assign extrametricality to the suffix, just as in (26a). The case in (29b) will not, however, since the suffix should now revoke the extrametricality of the stem-final syllable under peripherality, just as in (the genitive singular) (30).

(30) uniwersytét-u

Rubach and Booij therefore conclude from this that, while the extrametricality of (26b), (28) associated with *gramatyk-* is ordered before yer-deletion, the one of (26b), (29), associated with *uniwersytet-*, must be ordered *after* yer-deletion. The exclusion of ternary feet thus leads to postulating two different notions of extrametricality, one (that of (26b) *uniwersytet*) marked on the stem, the other (that of (26a) *gramatyk-a*) lexically associated with the stem but "transmitted" to the suffix. These two different extrametricalities have furthermore different (and apparently arbitrary) orders of application with respect to other rules in the system.

In contrast, let us review again the facts from our perspective. We suppose, again, that ternary feet are allowed. Let us suppose further that stems like *gramátyk-*, *uniwérsytet-* are lexically stressed like all others, but are peculiar in belonging to a sector of the lexicon which permits ternary feet. This will suffice for both of (26a, b) *gra(mátyk-a)*, *uni(wérsyte)t*, as well as for (29b) *uni(wérsyte)t-ϕ*, in which ϕ is a deleted yer, which we take to yield a "weak" syllable, extrametrical in Polish, hence also in (29a) *gra(máty)k-ϕ*. Stem stress will now predictably be overruled when it yields a foot larger than ternary, as in **uni(wérsytet-u)*, and **gra(mátyc-ϕn-os)c*, in which the deleted yer, maintained as an empty position, cannot be extrametrical presuming there is no *foot-internal* extrametricality. Once overruled, the lexically given stem stress will have no further effect, whence the normal penultimate of (30) *uniwersy(tét-u)*.[21] As for the antepenultimate of (28)

21 Note that the shift of *uniwérsytet/uniwersytétu* is unlike that of Spanish *régimen/regímenes*, which instantiates consistent antepenultimate stress. We have no account for this difference, but recall (fn. 13) *carácter/caractéres*, which partially mirrors the Polish case.

grama(týcz-ϕn-os)c, that will follow from the simple fact that penultimate stress is here impossible, as the deleted yer is unable to bear it.[22] The latter account relies on minimal and plausible assumptions, it avoids the complexities incurred by syllable extrametricality, and as such it argues both against the latter and for the existence of ternary feet.

2.7 Conclusion

We have claimed that two apparently different stress patterns appearing both *within* various languages like Arabic, Tiberian Hebrew, and Spanish, as well as *across* different languages, can be unified by postulating metrification of a final null vowel in the apparently "shorter" pattern, which reduces it to the longer one. We have thus provided an alternative to the influential notion of syllable extrametricality of Hayes (1981, 1982, 1985a) which performs a comparable "equalizing" function, by reducing the longer pattern to the shorter one instead.

We have argued that two arguments in particular establish the superiority of our approach:

1 The null vowel hypothesis, unlike syllable extrametricality, accounts for stress at the same time as it does for the exceptional class of "superheavy" final syllables in languages like Arabic.
2 While the trisyllabic feet implied by the rejection of syllable extrametricality must be independently admitted, the monosyllabic ones required by the rejection of the null-vowel hypothesis must be independently excluded.

22 However, we are unable to account for the difference between this case, in which default of penultimate yields antepenultimate stress, and the case of Tiberian Hebrew discussed in 2.3 above, in which comparable default yields *final* stress.

3 *The stress pattern of English*

3.1 Introduction

It has long been known that the English lexicon does not exhibit a uniform metrical behavior, but breaks down into two major subsets, whose rightmost stress conforms to either of (1) or (2).

(1) a. Heavy penultimate, if there is one:
agénda, appéndix, horí:zon
b. Otherwise, antepenultimate:
américa, ásterisk

(2) a. Superheavy final, if there is one:
prevént, decí:de
b. Otherwise, penultimate:
inhábit, imágine

The pattern of (1) is the one that nouns follow typically but not always, while that of (2) is the one that verbs follow almost invariably. Adjectives exhibit either pattern. Suffixed adjectives prevalently follow the noun pattern, as in *pérsonal*, *precípitous*, *díffident* (*SPE*, p. 81). In contrast, unsuffixed adjectives oscillate between the two patterns, as in *robúst*, *intáct*, versus *hónest*, *pérfect*.[1]

There are a number of cases, however, such as those in (3), that may seem – at least on some accounts – to violate the simple disjunction of (1) and (2).

1 Unlike *SPE* (p. 80), we do not see a generalization to the effect that unsuffixed adjectives follow the verb pattern, witness the cases in (i), which do not, some noted in *SPE*.

(i) a. áwkward, bástard, cóward, éarnest, éxpert, stúbborn, sécond, sólemn, élegant, hónest, módern, módest, stálwart, fórward, ádverse, ádult, ábject, pérfect
b. dérel*i*ct, díffic*u*lt, mánif*e*st, mórib*u*nd, tácit*u*rn, málap*e*rt, résol*u*te

The cases in (ib) are analyzed in *SPE* (p. 80) as having secondary stresses on the italicized vowels. We do not share this view. See 3.2 and 4.4 below.

(3) a. Long vowels in final syllables, as in *broca:de*, *dynami:te* seem to be always stressed, in contrast to other superheavy finals, which may be unstressed, as in *ásterisk/appéndix*.
b. Cases like *permít* seem to violate (2) (compare *inhábit*). Similarly, cases like *vanílla* seem to violate (1) (compare *américa*).
c. Certain syllables closed by sonorants or *s* seem to permit violations of (1a), as in *órchestra*, *álternate*.

We will deal with each of these cases later on, and argue that they can actually be accommodated in various ways. For the time being we will, then, focus on the generalizations in (1) and (2).

The latter generalizations were indeed expressed in *SPE* (p. 77) in terms of a single "Main Stress Rule," given in (4a), along with its syllabic translation in (4b).[2]

(4) a. $\acute{V}\ C_0\ (\ \underset{-\text{tns}}{[\ V\ ]}\ C_0^1\ )\ \langle V\ C_0 \rangle$

b. $\acute{\sigma}\ (\ L\ ) \left\| \begin{array}{l} \text{(i) } \sigma \\ \text{(ii) } C \end{array} \right.$

One can see that the subcase in (4bi) corresponds to the version of (4a) in which the portion in angled brackets is present (the case of nouns), whereas the subcase in (4bii) corresponds to absence of that portion (the case of verbs).[3] The contents of the parentheses in (4a) translate into a light syllable – the parentheses themselves abbreviating a disjunctive ordering in the standard way, so that the left-hand portion of (4b) will have the two ordered expansions $\sigma L/\sigma$, which are equivalent to the two unordered ones $\sigma L/H$.

With the introduction into phonological theory not only of the syllable, but of larger metrical units such as the foot, it may have seemed reasonable to take the left-hand portion of (4b), which remains constant,

2 In the *SPE* (p. 77) formulation, the last V is actually also specified as "–tense," like the penultimate. This is to express the view of (3a) above that tense(/long) vowels in final syllables are always stressed. We will, however, reject that view.

3 Note that the C_0^1 of (4a) would translate into an optional C in (4bii), rather than an obligatory one. However, the expansion of *SPE*'s (4a) that translates into (4bii) is supposed to apply to verbs, which only rarely end in a light open syllable, like *accómpany*, *rémedy*. An optional C in (4bii) would in fact incorrectly allow **accompány*, **remédy*. The C in (4bii) must thus be obligatory, *contra* (4a). The stress of *accompany*, *remedy* will then be correctly described by (4bi).

to be a foot (the parentheses do not stand for foot boundaries here), with the lexically variable and sometimes subsyllabic right-hand residue being extraneous to that foot. In essence, this is the approach of Hayes (1981, 1982, 1985a), which was broadly accepted in subsequent work in metrical phonology, and integrated, with minor changes of empirical content, into the framework of HV. Abstracting away from the specific "tree" notation of Hayes's earlier work, or the bracketed grid notation of HV, this kind of approach will thus presume (rightmost) feet to range over the two possibilities _(H)/(σL)_, as already noted, corresponding to each of the two expansions of the left portion of (4b), and "extrametricality" to have the two instantiations of (4bi, ii). This apparatus will then capture the generalizations of (1) and (2) as in (5) and (6), respectively (where angled brackets now indicate extrametricality, unlike those of (4a)).

(5)	a.	Heavy penultimate:	(H)<σ>	e.g. a(gén)<da>
	b.	Antepenultimate:	(σL)<σ>	e.g. a(méri)<ca>
(6)	a.	Superheavy final:	(H)<C>	e.g. pre(vén)<t>
	b.	Penultimate:	(σL)<C>	e.g. in(hábi)<t>

One of the liabilities of this approach is in the "residue." As we observed for the case of Arabic, the set {σ, C}, to which extrametricality is due to apply, is not a natural class. In fact, the term "extrametricality" here is misleading. Only in (5) is there a syllable which is not metrified and hence properly "extrametrical." In (6) there is instead a consonant which must not be computed by _syllable_ structure, and is hence extra_syllabic_ rather than extrametrical (consonants are not generally "metrified," in any sense – syllables are).[4] Furthermore, to the extent that σ and C are a class, they are an arbitrary one. As already noted, nothing excludes V from this class, which would produce structures like *_americ<a>_, with stress on a light penultimate _ri_ now turned into a heavy syllable _ric_. As we will argue, such structures do not exist, _vanílla_ (of (3b) above) notwithstanding. Zero extrametricality, not postulated by Hayes (for English) would also not be excluded. The latter would predict the type *_americá_, once again, as well as *_inhabít_, with stress on a final heavy rather than

4 HV (p. 231) in fact appropriately remove this case of extrametricality, stating that the rule that stresses heavy syllables is subject to the "proviso that the word-final consonant is not counted in the determination of rime branchingness in the case of the final syllable of underived verbs and adjectives." But the question, of course, simply becomes why there should be such a proviso.

superheavy, both non-existent as we will argue, both *vanílla* and *permít* of (3b) notwithstanding.

Matters change if, instead of looking at (i) and (ii) in (4b), one looks at their difference, or simply the difference between the two stress patterns – the portion in angled brackets in *SPE*'s (4a). That difference is precisely one vowel, in the sense that adding one vowel to (4bii) reduces it to (4bi). This seems a more promising characterization, since unlike the disjunction σ/C, the class "vowel" *is* a natural class. Pursuing that, we suppose that the words described by (6) have a final null vowel, hence reducing (6) to (5). Then, if feet ranged over *(H)/(σL)* as postulated by Hayes, extrametricality would uniformly apply to one syllable – in itself a desirable result. But (putting *kangaróo* and the like aside for the moment), with syllable extrametricality now always obtaining, its motivation would also wane since the latter in conjunction with unary/binary feet would be perfectly equivalent to binary/ternary feet: our system.

A system based on binary/ternary feet cannot entirely dispense with extrametricality, however. If null vowels are to be motivated independently of stress, by constraints on syllable structure, they will occur in more cases than stress requires. In essence, the overall system one needs is the one already described on pages 15–18, repeated in (7) below, where syllables with null vowels are "weak" syllables for (7c).

(7) a. All words end in a vowel
    b. Final vowels can be null
    c. Weak syllables may or may not be extrametrical

The two generalizations of (1) and (2) are accounted for in this system as in (8) and (9), respectively.

(8)	a.	Heavy penultimate:	(Hσ)	e.g.	a(génda), ho(ri:zo)nϕ
	b.	Antepenultimate:	(σLσ)	e.g.	a(mérica), (ásteris)kϕ
(9)	a.	Superheavy final:	(HCϕ)	e.g.	pre(véntϕ)
	b.	Penultimate:	(σLCϕ)	e.g.	in(hábitϕ)

English would then appear to be like Tiberian Hebrew or Spanish with respect to (7a, b), (all being like Italian with respect to (7a)). With respect to (7c), it will be a hybrid language, permitting its lexicon to employ either setting of the parameter of (15a) in 2.4 above, which specifies whether or not weak syllables are extrametrical. We will see later on that there are in fact principles behind this apparently idiosyncratic oscillation.

The two alternative systems we are considering, then, compare as in (10), in which "W" is a weak syllable.

(10)		*Feet*	*Extrametricality*
a.	After Hayes	(H)/(σL)	C/σ
b.	This proposal	(Hσ)/(σLσ)	none/W

Let us consider here vowel-final oxytones like *kangaróo*. In Hayes' (1985a, p. 151) system, these are attributed to a rule of "Long Vowel Stressing" applying to all long vowels in final syllables prior to extrametricality. This rule aims to account for the class of apparent exceptions in (3a) above (HV have a comparable provision). However, we will argue against such a rule in the next section. If we are correct, this will compel the system in (10a) to allow for zero extrametricality, and hence run into the difficulties noted (i.e. **americá*, **inhabít*). From our perspective, such cases can be analyzed by supposing that they have a final null syllable, like the Italian oxytones discussed in 2.5. These cases will be different from others in that the null structure does not receive independent motivation from syllabification considerations. They are also different from the case of Italian oxytones in that motivation from morphological considerations is (to our knowledge) also lacking. This does not invalidate the proposed analysis. The argument for empty structure remains. As usual, what we are trying to determine here is what the abstract nature of an exceptional stress pattern is: exceptional feet/ syllables/ segments ((3) of 1.3 above). We are consistently finding that there are no exceptional feet (many of the previous cases, including that of Italian oxytones). In some instances, such as the present one, there is no direct evidence to decide. Surely in such cases we still want to maintain the same conclusion we reached where the evidence did arise. (Non-existence of monosyllabic feet will be further argued for extensively below.[5])

At first sight, then, the two systems in (10) seem roughly equivalent, both in complexity and in empirical coverage. However, we will argue

5 Note that it is difficult here to determine whether the postulated null syllable should be regarded as a collection of null segments, and hence whether we are dealing with an instance of (3b) or of (3c) in 1.3. Nothing depends on the resolution of this issue.

Note too that the stress pattern is exceptional here not only for the final stress, but also for having primary stress on a structurally "weak" foot, i.e. not as in **kángaròo*. We have no particular way to capture this fact, other than by saying that the principle in (4) of page 16 above can be overridden under certain circumstances (i.e. with borrowings).

that they are not. In particular, we see the facts of English as providing three major arguments for (10b), echoing some of the arguments of chapter 2. We list these in (11).

(11) a. Only (10b) (with (7)) accounts for "superheavy" syllables.
b. Only weak-syllable extrametricality is independently required.
c. Only binary/ternary feet are independently attested, in word-internal position.

Much of this chapter will be devoted to presenting these arguments. We begin, however, with the apparently exceptional cases of (3) above.

3.2 Long Vowel Stressing and other "exceptions"

One of the many long-enduring legacies of *SPE* is the claim in (12) below (see *SPE* rule (25e), p. 72, and discussion on p. 78; Liberman and Prince 1977, p. 272; Hayes 1985a, p. 151; HV pp. 233f.).

(12) Long vowels in final syllables are always stressed

Typical cases cited in support of (12) are those in (13).

(13) a. machí:ne, brocá:de, canó:e, domáin
b. húrric*a:*ne, bárit*o:*ne, mágaz*i:*ne, dýnam*i:*te, réneg*a:*de, cómprom*i:*se

The nouns in (13a) and others like them are clearly special in that they pattern like verbs (compare *prevént*). But this phenomenon does not seem to single out syllables with long vowels, as (14) shows.

(14) cemént, gazélle, giráffe, attáck, arabésque, arrést,
ellípse, shebáng, abýss

The existence of cases like (13a) is therefore insufficient to establish the correctness of (12). The cases in (13b) are even less indicative, for here the presence of final stress is itself in question. In general, perceptual evidence does not appear to be a reliable indicator of secondary stress with heavy syllables whose vowel is unreduced. We must therefore rely on other kinds of evidence to determine presence of stress, some necessarily theory-internal, but nonetheless valid. In particular, we must consider that, if the italicized vowels in (13b) bore stress, main stress would be computed from that position on, whereas if they did not, main stress would be computed from the end of the word. This type of consideration makes main stress *compatible* with stress on the long vowels in (13b), but in fact also with lack of stress. For a stressless final would just make these cases comparable to *ásterisk*, *lábyrinth*, which also have an unstressed superheavy final, simply exhibiting the normal stress of nouns. In sum, there is no evidence for final stress in (13b) at all. In contrast, final stress is established, on this criterion, for cases with a heavy penultimate like *ánecdo:te*, which would be incorrectly predicted as **anécdo:te* otherwise. But of course *ánecdò:te* is just like *pálimpsèst*, and thus continues not to show that V:C# is special, and different from VCC# – it simply indicates that sometimes nouns follow the verb pattern. Let us now apply the same criterion to the cases in (15).

(15) a. mollúscoid
b. stalágmi:te
c. peróxi:de
d. alúmni:

If, contrary to (12), these cases had in fact no final stress, their stress pattern would be exactly as predicted for nouns in general. In contrast, the presence of a final stress would make the position of the primary peculiar, since in general word-internal stresses follow rather different patterns of "retraction," as in *désignàte*, *cónfiscàte*, *tàtamagóuchi*, etc., to be examined in detail in 3.6 below. Hayes (1985a, pp. 151-58) accounts for this fact by supposing that "Long Vowel Stressing," applying to the final syllables in (15), is in a sense orthogonal to the rest of the stress system. Specifically, he proposes that the latter rule is ordered *before* extrametricality, which will then still apply to the final syllables in (15), despite the presence of stress. This analysis correctly accounts for the facts, but of course it simply states that postulating final stress in (15) is problematic, since it requires both a special rule and a special ordering statement.

The system of HV introduces analogous complications. It expresses (12) above by means of the italicized exception clause in the rule of syllable extrametricality in (16) (HV's (19), p. 234, emphasis mine, LB).

(16) * → . / ___] line 0 in nouns and certain suffixes *provided * dominates a rime with a short vowel (nonbranching nucleus)*

The immunity to extrametricality of (16) will cause the final heavy syllables in (15) to be stressed under the usual *(H)/(σL)* pattern. As for the primary stresses, discussing those of (15a, b) *mollúscoid, stalágmIte*, HV (pp. 254ff.) propose that stem and suffix are here independent "stress domains," so that not only the suffix, but also the stem, is independently stressed in accordance with the *(H)/(σL)* pattern, and later concatenated with the suffix. We may note incidentally that extending this analysis to the case in (15c) seems to lead to the surprising conclusion that, whereas *alumn-i:* must constitute two separate stress domains, *alumn-us* must not, lest **alúmnùs* be also derived.[6] More important, however, is the fact that, while HV utilize the notion of independent domains for other classes of cases (*ory/ary*, *atory*, *ive*, *ative*), this is nonetheless an exceptional device in their own system, and one which we will later show in fact plays no role in English. Therefore, supposing that long vowels are exceptional in the manner of (12) introduces further exceptions into the system, a fact which is all the more problematic since the latter have exactly the effect of canceling the former. Thus, in HV's analysis, combination of the notion of independent domains and the italicized portion of (16), both exceptional devices, surprisingly yields the same result as if neither existed – just the normal stress pattern of nouns in (15). In sum, supposing that (12) is factually true leads to rather conspicuous complications in the analysis, as is evident in both Hayes' and HV's theories – a clear argument against it. That argument is strengthened by the cases in (17a, b).

(17) a. rábbi:, áthle:te, sáti:re, cárbi:ne, génti:le, gángre:ne
b. repórt, robúst, ovért, crusá:de, pontóon, cantéen, trapé:ze

If the cases in (17a) have final stress, there will be no reason why that stress should not be primary just as it is in (17b). Note that the pattern in (17b) follows from supposing, as seems plausible, that a final "weak" foot fails to attract primary stress only if there is an alternative foot which is not also weak. Thus, although some of the items in (17b) have initial stresses, those feet – to which we return in 4.2.1 below – are plainly not heavier or stronger than the final one, which thus retains final stress. If so, the cases in (17a) must therefore *not* have final stress.

Further evidence against (12) comes from verb/noun alternations like (18a), duplicated by each of the items in (18b).

6 Note that one may not suppose that *us* is extrametrical if it is an independent stress domain. For surely extrametricality must not apply to monosyllables.

(18) a. [$_V$excí:se]/[$_N$éxci:se]
b. combi:ne, commu:ne, compo:und, decre:ase, incli:ne, incre:ase, invi:te, perfu:me, proce:ed, produ:ce, upgra:de, upri:se

If the nouns in (18) do *not* have final stress, then the noted alternations simply reflect the standard difference between nouns and verbs, which follow (1) and (2) above, respectively. In our analysis, that difference is metrification versus non-metrification of the final weak syllable, as *ex(cí:se)* versus *(éxci:)se*, mirroring *re(córdφ)* versus *(récor)dφ* and many other similar cases. In contrast, if the long vowels in (18) *are* stressed in both verbs *and* nouns, then those alternations represent some new phenomenon which has exactly the same effect as if (12) did not hold, by coincidence.

Finally, consider the verbs in (19).

(19) a. solídify:, persónify:, sylläbify:, acídify:, humídify:
b. illúminà:te, désignà:te, íllustrà:te
c. óxygenà:te, hýdrogenà:te, péregrinà:te

The stress pattern of the verbs in *a:te* in (19b, c) does require postulating a final stress. The opposite assumption would predict **desígna:te*, and likewise exclude *íllustrà:te* and the cases in (19c). The cases in (19a) are different, however, since their antepenultimate stress next to a light penultimate would (in some sense) be normal. Therefore, their final syllable *need* not be stressed. In fact, it *must* not, since, if *fy:* did bear stress, there would be no account of the difference between (19a) and (19c). The cases in (19c) preserve the stress of their stems *óxygen*, *hýdrogen*, *péregrin* (Hayes 1985a, pp. 169f.). If *fy:* was stressed, like *a:te*, then the cases in (19a) should comparably preserve the stress of *sólid*, *pérson*, *sýllable*, *ácid*, *húmid*, as in **sólidify*, **pérsonify*, **sýllabify*, **ácidify*, **húmidify*. Verbs in *fy:* must therefore *not* have final stress. This is in fact independently predicted by our analysis. For our condition (7a) above imposing final vowels is satisfied by the verbs in (19c) directly, without recourse to a null vowel.[7] If there is no null vowel, then stress

7 Of course we are not excluding that there *could* be a null syllable with vowel-ending verbs, just as there is one with some nouns like *kangaróo*. This will be required for cases like *defý:*, *complý:*. Final diphthongs, however, seem special as they do take stress rather generally, for reasons which elude us, as in *annóy*, *survéy*, *destróy*, *deláy*, *convéy*, *portráy*. This problem is analogous to the one noted for Spanish in fn. 14 of chapter 2. Non-final stress occurs with diphthongs only when the verb has a noun counterpart, as in *jóurney*, *vólley*, and the variant *súrvey*.

on *fy:* is excluded. In general, our prediction is then that verbs ending in an overt vowel should metrify like nouns – a prediction that is generally correct, given not only (19a), but also cases like *accómpany*, *rémedy*.[8]

Note that support for the assumption that the long vowels of (13b), (15), (17a), (19a) are stressed could in principle come from the fact that many unstressed vowels appear to shorten, like the ones in (20).

(20) a. expl*ái*n ⇒ èxpl*a*nátion
b. der*í:*ve ⇒ dèr*i*vátion

If the alternations in (20) were due to a general rule of shortening in unstressed position, then indeed the long vowels under discussion could only remain long if they were stressed. However, we will later argue that there is no general rule of shortening in unstressed position, so that even this kind of motivation for taking long vowels to be always stressed is lacking.[9]

Since there is therefore no reason to suppose that long vowels in final syllables are always stressed, and in fact good reasons to believe otherwise, we conclude that syllables with long vowels in fact present no exception to the generalizations in (1), (2) above.

3.3 Geminate consonants

Cases like (21a, b) are also in apparent violation of the generalizations in (1), (2) above, as we noted in (3b).[10]

8 The assumption that long vowels in final syllables may, but need not, be stressed will also reduce alternations like the one in (i) and others noted in *SPE* (pp. 153ff.) to the independently attested oscillation between the two patterns of (1) and (2) above, which we attribute to metrification versus non-metrification of the final weak syllable, as indicated.

(i) a. (rècon)(dí:te)
b. re(cóndi:)te

9 Note too that in fact none among *SPE*, Liberman and Prince (1977), Hayes (1982, 1985a), HV postulate a shortening rule that would affect final syllables. Thus, there is no motivation for (12) even internally to those theories.

10 Further examples of the type in (21a) are given in (i), and of type (21b) in (ii) and (iii). Those in (ii) are verbs, and those in (iii) other categories.

(i) abscissa, achilles, antenna, antilles, armadillo, assassin, ballerina, banditti, bordello, buchanan, chamorro, cigarillo, committee, dilemma, donatello, falsetto, flagellum, gabriella, gorilla, halicarnassus, henrietta, libretto, magellan, nantucket, narcissus, sabrina, savanna, scintilla, sombrero, spaghetti, tallahassee, tobacco, umbrella, vanessa

(21) a. vanílla, kentúcky
b. permít, regrét

Such cases are sometimes treated as pure idiosyncrasies. Thus, HV (p. 232) attribute (21a) to the special provision in (22).

(22) "their stem morphemes are entered into the lexicon with a line 1 asterisk on the penultimate syllable."

Note that (22) is in fact a subcase of the "exceptional foot" type solution of (3a) in 1.3 above – the type that we will consistently reject. The most promising alternatives to (22) seem to be the ones in (23), of which the one in (23b) presupposes syllable extrametricality and is thus not possible within our approach.

(23) a. Certain single consonants behave like biconsonantal sequences.
b. Certain words have zero extrametricality.

The account in (23a) is in essence the one of *SPE* (pp. 82f., 148ff.). If we follow it, and suppose that the consonants in pre-final position in (21a) as well as the final ones in (21b) are bipositional for syllabification, then the cases in (21a) will in fact have heavy penultimates, and the ones in (21b) superheavy finals, thus complying with the generalization in (1) and (2) above, respectively. As noted earlier, this is an approach of the "exceptional segment" type – the type we will argue for. The alternative in (23b), proposed in Selkirk (1984, p. 92), does not directly classify into one of our three types. It is a perfectly natural solution within the theory that has syllable extrametricality. This alternative is also the one proposed for nouns like *berlín, tibét*, which further instantiate the pattern of (21b), in HV (p. 236). Since theories that have syllable extrametricality have feet $(H)/(\sigma L)$, zero extrametricality will correctly give *va(nílla)*, *per(mít)*, *ber(lín)*, and so on. The account in (23b) is more principled than the one in (22), both because it utilizes one of the expected

(ii) abet, abhor, abut, acquit, address, admit, allot, appal, assess, befall, befit, beflag, befog, begin, beset, caress, commit, confess, digress, discuss, distil, expel, forget, fulfill, impel, instil, omit, percuss, profess, progress, propel, rebel, recess, redress, remit, repel
(iii) antoinette, baton, brasil, brunette, canal, cecile, cezanne, chagrin, chanel, cornell, diane, duet, duress, fidel, gabrielle, gallaudet, gazelle, giraffe, hotel, inverness, lacrosse, largess, lautrec, lucille, marcel, morale, morass, pascal, pecan, quartet, remiss, roulette, salon, sedan, siam, spokane, sudan, susanne, teheran, until

expansions of extrametricality and because it more adequately constrains the range of possible exceptional cases, while (22) permits stresses to be assigned randomly. The alternations in (24), however, argue against (23a), and for (23b).

(24) a. tibé*t* ⇒ tibé*t*an
b. remí*t* ⇒ remí*tt*ant
c. deté*r* ⇒ deté*rr*ent
d. propé*l* ⇒ propé*ll*ant

What (24) shows is that instances of (21b) regularly give rise to instances of (21a) under monosyllabic suffixation. This is predicted only by (23a). If the italicized consonants are bipositional, then the alternations in (24) reduce to those in (25) (in which all items conform with (1)/(2) above).

(25) a. assíst ⇒ assístant
b. consúlt ⇒ consúltant
c. repént ⇒ repéntant
d. dispérse ⇒ dispérsant

In contrast, (23b) incorrectly predicts (26).

(26) **tíbet*an, **rémitt*ant, **própell*ant

The reason is that the extrametricality status of the italicized stems should make no difference once a suffix is attached, since extrametricality is lost when non-peripheral. Hence, (26) should be possible just like (27), which employ the same suffixes.[11]

(27) *améric*an, *inhábit*ant, *solícit*ant, *líbel*ant

Note that supposing that – somehow – zero extrametricality could be propagated to the suffix in (26) would obviously also give incorrect results, as in **remit*(*tánt*).[12] HV's (22) is also inadequate in the face of (24). The reason is that, to the extent that exceptional stress seems to exist, as for example in *órchestra* compared with normal *asbéstos*, or *cátholic* compared with normal *apostólic*, it appears *not* to survive

11 The same kind of argument is also provided by alternations like *bacíllum*/*bacíllar*. That is, supposing that *bacíllum* is due to zero extrametricality will not do for *bacíllar*, since the suffix *ar* must be extrametrical in that theory, given *cópular*, etc. Analogously for *papílla*/*papíllar*, *patélla*/*patéllar*, *axílla*/*axíllar*, *colóssus*, *colóssal*.

12 On this point, arguing against Selkirk's suggestion, we in fact echo HV (p. 232, last paragraph of section 7.1).

affixation, as in *orchéstral*, despite the fact that affixation adds no syllables here, or *cathólicism*, despite the fact that *ism* is generally stress-neutral. In (24), however, the apparent exceptional stress persists.

It may also be useful to note that, while behaving like the "final cluster" cases in (25), the cases in (24) behave unlike the "long vowel" cases in (28), in which the suffixed forms do *not* preserve the stress of the stem.

(28) a. revé:re ⇒ réverent
 b. aspí:re ⇒ áspirant
 c. confi:de ⇒ cónfident

If the consonants in (24) are bipositional, acting like geminate consonants for syllabification, it may seem natural that they should behave like biconsonantal sequences and unlike the cases in (28), which we examine in chapter 5 below.[13]

The above argument against (23b) is also, indirectly, an argument against syllable extrametricality itself. As we noted in 3.1 above, zero extrametricality would be naturally expected within that approach, but it is not attested.

Alongside of the above "metrical" evidence supporting (23a), there is also evidence of other kinds. Thus, Myers (1987) argues that alternations like *keep/kept*, *wi:de/width*, *perceive/perceptive*, *interve:ne/intervention*, *scri:be/scripture*, and others follow from general conditions on syllable structure. Adapting his discussion to our framework, we will take the stem of such cases to be syllabified as in *kee.p*ϕ, and affixation of a past tense morpheme *t*ϕ to suppress the stem-final ϕ to produce *keep.t*ϕ. Shortening of the vowel, yielding *kep.t*ϕ, will then result from the constraint on rimes that they contain at most two positions.[14] On that view, cases like (29a) will presuppose derivations like (29b), evidently followed by degemination, to yield the phonetic representation [bled].

(29) a. bleed/bled, hi:de/hid, feed/fed, speed/sped,
 breed/bred, lead/led, re:ad/read, sli:de/slid
 b. blee.dϕ ⇒ bleed.dϕ ⇒ bled.dϕ

13 There are, however, a few "geminate" cases that behave like the long-vowel cases in (28), e.g. *refér/réferent*, on which we will have further comment in 10.3.3 below.

14 As discussed in Borowsky (1989), three position rimes are possible under certain specific conditions, which do not concern the text cases, as in *boulder*, *da:nger*.

The point of this is that we have here independent evidence that *there are consonants that are phonetically realized as simple, but function as geminates with respect to syllable structure*, in shortening a preceding vowel. If this is true, nothing further is required to account for (21) above. In contrast, there is no independent, i.e. non-stress-related, evidence for either of (22) or (23b). The view that the apparent deviancy of the cases in (21) is due essentially to phonetic degemination of what are geminates for syllable structure will also explain why no comparably deviant stress patterns exists in other languages, say Latin or Arabic, in which phonetic geminates do exist. Once again, the solution that proves correct is of the "exceptional segment" type, namely one that attributes the variability and idiosyncrasy to the relation between units of syllable structure and phonetically realized segments.

SPE (pp. 82f., 148f.) provides further arguments supporting the existence of phonological geminates (23a). One concerns the distribution of [ʌ] and [yu], with respect to which the consonants in (30a) behave like the clusters in (30b) and unlike the single consonants in (30c).

(30) a. mu*ss*el, ru*ss*el, ru*ss*et, cu*rr*ent, cu*nn*ing, bu*ck*et, kentu*ck*y, pu*tt*y
b. mu*sk*et, mu*st*ard
c. cu*p*ola, mu*r*al, mu*s*ic, pu*n*itive

A second one concerns intervocalic voicing of *s*, which occurs in (31a), but not in (31b).

(31) a. mu*s*ic, re*s*ent, re*s*ist
b. mu*ss*el, ru*ss*el, ru*ss*et

As (31b) shows, this second criterion correlates with the first, based on the [ʌ]/[yu] distinction. Furthermore, it also correlates with independent morphological considerations. Thus, in *dissemble*, *dissent*, where voicing does not occur, geminate status is independently predicted by the fact that these items clearly consist of a morpheme *dis* (compare *DIStrust*), and a morpheme *semble*, *sent* (compare *reSEMBLE*, *reSENT*).

A third argument given in *SPE* is based on the failure of the items in (32a) to undergo "C*i*V lengthening," which affects open syllables generally, as shown by (32b) versus (32c).

(32) a. pot*a*ssium, congr*e*ssional, conf*e*ssion, digr*e*ssion, depr*e*ssion
b. r*a:*dium, m*e:*dial, gymn*a:*sium, magn*e:*sium
c. c*a*lcium, comp*e*ndium, adv*e*rbial, rev*u*lsion

The *SPE* arguments seem to us just as valid at present as they were when they were given. Hence there seems no reason to abandon the conclusion they led to for either (22) or (23b).

We then conclude that English has a set of consonants which are bipositional with respect to syllabification, and hence close the preceding syllable. The noted stress facts follow from supposing that metrical structure treats those closed syllables like any other. Bipositional or geminate status is not reflected at the phonetic level, as is independently clear from the noted *dissemble*, etc. It is represented with some consistency in the orthography, witness *vanilla*, *kentucky*, etc., as well as *permítting* versus *inhábiting*, etc.[15] It may be worth stressing that the above discussion does *not* claim that speakers learn which consonants are syllabically geminates from the independent evidence we cited, and then go on to apply the stress principles correctly. The reason why this view is not very plausible is that that independent evidence is very diluted at best and in many cases nil. The more plausible view, rather, is that speakers learn where to place the stress from the stress evidence itself, which is always present. Given constraints on possible feet, then, the system of mental representation will sometimes be forced to parse a phonetically simple consonant as a geminate. Once it does so for metrical reasons, the rest of the phonology will simply follow suit, treating them as geminates consistently.

The above hypothesis will now enable us to maintain that in fact there is never any deviation from the usual feet $(H\sigma)/(\sigma L\sigma)$ even with monosyllables like *shop*, *ban*, *cup*, etc. We can take these cases to have both a bipositional consonant and a null vowel, e.g. as in *cuppϕ*. This analysis is the only one consistent with our hypothesis that there are exceptional segments, but no exceptional feet, which will be further confirmed below. In this connection, recall also the non-existence of monosyllabic words, overtly in certain languages, e.g. Malayalam, Yidin^y, and more abstractly in others, e.g. Italian. Note further that Italian vowel lengthening, which

15 However, *SPE* (p. 94) attributes the stress of *permít* not to a geminate *t*, but rather to the structure *per + mit* – a view which we will not adopt. Furthermore, the stress of cases like *alabáma*, *pellágra*, *candelábra*, *koála* is attributed to the presence of a long – and yet lax – *a*. We will leave open the question of the exact analysis of these cases.

ensures that final bisyllabic feet have the structure (*HL*), affects disyllabic words as well, e.g. *cá:sa*, indicating that the range of possible feet is *not* extended (here to ($L\sigma$)) by default of syllables. The postulated *cuppφ*, *shoppφ*, *mannφ*, *bannφ* etc. have the usual consistency with orthography, as in *shopping*, *manning*, *banning*, etc. They also correspond closely to the phonetic structure assigned to them by speakers of Malayalam, who, as noted in 2.5, pronounce them as [kʌppə], etc. according to Mohanan (1989). In sum, minimal words in English are taken to be defined by the minimal foot ($H\sigma$), just as in Malayalam and in Italian. A partial qualification to this claim, introducing the foot (*LH*), will be made in chapter 5, but does not affect our general point here.

3.4 Syllables closed by sonorants and *s*

Based in part on observations of Kiparsky (1979), Hayes (1985a, pp. 173ff.), HV (pp. 256ff.) note that syllables closed by sonorants sometimes behave differently from other heavy syllables, as shown in (33).

(33)	I	II	III
	Heavy syllable	*Light syllable*	*V-sonorant*
a.	a*rách*noid	só*le*noid	hél*min*thoid
b.	sta*lág*mite	dý*na*mite	ár*gen*tite
c.	sma*rág*dine	ál*ka*line	sér*pen*tine
d.	ol*fác*tory	áu*di*tòry	ré*per*tòry

Following Kiparsky (1979, p. 428), both Hayes (1985a, p. 174) and HV (p. 257) seek to account for this by supposing that the "V–sonorant" syllables in (33III) are initially stressed, like other heavy syllables, and then "destressed" in post-stressed position by a rule of "sonorant destressing." Since we exclude destressing rules in general, we will exclude this one in particular. A straightforward alternative to destressing will be to suppose that, under appropriate conditions, (34) holds.

(34) Syllables closed by sonorants count as light.

As a stipulation, (34) is no worse than "sonorant destressing," clearly. In fact (34) has an immediate advantage. If the V-sonorant syllable of *répertòry* of (33d) is like a light syllable, the presence of a secondary stress on *ory* will follow from the same principles at work in *áuditòry*, whatever they are. In contrast, if that syllable is initially stressed like the heavy syllable of *olfáctory*, an account is required for the secondary on *ory* in one case but not in the other.[16] (We put aside for now whether the other cases in (33III) also have a secondary stress parallel to that of *ory*).

The conditions appearing to control (34) are several. One (in fact expressed in the Kiparsky/Hayes/HV specific formulation of "sonorant destressing") is a condition that metrification be exhaustive, or simply "exhaustiveness," as the V-sonorant cases in (34) differ from those in (35).

(35) sala*mán*droid, archi*mán*drite, ele*phán*tine, ele*mén*tary

That is, (34) is permitted only if necessary to exhaust the sequence of syllables (by means of the normal range of feet). In the cases in (35), exhaustiveness can be achieved without the intervention of (34), as in *(sàla)(mándroi)d*. However, exhaustiveness cannot be a sufficient condition, since, by itself, it appears to license (34) only sporadically, as in (36a) (from HV, p. 258), and not in (36b).

(36) a. wá*shing*ton, pál*mer*ston, bír*min*gham, rú*ther*ford, lí*ving*ston
b. ve*rán*da, a*gén*da, con*sén*sus, a*mál*gam, u*tén*sil, ap*pén*dix, ad*vén*ture, mo*nòn*gahéla

Since the phenomenon is more systematic within the specific classes in (33) than elsewhere, we presume some other factor to be at work there, the exact nature of which we put aside for the moment, returning to it in 4.2.3 below.

Another of the conditions licensing (34) is preservation of stem stress, henceforth "stress preservation," illustrated in (37), in which we take the "weak" syllable *ble* to be extrametrical (see p. 16 above, 3.5 below).

(37)	a.	pátent	⇒	(pá*ten*ta)ble
	b.	párent	⇒	(pá*ren*ta)ge
	c.	cávern	⇒	(cá*ver*nou)s
	d.	òpportúnist	⇒	(òp*por*tu)nístic

The cases in (37) contrast minimally with those in (36b), in which stress preservation is not at work. Notice that those in (36a) are themselves plausibly cases of stress preservation, in a sense. For it is clear that, etymologically, these consisted of two feet (e.g. *wáshing-tóun*), making

16 In the traditional analysis, in which *ory* is itself initially stressed even in *olfáctory*, etc., this fact is accounted for by ordering "sonorant destressing" prior to the rule that destresses *ory* (HV's "stress deletion"). Since there is no independent evidence for this ordering, no explanation is thereby achieved.

for a regular stress pattern. When the final stress was lost, the old primary was maintained by apparently invoking (34).

Even stress preservation does not suffice to give entirely consistent results, however, since the cases in (38) contrast with those in (37) – a variation that we consider further in Part II.

(38) a. móment ⇒ mo(méntou)s
b. párent ⇒ pa(rénta)l

Descriptively, the conditions inducing (34) may thus be stated as in (39).

(39) a. Exhaustiveness
b. Factors specific to the classes in (33)
c. Stress preservation

It thus appears that, by itself, exhaustiveness (39a) triggers (34) at most sporadically, as in (36a); the conjunction of the latter and the conditions of (39b) triggers it with some regularity, as in (33III), while (39b) alone is insufficient, as in (35); and the conjunction of exhaustiveness (39a) and stress preservation (39c) also triggers it with some variability, as in (37) versus (38). Just as it plays a role in enforcing (34), as one might expect stress preservation also plays a role in inhibiting it, as in e.g. *dispénsary* (← dispénse), contrasting with (33III).

The conditions in (39), considering those of (a, c) for now, seem natural, and we will see that they play a role in determining metrification more generally. What we then need to understand is why (34) should obtain at all. Ideally, it should be related to some other, independent property of syllables closed by sonorants. As we see in 4.4 below, such syllables differ from other closed syllables in permitting vowel reduction with some freedom. Thus, the "skipped" syllables of *sérp*[ə]*ntìne*, *òpp*[ə]*rtunístic*, and the other similar cases above, all have reduced vowels, as do the cases in (40), in contrast with, for example, *ìmpr*[e]*gnátion*, *àdj*[e]*ctíval*, in which the vowel in the unstressed medial syllable is unreduced.

(40) a. ìnf*o*rmátion, cát*e*rpìllar
b. cárp*e*nter, kíss*i*nger, héck*i*nger

Note here in passing that the items in (40b) need not invoke (34), since they have a final "weak" syllable that can be extrametrical, as we see in 3.5 below. Our point here is simply that the unstressed vowels reduce in syllables closed by sonorants, however they get to be unstressed. It would seem natural to suppose that vowel reduction entails a partial loss of quantity, as this is often an intermediate step to syncope.[17] We may thus think of heavy syllables as being demoted to light when they contain a reduced vowel. As we noted, however, the behavior typical of light syllables obtains only under specific circumstances, suggesting the demotion is only partial.

Syllables closed by *s* exhibit a somewhat similar behavior. Thus, Kiparsky (1979), Hayes (1985a, p. 148, citing Kahn) note cases like (41).

(41) a. ór*ches*tra, sá*cris*tan, pé*des*tal
b. gál*ves*ton, pró*tes*tant

Hayes argues that the sequence *s*–obstruent is generally heterosyllabic, whence [ʌ] rather than [uw]/[yuw] in *musket, rustic, custard,* etc., so that the items in (41), in fact rather rare compared with those that exhibit the expected penultimate stress, are indeed exceptional.[18] While one might suggest that they are exceptional precisely in syllabifying *s*C tautosyllabically, we will propose instead that the italicized syllables in (41) are peculiar in the same way as those in (33III), (36a), namely because of vowel reduction, which is indeed possible with some generality in syllables closed by *s*. For instance, it occurs in all of the cases in (42), which thus parallel those in (40) above.[19]

(42) or*ches*trate, mi*nis*terial, mi*nus*cule, admi*nis*tration, a*ris*tocracy, a*ris*totle, ba*lus*trade, con*fis*cate, ob*fus*cate, ma*gis*trate

17 M. Kenstowicz (p.c.) in fact points out syncopated cases like *mem'ry*, contrasting with non-syncopated *memərize*. This difference would seem predictable from metrical principles. In the latter cases, supposing *i:ze* bears secondary stress, syncope would produce a monosyllabic foot (*mem*), disallowed within our analysis. In contrast, the former case *mem'ry* retains a bisyllabic structure. It remains unclear, however, how to distinguish this case from others, specifically that of Tiberian Hebrew discussed in 2.3 above, in which medial empty structure resulting from syncope sufficed to satisfy metrical requirements.

18 The sequence *s*–obstruent is possibly tautosyllabic in cases like those in (i).

(i) livingston, demonstration, construction, instrument

19 The cases in (42) contrast with those in (i), also from Hayes (1985a, p. 148), in which the italicized vowel (while still unstressed) is unreduced.

(i) inf*e*station, det*e*station, el*a*sticity

We interpret non-reduction here as a "preservation" effect from *infést, detést, elástic* (see 10.3.3 below). This effect, however, is less than systematic, given *infərmation* (← *infórm*) and other cases.

A further parallelism between V–sonorant and V–*s* syllables concerns the conditions in (39). Note in particular that all the cases in (41) above satisfy exhaustiveness (39a), while the ones in (43) below satisfy stress preservation, mirroring those in (37). (In (43) weak syllables *ble*, *tive*, *cy* are taken to be extrametrical [see p. 16, section 3.5, and chapters 8, 9] and † signals other variants).

(43)	a.	admínister	⇒	ad(mínistra)ble
	b.	législa:te	⇒	†(législa)tive
	c.	áristòtle	⇒	†(àristo)té:lian
	d.	mágistràte	⇒	†(mágistra)cy

The cases in (41b) *gálveston*, *prótestant* can then be regarded as "etymologically" preserving, the former like (36a) *wáshington*, etc., the latter from *prótest* (as suggested in Kiparsky 1979, p. 431). Note that *législative* of (43b), as well as *sácristan* of (41a) do in fact not have ə, but maintain *i*. However, this seems to be a general peculiarity of *i*, which shows up unreduced (at least idiolectally) even in the unstressed open syllables of *lég*[i]*ble*, *sácr*[i]*fice*. We may then regard the weakening of vowels that results in reduction as not always affecting *i* because the latter is "inherently" weak, as implied by its role in weak syllables like *ive*, *cy* of (43).[20]

The parallelism between V–sonorant and V–*s* is a bit less clear with regard to the factors of (39b) (still to be identified), specific to the classes in *oid*, *ine*, and some others. Thus, *hélminthoid*, *sérpentine* of (33III) above are paralleled by *phílistine*, but not by *mollúscoid*, *asbéstine*. The latter two might, however, be interpreted as preservations from, or stress consistencies with, *mollúscus*, *asbéstos*, respectively. The case *répertòry* of (33III) is also not paralleled by *consístory*, but here the parallel variant *cónsistòry* is also attested.

Disregarding the latter possible divergence, we will conclude, given the noted similarities, that both syllables closed by sonorants and those closed by *s* can function as metrically light because they allow reduction or "weakening" of the vowel, with a consequent loss of quantity.

In the last three sections, we have thus removed all three apparent exceptions to the main generalizations, which we listed in (3) above. There remains of course one more set, represented by cases with final

20 Note too that, in contrast to *administrable*, *administer* of (43a) does not necessarily require that the V–*s* syllable behave as light, as the final weak syllable is possibly extrametrical, as suggested for (40b) *cárpenter*, etc.

"weak" syllables, such as those in (43), to which we will return shortly. We first turn to the main arguments for our approach outlined in (11) above.

3.5 Superheavy syllables

As in the case of Arabic, our approach based on (44) below provides a unitary account of the stress facts and of the distribution of "superheavy" syllables, the latter eluding previous analyses.

(44) a. All words end in a vowel
b. Final vowels can be null

As we saw, the condition in (44a), plausibly related to the general preference for onsets over codas, is the one required as well by languages like Italian, Malayalam, Kannada, Diyari, Spanish and Tiberian Hebrew. The one in (44b) is also required by other languages, like Arabic, and is the one that disposes of the exceptionality of "superheavy" syllables, which become well-formed bisyllabic sequences, as in *preVEN.Tφ*. The reason why "superheavy" syllables occur essentially only word-finally is, on this view, that *null vowels* do. In turn, the latter distribution may be taken to depend on the inherent prosodic weakness of word edges. Yet there are cases in which null vowels must be postulated even word-internally. Consider for example *sixths*. If normal syllable size is not to be exceeded here, some null vowels will have to occur word-internally, to break up the long sequence of consonants [ksθs]. A more accurate statement concerning the distribution of null vowels would thus seem to be that they can occur not only word-finally, but also morpheme-finally if needed for syllabification. Note in this connection that it is a simple fact about English that there are two sets of suffixes, one affecting the syllabic structure of the stem, as in the noted *keep* → *kept*, the other not, as in *seep* → *seeped* – a difference that must be expressed in any theory. The proposed assumption about null vowels will allow us to do this straightforwardly. We suppose, as in 3.3 above, that one set of suffixes supplants stem-final null vowels, whence *kee.pφ* → *kep.tφ*, while the other does not, as in *see.pφ* → *see.pφ*.dφ.[21]

21 We will see in 9.3.7 below that the different direction of voicing assimilation – progressive, as in *seepe*[t], *bribe*[d], versus regressive, as in *ke*[p]*t*, *le*[f]*t* – is predictable from this analysis.

The suffixes involved in *sixths* must then evidently be of the latter kind, hence *sik.sϕ.θϕ.sϕ.*[22]

While word-internal occurrence is thus allowed, there is still an asymmetry between final and internal positions, of the kind we observed in other languages. Thus, under certain circumstances, a final null vowel becomes overt when internalized, as in *pre.ven.t*[ϕ]/*pre.ven.t*[e].*dϕ*, *chur.ch*[ϕ]/*chur.ch*[e].*sϕ*.[23] These alternations are thus like Spanish *señor*[ϕ]/*señor*[e]*s* discussed in 2.4 above, aside from the exact conditions determining epenthetic filling. Our view then correctly predicts that, in contrast to the above cases, there will be no epenthesis in cases like *bi:te* → *bi:t* + *tϕ* to yield **bi:t*[e]*tϕ*, since the suffix here is one that eliminates the relevant position, just as in *kept.*

Null vowels would also seem required in some isolated instances in other than morpheme-final position, as in *aPARTϕment*, *dePARTϕment*, where the capitals represent word-internal superheavy syllables. This analysis in fact accounts for the superficially odd accentuation of *de(pàrtϕ)(ménta)l*, which has apparently adjacent stresses, generally disallowed, as we see in chapter 4.[24]

In sum, the general distribution of null vowels seems to be controlled by relatively simple factors, as they occur primarily word-finally, and morpheme-finally in certain cases. Whatever their exact distribution, however, the important fact is that under the null-vowel hypothesis, syllable structure and metrical structure are always consistent with one-another. This is not the case under the alternative approach, since (as we noted in connection with Arabic) the extrametricality of that approach and apparent extrasyllabicity of final consonants coincide only fortuitously as in *ro.bús.*<*t*>. They do not coincide in *a.mé.ri*<*ca*>, which has extrametricality but no extrasyllabicity, or in *hó*<*nes.t*>, in which a full syllable is extrametrical, but only one consonant is extrasyllabic.

The reality of final null vowels is further underscored by various phenomena originally noted in *SPE*. For example, if one characterizes the *t*/*s* alternation in *frequent*/*frequency* in terms of spirantization before a front vowel, then *frequence* must presumably also end in a front vowel. While *SPE* postulated here a final *e* which was later deleted, we may

22 Ordinal *th* has idiosyncratic properties, however, apparently suppressing the stem-final null vowel in *fi:ve* → *fifth*, but not in *ni:ne* → *ni:neth*.

23 Note also cases like *alleg*[ϕ]*dϕ* versus *alleg*[e]*dly*.

24 The stressing of *dèpartϕméntal*, also attested, is perhaps analogous to that of *òpportunístic* in (37d) above.

instead suppose that our empty position contains sufficient feature specifications to induce spirantization (say [–back; –low]). Of course, in *frequentϕ*, the null V must not contain such specifications, but there is no inconsistency in this view. We may simply assume that the existence of features implies the existence of the position, while the opposite does not hold. Note that a comparable complication arises in *SPE*, which employed *e*-elision in cases like *cemént*, despite the lack of spirantization. Other cases in which the null V would seem motivated by spirantization, or – comparably – velar softening, include the ones in (45) (see *SPE*, pp. 45ff., 161ff., 220ff.; Rubach 1984, p. 29, fn. 7).

(45) a. ellip*s*ϕ ⇒ ellip*t*ic
b. chao*s*ϕ ⇒ chao*t*ic
c. redu*c*ϕ ⇒ redu*c*tion
d. alle*g*ϕ ⇒ alle*g*ation

Postulating that the null element will contain exactly the right features to induce spirantization/velar softening has of course a purely descriptive value with regard to those phenomena. The same is true of the *SPE* claim that the underlying vowel is an *e*, as opposed to any other. Still, to the extent that other analyses may fail to achieve even simple description in this domain, there may be an additional advantage for the present approach.

Another of the *SPE* arguments for *e*-elision which adapts to our purposes, and which is slightly more substantive, concerns the behavior of the suffix *age*. By itself, that suffix behaves metrically as a single syllable, as shown by the cases in (46), which have normal penultimate/antepenultimate stress.

(46) a. ad(vánta)ge
b. (bévera)ge

The suffix *ous* also behaves like a single syllable when occurring by itself, as in the cases in (47).

(47) a. tre(méndou)s
b. (márvelou)s

However, as noted in *SPE* (p. 48), when the two suffixes are combined to form the sequence *age* + *ous* they behave as if there were *three* syllables, as shown by (48) (which are not **cóurageous*, **advántageous*).

(48) cou(rá:geou)s, advan(tá:geou)s

The orthographic sequence *eous* behaves here just like any bivocalic sequence [iV], e.g. that of *caná:dian*, both in placing stress on the immediately preceding vowel, and in inducing lengthening of that vowel ("C*i*V lengthening"; see 5.5 below). The presence of the final null vowel in (46) (*age*) is thus determined by the fact that it behaves just like an overt high front vowel in (48). In fact, it behaves just like the final vowel of *acy* in (49).[25]

(49) a. contumacy + ous ⇒ contu(má:ciou)s
b. efficacy + ous ⇒ effic(á:ciou)s

One may wonder here whether the null-vowel hypothesis would predict that words could end in the full range of possible onsets, such as *pr*, *kw*, hence incorrectly permitting e.g. **bishoprϕ*, **antikwϕ*. The answer is negative. That prediction would only ensue if one could maintain that the structure of an onset is independent of the quality of the nucleus. But this is plainly not the case, since *participle*, *article*, in which the nucleus of the final syllable is sonorant *l*, contrast with impossible **participrle*, **artikwle*, in which the same nucleus cannot occur with a more complex onset. Evidently, *r*, *w*, can only occur in onsets when they are followed by a more sonorous element. A null vowel is obviously not such an element, any more than a syllabic sonorant, whence the exclusion of **bishoprϕ*, **antikwϕ*, etc.

In conclusion, the primary motivation for the null vowel hypothesis is the same in English as in Arabic. Only that hypothesis successfully deals with the two apparent peculiarities of superheavy syllables, one relative to stress and one relative to syllabification. In addition, the existence of null vowels is supported by the observation of *SPE* that they exhibit properties of overt segments. This section has provided the argument of (11a) above that only our approach accounts for superheavy syllables.

25 Note that, clearly, *ous* does not always maintain a stem-final null vowel, witness *ánalogϕ* → *a(nálogou)s*, not **ana(lógeou)s*. This is true for final *y* as well, as in *anómaly* → *a(nómalou)s*, though less frequently. The generalization at work with the null V, and in part with *y*, is apparently that that element will be preserved whenever it affects the quality of the preceding segment (say by spirantization or palatalization).

3.6 Weak syllables

Hayes (1985a, p. 182), following earlier literature, notes the apparent exceptionality of the items in (50).

(50) a. gála*xy*, líber*ty*, chíval*ry*, tímil*ty*
b. cýlin*der*, próven*der*
c. présiden*cy*, rélevan*cy*
d. intérmina*ble*, indómita*ble*

The cases in (50a, b) have antepenultimate stress despite the heavy penultimate, while the ones in (50c, d), with a light antepenultimate, have pre-antepenultimate stress. Hayes supposes that the italicized syllable in each case is extrametrical – a term first used in this connection in Liberman and Prince (1977). We take this conclusion to be quite correct. With the final syllable thus removed from consideration, all cases in (50) become normal. Within our system, this extrametricality will be sufficient. In contrast, within Hayes' system, which postulates feet (*H*)/(σL), extrametricality must apply a second time to each of the penultimate syllables in (50). Following a long tradition that goes back to *SPE* (pp. 85, 130ff.), Hayes supposes here that the extrametricality of the final syllables in (50) is (unlike that of the penultimates) due to the fact that those syllables do not exist at the level of application of the stress principles, having underlyingly non-syllabic nuclei, and being produced only by "late syllabification."[26] However, note that items of this kind in fact show a great deal of variation, since (50) contrasts with (51), and many other similar cases.

(51) aristócra*cy*, ecóno*my*, teléph*ony*, telégra*phy*

The stress pattern of the items in (51) is the normal one for nouns. In Hayes' theory, this implies that, in contrast to (50), only a single case of extrametricality must have applied. The question is then which. The hypothesis that the final syllables in (50) are created "late" would make it natural to suppose that the same has occurred in (51), and that it is thus Hayes' *syllable* extrametricality which is not applying here. This seems unlikely, however. The reason is that, as we see in (57)–(58) below, the two metrifications of (50) and (51) are instantiated by roughly comparable numbers of cases. In contrast, non-application of Hayes' syllable extrametricality with nouns, as in *cemént*, *gazélle*, *brocá:de*, etc. would

26 See also HV, p. 239, fn. 6.

seem relatively rare, thus suggesting it is rather the extrametricality of the *final* syllables of (50) which does not obtain in (51). This casts doubt on the "late syllabification" account since we do not expect syllables to vary between "late" and "early" syllabification.[27] In fact there is independent reason to doubt that account, provided by the cases in (52),(53), which parallel those in (50), (51), respectively.

(52) a. nóminat*ive*, cáricat*ure*, líterat*ure*, músculat*ure*, cándidat*ure*
b. ádject*ive*, ápert*ure*
(53) a. accúsat*ive*
b. objéct*ive*, incént*ive*, conjéct*ure*, advént*ure*

In these cases, there is little reason to believe that the italicized sequences, extrametrical in (52) but not in (53), could be syllabified late, since they appear to be normal VC sequences. We thus seem to be driven to the conclusion that English has a class of syllables which simply may or may not be metrified, which we will call "weak syllables." In sum, the notion of syllable extrametricality introduced in Hayes (1981, 1982, 1985a) does not dispense with, or subsume, another notion of extrametricality, the one (of Liberman and Prince 1977) applying to weak syllables. The reason is that both must be at work in (50), while only one is in (51). In addition, the variation between those two sets of cases is most plausibly due to variation in the extrametricality of weak syllables. This undercuts the traditional account in terms of late syllabification, as does, independently, the extrametricality of the italicized syllables in (52).

Consider now also the cases in (54).

(54) a. állegò*ry*, émissà*ry*, cémetè*ry*, céremò*ny*
b. métallùr*gy*, órthodò*xy*, álabàs*ter*, hélicòp*ter*

27 Note that the *SPE* system (pp. 128-35) accounted for both (55a) *gálaxy* and (57) *aristócracy*, without attributing a different status to the final syllable. Rather, it relied on "post-stress" destressing in the former case (*gáláxy* → *gálaxy*). As Hayes notes, however, the *SPE* analysis would fail in cases like *présidency*, *rélevancy*, which should rather be **présidèncy*, **rélevàncy*. Also, and more generally, the *SPE* destressing account would not extend to cases like *cóntumacy*, and if so extended would then fail to distinguish the latter from *diplómacy*. Note further that the *SPE* analysis (pp. 126f.) postulated a special provision for items in *acy*, such as those in (i), to ensure the underlying morpheme *a:t* would be ignored by the main stress rule when applying on the last cycle. No special provision is required here.

(i) áccuracy, ádvocacy, equívocacy, ...

c. súbstitùt*ive*, árchitèct*ure*, législàt*ure*, nómenclàt*ure*, législàt*ive*, authóritàt*ive*

The final syllables in (54a, b) have also generally been regarded as extrametrical, like those of (50) (see LP, pp. 292ff.; Hayes 1985a, pp. 227f.; HV, p. 241 fn. 7, p. 257), the putative cause of the extrametricality being again "late syllabification," still following *SPE* (pp. 130ff., 152). On this view, at the level at which primary stress is assigned, the items in (54a, b) will compare with those in (55) and many others, whose rightmost stress is on the final (overt) syllable.

(55) bérnardìne, désignàte, récognìze, cávalcàde

The generalization controlling primary stress would from this point of view be "rightmost, *non-final* stress" (Halle 1973, p. 456, citing Schane; Liberman and Prince 1977, p. 268), whence only a secondary in the final positions of (55) and, presuming "late syllabification," (54a, b). There are several difficulties with this interpretation, however. One is that the final syllables in (54a, b) are not very likely to be extrametrical like those of (50), for the same reasons that applied to (51). That is, it is here metrification of the final syllables that best accounts for the rightmost stress, reducing it to the normal one for nouns (on a heavy penultimate).[28] Non-metrification would only make that stress pattern comparable to that of verbs. A second difficulty is that late syllabification would again not extend in any natural way to the cases in (54c).[29] Yet a third difficulty arises within the theory that has also syllable extrametricality (i.e. Hayes'), providing further argument against it. Within that theory, the property of the cases in (54) and (55) of having a rightmost monosyllabic foot is shared by *all* cases with a stressed heavy penultimate, like *ari(zó:)<na>*, *bernar(dí:)<na>*, which, however, retain primary stress on their final foot. This means that, within that theory, feet not attracting primary stress, which we will refer to as "weak feet," cannot be metrically defined. Specifically, they cannot simply be "monosyllabic." Rather, they must be defined as "monosyllabic and word-final" – a characterization which is less than enlightening, and further impugned by the noted

28 We presume that long vowels surface as short before *r*, as argued in Liberman and Prince (1977, p. 292), Rubach (1984, p. 51).

29 In the cases in (i), contrasting with those in (64c), the expected weak foot fails to obtain, however. We have no account of this.

(i) mànufácture, àpprehénsive, lòcomótive arguments that the final syllables in (54) are in fact *not* created "late," but just "weak" syllables. Factoring in those arguments would induce further complications into the definition, turning into "monosyllabic and either word-final or followed by a weak syllable." To sum up again, beside requiring two different notions of extrametricality, the theory that employs *syllable* extrametricality provides no natural, metrically based, characterization of weak feet.

In contrast to the latter theory, the present approach requires *only* weak-syllable extrametricality, on the simple assumption that syllables with null vowels are in the class of weak syllables. On that view, *(ásteris)kφ/in(hábitφ)* will mirror *(áccura)cy/a(cádemy)*, and the many pairs like *(fréquen)ce*, *(fréquen)cy* will correspondingly be fully transparent. Note that in the case of extrametrical *ive* and *ure* of (52) above, there will then be *two* consecutive extrametrical syllables, the second with a null vowel. It is in fact quite generally the case, within our analysis, that extrametricality, while applying to weak syllables, is not confined to *single* syllables – an assumption which raises no particular difficulty. Our approach also succeeds in providing a unitary metrical definition of weak foot. That definition is "(σW)," namely a foot which is bisyllabic and includes a weak syllable – the quantitatively weakest foot in our system. The cases in (54), (55) thus all instantiate this structure.[30]

As discussed on pages 16–17 above, we propose that metrical weakness results from acoustic weakness, which may seem relatively obvious for syllables with sonorants. For those with *y*, as well as *ive*, *ure*, it would result from the general acoustic weakness of high vowels (see Lehiste 1970, pp. 120ff.), although the *u* in *ure* is in fact reduced to ə as is general before *r*. Acoustic weakness will of course make syllables with null vowels automatic members of this class. Beside seeming generally natural, the postulated correlation between lack of metrical prominence and acoustic weakness is supported by facts from various languages.

30 HV regard the mechanisms responsible for final weak feet as closely related to those responsible for shifts of primary stress at the phrase level, as in *mìssissíppi* → *míssissìppi législatùre* (Prince 1983; Hayes 1985a), whence their use of the term "Rhythm rule" in both cases. While a unified account would of course be desirable, the connection between the two phenomena does not seem to us to be as close as HV suppose. As they note, the phrase-level phenomenon shifts the stress from a final to an initial foot, as in ápalàchicóla → *ápalàchicòla fálls* (Prince 1983). But, in contrast, the word-level phenomenon only places stress on the *penultimate* foot, as in *pàrasíticìde*, *ìndemnífìcatòry*, *totàlitárianìze*.

Thus, HV (p. 51) report, citing other sources, that in Eastern Cheremis and various other languages stress falls on the last *full* vowel, a generalization well known to obtain also in French, and which suggests that syllables with reduced vowels are extrametrical in those languages. Of course this then raises the expectation that reduced vowels may exhibit the behavior of weak syllables in English as well. This is apparently not true in general, but seems at least not too far from true, as we see in some of (56) below. The "weak-syllable" behavior is also not general to all instances of *i* or *u* in final syllables, however – a variation for which we have no account at this time. For instance, it is not found in *cìncinnáti*, *màcaróni*, *mìssissíppi*, *mùssolíni* and others, but, with some idiolectal variability, it is nonetheless found in the cases in (56a) – a behavior shared by some final syllables with reduced vowels, such as those in (56b). For more detailed observations in this general domain, see Bolinger (1981, pp. 54ff.), from which some of these examples are taken, as well as Ross (1972, pp. 274f.)[31]

(56) a. ábalòn*e*, áphrodìt*e*, míramònt*e*, tríticàl*e*, pákistàn*i*, páragòg*e*, píccalìll*i*, ládefòg*e*d
 b. cápybàr*a*, díoràm*a*, dándelì*o*n, hámadrỳ*a*d, jácarànd*a*, málathì*o*n, pnéumocòcc*u*s, rútabàg*a*

In sum, while not fully general, the "weak-syllable" behavior of high vowels does indeed generalize somewhat beyond the cases in (54) above, and is partially shared as well by syllables with reduced vowels, hence supporting our hypothesis that acoustic weakness is behind this phenomenon.

We now turn to consideration of a larger sample of cases with weak final syllables, given in (57), (58) below, in which "†" indicates existence of other variants, and "Br." refers to British pronunciation.

31 As partly noted earlier in the text, the acoustic weakness of *i*, *u* is possibly related to the fact that they fail to reduce in unstressed open syllables with some regularity, as shown in (i).

(i) a. d*i*vín*i*ty, ádd*i*t*i*ve, míl*i*tàry
 b. distríb*u*te, cóst*u*me, látit*u*de

One may thus suppose that unstressed open syllables require "weaker" vowels – a notion satisfied by all of ə, *i*, *u*.

(57) *"W" extrametrical*

a. (áller)gy =

energy, jeopardy, normandy, burgundy, liturgy, lethargy, calumny, galaxy, liberty, chivalry, timilty, autopsy, amnesty, dynasty, majesty, casualty, penalty, royalty, sacristy, property, specialty, poverty, puberty, industry, cavalry, synergy, infantry, registry, tendency, *loyalty, agency, masonry, rivalry, gadgetry, adjacency*

a′. (cárpen)ter =

carbuncle, furuncle, †peduncle, tubercle, corpuscle, cylinder, provender, ancestor, cucumber, hanover, minister, calendar, harbinger, messenger, passenger, derringer, sinister, bannister, baluster, barrister, hamburger

b. (cóntuma)cy =

efficacy, appetency, Br. acrimony, Br. alimony, Br. parsimony, †Br. miscellany, Br. monastery, *accuracy, adequacy, magistracy, adjutancy, presidency, relevancy*

(58) *"W" metrified*

a. *as*(*sémbly*) =

†Br. autopsy

a′. se(méster) =

december, philander, disaster, cadaver, palaver, decanter, pilaster, apostle, epistle, disciple, evangel, example, †peduncle

b. di(plómacy) =

antipathy, allotropy, autocracy, hypocrisy, antinomy, anatomy, academy, dichotomy, economy, telephony, telegraphy, hegemony, epiphany, apology, analogy, anomaly, ecology, isonomy, agronomy, taxonomy, monopoly

b′. (végeta)ble =
†participle

c. (métal)(lùrgy) =
acrimony, alimony, allegory, emissary, cemetery, ceremony, controversy, catalepsy, cataplexy, sanctimony, parsimony, narcolepsy, epilepsy, demagogy, apoplexy, chalcedony, monastery

c′. (sála)(mànder) =

alabaster, poetaster, filibuster, caterpillar, aristotle, pumpernickel, alligator, paradiddle, knickerbocker, haberdasher, mollycoddle, helicopter, necromancer, gerrymander, tabernacle, †participle

The cases in (57), (58) exhibit certain subregularities which are worth noting, reflecting mechanisms at work more generally. One such mechanism is the already noted preference for exhaustive metrification. The oscillations in (a, a′, b, b′) above would in fact follow from supposing that the latter preference holds with respect to both initial syllables and final weak syllables. Then, the cases in (57) would satisfy left-hand exhaustiveness, while those in (58) satisfy right-hand exhaustiveness. In this respect, overt weak syllables would differ from weak syllables with null vowels which can be freely extrametrical, as with nouns (verbs representing a special case, as we see later on). This difference, which would see metrical structure tendentially aligned with phonetic structure, seems natural, and does not undercut the parallelism between null vowels and other weak syllables, which still holds for the relevant respects noted. Satisfaction of both left-hand and right-hand exhaustiveness is impossible in (a, a′), as those trisyllabic cases have a heavy medial, which would yield *($\sigma H \sigma$) (see, however, fn. 34 below). Analogously, the quadrisyllabic cases in (b, b′) have a light penultimate, which would yield *($L\sigma$) under exhaustive parsing ($\sigma\sigma$)($L\sigma$).

This correctly predicts that quadrisyllabic cases with a *heavy* penultimate should always metrify a final weak syllable and hence achieve exhaustive parsing, as in fact in (c, c′), thus excluding the structure of **pum(pérnic)kel*, **ca(térpil)lar*.[32] A further factor at work is stress preservation, satisfied in all of the italicized cases, as well as in others in which it causes deviations from the patterns of (57), (58), as in *ad(jácen)cy* (← *adjácent*), contrasting with *(métal)(lùrgy)*, etc. of (c, c′).[33] Further comment seems required by the asymmetry in (a) above, disfavoring metrification of the weak syllable, while the one in (b′) we regard as accidental and due to the small size of this class. We presume the asymmetry in (a) is due to the fact that "weak" feet (*HW*) are metrically non-optimal, witness their noted failure to attract primary stress. On this view, both options in (a) are indeed comparable with respect to exhaustiveness, but the one in (57) is superior for avoiding a weak foot, and is therefore chosen. The same asymmetry does not quite carry over to weak syllables with sonorants of (a′), conceivably an indication that those syllables are not equally "weak."

In sum, we propose that a good approximation to the patterns in (57), (58) is achieved by postulating a notion of optimal metrification congruous with that of "maximal" metrification. The latter will require (left-hand) exhaustiveness, metrification of weak syllables and avoidance of single weak feet. We will return to the notion of optimal metrification at various points later on, especially chapter 5. We will see that another factor that contributes to that notion is the alignment of heavy syllables with stresses. We may consider here that there is no general violation of that requirement in (57), (58), since most of the unstressed syllables of (57a, a′) are closed by sonorants or *s*, which we have determined can function as light in unstressed position. The only exceptions are *galaxy*, *autopsy*, which will remain unaccounted for from this point of view,

32 This prediction is violated in British †mis(célla)ny, †co(rólla)ry and others, in which the presumed preference for metrification of weak syllables in *y* does not hold or is weaker, as indicated by the systematic difference between (i) below and their American counterparts in (58a) above.

(i) (állego)ry, (émissa)ry, (cémete)ry, (céremo)ny

Note, too, that there are a few apparent exceptions to the failure of final feet like the ones in (62c′) to attract primary stress, like *àlexánder*, and – idiolectally – *còriánder*, *òleánder*, *zòroáster* (Bolinger 1981, p. 55). See also fn. 29.

33 Stress preservation has certain specific classes of exceptions, which include *díplomat* → *diplómacy*, and similarly *autócracy*, *hypócrisy*, *teléphony*, *telégraphy*, *análogy* of (62b). See 10.3.3 below.

although the latter case has the predicted dialectal variant *au(tópsy)*.[34] Other classes in which metrification versus non-metrification of weak syllables is involved are the *ary/ory* and the *ative* classes, which we will address separately later on.

To conclude, in this section we have argued that the notion of weak-syllable extrametricality necessary within the null-vowel hypothesis is independently required by syllables with syllabic sonorants and syllables ending in *y*, *ive*, *ure*. We have argued further that the parallelism between syllables with null vowels and other weak syllables is confirmed by the phenomenon of "weak feet." This is our argument of (11b) above. In the next section, we turn to the one of (11c), which is that only the binary/ternary feet of our analysis are attested word-internally.

3.7 Stress iterations

3.7.1 Introduction

Our analysis claims that the unary/binary pattern $(H)/(\sigma L)$ is an artifact of syllable extrametricality. If this is correct, then the mechanisms constructing such feet should be quite inapplicable in word-internal position, where extrametricality plays no role. That this is true seems relatively uncontroversial. Thus, both Hayes (1982, 1985a) and HV distinguish the "English Stress Rule" (ESR), which operates at the right edge of the word, from the rule of "Strong Retraction" or "Alternator" (distant descendant of *SPE*'s [p. 78] "Alternating Stress rule"), which operates word-internally. In Hayes' system, this effect is achieved by stipulating that the ESR is confined to the right edge of the word and is non-iterative, while Strong Retraction follows the ESR by extrinsic ordering and preserves existing metrical structure. In HV's system, these same effects are derived from somewhat more primitive notions. Thus the "ESR" is itself derived from the interaction of two different devices: an "Accent rule" (p. 227) that assigns stresses, or "line 1 asterisks," to all heavy syllables, and the mentioned "Alternator," which operates also word-internally, and respects the effects of the Accent

34 Note that under the more structured characterization of optimal metrification we give in chapter 5, it will not be obvious that the indicated metrifications in (57a, a′) are superior to the alternative metrifications as weak feet, as in **al(lérgy)*. On the other hand, it will also appear that the metrification (σHW), as in *(állergy)*, is superior to both. This possible analysis, which we will not explicitly adopt, seems nonetheless compatible with the rest of our discussion.

rule. Typical derivations are illustrated in (59a, b), in which we give the final grid at the top of the diagram, and its derivation from top to bottom below. The numbers in the columns give the grid level at that point in the derivation, while the numbers in parentheses refer to HV's (chapter 7) rules.[35]

(59) a.

	line 2			*	
FINAL GRID:	line 1	*		*	
	line 0	*	*	*	*
		a	ri	zo:	na

start

Extrametricality (19)	0	0	0	-
Accent rule (11)			1	
Alternator (5a–c)	1		1	
Line 1 unbd. const. (5d–f)			2	

end

b.

	line 2	*		
FINAL GRID:	line 1	*		
	line 0	*	*	*
		ca	me	ra

start

Extrametricality (19)	0	0	-
Accent rule (11)			
Alternator (5a–c)	1		
Line 1 unbd. const. (5d–f)	2		

end

In (59a, b), the Accent rule singles out heavy syllables as noted; the Alternator then constructs binary feet right-to-left, except to abide by the effects of the Accent rule; the rule of "line 1 unbounded constituents" constructs such constituents on line 1, which results in a line 2 asterisk over the rightmost line 1 asterisk, thus marking the primary stress. In this system, the "ESR" effects come to be limited to the right edge, but *not* by assuming – as in Hayes' system – that the latter ESR, alias "Accent rule" is non-iterative. Rather, this is done by suppressing

35 We do not give foot (HV's "constituent") boundaries, but those can be easily inferred from the grid and the assumption that feet are left-dominant (left-headed).

the effects of the latter rule everywhere *except* word-finally, through "conflation" of lines 1 and 2, i.e. by suppressing all line 1 asterisks except those which have a line 2 counterpart, as illustrated in (60) (note fifth derivational step).

(60)

		in	for	má:	tion
	line 2			*	
FINAL GRID:	line 1	*	*		
	line 0	*	*	*	*
		in	for	má:	tion
start of cycle					
Extrametricality (19)		0	0	0	-
Accent rule (11)		1	1	1	
Alternator (5a–c)		1	1	1	
Line 1 unbd. const. (5d–f)				2	
Stress conflation (5g)		0	0	2	
end of cycle					
Alternator (5a–c)			1		
end of post-cycle					

As (60) indicates, the Alternator is both cyclic and non-cyclic. However, its cyclic effects surface only when they translate into a "line 2 asterisk" (primary stress), and are suppressed by conflation otherwise. Note that, given conflation, the secondary stress of (59a) above must actually be attributed to the *post*-cyclic rather than the cyclic application of the Alternator. This system thus yields the pattern $(H)/(\sigma L)$ for rightmost feet by the interaction of the Accent rule and the Alternator, as stated above. Because of cyclic "conflation," and because only the Alternator and not the Accent rule is repeated post-cyclically, word-internal feet will follow the pattern $(\sigma\sigma)$.

While the two systems just described (Hayes' and HV's) would thus not normally produce the pattern $(H)/(\sigma L)$ word-internally, there are nonetheless cases where that pattern has been claimed to occur, and which those frameworks have sought to accommodate. We consider this issue in the next subsection, arguing that those cases have been misanalyzed, so that the pattern $(H)/(\sigma L)$ does in fact *not* exist word-internally. In later subsections we turn to other word-internal patterns.

3.7.2 Weak Retraction

Liberman and Prince (1977; henceforth LP) identify the three different patterns of word-internal iteration, or "stress retraction" in (61)–(63), in which the specific examples are our own choice.

(61) *Long Retraction* (LR)
a. tàtamagóuchi — monòngahéla
   wìnnepessáukee
b. manípulatòry — compénsatòry
   ànthropológic — larỳngológic

(62) *Strong Retraction* (SR)
a. manípulàte — désignàte
b. àpalàchicóla
c. napòleónic

(63) *Weak Retraction* (WR)
a. céllul*i:*te — staláct*i:*te
b. cý:an*i:*de — peróx*i:*de
c. gémin*i:* — alúmn*i:*
d. adiránd*a*ck — mamáron*e*ck

The "LR" pattern of (61) corresponds directly to the binary/ternary feet $(H\sigma)/(\sigma L\sigma)$ postulated within our theory. The "SR" pattern of (62) corresponds to binary feet $(\sigma\sigma)$, directly predicted by one of the devices of the Hayes/HV theory, the "Alternator." Putting aside these two contending patterns for the moment, we consider the third one, namely the "WR" pattern of (63), which is the one our perspective would seem to preclude. These cases instantiate the pattern $(H)/(\sigma L)$ on the assumption that the italicized vowels bear secondary stress. There is reason to believe, however, that such assumption, sanctioned by a long tradition, is in fact incorrect. In essence, the reason is that "WR" has a rather peculiar distribution: it occurs only next to a final syllable, as in all of (63), and many other cases. Consider in this connection that Hayes (1982, p. 247) lists as "weak retractors" the suffixes in (64), all of which are monosyllabic.[36]

36 Hayes in fact lists a few which are not monosyllabic, specifically *ary*, *ory*, *ant*, *ative*, *atory*. As for the first two, we will see later on (4.2.2) that their behavior in fact supports the text claim that there is no "weak retraction." As for the latter three, they are only

(64) a. a:ne, a:te (adj.), e:s, i:, i:de, i:le, i:ne, oid, o:se
b. on

We find only one possible explanation for this curious constraint: the stress iteration in such cases is not *from* the final syllable; rather, it *includes* that syllable, so that it is in fact from the end of the word. Hence, the items in (63) and all such cases are just normal cases of penultimate/antepenultimate stress, and no mystery is associated with them. If WR was a real pattern of stress "retraction," it should be found elsewhere. A different way of putting it is that the alleged stress of the italicized vowels in (63) does not interact with the rest of the stress system. The latter operates just as if the former was not there, giving the standard pattern. This fact was well understood by Hayes (1982, 1985a), who concluded (correctly, within his framework) that WR was nothing but the ESR, applying here normally, hence after extrametricality of the final syllable. He then attributed the presumed final stress to the rule of "Long Vowel Stressing" for cases like (63a–c), and to an idiosyncratic rule assigning "a word-final monosyllabic foot" for those in (63d), both rules applying prior to syllable extrametricality (and not blocking it). While correctly expressing that lack of interaction, the above assumptions are otherwise unmotivated. As we already noted for the long-V cases (3.2 above), those complications are simply an argument that the alleged final stress in (63a–d) is in fact not there at all. The lack of interaction with the other stresses is then trivially explained. A reexamination of the traditional motivations for assuming a final stress in (63a–d) is then in order.

weak retractors (if at all) in the irrelevant sense of placing stress on a preceding heavy syllable, as in *infórmative, compénsatòry*. The sense relevant to the text is different, however, and rather that of distance between stresses – a sense in which they are *not* weak retractors and aptly not classified as such in LP.

On the other hand, on their part LP (pp. 274f.) list *ology* among the suffixes associated with weak retraction. The evidence does not support that classification, however (which also does not concur with Hayes'). Cases like *odontólogy, egyptólogy*, which LP give with a stress on the second syllable, have it on the first in most dictionaries. Stress on the second seems also possible, but likely for special reasons, which we return to in 4.2.1 below. Cases like *mìcromorphólogy, òphthalmólogy, sỳmptomatólogy* also clearly argue against "weak retraction."

Note, too, that, in fact, we find insufficient evidence to determine that *a:ne* of (64), presumably as in *mundá:ne*, is a "weak retractor." Adjectival *a:te*, as in *intésta:te* is also quite rare, the norm being with a short *a*. More extensive discussion of the stress patterns characteristic of each suffix will be presented in later chapters.

For the long-V cases in (63a–c), those motivations lie in the "Long Vowel Stressing" of 3.2 above, which we have already dismissed. The two traditionally held assumptions, that there is "Long Vowel Stressing" and that there is "Weak Retraction," constitute a vicious circle, merely complicating the description of English stress. Abandoning the former assumption reduces the behavior of syllables with a long vowel to that of heavy syllables in general, as argued in 3.2, hence avoiding one complication. Abandoning the latter reduces the pattern of (63a, c) to normal penultimate/antepenultimate stress, avoiding a second complication.

The case of (63d) is analogous. Here, the motivation for presuming that the final syllables of *adiróndack* and similar cases bear secondary stress lies in the assumption that there is a simple biconditional relation between non-reduction and stress, which again goes back to *SPE*, in the form of the vowel reduction rule in (65) (*SPE* (103), p. 111).

(65) $$\begin{bmatrix} -\text{stress} \\ -\text{tense} \\ \text{V} \end{bmatrix} \rightarrow \text{ə}$$

Given (65), the final syllable of *adirónd*[æ]*ck* must have final stress, because its vowel is unreduced, in contrast, for example to that of *con-néctic*[ə]*t*. However, as was already clear in *SPE* and is clearer still in its many descendants, maintaining the maximally simple theory of vowel reduction in (65) only complicates the theory of stress. And, while this particular partitioning of subtheories might have seemed reasonable in the pioneering setting of *SPE*, whose "a-syllabic" theory of stress was independently complex, it was nonetheless arbitrary. We will argue that complicating the theory of vowel reduction instead, so as to keep the theory of stress simple is the better alternative, and that in fact there is no final stress in (63d) any more than in (63a–c) – only an unreduced vowel in an unstressed syllable.

The complexities resulting from the traditional set of assumptions are also quite evident in HV's account of (63d) (as they were in their account of (63a–c), discussed in 3.2 above). In contrast to Hayes', which presumed a final stress in (63d) *adiróndack* to be assigned by a special rule operating within the extrametrical portion, HV's analysis attributes both presumed stresses to the "Accent rule" (one incarnation of the "ESR"). The latter is supposed to apply here to the final syllable because extrametricality exceptionally fails (recall our criticism of "zero extrametricality" in 3.3 above). The stress on the penultimate is also attributed here to the Accent rule, whose effects are now exceptionally present word-medially because of the (idiosyncratic) failure of "conflation" (recall (60) and the discussion). In addition, the final stress fails to turn into a primary because of the "Rhythm rule" whose function is to demote a final stress, enhancing the one that precedes it (recall discussion of (55) above). The derivation of this kind of case (HV's (24c), p. 236) is then as in (66).

(66)

	line 2			*	
FINAL GRID:	line 1	*		*	*
	line 0	*	*	*	*
		a	di	ron	dack

				start of cycle
Extrametricality (19)	0	0	0	0
Accent rule (11)			1	1
Alternator (5a–c)	1			
Line 1 unbd. const. (5d–f)				2
Stress conflation (5g)	1	0	1	2
				end of cycle
Alternator (5a–c)	1	0	1	2
Rhythm rule (21)			2	1
				end of post-cycle

Note that application of the Rhythm rule in (66) would itself be exceptional, since a final stress generally fails to be primary only when the preceding foot is binary or larger, as in *bérnardìne*, but not (with any regularity) when it is monosyllabic (presuming there is such a foot), witness *paulíne/?páuline*, *repórt/*réport*, *ovért/*óvert*, and other cases. Thus, in HV's analysis, these cases would be three-ways exceptional, as in each of (67a, b, c). (They are also radically different from the long-V cases of WR which invoke multiple "stress domains" – 3.2 above.)

(67) a. Zero extrametricality
b. Failure to conflate
c. (Exceptional) Rhythm rule

It is then a notable coincidence that the words in (63d) should have exactly the same primary stress as if they were just normal. Hayes' account was in fact preferable here, since it postulated only *one* exceptionality (idiosyncratic final foot) rather than three. Unlike HV's, it implicitly maintained the factual truth of (68) – a point on which we will agree.[37]

(68) The pattern of stress assignment "$(H)/(\sigma L)$" is never iterated consecutively through the word.

The generalization in (68) is now our argument. If unary/binary feet $(H)/(\sigma L)$ do not exist at all, (68) is automatically true, their apparent occurrence word-finally being an artifact of C/σ extrametricality and the failure to recognize null vowels. If such feet exist, (68) must be stipulated. Hayes' theory does so by defining the ESR as "non-iterative," and HV's does so by means of an operation of "conflation," which suppresses the effects of all iterations except the rightmost.

In conclusion, there is no "Weak Retraction," not only as a general pattern of stress iteration, as implicit in Hayes' analysis, but even as a descriptive category. The reason is the lack of evidence for a final stress in any of (63a–d) or other similar cases. Supposing there is no final stress in (63a–c) and in items employing the suffixes of (64a) above has no adverse consequence, as we argued in 3.2. Supposing there is no final stress and only an unreduced vowel in items like (63d) *adiróndack* and those employing the suffix of (64b) above, like *eléctron*, does have certain consequences for the theory of vowel reduction, however. It requires a more complex one than (65) above. These consequences are worth bearing, however, given the noted simplifications in the theory of stress, a point which we will argue further in 4.4 below.

3.7.3 Strong Retraction

Having thus argued that WR does not exist, we are left with LR and SR as real word-internal iterations.

As we noted, within the theory whose word-final feet are $(H)/(\sigma L)$, an independent device yielding the SR pattern (Alternator) is generally postulated, following Hayes (1982, 1985a). This leaves out the LR pattern. On the other hand, our theory based on $(H\sigma)/(\sigma L\sigma)$ will yield the LR pattern directly, leaving out SR. Since we will argue that the difficulty of accommodating SR within the latter is no greater than the difficulty of

37 In HV's framework, the truth of (68) would of course imply that there are no failures of "conflation." HV also cite a few other "exceptions" to (68), like *haliCARnássus*, which we will consider below.

accommodating LR within the former, we may now compare the two approaches as in (69), thus revising (10) above.

(69)	*Feet*	*Extrametr.*	*LR*	*SR*
a. After Hayes	(H)/(σL)	C/σ	?	Alternator
b. This proposal	(Hσ)/(σLσ)	none/W	normal feet	?

The right-hand side of (69) is our argument. While the two theories compare in empirical adequacy to this point, only (69a) needs a special device to construct word-internal feet, namely the Alternator. Let us then proceed to consider what adjustments are required to achieve full empirical adequacy, that is deal with the question mark in each of (69a, b), beginning with the former.

As we noted in 2.6 above, within (69a), the ternary feet of *tàtamagóuchi, wìnnepessáukee*, etc. are generally derived by concatenation of a word-initial unary and a binary, via destressing, as in (70).

(70) (tà)(tàma)góuchi ⇒ (tàtama)góuchi

As also noted, this type of account has two major liabilities. One is that it relies on destressing, which we aim to eliminate. The other is that it fails to relate the impossibility of **(mònonga)héla*, **(cómpensa)tòry* to that of **ágenda*.[38]

In Hayes (1985a, p. 180) the impossibility of **mònongahéla* is expressed by means of the italicized clause in the destressing rule in (71) (Hayes' (88), emphasis mine, LB).

38 This parallelism between word-internal and word-final iterations has been well recognized at least since *SPE*, as the quote in (i) indicates, and has been expressed in various work that preceded the introduction of syllable extrametricality, such as Ross (1972, p. 304), LP (p. 278), Schane (1979, p. 499), as well as in the descriptive work of Fudge (1984, p. 31).

> (i) Note that the first two parts of [the "Auxiliary Reduction Rule" (107)] are strikingly similar to the rules of primary stress placement. Cases (a) and (b) of (107) assert that secondary stress is placed on a vowel preceding a weak cluster (case (a)) or on a strong cluster (case (b))... The rule is closely analogous to the Main Stress Rule, the central difference being that secondary stress is assigned rather than primary stress. (*SPE*, p. 114).

SPE (p. 115) then goes on to point out that "As matters now stand, we are unable to formulate a generalization that covers both the rule of primary stress assignment and the rule of secondary stress assignment, despite the near identity of the two rules... We are therefore forced to leave this as an open problem."

(71) "delete a binary foot *whose first syllable is open* and which is immediately preceded by a non-branching foot."

Note that the restriction to "open" rather than light syllables in (71) will incorrectly permit **(èncy:clo)pédia*, to our ear comparable to **(mònonga)héla*. The reasons behind such restrictions lie in Hayes' analysis of cases like *cúrsory*, where (71) is supposed to remove stress from an underlyingly long *o*. From our perspective, which will provide a rather different analysis of the *ary/ory* class, there will be no comparable reason to (incorrectly) relax the statement that ($\sigma H \sigma$) is excluded.

In contrast to Hayes' analysis, HV account for **(mònonga)héla* by postulating that destressing exempts *heavy* syllables, somewhat analogously to (71), but in a way which seems independently required, since they employ for (70) the same destressing rule as for (72).

(72) (bà)nána $\Rightarrow$ banána

On this view, the non-application of destressing in *monòngahéla*, contrasting with (70), is comparable to non-application in *bàndánna*, contrasting with (72), and reflects the non-destressability of heavy syllables in general. We will return (4.2.1) to the apparent unary of *(bàn)danna* and similar cases. The two cases of destressing in (70) and (72) are brought together in HV's system, by supposing that destressing occurs a-directionally next to a stress of greater magnitude. In (72), the latter is the primary stress. However, in *tàtàmagóuchi* (70), a-directional destressing now requires prior enhancing of the initial stress, attributed to the rule in (73) (HV, p. 242), where we ignore the parenthesized portion for the moment (parentheses ours, LB).

(73) "the rule of Stress Enhancement ..., which enhances stress on the first (or second) syllable of a word."

This rule is preceded by a rule constructing "line 2 unbounded constituents," which has the effect of further enhancing primary stress so as to maintain its prominence. The full derivation of (70) is then as in (74).

(74)

	line 3				*	
	line 2	*			*	
FINAL GRID:	line 1	*			*	
	line 0	*	*	*	*	*
		ta	ta	ma	gou	chi

start of cycle

Extrametricality (19)	0	0	0	0	-
Accent rule (11)			1		
Alternator (5a–c)	1	1			
Line 1 unbd. const. (5d–f)			2		
Stress conflation (5g)	0	0			
═══ end of cycle					
Alternator (5a–c)	1	1			
Line 2 unbd. const. (39)			3		
Stress enhancement (38)	2				
Stress deletion (33)	0				
═══ end of post-cycle					

Returning to the the case of *monòngahéla*, it is clear that its second syllable will not destress on HV's account, but it remains unclear how it could be fully derived. This could only occur if "enhancing" (73) applied here to the second rather than the first syllable as stated in the parenthesized portion of (73). The first syllable would then correctly destress under their stress deletion. However, HV give little indication of what controls the two options in (73). A further, more elaborate attempt to account for the Long Retraction pattern is made in Halle and Kenstowicz (1991), which we will consider as an appendix to this discussion in the next subsection.

Consider then at this point that any theory has to deal with the empirical fact that, under certain circumstances, (75) holds.

(75) Ternary feet ($\sigma L \sigma$) are possible word-internally.

Given that (75) is factually true, and given the amount of stipulation involved in both Hayes' (71), and HV's (73), to account for it, the exclusion of feet ($\sigma L \sigma$) from the foot inventory that the above analyses attempt is illusory, and in fact counterproductive. As noted in 2.6 above, the maneuvers required to account for (75) within a strictly binary foot inventory are undesirable relaxations of the theory, which can yield unwanted derivations, like the one in (76a) below. They are also not obviously well suited to handle other instances of (75), like those in (76b).

(76) a. (phe)(nomeno)lógic ⇒ *(phènomeno)lógic
     b. phe(nòmeno)lógic, an(tícipa)tòry, so(lìdifi)cátion

Turning now to the comparable task for our approach, i.e. accounting for "Strong Retraction," alias the fixed binary pattern, we have seen that

that pattern exists in other languages. Let us then assume that, under certain circumstances, English permits one more type of foot word-internally, a binary foot headed by a light syllable, as in *ma(nípu)làte.* Let us state this as in (77).

(77) Binary feet ($L\sigma$) are possible word-internally.

The special "circumstances" licensing (77) are – at least descriptively – rather clear. We state them in (78), returning later to more specific discussion.

(78) a. *Stress Preservation*
me(dìci)nálity (cf. *medícinal*)
b. *Preceding a Weak Foot*
an(tíci)(pà:te)
c. *Exhaustive Metrification*
(àpa)(làchi) cóla

Each of the cases in (78a, b, c) contrasts with, e.g., *(tàtama)góuchi,* in which: (a) there is no stress preservation, since the item is not derived; (b) the final foot is strong; and (c) it is a ternary rather than two binaries which exhausts the sequence of syllables. Note that the conditions in (78a, b, c) rank in strength in that order. It is obvious that (78c) is weaker than either of (78a, b), since it fails to impose a ternary in either of ??*(mèdici)nálity,* or ??*(ántici)pàte.* It is also weaker than (78a), since it fails to impose two binaries in ?**(phèno)(mèno)lógic,* ?**(ànti)(cìpa)tóry,* etc., which are instead stress-preserving from *phenòmenólogy, antícipàte,* respectively. It is also clear that (78a) is stronger than (78b) since it imposes a binary in *an(tìci)(pátio)n* despite the absence of a weak final foot, while imposing a ternary in *(óxyge)(nàte)* (cf. *óxygen*) despite the presence of a weak final foot.[39]

Putting aside (78b) for the moment, the conditions of (78) seem rather natural, so that it is reasonable to suppose that they may play a role. No more than (77) thus seems required, which is then parallel to (75), required by the alternative. Note that, since ternaries ($\sigma L\sigma$) and binaries ($L\sigma$) are in complementary distribution (one obtains when the other does not), the conditions describing the former are just as simple as those

39 There are occasional exceptions, however. In *orígináte,* (67b) seems to prevail over (67a) (cf. *órigin*). Analogously, in the variants *oxýgenàte, hydrógenàte.*

describing the latter. Specifically, mirroring (78a, b, c), the conditions controlling the ternary feet in (75) are: (a) allowed under stress preservation: *phe(nòmeno)lógic*; (b) disallowed when preceding a weak foot: ??*(ántici)(pàte)*; (c) allowed under exhaustive metrification: *(tàtama)góuchi*. In conclusion, then, it is a simple fact that non-final feet range over the three possibilites in (79) below. The choice between (b) and (c) is determined by the factors just discussed. Hence, the two theories in (69), one based on the "Alternator," corresponding to the two possibilities in (79a, c), the other based on the two in (79a, b), require exactly comparable extensions, and exactly comparable statements defining the conditions for the extension. The noted argument provided by the right-hand side of (69) above therefore stands.

(79) a. (Hσ)
b. (σLσ)
c. (Lσ)

The further question is whether there is any naturalness to either extension, namely whether either of the alternative stipulations in (75), (77) can be reduced to principle. We return to that question in 3.7.5 below.

3.7.4 Appendix

In an attempt to overcome the noted weakenesses of the HV analysis, Halle and Kenstowicz (1991) propose a different solution to the problem of ternary feet in non-rightmost position, by supposing that such feet result from left-to-right, rather than right-to-left parsing. On that view, trisyllabic sequences would have a monosyllabic residue on the right rather than the left, like the capitalized portion of *(tàta)(MA)góuchi*. This dispenses with the "Enhancement" rule (73) above, since, without further ado, destressing can now be taken to simply target all "degenerate" feet consisting of a single light syllable, hence the medial one in *tàtamagóuchi*, along with the initial one of *banána*, correctly sparing the heavy initial syllable of *bàndánna*. Within this analysis, the generalization represented by *mo(nònga)hela* is attributed to the hypothesis that the "Accent rule," formerly taken to be only cyclic (as in HV), is in fact non-cyclic as well, hence reimposing stresses on heavy syllables after "conflation" had eliminated them (discussion of (60)). The metrification *(monon)*... will be excluded by the usual convention that the

Alternator respect the effects of the Accent rule, hence requiring *mo(nonga)....*

This account, successful in the respects just noted, is not successful in others. A non-cyclic accent rule will mean that non-rightmost feet obey the "Weak Retraction" pattern – a pattern that all previous research had regarded as sporadic at best, and that we have further argued does not exist at all. That is to say, the apparatus needed for *monòngahéla* will now incorrectly predict stress on each of the capitalized syllables in (80).

(80) àDAPtátion, àfFIRmátion, càTAStróphic, cònFIRmátion, cònSERvátion, cònSULtátion, cònVERsátion, cèMENtátion, èxTERnálity, fràgMENtátion, ìnFORmátion, ìnTERnálity, làMENtátion, prèSERvátion, trànsPORtátion, ùniVERsálity, ùSURpátion

The authors are of course aware of this, and thus suggest (p. 461) that the Accent rule is "lexically restricted" in its operation in the non-cyclic stratum. For this reason, it would not apply to the items in (80), while applying, however, to *hàliCARnássus*, *ìnCANtátion*, *ìnCARnátion*, *òsTENtátion*, and others. (Recall that we are taking such cases to have only unreduced but *unstressed* vowels, pending further discussion in 4.4 below.) The problem with postulating a "lexical restriction" here is that it is now expected in the *monòngahéla* cases as well, the pattern **mònongahéla* being predicted with the same frequency as that of (80). That is not the case, however. That pattern is virtually absent (see fn. 40). The cases in (81) are all just like *monòngahéla.*

(81) a. compénsatòry, confíscatòry, excúlpatòry, incúlpatòry, infánticìde, larỳngológic, obfúscatòry, ophthálmològic, rodénticìde

b. anèsthesímeter, astìgmatómeter, coelènteráta, colùmbiána, commèntatórial, cotèmporáneous, decàlcománia, decòrtizátion, elèctrolýtic, evàngelína, gigàntomáchia, magìndanáo, menìngocóccus, metèmpsychósis, physiògnomónic, potèntiómeter, quezàltenángo, recògnizée, refràctométric, tezcàtlipóca

We will see in Part II that a stem stress essentially *never* fails to be preserved in derived items if it *can* be preserved, namely if it corresponds to well-formed feet. If this is correct, then feet (*H*) are not an option, since all of (80) have stem stresses on the capitalized syllable. Analogously, feet

($\sigma H\sigma$) must also not be an option, since all of (81a) have stem stresses on the initial syllable (*cómpensàte*, etc.).[40]

In sum, while interesting and original within the general formalism of HV, the analysis of Halle and Kenstowicz (1991) presupposes factual generalizations rather different from the ones presupposed here, specifically: "lexically restricted" word-internal (H), along with "lexically restricted" word-internal $\sigma(H\sigma)$. So far as we know, such factual assumptions are incorrect. In our view, the structure (H) is instead *impossible*, while the structure $\sigma(H\sigma)$ is *obligatory* (the alternative *($\sigma H\sigma$) being excluded), and deviations from these patterns are only apparent.

3.7.5 *Constant transition*

Consider now that, from the standpoint of our proposed analysis, feet are allowed to be "smaller," or lighter, word-internally. As we will see later, the structure ($L\sigma$) corresponding to "Strong Retraction" is not allowed word-finally, at least with the same degree of generality, even under the conditions of (78) above, such as stress preservation. For instance, in *bláspheмous*, where the vowel in the penultimate syllable is short for reasons we will return to, compared with *blasphé:me*, stress has retracted one syllable. If ($L\sigma$) was a possibility, stress-preserving **blasphémous* (with a short *e*) should be possible. The question then is whether we

40 This is not completely true, since, as we have seen in 3.4, stress preservation has sometimes the ability to impose feet ($\sigma H\sigma$), at least when the median syllable is closed by a sonorant or *s*, e.g. (*cávernou*)*s*. We find that effect in each of the items in (i), including the italicized ones, in which the median syllable is closed by other than a sonorant or *s*. The items in (ib) permit also (a non-preserving) stress on the second rather than the first syllable.

(i) a. (*àlexan*)*drétta*, (àllerge)nícity, (àspergil)lósis, (cỳberne)tícian, (*dìagnos*)*tícian*, (mìsinfor)mátion, (pàlinge)nétic, (sìmulta)néity
b. (àmorti)zátion, (*àrithme*)*tícian*, (*dìsadvan*)*tágeous*

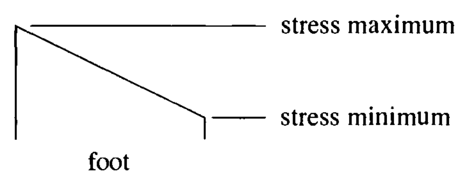
Preservation of the initial stress is from each of the items in (ii), respectively.

(ii) a. àlexándra, àllergénic, àspergíllus, cỳbernétic, dìagnóstic, mìsinfórm, pàlingénesis, sìmultáneous
b. ámortìze, àrithmétic, dìsadvántage

The above observation makes the text point even stronger. If stress preservation, beside being fully regular when standard type feet are involved, can even create slightly nonstandard ones, then the unary feet that would be needed to preserve stem stress in (80) above must be all the more impossible.

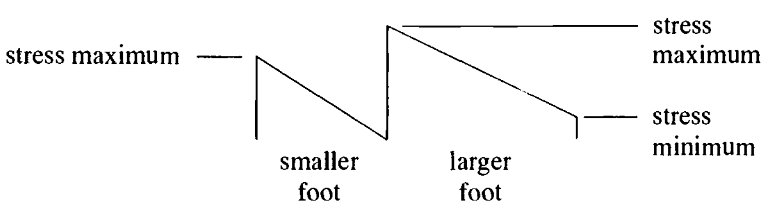
have any reason to expect smaller feet word-internally. We hypothesize that the reasons lie in the prosodic envelope of the word, which we independently know is larger at the right end. In particular, consider how there is a direct correlation between quantity and stress, in the sense that it takes a certain quantity to yield a unit of stress or "foot." Simplifying for the sake of discussion, let us say that it takes a certain number of "moras." Consider further how it is also clear that levels of stress are generally lower word-internally than finally – primary stress generally falling on the last foot. Now the simple conjunction of these two considerations – (i) the connection stress-quantity, and (ii) the lower stress word-internally – will predict feet of lesser quantity word-internally. This type of consideration may seemingly predict, along with inclusion of smaller feet word-internally, also exclusion of larger ones. But we could in fact regard ternaries ($\sigma L \sigma$) as somewhat exceptional word-internally, allowed only under the circumstances noted, namely exhaustiveness and stress preservation, hence in fact consistent with those predictions. Considering now further that the notion of "quantity" is congruous with that of time, as syllables of greater quantity are those whose rimes fill more time units, one may think of the noted relation between quantity and stress as due to the fact that feet have a sloping, perhaps "saw-tooth" envelope, with a characteristic slope or "rate of transition." Taking the latter to be constant for concreteness, we may represent this as in (82).

(82)



The noted quantitatively smaller feet word-internally would then follow from the fact that the maximal stress in that position is lower than word-finally, due to the effect of the word envelope, combined with the fixed foot slope. This view is illustrated in (83).

(83)



If this hypothesis that foot size is relativized to prosodic prominence within the word proves correct, it will remove the stipulatory character of (77) above, licensing binaries ($L\sigma$) only internally. In contrast, the same considerations will not help the alternative approach, for which the binary/ternary feet observed internally are actually *larger* than the unary/binary ones it postulates word-finally – an asymmetry opposite that of the prosodic envelope of the word.

This notion of "constant rate of transition" within the foot is independently supported by the so-called "Arab rule" of Hayes (1985a, p. 177 and references). The phenomenon, originally observed in Fidelholtz (1966) and discussed by Ross (1972) and others, is represented by the range of variation in the pronunciation of words like *arab*, attested both as [ærəb] and [eyræb], but not as *[æræb], or *[eyrəb].[41] Assuming that this kind of word consists of only one foot under either pronunciation, the phenomenon shows that, while the whole foot can vary in prominence, the relation between the two syllables remains constant, the greater prominence of one obtaining if and only if greater prominence of the other also obtains.

Supposing further that not only feet, but word prosody, may also have an inherently constant rate of transition may shed light on the generalization in (78b) above, which we may refer to as the "Strong Retraction" condition, excluding ternary feet when followed by a final weak foot. The reason is that the presence of a weak foot rather plausibly depresses the word envelope in its final portion, in turn depressing the rest of it under constant transition, hence inducing smaller word-internal feet.[42] A word of caution is in order here, however. While the notion of constant transition in word prosody would indeed yield the right kind of relation between feet to express the "Strong Retraction" condition, it is nonetheless a fact that, when the final foot is weak, the prominence relation between the last two feet is apparently reversed, primary stress moving to the penultimate foot as we have seen (p. 16, 3.6 above), hence in a sense violating the very notion of "constant transition" or fixed envelope. We are unable to resolve this paradox at this point.

In sum, while aspects of the foregoing discussion are speculative, needing further study, there are nonetheless indications that fixed relations in

41 In this connection, note also *SPE*, p. 161, citing the two variants *(prèsən)tátion* versus *(prè:sen)tátion*.

42 The postulated constant rate of transition, both at the foot and at the word level may conceivably reflect the time-constant of some physiological mechanism.

prominence hold both between syllables in the same foot, and between feet in the same word. We may note that, should this prove correct, crucial aspects of stress are quite orthogonal to traditional formalisms like metrical trees and grids, both ill-equipped to characterize shapes of prosodic envelopes.

3.7.6 Conclusion

We have argued that, if one examines internal portions of the word, where extrametricality plays no role, one finds that the pattern $(H\sigma)/(\sigma L\sigma)$, independently provided by our theory, is attested, whereas the pattern $(H)/(\sigma L)$, independently provided by the alternative theory is not, since the phenomenon traditionally called "Weak Retraction" is illusory. The theory based on syllable extrametricality is thus forced to the conclusion that word-internal feet are unrelated to word-final ones, a major weakness, as argued on pages 15–17 above. In contrast, the present approach only requires a minimal extension of the range of available feet to move from word-final to more internal portions. We have seen further that precisely that extension would follow if foot size is relativized to word prosody, which in turn would follow if stress levels, both within the word and within the foot are bound to (relatively) fixed rates of transition.

In parts of this chapter we have pursued a strategy different from the one followed earlier, which consisted of holding the foot inventory to be relatively fixed and attributing variation to segmental structure. Instead, we have partly relaxed the foot inventory, introducing the foot $(L\sigma)$, and we have also introduced the extrametricality of weak syllables. Alternatives would seem here rather unnatural, and we will see in Part II that stress preservation, which is controlled by the range of possible feet and extrametrical syllables, will confirm these analyses.

3.8 Summary

We began this chapter by reasserting what had been claimed implicitly or explicitly in most literature since *SPE*, namely that English stress abides by the two major generalizations in (1), (2) above, repeated here below.

(84) a. Heavy penultimate: *agénda*, *appéndix*, *horí:zon*
b. Antepenultimate: *américa*, *ásterisk*

(85) a. Superheavy final: *prevént*, *decí:de*
b. Penultimate: *inhábit*, *imágine*

We did so by addressing three classes of apparent deviations from those generalizations. We specifically argued that: (i) the view that long vowels in final syllables are always stressed (e.g. *alúmni:*) is incorrect, and that heavy syllables with long vowels are no different from other heavy syllables in this regard; (ii) cases like *permít*, *vanílla* depend on the ability of phonetically single consonants to function bipositionally in syllable structure; (iii) cases like *cáVERnous*, *péDEStal*, depend on the ability of syllables closed by sonorants and *s* to function as quasi-light when unstressed.

We then provided a comparison of the approach that takes the "shorter" pattern of (85) to be more primitive, employing "extrametricality" in (84), with ours, which takes the pattern of (84) as more primitive, and employs a null vowel in (85). In support of the latter approach, we have argued that: (i) null vowels are independently motivated by "superheavy" syllables; (ii) the extrametricality needed for syllables with null vowels is independently motivated by cases like *éfficacy*; (iii) feet $(H\sigma)/(\sigma L\sigma)$ resulting from our approach are independently attested word-internally, and that the monosyllabic feet (H) of alternative theories do not exist word-internally at all.

4 *Stress without destressing and vowel reduction*

4.1 Introduction

In this chapter, we first consider the issue of destressing rules, showing how our analysis eliminates them, and then the issue of vowel reduction. The two are interrelated in the following fashion. Given that destressing rules of earlier analyses generally eliminate one of two adjacent stresses, they will be systematically undercut by our claim that there are no monosyllabic feet, which implies automatic exclusion of adjacent stresses. Our claim will seem to overshoot the target, however, since past analyses do not eliminate *all* adjacent stresses. Here, we will argue that only where initial syllables are involved, as in *bàndánna*, are there truly adjacent stresses, requiring an extension of our analysis, while other cases only involve unreduced but unstressed vowels. This is where the discussion of vowel reduction comes in, to examine its interaction with stress.

4.2 Scope of "destressing"

4.2.1 Initial syllables

HV postulate five main cases of destressing, which they attribute to two main rules, improving somewhat on Hayes' (1982, 1985a) system, which employed three. One of HV's rules is given in (1), along with their definition of "stress well" (our own paraphrase).[1]

(1) a. "Over a stress well, delete asterisks on line 1 and above, provided that the well is assigned to a syllable with a non-branching rime."[2]

1 Most destressing rules are ancestrally related to *SPE*'s (p. 125) "Auxiliary Reduction Rule I," a useful discussion of which is found in LP (pp. 286ff.).

2 We have omitted from the quote the phrase "or to a Latinate prefix." The observation goes back to *SPE* that Latinate (and Celtic) prefixes turn up unstressed in initial position

b. Stress well $=_{\text{def}}$ a syllable whose level of stress is lower than that of an adjacent syllable.

One of the cases invoking (1) is the derivation in (2), already considered in 3.7.3 above.

(2)

		ta	ta	ma	gou	chi
	line 3				*	
	line 2	*			*	
FINAL GRID:	line 1	*			*	
	line 0	*	*	*	*	*
		ta	ta	ma	gou	chi
start of cycle						
Extrametricality (19)		0	0	0	0	-
Accent rule (11)					1	
Alternator (5a–c)		1	1			
Line 1 unbd. const. (5d–f)					2	
Stress conflation (5g)		0	0			
end of cycle						
Alternator (5a–c)		1	1			
Line 2 unbd. const. (39)					3	
Stress enhancement (38)		2				
Stress deletion (33)					0	
end of post-cycle						

From the point of view of the grammar that produces the derivation in (2), the "stress deletion" of the last step seems an arbitrary complication, as the same grammar without it would be simpler and more natural. This suggests that a different perspective may be in order. As we noted in 3.7.3 above, considering the conditions under which representations obtain, rather than their possible derivational histories, seems to provide that perspective. As we noted, ternary feet ($\sigma L\sigma$), like the initial one in (2), obtain when they exhaust the structure of the word. To suppose that there is an "exhaustiveness" condition on metrification seems conceptually natural, in contrast to the arbitrariness of a destressing rule. We then only need to state further that feet ($\sigma L\sigma$) are available. As we argued in 3.7.3, there is no advantage in attributing them to complex derivations. Hence, cases like (2) provide no evidence for "destressing."

despite their closed syllables, as in *inténse*, *exúde*, *macdónald* (see also LP, pp. 287ff.). We put this case aside, as we have no particular insight to contribute on this matter.

Similar considerations apply to a second application of HV's (1), illustrated in (3).[3]

(3)

	line 2		*	
FINAL GRID:	line 1		*	
	line 0	*	*	*
		a	gen	da
				start of cycle
Extrametricality (19)				-
Accent rule (11)			1	
Alternator (5a–c)		1		
Line 1 unbd. const. (5d–f)			2	
Stress conflation (5g)		0		
				end of cycle
Alternator (5a–c)		1		
Stress deletion (33)		0		
				end of post-cycle

The factual generalization instantiated by (3) and correctly captured by HV's analysis and other work is that a single light syllable cannot be metrified as a separate foot, which we may state as in (4).[4]

(4) * (L)

This too is a natural condition, one that holds independently even in HV's framework, which allows the foot (*H*), but not the one in (4), quite generally. That condition is in a sense expressed by the rule in (1), but note that nothing beyond the condition is required. The rule is

3 HV's improvement over Hayes' and earlier systems consists of reducing the post-stress destressing of (2) and the *pre*-stress destressing of (3) to the single rule in (1). As we noted in 3.7.3, this can only be achieved by postulating the additional "stress enhancement" of (2). (See, however, HV's p. 245 attempt to motivate enhancement independently.)

4 The literature has noted apparent exceptions. LP (p. 284) cite the cases in (ia) as unpredictably stressed on the initial syllable. Hayes (1985a, p. 148) reports the cases in (ib) as at least occasionally unstressed, citing observations by Kahn, and Fidelholtz.

(i) a. rà*cc*óon, tà*tt*óo, sè*tt*ée

b. m[ə]stítis, [ə]sténsible, pl[ə]stícity, p[ə]stíferous, m[ə]scára

A natural account of the cases in (ia) within our general assumptions is to suppose that the italicized consonants are bipositional, resulting in heavy initial syllables. As for the cases in (ib), we only note that this behavior is consistent with our claim of 3.4 above that syllables closed by *s* can behave as light ones under specific conditions.

LP also note cases like *sch*[ə]*mátic*, in which the initial syllable should be heavy, given the long vowel of *sche:ma*. We consider these systematically in the next chapter.

again superfluous, as there is no reason to suppose that the initial syllable in (3) is first stressed and *then* destressed. Given (4), it will simply *not* be stressed. Note that (4) must thus overrule exhaustiveness, yielding unparsed initial syllables, but this holds of other conditions as well, specifically stress preservation (discussed in Part II), and the "Strong Retraction" condition postulated in 3.7.3 for final weak feet, both of which overrule exhaustiveness, as in *medìcinálity* (←*medícinal*), *artículàte*, respectively.

While the condition in (4) is automatic on our view that there are no monosyllabic feet, the case in (3) nonetheless contrasts minimally with those in (5), which appear to have a secondary on the initial syllable, just as HV's rule in (1) predicts.

(5) a. bàndánna, bàctéria, thìrtéen, chrìstíne
b. cì:tátion, vò:cátion, lò:cátion, nò:tátion

Let us first establish that the prominence of the initial syllables in (5) is indeed due to stress, as has been maintained by past analyses. There are at least two reasons for this conclusion. One is the occurrence of stress shifts at the phrase level. The phenomenon, illustrated by well-known examples like *mìssissíppi* → *míssissìppi législatùre*, consists of a backward shift of the primary stress when the next word has its own primary on the initial syllable. Hayes (1984) has shown that metrically single heavy syllables like the ones in (5) are indeed targeted by such shifts, as in (6) (Hayes' examples).

(6) córnèll hóckey, sálvàtion ármy, chrístìne schéafer

Although Hayes notes that shifts onto such monosyllabic feet occur only under somewhat specific conditions, hence not, for example, in **móntàna góvernor* (see also Kiparsky 1979; LP), his discussion also indicates clearly that shifts *never* occur onto syllables that are not independently stressed, compare **máròon sweater* (LP, p. 285), or Hayes' discussion of **álìve péople*.[5] Thus, the initial syllables in (6) must be stressed even in the absence of the shift.

The second relevant fact is the contrast between (5b) and (7) below.

5 From our viewpoint, the reason why stress shifts occur less regularly onto single-syllable feet is that those feet are in fact of the "weak" variety, as we see below. This view is supported by the fact that the same shifts are rather more regular when the final foot is itself weak, hence no more "stress-attracting" than the initial one, as in *chrìstíne* → *chrístìne schéafer* of (6).

(7) a. rèc*i*tátion
b. àdv*o*cátion, ìnv*o*cátion, rèv*o*cátion, cònv*o*cátion, pròv*o*cátion
c. àll*o*cátion, còll*o*cátion
d. ànn*o*tátion, cònn*o*tátion

The generalization here is that vowels that can be regarded as "underlyingly" long, like those italicized in both (5b) and (7) (compare (8) below) are generally shortened when adjacent to another stress as in (7), unless they are in an initial syllable as in (5b) above. This would follow if the italicized vowels of (5b) above *cì:tátion*, etc. were stressed, like those of (8). Then, the alternation in vowel length ((5b)/(7)) would be due to the stressed versus unstressed character.[6]

(8) a. cí:te
b. invó:ke
c. ló:cus
d. nó:te

Note further that items like *pro:dúction* have variants with a long vowel in the initial syllable, in contrast with the exclusively short one of *próduct*. While we consider this alternation in detail in the next chapter, we note here that there is little reason for the long vowel in the former unless such initial heavy syllables bore stress, although we will need to explain why stress does not also lengthen the vowel in the latter case.

The apparent contrast between *(*L*) and (*H*) in word-initial position may seem to support the theory based on σ/C extrametricality, which independently postulates the same divergence word-finally, as in (9a) below, while our approach correspondingly postulates only a difference between bisyllabic feet *(*Lσ*) and (*Hσ*), as in (9b).

(9)	a.	*(L):	*inha(bí)t	(H): pre(vén)t
	b.	*(Lσ):	*inha(bítϕ)	(Hσ): pre(véntϕ)

6 The text discussion stands despite various related points. One is that we are not assuming that the shortening in unstressed position is fully general, given the unstressed long vowels of *alúmni:*, etc., postulated in 3.2 above. Another is that, to the extent that there is shortening, initial syllables are not *always* spared, witness *plá:to* → *pl*[ə]*tónic*. Thirdly, the cases in (i) contrasting with those in (7) are also attested with the italicized vowels long.

(i) †exc*i*tation, †inc*i*tation, †ev*o*cation

The point of the text is that there is *some* asymmetry between initial and medial syllables, and that much is clear. For a full discussion of vowel length see chapters 5 and 10.

This type of argument for σ/C extrametricality is defused on closer scrutiny, however. For, within our approach too, the word-initial generalizations can be reduced to the word-final ones, by adopting the analysis in (10).

(10) a. *(ϕL): *(ϕbà)nána b. (ϕH): (ϕbàn)dánna

That is, it seems reasonable to suppose that, if empty structure is available to metrification at the right edge, it should be available at the left one as well.[7] On this view, the asymmetry in (10) reduces to the one in (9b), so long as we account for the iambic status of the initial feet in (10), contrasting with the generally trochaic feet of English. It seems natural to suppose that a normally trochaic foot can become iambic when the designated syllable is in fact unstressable, like the null one in (10). Note that this hypothetical state of affairs is very much like the one independently postulated in 2.3 above for syncopated cases like *kaa(tϕbúu)* in Tiberian Hebrew, in which the normally penultimate stress shifts to the final syllable. A similar phenomenon exists also in certain Arabic dialects, discussed in Al-Mozainy *et al.* (1985), Kenstowicz (1990a). An analogous situation seems to obtain to a limited degree in English as well, in cases like (11a, b) (from *SPE*, p. 116, and LP, p. 275, respectively).

(11) a. †(elèc)trícity, †(elàs)tícity
b. †(aràch)nólogy, †(odòn)tólogy, †(egỳp)tólogy

So far as we can determine, the phenomenon of (11) is limited to initial onsetless light syllables followed by heavy ones. The unstressed vowel in the initial syllable reduces here to ə, as in other open syllables, resulting in a rather similar configuration to that postulated in (10) *(ϕbàn)dánna*, lending plausibility to that analysis. An interesting case which lends further plausibility to the above analysis is discussed in Goldsmith (1990, pp. 173ff.). In Malak Malak (Australia), stresses are on even-numbered syllables counting from the end. Odd-numbered syllables which are initial are not generally footed, whence *melpápu*, "father," rather than **mélpàpu*. We can take this to mean that initial feet like the one in (10b), which we may think of as "degenerate" because iambic

7 This predicts that empty structure word-initially should be available to syllabification as well, since it is word-finally. This seems to be true for initial *s + obstruent* clusters, as we argue in 4.4 below. In Burzio (1989), we have shown that there is independent evidence for empty structure before initial *s + obstruent* clusters in Italian.

in an otherwise trochaic system (such as that of Malak Malak or English), are disallowed. Languages in fact seem to oscillate on this point. There is one interesting exception to this generalization of Malak Malak, however. Precisely with trisyllabic words, the initial stress can optionally obtain, provided that the third, rather than the second syllable receives the following stress, as in *mèlpapú*. We interpret this to mean that an initial iambic foot as in (10b) above is not excluded altogether, but only in otherwise trochaic structures, as in **(ϕmèl)(pàpu)*. The structure *(ϕmèl)(papù)*, on the other hand, is well formed because it is consistently iambic. This possibility is open only to trisyllabic words because the iambicity of the initial foot can evidently only propagate to the immediately adjacent foot.

While we exclude feet (*Lσ*) word-finally, we do not exclude them *non*-finally, as discussed in chapter 3, given *(àri)zóna*, *ac(céle)ràte*, etc. This gives us no reason then to exclude the iambic counterpart (*ϕL*) of (10). The reasons will be provided, however, by the notion of "foot weight" developed in the next chapter. In essence, we will claim that all syllables contribute in some measure to foot "weight." From that point of view, it will be straightforward to suppose that the foot (*Lϕ*), *and* its iambic counterpart (*ϕL*), is below the minimum weight required, while (*LL*) is above it and hence well formed. This will exclude **(ϕba)nana*, while permitting *(ari)zona*, etc.

In conclusion, we take *apparently* monosyllabic feet consisting of a heavy syllable to be possible at either edge of the word, because empty structure is available at the edges to construct binary feet. We maintain, however, that monosyllabic feet do *not* occur word-internally, a point that comes up in the next subsection.

4.2.2 The *ory/ary* class

A further case in which destressing has traditionally been invoked is that of *ory/ary* items, whose behavior in American English is illustrated by (12a, b).

(12) a. olfáctory, eleméntary
b. áuditòry, mílitàry

As (12) shows, these items normally stress the syllable preceding the suffix if it is heavy, and the next otherwise. Ever since *SPE* (pp. 123ff.) this pattern has been analyzed as involving assignment of stress to *ory/ary*, followed by a second stress iteration of the "Weak Retraction" type, i.e. *(H)/(σL)*. On this view, at some level of derivation, (12a) has a stress on *ory/ary* just like (12b). HV (pp. 256ff.) follow in this tradition, postulating subsequent application of destressing (1), correctly applying to (12a) in a "stress well," and sparing (12b). We abstract away here from the question of why the stress on *ory* should be weaker in that framework, satisfying the notion of "stress well" (we considered that question in 3.6 above).

As we noted in 3.2, the "Weak Retraction" pattern that HV postulate for (12) and which our theory precludes is exceptional in their own analysis, and is achieved here as in a few other cases by postulating independent "stress domains" for stem and suffix. This is to say that, in (12), *olfáct*, *áudit* are taken to be stressed as if they were independent words (but with no extrametricality). This kind of weak retraction-plus-destressing combination is undercut by the conclusion of 3.6 above that syllables C_0y can be extrametrical – an essentially theory-neutral fact, given the pattern of *éfficacy*, etc., or for that matter of the British counterparts to (12), given in (13) in our analyses.

(13) a. ol(fácto)ry, ele(ménta)ry
b. (áudito)ry, (mílita)ry

Specifically, consider that destressing under stress adjacency ("stress well") is of no use for (13b), requiring extrametricality of the final syllable instead. The latter, however, is now sufficient for (13a) as well, identical to their American counterparts. This will then make possible an analysis of the American English facts in (12) in terms of a simple condition that, when a heavy syllable precedes *σry*, that syllable must be stressed, forcing *ry* to be extrametrical. We may state that condition as in either of (14a, b).[8]

(14) a. ($\acute{\text{H}}$ σ) ry
b. * H (σ́ ry)

The condition in (14) may seem to partly offset the advantages of eliminating destressing and weak retraction. Several considerations provide independent support for it, however.

8 We suppose that *(*σσ*ry) is not possible, because the syllable preceding *ry* is metrically heavy, *a/o* being merely laxed phonetically by the presence of *r*.

Recall that the notion of "constant transition" proposed in 3.7.5 above hypothesizes a fixed differentiation in prominence between stressed and unstressed syllables. Since heavy syllables are inherently more prominent, it seems natural that the latter differentiation should be more easily achieved if heavy syllables are in stressed position. In this sense, (14) can then be taken to be related to "constant transition." While we thus presume that the desired alignment of heavy syllables with stresses can be achieved by exploiting the metrical ambiguity of weak syllables as in (14), it is clear that it cannot be achieved more generally, for example not in *dèLECtátion*. This is due to the non-existence of monosyllabic feet, as we have argued. Extending the idea that (14) is related to constant transition, in chapter 5 below we will argue that it is an instantiation of an even more general condition that helps define the overall foot typology, and is in this sense closely related as well to the ill-formedness of feet $*(\sigma H \sigma)$.

A different kind of consideration supporting (14) has to do with the already noted behavior of syllables closed by sonorants, as in *(rePER)(tory)*, in which the capitalized syllable behaves like a light syllable relative to the pattern in (12) above, in contrast to that of *a(GENda)*, which behaves just like a heavy one with respect to stress. The difference is captured by supposing that syllables closed by sonorants – "σ_n," for short – behave as light ones (when unstressed) only with respect to (14), rather than more generally, hence allowing $\sigma_n(\sigma ry)$. Thus, in *(rePER)tory*, the "light-like" behavior of σ_n can be taken to be induced by the preferred American metrification *(σry)*, not a factor in *a(GENda)*.

A further consideration concerns the differences between British and American English in (15)–(17).

(15)	a.	*British*:	ca(pi*ll*a)ry, co(ró*ll*a)ry, ma(xi*ll*a)ry, an(ci*ll*a)ry,me(dú*ll*a)ry, pa(pi*ll*a)ry
	b.	*American*:	(cápi*l*)(*l*àry), (córo*l*)(*l*àry), (máxi*l*)(*l*àry), †(ánci*l*)(*l*àry) †(médu*l*)(*l*àry), †(pápi*l*)(*l*àry)
(16)	a.	*British*:	sa(l*í*va)ry, an(t*í*qua)ry, ca(t*é*na)ry, mil(l*é*na)ry, cen(t*é*na)ry, disci(pl*í*na)ry
	b.	*American*:	(sál*i*)(vàry), (ánt*i*)(quàry), (cát*e*)(nàry), (míll*e*)(nàry), (cént*e*)(nàry), (discipl*i*)(nàry)
(17)	a.	*British*:	†ar(tìcu)(l*á*to)ry, †an(tìci)(p*á*to)ry, †ca(pìtu)(l*á*to)ry, †con(gràtu)(l*á*to)ry, ...
	b.	*American*:	ar(ticul*a*)(tòry), an(tícip*a*)(tory), ca(pítul*a*)(tory), con(grátul*a*)(tory), ...

The British cases in (15a) are straightforward from our point of view, if we suppose that the italicized consonants function as geminates, as in *vanilla*, etc. of 3.3 above. Those in (16a), (17a) are straightforward too, since their italicized vowels are long, yielding penultimate stress as usual. Their American counterparts will also follow, if we suppose that (14b) rather than (14a) is the relevant principle, and that, with respect to the latter, heavy syllables due to geminates (as in (15b)) and to long vowels (as in (16b), (17b)) are in a sense ambiguous, because they can be interpreted as light when unstressed, analogously to what we are claiming for syllables closed by sonorants. Both types of syllables are indeed realized as light when unstressed – those with geminates because, phonetically, they are always non-distinct from light ones, and those with long vowels because the latter surface as short in unstressed position, as we noted in 4.2 and consider further in chapters 5 and 10. As in the case of syllables closed by sonorants, we thus suppose that the light-like behavior obtains here only as imposed by the preferred (American) metrification (σry), not more generally.

In contrast to the above account, the more traditional one has no way to express the differences in (15)–(17). Beginning with the British cases, extrametricality of the final syllable is required as argued, which means that theories based on σ/C extrametricality will have "double" application of extrametricality here as with e.g. *áccuracy*, as discussed in 3.6 above. The stressed syllables in (15a), (16a) must then be supposed to be metrically heavy as we suggested, so as to reduce those cases to prototypical *olfáctory*. However, an account of the American cases based on "Weak Retraction" $(H)/(\sigma L)$ from the edge of the suffix V*ry* (however implemented) will now be at a complete loss to express the noted differences. For the pattern $(H)/(\sigma L)$ to the left of the suffix is exactly what obtains in British English.

By relying on (14), which seems both plausible and independently motivated, we can thus remove this further case of "Weak Retraction" and, with it, any evidence for "destressing" in (13).

There is just one more use of destressing (1) above in HV's analysis, illustrated in (18) below. It is made necessary by the assumption that syllable extrametricality is "cyclic," hence repeated post-cyclically as shown, thus enabling the Alternator to (non-vacuously) construct a word-final foot in pro-paroxytonic words.

(18)

		a	me	ri	ca
	line 2		*		
FINAL GRID:	line 1		*		
	line 0	*	*	*	*
		a	me	ri	ca
start of cycle					
Extrametricality (19)		0	0	0	-
Accent rule (11)					
Alternator (5a–c)		1	1		
Line 1 unbd. const. (5d–f)			2		
Stress conflation (5g)		0			
end of cycle					
Extrametr. revoked					0
Alternator (5a–c)		1		1	
Stress deletion (33)		0		0	
end of post-cyycle					

Since there is no independent evidence whatever for a penultimate stress in cases like (18), destressing here is a purely theory-internal contingency which need not concern us any further.

4.2.3 Sonorant destressing

The second of HV's destressing rules is that of "sonorant destressing," first introduced in Kiparsky (1979) and adopted as well in Hayes (1982, 1985a). We give HV's (p. 257) formulation in (19a), and illustrate its application in (19b).

(19) a. *Sonorant destressing*

* → . /	* ___ *	line 1
	# * * * #	line 0

where # represents a word boundary

Condition: ___ dominates a rime ending with a sonorant b.

	line 3	*			
	line 2	*		*	
FINAL GRID:	line 1	*		*	
	line 0	*	*	*	*
		re	per	to	ry

start of cycle

.

.

.

	0	2	2	#
Alternator (5a–c)	1			
Line 2 unbd. const. (39)			3	
Rhythm rule (21)		3	2	
Sonorant destressing (67)	3	0	2	
y-syllabification				0
Stress deletion (33)				

end of post-cycle

The first line in (19b) is the end result of HV's derivation by "independent stress domains" described above. The environment for destressing (19a) is satisfied in (19b) because the final *y* is supposed to be non-syllabic at that level of derivation (recall discussion in 3.6), and syllabified only late, as in (19b). The destressing of the second syllable by (19a) results in the shift of the whole column of asterisks onto the first syllable under HV's conventions. Note that in (19b) sonorant destressing must be extrinsically ordered before "stress deletion (33)" (= (1) above), so as to prevent the latter from destressing *ory*. As we argued in 3.4 and 4.2 above, there is no need for a destressing rule in these cases. One can alternatively simply state the conditions under which syllables closed by sonorants can function as light and hence *remain* unstressed, as in (19b) *(réper)(tòry)*. This will explain immediately why *ory* is not "destressed," in contrast to the ordering statement otherwise needed, which seems quite arbitrary. As we saw, some of the conditions involved are "exhaustiveness" (indirectly expressed by (19a) which transfers stress to the first syllable), and stress preservation (not expressed by (19a)), as in various cases to which we return in Part II, such as *párentage* (←*párent*), *cávernous* (← *cávern*), as well as *dispénsary* (← *dispénse*) where stress preservation overrules exhaustiveness, as we will see it does quite generally.

With regard to the latter two conditions: exhaustiveness and stress preservation, we must note that, while HV succeed in covering several cases with only two destressing rules, there is nonetheless a loss of generality in the approach, since the same conditions at work in the phenomena covered by destressing (19a) are also at work in phenomena covered by the other "destressing" rule, namely (1) above, witness exhaustiveness in *(tàtama)góuchi*, and stress preservation, overruling exhaustiveness, in *me(dìci)nálity*. In a rule-based system, it is an accident that identical conditions should show up in unrelated rules. This suggests that the rules are an artifact, and that it is rather the conditions that stand as the building blocks of the theory.

In requiring that the would-be-destressed syllable be followed by a final stress, HV's (19a) above aims to express the fact that the phenomenon in question does not only occur with *ary/ory* (whose stress is "final" prior to the syllabification of *y*), but also with *i:le*, *i:de*, *i:ne*, *oid*, all of which HV presume to be stressed, and hence not for instance in **áGENnda*. Our discussion of *ary/ory* not relying on final stress can in fact be generalized to cover all of these cases as well. To do so, we suppose that the suffixes in question all normally metrify as (σW), i.e. (C_0ory), $(C_0i{:}le)$, etc., and that the condition (14b), which we now make general, requires the alternative metrification $\sigma)W$ when a heavy syllable precedes, e.g. $(HC_0o)ry$, $(HC_0i{:})le$, etc., as in *re(fécto)ry*, *pro(jécti:)le*. This mechanism represents the "factors" of (39) of chapter 3, specific to these classes of words, that had remained unidentified. On this view, there is therefore no stress on the suffix in these cases, as is apparent for V*ry* (*, *refèct*[ə]*ry*), hence again no "Weak Retraction." Syllables closed by sonorants may fail to trigger (14b) (under the further conditions noted) because they can function as light in unstressed position, hence *(réPER)(tòry)*, *(sérPEN)(tì:ne)*, *(árGEN)(tì:te)*, *(hélMIN)(thòid*ϕ*)*.[9] This,

9 The text account may seem paradoxical in that the metrification *i:)le*, which is supposed to align heavy syllables with stress, in fact fails to stress the heavy syllable of the suffix itself. The paradox is resolved by supposing that there is in fact a bias against metrification of null vowels, which is the norm only with verbs. In the metrification *i:)le* that bias is satisfied, while the alignment with heavy syllables with stress is not. However, the latter factor is neutralized when there is a further heavy syllable that precedes and that could be aligned with stress only if the suffix was not. These considerations would plausibly not extend to the case of *ary/ory*, which would remain as discussed in the text. Instead, the normal metrification in that case would be V*ry*), consistent with some notion of exhaustiveness as argued in 3.6, but plausibly no "misalignment" would result in the alternative V)*ry* because the V is realized as lax, as generally before *r*. We return to these issues in 7.3 below.

like destressing (19a), accounts for the asymmetry between the contexts in question and more general ones, where the phenomenon is more rare, e.g. *wáSHINGton*, versus **áGENda.*[10]

The welcome conclusion is therefore that there is no need for destressing rules in our system – a consequence of the fact that monosyllabic feet are never constructed.[11]

4.3 The residue of destressing

Alongside of the monosyllabic feet that are eliminated by "destressing," past analyses also postulate others which are not eliminated. We review those here one by one.

We have already discussed feet bearing the rightmost or the leftmost stress, such as the italicized ones in (20a, b), respectively.

(20) a. prè *vént*, àri *zó:* na
  b. *bàn* dánna, *cì:* tátion

We have argued that such feet are in fact *bi*syllabic, the additional syllable being null or overt in (20a), and null in (20b). We have also

10 But note that neither this discussion nor (19a) can distinguish between *áGENda and British *ìnVENtəry* and the like, which are affected by "sonorant destressing" just like their American counterparts. A likely solution lies in the history of English. Walker (1775) provides some evidence that late-eighteenth-century British English had the metrification ...V*ry*), like current American, and in fact even more consistently. Thus, the words in (i) all had initial stress.

(i) a. cónsistory = secretory, deceptory, receptory, receptary, redemptory, peremptory
  b. désultory = inventory, promontory, legendary, secondary, exemplary, sedentary, commentary, momentary, voluntary

In this light, the treatment of syllables closed by sonorants as light, as in contemporary (*ínvento*)*ry*, can be seen as driven by diachronic stress-preservation from (*ínven*)(*tòry*), hence analogously to the derivation *wàshing-tóun* ⇒ *wáshington* appealed to in 3.4 above.

11 Another case of destressing is postulated in Hayes (1985a, p. 177) to handle *ærəb/eyræb* alternations - the "Arab rule." Hayes analyzes these cases as consisting of two feet, i.e. (*ey*)(*ræb*), with destressing removing the rigthmost in the variant *arəb*. Note that the two-foot analysis of such cases raises the usual question of why the primary is on the first syllable, in contrast to e.g. *rè:pórt*. No such problem arises and no destressing is required within our single-foot analysis, which postulates "constant transition" within the foot, as in 3.7.4 above.

Yet a further case of "destressing" is that of items in *ative*, which we discuss in 5.2.3 below.

already considered feet bearing a primary stress followed by a presumed secondary, as in (21).

(21) a. a *lúm ni:*, pro *jéc ti:le*, pa *pý: ri:*
b. adi *rón dack*, mo *nád nock*

Here, we have argued that the final syllables do in fact *not* bear stress, hence directly reducing the pattern in (21) to the normal one of nouns (heavy penultimate), in contrast to the various exceptional devices otherwise required (see 3.2, 3.7.2 above). By doing so, we have placed some additional burden on the theory of vowel length, which must now account for the unstressed long vowels of (21a), and on the theory of vowel reduction, which must account for the corresponding unreduced vowels of (21b) – two issues to which we will return.

It remains to check for monosyllabic feet in more internal positions of the word. Before turning to the facts, it will be useful to see what predictions HV's system actually makes in this domain, that is, what factual generalizations it presupposes. Of relevance here is HV's (p. 241) rule of "vowel shortening" given in (22a), along with the definition of "stress well," repeated from (1b).

(22) a. $V\!: \Rightarrow V \;/\; \sigma \_\_ \sigma$
condition: V dominates a stress well
b. Stress well $=_{\text{def}}$ a syllable whose level of stress is lower than that of an adjacent syllable.

We must note that all targets of shortening are automatically also targets of destressing (1) above, which follows it in the derivation, and which applies to light syllables in "stress wells." For example, in the derivation of *reféctOry*, shortening would first apply to the *O*, presumed initially stressed and underlyingly long, and then destressing would. In *ìnvOcátion*, (22) would shorten the *O* whether or not it bore stress, and then destressing would apply if it did initially bear stress. The formulations of (22) and (1) above combined thus ensure that shortening/destressing will apply everywhere, except: (i) initially, as in *ci:tátion*, etc.; (ii) finally, as in *alúmni:*, etc.; and (iii) when a vowel bears primary stress, as in *arizo:na*, *papy:rus*, *papy:ri:*. Since those are precisely the cases we have already discussed, this means that the conjunction of shortening (22) and destressing (1) in fact precludes any *further* monosyllabic feet (*H*) beyond the ones of (20)–(21), in the cases in which "H" has a long vowel. On this point, we simply agree with HV in presupposing that factual generalization, namely that there are no such monosyllabic feet.[12] In their system, this is captured by the specific formulation of (1) and (22) – not an *a priori* necessity. In contrast, in our system, this follows automatically from the more general claim that there are no monosyllabic feet.

HV's system makes different predictions when "H" is a *closed* syllable rather than one with a long vowel. Here, their system of *destressing* predicts monosyllabic feet (*H*) should occur freely, as the destressing of (1) above only applies to *light* syllables, and shortening (22) is irrelevant. The question, then, is whether HV's system of *stressing* ever constructs such feet. In fact, in general, it does not, because of "conflation," as noted in 3.7.2 above. We illustrate this again in (23).

(23)

FINAL GRID:	line 2	*				
	line 1	*		*		
	line 0	*	*	*	*	
		in	for	ma:	tion	
						start of cycle
Extrametricality (19)		0	0	0	-	
Accent rule (11)		1	1	1		
Alternator (5a–c)		1	1	1		
Line 1 unbd. const. (5d–f)				2		
Stress conflation (5g)		0	0	2		
						end of cycle
Alternator (5a–c)		1				
						end of post-cycle

12 Although the non-existence of stress-adjacent long vowels in medial position has the exceptions of fn. 6, the generalization is nonetheless confirmed by the paradigm in (i).

(i) a. (bí:c*y*cle), (trí:c*y*cle)
b. (ùni)(c*ý:*cle)

The metrifications indicated in (i) follow from supposing, along with non-availability of monosyllabic feet, that word-initial parsing as in (*ϕbi:*)..., proposed in (10b) above, is (somewhat) degenerate and hence non-preferred (on this, see also 5.4 below), though it is clearly not excluded, given (*ϕbi:*)(*pártisa*)*n*, etc. The shortening *y:* → *y* of (ia) then follows as a standard case of shortening in unstressed position, whatever its exact account is (see 5.2.4, 10.3 below).

"Conflation," which is in fact another "destressing" mechanism, ensures that, in general, monosyllabic feet (*H*) will not arise non-finally (i.e. as the non-rightmost stress), except word-initially (*bàndánna*, etc.), where they can arise by a "degenerate" application of the alternator, which finds only one syllable left. Once again, we agree with the factual generalization that this implies, that there are no word-medial monosyllabic feet – a result of the special rule of conflation in HV's system, but once again automatic on our view. There are, however, two cases in which the effects of conflation are superseded in HV's system. One is illustrated in (24), in which conflation simply (though exceptionally, given *ìnf*[ə]*rmátion* (23) and other cases) fails.

(24)

	line 2				*	
FINAL GRID:	line 1	*		*	*	
	line 0	*	*	*	*	*
		ha	li	car	nas	sus
start of cycle						
Extrametricality (19)						-
Accent rule (11)				1	1	
Alternator (5a–c)		1				
Line 1 unbd. const. (5d–f)					2	
Stress conflation (5g)						
end of cycle						
Extrametricality revoked						0
Alternator (5a–c)						
end of post-cycle						

Here, we will now *dis*agree with HV's factual assumptions, and maintain that there is no secondary stress next to the primary (in fact concurring with most dictionaries on this point). We will suppose that the prominence of that syllable results from simple absence of vowel reduction, and that, in general, unstressed syllables closed by sonorants may or may not reduce their vowels, as in the contrast between (23) *inf*[ə]*rmation* and (24). We will regard this variation as essentially idiosyncratic, comparing here with HV's system, which makes no predictions in this regard. Nonetheless, we find reason to suppose that the variation is at least in part related to vowel quality, as e.g. *pàraphernália* contrasts minimally with the case in (24) in reducing the pre-tonic vowel, as does – to our ear – hypothetical *hàliphernássus*. If this is correct, it supports our own view, since it seems reasonable to suppose that vowel reduction depends in part on vowel quality, but less so to suppose that stress does.[13]

The second case in which the effects of HV's conflation are superseded is illustrated in (25), where the special rule of "stress copy" reintroduces a stress from an earlier "cycle" – the stress of *condénse*.

(25)

FINAL GRID:	line 2			*		
	line 1	*	*	*		
	line 0	*	*	*	*	
		con	den	sa	tion	
						start of cycle
Extrametricality (19)		0	0	0	-	
Accent rule (11)		1	1	1		
Alternator (5a–c)						
Line 1 unbd. const. (5d–f)				2		
Stress conflation (5g)		0	0			
						end of cycle
Extrametr. revoked					0	
Stress copy (46)			1			
Alternator (5a–c)		1				
Shortg. over st. well (37)						
Stress deletion (33)						
						end of post-cycle

HV handle the preservation of earlier stresses by presuming that (at least with affixes like *ation*) stresses are first all erased – the "Stress Erasure Convention" (HV, p. 83), and then reintroduced by "stress copy." This reintroduction has itself an idiosyncratic character, as (25) contrasts with (23) despite *infórm*, parallel to *condénse*. Note that neither "failure of conflation" nor "stress copy" would ever succeed in introducing monosyllabic feet with long vowels, since those would be removed by "shortening over a stress well" feeding "stress deletion," both of which are ordered late, as shown in (25). On this view, there would therefore be an asymmetry between V: and VC syllables, with only the latter permitted as a medial monosyllabic foot.

Two considerations challenge the analysis in (25). One is that alleged contrasts like *SPE*'s famed *cond*[e]*nsation*/*comp*[ə]*nsation* that (25) is

13 This is partially qualified by the fact that we are seeing a dependency between stress and vowel quality in our characterization of weak syllables.

meant to express, though real, are in fact rather weak (not recognized by all speakers according to Fudge (1984, p. 216)). In contrast, preserved stresses are detected somewhat more robustly, as we see in Part II. The other is that stress preservation can be shown to be quite regular, again as we see in Part II, and thus not subject to the variation seen here. Both facts then suggest that the relative prominence of *DEN* in (25) is *not* due to preservation of stress. Once again, we attribute such prominence to the workings of vowel reduction. On that view, the contrast between (23) *inf*[ə]*rmation* and (25) *cond*[e]*nsation* will be due to the noted variability in vowel reduction with syllables closed by sonorants. As for *cond*[e]*nsation* versus *comp*[ə]*nsation*, we account for it in terms of the notion, to which we return in 10.3.3 below, that, in word-formation, there is preservation of segmental quality independent of preservation of stress. Thus, in *cond*[e]*nsation*, vowel reduction is partly inhibited by the latter effect, which prescribes the full vowel of *cond*[é]*nse*, while reduction in *cómp*[ə]*nsàtion* is not comparably inhibited, since *cómp*[ə]*nsàte* already has a reduced vowel. The reduction in *ìnf*[ə]*rmátion* will still be due to the noted variability (tentatively attributed to the different vowel quality), with a "stronger" reduction effect here overriding (segmental) preservation from *inf*[ó]*rm*. There is therefore no reason to suppose that there are word-medial monosyllabic feet in cases like *hàliCARnássus*, or *cònDENsátion*, and hence no reason to see an unexpected asymmetry between V: and VC syllables in their ability to form word-medial monosyllabic feet.

In conclusion, the assumption that there are no monosyllabic feet is quite consistent with the observed stress pattern of English. Maintaining it enables us to dispose of a complex "destressing" apparatus, which includes (1) above, (19) (working with (22)), as well as "stress conflation," and which is to a good extent devoted to undoing the effects of the opposite assumption, namely that there *are* monosyllabic feet.

4.4. Vowel reduction

4.4.1 Closed versus open syllables

Having thus maintained that stress is a necessary but not sufficient condition for vowel reduction, and that there exists a class of unstressed but unreduced vowels, we now attempt to identify the other factors at work beside stress.

To begin with, it seems clear that there is a distinction between open and closed syllables – unstressed open syllables reducing quite generally, as for example in (26a), while closed ones do not, as in (26b).[14]

(26) a. *a*méri*ca*, pár*a*sì:te, *e*cón*o*my, m*o*nòng*a*hé:l*a*
b. àdj*e*ctí:val, àrchit*e*ctónic, gàstr*o*cnémius

There is no reason to suppose that any of the italicized vowels in (26b) are stressed, other than the traditional (but arbitrary) assumption that *all* unstressed vowels reduce – an assumption directly challenged by cases like (27), whose italicized vowels are *un*reduced.[15]

(27) a. pród*u*ct, †prój*e*ct, †prógr*e*ss
b. dérel*i*ct, díffic*u*lt, mánif*e*st, mórib*u*nd, tácit*u*rn

In these cases, there are specific reasons for assuming lack of stress. Considering (27a), if the final syllable were stressed here, constituting a final foot, then the first syllable *pro* would be a separate foot. But this kind of foot, with a single light syllable, is otherwise unattested, as we saw in 4.2.1, e.g. **bànána*. Compare also (27a) with cases like *prodúction*. In the latter, the initial syllable can vary idiolectally between *pro:*, with a long vowel, and *prə*, with a reduced (and hence unstressed) one, but cannot be *pro*, with a short and unreduced vowel. This otherwise curious gap simply reflects the generalization in (4)/(10) above, excluding feet

14 Recall that we regard the final *y* of *economy* in (26a) as somewhat analogous to a reduced vowel. See 3.6 above.
Note further that certain final vowels fail to reduce and surface as tense instead, e.g. *volcano*, *motto*, etc. (see *SPE*, p. 74; Halle and Mohanan 1985, p. 59). We have no specific proposal on this matter.
Note, in addition that, in ternary feet, foot-medial open syllables are affected by reduction to a greater extent than foot-final syllables. Thus, we find *(tætəma)gouchi* preferable to *(tætamə)gouchi*, and analogously with *(rigama)role*, *(panama)*, etc. This asymmetry is reflected in the distribution of syncope, as in *(mem'ri)zation*, not **(memor')zation*. This is paralleled as well in the history of French, as discussed in Jacobs (1989), who notes the pattern of syncope in (i) (foot boundaries ours).

(i) a. Latin: (sìm*i*li)(tú*di*ne)m → (simϕli)(tudϕne) →
b. Old French: sembletume "resemblance"

This fact suggests that the prosodic envelope of ternary feet is more complex than suggested by the simple notion of "constant transition" proposed in 3.7.5, and that it involves falling on the medial syllable followed by rising.

15 In (27a), the *e* of *project* varies between [e] and [i], the latter possibly a reduced vowel. The *o* of *progress* is long in some dialects (British/Canadian). The text point remains unaffected by these facts.

whose only overt syllable is light. But now, if the final syllable in *product* bore stress, its *initial* syllable should behave exactly like that of *prodúction*, contrary to fact. The same point is made by the other two items in (27a) *project, progress*, contrasting with *pro(jéctio)n, pro(gréssio)n*, respectively. The initial light syllable of each of (27a) must rather be part of a *larger* foot including the final syllable, which must then be unstressed.[16] As for (27b), final stress here seems also unlikely in light of the diagnostic provided by adverbial *ly*. As we see in 8.2.3 below, adjectives that – in our terms – have a final weak foot, shift the primary stress forward under affixation of *ly*, as in *mílitàry* → *mìlitárily*, *législàtive* → *lègislátively*, and (at least idiolectally) *ópportùne* → *òpportúnely*. But the adjectives in (27b) do not exhibit such shifts, as in **dèrelíctly*, **dìffícúltly*, **màniféstly*, etc., suggesting these do *not* have final weak feet, namely no final stress.[17]

Note further that items in *ent* or *est* exhibit dialectal/idiolectal variation regarding reduction of *e*. Yet there is no variation in the stress pattern. Thus, *appárent* does not turn to **ápparènt* for speakers who do not reduce *e*. Analogously with *delínquent, depéndent, despóndent, evanéscent*, etc. Nor do *hónest, prúdent* ever become **honést, *prudént*, mirroring *robúst, rotúnd*. These facts indicate that the unreduced *e* in these cases is not due to stress. In sum, it seems clear that a biconditional relation between stress and reduction cannot be maintained, as some closed syllables have unstressed and yet unreduced vowels.

The distinction we are thus postulating between open and closed syllables with respect to vowel reduction is a natural one to expect. It follows from the fact that (as shown by their citation forms "bee, cee, dee, ef, ...") consonants can in general be articulated only as transitions between openings and closures of the vocal tract, hence in this sense

16 The foot (*LH*) must thus be allowed word-finally when it is also word-initial as in *(produc)t* and the other similar cases. We return to this point in the next chapter.

17 The validity of this diagnostic may be challenged by noting that in cases like *òrdi(nárily)* the final foot is ternary, and for that reason not weak, while in *dère(líctly)* it is bisyllabic. This possibility depends on the fate of the stem-final null vowel. As we discuss later on, we presume the latter is suppressed under suffixation unless needed by syllabification. If this is correct, it must then be preserved in (27b) as in *de.re.lic.tϕ*.ly, etc., unless the syllables *tly, dly, nly* are all well-formed. To the extent that this seems unlikely, the text argument will stand. In any event the latter is reasserted by comparable examples with *ness*, which also causes shifts, as in *oblìgatóriness*, yet not in **mànifḗstness*. Here too, the shifts are due to incorporation of *ness* into a formerly weak foot. Non-occurrence of the shift will then imply unquestionably that there is no final weak foot in the base adjective, since *ness* is not a weak syllable, making the possible binarity of ...*(festnes)s* irrelevant. See 8.2 below for further relevant discussion.

needing a vocalic "support." In closed syllables, corresponding to sequences VC_1C_2, reduction of V would (partially) deprive C_1 of that support, and is for that reason inhibited. In contrast, reduction of V_1 in an open-syllable sequence V_1CV_2 is not comparably inhibited, because support for C is provided here by V_2.[18] Cross-linguistic evidence also confirms this basic distinction. For instance, Jacobs (1989, p. 21) notes the asymmetrical developments of (28) in the history of French, open syllables permitting reduction, and ultimately syncope, while closed ones did not.

(28) *Latin* *Old French*

a. dùb*i*táre ⇒ dub*ə*táre ⇒ dotér "to doubt"

b. vòl*u*ptátem ⇒ vol*u*pté "voluptuousness"

Similarly, Halle and Kenstowicz (1991, p. 484) report (citing work by M. Brame) that Palestinian Arabic "has a rule syncopating high vowels in unstressed non-final *open* syllables" (emphasis mine, LB).

In contrast to the syllables closed by obstruents of (26b) above (*archit*[e]*ctonic*, etc.), which seem to block reduction rather generally, syllables closed by sonorant or *s* frequently permit reduction, however, as we noted in 3.4 above with cases like (29).

(29) *Reduced*

inf*o*rmation, carp*e*nter, orch*e*strate

This distinction too seems a rather natural one. Presuming that sonorants and *s* have higher intrinsic sonority than obstruents (Steriade 1982; Selkirk 1984), it will be reasonable to expect that they could "stand alone" more than obstruents, not requiring vocalic support to the same degree. This view is confirmed by the fact that – in English – sonorants can be syllabic, not only as in the noted *carpent*[r], *particip*[l], but also as in *cent*[n]*ary* (*centenary*), *vet*[n]*ary* (*veterinary*), etc. This relative autonomy holds of *s* as well, although in a somewhat different sense. The latter is apparently permitted to violate sonority requirements both

18 By the same token, vowel reduction should be inhibited in initial syllables where the vowel is needed to "support" the onset. This does not seem true in general, witness *str*[ə]*monium*, *str*[ə]*tigraphy*. Yet, there is some asymmetry in the expected direction at least with respect to syncope. As W. Badecker (p.c.) points out, simple onsets permit syncope, as in *c'nadian*, *p'tomac*, while complex ones do not, as in *plə*tonic/**pl'tonic*. This would follow from biconsonantal sequences requiring vocalic support to a greater degree than single consonants.

word-finally, as in [aks] (*axe*), *beeps*, where it reverses the post-vocalic downfall, and word-initially, as in *stop*, *spring*, where it reverses the pre-vocalic rise in sonority. The apparent exceptionality is removed, however, if we take *s* to be in a separate syllable, as we are independently doing word-finally by introducing null vowels, as in *ak.sϕ*, *bee.pϕ.sϕ*, etc. Extending this to word-initial position, we will hypothesize the structures *ϕs.top*, *ϕs.pring*, etc. (recall fn. 7 above; for a similar hypothesis, see also Kaye 1992). In sum, both sonorants and *s* can be syllabic (though in somewhat different ways, and the former not initially, it seems), in contrast to stops which cannot, as shown by exclusion of the parallel **ak.pϕ*, **ϕp.top*. We return shortly to the sequences of *act*, *opt*. This "autonomy" indicates plausibly that sonorants and *s* have greater intrinsic sonority, to which we attribute their weaker requirement for a preceding full vowel.

While reduction is possible in syllables closed by sonorants or *s*, for the above reasons, it is nonetheless not general, as shown by the noted *halicarnassus*, and the other cases in (30).

(30) *Unreduced*
halic*a*rnassus, inc*a*ntation, inc*a*rnation, ost*e*ntation

Our discussion will accommodate this variation only in part, in the way discussed for contrasts like *comp*[ə]*nsátion*/*cond*[e]*nsátion* in 4.3 above. The remaining variation we leave unaccounted for, as mentioned earlier, suggesting, however, that it may be related to the specific character of the vowel, or perhaps the character of the vowel–sonorant combination involved.[19]

Note now that, from the point of view of the proposed notion of vocalic "support," we predict that word-final consonants in the structure ...VC# should behave like codas with respect to vowel reduction, despite our claim (null-vowel hypothesis) that they are actually onsets, in the structure ...VCϕ#. The reason is the obvious inability of the null vowel *ϕ* to provide any (acoustic/articulatory) support, thus forcing C to rely on the preceding V, just as in closed syllables. We thus predict for word-final consonants the same bifurcation between sonorants/*s* and other

19 Note that HV (pp. 239f.) formulate the rule of vowel reduction as affecting unstressed short vowels in *open* syllables. While this seems correct in the light of our text discussion, it is inconsistent with their own characterization of *compensátion* as having a "reduced (unstressed) pretonic vowel" (p. 247). If vowel reduction affected only *open* syllables, then *compensátion* should have a full vowel, just like *condensàtion*, and the difference between the two, which they attribute to stress, should in fact not exist.

obstruents that we observed word-internally. The correctness of this prediction is in fact shown by the very detailed discussion in Ross (1972), from which the examples in (31a, b, c) are taken.

(31) a. hándic*a*p, báob*a*b, lák*o*ff, adiránd*a*ck, húmb*u*g, ázt*e*c
b. amálg*a*m, decór*u*m, wiscóns*i*n, uténs*i*l, sýllab*u*s
c. cárav*a*n, márath*o*n, méte*o*r, agamémn*o*n, orést*e*s

The italicized vowels are unreduced in (31a) where they are followed by obstruents; they are reduced in (31b), where they are followed by sonorants or *s*, but unreduced again in (31c), where they are still followed by sonorants or *s*. Ross (1972), and most literature since, interpreted the contrasts in (31) in terms of stress, following *SPE* in this respect, which – as noted – had taken stress as necessary for non-reduction (as in (65), chapter 3). The present work attempts a different interpretation, agreeing instead with Fudge (1984), who sees such contrasts as all occurring in unstressed position. We also concur with Fudge (1984) in taking the phenomenon to generalize to word-medial positions, with (31a, b, c) mirroring (26b) *adj*[e]*ctival*, (29) *inf*[ə]*rmation*, and (30) *inc*[a]*ntation*, repectively.

In support of our view, recall here the argument against the stress analysis already given in 3.7.2, based on the fact that the prominence of the italicized vowels in (31a, c) does not "interact" with stress. Thus, *adirónd*[æ]*ck*, *agamémn*[o]*n*, *orést*[i]*s* (and the other examples in Ross' [1972] (89)), all have the same stress pattern of *wiscóns*[ə]*n*, *uténs*[ə]*l*, etc. – the normal one of nouns. Final stress would predict **adírondàck*, **agámemnòn*, **óréstès* instead, or else require a second complication to deal with main stress – the infamous "Weak Retraction."[20]

We have also already noted (3.7.2.) how a final stress in cases like *adirónd*[æ]*ck* would yield no consistent way to decide which stress should be primary, as there would then be two feet of comparable weight. Analogously with cases like *lák*[o]*ff*, *húmb*[ʌ]*g*, *ázt*[e]*c*, which could then not be distinguished in any principled way from *ròbúst*, *òvért*, *ùrbáne*, *rèmóte*, *dòmáin*, *shàmpóo*, *chìnése*, etc.

20 The main stress of *cáravan*, *márathon* and others is compatible with final stress (recall that a final C could be a geminate), but does not require it, in contrast, for example, to *cátamaràn*, which does. Without specific motivation either way, it seems more natural to suppose that these too simply instantiate the normal (penultimate/antepenultimate) pattern, and thus do *not* have final stress, but just an unreduced vowel.

Finally, the stress account is undercut by the existence of similar phenomena in word-internal position as we noted, to which it would seem most unlikely to extend. In (32) and (33) below (based in part on Fudge 1984) we compare final and internal positions, giving further examples of reduced and unreduced vowels.

(32) *Word-finally*

a. Obstruents except *s*: *unreduced*

carn*a*p, satr*a*p, beb*o*p, parsn*i*p, turn*i*p, kidn*a*p, ketch*u*p, mamaron*e*ck, heml*o*ck, kop*e*ck, sherl*o*ck, shyl*o*ck, tarm*a*c, alman*a*c, lil*a*c, slov*a*k, kod*a*k, kay*a*k, ‡bedr*o*ck, ‡feedb*a*ck, ‡drawb*a*ck, ‡gimcr*a*ck, ‡nitp*i*ck, ‡setb*a*ck, ‡wedl*o*ck, musk*e*g, humb*u*g, shind*i*g, ‡zigz*a*g, ‡eggn*o*g, ‡nutm*e*g

b. Sonorants and *s*: *reduced*

apr*o*n, bals*a*m, amalg*a*m, cust*o*m, bus*o*m, bux*o*m, cond*o*m, phant*o*m, rans*o*m, slal*o*m, trans*o*m, bac*o*n, utens*i*l, enam*e*l, syllab*u*s, asparag*u*s

c. Sonorants and *s*: *unreduced*

tamp*o*n, pe*o*n, samp*a*n, mete*o*r, ig*o*r, wigw*a*m, ag*a*r, cha*o*s

(33) *Word-internally*

a. Obstruents except *s*: *unreduced*

†(aut*o*p)sy, †(macr*o*p)sy, †(micr*o*p)sy, †(hydr*o*p)sy, (gastr*o*c)nemius, (archit*e*c)tonic, (olf*a*c)tometer, (adj*e*c)tival, ‡(el*e*c)trolysis, ‡(el*e*c)trometer, ‡(aff*e*c)tation, ‡(hyper*a*c)tivity, ‡(insp*e*c)torial, ‡(microb*a*c)terial, ‡(refl*e*c)tivity, ‡(refr*a*c)tometer, ‡(cond*u*c)tivity, ‡(coll*e*c)tivity, ‡(conn*e*c)tivity, ‡(exp*e*c)tation, ‡(syn*e*c)dochic, ‡(del*e*c)tation, (des*i*g)nate, (ins*i*g)nificant, ‡(ast*i*g)matic, ‡(en*i*g)matic, ‡(impr*e*g)nation, ‡(physi*o*g)nomic, ‡(res*i*g)nation

b. Sonorants and *s*: *reduced*

(cont*e*m)plation, (ser*e*n)dipity, (conc*e*n)trate, ‡(aff*i*r)mation, ‡(conf*i*r)mation, ‡(cons*e*r)vation, ‡(cons*u*l)tation, ‡(conv*e*r)sation, ‡(inf*o*r)mation, ‡(lam*e*n)tation, ‡(pres*e*r)vation, ‡(transp*o*r)tation, ‡(us*u*r)pation

c. Sonorants and *s*: *unreduced*

(def*a*l)cate, (inc*a*n)tation, (inc*a*r)nation, (ex*o*r)cise, (inc*u*l)pate, ‡(complem*e*n)tation, ‡(exh*o*r)tation, ‡(comp*a*rt)mental, ‡(disp*e*n)sation, ‡(dep*a*rt)mental, ‡(dep*o*r)tation, ‡(det*e*s)tation, ‡(el*o*n)gation, ‡(emb*a*r)kation, ‡(em*e*n)dation, ‡(ex*a*l)tation, ‡(ferm*e*n)tation, ‡(fragm*e*n)tation, ..., †(ost*e*n)tation, †(cont*e*m)plate, †(incr*u*s)tation, †(inf*e*s)tation

In (33), (34), "‡" identifies words in which a "preservation" effect from a related word may be expected, and "†" the existence of other variants. The distribution of "‡" makes it evident that preservation could not provide a full account of the unreduced cases given its presence with both reduced and unreduced cases.

The relation between vowel reduction in word-final and word-internal syllables is underscored further by the fact, noted again in Fudge (1984), that the distribution in both cases exhibits "Arab-rule" effects. That is, in both positions, if the syllable bearing stress is light, then the unstressed syllable is affected by reduction, regardless of the quality of the post-vocalic consonant, thus precisely as in *ar*[ə]*b*, versus *carn*[æ]*p*.[21] Relevant examples are given in (34) ("†": other variants).

(34) Reduction / $\acute{\mathrm{L}}$ C_0 ___ C

a. *Word-finally*

doll*o*p, devel*o*p, gall*o*p, goss*i*p, hyss*o*p, scall*o*p, troll*o*p, jal*a*p, barr*a*ck, butt*o*ck, cass*o*ck, derr*i*ck, gimm*i*ck, hamm*o*ck, hass*o*ck, padd*o*ck, traff*i*c, hav*o*c

b. *Word-internally*

(rec*o*g)nizable, (res*i*g)nation, †(ad*a*p)tation, †(stal*a*c)tite, †(stal*a*g)mite

As Fudge notes, there are cases that violate this generalization. For example, (*ad*[æ]*p*)*tation* is also found with an unreduced vowel, (*att*[e]*s*)*tation* does not appear to reduce, nor does *macr*[o]*n*, despite the

21 The occurrence of this type of phenomenon word-internally was in fact noted in *SPE* p. 161, which cited the contrast (*pre:s*[e]*n*)*tation*/(*pres*[ə]*n*)*tation*. A similar case is (*e:v*[o])*cation*/(*ev*[ə])*cation*.

light initial syllable in all three. The cases in (27a) (*product*, etc.) are also exceptional in the same way.[22] Nonetheless, the existence of a comparable generalization in both positions seems clear, supporting the view that the phenomena identified by Ross extend to word-medial positions. As we discussed in 3.7.5, we interpret the "Arab rule" in terms of constant prosodic transition within the foot, resulting in a less prominent unstressed syllable when the stressed one is itself less prominent. We then take reduction in (34) to indicate that the need for full "vocalic support" is not an absolute requirement, but rather one of several contending factors, overcome here by "constant transition."

4.4.2 Final clusters

In addition to the important observations just cited, Ross (1972) noted further that coronal stops *t*, *d* are unlike other stops in not inhibiting vowel reduction – in his terms: "in attracting stress." This is shown by (35), which contrasts with (31a) above *handic*[æ]*p*, etc.

(35) t/d: *reduced*
connecti*cu*t, idi*o*t, lilli*pu*t, titi*cu*t, chari*o*t, chevi*o*t, ili*a*d, myri*a*d, pyram*i*d, peri*o*d, inval*i*d, taban*i*d

Here too, as in the case of sonorants and *s*, there is variability, as the cases in (35) contrast with unreducing *nom*[æ]*d*, *nimr*[o]*d*, *endic*[o]*tt* and others (Ross 1972, p. 251). Still, (35) establishes that there is a difference between coronal stops, which need not block reduction, and other stops, which – aside from "Arab-rule" effects – rather generally do. With regard to (35), let us then suppose that, when they are articulated in a sonority fall, coronal stops require a lower "downstep" in sonority than their congeners, thus allowing a preceding vowel to reduce, losing some of its sonority.[23] In this connection, Ross (1972) observed still further that final coronal stops fail to inhibit reduction, not only when they occur post-vocalically as in (35), but also when they occur as the *second* member of a cluster that has a sonorant or *s* as its first, as in (36a) below. In this

22 Exceptions in the other direction also exist, like *ja:c*[ə]*b*, *dunl*[ə]*p* and other cases in Ross' (1972, ex. (55)).

23 Of course this will predict that the same should be true word-internally, with syllables closed by coronal stops. Unfortunately, we find no real inventory of such cases, as the overall number of cases with unstressed closed syllables is itself relatively small.

behavior, *t/d* continue to contrast with other stops, as shown by (36b) (Ross 1972, p. 248; Fudge 1984, p. 201).

(36) a. *Reduced*
eleph*a*nt, elem*e*nt, lieuten*a*nt, serp*e*nt, comf*o*rt, orch*a*rd, bast*a*rd, ever*e*st, catal*y*st,
b. *Unreduced*
pod*u*nk, oz*a*rk, aardv*a*rk, abelm*o*sk, aster*i*sk, arim*a*sp

On our interpretation, these facts will suggest that in (36) the final consonant still imposes the usual sonority requirements on the preceding vowel *despite* the intervening sonorant/*s*, as the contrasts of (36) mirror the one between *connectic*[ə]*t* (35) and *handic*[æ]*p* (31b). The variability noted for (35) indeed still obtains here, as the cases in (36a) contrast also with the structurally parallel *sycoph*[æ]*nt*, *peder*[æ]*st*, *bomb*[æ]*st*, *moz*[a]*rt*, *abel*[a]*rd*, and others. No corresponding variability is found for (36b) *pod*[ʌ]*nk*, however, which thus continues to mirror (31a) *azt*[e]*c*.[24]

Note that the above variability, as in *eleph*[ə]*nt*/*sycoph*[æ]*nt*, provides further argument for the postulated independence of vowel reduction and stress. Where stress is unquestionably involved, as with verbs ending in VCC, there is no variability, as all such verbs are stressed on the last V.[25] Thus there are no forms **súpplant*, **énchant*, **áfford*, **bómbard*, **débunk*, **émbark* to parallel (36a) *élephant*, etc. Furthermore, the final consonants of (31a) *handic*[æ]*p*, etc. which would induce final stress systematically with nouns, in fact do *not* do so with verbs, as in *devélop*, not **dévelòp*.[26] Thus, a stress account of (31a) *handic*[æ]*p* and (36b) *pod*[ʌ]*nk* would be a serious setback to the program, initiated by Hayes and upheld here, of reducing the stress of nouns and that of verbs to the same basic principles, as is quite evident from the fact that Ross (1972, p. 273) indeed postulates two separate rules.[27]

Returning to (36), the "transparency" that sonorants and *s* exhibit in permitting the noted relation between the vowel and the final consonant

24 Although Arab-rule type effects are also present here as expected, as in *mon*[ə]*rch*, *dam*[ə]*sk*, which parallel (32).

25 Except for those related to nouns, e.g. *pátent* - a different phenomenon (see fn. 6, chapter 8 below).

26 Note that reduction in *devél*[ə]*p* is a straightforward case of "Arab rule."

27 This point stands despite the fact that in Ross's formulation the two rules are artfully combined using brace notation.

is not shared by stops, which always inhibit reduction when combined with *t/d*, as in (37).

(37) *Unreduced*

a. catar*a*ct, ins*e*ct, def*e*ct, dial*e*ct, imp*a*ct, obj*e*ct, subj*e*ct, prod*u*ct

b. trans*e*pt, conc*e*pt, perc*e*pt, prec*e*pt, ed*i*ct, distr*i*ct

Sonorants and *s* thus seem to have two different properties: higher sonority, and higher "transparency." While it would of course be desirable to relate them to one another, we will not attempt to do so here. It is of further relevance now to note that, in final clusters, there is an asymmetry between *t/d* and the other stops, not only with respect to vowel reduction, as in (36a/b) above, but also with respect to frequency of occurrence, as clusters $C_s t/C_s d$, in which C_s is a sonorant or *s*, are much more frequent than their counterparts involving other stops. The numbers in (38), (39) below are (rough) counts from two different electronic word lists.[28]

(38) *Final clusters* (list 1)

a. rC:	*rt*	*240*	*rd*	*290*	
	rk	130	rg	25	
	rp	20	rb	25	
b. lC:	*lt*	*100*	*ld*	*180*	
	lk	50	lg	1	
	lp	10	lb	3	
c. NC:	*nt*	*1740*	*nd*	*420*	
	nk	90	ng	___	
	mp	60	mb	___	
d. sC:					*st 2000+*
					sk 30
					sp 20

28 Lists 1 and 2 are, respectively, the *Word Perfect* speller and *Wordfind*. The counts are rough and do not exclude possibly irrelevant material, such as acronyms.
We do not report numbers for the (orthographic) clusters *ng*, *mb*, because these are simplified in most dialects. Note that final *s*C clusters exist only in the voiceless variety.

(39) *Final clusters* (list 2)

a. rC:	*rt*	*170*		*rd*	*253*
	rk	98		rg	38
	rp	13		rb	20
b. lC:	*lt*	*72*		*ld*	*129*
	lk	40		lg	0
	lp	8		lb	3
c. NC:	*nt*	*1165*		*nd*	*322*
	nk	83		ng	___
	mp	56		mb	___
d. sC:			*st* *1468*		
			sk 26		
			sp 15		

Our account of reduction based on sonority sheds light on this second asymmetry as well. We suppose that in the configuration $VC_sC\#$, in which C_s is a sonorant/*s* and V is a full vowel, C_s is indeed "transparent" in the earlier sense, but only relative to stops, hence passing on the sonority of V to C more than a stop would. In other words, we may still take C_s to in fact attenuate such sonority, as seems intuitively plausible. This will then predict that coronal stops, which require a lower sonority downstep as argued, witness *connectic*[ə]*t* versus *adirond*[æ]*ck*, should be licensed in this environment to a *greater* degree, than their labial/velar couterparts, precisely as suggested by the asymmetries in (38)–(39). Furthermore, reduction of V, which further decreases the sonority downstep, should be somewhat possible with clusters ending in coronals, but not with those ending in velars/labials, precisely as in (36a, b) *eleph*[ə]*nt*, *pod*[ʌ]*nk*, noted by Ross.

This characterization will then make predictions for clusters of stops. Given the lesser "transparency" of stops compared with sonorants/*s* ((37) versus (38)–(39)), frequency of such clusters should be altogether lower than that of the clusters in (38)–(39). In addition, to the extent that such final clusters exist, they should be asymmetrically distributed in the same direction of (38)–(39), favoring final coronals. This is true, as shown by the numbers in (40), (41) (which have the same sources as (38), (39), respectively).[29]

29 The text characterization of coronal stops is perhaps to be generalized to other coronals, which share the ability to follow other consonants in word-final position. See Borowsky (1986, pp. 175ff.).

(40) *Final clusters* (list 1)

a.	kt	200+	(project, act, ...)
	pt	85	(abrupt, opt, ...)
b.	tp	0	
	kp	0	
c.	tk	0	
	pk	0	

(41) *Final clusters* (list 2)

a.	kt	161	(project, act, ...)
	pt	69	(abrupt, opt, ...)
b.	tp	0	
	kp	0	
c.	tk	0	
	pk	0	

In contrast to the impossible clusters of (40b, c), (41b, c), any stop will of course allow a following sonorant or *s*, as the latter can occur independently of a preceding vowel, as in the noted *particip*[l], *carpent*[r], *beeps*, etc.[30]

We sum up the above account as in (42).

(42) *Summary*

I. In the structure VCX, where *X* is not a vowel:
   a. Reduction of V is generally inhibited, because C requires vocalic support (not provided by *X*): *adirond*[æ]*ck*, *adj*[e]*ctival.*
   b. Reduction of V is permitted if either (i) or (ii).
      (i) C has high intrinsic sonority, being either a sonorant or *s*: *ser*[ə]*ndipity*, *apr*[ə]*n*.
      (ii) C requires a low sonority downstep, being *t*/*d*: *connectic*[ə]*t*.

30 In contrast to word-final position, the clusters of (38b, c), (39b, c) occur frequently in medial position, but are almost exclusively confined to compounds – a fact not accounted for by the text. Following is a small sample.

(i) a. foo*tp*ad, kni*tp*ick, ou*tp*ost, po*tp*ie, po*tp*ourri
   b. jac*kp*ot, crac*kp*ot, coc*kp*it
   c. ca*tk*in, ca*tc*all, nigh*tc*lub, ou*tc*lass, ou*tc*ry, shor*tc*ut, vie*tc*ong
   d. bum*pk*in, na*pk*in, u*pk*eep

c. Reduction of V is forced (plus or minus idiosyncrasies) by "constant transition," when the preceding stressed syllable is light ("Arab rule"): *hamm*[ə]*ck*, *rec*[ə]*gnition*.

II. In the structure VC_1C_2X, where X is not a vowel:

a. If C_1 is (relatively) sonority-transparent, being a sonorant or *s*, then C_2 is *maximally* licensed if it requires a low sonority downstep (*t*): *elephant*; and only *minimally* licensed if it requires a high sonority downstep (*p*, *k*): *podunk*. Minimal licensing (as with clusters C*p*, C*k*) results in both of (i), (ii).

(i) Relative infrequency: *podunk*
(ii) Non-reduction of V (whose sonority is critical): *pod*[ʌ]*nk*

b. If C_1 is (relatively) sonority-opaque, being a stop, then C_2 is *maximally* licensed only if it either requires a low sonority downstep (*t*): *abrup*[t]; or if it is intrinsically sonorous (sonorant, *s*): *particip*[l]. Clusters stop-*p*, stop-*k* are thus excluded.

Note: The contrast between **tp*, **tk* and *sp*, *sk*, sonorant-*p*, sonorant-*k* indicates that *t*(/*d*) *cannot* be treated on a par with sonorants/*s*, underscoring the independence of (i), (ii) in Ib above.

Our arguments against the stress treatment of the regularities identified in Ross (1972) are thus as follows: (i) The presumed stress does not interact with the rest of the stress system, which places main stress normally, as in *adiróndì*[æ]*ck*. Final stress, exceptional in itself, would thus imply that the next stress iteration is also exceptional here, and that the resulting combination coincides with the norm by accident. (ii) It seems unnatural to suppose that different consonants, such as *k*, *t*, would have different properties for stress, as in *adirond*[æ]*ck*/*connectic*[ə]*t*, *pod*[ʌ]*nk*/*eleph*[ə]*nt*, as we expect stress to depend only on *syllable* structure. Where stress is unquestionably involved, as with superheavy finals in verbs, there is in fact no such variation: *debúnk*/*enchánt*.

The difficulties of the stress account justify an attempt in a different direction, complicating the theory of vowel reduction instead. The necessary complications here turn out to be rather natural, as in I above, correctly predicting comparable phenomena both finally and medially.

Those complications also seem independently motivated, since they appear to shed light on the distribution of word-final clusters, as in II above, obviously beyond the reach of a stress account.

4.5 Conclusion

In this chapter we have thus argued that excluding monosyllabic feet results in the desirable elimination of "destressing" rules, and that the residue of monosyllabic feet left by destressing rules is in fact illusory – the relevant phenomena being adequately handled by an appropriate theory of vowel reduction.

5 *Stress and vowel length*

5.1 Introduction

In the past three chapters, we have followed tradition in maintaining that metrical structure stands in a systematic relation with segmental structure. In this chapter, we will argue that this continues to be true with respect to vowel length, in the sense that long vowels yield heavy syllables, which behave just like other heavy syllables with respect to stress. We will depart from tradition, however, in maintaining that metrical structure lines up not with *underlying* segmental structure – vowel length in particular – but rather with *derived* structure. If true, this supports our proposed "stress-checking" approach over stress assignment by rule. In this connection, consider the alternations in (1) and (2).

(1) a. asp*i:*re
    b. ásp*i*rant
(2) a. ádject*i*ve
    b. adject*i:*val

If stress is assigned by rule, the italicized vowel in (1a) must be underlyingly long to attract it, but then it should do the same in (1b). In (2a), on the other hand, one must take the italicized vowel to be underlyingly short (the final syllable must in fact be extrametrical, not possible if the vowel is long; see p. 16), but then the same vowel should not attract stress in (2b). The facts in (1)–(2) would therefore require postulating certain mechanisms that readjust vowel length *before* stress assignment. And while any theory will need some mechanism to readjust vowel length, for the one based on rules it is an accident that the noted order should hold rather than the opposite one, which would yield (3a, b).

(3) a. *aspírant
    b. *adjécti:val

Note that nothing changes if one reverses the assumptions about underlying length, taking an underlyingly short vowel to undergo lengthening in (1a), and a long one to undergo shortening in (2a). Length readjustments must still precede stress by extrinsic ordering, lest (4a, b) be derived (supposing *ive* in (4b) is not extrametrical given the underlyingly long vowel).

(4) a. *áspi:re
    b. *adjéctive/*ádjectìve

What a rule-based perspective misses is the fact that stress lines up solely with *derived* vowel length, failing to exclude alignment with underlying length in principle. Note in addition that, whichever version of the above account one chooses, the two devices readjusting vowels, one shortening, the other lengthening them, will remain completely unrelated to one-another from a rule-based perspective.

In contrast to the above cases, in which a rule system would require length adjustments *prior* to stress, others, like those in (5), require readjustment *after* stress.

(5) a. div*í*:ne / div*í*nity
    b. n*á*:ture / n*á*tural
    c. t*ó*:ne / t*ó*:nal
    d. t*ó*:ne / t*ó*nic

The reason is that the long/short alternation obtains only in some specific and metrically defined environments, the ones of (5a, b, d), and not in the one of (5c). Note that the virtual segmental identity of (5c, d) makes it impossible to distinguish those two cases in purely segmental/syllabic terms. On the other hand, we independently know that *ic* is metrically just like *ity* and in fact like a bisyllabic sequence, because it places stress on the immediately preceding syllable, for example in *germánic*, *tympánic*, *barbáric*, versus *dóctoral*, *týmpanum*, *bárbarous*. For us this is so because *ic* metrifies a final null vowel, placing the italicized vowel in (5) in a ternary foot. For other theories it is for other, but equivalent, reasons. In sum, it is clear that metrical structure must be present in (5) when length readjustments occur, since only that will distinguish (5a, b, d) from (5c). That is true whether we postulate a shortening rule applying to the right-hand forms or a lengthening rule applying to the left-hand ones. Therefore, within a rule-based system, there is no possibility of unifying the account of (1)–(2), which requires stress after length changes, with that of (5), which requires the opposite. This is important, because the cases in (5) in fact still fall under the same generalization that stress lines up with *derived* vowel length. Put differently, no matter what changes in vowel length occur, one always finds that well-formed feet are definable after the changes. This fact is highly accidental on a stress-by-rule approach, but is automatic on a stress "checking" approach, imposing well-formed feet in derived structure.

This means that, given a characterization of well-formed feet, one can take stress to derive from vowel length, or the other way around, as in either of (6a, b).

(6) a. Vowel length is fixed underlyingly; stress is derived.
b. Stress is fixed underlyingly; vowel length is derived.

Note that, to implement (6a), we would have to permit vowel length to vary in word-formation (e.g. *aspi:re/aspirant*, *adjective/adjecti:val*). While our analysis will later be revised, in this chapter we will take the approach in (6b), arguing that an assumption that vowels freely lengthen in the course of the derivation to satisfy metrical well-formedness suffices to account for all cases. On this view, the ones in (1a, b) would have the phonological derivations in (7).

(7) a. aspíre $\Rightarrow$ as(pí:re)
b. áspirant $\Rightarrow$ (áspiran)t

In (7a) lengthening occurs to achieve the well-formed foot ($H\sigma$), the alternative ($L\sigma$) being excluded in word-rightmost position, as in **ame(ríca)*, or **inha(bítϕ)*. No lengthening occurs in (7b), because this case is well formed without lengthening, and in fact only without lengthening, the resulting foot being like that of *a(mérica)*, *in(hábitϕ)*. The one produced by lengthening would be ill-formed like that of **a(rízo:na)*, or **(ágenda)*. As for the cases in (2), they would be as in (8).

(8) a. ádjective $\Rightarrow$ (ádjec)tive
b. adjectíval $\Rightarrow$ adjec(tí:va)l

No lengthening occurs here in (8a) because the syllable *ti:* would cease to be a weak syllable, requiring metrification, which is not compatible with the given stress. Lengthening occurs in (8b) to achieve a well-formed foot ($H\sigma$), just as in (7a). Within this approach, we are thus placing the initial burden on stress, which we allow to vary idiosyncratically to the extent that – with the help of vowel lengthening – it can lead to well-formed feet, as in (9).

(9)	a.	divíne	⇒	di(ví:ne)
	b.	náture	⇒	(ná:tu)re
	c.	tóne	⇒	(tó:ne)
	d.	tónal	⇒	(tó:na)l
	e.	divínity	⇒	di(vínity)
	f.	nátural	⇒	(nátura)l
	g.	tónic	⇒	(tónicϕ)

Lengthening in (9a–d) is just as in (7a), (8b). Non-lengthening in (9e–f) (formerly cases of "trisyllabic shortening") follows from the fact that ternary feet (*LLσ*) are well formed, again as in *a*(*mérica*), *in*(*hábitϕ*). Note that in (9) we must require that word edges metrify in certain specific ways, excluding the null vowel in the case of nouns and adjectives in *al*, but including it in the case of adjectives in *ic*. This, however, is required independently of vowel length, to account for the general stress pattern noted shortly above, i.e. *bar*(*báricϕ*), versus (*dóctora*)*lϕ*, etc. – an issue to which we will return. The cases in (3) and (4) above, formerly requiring extrinsic ordering of rules, are now excluded as instances of ill-formed feet, as is easy to see. This approach thus sheds light on Ross' (1972, p. 270) observation (noted in 2.1 above) that stressed penultimate syllables in verbs have short vowels quite generally, e.g. *devélop*. Given metrification of the final null vowel with verbs, those cases will be cases of "trisyllabic shortening," now only a descriptive category, like those in (5a, b, d) above, just as in Ross' "*e*-elision" approach.

In the rest of this chapter, we show that this kind of solution generalizes to virtually all other cases, and compares favorably with all past accounts. Later on, however, we will see that our solution must be modified, and recast more as a combination of both (6a, b) above. The reasons will have to do with preservation of stress in word-formation, which undercuts the present assumption that the underlying position of stress is free, as in e.g. *aspíre*/*áspirant*. The revisions required will be rather straightforward, however, and preserve the backbone of the present analysis.

5.2 Past accounts

5.2.1 Trisyllabic and bisyllabic shortening

HV (p. 253) follow Myers (1985, 1987) in postulating a rule of shortening in binary feet, which we may state as in (10).

(10) *Myers'/HV's shortening in binary feet (adapted)*
Shortening affects σ_1 in (σ_1 σ_2)

This rule will shorten the italicized vowels in each of the right-hand forms in (11) on the analyses indicated.

(11) a. div*í:*ne ⇒ di(v*í*ni)ty
b. obl*í:*ge ⇒ o(bl*í*ga)tòry
c. pr*ò:*vi:de ⇒ (pr*ò*vi)déntial

While the feet of (11c, b) are binary just factually, the one of (11a) is binary within Hayes'/HV's theory employing syllable extrametricality. On this analysis no shortening occurs in the left-hand forms because those feet are *mono*syllabic. Further examples of each case of (11a, b, c) are given in (12a, b, c), respectively (see also Myers 1987, pp. 499ff.).

(12) a. n*a*tural, f*a*bulous, t*a*bular, der*i*vative, prov*o*cative, comp*o*sitor, t*o*nic, sem*i*tic, paras*i*tic, m*e*tric, st*a*tic, ...
b. def*a*matory, decl*a*ratory, excl*a*matory, expl*a*natory, exp*o*sitory, obl*i*gatory, cons*o*latory, prof*a*natory, rev*e*latory
c. r*e:*fute/r*e*futation; pr*o:*fane/pr*o*fanation; pr*o:*pose/pr*o*position; pr*o:*voke/pr*o*vocation; r*e:*port/r*e*portorial; p*o:*litical/p*o*litician; pr*o:*miscuous/pr*o*miscuity; m*o:*nastical/m*o*nastery; pr*o:*sérpina/pr*ò*serpíne

We must take note of the apparent argument for syllable extrametricality here, since the latter enables the case of "trisyllabic shortening" (11a) to fall under the same generalization as the ones in (11b, c). These alternations follow from our proposed analysis as well, however, defusing the argument. We take all italicized vowels in (11) to be underlyingly short, lengthening occurring in the left-hand forms. The case of (11a) *diví:ne* is as discussed in 5.1 above, and that of (11b) *oblí:ge* is exactly analogous. Lengthening of *o:* in *pro:vi:de* of (11c) will also follow from similar considerations and specifically from the discussion in 4.2.1 above, in which we noted the inability of single initial light syllables to be footed, as in *bənána*, versus *bàndánna*. The given stress on the initial syllable of *pròvíde* will then force that syllable to be heavy (in a foot (ϕH), as we argued), whence the long vowel. Absence of initial stress would predict *prəvIde*, which in fact is also attested – a rather common pattern of variation, which extends to many of the parallel forms in (12c), *refúte*, *profáne*, etc., as well as *schemátic*, noted in fn. 4, chapter 4. We may attribute the variability of stress here to a weaker degree of lexicalization of secondary stresses in general compared with primary ones, perhaps due in turn to their weaker perceptual prominence. The right-hand forms in (11) above will fail to undergo lengthening because the short vowels correspond here to well-formed feet. The reason is that the one in (11a) is parallel to that of *a(mérica)* as noted, while the ones in (11b, c) are parallel to those of *ac(céle)ràte*, *(àri)zóna* and many other cases, indicating that the structure ($L\sigma$) is well formed as a non-rightmost foot.[1] This system predicts the existence of comparable cases in which the vowel in question is *underlyingly* long, and which should therefore exhibit no alternation. This is correct, as shown in (13), given in our analyses.[2]

(13) a. lí:bel ⇒ (lí:belou)s
b. mó:tive ⇒ (mò:ti)vá:tion
c. prè:sent ⇒ (prè:sen)tá:tion

From our point of view, no shortening occurs in the right-hand forms here, first because there is no shortening, and second and more importantly because these, like the cases in (11), have well-formed feet. In contrast, for the rule in (10), the cases in (13) and the analogous ones in (14) (mostly from Myers 1987, p. 516) are all "exceptions" ("†" = other variants).[3]

1 Note that dealing with (11a, b, c) in terms of two well-formed feet ($L\sigma$) and ($\sigma L\sigma$) does not make our foot typology less parsimonious than that of the alternative theory. While the latter employs the same binary foot for all three cases in (11), it employs just as many foot types in general, as we saw in 3.7 above.

2 The case in (13c) also exists in the variant *pr*[e]*sentation*, with a short *e* (noted in fn. 41, chapter 3). This would follow from ambiguity in underlying length of the vowel.

3 The cases in (i), also listed by Myers as exceptions to (10), can for us have bisyllabic feet and a final extrametrical syllable as indicated. On that analysis, the long vowel would follow from the ill-formedness of ($L\sigma$) as a rightmost foot, and could be either underlying or derived by lengthening.

(i) de(nó:ta)tive, (fló:ta)tive, (pró:ba)tive, ex(cí:ta)tive, (pá:pa)cy, di(pló:ma)cy, (prí:ma)cy, (pí:ra)cy, (sé:cre)cy, (ví:bra)tive, (sé:cre)tive, a(mé:na)ble, (dýnas)ty

(14) a. (ph*ó:*bicϕ), (b*á:*sicϕ), (sc*é:*nicϕ), a(n*é:*micϕ), a(ph*á:*sicϕ), encyclo(p*é:*dicϕ), (n*ó:*tify), (n*í:*cety), o(b*é:*sity), (pr*ó:*bity), †(*ó:*vula)r, (t*í:*tanou)s, (m*óu*ntainou)s, (cl*í:*mata)l, (s*ó:*norou)s

b. (pr*ó:*cre)àte, (pr*ò:*le)gómenon, (pr*ó:*lo)gìze, †(pr*ò:*phi)láctic, (pr*ò:*hi)bítion, (pr*ò:*le)tárian, (pr*è:*ma)túre, †(pr*è:*mo)nítion, (m*í:*gra)tòry, (ph*ò:*ne)tícian, †(p*é:*na)lìze, †(ph*ò:*no)lógical, †(*è:*co)nómic, †(p*á:*tro)nìze, (s*ì:*mul)táneous, (h*ó:*mi)cide.

The cases in (15) are on our analysis analogous to the ones in (13)–(14) and can be taken to have an underlyingly long vowel as well.

(15) a. (*ó:*maha), (b*óo*meran)g, (d*í:*nosau)r, (b*ó:*lshevi)k, (*á:*belmos)k, (pr*ó:*toco)l, (v*í:*tami)n, (*ó:*volo), (d*y:*namo)

b. (cl*ỳ:*tem)néstra, (p*ó:*la)ròid, (n*í:*ghtin)gàle, (rh*ò:*do)déndron, (*á:*bra)hàm, (*ò:*ca)rína, (w*èi*sen)héimer, (n*ó:*men)clàture, (*è:*del)wéiss, (tr*í:*lo)bìte, (n*ó:*vo)càine

Unlike the ones in (13)–(14), however, these cases need not be listed as exceptions to (10), since in the traditional framework they can be accounted for in terms of "strict cyclicity," namely by supposing that cyclic rules, such as presumably (10), do not apply to underived items (Kiparsky 1982a, p. 85; Halle and Mohanan 1985, p. 95; HV, p. 80).

Our approach, relying on underlying stress and the notion that vowels lengthen as required by metrical conditions is thus at least as empirically adequate for (11) as the rule in (10), and in fact arguably more so. Its real superiority, however, is in that it extends to cases that the rule in (10) cannot cover, as we see next.

5.2.2 Morphological shortening

One of the cases not accounted for by HV's (10) is the shortening of (1) above, repeated in (16) in our analyses.

(16) a. as(p*í:*re) b. (ásp*i*ran)t

As we argued, given the stress, the vowel length of each of (16a, b) will follow. The same is true in (17), where the alternation does not obtain, despite the identical morphological environment.

(17) a. ex(c*í:*te) b. ex(c*í:*tan)t

That is, a short vowel in each of (17a, b) is excluded by the ill-formedness of *(*Lσ*) as a rightmost foot, just as in (16a), while a long vowel in (16b) is excluded by the ill-formedness of *(*σHσ*). The variation of (16)/(17) is rather common, as the cases in (18) are all like (16b), while those in (19) are like (17b).

(18) a. ádm*i*rable, cómp*a*rable, irrép*a*rable, irrév*o*cable,
 b. vág*i*nal, antíp*o*dal, centríf*u*gal, moléc*u*lar
 c. ábst*i*nent, cónf*i*dent, coínc*i*dent, ígn*o*rant, prés*i*dent, rés*i*dent, préc*e*dent, chást*i*sement, †advért*i*sement
 d. exéc*u*tor, (sub)már*i*ner
 e. carnív*o*rous, blásph*e*mous
 f. hýpn*o*tist, teléph*o*nist,
 g. appét*i*tive, constít*u*tive, exéc*u*tive, rél*a*tive

(19) a. opp*ó*:sable, rest*ó*:rable, †rep*á*irable
 b. anecd*ó*:tal, homic*í*:dal
 c. persev*é*:rance, †adh*é*:rent, disp*ú*:tant, poll*ú*:tant
 d. div*í*:sor, inc*í*:sor
 e. des*í*:rous
 f. esc*á*:pist, extr*é*:mist,
 g. div*í*:sive

Myers (1985, p. 281; 1987, p. 504) attempts a solution to the cases in (16), (18) by means of the rule of "sonorant destressing" discussed in 4.2.3 above, traditionally invoked for cases like *répertòry*. On his analysis, stress would first be assigned to both medial and initial syllables, and then removed from the former, which would then presumably be subject to some general rule of shortening in unstressed positions (see 5.2.4 below). This has several inadequacies, however, even aside from the unsystematic character of the phenomenon, shown by (18)/(19), not paralleled by the *repertory* class. Most significantly, the apparent "destressing" here is not limited to post-initial positions like that of *répertòry* (compare *eleméntary*, not **eléméntàry*), as shown by some of the cases in (18), like *exécutor*, *carnívorous*, *teléphonist*, *appétitive* and others. Furthermore, syllables closed by sonorants – the target of "sonorant destressing" – are in fact *not* affected by this phenomenon, as shown by *consúltant*, *repéntant*, *dispérsant*, which are quite consistent with our analysis. Such an extension of "sonorant destressing" is also excluded trivially by our arguments of 4.2.3 above that the latter destressing in fact does not exist.

Better descriptive adequacy is attained by Kiparsky's (1979, p. 421) original formulation, which we give in (20).

(20) *Kiparsky's ("morphological") shortening*
"a lexically conditioned vowel shortening rule which applies to the presuffixal vowel in certain words prior to the assignment of stress."

While correctly accounting for (16)–(19), the rule in (20) is now subject to the criticism of 5.1 above. That is, there is no particular reason for a rule of this sort and for its extrinsic ordering relative to stress assignment. It is true, however, that any theory would need the lexical marking or "conditioning" referred to in (20), given the noted variation. But, by taking stress to be present underlyingly, our analysis provides that automatically. That is, stress *is* now the lexical marking. Since everything else appears to follow correctly from metrical theory, our analysis is thus optimal, requiring no stipulation. Note too that the phenomenon in question is *not* confined to suffixed items as (20) states, but in fact extends to prefixed ones as well, as shown by (21a), and the further examples in (21b).

(21) a. (p*í*:ou)s ⇒ (ímp*i*ou)s
b. inf*a*mous, bíc*y*cle, omníp*o*tent, unív*a*lent, unív*o*cal, súbs*e*quent, antíth*e*sis

For us, these follow in the usual manner, by simply taking all italicized vowels to be underlyingly short.

Our system therefore successfully reduces two formerly different and unrelated mechanisms to independently needed principles of metrical theory. What makes this possible is the shift from a rule-based approach to one based on well-formedness conditions. Unification is logically impossible within a rule system, since a rule handling the cases in (11) (Myers'/HV's) must be ordered *after* stress assignment, while a rule handling (16) (Kiparsky's) must be ordered *before*, as we have previously noted.

5.2.3 *ative* shortening

Our account of (16), (17) extends straightforwardly to the cases in (22a, b) respectively.

(22) a. (géne)(r*à:*te) ⇒ (génera)tive
b. (ínno)(v*à:*te) ⇒ (ínno)(v*à:*ti)ve

The long vowels of the left-hand forms will follow from lengthening in the same way as that of *aspi:re* of (16a) and other cases. The one of *ínnovà:tive* in (22b) is also quite analogous. Note that, as in other previous cases, we must exclude metrification of the final null vowel here, which would give a well-formed foot (*ative*), with a short *a*. Again, this property, to which we will return, is independently established. Thus, there is no item like **sen*(*sítive*), **pri*(*mítive*), **appo*(*sítive*), which should be possible if the null vowel *could* be metrified.[4] The well-formedness of *génerative* in (22a) will follow from the fact that *ive* is a weak syllable, which is also independently established, for example by the weak final foot of *ínnovà:tive*, and by its extrametricality in (*ádjec*)*tive*. Comparable extrametricality in (*génera*)*tive* will yield a well-formed ternary foot, requiring no lengthening.

The variation in (22) is also rather general, like that of (16)/(17), underscoring their similar nature. For instance, the cases in (23) generally pattern like (22a), while those in (24) pattern like (22b), although there is much idiolectal variation in this domain.

(23) álter[ə]tive = áppplic*a*tive, appréci*a*tive, assóci*a*tive, collábor*a*tive, commémor*a*tive, commíser*a*tive, commúnic*a*tive, coóper*a*tive, cópul*a*tive, cúmul*a*tive, décor*a*tive, elábor*a*tive, féder*a*tive, figur*a*tive, imágin*a*tive, ìndiscrímin*a*tive, íter*a*tive, manípul*a*tive, óper*a*tive, pálli*a*tive, postóper*a*tive, remúner*a*tive, rúmin*a*tive, spécul*a*tive, términ*a*tive, ùnappréci*a*tive, ùncommúnic*a*tive, ùncoóper*a*tive, ùnimágin*a*tive, vitúper*a*tive

(24) accómmod*à:*tive = accúmul*à:*tive, agglútin*à:*tive, ággreg*à:*tive, allíter*à:*tive, ánnot*à:*tive, authórit*à:*tive, cónnot*à:*tive, corróbor*à:*tive, delíber*à:*tive, ímit*à:*tive, médit*à:*tive, multíplic*à:*tive, pénetr*à:*tive, quálit*à:*tive, quántit*à:*tive, reíter*à:*tive, végete*à:*tive

4 Note here the item *olive*, in which a trisyllabic foot may seem appropriate, given the short *o*. Here, *ive* is obviously not a suffix, however.

The foregoing account thus enables us to eliminate another former rule, which we give in (25) in HV's (p. 262) version (while Myers' analysis does not deal with these cases).

(25) *HV's "ative" rule*
"a special rule that renders *-at-* non stress bearing ... [applying] to specifically marked words."

On HV's analysis, based in part on earlier work by D. Nanni, cases like *génerative* of (22a) are presumed to be first stressed in the manner of *ínnovà:tive* of (22b), and then destressed by (25). The actual shortening of *a* is attributed to a general rule that affects unstressed vowels, which we will consider below. The advantages of eliminating (25) seem obvious, especially within our general program to eliminate all destressing rules. From our viewpoint, the specific "marking" in (25) is the same as that of Kiparsky's rule (20), and is again just stress itself. Furthermore, no mechanism needs to target the sequence *ative* in particular. For note that vowels preceding *ive* alternate in length more generally, as in *lenitive/divi:sive* of (18g)/(19g) above, so that nothing seems special about *ative*. In turn, nothing seems special about *ive* either, as all the other cases in (18)/(19) (not considered by HV) show.

Consider too that our analysis correctly predicts that cases in which the stress falls on the stem-final syllable, such as those in (26), should only surface in ə*tive*, never in *a:tive*.

(26) a. affirm[ə]tive = accús*a*tive, advérs*a*tive, altérn*a*tive, appéll*a*tive, àrgumént*a*tive, attést*a*tive, compár*a*tive, compéns*a*tive, concéntr*a*tive, confirm*a*tive, consérv*a*tive, consúlt*a*tive, contémpl*a*tive, corrél*a*tive, defórm*a*tive, exhórt*a*tive, expéct*a*tive, explór*a*tive, ferment*a*tive, infórm*a*tive, mànifést*a*tive, presérv*a*tive, prevént*a*tive, refórm*a*tive, remónstr*a*tive, rèpresént*a*tive, restór*a*tive, supérl*a*tive, transfórm*a*tive, usúrp*a*tive

b. derív[ə]tive = evóc*a*tive, exécr*a*tive, impér*a*tive, indíc*a*tive, ìnterróg*a*tive, pejór*a*tive, prerróg*a*tive, provóc*a*tive

The reason is the non-existence of monosyllabic feet, which precludes adjacent stresses in general.[5] We may note that the cases in (26a) stress

5 Recall, however, that clashing stresses can occur when the first stress is initial, as in *bàndánna*. This will predict cases of stressed *à:tive* next to a stressed syllable when the

a heavy syllable and would therefore be well-formed under either of the metrifications of *af(fírma)tive*, *af(fírmati)ve*. In contrast, in (26b), a light syllable is stressed, so that the ternary metrification of *de(rívati)ve* must be presumed. Our account also correctly predicts that when the syllable preceding *ative* is heavy and *not* stressed, only the stressed variant *à:tive* should occur, as indeed in (27).

(27) ádumbrà:tive = contemplative, demonstrative, designative, devastative, facultative, illustrative

The reason here is the non-existence of feet ($\sigma H \sigma$), as in **(ádumbra)tive.*[6]

The above facts thus clearly show that the main stress of items in *ətive* does *not* result from a second stress iteration following the stressing of *at*. If it did, there should be no difference in main stress between (26) and (27), namely one should find **áffirmətive* alongside of *ádumbrà:tive*, *íllustrà:tive*. Alternatively, if one postulated a pattern of "weak retraction" $H/L\sigma$ (recall (66) in 3.7.2 above) to account for *affírmətive*, then one should also find **adúmbrà:tive*, **illústrà:tive.*[7] The above facts also show that the unstressed variant *ətive* is *not* the result of destressing of *à:tive*. If it was, the same variation *ətive/à:tive* of (23)/(24) should occur in

latter is initial. The prediction is correct, given *crèátive*, *rótàtive*, as well as *plácàtive*, *víbràtive*, the latter two also attested with unstressed *ətive*. In contrast, the cases in (i) are only attested with unstressed *ətive*.

(i) caus*a*tive, cur*a*tive, form*a*tive, loc*a*tive, lucr*a*tive, narr*a*tive, neg*a*tive, prob*a*tive, put*a*tive, rel*a*tive, talk*a*tive, tent*a*tive

6 This generalization holds with occasional exceptions, like the variants *ad(mínistra)tive*, *(législa)tive*, in which the syllable closed by *s* is presumed to function as light in the manner discussed in 3.5 above.

Note also that the text discussion is not affected by the fact that some items in (27) occur also in the pattern of (26) and *vice versa*.

7 A pattern of "Weak Retraction" is precisely what is postulated by HV (p. 261), who propose that *ative* and its stem constitute independent "stress domains" - the same device they employ for the *atory* class. A stem like *affirm* will thus be stressed like the homonymous word, whence the stress of *affírmative*. Note that cases like *affírmative* may seem to be handled correctly by HV's system, if not by the *ative* rule, by shortening (HV's (37)) and destressing (HV's (33)) both applying to *a:t* (both rules were discussed in chapter 4 above). However, for shortening to apply, the "Rhythm rule" would have to apply first, demoting the stress of *a:t* to secondary. This can only happen if the syllable *ive* is somehow "invisible" to the rhythm rule, which only affects final syllables (e.g. *bérnardìne*, versus *bèrnardína*). In contrast, however, *ive* must be visible to shortening, which does *not* apply to final syllables, e.g. *alúmni:*, giving rise to a potential paradox.

both (26) and (27). What one must assume, rather, is that there is a first stress iteration on *at* if and only if the latter surfaces as *à:t*, which is equivalent to saying that there is no destressing. In sum, the correct generalizations emerge if one considers the full derived representation, as in our stress-checking approach, and not the derivational steps of past analyses.

5.2.4 Shortening in unstressed position

By interpreting many instances of long vowels as a reflex of stress, our approach will also predict alternations like those in (28).

(28)	a.	de(f*á:*me)	⇒	(dèf*a*)mátion
	b.	com(p*ó:*nen)t	⇒	(còmp*o*)néntial
	c.	pro(v*í:*de)	⇒	(pròv*i*)déntial
	d.	vol(c*á:*no)	⇒	(vòlc*a*)nólogy

Taking the italicized vowels to be underlyingly short, these will lengthen in the left-hand items as usual due to the ill-formedness of $(L\sigma)$ as a rightmost foot, but will remain short in unstressed position in the right-hand cases. Note that lengthening will not be expected in unstressed position, especially if we were right in 4.2.2 above in suggesting that metrical prominence will line up with syllabic weight to the extent possible, a point to which we return shortly. More cases like the right-hand ones in (28) are given in (29).

(29) àsp*i*rátion, dècl*i*nátion, dègr*a*dátion, dèr*i*vátion, èxpl*a*nátion, hòr*i*zóntal, rèc*i*tátion, rèv*e*látion

We will expect the usual pattern of "exceptions" here as in the previous cases, within this analysis due to vowels that are underlyingly long. This seems correct, given the cases in (30). Many of these, however, especially those in (30b), occur also with a short (and reduced) vowel.

(30) a. cònd*o:*nátion, ìnt*o:*nátion, dèn*o:*tátion/dén*o:*tàtive
b. àdv*o:*cátion, àll*o:*cátion, ànn*o:*tátion, còll*o:*cátion, còmp*o:*sítion, cònn*o:*tátion, cònv*o:*cátion, èv*o:*cátion, èxc*i:*tátion/éxc*i:*tàtive, ìnc*i:*tátion, ìnn*o:*vátion/ínn*o:*vàtive, ìnv*o:*cátion, lòc*o:*mótive, pròv*o:*cátion, rèv*o:*cátion

Our metrical account of (28)–(29) does the work of yet another rule formerly invoked for such cases. In HV's framework, the latter is a second shortening rule, already discussed in 4.3 above and repeated in (31) (Myers' theory does not deal with this type of alternation).

(31) *HV's shortening in a stress well*

a. V: ⇒ V / σ ___ σ

condition: V dominates a stress well

b. Stress well $=_{\text{def}}$ a syllable whose level of stress is lower than that of an adjacent syllable.

Note that (31) has somewhat different empirical effects than our proposed analysis. As indicated in (31a), HV's rule exempts both word edges from shortening. Let us consider the left edge first, which must be exempted for cases like (32), contrasting with (28) *dèf*[ə]*má:tion*.

(32) t*í*:tan ⇒ t*ì*:tánic

The distinction between (32) and (28) seems genuine. That is, the non-shortening of (32) seems much more systematic than that of (30), exceptional compared to the shortening of (28). Exemption from shortening in the configuration of (31) is not systematic, however. Many items like the right-hand one in (32) allow a "shortened" (and reduced) variant as well, as in (33).

(33) t*í*:tan ⇒ tətánic

Analogously, the cases in (34a) all appear to have both variants, while those in (34b, c) are prevalently attested in only one.

(34) a. *long-V*/ə: b*a*nálity, c*i*tátion, f*a*tálity, l*e*gálity, l*o*cálity, l*o*gístic, m*i*nórity, m*o*nócracy, n*a*tívity, ph*o*nólogy, pl*a*tónic, ps*y*chíatry, s*a*tánic, sch*e*mátic, t*y*ránnical

b. *long-V*: *i*dólatry, *i*dyllic, gr*a*dátion, p*o*díatrist, r*o*dénticide, z*o*díacal

c. ə: l*a*bórious, m*a*níacal, pl*a*nárity

The generalization in this particular structural position is therefore *not* immunity to shortening, but rather variability. This variability follows from our analysis in the same fashion as the one of *prò:ví:de*/*prəví:de* of (11c) above. That is, the presence of stress on the initial syllable will require that syllable to be heavy, inducing vowel lengthening, while absence of stress will lead to vowel reduction. Once again stress functions as the lexical diacritic needed in any theory to distinguish the three classes in (34) (although underlying vowel length could also make some of the distinctions, redundantly[8]).

Turning now to right edges, the immunity to shortening expressed by HV's (31) is motivated by cases like (35) discussed in 3.3 above, whose italicized vowels would unduly shorten without that exemption.

(35) a. mollúsc*oi*d
b. stalágm*i:*te
c. peróx*i:*de
d. alúmn*i:*

In our analysis, these vowels must be taken to be underlyingly long, on a par with the ones in (30). This is potentially problematic, however, since the pattern of (35) seems rather more pervasive – a point to which we will return.

In sum, aside from the possible difficulty just noted, our account extends as well to the apparent shortening of unstressed vowels illustrated in (28).

5.3 Vowel lengthening

Alongside of the cases so far discussed, formerly attributed to shortening rules, there are others like those in (36), where the traditional approach would require lengthening, obviously unrelated to the former.

(36)	a.	(ádjec)t*i*ve	⇒	àdjec(t*í:*va)l
	b.	e(lízab*e*)th	⇒	elìza(b*é:*tha)n
	c.	(dísciplɪ*i*)ne	⇒	†dìsci(pl*í:*na)l
	d.	(hércul*e*)s	⇒	†hèrcu(l*é:*a)n

As we argued in 5.1 above for (36a), this kind of alternation follows on our account by simply taking the italicized vowels to be underlyingly short, lenghtening in the right-hand forms for now familiar reasons. These cases are in fact exactly the mirror image of those in (28), in

8 However, given *grAdual, tYrannous*, items like *grA:dation, tY:rannical* would have to have the capitalized vowels underlyingly short, and hence stress as a *non*-redundant marking.

which vowels went from stressed in a binary foot (→ long) to unstressed (= short). Further examples of the same kind as (36) are given in (37).

(37) a. substan(t*í*:va)l, abla(t*í*:va)l, agen(t*í*:va)l, infini(t*í*:va)l
b. antipo(d*é*:a)n, apo(g*é*:a)n, damo(cl*é*:a)n, oedi(p*é*:a)n, sopho(cl*é*:a)n

To our knowledge, these kinds of cases are not explicitly dealt with by recent literature, but alternations like *impious/pi:ous* (of (21) above), which are rather similar (especially to (36d)), are considered by Halle and Mohanan (1985, p. 81), who postulate a lengthening rule applying to "a number of specially marked words." Our approach would thus also supplant that rule, which we consider further in another connection below.

Note that the long vowel in (36) and (37) is for a rule-based approach only half of the problem. The other half is the stress, which, as already noted, will be assigned correctly only if lengthening applies first.[9] Somehow, this lengthening must be confined to penultimate syllables, since it does not occur elsewhere. But compare now (37b) with (38), where the italicized vowels are short.

(38) archimréd*e*an, prométh*e*an, chíl*e*an, guín*e*an, prót*e*an, cesár*e*an, †hercúl*e*an, caríbb*e*an

These cases confirm that lengthening must occur prior to stress, since the latter accordingly falls on the heavy penultimate in (37), but on the antepenultimate in (38). They also indicate, however, that words (at least those in *ean*) must be marked for whether or not they undergo lengthening (in fact, as in the Halle and Mohanan's rule cited). Thus, within a rule system, lengthening here must: (i) occur before stress; (ii) be limited to penultimate syllables; and (iii) apply only to "marked" words. Each point requires specific stipulation, but the facts fall out of our approach directly. Under stress checking: stress and derived vowel length are checked simultaneously, requiring no ordering; lengthening occurs only in penultimates because only stressed penultimates need to be heavy; and, since stress is present underlyingly, the "marking" distinguishing (36)–(37) from (38) is automatically provided.

Another case of "lengthening" is the one in (39).

9 Note that the alternation of (36a) was accounted for in *SPE* (pp. 155f.) by postulating an underlyingly long *i:*, yielding the cases in *i:val* directly, while the corresponding cases in *ive* were supposed to first receive final stress and then be subjected to a special shortening rule. This account would not extend to the other cases in (36), however.

(39) a. (sí:gnφ)
b. (sígnatu)re

Halle and Mohanan (1985, p. 86) argue that the underlying representation here contains the cluster *gn*, which is then simplified in (39a), presumably because unsyllabifiable in this context. The lengthening in (39a) is presumed to be "compensatory," and not occurring in (39b) because the cluster is not simplified. While this account seems plainly on the right track, there is, however, no reason for the lengthening unless the structure were otherwise ill-formed. That ill-formedness is for us the usual one of feet *(*Lσ*), and the lengthening the same as that of *as*(*pí:re*), *di*(*ví:ne*), *adjec*(*tí:va*)*l*, etc.[10] Hence another device: "compensatory lengthening" is subsumed under metrical theory. Note that exclusion of *[si.nφ], with a short *i*, in (39), entails a comparable exclusion of structures like *sho.pφ*, *ba.nφ*, etc., and hence supports the "geminate" analysis *shop.pφ*, *ban.nφ* of all such monosyllables, argued for in 3.3 above.

Yet another case where lengthening would seem needed, although this case is not usually addressed in the literature, is the one in (40), discussed in 4.4 above.

(40) a. próduct ⇒ prò:dúction
b. próject ⇒ prò:jéction

The long vowels in the right-hand cases in (40) follow from our analysis as usual, given their stress. The unstressed variants *prəducction*, *prəjéction* are also attested, which follows from the same vacillation in the initial stress as in *prò:ví:de*/*prəví:de* of (11c) above, or *tì:tánic*/*tətánic* of (32)–(33). The cases in (41) are all of this general type, although the one in (41b) seems attested only *with* initial stress.

(41) a. mólecule/mò:lécular; pólitics/pò:lítical; sólidφ/sò:lídify; prócess/prò:céssion; prógress/prò:gréssion; próphet/prò:phétic
b. prógeny/prò:génitor

The non-lengthening in the left-hand cases in (40) above, however, will require further comment. While we have so far excluded rightmost feet

10 This point stands despite the fact that some other option beside lengthening must be available for cases like *bomb*, *damn*, whose final clusters also simplify, but where lengthening does not occur. We may suppose that the phonetically simplified clusters remain structurally bipositional here, much like the presumed final geminates of *remit*, *shop*, etc.

(*Lσ*) altogether, we must partially revise that assumption, and suppose that the structure (*LH*) is allowed, at least word-initially, where construction of a larger foot is precluded. The configuration #(*LH*) is in fact widely attested, as shown by the sample in (42).

(42) (pá.ren)t = ballast, brigand, cavern, chemist, clarence, clement, damask, desert, forest, forint, gerund, hazard, herald, honest, larynx, legend, leonard, leopard, lizard, monarch, niggard, pageant, pattern, peasant, petard, pharynx, pheasant, placard, pleasant, present, product, proverb, richard, robert, scabbard, second, shepherd, slattern, syrinx, talent, tavern, tenant, terence, torrent, triplex, wizard

Still, we may regard this structure as a borderline case, as many comparable items, like those in (43a), have a *long* vowel in the initial syllable, suggesting lengthening in this structure, while the items in (43b) are attested in both variants, with and without lengthening.[11]

(43) a. (ré:.cen)t = adolf, ajax, blatant, bogart, borax, climax, cobalt, cogent, decent, defect, docent, island, latex, license, locust, moment, mozart, phoenix, poland, potent, precept, pretext, protest, pyrex, radix, regent, resource, retard, rodent, sequence, stipend, tyrant, vacant, vagrant, xerox, yogurt, yokuts
b. (pá:.ten)t/(pá.ten)t = covert, fecund, phalanx, provost, ribald

Note that, in contrast to initial position, non-initially, where a ternary foot *can* be constructed, the structure (*LH*) is essentially excluded. We find it only in sporadic cases, like those in (44).[12]

(44) discrépant, lieuténant, inclément

This initial/non-initial asymmetry is also apparent in the minimal pair *chémist/álchemist* (not **alchémist*). Hence, we must regard the foot (*LH*)

11 Note that in (43a), at least *po:tent*, *pro:test*, *re:tard*, *se:quence*, *tỳ:rant* must have underlyingly short vowels on our account, given the alternants in (i).

(i) ímp*o*tent, pr*o*tést, r*e*tàrded, súbs*e*quent, t*ý*rannous

12 We take the stressed vowels in *adhérent*, *cohérent*, as well as in the item *appárent*, to be metrically long, but "laxed" by the following *r*, like those of suffixes *ary*, *ory*, *ery*. For

as marginally possible in rightmost position, but – essentially – only by default, that is when a ternary foot cannot be constructed instead.

While accounting for the left-hand forms in (40), the foregoing now also accounts for the alternation in (45).

(45) (plé:*a*se) ⇒ (plé*a*san)t

That is, assuming again underlying shortness, lengthening in *please* continues to follow as in *di*(*ví:ne*), while (*pléasan*)*t* is now exempted from lengthening by the well-formendess of (*LH*), like (*próduc*)*t*, (*prójec*)*t* of (40). The alternation of (45) is duplicated in *south/southern*, though not in other cases, like *mí:grate*/(*mí:gran*)*t*, *ví:brate*/(*ví:bran*)*t*, *vá:ca:te*/(*vá:can*)*t*. The latter we may regard as having underlyingly long vowels, as suggested for the first two also by (*mí:gra*)*tòry*, (*ví:bra*)*tòry*.

The (relative) well-formedness of (*LH*) in rightmost but initial position contrasts with the ill-formedness not only of #(*LW*), shown by (45), but also of #(*LL*), as shown by the lack of alternation in (46).

(46) (tó:ne) ⇒ (tó:na)l

Both items in (46) contrast with (*tónic*ϕ), in which the trisyllabic foot suffices for well-formedness. The lengthening of *tó:nal* in (46) is rather systematic in bisyllabic structures, as indicated by the sample in (47).

(47) á:nal, bá:sal, fé:cal, fé:tal, fó:cal, ló:cal, mó:lal, nó:dal, nó:tal, sí:nal, tí:dal, ví:ral, zó:nal; ló:bar, plá:nar, pó:lar, vé:lar; fá:mous, sé:rous, nó:dous, fí:brous, ní:trous, spí:nous

Note that there is a fair number of cases with the apparent structure of (47), and yet with a short vowel, like *atom*, *color*, *debit*, *gamut*, *grammar*, *lemon*, *madam*, *manor*, *merit*, *novel*, *peril*, *pivot*, *rabbit*, *satyr*, *stirrup*, *stomach*, *summit*, *syrup*, *tennis*, *bullet*, *planet*, *pocket*, *prophet*, *rocket*. We may suppose that these cases parse a final null element

reasons that remain unclear, however, that effect is not always present, as in *appEar*, *adhEre*, the variants *adhErent*, *cohErent*, as well as the idiolectal variant [eyræb].

Selkirk (1984, n. 21, p. 246) cites the further cases in (i).

(i) a. quinté*ss*ence
b. adolé*sc*ent, sené*sc*ent, pubé*sc*ent, pubé*sc*ence

Here, however, the stress of *coalésce*, *convalésce* suggests the italicized consonants in (ib) are geminates, yielding a closed penultimate. Other sporadic cases, like the one in (ia), could perhaps be analogous, consistently with their orthography.

like monosyllables, as in *(á.to.mφ)*, yielding a ternary foot *(σLσ)*.[13] This will account for alternations like *(tá:.ble)/(tá.ble.tφ)*, *(zéa.lφ)/(zéa.lo.tφ)*. Our account of the lengthening in (46) and (47) above remains unaffected since we independently know that suffixes like *al*, *ar*, *ous* do not parse a null element (see Part II).[14]

In sum, the alternation of *please/pleasant* in (40), and the non-alternation of *to:ne/to:nal* in (46) follow from postulating that *#(LH)* is well formed, while *#(LL)* and *#(LW)* are not. Supposing further that an initial foot *(φL)* is also excluded as an (iambic) variant of *(LW)*, as we argued in 4.2.1 above, will extend the account to *product*, *pro:duction* of (40).

We now note further that the alternations of (40) and (45) provide additional evidence against the notion of syllable extrametricality. Consider the analyses that that notion entails, given in (48a, b).

(48) a. pró <duct> ⇒ prò:dúcti <on>
b. plé:a <se> ⇒ pléa <sant>

In (48), both *product* and *pleasant* must have a final extrametrical syllable, as is the norm for their classes, and so as to avoid an incorrect final stress. This means that their initial syllables constitute monosyllabic feet. An analysis in which the final syllable is not extrametrical but rather receives secondary stress still leads to the same conclusion, with the initial syllable in a monosyllabic foot, as in *pródùct*, *pléasànt*. However, initial monosyllabic feet cannot be maintained here, since they would violate the generalization, well-established on theory-neutral grounds, that feet consisting of a single light syllable do not exist at all, witness: **bànána* (versus *bàndánna*); **sign* with a short *i*; the stress pattern **inhabít*, etc. Even more significantly, if *product/pleasant* had initial monosyllabic feet, there would be no metrical distinction

13 In principle, one could alternatively take either the median or the final consonant to be parsed as a geminate, e.g. *(át.to)m/(á.tom)m*, yielding well-formed binary feet *(Hσ)/(LH)*, respectively. We take the geminate parse of consonants to be relatively rare, however, making the text solution more appealing.

14 Occasional deviations may have to be admitted, however, to account for a few cases like *(zéa.lφ)/(zéa.lou.sφ)*, and perhaps *(schóo.lφ)/(schó.la.rφ)*. This exceptionality in the parsing of the final null vowel would be complementary to that of *(cátholi)cφ*, compared with normal *dy(námicφ)*.

Oscillation in the parsing of the final null element is perhaps also at the basis of the different vowel length in *(pléasure)*, *(tréasure)*, *(ténure)*, *(méasure)*, compared with *(séizu)re*, *(nátu)re*, *(cló:su)re*, *(créatu)re*, and in the two variants of *leisure*.

between them and their respective alternants *prò:dúction/plé:ase*, and hence no way to provide a metrical account of vowel length. The contrasts in vowel length in (48) thus seem to lead to the inevitable conclusion that the final syllable in items like *product*, *pleasant* and likewise all of those in (42), is metrified but not stressed, in a foot (σH). But now note that if feet (σH) are part of the inventory, then there *cannot* be any syllable extrametricality. If there was, the stress pattern of *(*ágen*)<*da*>, with antepenultimate stress over a heavy penultimate, should be perfectly normal.

In this section, we have thus considered lengthening in the cases of *adjectí:val*, *sí:gn* and *prò:dúction*, and argued that, within a rule system, the first of these would require lengthening before stress, while the third and presumably the second would require lengthening after stress. This would imply the existence of two separate lengthening mechanisms, unrelated as well to the shortening ones which we reviewed in 5.2. In contrast, our approach based on underlying stress and the assumption that vowels lengthen freely to yield well-formed feet has extended straightforwardly to all of these cases. In addition, we have also seen that the contrast in *pro:duction/product* leads to the theory-neutral conclusion that feet (σH) exist, which implies that syllable extrametricality does not.

5.4 Foot types and foot weight

In the last two sections, we have argued that stress "checking" is superior to assignment by rule in certain specific respects. A more general respect in which it is also superior is that it directly captures the fact that stress patterns reduce to a small number of derived structures, specifically feet. From a rule-based perspective, one would rather expect a relatively large number of stress patterns, reducible to a small number of derivational operations – not a fact, so far as we can tell.

In this section, we will argue further that the inventory of feet we have postulated is in fact a coherent set, definable in terms of more primitive and plausible notions. One of these is a notion of foot "weight," congruous with the standard notion of *syllable* weight. We suppose in particular that foot weight results from compounding the weights of individual syllables, though in a way that takes account of the position of each syllable within the foot. As we discussed earlier, we hypothesize foot pulses to have "triangular" or saw-tooth shape, though this will no doubt prove to be only a rough idealization.[15] We will then pursue here the more specific hypothesis that the contribution of individual syllables is some multiplicative function of their own intrinsic weight and of the pulse amplitude they are associated with by position. For concreteness and illustration, and as a preliminary conjecture to lead to further research, we will associate specific, order of magnitude, numbers both with syllable types and with positions. We will take the intrinsic weight of the three different kinds of syllables (heavy, light and weak), to be as in (49).

(49) *Intrinsic weight*
 a. H: 3
 b. L: 2
 c. W: 1

We will then take the multiplicative factor associated with each position within the foot to be as in (50a, b) for binary and ternary feet, respectively.

(50) a. (σ σ)
  3 1.5
 b. (σ σ σ)
  3 2 1

Note, again, that these numbers are only qualitatively consistent with the evidence available, and are otherwise arbitrary, the following exercise aiming only to establish initial plausibility to this general approach to foot typology.

Proceeding then to multiply the values in (49) and (50), we obtain the following "weights" for each of the logically possible types of binary and ternary feet.

(51) (i)	(Lσ):		(ii)	(Hσ):	
a.	LW	7.5	d.	HW	10.5
b.	LL	9	e.	HL	12
c.	LH	10.5	f.	HH	13.5

15 This discussion will ignore the fact noted in fn. 14, chapter 4 that ternary feet seem to have a rise–fall profile.

(52) (i) (σLσ): (ii) (σHσ):

a.	LLW	11	g.	LHW	13
b.	HLW	14	h.	HHW	16
c.	LLL	12	i.	LHL	14
d.	HLL	15	j.	HHL	17
e.	LLH	13	k.	LHH	15
f.	HLH	16	l.	HHH	18

Note now that, as far as rightmost feet are concerned, we need to exclude all of (51i) except for certain instances of (51c) as we have seen, and exclude as well all of (52ii). We can then see that absolute limits on weight would not be sufficient to make the right distinctions, since some of the ill-formed cases in (52ii) compare in weight with some of the well-formed ones in (52i), while well-formed (51d) also compares with the generally excluded (51c). Let us then suppose that well-formedness is not determined by absolute weight, but rather by weight "optimization," specifically that a foot is well-formed if it is the closest to optimal weight among the alternatives. Let us further suppose that, along with weight optimization, a certain notion of "metrical alignment" must also be satisfied, requiring that inherent prominence of syllables be aligned with positional prominence within the foot. Specifically, we will take metrical alignment to exclude heavy syllables in unstressed position, as indicated in (53).

(53) *Metrical alignment*
*(σ ...H ...)
where "..." includes no foot boundaries

The condition in (53) is of course just the one in (14) of 4.2.2 above. As we did in 4.2.2, we take (53) to be also relativized, like weight optimization, so that its effect will only be that of deciding between options and not that of an absolute prohibition, which would make it false. We can then consider all logically possible trisyllabic sequences, comparing bisyllabic and trisyllabic metrifications on the basis of the two proposed criteria of weight optimization and metrical alignment. We will see that, to adequately approximate the facts, we need to set optimal weight for rightmost feet at 12. We begin with sequences that have a light medial syllable, as in (54) below.

(54)

			A	*W*		
a.	*L(LW)	7.5		→	(LLW)	11
b.	*H(LW)	7.5	→	→	(HLW)	14
c.	*L(LL)	9		→	(LLL)	12
d.	*H(LL)	9	→		(HLL)	15
e.	*L(LH)	10.5		→	(LLH)	13
f.	*H(LH)	10.5	→	←	(HLH)	16

In (54), the numbers give foot weight in accordance with (51)–(52), and the arrows point to the preferred option under each criterion, that is closer approximation to weight 12 (given under "W"), and non-violation of alignment (53) (given under "A"). The non-preferred options are then automatically excluded as indicated by the asterisks, which in fact represent correct results. Reviewing each case, in (54b, c, f) the binary options on the left are non-preferred with respect to alignment because they would place a heavy syllable in unstressed position.[16] In all cases in (54a–e), the ternary option is thus preferred, either by weight or by alignment, or both. In (54f), however, we must presume that the better alignment of the ternary option suffices to overrule the better weight of the binary one, but note that the existence of a few cases like *lieu(ténan)t* and the others of (44) above (versus the more numerous ternary cases like *(cónsonan)t*), suggests that this occurs by a less than overwhelming margin and in fact roughly confirms the proposed account.

Let us now consider trisyllabic sequences with a heavy median, as in (55), where the predicted asterisks seem again true to fact.

(55)

			A	*W*		
a.	L(HW)	10.5	←	→	*(LHW)	13
b.	H(HW)	10.5		←	*(HHW)	16
c.	L(HL)	12	←	←	*(LHL)	14
d.	H(HL)	12		←	*(HHL)	17
e.	L(HH)	13.5	←	←	*(LHH)	15
f.	H(HH)	13.5		←	*(HHH)	18

Here, in (55b, d, f) the binary and ternary options are equal with respect

16 When that heavy syllable is initial, however, it may be stressed, as in *(φbàn)dánna*. Yet we take this possibility as essentially not contributing to alignment, however, because we presume metrification of empty structure (initial or final) to be itself a case of "misalignment," as was suggested in 3.6 above and will be further discussed in 7.2 below.

to alignment, since each has one unstressed heavy syllable, unlike (55a, c, e), in which only the ternary structure does. In (55a) we must suppose again that better alignment overrules better weight, consistently with the account of (54f).[17]

Consider now the case in which the ternary options in (54) and (55) are not available, as with bisyllabic words. Then, the binary options in (55) would continue to be well formed, this time because of lack of alternatives, but the ones in (54) would *not* become comparably well formed. The reason is vowel lengthening, which provides a *further* alternative. We then compare the binary cases in (54) with their vowel-lengthened alternatives, as in (56).

(56)			*A*	*W*		
a.	*(LW)	7.5		→	(HW)	10.5
b.	*(LL)	9		→	(HL)	12
c.	(LH)	10.5			(HH)	13.5

It is clear that there is no difference between the two sets in (56) with respect to alignment (53), only a difference in weight. However, in (56c) the two options have comparable divergences from optimal weight 12, which accounts for the well-formedness of both *(pléasan)t*, and *(mó:men)t* noted in 5.3, as well as for oscillations like *pátent/pá:tent*, *próvost/pró:vost*, etc. In contrast, in (56a, b), the right-hand forms have a clearly preferable weight, whence the lengthening of both *(tó:ne)* and *(tó:na)l*. Since vowel lengthening is available generally, not just in disyllabic words, mapping of the left-hand cases into the right-hand ones in (56a, b) by lengthening will extend to cases like *di(ví:ne)*, *adjec(tí:va)l* and the others discussed in 5.3. Note that we correctly predict that readjustments in weight will never occur by lengthening of an unstressed vowel, as in *(LL)* → *(LH)*. While the latter foot is well formed as in (56c), its alternative *(HL)*, obtained by lengthening the stressed vowel instead, is superior for alignment, and must therefore be chosen.

In contrast to (56), all ternary feet continue not to require lengthening, in the manner illustrated in (57).

17 It is not clear that the structure *(LHW)* is systematically excluded, however, since cases like *(galaxy)* and others discussed in 3.6 above could in principle receive this kind of analysis, rather than one that has an extrametrical weak syllable.

(57)

			A	W		
a.	(LLW)	11		←	*(HLW)	14
b.	(LLL)	12		←	*(HLL)	15
c.	(LLH)	13		←	*(HLH)	16
d.	(LHW)	13		←	*(HHW)	16
e.	(LHL)	14		←	*(HHL)	17
f.	(LHH)	15		←	*(HHH)	18

As shown, the lengthened variants are all worse than their non-lengthened counterparts with respect to weight, while they do not differ from them with respect to alignment. The structures on the right will thus all be ill-formed. This, however, does not make all the ones on the left *well*-formed, since those in (57d–f) continue to be excluded in the manner of (55) above.

The foregoing discussion, relying on the notions of optimal weight and optimal alignment, thus seems able to correctly characterize the range of possible rightmost feet, confining them to ($H\sigma$) and ($\sigma L\sigma$), in addition to (LH) when left-hand exhaustive.

As we argued in 3.7.4, we expect non-rightmost feet to require a lower weight. Still pursuing the limited goal of showing general plausibility in this approach, let us then suppose the optimal weight here is 10. Binary and ternary variants will now compare as in (58) below, where we have excluded feet with weak syllables, since the latter occur only finally.

(58)

			A	W		
a.	L(LL)	9	→	←	(LLL)	12
b.	H(LL)	9	→	←	(HLL)	15
c.	L(LH)	10.5	→	←	(LLH)	13
d.	H(LH)	10.5	→	←	(HLH)	16
e.	L(HL)	12		←	*(LHL)	14
f.	H(HL)	12		←	*(HHL)	17
g.	L(HH)	13.5		←	*(LHH)	15
h.	H(HH)	13.5		←	*(HHH)	18

In (58), all ternaries are clearly farther from optimal weight than their binary counterparts. As for alignment, in order to simplify discussion, we first take the trisyllabic sequences in (58) to be word-initial. We also take any residue (whether H or L) to be a form of misalignment, because both possibilities $\#\sigma$(... and ($\phi\sigma$)(... are misaligned with phonetic structure, the former excluding a phonetically realized syllable, the latter including a null one.[18] The forms on the left thus all have some degree of misalignment. The latter misalignment, however, is paralleled by the forms on the right in (58e–h), all of which place one more heavy syllable in unstressed position than their left-hand counterparts. In (58e–h), alignment is thus neutral, so that weight will be free to select the binary option. In the cases in (58a–d), however, the misalignment of the left-hand options is *not* matched by that of the right-hand ones, which are thus preferable for alignment, though not for weight. Presuming that alignment overrules weight as in the previous cases of conflict would predict that the ternary options should be generally preferred, which is essentially correct. Note, however, that we might expect a difference between (58a, c) and (58b, d), since in the latter two cases the weight deviancy of the ternary option is much more significant than in the former. HV (p. 243) argue in fact, on the basis of examples like *do:(dèca)nésus*, *i:(còsa)hédron*, that a word-initial sequence $HL\sigma$ is usually parsed as $H(L\sigma)$. If this generalization is correct, it would indeed support the characterization in (58), and indicate that, while alignment generally overrules weight, a large weight divergence can overrule alignment instead.[19] HV (p. 243) also note the pattern of *a(mànu)énsis*, *a(pòthe)ósis*, *e(pàmi)nóndas*. If these cases are indeed representative, they will suggest that onsetless syllables are in a sense more easily emarginated, giving rise to milder misalignment when they remain unmetrified. This would then permit weight to prevail in (58a, c), selecting the binary option.[20]

Our discussion of 3.7.4 has suggested that word prosody imposes a fixed difference between rightmost and non-rightmost feet, which we are now supposing to have 12 and 10 as typical weights, respectively. This will predict that when the rightmost foot diverges from the typical weight, so should the non-rightmost one, as in the case of "Strong

18 Note that treating *L(* as a case of misalignment when word-initial does not affect the discussion of (54) and (55) above. In (54a, c, e) the ternary option will prevail as before, now also by alignment. In (55c, e) the binary option continues to prevail, though now only by weight. As for (55a), we may now expect the ternary (*LHW*) to be possible when left-hand exhaustive, but the facts are actually compatible with that conclusion, e.g. (*galaxy*), as noted in fn.17 above.

19 Other examples given by HV, like *i:cònoclástic*, *de:gènerátion*, are irrelevant, however, since their stress pattern is predicted by stress preservation, as we see in chapter 6 below.

20 The binary option is in fact occasionally selected even in other cases, e.g. *foràminífera*, attested both with initial and with peninitial stress. Furthermore, even when there is no oscillation, speakers' judgments are relatively weak in this domain, a fact which seems generally in line with the idea of (58a–d) that there are two principles seeking opposite resolutions.

Retraction" *ca(pítu)(làte)*, etc., where a final weak foot induces a preceding binary rather than a ternary. This phenomenon is expressed by the proposed numerology, since supposing that the 12/10 ratio between final and non-final feet remains constant, feet preceding weak ones are predicted to have weight 8.7, since weak feet have weight 10.5 (see (51d)). The "Strong Retraction," i.e. the fixed binary pattern, would now follow from supposing that, with optimal weight 8.7, the weight preference for the binary in (58) is increased sufficiently to be no longer overruled by the alignment preference. Of course the same apparatus will predict finer degrees of interdependence between final and non-final feet, which, however, we are unable to verify at this point.

Let us now consider non-rightmost feet over sequences of syllables other than ternary. For binary sequences, binary metrification will be the only option, and will hence be well-formed by default of alternatives, as in *(àri)zóna*. Turning to quadrisyllabic sequences, let us do so by just adding one syllable to the left of each of (58a–h), as in (59a–h), respectively.

(59)

			A	*W*		
a.	σL(LL)	9	←	←	*σ(LLL)	12
b.	σ*H*(LL)	9		←	*σ(HLL)	15
c.	σL(LH)	10.5	←	←	*σ(LLH)	13
d.	σ*H*(LH)	10.5		←	*σ(HLH)	16
e.	σL(HL)	12	←	←	*σ(LHL)	14
f.	σ*H*(HL)	12		←	*σ(HHL)	17
g.	σL(HH)	13.5	←	←	*σ(LHH)	15
h.	σ*H*(HH)	13.5		←	*σ(HHH)	18

In (59), italics mark all relative misalignments, supposing that the initial bisyllabic sequences in the left column are to be metrified as binary feet. As shown, the binary metrification always prevails over the ternary, either by weight or by both weight and alignment, which again seem empirically correct, e.g. *(àpa)(làchi)cóla*, *(èndo)(crìno)lógic*. We forgo discussion of longer sequences, which would be more complex. So far as we can tell, predictions continue to be in the right direction.

Finally, we consider single initial syllables, beginning with light ones. The logical possibilites for such syllables are non-metrification, and metrification in a structure *(ϕL)*. From the point of view of alignment, both are deviant by our earlier hypotheses, hence equivalent. As for weight, it is irrelevant to the first option, but non-optimal in the second. Supposing that iambic (*ϕL*) is weight-equivalent to trochaic (*LW*), that weight is then 7.5 versus optimal 10. The first option, namely non-metrification, is then preferable for weight, and hence preferable altogether, which is correct, initial light syllables remaining unmetrified as we have seen, e.g. *ba(nána)*.

Consider now a single heavy syllable. Metrification here yields near optimal (non-rightmost) weight 10.5, if we take (*ϕH*) to be weight-equivalent to the general (*HW*). Non-metrification will be irrelevant to weight as usual, so that weight will be neutral between the two options. We must therefore suppose alignment to prefer (*ϕH*)... over *#H(*... This seems plausible, since the latter structure is not only "misaligned" because non-exhaustive, but also for failing to produce a stress on a heavy syllable, unlike the former, whence, e.g. *(ϕbàn)dánna*. The analysis of single initial syllables is then as summarized in (60).

(60)

		A	*W*		
a.	#L(		←	*(ϕL)	7.5
b.	*#H(	→		(ϕH)	10.5

The two metrical equivalents are thus: unmetrified *L*, and metrified (*ϕH*). This accounts for the rather widespread oscillation between the two noted in 5.3 above, as in *prəducción/prò:dúction.*[21]

In this section we have thus argued that the rather narrow range of observed foot types is not a random collection, but results from the interaction of two factors, one a general notion of metrical alignment which includes both correspondence of heavy syllables with stress and correspondence of metrical structure with phonetically realized structure, the other a notion of optimal foot weight. While our discussion has been speculative in fundamental respects, the proposed approach appears to have a sufficient degree of plausibility and substance to warrant consideration and further study.[22]

21 Note here that, if there were different degrees of vowel lengthening, we might expect a lower one in initial syllables than in rightmost feet, conforming with the general weight asymmetry between rightmost and non-rightmost feet. Some dictionaries (e.g. Webster's *New Collegiate Dictionary*, 1959, based on Webster's *New International*, 2nd edn.) do in fact distinguish between the capitalized vowels of *fAtality, lOcality, lEgality, tOnality*, which are defined as "semi-long," and those of *fAtal, lOcal, lEgal, tOne*, which are defined as "long."

22 The text attempt to define foot typology in terms of more primitive notions is rather similar in spirit to that of Prince (1991a). It differs significantly from the latter in its

5.5 Onsetless syllables

In addition to the ones examined above, there are two other vowel-length alternations which seem to yield to a metrical account, one exemplified in (61).

(61) a. var*i*ous ⇒ var*í:*ety
b. man*i*ac ⇒ man*í:*acal
c. simultan*e*ous ⇒ simultan*é:*ity

In addressing cases like (61), Halle and Mohanan (1985, p. 81) propose the rule in (62).

(62) *"Special" lengthening, after Halle and Mohanan (1985)*
"a special rule that lengthens the stressed vowels in a number of specially marked words."

While lexical "marking" seemed justified for cases exhibiting variability, like *áspirant/excí:tant*, or *génerative/innová:tive* and others discussed above, we note that in this case it does not seem to be, since lengthening in this configuration is quite general. That is, in a sequence V_1V_2, if V_1 is stressed, it is *always* long. Thus, in contrast to hundreds of sequences [Cayə] (namely: consonant, long *i*, reduced vowel), like those of (61a, b) and (63a) below, the English lexicon contains no instances of [Ciə], with "*í*" stressed but short. Vowels other than *i* seem to behave quite analogously, as shown by (61c), (63b).[23]

(63) a. psor*í:a*sis, ammon*í:a*cal, genes*í:a*cal, paradis*í:a*cal, simon*í:a*cal, zod*í:a*cal, †embr*ý:o*nal, am*ý:e*lous, b*í:o*gen, cr*ý:o*gen, d*í:a*dem, d*í:a*gram, d*í:a*lect, d*í:o*cese, d*í:a*mond, h*í:e*rarch, h*ý:a*cinth, h*ý:a*lin, *í:o*din, lev*í:a*than, par*í:e*tal, pod*í:a*try, psych*í:a*try, th*í:a*min, var*í:o*la, v*í:o*lence, v*í:o*let agr*í:o*pe, alcib*í:a*des, alc*ý:o*ne, anch*í:a*le, ant*í:o*chus, ant*í:o*pe, arg*í:o*pe, ast*ý:a*nax, call*í:o*pe, cass*í:o*pe, cebr*í:o*nes, chalc*í:o*pe, herm*í:o*ne, *í:a*cchus, laert*í:a*des, l*ý:a*llpur, milt*í:a*des, p*í:e*lus

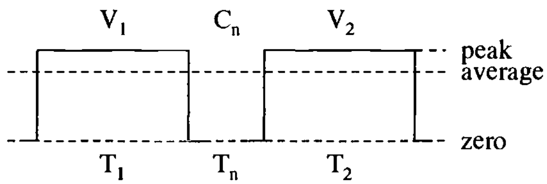
empirical basis, however, in particular in postulating ternary feet and excluding monosyllabic ones and excluding as well the possibility that feet may be constructed on subsyllabic units like moras.

23 The only exceptions are independent diphthongs, as in *annoyance*, where the *o* is short (*[ow]), presumably because such is the structure of the diphthong *oy*.

b. algebr*ái*c, alt*ái*c, arch*ái*c, choler*ái*c, g*ái*ety, mos*ái*c, ph*áe*ton beths*ái*da, dan*ái*des

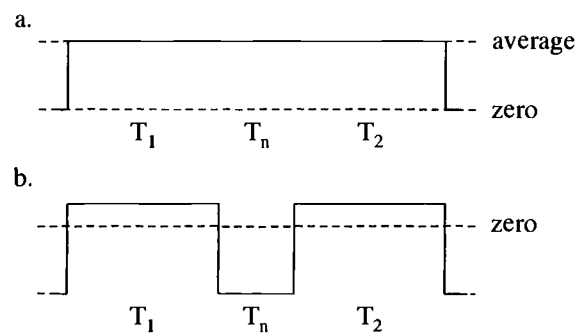
The descriptive generalization is thus that any foot with the structure (L_1L_2...) is well-formed only if L_2 has an onset. The notion of foot weight of the previous section will prove useful in this connection as well. The lengthening in (61), (63) would in fact follow from supposing that onsets generally contribute to weight, *contra* standard views. The onsetless syllable in each of the italicized sequences in (61), (63) would then result in weight deficiency, corrected as usual by vowel lengthening. The postulated contribution of onsets seems plausible if we take "weight" to be commensurate with some function of acoustic energy. For it is clear that interruptions in the acoustic signal, such as a consonant intervening between vowels, contribute to overall energy, despite the fact that that consonant would be an onset. To see this, consider (64), an idealized representation of acoustic intensity over time for two vowels V_1, V_2 separated by a consonant C_n.

(64)



Over total time $T_1 + T_n + T_2$, the signal in (64) can be analyzed as the sum of a continuous signal (65a), and an alternating one (65b).

(65)



It is clear that (65a) is equivalent for energy to occurrence of the two vowels V_1 and V_2 by themselves, without C_n. The reason is that in (64) "*average* times $T_1 + T_n + T_2$" equals "*peak* times $T_1 + T_2$" (by definition of *average*). Thus (65b) factors out the energy contribution of the onset. That contribution is obviously not null, as with any alternating signal, despite the null average of its amplitude. Thus, onsets contribute to acoustic energy, and, if foot weight is commensurate with energy as we suppose, they contribute to weight. Relying again on the rough indicative figures of 5.4 above, consider a ternary foot (*LLL*), whose normal weight was deemed at $6+4+2=12$, equivalent to the optimal value. Supposing – again in a very speculative vein – that onsetlessness halves the contribution of the median syllable, in the cases in question that weight would reduce to non-optimal $6+2+2=10$. If the vowel in the initial syllable now lengthens, making that syllable heavy, weight increases again to near-optimal $9+2+2=13$. A number of questions, for which we have no exact answer at this point, remain open, however. One concerns the fact that onsetlessness has an effect only foot-medially. Thus ([a]*gony*) or *collegi*([a]*lity*) do not lengthen the bracketed vowel. Another concerns the lengthening in cases like (*vi:olen*)*ce*, (*di:amon*)*d*, where one might expect the weight contribution of the foot-final heavy syllable to make it unnecessary; compare (*produc*)*t*. Finally, lengthening occurs in non-rightmost feet not only when they are binary, like that of (*di:a*)*betes*, where the proposed formulas would still give roughly the right results, but also in the few existing ternary ones, like that of (*hi:ero*)*glyphic*, where they would not. The reason is that non-lengthened (*hiero*) must be comparable in weight to normal binaries, which do not undergo lengthening in non-rightmost position; witness *ex*(*plana*)*tory*. These difficulties may seem to point to a rather mechanical lengthening rule, not quite sensitive to the fine details of metrical structure. Still the metrical basis of the phenomenon is quite clear since stress is required (compare the short *i* of *mán*[i]*ac*), and the onsetlessness of the median syllable is surely not coincidental. We note in this connection that various other cases have been cited in the literature in which onsets seem to be metrically relevant. Halle and Kenstowicz (1991) report that in Manam, main stress is normally penultimate (e.g. *amári)*, but antepenultimate when the penultimate has no onset (e.g. *móari*). From our point of view, this is similar to the case of (61)–(63) above in pointing to the general closeness of ternary feet with onsetless medians to normal binaries. Another case in which onsets have been found to be relevant is that of Pirahã, discussed in Everett and Everett (1984). As they argue, onsets in Pirahã contribute to syllable weight. From our point of view, they then contribute to foot weight too, by extension. (For the relevance of onsets, see also HV, p. 50, fn. 1 and references cited.) We will thus suppose that the above metrical account is at least on the right track, the noted difficulties notwithstanding.

The proposed view that bivocalic sequences contribute less to foot weight than other bisyllabic sequences seems to shed light on the lengthening of (66) as well, traditionally accounted for by a rule lengthening vowels in the environment of "C*i*V" (*SPE*, p. 47; Halle and Mohanan 1985, p. 78), given in (67).

(66) a. boston ⇒ bost(ó:n*ia*)n
b. canada ⇒ can(á:d*ia*)n

(67) *CiV-lengthening*
V → V: / ___ CiV

If the weight contribution of sequences *iV* is taken to be comparable to that of a single syllable rather than two, then the lengthening in (66) will obviously be just like that of binary feet, e.g. (*tó:na)l*. The monosyllabic "weight" of *iV* sequences, however, would not follow from the simple onsetlessness of the final syllable, on the proposed type of calculation. What we will need to assume instead is that, for purposes of weight, C*i*V sequences are in fact single syllables with complex onsets, thus fully reducing the feet in (66) to binary. Yet the stress itself requires *bi*syllabic parsing of *iV* sequences (as argued in *SPE* [p. 87] for *ion*), since it generally falls on the immediately preceding syllable, as in (66), hence excluding *(*bóstonia)n*, *(*cánadia)n*. We are therefore forced to the conclusion that syllable count is independent of, and not reducible to, foot weight. Hayes (1982, pp. 265ff.) has claimed that stress is in fact compatible with monosyllabic parsing of *iV* sequences, arguing that the consonant in C*i*V closes the preceding syllable, as in *ca.na:d.ian*, so that stress will be attracted by the heavy penultimate. This analysis, which has gained some acceptance, is, however, totally inconsistent with the very presence of vowel lengthening, which in fact does *not* occur in closed syllables, witness *cádmium*, *insómnia*, *nostálgia*, *áxial*, *fináncial*, *cáspian*, *lésbian*, *énviable*, *absténtious*, *bástion*, etc., in contrast to the cases in (66) above and the further examples in (68).[24]

(68) hé:l*iu*m, phó:b*ia*, croá:t*ia*, pé:r*io*d, arté:r*ia*l, baró:n*ia*l, collé:g*ia*l, coló:n*ia*l, ará:b*ia*n, irá:n*ia*n, comé:d*ia*n, aristoté:l*ia*n, remé:d*ia*ble, sacrilé:g*iou*s, absté:m*iou*s, advantá:g*eou*s, krité:r*io*n

In contrast to the general bisyllabic parsing that one must therefore assume, monosyllabic parsing of *iV* does occasionally occur, but only in cases like (69), which involve rather special circumstances, to which we will return (9.5 below).

(69) a. organi(zá:t*io*na)l
b. ob(jéct*io*na)ble

Note that, while in cases like (69a) one finds lengthening even in a trisyllabic foot, a fact to which we will return later on (9.4.2), there are cases like (*nátiona*)*l*, (*rátiona*)*l*, in which "C*i*V" lengthening fails in a trisyllabic foot as we would expect, confirming the metrical nature of the phenomenon. (For a different analysis of "C*i*V" lengthening, see Hayes 1989.)

Unlike the lengthening of (61), (63) above, "C*i*V" lengthening as in (65), (66) does not appear to extend to sequences other than *iV*, witness *gradual*, not **gra:dual*. Here, we may suppose that only *i* can form a part of a complex onset, so that with other sequences feet will remain trisyllabic for purposes of weight, the onsetless status of the final syllable being insufficient to cause lengthening.[25]

The "complex onset" hypothesis may seem problematic for cases like those in (70), in which the *iV* sequence is distributed over different feet.

(70) ànes(thè:si)ólogy, (à:si)átic, bac(tè:ri)ólogy, col(lè:gi)álity, de(fò:li)átion, ec(clè:si)ástical, (gè:ni)álity, ne(gò:ti)átion, (pà:tri)árchate, (pè:di)átrics, (pè:ri)ódical (rà:di)ólogy, (sò:ci)ólogy, (spà:ti)álity

24 The reasons behind Hayes' assumed monosyllabic parsing are cases like (*álie*)*náte*, *a*(*mélio*)*ràte*, *de*(*tério*)*ràte* and others, not otherwise derivable by his rule of "Strong Retraction," constructing only bisyllabic feet. In our framework, the latter cases follow from assuming, consistently with 3.7.3 above and the previous section, that the "Strong Retraction," which we associate with final weak feet, consists of feet *of lesser weight* than normal ternaries, not necessarily binary ones.

25 There is, however, at least one case in which *uV* undergoes monosyllabic parsing like the *iV* of (69), namely (*spíritua*)*l*.

Yet, the independently assumed divergence between surface syllabification, relevant to foot weight, and syllable count, relevant to parsing into feet, may suffice to deal with these cases as well. That is, the parsing of (70) simply follows from the general bisyllabic parsing of *iV*, while the lengthening follows if the *i* is a-syllabic for weight, being part of the next syllable. Then, with weight being borne by the stressed syllable alone, that syllable would have to be heavy. On the above calculations, a single heavy syllable would yield foot weight $3 \times 3 = 9$ (see (49)–(50)), hence close to optimal 10.[26]

One question we must leave open in connection with C*i*V lengthening concerns the immunity of *i* itself to lengthening, as in *delírium*, *abyssínia*, *trívial*, *sicílian*, *pítiable*, *vícious*, *edítion*. We may suppose that foot normalization in these cases occurs by "consonant," rather than vowel lengthening, as in (*trív.via*)*l*, etc., yielding a closed syllable, though we have no understanding of why this should be the case.

In sum, we have argued that bivocalic sequences, while generally parsed bisyllabically, yield weight-abnormal feet due to the missing onset, which then results in vowel lengthening. The conditions on foot weight postulated earlier prove generally applicable to these cases as well, *modulo* some additional assumption, and leaving a certain number of questions open.

26 It is true that in these cases the *i* is phonetically scanned as if it were an independent syllable, in contrast to the cases in (66), (68) (see, however, Hayes 1982, pp. 267ff., for a more detailed discussion), but this seems less than inconsistent with the proposed interpretation. Alternatively, we may suppose the lack of a following consonant permits the foot-final *i* in (70) to reduce to an exceptionally low acoustic level (recall 4.4 above), perhaps like that of the final *y* of *accuracy*, to which it seems perceptually comparable. If the weight of the foot-final syllable is like that of a weak syllable, lengthening will follow rather accurately, since *HW* is now near optimal 10.5, while *LW* is only 7.5, as in (51) above.

Notice exceptional non-lengthening in certain cases, like (*rávi*)*óli*, for which we have no account. Note too that our account will predict non-lengthening in non-rightmost feet, as with binaries in general. Cases like (*á:lie*)*nate* and others cited in fn.24 are thus surprising, but other cases do fail to lengthen as predicted, like (*pétio*)*late* (from Hayes 1982, p. 266). We also predict non-lengthening or unsystematic lengthening in cases mirroring (*próduc*)*t*, with a foot-final heavy syllable and word-initial stress. There are in fact some non-lengthening cases like *sp*[a]*niard*, *v*[a]*liant*, *p*[o]*niard*, along with lengthening ones like *dé:viant*, *grá:dient*, *lé:nient*, *pá:tient*, *sá:pient*, *sá:lient* - seemingly the expected variation.

5.6 Conclusion

In this chapter, we have claimed that the simple system in (71) accounts for the majority of alternations in vowel length in English.

(71) a. Vowels may lengthen.
b. Metrical theory.

Metrical theory (71b) includes the assumption that stress is present underlyingly and a specification of well-formed feet. The types of alternations that this system accounts for (with the noted residual difficulties), and the individual rules that this system aims to supersede, are listed in (72).

(72) a. *Myers'/HV's shortening in binary feet*
(i) div*i:*ne/div*i*nity
(ii) obl*i:*ge/obl*i*gatory
(iii) pr*o:*vi:de/pr*o*vidential
b. *Kiparsky's "morphological" shortening*
asp*i:*re/asp*i*rant
c. *HV's "ative" rule*
gener*a:*te/gener*a*tive
d. *HV's shortening in a stress well*
def*a:*me/def*a*mation
e. t*i:*tan/t*i*tanic
f. elizab*e*th/elizab*e:*than
g. *Halle and Mohanan's "compensatory" lengthening*
s*i:*gn/s*i*gnature
h. pr*o*duct/pr*o:*duction
i. pl*e:a*se/pl*ea*sant
j. *Halle and Mohanan's "special" lengthening*
var*i*ous/var*i:*ety
k. *"CiV" lengthening*
can*a*da/can*a:*dian

In conjunction with Myers' (1987) syllable-based account of alternations like k*ee*p/k*e*pt, w*i:*de/w*i*dth, perc*ei*ve/perc*e*ptive, interv*e:*ne/interv*e*ntion, scr*i:*be/scr*i*pture, etc., which we briefly discussed in 3.4, the above account thus advances the general thesis that in English there are in fact no "rules" of vowel length at all, only readjustments driven by independent subtheories or "modules" like syllable theory and metrical theory – a qualitative advance, reminiscent of comparable ones in the recent history of syntax.

There are, however, important respects in which the system proposed in this chapter is inadequate. One relates to the principle of stress preservation to which we turn in Part II, and which requires that stress be preserved in word-formation to the extent possible. While an account of each of (72b, c, e) follows correctly from taking stress for granted as we argued, we can in fact no longer to do so once stress preservation is recognized, since the latter would impose a stress on the bracketed syllables in each of *as*[pi]*rant*, *gene*[ra]*tive*, [ti]*tanic* and hence presumably cause the vowel to lengthen just as in their stems *aspi:re*, *genera:te*, *ti:tan*. Another inadequacy concerns cases like *mollúscoid*, *stalágmi:te*, *peróxi:de*, *alúmni:*, where the long vowels in the final syllables are presumed to be underlyingly long. As we already noted, such long vowels are comparatively more common than the long vowels in other unstressed positions, e.g. *ànno:tátion*, an asymmetry between final and internal positions which is being missed. More importantly, the above approach leads to paradoxes in cases like *áthl*[e:]*te*/*athl*[é]*tic*, *adúmbr*[a:]*te*/*adúmbr*[a]*tive*, in which the bracketed vowel would have to be underlyingly long to account for the first member of each pair but short to account for the second. What all of these facts suggest is that, while vowel length is indeed metrically driven, it is also to some extent a function of affixation (along the lines of Kiparsky's rule). We will see in chapters 9 and 10 that the system just proposed can in fact be recast rather straightforwardly to overcome these problems, while preserving most of the results achieved.

PART II

Stress and word-formation

In the previous chapters, we argued that the relation between sequences of syllables and stress is relatively simple and essentially defined by a set of three possible feet, in the manner illustrated in (1).

(1)		*Feet*	*Non-rightmost*	*Rightmost*	
	a.	mo(nòn.ga)héla	(H σ)	(H σ)	a(gén. da)
	b.	(wìn.ne.pes)sáukee	(σ L σ)	(σ L σ)	a(mé.ri.ca)
	c.	ac(cé.le)ràte	(L σ)	#(L σ)	(hó.nes)t

The relation thus defined is less than fully deterministic, however. That is, it is not always the case that, given a particular sequence of syllables, a unique arrangement of stresses is thereby predicted. There are, in particular, two major indeterminacies. One concerns sequences *σLσ* when occurring to the left of another foot. As (1) shows, such sequences can be parsed either as (*σLσ*) as in (1b) (*wìnnepes*)*sáukee*, or as *σ*(*Lσ*) as in (1c) *ac*(*céle*)*ràte*. There is no comparable variation in rightmost feet, as the metrification *σ*(*Lσ*) is excluded in that case. Nonetheless, rightmost feet give rise to the second major indeterminacy or variation, due to the presence of final "weak" syllables, which may or may not be metrified, as we argued. The two indeterminacies in question are illustrated in (2) and (3) below, respectively.

(2) *Non-rightmost feet*
a. ... σ (L σ)(... e.g. ac(céle)ràte
b. ... (σ L σ)(... e.g. (wìnnepes)sáukee

(3) *Weak syllables*
a. ... W) e.g. a(cádemy); ro(bústϕ)
b. ...)W e.g. (éffica)cy; (hónes)tϕ

We have also seen, however, that the two variations of (2) and (3) do not occur randomly, but are rather controlled by various further principles or conditions discussed in the previous chapters, which, when included into the overall system, will in fact largely remove all "indeterminacy." We list those conditions in (4).

(4)	a.	Strong Retraction condition:	... $(\sigma\sigma)(HW)\#$
	b.	Metrical Alignment:	$*(\sigma...H...)$
	c.	Metrification of verbs:	... $\phi)\#$
	d.	Exhaustive Parse:	$\#(.../...)\#$

The condition of (4a) imposes a binary rather than ternary foot when preceding a final weak one, hence as in *ac(céle)ràte* of (1b), thereby overruling exhaustiveness (4d) (see 3.7 above). Metrical Alignment (4b) overrules exhaustiveness as well, and aims to stress heavy syllables by controlling the metrification of a final weak syllable, as in *re(fécto)ry* versus *(áudi)(tòry)* (see 4.2.2 above). The condition in (4c) imposes that verbs metrify a final null vowel, as in *con(vértϕ)*, where (right-hand) exhaustiveness is again overruled, in contrast to the noun *(cónver)tϕ*. Finally, exhaustiveness (4d) avoids monosyllabic residues, by imposing a ternary foot in *(wìnnepes)sáukee* (1b), but two binaries in e.g. *(àpa)(làchi)cóla*.

In this second part, we consider the interaction between stress and word-formation, and will argue that one major player in this domain is a principle that imposes consistent metrical characteristics on morphemes, and in particular preservation of stem stress under affixation. We will begin our discussion by simply referring to such principle as "stress preservation." We will attempt to show that many apparently complex facts relative to the interaction of stress and morphology follow from simply assuming that the latter principle, while subordinate to the foot typology in (1), namely unable to extend the range of possible feet, ranks above all of the conditions in (4). For this reason, when it is at work, *it*, rather than any of (4), will resolve the indeterminacies of (2) and (3).

We will argue that the two well-known phenomena of (5) and (6) below are in fact precisely the result of the resolution of (2) and (3) above, respectively, in a stress-preserving manner.

(5) *Weak preservation*
napóleon ⇒ na(pòle)ónic

(6) *Strong preservation*
pròpagánda ⇒ pròpa(gándis)tϕ

That is, we will argue that, in (5), the non-rightmost binary foot is the means to preserve the stress of the stem *napóleon*, which remains in the derived form as a secondary, while in (6) non-metrification of the final weak syllable of the suffix is what makes it possible to preserve the stem stress in full. We will argue that this type of account is conceptually the simplest, since it only requires stating that *there is* a principle of stress preservation ranked above all of (4), the circumstances under which the preservation occurs being automatically defined by the familiar foot typology in (1) in its usual function as an output condition (our "stress checking"), just as with morphologically primitive words.[1]

The proposed account will be rather different in character from the more traditional ones, which have typically attributed the (weak) preservation of (5) to the workings of the "cycle," and the (strong) preservation of (6) to the ability of certain suffixes like *ist* to evade metrification in various ways (Siegel 1974; Allen 1978; Kiparsky 1982a, 1982b; Halle and Vergnaud 1987a, 1987b; Halle and Kenstowicz 1991). Instead, we will specifically maintain that no English suffix can "evade" metrification in any way, and that the difference between "neutral" (or strongly preserving) suffixes, at least those of the Latinate class like *ist* of (6), and non-neutral ones like *ic* of (5) is rather a reflex of the way in which the indeterminacy of final weak syllables can combine with the phonological structure of the suffix itself, either to guarantee preservation of stem stress or not. We begin by analyzing the phenomenon of weak preservation of (5) above, which is the topic of the next chapter.

1 Note that this characterization is a bit different from the one we attempted in 5.4 above, which viewed conditions such as those in (4) (at least (a, b, d)) as part of the definition of a well-formed foot. Here we are rather taking those conditions, as well as stress preservation, to have the ability to select among a set of well-formed feet independently defined. While the two characterizations are not fundamentally different, they are also not equivalent in principle. Under the one of 5.4, though not the one adopted here, one might expect stress preservation to give rise to feet which do not obtain otherwise. This expectation is not fulfilled in general, though it arguably is in certain cases (see some of 9.5 below). Our present choice of characterizations is determined both by expository goals and by the rather tentative character of the approach in 5.4. Further study might well reveal, however, that the latter was the more adequate.

6 *Weak preservation*

6.1 Introduction

The view that even the "restressing" suffixes can preserve the metrical structure of the stem to some degree has been widely held in the past. That view is implicit in *SPE*'s extensive use of the principle of the "cycle" (see for example *SPE*'s [p. 43] derivation of *theàtricálity*), and it is reasserted quite explicitly by LP (pp. 300f.), who cite the many pairs like *recíprocal/recìprocálity*. Kiparsky (1979) also takes that view, claiming that not only stresses are preserved, as held by LP, but even the prominence relation between them (as represented by labeled trees). Kiparsky argues that, e.g. in *tòtàlitárian*, the first syllable is less prominent than the second, mirroring the pattern of *tòtálity*. In contrast to the latter views, however, HV (pp. 245f.), citing Kenyon and Knott (1944), claim that words like *theàtricálity*, *postèriórity* can in fact occur with secondary stress on either of the first two syllables, in their view a pattern common to underived items as well, hence exhibiting no particular preservation effect from *theátrical*, *postérior*, respectively. HV's theory reflects this general assessment of the facts in their "Stress Erasure" convention (HV, p. 83), which eliminates all earlier stresses at the beginning of each new cycle.

In this work we will make extensive use of the factual classifications given in Fudge (1984), which we find particularly thorough with respect to the above type of issue. The latter classifications indeed support the view of the majority of sources rather than that of HV. In particular, Fudge describes two types of assignment of secondary stress: one by a general "rhythmic principle," operative with all underived words, the other by the metrical properties of an inner suffix, an example of which is *equìvocátion*, where Fudge supposes the secondary stress is due to the "stress-placing" properties of the suffix *at*, which assigns stress two syllables away, just as it does in *equívocàte*. The translation from Fudge's descriptive categories into ours is straightforward. Saying that *at* assigns both the primary of *equívocàte* and the secondary of *equìvocátion* in the same manner is equivalent to saying that *equivocat* + *ion* preserves some of the metrical structure of its stem *equivocate*, an effect that obtains with all suffixed items generally, not just those with *two* suffixes. Halle and Kenstowicz (1991, p. 490) partially qualify the claim of HV, admitting a preservation effect in cases like *oríginal/orìginálity* – one which they claim, however, is subject to "considerable lexical conditioning."

In this chapter, we will argue that indeed there is preservation of stem stress with "non-neutral," or "restressing" suffixes. As for HV's claim, and Kenyon and Knott's (1944) judgments, we take them to reflect the fact that stress preservation in these instances prevails only by a relatively narrow margin over the factors at play with underived items, namely the ones in (4) on page 166 above, left-hand "exhaustiveness" in particular. For this reason, left-hand exhaustive ?*(mèdici)nálity* is only mildly deviant compared with preserving *me(dìci)nálity*. Nonetheless, the preservation facts we report are clearly detectable, attested as well in most dictionaries. In addition to asserting the existence of stress preservation, we will argue further that, whereas the latter phenomenon may appear highly "irregular" if one expects that *any* stem stress should be preserved, it is in fact completely regular if one holds the less naive expectation that stem stresses should be preserved *if and only if* they correspond to independently well-formed feet.

6.2 Suffixation and boundary shifts

As discussed on pages 165–67 above, our analysis makes the specific claim that, if either of the alternative possibilities in (1) relative to non-rightmost feet preserves a stem stress, it should always be chosen over the other.

(1) a. . . .(σ L σ) (. . .
    b. . . . σ(L σ) (. . .

In order to seriously test this prediction, we will need some systematic way to identify relevant cases. In this section, we attempt to define the abstract structural characteristics of stem–suffix combinations that can test for stress preservation, turning to actual instances in the next section.

We begin by considering that the effect of suffixation is that of incrementing the metrifiable structure by specific amounts. Among the logically possible increments are at least the two foot fragments in (2a, b), and a full foot, as in (2c).

(2)	a.	σ)	e.g. *al*:	pa(rent + *a*)*l*
	b.	L σ)	e.g. *ity*:	ac(tiv + *ity*)
	c.	(Foot)	e.g. *ation*:	personifi + (*catio*)*n*

Note now that the other possible bisyllabic sequence beside (2b), namely *H* σ) will necessarily be a foot given our assumptions on possible feet ((1) on p. 165 above), and hence an instance of (2c). In fact, all logical possibilities reduce to the more general version of (2) given in (3), where $F_{0\text{-}n}$ is a sequence of any number of feet.

(3) a. σ) $F_{0\text{-}n}$
b. L σ) $F_{0\text{-}n}$
c. (Foot) $F_{0\text{-}n}$

It turns out, however, that no English suffix is larger than a foot, so that the set defined by (2) will suffice to characterize existing cases without requiring (3).[1]

We consider then what effects each of (2a, b, c) would have when added to an already existing metrical structure. Supposing that it were simply added to such a structure, each suffix will have the effect of "resetting" what was the rightmost foot boundary (henceforth "RFB") in the manner illustrated in each of (4), where the suffix follows the "+" boundary, and where both the RFB and a new boundary that replaces it are italicized.

(4) a. *RFB shifts forward one σ*
. . . σ_n) + σ) ⇒ . . . σ_n σ)
b. *RFB shifts backwards one σ*
. . . σ_n) + L σ) ⇒ . . .)(σ_n L σ)
c. *RFB remains unaffected*
. . . σ_n) + (Foot) ⇒ . . . σ_n)(Foot)

We will refer to the different effects in (4a, b, c) as "+1, −1, 0" shifts, respectively, thus identifying them by the number of syllables by which the RFB of the stem shifts and the direction of the shift. This designation

1 We abstract away from the sequences *itory, atory*, for the moment, which (in American English) are larger than a foot, returning to these later on.

is partly arbitrary, since for example the effect in (4b) is no more a "−1" than a "+2" shift, but this particular designation will prove more convenient. Whether or not the "shifts" in (4) will propagate further to the left, affecting other feet, will depend on the specific structure of the stem, as we will see.

We must also consider that suffixes are not always concatenated externally to the metrical structure of the stem, but are sometimes in partial overlap with that structure. For example, in *propagandist*, the *i* of *ist* replaces the final *a* of *propa(gánda)*. Such a "one-syllable" overlap is frequent and typical, alongside of the external concatenation of (4). It is worth stressing that the relevant notion of "overlap" here refers to *metrical* domains, not segmental ones. Thus, the *ist* of *americanist* is taken to be "concatenated" with the stem *a(merica)nφ*, despite the fact that it presumably overlaps with the final null vowel. We may in fact suppose (consistently with some of 3.5 above) that *ist*, and more generally V-initial suffixes, *always* suppress a final vowel of the stem, overt or null. This will give a *metrical* overlap only when that final vowel is metrified. Under such "syllable-overlap" and suppression of the stem-final syllable, the effects of each of (2) will differ from those in (4a, b, c), and will be as in (5a, b, c) instead, respectively.

(5) a. *RFB remains unaffected*

$\ldots \sigma_{n-1}\ \sigma_n)$

$+\sigma\,) \quad \Rightarrow \quad \ldots \sigma_{n-1}\ \sigma)$

b. *RFB shifts forward one σ*

$\ldots \sigma_{n-1}\ \sigma_n)$

$+ \quad L\ \sigma) \quad \Rightarrow \quad \ldots (\sigma_{n-1}\ L\ \sigma)$

c. *RFB shifts backward one σ*

$\ldots \sigma_{n-1}\ \sigma_n)$

$+(\text{Foot}) \quad \Rightarrow \quad \ldots \sigma_{n-1})(\text{Foot})$

The overall effects of suffixation on the most immediately adjacent metrical structure can therefore be summarized as in (6).

(6)

Suffixal material	Shifts: *Concatenation*	Shifts: *σ-overlap*
a. σ)	+1 (4a)	0 (5a)
b. L σ)	−1 (4b)	+1 (5b)
c. (Foot)	0 (4c)	−1 (5c)

We will now see that each of the "+1, −1, 0" shifting effects of (6) is relevant to test our stress preservation hypothesis. Specifically, stress preservation will predict that, under a "−1" shift, a non-rightmost ternary foot ($\sigma_1 L_2 \sigma_3$) should turn into a binary ($\sigma_1 L_2$) to preserve stress on σ_1 regardless of availability of other syllables to the left. Since our foot typology ((1) on p. 165) would independently constrain such a foot to binary if σ_1 were to be heavy, only cases in which σ_1 is light will be relevant. The overall test configuration for "−1" shifts will therefore be as in (7a), and as in fact instantiated in (7b). Italics identify the preserved stress/foot boundary.

(7) *Stress preservation under "−1" shift*

a. $\ldots\sigma_0$ $(L_1\ L_2\ \sigma_3)$ $\Rightarrow$ $\ldots\sigma_0\ (L_1\ L_2)(\sigma_3 \ldots$

b. me (*dí* ci na) l ⟶ me (*dì* ci)(ná lity

In contrast to the "−1" shift of (7), a "+1" shift under stress preservation will be predicted to turn a binary foot ($\sigma_1\sigma_2$) into a ternary ($\sigma_1\sigma_2\sigma_3$), provided that σ_2 is light. Again, availability of one extra syllable to the left is necessary for a meaningful test. The relevant configuration is then as in (8), where the resulting foot must be non-rightmost, as discussed.

(8) *Stress preservation under "+1" shift*

a. σ_0 $(\sigma_1\ L_2)\ldots$ $\Rightarrow$ $\sigma_0\ (\sigma_1\ L_2\ \sigma_3)(\ldots$

b. phe (*nò* me)(nólogy ⟶ phe (*nò* me no)(lógic

The "0" shift is also relevant to preservation, in two cases. In one of these, a word-final sequence $\sigma_0(\sigma_1 L_2 \sigma_3)$ becomes non-final as a result of suffixation, and is predicted to be preserved as such in the manner of (9), despite the fact that the alternative $(\sigma_0\sigma_1)(L_2\sigma_3)$ would also be available (compare *(àpa)(làchi)cóla*).

(9) *Stress Preservation under "0" shift (ternary foot)*[2]

a. σ_0 $(\sigma_1\ L_2\ \sigma_3)$ $\Rightarrow$ $\sigma_0\ (\sigma_1\ L_2\ \sigma_3)(\text{Foot})$

b. per (*só* ni fy) ⟶ per (*sò* ni fi)(cátio)n

The second relevant case of "0" shift involves a word-internal sequence $\sigma_0(L_1\sigma_2)$, which is also predicted to be preserved under suffixation, in the manner of (10).

2 Recall that we take the morpheme *fy* of (9b) to be unstressed, as argued in 3.2 above.

(10) *Stress Preservation under "0" shift (binary foot)*

a. σ_0 $(L_1\ \sigma_2)\ldots$ $\Rightarrow$ σ_0 $(L_1\ \sigma_2)\ldots$

b. ca (*pí* tu)(làte ca (*pì* tu)(látion

Note that the "0" shift of (10) is not directly covered by (6) above and relevant discussion, which considered only shifts of the *rightmost* foot boundary (RFB). Rather, (10) represents a "0" shift which occurs more internally, *concomitantly with* a "+1" shift of the RFB. Such "concomitant" shifts are obviously just as relevant to our goals, and will be reviewed more systematically in the next section.

6.3 The evidence for weak preservation

6.3.1 Preservation under "–1" shift

On the basis of the above discussion, it will be relatively simple to look for suffixes that cause each type of shift, and then identify, within the class of words that have those suffixes, the ones that have the test structure. We begin with instances of "–1" shifts, repeating the relevant configuration of (7) above in (11).

(11) *Stress preservation under "–1" shift*

$\ldots\sigma_0\ (L_1\ \mathrm{L}_2\ \sigma_3)$ $\Rightarrow$ $\ldots\sigma_0\ (L_1\ \mathrm{L}_2)(\ \sigma_3\ldots$

Recall how one case of "–1" shift arises with the suffixal structure $L\sigma$), as in (4b) above, repeated in (12).

(12) *"–1" shift*

$\ldots\ \sigma_n)\ +\ \mathrm{L}\ \sigma)$ $\Rightarrow$ $\ldots\ )(\sigma_n\ \mathrm{L}\ \sigma)$

One suffix that has the structure $L\sigma$) is obviously *ity*. With items that appear with this suffix, we find that stress preservation occurs as predicted, as shown in (13)–(18) below. In the examples that follow, (a) gives the stress-preserving structure in abstract, and (b) lists the relevant cases. Italics mark the stresses preserved.

(13) . . .*bility*

a. $\ldots\sigma_0\ (L_1\ \mathrm{L}_2\ \mathrm{ble})$ $\Rightarrow$ $\ldots\sigma_0\ (L_1\ \mathrm{L}_2)$(bi li ty)

b. di(*vì*si)(bílity), de(*dù*ci)(bílity), com(*pà*ti)(bílity), in(*vì*si)(bílity), in(*sò*lu)(bílity)

(14) . . .*ality*

a. $\ldots\sigma_0\ (L_1\ \mathrm{L}_2\ \mathrm{al}) \Rightarrow \ldots\sigma_0\ (L_1\ \mathrm{L}_2)(\mathrm{a\ li\ ty})$

b. me(*dì*ci)(nálity), col(*lè*gi)(ália), con(*vì*vi)(ália),
cor(*pò*re)(ália), gram(*mà*ti)(cálity), re(*cì*pro)(cálity),
the(*à*tri)(cálity) con(*dì*tio)(nálity)

(15) . . .*arity*

a. $\ldots\sigma_0\ (L_1\ \mathrm{L}_2\ \mathrm{ar}) \Rightarrow \ldots\sigma_0\ (L_1\ \mathrm{L}_2)(\mathrm{a\ ri\ ty})$

b. fa(*mì*li)(árity), or(*bì*cu)(lárity), par(*tì*cu)(lárity),
pe(*cù*li)(árity)

(16) . . .*ority*[3]

a. $\ldots\sigma_0\ (L_1\ \mathrm{L}_2\ \mathrm{or}) \Rightarrow \ldots\sigma_0\ (L_1\ \mathrm{L}_2)(\mathrm{o\ ri\ ty})$

b. su(*pè*ri)(ority), in(*fè*ri)(ority), pos(*tè*ri)(ority)

(17) . . .*osity*

a. $\ldots\sigma_0\ (L_1\ \mathrm{L}_2\ \mathrm{ous}) \Rightarrow \ldots\sigma_0\ (L_1\ \mathrm{L}_2)(\mathrm{o\ si\ ty})$

b. re(*lì*gi)(ósity), im(*pè*tu)(ósity), vo(*lù*mi)(nósity),
li(*tì*gi)(ósity), me(*tì*cu)(lósity)

Another suffix which we know instantiates the metrical structure Lσ) is *icϕ*), which, like *ity*, places stress on the immediately preceding syllable. (We return to a systematic review of non-neutral suffixes in the next chapter.) Stress preservation with this suffix obtains again just as we predict, as shown by (18)–(21).

(18) . . .*istic*

a. $\ldots\sigma_0\ (L_1\ \mathrm{L}_2\ \mathrm{is})\mathrm{t} \Rightarrow \ldots\sigma_0\ (L_1\ \mathrm{L}_2)(\mathrm{is\ ti\ c\phi})$

b. an(*tà*go)(nísticϕ), mi(*sò*gy)(nísticϕ), re(*cì*di)(vísticϕ),
mo(*nò*po)(lísticϕ), a(*nò*ma)(lísticϕ)

(19) . . .*astic*

a. $\ldots\sigma_0\ (L_1\ \mathrm{L}_2\ \mathrm{as})\mathrm{t} \Rightarrow \ldots\sigma_0\ (L_1\ \mathrm{L}_2)(\mathrm{as\ ti\ c\phi})$

b. en(*thù*si)(ásticϕ), i(*cò*no)(clásticϕ)

(20) . . .*ic*

a. $\ldots\sigma_0\ (L_1\ \mathrm{L}_2\ \sigma_3) \Rightarrow \ldots\sigma_0\ (L_1\ \mathrm{L}_2)(\sigma_3\ \mathrm{i\ c\phi})$

b. na(*pò*le)(ónicϕ), a(*pò*ca)(lýpticϕ)

3 Note that the examples in (16b) do indeed conform with the schema in (16a) because we take their long *e* to be lengthened under stress ("C*i*V" lengthening), as we saw in 5.5 above, rather than underlyingly long. The same consideration applies to the cases in (21) below.

Yet another suffix with the structure $L\sigma)$ is *ial* of (21). Preservation is again as predicted.

(21) . . .*ial*

a. $\ldots\sigma_0\ (L_1\ L_2\ \sigma_3) \Rightarrow \ldots\sigma_0\ (L_1\ L_2)(\sigma_3\ \text{i a})\text{l}$

b. ex(*pè*di)(éntia)l, ex(*pè*ri)(éntia)l

As we mentioned earlier, certain shifts in the position of foot boundaries arise concomitantly with those summarized in (6) above. Consider that (22) below, while involving a "+1" shift (as a subcase of (4a)), also involves a "–1" shift.

(22) *"–1" shift (concomitant with +1)*

$\ldots\ H_n) + \sigma) \Rightarrow \ldots)(H_n\ \sigma)$

That is to say, whenever a "+1" shift occurs to the immediate right of a heavy syllable, the newly included syllable and the preceding heavy will obligatorily come to form a binary foot (Hσ), whence both the "+1" and "–1" effects. The phenomenon in (22) is now instantiated in the cases in (23), in which *al* is the monosyllabic suffix, and which are again stress-preserving in the predicted manner.[4]

(23) . . .*ental*

a. $\ldots\sigma_0\ (L_1\ L_2\ \text{en})\text{t} \Rightarrow \ldots\sigma_0\ (L_1\ L_2)(\text{ent a})\text{l}$

b. co(*ì*nci)(dénta)l, ex(*pè*ri)(ménta)l

A third set of conditions that result in a "–1" shift involves adding a foot under σ-overlap, as in (5c) above, repeated in (24).

(24) *"–1" shift*

$\ldots\ \sigma_{n-1}\ \sigma_n) + (\text{Foot}) \Rightarrow \ldots\ \sigma_{n-1})(\text{Foot})$

The cases in (25)–(28) are now of this form, and results are again as predicted.[5]

(25) . . .*oid*

a. $\ldots\sigma_0\ (L_1\ L_2\ \sigma_3) \Rightarrow \ldots\sigma_0\ (L_1\ L_2)(\text{oi d}\phi)$

b. bac(*té*ri)(òidϕ) (compare: *bactérium/bactéria*)

4 The case in (i), due to monosyllabic syllabification of *ary* after a heavy syllable (4.2.2 above) is also similar.

(i) in(tégumen)t $\Rightarrow$ in(tègu)(ménta)ry

5 The assumption that *oid* normally metrifies as a foot is based on the discussion of 4.2.3 above, but see also 7.3 below. As for *ci:de* the evidence is rather limited. For example (*àcari*)(*cì:de*) calls for a stress on *cìde*.

(26) . . .*cide*

a. $\ldots\sigma_0\ (L_1\ \mathrm{L}_2\ \sigma_3) \Rightarrow \ldots\sigma_0\ (L_1\ \mathrm{L}_2)(\mathrm{ci{:}}\ \mathrm{d}\phi)$

b. bac(*té*ri)(cì:de)

(27) . . .*ology*

a. $\ldots\sigma_0\ (L_1\ \mathrm{L}_2\ \sigma_3) \Rightarrow \ldots\sigma_0\ (L_1\ \mathrm{L}_2)(\mathrm{o\ lo\ gy})$

b. phe(*nò*me)(nólogy), bac(*tè*ri)(ólogy)

The above cases of stress preservation all contrast with the cases in (28), in which the stem stresses, indicated by italics, cannot be preserved since this would result in ill-formed feet.

(28) *Predicted remetrification*

a. . . .*ality* (compare (14))
(ùni*ver*)(sálity), (còm*mu*)(nálity), (ìm*mor*)(tálity), (ìnstru*men*)(tálity), (ìn*for*)(málity), (ìn*ter*)(nálity), (sènti*men*)(tálity), (èx*ter*)(nálity)

b. . . .*istic* (compare (18))
(pròpa*gan*)(dístic)

c. . . .*ic* (compare (20))
(cà*tas*)(tróphic)

d. . . .*ial* (compare (21))
(còm*po*)(néntial), (è*xis*)(téntial)

e. . . .*ental* (compare (23))
(ànte*ce*)(déntal)

f. . . .*oid* (compare (25))
(bác*te*)(ròid)

g. . . .*cide* (compare (26))[6]
in(fánti)(cì:de), *ro*(dénti)(cì:de)

More specifically, non-preservation in (28a–f) is due to non-existence of monosyllabic feet, and in (28g) to non-existence of feet ($\sigma H \sigma$).

6 Unlike the cases in (26), these actually instantiate a "+ 1" shift, the epenthetic *i* adding one syllable. Note that despite the new stress on the second syllable, the stress on the initial one is presumably still preserved in these cases, since that syllable can metrify in the manner discussed in 4.2.1 for (ϕ*bàn*)(*dánna*), etc. The text discussion remains unaffected.

6.3.2 Preservation under "+ 1" shift

We now turn to the second of our cases of "shifts." The preservation schema for "+ 1" shifts was given in (8) above and is repeated here.

(29) *Stress preservation under "+ 1" shift*

$\sigma_0\ (\sigma_1\ L_2) \ldots \quad \Rightarrow \quad \sigma_0\ (\sigma_1\ L_2\ \sigma_3) \ldots$

One of the cases of suffixation yielding the "+ 1" effect was (5b) above, repeated in (30).

(30) *"+ 1" shift*

$\ldots\ \sigma_{n-1}\ \sigma_n)$
$\qquad\qquad + L\ \ \sigma) \quad \Rightarrow \quad \ldots (\sigma_{n-1}\ L\ \sigma)$

In general, the type of suffixation illustrated in (30) is, however, inapplicable to (29), which is only relevant to non-rightmost feet. However, if the foot to the left of the suffix is trisyllabic, then (30) *will* become relevant, since the "+ 1" shift of the right-hand boundary will necessarily propagate to the left-hand one, producing the effect of (29) word-internally. This happens in (31), where the sequence Lσ) is *icϕ*), attached by σ-overlap to the already maximal foot (*σlogy*). Preservation obtains as predicted.

(31) . . .*σlogic*

a. $\ldots \sigma_0\ (\sigma_1\ L_2)(\sigma$ lo gy$) \Rightarrow \ldots \sigma_0\ (\sigma_1\ L_2\ \sigma)($lo gi c$\phi)$

b. bac(*tè*rio)(lógic), epi(*dè*mio)(lógic), e(*pì*stemo)(lógic), phe(*nò*meno)(lógic)

Note that some of the binary feet that serve as the input to (31a) are themselves the result of earlier preservation, e.g. *phe(nòme)nólogy* of (27) above.[7]

Beside the cases already noted, the "+ 1" effect also occurs concomitantly with the "–1" of (5c) above, in the manner illustrated by (32).

(32) *"+ 1" shift (concomitant with "–1")*

$\ldots)(H_{n-1}\ \ \sigma_n)$
$\qquad\qquad +(\text{Foot}) \Rightarrow \ldots H_{n-1})(\text{Foot}) \ldots$

7 Note, too, that the examples in (31) are at the same time also instances of non-preservation of the stress on the syllable immediately preceding *lógic*, due to its adjacency to the other stress.

The "−1" effect of (32) is due to the overlap between the added foot and the suppressed final syllable of the stem. Since the penultimate syllable of the stem is heavy, it will be preceded by a boundary prior to suffixation, and followed by one after suffixation, resulting in the "+1" shift. The configuration of (32) arises when suffix *ory* is attached to verbs in *ate*, yielding the *atory* class of adjectives. The cases relevant to stress preservation are given in (33), and indeed pattern as expected.[8]

(33) . . .*atory*

a. $\sigma_0\ (\sigma_1\ L_2)\ (\text{a: t}\phi) \Rightarrow \sigma_0\ (\sigma_1\ L_2\ \text{a})\ (\text{tory})$

b. ad(*jú*dica)(tòry), al(*lé*via)(tòry), an(*tí*cipa)(tòry), ar(*tí*cula)(tòry), ca(*pí*tula)(tòry), con(*cí*lia)(tòry), con(*grá*tula)(tòry), cor(*ró*bora)(tòry), de(*pré*cia)(tòry), dis(*crí*mina)(tòry), e(*já*cula)(tòry), e(*lí*mina)(tòry), hal(*lú*cina)(tòry), in(*crí*mina)(tòry), inter(*mé*dia)(tòry), i(*ní*tia)(tòry), in(*tí*mida)(tòry), in(*vés*tiga)(tòry), ma(*ní*pula)(tòry), ne(*gó*tia)(tòry), par(*tí*cipa)(tòry), pro(*pí*tia)(tòry), re(*cí*proca)(tòry), recon(*cí*lia)(tòry), re(*crí*mina)(tòry), re(*mú*nera)(tòry), re(*tá*lia)(tòry)

In contrast to the above cases, those in (34) predictably fail to preserve the stress(es) of the stem (italicized).

(34) *Predicted remetrification*

a. . . .*ologic* (compare (31))
(*è*ndo)(crì*no*)(lógic), (*pà*ra)(sì*to*)(lógic), (*pà*le)(òn*to*)(lógic), (*mè*te)(ò*ro*)(lógic)/(*mè*teo*ro*)(lógic), *oph*(thàl*mo*)(lógic), *la*(rỳn*go*)(lógic)

b. . . .*atory* (compare (33))
com(pénsa)(tòry), *con*(físca)(tòry), *ex*(cúlpa)(tòry), *in*(cúlpa)(tòry), *ob*(fúsca)(tòry)

The reasons for the remetrifications in (34) are the usual ones, that is non-existence of monosyllabic feet, and non-existence of feet ($\sigma H \sigma$).[9]

8 However, since we know that heavy syllables preceding *ory* attract stress (*re*(*fécto*)*ry*; see 4.2.2 above), we might expect ...(*a:to*)*ry* – an attested variant in British English. We return to this case and the special status of long vowels below, especially 10.3.
There are also some unexplained exceptions to stress preservation, however, like *in*(*térro*)(*gàte*) → (*ìnter*)(*róga*)(*tòry*), as well as the ...*ficatory* class, further noted in fn. 19 below.

9 The case (*mástutba*)*tòry* is like (*òpportu*)*nístic* in involving a syllable closed by a sonorant which functions as a light one under stress preservation – a common pattern, as noted in 3.4.

Note that the loss of stress on the *a* of *a:te* in American *a(tòry)* also constitutes a predicted remetrification, given the stress on the next syllable. In contrast, the British metrification *(á:to)ry* (with a long *a*) preserves the stress of *a:te* as in *an(tíci)(pàte)* → *an(tìci)(pá:to)ry*. This difference follows from the general extrametricality of *ry* in British English, noted in 3.6 above. The British alternation thus constitutes a case of "0" shift parallel to that of *(à:te*/*(á:tion* (of (40) below) in both dialects.

6.3.3 Preservation under "0" shift

The third type of relevant "shift," which is in fact no shift, has two subcases, one given in (35), which repeats (9) above.

(35) *Stress preservation under "0" shift (ternary foot)*
σ_0 (σ_1 L_2 σ_3) ⇒ σ_0 (σ_1 L_2 σ_3)(Foot)

The prediction stated in (35) is fulfilled by the cases in (36), where we recall (3.2) that verbs in *fy* do not have final stress.

(36) . . *.fication*
a. σ_0 (σ_1 L_2 fy) ⇒ σ_0 (σ_1 L_2 fi)(cation)
b. per(*sò*nifi)(cátion), i(*dèn*tifi)(cátion), ce(*mèn*tifi)(cátion), a(*cì*difi)(cátion), hu(*mì*difi)(cátion), in(*tèn*sifi)(cátion), e(*lèc*trifi)(cátion), in(*dèm*nifi)(cátion), e(*xèm*plifi)(cátion), sac(*chà*rifi)(cátion), so(*lì*difi)(cátion), syl(*là*bifi)(cátion)

Another instantiation of (35) is provided by cases in *bility*, in which *ity* is concatenated with a formerly extrametrical *ble*, to give rise to a full foot, as in (37).

(37) . . *.bility*
a. σ_0 (σ_1 L_2 σ_3) ble ⇒ σ_0 (σ_1 L_2 σ_3)(bility)
b. as(*sì*mila)(bílity), com(*mèn*sura)(bílity), com(*mù*nica)(bílity), de(*cì*phera)(bílity), de(*mò*lisha)(bílity), de(*pò*sita)(bílity), de(*tèr*mina)(bílity), de(*vè*lopa)(bílity), dis(*rè*puta)(bílity), dis(*tìn*guisha)(bílity), de(*lì*vera)(bílity), re(*cò*vera)(bílity), in(*còr*rigi)(bílity), so(*lì*cita)(bílity)

The case in (38), in which a formerly extrametrical *ive* comes to form a foot with *ity* is also quite parallel to (37).

(38) . . .*ivity*

a. $\sigma_0\ (\sigma_1\ L_2\ \sigma_3)$ ive $\Rightarrow$ $\sigma_0\ (\sigma_1\ L_2\ \sigma_3)$(ivity)

b. as(*sò*cia)(tívity)

The second subcase of "0" shift involves preservation of a binary foot as in (39), which repeats (10) above.

(39) *Predicted Stress Preservation under "0" shift (binary foot)*

$\sigma_0\ (L_1\ \sigma_2)\ \ldots \Rightarrow \sigma_0\ (L_1\ \sigma_2)\ \ldots$

One of the cases of suffixation that will produce this "0" shift has the structure of (40) and occurs concomitantly with a "+1" shift of the Rightmost Foot Boundary.

(40) *"0" shift (concomitant with "+1")*

$\ldots)(\mathrm{H}_{n-1}\ \mathrm{L}_n) + \sigma) \Rightarrow \ldots)(\mathrm{H}_{n-1}\ \mathrm{L}_n\ \sigma)$

In (40), although the rightmost boundary shifts to the right, the more internal one does not. The reason is the exclusion of σ(Lσ) word-finally, in contrast to the well-formedness of (σLσ). The *a:tion* cases in (41) below represent exactly this type of case, if we suppose the *i* of *ion* in fact spells out the null V of *a:te*. (Alternatively, we may take a suffix *ion* to overlap with the final null vowel of *ate*, hence not quite as in (40), but still instantiating (39), equivalently.)

(41) . . .*ation*

a. $\sigma_0\ (L_1\ \sigma_2)$(a: t$\phi$) $\Rightarrow$ $\sigma_0\ (L_1\ \sigma_2)$(a: ti o)n

b. ac(*cè*le)(rá:tio)n, ac(*cù*mu)(lá:tio)n, af(*fì*li)(á:tio)n, ap(*prè*ci)(á:tio)n, ap(*prò*pri)(á:tio)n, ar(*tì*cu)(lá:tio)n, as(*sà*ssi)(ná:tio)n, as(*sì*mi)(lá:tio)n, ca(*pì*tu)(lá:tio)n, col(*là*bo)(rá:tio)n, com(*mè*mo)(rá:tio)n, com(*mì*se)(rá:tio)n, com(*mù*ni)(cá:tio)n, con(*cì*li)(á:tio)n, con(*fè*de)(rá:tio)n, con(*glò*me)(rá:tio)n, con(*tà*mi)(ná:tio)n, cor(*rò*bo)(rá:tio)n, con(*sò*li)(dá:tio)n, de(*bì*li)(tá:tio)n, de(*fò*li)(á:tio)n, de(*gè*ne)(rá:tio)n, de(*lì*be)(rá:tio)n, de(*tè*rio)(rá:tio)n, de(*là*pi)(dá:tio)n, de(*prè*ci)(á:tio)n, dis(*crì*mi)(ná:tio)n, di(*sìn*te)(grá:tio)n, dis(*sì*mi)(lá:tio)n, dis(*sò*ci)(á:tio)n, e(*là*bo)(rá:tio)n, e(*lì*mi)(ná:tio)n, e(*lù*ci)(dá:tio)n, e(*quì*vo)(cá:tio)n, e(*rà*di)(cá:tio)n, ex(*trà*po)(lá:tio)n, fa(*cì*li)(tá:tio)n, hal(*lù*ci)(ná:tio)n, hu(*mì*li)(á:tio)n, in(*crì*mi)(ná:tio)n, ges(*tì*cu)(lá:tio)n, in(*sì*nu)(á:tio)n, in(*tì*mi)(dá:tio)n, ma(*nì*pu)(lá:tio)n, par(*tì*ci)(pá:tio)n, pre(*cì*pi)(tá:tio)n, pro(*lì*fe)(rá:tio)n, re(*frì*ge)(rá:tio)n, re(*gè*ne)(rá:tio)n, re(*mù*ne)(rá:tio)n, re(*pà*tri)(á:tio)n, re(*tà*li)(á:tio)n, vi(*tù*pe)(rá:tio)n

The relevance of the cases in (41) stems from the fact that we are associating the (non-exhaustive) internal binaries of (*à:te* verbs, or "Strong Retraction," with the presence of a weak final foot (3.7.3 above). Since, in contrast to (*à:te*, (*á:tion* is not a weak foot (witness its primary stress) all of (41b) provide evidence of preservation.

In contrast to (41), the very few cases of (*à:te* verbs that exhibit a ternary internal foot, such as *óxygenà:te*, *péregrinà:te*, *térgiversà:te*, yield a ternary in the corresponding noun in (*á:tion*, as in (42), further confirming the preservation effect.

(42) *Predicted ternary feet*
(òxyge)(ná:tio)n, (*pè*regri)(ná:tio)n, (*tè*rgiver)(sá:tio)n

In further contrast, the few cases that have stress on the syllable preceding *a:te* (sometimes only as a possible variant) are predictably remetrified in the corresponding *á:tion* noun, as in (43).[10]

(43) *Predicted remetrification* (compare (41), (42))
(à*dum*)(brá:tio)n, (ìn*cul*)(cá:tio)n, (dè*fal*)(cá:tio)n, (ìm*preg*)(ná:tio)n, (dè*lec*)(tá:tio)n

The case in (44), involving the suffix *an* and a stem in *ary* is structurally quite parallel to (41).

(44) . . .*arian*
a. σ_0 (L_1 σ_2)(a: ry) $\Rightarrow$ σ_0 (L_1 σ_2)(a: ri a)n
b. he(*rè*di)(tária)n

In contrast to preservation of the binary in (44), the items in (45) exhibit preservation of an (exceptionally) ternary foot from the corresponding items in *ary*, thus being correspondingly parallel to (42).

(45) *Predicted ternary feet*
(dìscipli)(nárian), (*vè*teri)(nárian)

And, in contrast to (44)–(45), we find the predicted remetrification in (46).

10 Recall that we presume no stress on *a:te* in *a*(*dúmbra:*)*te*, etc. (see 3.2 above).

(46) *Predicted remetrification*
(pàrlia*men*)(tárian)

The cases in (48), (49) below instantiate a further case of "0" shift – that of (47), which repeats (5a) above, and involves a monosyllabic suffix with syllable overlap.

(47) *"0" shift*
$\ldots \sigma_{n-1}\, \sigma_n) + \sigma) \Rightarrow \ldots \sigma_{n-1}\, \sigma)$

(48) . . .*oidal*
a. $\sigma_0\ (L_1\ \sigma_2)$(oi d$\phi$) $\Rightarrow$ $\sigma_0\ (L_1\ \sigma_2)$(oi da)l
b. bac(*tè*ri)(óida)l

(49) . . .*cidal*
a. $\sigma_0\ (L_1\ \sigma_2)$(ci: d$\phi$) $\Rightarrow$ $\sigma_0\ (L_1\ \sigma_2)$(ci: da)l
b. bac(*tè*ri)(cí:da)l

6.3.4 Synopsis

In the last two subsections, we made a systematic attempt to identify stem–suffix combinations relevant to testing for stress preservation. The chart in (50) below gives a synoptic summary of the relevant cases, citing the number of instances of each.[11]

11 Alongside of the cases summarized in (50), in which stress preservation overrides exhaustiveness, we may also note those in (i) in which both are satisfied (those in (b) preserve the *secondary* stress of the stem).

(i) a. (àrti)(*fì*ci)(álity), (indi)(*vì*du)(álity)
b. (*àn*thropo)(lógic), (*crì*mino)(lógic), (*gỳ*neco)(lógic), (*àr*cheo)(lógic), (*clì*mato)(lógic), (*mì*nera)(lógic)
c. (ádula)(tòry), (ádvoca)(tòry), (ámbula)(tòry), (cálcula)(tòry), (cástiga)(tòry), (círcula)(tòry), (cónsecra)(tòry), (cópula)(tòry), (dédica)(tòry), (délega)(tòry), (dépreca)(tòry), (éscala)(tòry), (éxpia)(tòry), (fórnica)(tòry), (média)(tòry), (mítiga)(tòry), (módula)(tòry), (régula)(tòry), (óvula)(tòry), (prédica)(tòry), (spólia)(tòry), (stímula)(tòry), (stípula)(tòry), (términa)(tòry), (úndula)(tòry), (válida)(tòry), (véntila)(tòry), (víndica)(tòry)
d. (fòrtifi)(cátio)n
e. (mànagea)(bílity)

Note that the cases in (ic) are in fact still relevant to establishing preservation since here we would otherwise expect a binary foot (Strong Retraction) preceding the final weak one.

(50)

I	*"–1" shift*				
	a.	di(vísible)	⇒	di(vìsi)bílity	5
	b.	me(dícina)l	⇒	me(dìci)nálity	8
	c.	fa(mília)r	⇒	fa(mìli)árity	4
	d.	su(pério)r	⇒	su(pèri)órity	3
	e.	re(lígiou)s	⇒	re(lìgi)ósity	5
	f.	an(tágonis)t	⇒	an(tàgo)nístic	5
	g.	en(thúsias)t	⇒	en(thùsi)ástic	2
	h.	na(póleo)n	⇒	na(pòle)ónic	2
	i.	ex(pédien)t	⇒	ex(pèdi)éntial	2
	j.	co(ínciden)t	⇒	co(ìnci)déntal	2
	k.	bac(tériu)m	⇒	bac(tèri)óid	1
	l.	bac(tériu)m	⇒	bac(tèri)cí:de	1
	m.	phe(nómeno)n	⇒	phe(nòme)nólogy	2
II	*"+1" shift*				
	a.	phe(nòme)nólogy	⇒	phe(nòmeno)lógic	4
	b.	ar(tícu)là:te	⇒	ar(tícula)tòry	27
III	*"0" shift (ternary foot)*				
	a.	per(sónify)	⇒	per(sònifi)cátion	12
	b.	as(símila)ble	⇒	as(sìmila)bílity	14
	c.	as(sócia)tive	⇒	as(sòcia)tívity	1
IV	*"0" shift (binary foot)*				
	a.	ac(céle)rate	⇒	ac(cèle)rá:tion	53
	b.	he(rédi)tary	⇒	he(rèdi)tárian	1
	b.	bac(téri)oid	⇒	bac(tèri)óidal	1
	c.	bac(téri)cide	⇒	bac(tèri)cí:dal	1

The number of instances found, over 150, while not very large in absolute terms, is nonetheless significant. The reason is that it is the result of a rather systematic (though less than fully exhaustive) search, and that it contrasts very sharply with the number of counterexamples found, which is virtually null aside from cases with long vowels that we note just below, and the few cases of fn. 8. The reason why the number is not larger is that, as our analysis predicts, stress preservation is detectable only under rather specific circumstances, which are relatively rare.

Cases in which stress preservation is contingent on a long vowel, like *aspí:re/áspirant*, represent systematic exceptions to stress preservation, and will be dealt with in 10.3 below, where we revise the analysis of vowel length we gave in chapter 5.

The conclusion we are therefore reaching is that preservation of stress in word-formation is totally regular. As noted in 5.0, what is crucial in reaching it is the shift from the naive expectation that *any* stem stress may be preserved to the more structured one that only those that correspond to well-formed feet may be. The exact definition of well-formed feet then obviously becomes crucial.

We need to note here that we differ from past discussions not only by the analysis, but also by our assessment of the facts, which is partly theory-driven. For instance, most of our predecessors regularly followed *SPE* (p. 116) in regarding the prominence of syllables like the second one of *conDENsation* as due to stress, apparently preserved from *condénse*. We take a different view (concurring instead with Fudge 1984, p. 216). We regard the prominence of that syllable as indeed related to stress, but only indirectly. Specifically we take *DEN* in *conDENsation* to have an unreduced vowel via preservation of vowel quality (rather than stress) from *conDENse*, where that same vowel is stressed and hence unreduced. We presume segmental quality can be preserved in a manner rather parallel to stress, under specific conditions of its own, whose exact nature, however, will not be addressed in this study. It is exactly this type of case which underlies the view of Halle and Kenstowicz (1991) that stress preservation is idiosyncratic, and subject to "lexical conditioning," as we can see by considering the variation in (51).

(51) a. còmp*o*néntial, còmm*u*nálity, àntec*e*déntal, ànthrop*o*lógic, artìcul*a*tóry
  b. càt*a*stróphic, ìnt*e*rnálity, ìnf*o*rmátion, èxt*e*rnálity, ùniv*e*rsálity, àd*a*ptátion, àff*i*rmátion, còmp*e*nsátion, cònf*i*rmátion, còns*e*rvátion, còns*u*ltátion, cònv*e*rsátion, cèm*e*ntátion, fràgm*e*ntátion, làm*e*ntátion, près*e*rvátion, trànsp*o*rtátion, ùs*u*rpátion
  c. ìmm*o*rtálity, ìnf*o*rmálity, ìnstrum*e*ntálity, sèntim*e*ntálity, àcc*e*ptátion, àff*e*ctátion, àtt*e*státion, cònd*e*mnátion, cònd*e*nsátion, èxp*e*ctátion, èx*i*sténtial, pròpag*a*ndístic

All of the cases in (51) have a stem stress on the italicized vowel, which is in an open syllable in (a), and in a closed one in (b, c). That vowel is reduced in (a, b), which we take to imply no stress, and unreduced in (c). As we argued above, perceptual evidence is ambiguous as to whether or not stress is involved in (51c), however, the only clear fact being just the unreduced vowel. More theory-internal evidence then becomes relevant. Since stress preservation must be involved in (50) (given the unreduced vowels even in open syllables, e.g. *meDIcinálity*), it is unlikely to be also involved in (51), since the former exhibits no variation, unlike the latter. This fact then suggests redrawing the traditional classificatory lines, treating only (50) as stress preservation, and the more variable, syllable-, and perhaps segment-dependent (51) as something else, specifically as preservation of segmental properties. As we argued in 4.4, the facts in (51) are interpretable in terms of a plausible theory of vowel reduction, a phenomenon systematic in unstressed open syllables, whence (51a), but unsystematic in closed ones, whence the contrast between (51b) and (51c). Non-reduction in (51c) can still be related to stress, but now only in the indirect way just discussed, an effect often overcome by the other factors at work, whence (51b).[12]

The above discussion has not dealt with the noted observation of Kiparsky (1979) that cases like *tòtàlitárian*, *sènsàtionálity* preserve not only the formerly primary stress, but also the relative prominence of the first two syllables. Here, our interpretation will be somewhat different from Kiparsky's. We suppose that, in these cases, the relative weakness of the initial stress compared with that of the second syllable is simply due to the inital foot being weaker than the second because of the null syllable, as in *(ϕtò:)(tàli)tárian*, hence just as in underived *(ϕtì:)(cònde)róga*, also discussed by Kiparsky. As for the other variant of the latter word Kiparsky cites, with a more prominent first syllable, we

12 Note too that preservation effects such as those of (50) have been established for a number of other languages, as illustrated in (i)–(iii), in which the stress of (b) bears resemblance to that of the morphologically related item in (a) and differs from that of the "underived" item in (c).

(i)	*Italian* (Vogel and Scalise 1982)		
	a. sensíbile sensitive	b. sensìbilménte sensitively	c. tèmperatúra temperature
(ii)	*Chamorro* (Chung 1983)		
	a. inéNNulu? peeping	b. inèNNuló?ña their-peeping	c. pùtamunéda wallet
(iii)	*Indonesian* (Cohn 1989)		
	a. bicára speak	b. məmbicàrakànña speak-about-it	c. xàtulistíwa equator

In contrast, we know of no case of preservation that results in adjacent stresses like those of the traditional interpretation of (51c).

attribute it to the parsing *(tì:conde)róga*, where the syllable closed by a sonorant functions as light – a behavior encountered elsewhere, though more frequently with derived items, e.g. *(òpportu)nístic*, *(pàtenta)bílity*. In sum, we see no *further* preservation effect in this domain along the lines suggested by Kiparsky.

6.4 Consequences

6.4.1 Stress preservation and stress-checking

The observations of the previous section 6.3 have a number of consequences, the most immediate of which are those in (52).

(52) a. There is preservation of stress in word-formation.
b. The binary/ternary foot typology on page 165 above is correct.

The existence of stress preservation further supports the proposed general organization based on underlying stress and stress-checking. The reason is that, if metrical structure is present underlyingly, its preservation in word-formation is expected, since it is plainly the case that lexical structure in general is preserved. For instance, in the adjective *napoleonic*, both the segmental and the semantic structure of the stem *napoleon* is preserved in fundamental ways. That preservation reflects the general organization of the lexicon, evidently based on "recycling," or multiple uses, of existing substructures. From our perspective, existence of stress preservation is thus quite unsurprising. It merely indicates that stress is like everything else – surely the null hypothesis. We have seen that stress preservation is possible only under specific conditions, but this does not break the parallelism with other aspects of lexical representation. For instance, in *electri*[s]*ity* the [k] of *electri*[k] is *not* preserved, and in general it is clear that segmental structure too, while fundamentally preserved, undergoes readjustments in word-formation, subject to its own specific conditions.

In sum, our approach based on underlying stress would require specific stipulation if stress were *not* preserved. In contrast, for an approach based on stress assignment by rule, the opposite will be true. That is, within that approach one *can* express the fact that there is stress preservation, but only by special stipulation. The reason is that a rule system in which there is no preservation, and stress is assigned to derived and underived items in exactly the same fashion, would be straightforward, and in fact simpler than one in which there is preservation.

The specific conditions under which stress preservation seems possible also support our model, and stress-checking in particular. Stress-checking explains directly why the conditions of stress preservation are virtually identical to the conditions under which stress is assigned in general.[13] In a rule-based system there is no reason for this near-identity. That is, there is no reason why integration of new metrical structure with the old should mimic simple stress assignment, for instance in excluding adjacent stresses, e.g. **phenòmenológic*, and in excluding ternary feet ($\sigma H \sigma$), e.g. **cómpensatòry*. Rather, on that approach, the exact conditions for integration must be stipulated independently of the conditions for constructing feet in general.

In the above connection, consider that Hayes (1985a, p. 159), noting the restressing of *párent* → *paréntal*, states that "the English Stress Rule inflicts the minimum change . . . compatible with its conditions, deleting earlier structure where necessary." In contrast to this, he attributes different properties to the rule of "Strong Retraction," which (p. 169) "cannot delete older structure." Descriptively, of these two statements, the first is quite correct. That is, rightmost feet (attributed to the ESR in Hayes' system) never exhibit preservation effects (aside from the "neutral" suffixes, which we put aside here).[14] In our system, there is an explanation for this fact: in word-final position there is no metrical indeterminacy between $\sigma(L\sigma)$ and $(\sigma L\sigma)$ of the type that arises non-finally. This can be established quite independently of any analysis of stress preservation, based on the non-existence of items like **ame(ríca)* (on *vanilla*, etc.; recall 3.3). There is therefore no need to stipulate this as a property of the "ESR." The second of Hayes' statements is only partially correct. Older structure is in fact routinely deleted if it would give rise to impossible feet as noted.[15] Hayes' stipulation that non-rightmost feet are built preserving older structure would thus have to be suitably modified. Aside from this, we have two stipulations, one for each of Hayes' stress rules, stating whether or not the

13 Those conditions could not be quite identical, since that would make stress preservation undetectable. The difference is represented by the set of conditions in (4) on page 166, operative in non-derived items, but superseded by stress preservation in derived ones.

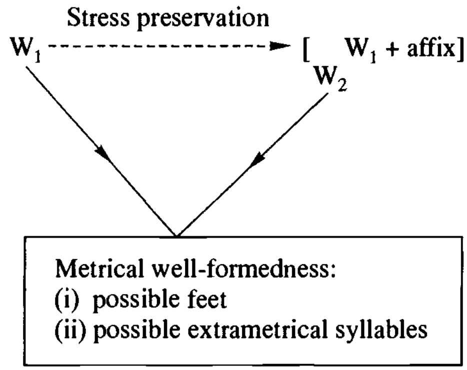
14 Note that while Hayes' reference to "minimum change" might suggest some preservation, there is in fact none, since his rule (like our system) sets a deterministic relation between syllables and stresses, constructing feet $(H)/(\sigma L \sigma)$.

15 Hayes notes the preservation of *sequéster/sequéstra:te*, which may suggest monosyllabic feet. Recall, however, that we analyze the latter item as *se(quéstra:)te* (fn. 10 above).

rule respects earlier stresses. This contrasts with no stipulation at all within our account since the exact scope of stress preservation is defined by the range of feet available non-finally, established on totally independent grounds as noted.

The overall organization we are assuming is thus as illustrated in (53).

(53) a. Lexicon:



b. Conditions on derived structure:

In this system, the stress preservation of (53a) holds as a condition on word-formation. Furthermore, all words, derived and underived, are subject to the same set of well-formedness conditions of (53b). These include a definition of the range of possible feet, and a definition of possible extrametrical syllables (weak syllables). Recall that those well-formedness conditions have overriding power over the preservation constraint in (53a), so that whenever they demand, remetrification rather than stress preservation will occur. Note that there is no real derivational sense to our notion of "remetrification" here. In this model, metrical structure is not compiled procedurally, but only verified, so that, in underlying representation, it simply *is*. Hence "remetrification" refers – euphemistically – to a metrical structure which is different from that of the corresponding stem.

In addition to the conditions indicated, (53b) will also contain a set of ancillary conditions – the ones in (4) on page 166 above, including exhaustiveness and "Strong Retraction." These must be differentiated from the others, however, since, as we have seen, stress preservation has the ability to override them, while it is itself overridden by the more central conditions of (53b).

It is worth noting that the overall organization in (53) still bears important similarities with the traditional conception of the "cycle." The reason is that inherent in both conceptions is the notion that the outcome of each individual step of word-formation, that is the result of each operation of affixation, is required to be a well-formed word, undergoing appropriate readjustments to that end. The difference is in the characterization of the readjustments and other observed regularities: by rule in one case, by conditions on derived structure in the other. As we noted, the rule-based characterization turns out to be too rich, permitting unwanted options. For instance, since the traditional cycle contemplates both cyclic and post-cyclic rules, nothing would exclude the possibility that stress could simply be *post*-cyclic, resulting in no preservation at all. Furthermore, as we also noted, the exact conditions for integrating metrical structures built on different cycles would not automatically reduce to more general conditions, requiring a separate statement, of an apparently arbitrary character.

Since it may seem improbable that, while stress is organized along the lines of (53), other aspects of representation, say those concerning segmental structure, could still be organized along the lines of the traditional rule-based cycle, our commitment to (53) prompts an attempt to reanalyze other phenomena along the same lines as well, displacing the rule-based approach more systematically. While a full-scale attempt to do so is clearly beyond the scope of this work, we are explicitly reinterpreting the workings of vowel reduction in the terms of (53), as discussed above. Specifically, we suppose that the conditions for vowel reduction are indeed defined as output conditions, and that vowel reduction, like stress, is a fact of the underlying representation of words. Like stress, vowel reduction in morphologically derived items thus also results from a tension between two constraints: a preservation constraint, imposing sameness of reduction across morphologically related words, and a set of well-formedness conditions on all words. As already noted, the latter conditions will require that unstressed vowels be reduced when they are in open syllables, and variably reduced or not in closed ones, as discussed in 4.4. The exact nature of the variation remains partly unclear just as in previous theories, but we now suppose the preservation effect contributes to that variation, whence contrasts like *cònd*[e]*nsátion*/*còmp*[ə]*nsátion*, the former item preserving the full vowel of *cond*[é]*nse*, while the latter similarly mirrors *cómp*[ə]*nsàte*. We will see in chapter 10 that the interaction of vowel length and affixation can be accounted for along the same general lines.[16]

16 Note that even such paradigm examples of rule systems as employed in Bromberger and Halle's (1989) defense of rule-based phonology can be straightforwardly reinterpreted

6.4.2 Stress preservation versus the "Stress Erasure Convention"

As we just noted, within a rule system, the fate of stem stresses in derived words must be stipulated, since either non-preservation or preservation under a variety of conditions are conceivable. HV (p. 83) do so by means of (54), which sanctions that earlier stresses are in fact never preserved.

(54) *Stress Erasure Convention*
In the input to the rules of cyclic strata . . .
information about stresses assigned on previous passes
[through the cyclic rules] is erased.

along the text lines. Bromberger and Halle (following *SPE*) note the following configuration of data in two sets of Canadian dialects A, B:

(i)	A	B
a.	r[ayD]ing	r[ayD]ing
b.	wr[ʌyt]	wr[ʌyt]
c.	wr[ʌyD]ing	wr[ayD]ing

That is, both dialects flap both /t/ and /d/ intervocalically, as in (ia) *riding* and (ic) *writing*. In addition, both raise /ay/ to [ʌy] before voiceless consonants, as in (ib) *write*. However, in dialects B voicing/flapping in *writing* prevents raising, while in dialects A, it does not, the underlying /t/ still triggering raising despite its realization as [D]. This seems to require ordered rules, the two groups of dialects differing as in (ii), where (a) is ordered before (b).

(ii)	A	B
a.	Raising	Flapping
b.	Flapping	Raising

An account based on output conditions is equally possible, however. Suppose both Raising and Flapping are stated as well-formedness conditions applying in the appropriate environments. Both (ia, b) will then follow. For (ic), we suppose further that there is a preservation condition in word-formation of the type proposed in the text, so that *writ-ing* tends to maintain the structure of *write*, which has a raised diphthong as in (ib). Preservation and Raising are now in conflict in (ic), since the former would impose [ʌy], while the latter would impose [ay] (because the conditions for Raising are not met). The difference between the two sets of dialects can now be expressed by ranking the two conditions differently, as in (iii), where (a) ranks above (b).

(iii)	A	B
a.	Preservation	Raising
b.	Raising	Preservation

Hence in dialects A *writing* preserves the raising of *write*, while in dialects B it does not. Flapping is evidently ranked above Preservation in both sets, since *writing* never preserves the [t] of *write*.

In sum, once our text approach is taken into account, what seemed like a perfect argument for ordered rules disappears.

The output of (54) is, however, corrected by another device: HV's (p. 46) rule of "Stress Copy," given in (55a), whose effects are illustrated in (55b) (which partially repeats (24) of chapter 4).

(55) a. *Stress Copy*
Place a line 1 asterisk on an element that has stress on any metrical plane.

b.

	line 3			*		
	line 2	*		*		
FINAL GRID:	line 1	*	*	*		
	line 0	*	*	*	*	
		con	den	sa	tion	
						start of cycle
	. . .					
						end of cycle
		0	0	2	0	
Stress Copy (46)			1			
Alternator (5a–c)		1				
Line 2 unbd. const. (39)				3		
Stress enhancement (38)		2				
						end of post-cycle

The "metrical plane" referred to in (55a) is the representation at the end of a "cycle." The item in (55b) is taken to have a stress on the second syllable at the end of the inner cycle, relative to *condénse*. The rule in (55a) can thus reintroduce that stress at the post-cyclic level of derivation, after (54) had in fact removed it. Stress Copy is regarded as applying only idiosyncratically, since it must fail in cases derivationally parallel to (55b), like those of (51a, b) above, which have a reduced vowel. From our point of view, this account is unsatisfactory for the reasons described in (56).

(56) a. There is no deeper reason for "Stress Erasure" as in (55).
b. There is no deeper reason for "Sress Copy" as in (56).
c. Stress Erasure and Stress Copy are partially redundant: one erases stresses, the other reinstates them.
d. This system is both too weak and too strong. Under certain conditions, earlier stresses are *always*, rather than just idiosyncratically, preserved – (50) above. Under other structural

conditions, earlier stresses are *never* preserved, not even idiosyncratically – (51) above.

In (56), (a–c) are conceptual liabilites, (d) an empirical one. In principle, there would be two different ways to correct the latter. One is to build the appropriate conditions into Stress Copy, supposing that stresses are always copied under those conditions (i.e. when they correspond to well-formed feet in our sense); the other is to build conditions into Stress Erasure, that is to suppose that the latter erases stresses only under the complementary conditions (i.e. when they do *not* correspond to well-formed feet in our sense). Of these alternatives, the latter would be preferable, because, unlike the former, it would eliminate Stress Copy, hence overcoming not only (56d), but (b, c) as well (although neither would relate the conditions of stress preservation to the general conditions on well-formed feet). However, the latter – more desirable – approach to correcting (56) can in fact *not* be taken, because of other characteristics of the analysis, specifically "Stress conflation," discussed in 3.7, and illustrated again in (57).

(57)

	line 2			*			
FINAL GRID:	line 1	*		*			
	line 0	*	*	*	*	*	
		se	ren	di	pi	ty	
							start of cycle
Extrametricality (19)		0	0	0	0	-	
Accent rule (11)			1				
Alternator (5a–c)		1		1			
Line 1 unbd. const. (5d–f)				2			
Stress conflation (5g)		0	0	2			
							end of cycle
Extrametr. revoked						0	
Alternator (5a–c)		1			1		
Stress deletion (33)					0		
							end of post-cycle

As we saw in 3.7.1, Stress conflation, applying at the end of each cycle, has the effect of eliminating all stresses except the rightmost. New stresses will then be assigned post-cyclically by the "Alternator," yielding the wanted secondaries. Qualifying "Stress Erasure" along the lines suggested, so as to allow, for example the stress of *medícinal* to be passed on to *medìcinálity*, would therefore not do, since "conflation," applying at the end of the first cycle, would erase it anyway. Therefore, none of the qualities in (56) is redeemable within a framework that has "conflation," and the only recourse seems to be further complicating the rule of "Stress Copy." Note in addition that there is a further problem related to conflation which can in fact *not* be corrected even by these further complications. It arises in the cases in (58), given in our analyses.

(58)	a.	ca(pítu)(làte)	⇒	ca(pìtu)(látio)n
	b.	phe(nòme)(nólogy)	⇒	phe(nòmeno)(lógicφ)

In these cases, what is preserved as a word-internal stress is one which is internal even in the source word. But that is precisely the kind of stress which conflation erases, as shown by the derivation in (59).

(59)

	line 3		*		
	line 2		*		*
FINAL GRID:	line 1		*		*
	line 0	*	*	*	*
		ca	pi	tu	la:te
start of cycle					
Extrametricality (19)		0	0	0	0
Accent rule (11)					1
Alternator (5a–c)		1	1		
Line 1 unbd. const. (5d–f)					2
Stress conflation (5g)		0	0		
end of cycle					
Alternator (5a–c)		1	1		
Line 2 unbd. const. (39)					3
Stress enhancement (38)			2		
Rhythm rule (21)			3		2
Stress deletion (33)		0			
end of post-cycle					

In (59), at the end of the cycle, there is no stress on the second syllable *pi*. Thus, for this particular class of cases, there can be no account of stress preservation at all in a system that has conflation. As we argued in 3.7, the need for "conflation" arises from an inadequate foot typology, in particular one that has monosyllabic feet (*H*). There are then two possible ways to avoid conflation. One is to stipulate that the rule that constructs such feet in rightmost position is non-iterative, and that a second rule takes over more internally to the word, which is essentially Hayes' system. The other way is to suppose that feet (*H*) are never possible, which is our system, requiring no stipulation. Once conflation is eliminated, the problem represented by (58) disappears, preservation of the stress of *medícinal* into *medìcinálity* becomes possible without requiring "Stress Copy," and the difficulties of (56b, c) are thereby eliminated, leaving only (56a, d). In turn, these reduce to the statement that stress is erased when it does not correspond to well-formed feet. If one then assumes stress-checking rather than assignment by rule, the latter statement is subsumed under the same apparatus needed for underived items, yielding our system, which has: no "conflation"; no "Stress Erasure Convention"; and no "Stress Copy."[17]

6.4.3 Stress preservation and ternary feet

Theories based on syllable extrametricality exclude ternary feet from the basic typology. As we noted in 2.6 and 3.7 above, in both Hayes' and HV's systems, cases like (*wìnnepes*)*sáukee* are derived from intermediate structures like (60a), resulting from application of the "Alternator." Stress-preserving cases like *medìcinálity* will now raise the question of how they could be correctly derived, given the comparable intermediate structure (60b).

(60) a. wìnnèpessáukee
b. mèdìcinálity

In Hayes' (1985a, p. 169) theory it is stipulated that Strong Retraction (= Alternator) "cannot delete older structure." If one extended that stipula-

17 Harris (1989) also argues against the "Stress Erasure Convention" (SEC). However, Halle, Harris and Vergnaud (1991) (HHV) reassert the existence of the SEC, reanalyzing the facts discussed in Harris (1989) and citing further evidence. The arguments in HHV seem quite correct. However, their conclusion that there must be a SEC is strictly contingent on general premises which we do not share, and their discussion leaves our text arguments quite unaffected. Whether the facts discussed in HHV can be dealt with within our framework is an interesting question, which we will not attempt to address here, however.

tion to the rule of "post stress destressing" (ibid., pp. 183f.), then the desired result *medícinàlity* would be attained since the rule of *pre*-stress destressing would be applying instead. In HV's system, the stress-preserving character of the latter type of case is not recognized, as we noted in 6.1 above. If it were, it would presumably have to be attributed to "Stress Copy," as with the case in (55) above. Aside from this, that system will be comparable to Hayes', in requiring some provision marking "older" stresses as not erasable.

A seemingly more adequate account of the cases in (60) is provided by the analysis of Halle and Kenstowicz (1991), briefly discussed in 3.7.4 above, which relies on left-to-right parsing for non-rightmost feet (constructed by non-cyclic application of the "Alternator"). The latter analysis, presupposing much of the HV framework, postulates application of Stress Copy to the second syllable of (60b). Subsequent application of the Alternator, which is presumed to abide by existing stresses, will yield *(me)(dìci)nálity*, contrasting with *(tàta)(ma)góuchi*. Deletion of all "degenerate" monosyllabic feet will then yield the right result in both of these cases. This apparatus may seem to work for the trisyllabic feet of the cases in (61) as well (which Halle and Kenstowicz do not specifically address).

(61) a. ar(tícula)tòry
b. phe(nòmeno)lógic
c. per(sònifi)cátion
d. as(sìmila)bílity

That is, comparable application of "Stress Copy" to the second syllable would seem to give the structure *(phe)(nome)(no)logic* after application of the Alternator, and the correct result after removal of the monosyllabic feet. There are still, however, two major difficulties with this account. One is that, as we noted in 6.4.2, Stress Copy is ineffective in retrieving the earlier stresses in (61a, b), since those stresses, being non-rightmost in the stem, are suppressed at the end of the first cycle by "conflation" (which Halle and Kenstowicz still presuppose). This problem extends in fact to all cases in which a non-rightmost stress is preserved, thus also to *accèlerátion*, etc., just as in the HV framework. The other difficulty arises with cases like (62a, b).

(62) a. ac(céle)ràte
b. (óxyge)nàte

Left-to-right parse here is clearly inadequate for (62a), since it would eventually yield *(*accele*)*rate*, like (*tatama*)*gouchi*. One would thus have to suppose that the "Strong Retraction" pattern, typical of verbs in *a:te* and other cases, consists of a *right-to-left* parse instead. The question then is what to do with the results of the right-to-left parse (*a*[k)(s]*ele*)*rate* and (*o*[k)(s]*yge*)*nate*. Plainly, to correctly yield (62a, b), destressing must apply to the first syllable in the first case, but to the second in the second case. Supposing, with Hayes (1985a, p. 169) that (62b) is a case of preservation from *óxygen*, one would have to conclude that the pattern of destressing under stress adjacency is in fact driven by preservation, requiring a special stipulation that older stresses are not erasable. But of course this is just the problem that arose for (60b) above, and that the left-to-right parse was supposed to solve. Thus, although now limited to a smaller subdomain, exactly the same problem of the HV analysis is still present here.[18]

The problematic character of the cases in (61) for theories that exclude ternary feet is also underscored by the fact that both Hayes' and HV's analysis accord those cases rather special treatments. Hayes (1982, p. 271) deals with the *atory* class of (61a) by taking the whole sequence *atory* to be extrametrical, so that the ESR will then correctly place main stress one or two syllables before that sequence (the stress on *ory* coming from the "Long Vowel Stressing" of 3.2 above, and final *y* being "syllabified late" in the manner discussed in 3.6 above). There is therefore no reliance on "preservation." HV's treatment of the same class is similar. It takes *atory* to be a "Stress domain," which essentially means that both *atory* and the preceding stem are stressed independently, as if they were separate words, hence *artícul* (compare *inhábit*), and *atóry* (compare *aróma*), followed by concatenation of the two partially metrified structures (and appropriate readjustments) to yield the correct form *artículatòry*. The limited adequacy of either account is evident in the exceptionality of the measures employed (there is no independent reason why *atory*, which consists of two suffixes, should either be extrametrical, or function like an independent word), and is stressed further by the fact that the phenomenon is in

18 Yet another difficulty would arise in cases like *compénsatòry*. A left-to-right parse respecting preservation on the initial syllable (from *cómpensàte*) would yield (*compen*)(*sa*)*tory* and ultimately **cómpensatòry*. Even supposing the "Accent rule" stresses the second syllable (recall 3.7.4) will not suffice, since there is no reason why the latter should win out over the initial stress.

fact not limited to any specific class, but is rather general, as shown by the other cases in (61), not considered in either analysis.[19]

In sum, the distribution of stress preservation confirms the correctness of the foot typology we are assuming, as stated in (52b) above, indicating in particular that ternary feet ($\sigma L \sigma$) exist. As noted early on, ternary feet imply that syllable extrametricality does not exist, lest the pattern *(*ámeri*) < *ca* > be incorrectly permitted.

6.5 Conclusion

In this chapter, we have argued that, while a certain kind of suffixation determines the position of the final stress, non-final stresses may remain true to the stem – a phenomeon which we termed "Weak Preservation." We have argued that the distribution of this phenomenon is predictable from the simplest possible assumption, namely that the foot conditions of (1) on page 165 above always hold, and that a principle of stress preservation exists.

We have further argued that this phenomenon supports our general perspective in various ways, specifically: in asserting the superiority of stress-checking over stress assignment by rule; in establishing the correctness of our foot typology; and in asserting the non-existence of a number of stress-removing devices, such as the "Stress Erasure Convention," "conflation," and other rules of "destressing."

19 There is, however, a residual problem for our own analysis of *atory* items, represented by the *ficatory* subclass in (i), corresponding to verbs in *fy*.

(i) cer(tífica)(tòry), clas(sífica)(tòry), indem(nífica)(tòry), jus(tífica)(tòry), pu(rífica)(tòry), os(sífica)(tòry), ve(rífica)(tòry)

Stress preservation, as well as exhaustiveness, would predict *(*cèrti*)(*fíca*)(*tòry*), etc. Hence we must stipulate for this class that the syllable *fi* must remain unstressed. The cases in (i) are also attested in the quadrisyllabic pattern of *cér.ti.fi.ca.tòry*. This pattern, not accounted for by previous analyses, is perhaps to be related to the one of *a.mè.ri.ca.ni.zátion*, discussed in 9.5 below.

In contrast to the cases in (i), the ones in (ii) have for us the expected preservation from the corresponding verbs *declaim*, etc.

(ii) de(cláma)(tòry), de(clára)(tòry), de(fáma)(tòry), ex(plána)(tòry), re(pára)(tòry), pro(fána)(tòry)

The case (*révoca*)(*tòry*) is exceptional in not preserving the stress of *revóke*; *de*(*róga*)(*tòry*) is normal in exhibiting "Strong Retraction" before a weak foot, while (*lábora*)(*tòry*) is exceptional in that respect, although near-syncope of the second syllable perhaps accounts for that exceptionality.

7 *The range of stress-"placing" suffixes*

7.1 Introduction

The thesis of the previous chapter that there is systematic preservation of stem stresses relied in part on factual observations of Fudge (1984; henceforth simply "Fudge"). In this chapter, we will consider Fudge's descriptive apparatus in detail, and argue that the factual generalizations it establishes readily translate into our analyses. We will first consider Fudge's classification of non-neutral suffixes in terms of the distance (of one, two, or more syllables) at which the suffix "places" main stress, and argue that Fudge's "distances" result from the suffix simply behaving like any comparable sequence of syllables – a standard assumption in much of the literature. We will then consider Fudge's claim that secondary stress is sometimes assigned "by suffix," as in *e(quìvo)(c-át-ion)*, in which *at* appears to place stress two syllables away, just as it does in *e(quívo)(c-àte)*. We will show that the phenomenon in question is just the stress preservation of chapter 6, possible in some cases, and predictably excluded in others.

Finally, preparing for our discussion of "stress-neutral" suffixes in chapters 8 and 9 (which will again rely on Fudge's detailed classification), we will consider suffixes that (in Fudge's terms) have a "mixed" behavior, being sometimes "stress-placing," as in *antágon-ist*, where the stress is a fixed number of syllabes from the suffix, and sometimes neutral, as in *américan-ist/propagánd-ist*, where the stress is rather that of the stems *américan/propagánda.* As implicit in the preceding remarks, we follow Fudge in using the term "suffix" for certain identifiable morphemes, regardless of whether or not the material that precedes them constitutes an independent word.

7.2 "Pre-stressed 1"

Fudge classifies suffixes which are not stress-neutral as in (1) (suffix italicized).

(1) *Non-Stress-neutral Suffixes (Fudge, pp. 40-133)*

a.	Pre-stressed 1	e.g. anatóm*ic*/militarísti*c*
b.	Pre-stressed 1/2	e.g. medícin*al*/parént*al*
c.	Pre-stressed 2	e.g. delíber*a:te*/démonstr*a:te*
d.	Pre-stressed 2/3	e.g. hélio*graph*/larýngo*graph*
e.	Auto-stressed	e.g. racket*éer*

As mentioned, the classification in (1) is based on the number of syllables between the suffix itself and the main stress, which is: always one syllable in (a); one syllable if heavy, and two otherwise in (b); always two syllables in (c); two syllables if the second is heavy, and three otherwise in (d); and zero syllables in (e), where the primary stress falls on the suffix itself. We begin with the class in (1a), reproducing Fudge's (p. 40) list in (2).

(2) erie, ic, id, ion, ish, itory, ity/ety, uble

It is obvious that the "stress placing" properties of the suffixes in (2) would follow from our foot typology, if we took their metrical structure to be $L\sigma$). Then, the observed one-syllable distance would simply be the "balance" adding up to a well-formed foot ($\sigma L\sigma$). Leaving out *itory* for the moment, we will in fact assign the suffixes in (2) the analyses in (3).[1]

(3)

	Structure: $L\ \sigma$)	*Examples*
a.	i cϕ)	in(trepidϕ)
	i shϕ)	a(bolishϕ)
	i ty)	a(menity)
	u ble)	(soluble)
b.	e rie)	cama(raderie)
	i o)nϕ	re(latio)n
	e ty)	va(riety)

Such analyses are straightforward in so far as the syllables under "L" are indeed all light. We will consider it a matter of lexical specification, however, where the rightmost foot boundary falls as regards the

1 As Fudge notes, *ety* is merely a contextual variant of *ity*, occurring after *i*.

postulated final weak syllables, which in general may or may not be metrified.[2] Consistently with our approach that represents metrical information in the lexicon, we will thus suppose that the right foot boundaries in (3) are part of the lexical representation of each suffix. The representations in (3) are not totally idiosyncratic, however. As we noted at various points earlier, there are some general predictors for the metrification of weak syllables. Specifically, we suppose that, everything else being equal, metrical structure tends to align with phonetically realized material, as may seem natural, so that weak syllables with null vowels will tend to be extrametrical, while other weak syllables tend to be metrified. Of course there is one major class of exceptions to this generalization, represented by verbs, which systematically metrify a final null vowel – a fact to which we will return, and simply take for granted for the time being. The suffixes in (3) now all conform with this revised generalization, except for *ic* and *id.* While the latter suffix exists in relatively few items as noted in fn. 2, and may be regarded as idiosyncratic, the behavior of *ic* seems in fact predictable from additional considerations. If we take the stress preservation of chapter 6 to be not an isolated characteristic of word-formation processes, but to instantiate a more general form of consistency between morphologically related words, then the metrification of *ic* will be predictable from the massive distributional overlap between items in *ic* and those in *ical*, as in *analýtic/analýtical*, *anatómic/anatómical*, etc. That is, items in *ic* will have to metrify the null vowel so as to be stressed consistently with their counterparts in *ical*, which have one more syllable. This view is in fact essentially a paraphrase, specific to our framework, of the *SPE* (p. 88) analysis, which effectively derived *ic* items from ones in *ical* via deletion of *al* after stress assignment. In sum, the position of the right foot boundaries in each of (3) is to a large extent predictable, making stress predictable in turn. Note that with the suffixes of (3a), stress on an open syllable generally finds a short vowel, hence further confirming the presence of a trisyllabic foot from the perspective of chapter 5 above.[3] The long vowels

2 Some of these suffixes, in particular *erie*, *uble* and *id* exist in relatively few items, so that there is no real sense in which they exhibit a consistent metrical behavior. The other suffixes *are* consistent, but with sporadic exceptions, such as those in (i) (Fudge, pp. 74, 80), which we attribute to non-metrification of the final weak syllable, as indicated.

(i) a. (cátholi)cϕ, (árabi)cϕ, †(héreti)cϕ, (lúnati)cϕ
  b. im(póveri)shϕ

3 Recall that the analysis of chapter 5 also accommodated the "exceptions," like *scé:nic*, *obé:sity* and others, listed in Fudge, appendix 4.1, pp. 53ff. It did so by postulating underlyingly long vowels. See, however, 10.3 below for a revised analysis of vowel length.

preceding *ion* and *ety* of (3b) are also consistent with the postulated trisyllabic foot, in the manner discussed in 5.4, while the (short) vowel preceding *erie* has a somewhat idiosyncratic character associated with this small class of borrowings.

Turning now to *itory*, which we had put aside, its metrification in British English is *ito)ry*, consistent with the British metrification of the V*ry* class in general, to which we return. Given this, its parallelism with the cases in (3) in placing stress on the immediately preceding syllable, as in *in(quísito)ry*, *ex(pósito)ry* is straightforward for British English. In contrast, in American English, its metrification is *i(tory)*, again consistently with the rest of the V*ry* class, yet main stress is generally the same as in British English, as in *in(quísi)(tòry)*, *ex(pósi)(tòry)*. This pattern follows from the "Strong Retraction" condition (of (4), p. 166 above) requiring binaries to precede weak feet.[4] In short, there are no special properties to *itory* – just the usual properties of the V*ry* class, in either dialect.

We then conclude that Fudge's "pre-stressed 1" suffixes are suffixes which metrify as bisyllabic sequences *Lσ*. These will simply require one more syllable to form a foot, whence the "pre-stressed 1" pattern.

7.3 "Pre-stressed 1/2"

The behavior of the suffixes that "place" primary stress on a preceding syllable if heavy, or two syllables before otherwise, would obviously also follow from our analysis if those suffixes were metrically monosyllabic. Consider then the ones in (4), which constitute part of Fudge's (p. 42) list, and where the analyses are again our own (†: other variants).

		Suffix	*Examples*	
(4)				
	a.	a)dϕ	(dýa)d	o(lýmpia)d
		a)ge	ad(vánta)ge	(ávera)ge
		a)lϕ[5]	pa(rénta)l	me(dícina)l
		a)nϕ	su(búrba)n	(áfrica)n
		a)te	in(téstat)e	de(génera)te
		o)nϕ	e(léctro)n	(léxico)n

4 In many cases the pattern is also consistent with stress preservation, as in *expóse* → *expósitory*.

5 As Fudge notes, *al* has the contextual variant *ar*, which behaves analogously, as in (Br.) *alve(ó:la)r*, with long *o*, versus *mo(lécula)r*.

	ou)sϕ	stu(péndou)s	a(nómalou)s
	u)mϕ	ad(déndu)m	cur(rículu)m
	u)sϕ	a(lúmnu)s	e(sóphagu)s
	i)ne[6]	clan(déstin)e	(díscipli)ne
	i)sϕ	sy(nópsi)s	(génesi)s
b.	i)ve	im(púlsiv)e	con(sécuti)ve
	u)re	em(brásu)re	(fúrnitu)re
	o)rϕ	im(pósto)r	am(bássado)r
c.	a)tive	†de(mónstra)tive	(fígura)tive
	a)ture	†no(méncla)ture	(témpera)ture
	i)ble	sus(cépti)ble	in(télligi)ble

The cases in (4a) are all phonetically monosyllabic, hence metrically monosyllabic so long as the final null vowel is not metrified. Since we suppose that the latter option is the norm for non-verbs, these cases are then straightforwardly as expected. Recall that we do not take lack of stress to imply vowel reduction necessarily (4.4 above), so that the relative prominence of the vowels in *ad*, *on* will not force us to postulate stresses on those suffixes. The suffixes in (4b) are also analogous to the ones in (4a): although weak syllables *ive*, *ure*, *or* can be extrametrical, as we have seen, we presume they are preferably metrified because phonetically realized, so that these cases are again as expected. The cases in (4c), however, where the phonetically realized weak syllables are extrametrical, will then require further comment. Beginning with *ible*, we note that extrametricality of *ble* is in fact the norm with derived items in *able*, e.g. *in(hábita)ble*, which represent the vast majority of occurrences of such final syllable. In those cases, extrametricality follows from stress preservation, as we will see in 8.2.2 below. We will then suppose that *ble*, in both *able* and *ible* (which are phonetically non-distinct), occurs as extrametrical with underived items as well for "consistency" – a notion to which we return. There are, however, occasional divergences from the standard pattern, as in *di(vísible)*, *hos(pítable)*, *(sóluble)*, in which *ble* is metrified, and which we will take to idiosyncratically depart from the prevalent metrification of *ble*, while satisfying the general tendency of overt weak syllables to be metrified.

6 Note that Fudge lists separately from the *ine* of (4a) that of chemical compounds like *(mórphi)ne*, *(glýceri)ne*. He also lists separately the agentive *or* of (4b), that of *dem(éano)r*, *be(hávio)r*, and that of *pr(í:o)r*, *ex(té:rio)r*. For ease of exposition we overlook these distinctions, unnecessary in so far as there is in fact no distinction in metrical behavior.

The cases of *ative*, *ature* in (4c) are partly similar to *ible*. We will see that here too the metrification of (4c) is frequent in derived items for reasons related to stress preservation as well as to vowel shortening, as in *(génera)tive*, and we will suppose they obtain with underived items also by "consistency." Note, however, the alternative metrifications *(a:ti)ve*, *(a:tu)re* are also frequent (5.2.3 above), as in *(légis)(là:ti)ve*, *(légis)(là:tu)re*, or *(quáli)(tà:ti)ve*, *(nómen)(clà:tu)re*. The latter metrifications will obviously *not* yield the "P 1/2" pattern, and are in fact listed by Fudge as exceptions.[7] In sum, while the suffixes of (4c) depart from the general tendency of overt weak syllabes to be metrified, this departure can to some extent be traced to their occurrence in derived items, where it is due to stress preservation, and can then be presumed to extend to underived items by "consistency," in a sense which we will make more explicit below. Some degree of idiosyncratic variation must also be postulated, however.

The cases in (5) are also in Fudge's "P 1/2" list and will again be straightforward.

(5)		*Suffix*	*Examples*	
	a.	an)tϕ[8]	a(búndan)t	(cónsonan)t
		an)ce[9]	a(búndan)ce	(cónsonanc)e
		en)tϕ	in(cúmben)t	in(télligen)t
		en)ce	in(cúmben)ce	in(télligen)ce
	b.	ee)	com(míttee)	(pédigree)
		ee)	fi(áncee)	(mátinee)

These suffixes are all phonetically monosyllabic, so that (supposing that "stress preservation" does not induce any deviations here) metrical monosyllabicity will follow from the postulated "alignment" with phonetic structure.[10]

7 There is also a third predicted pattern, combining the metrification *i)ve* with a short, unstressed, *a*, as in *de(rívati)ve*. In Fudge's terms, *ative* would therefore be not only "Pre-stressed 1/2" as in (4c), but also "Pre-stressed 2" as in the noted *(légis)(là:ti)ve*, as well as "Pre-stressed 1" as in *de(rívati)ve*. The last two patterns are lumped into Fudge's (p. 62) "exceptions."

8 We again inconsequentially ignore some of Fudge's further distinctions, such as the one between adjectival *ant* of (5a) and the nominal one of *ap(péllan)t*, *(célebran)t*, etc.

9 The same pattern of *ence* obtains with *ency* as in *(fréquen)cy e(mérgen)cy*, *(présiden)cy*. The extrametrical weak syllable is predictable here both from stress preservation, e.g. *(présiden)t*, and from "consistency" with the *ence* counterpart, e.g. *(fréquen)ce*.

10 Note that in the cases in (5b) there is no null vowel, so that metrical monosyllabicity is unambiguously expected.

A final set of cases in Fudge's list, requiring a slighlty more complex treatment, is that of (6).

(6)	*Suffix*	*Examples*	
a.	i:)de	hy(dróxi)de	(sácchari)de
	i:)le	pro(jécti)le	(dómici)le
	i:)ne	ele(phánti)ne	(álkali)ne
	oi)dϕ	el(lípsoi)d	(álkaloi)d
b.	e)ry	chi(cá:ne)ry	(cémete)ry
	a)ry	dis(pénsa)ry	con(témpora)ry
	o)ry	ol(fácto)ry	(cátego)ry

Superficially, the suffixes in (6) would seem to be parallel to the previous ones, yielding the right results on the metrifications given. However, we have already seen (4.2.3) that their behavior is in fact more complex than Fudge's classification implies. For one thing, in American English, the right-hand examples in (6b) are actually *(céme)(tèry)*, *con(témpo)(ràry)*, *(cáte)(gòry)*, although primary stress is still two syllables away as in the British variants, as noted for the *itory* class above. Furthermore, both sets in (6) have systematic "exceptions" to the P 1/2 pattern, such as those in (7) (where we have marked only primary stress), whose pre-suffixal heavy syllable is unstressed.

(7) a. mércanti:le, ínfanti:le, sáturni:ne, sérpenti:ne, hélminthoidϕ
  b. dýsentery, vóluntary, sédentary, ádversary, désultory, ínventory, prómontory, óffertory

Beginning with the cases of (6a), we propose the following account, which slightly reelaborates that of 4.2.3 above. We take each of the two options V:)$C\phi$, V:Cϕ), as in *i:)de*, *i:de)* to violate "metrical alignment" in a broad sense, the first for leaving a heavy syllable unstressed, the second for metrifying the null vowel. We also suppose that the two violations are of comparable degree, so that – by itself – the suffix will have no bias toward either metrification. The choice will then depend on the stem, to which the same criteria of "alignment" hold, requiring both that heavy syllables be stressed, as in *(H. . .*, and that parsing be (left-hand) exhaustive, as in *#(. . .*. Consider then the patterns in (8).

(8)

		I	II
		#(. . .	(H . . .
a.	pro(jécti:)le	*	ok
	*(prójec)(tì:le)	ok	*
b.	(mércan)(tì:le)	ok	?
	*mer(cánti:)le	*	ok
c.	(èle)(phánti:)ne	ok	ok
	*(élephan)(tì:ne)	ok	?
d.	(álka)(lì:ne)	ok	na
	(álkali:)ne	ok	na

Beginning with (8a), the correct result follows here from supposing (as we did earlier) that alignment (II) overrules exhaustiveness (I). In (8b), it follows from supposing that unstressed syllables closed by sonorants do not violate alignment to the same degree as other closed syllables, as argued in 3.4, 4.2.3 above. We still presume a partial violation, however, as syllables closed by sonorants do *not* behave like light syllables in full generality (as we saw in 3.4). We thus only take that violation to be less severe than one of exhaustiveness, which suffices for (8b). That residual violation, marked as "?" in (8) will now account for (8c). As for (8d), the outcome will remain undetermined, since both options are equivalent. As we know of no evidence that one metrification holds rather than the other, this result is consistent with the facts. Note that the indeterminacy is systematic here and extends to longer items as well, although none is available with this particular suffix (but compare *her(máphro)(dì:te)/her(máphrodi:)te* which we will consider below). The reason is that the metrification that includes the null vowel has a final weak foot, inducing "Strong Retraction," hence resulting in primary stress two syllables away, while the other metrification gives a ternary foot ($\sigma L \sigma$), hence also resulting in primary stress two syllables from the suffix.

Turning now to (6b), if we assume that the alternative metrifications *σ)ry*, *(σry)* are also equivalently well formed like those of the suffixes in (6a), deferring discussion of the specific reasons, then those cases will be quite analogous to the ones in (6a), as illustrated by (9), which is parallel to (8).

(9)

		I	II
		#(. . .	(H . . .
a.	re(fécto)ry	*	ok
	*(réfec)(tòry)	ok	*
b.	(réper)(tòry)	ok	?
	*re(pérto)ry	*	ok
c.	(èle)(méntary)	ok	ok
	*(élemen)(tàry)	ok	?
d.	Am.: (áudi)(tòry)	ok	na
	Br.: (áudito)ry	ok	na

The cases in (9a, b, c) then require no further comment, as they are identical to their counterparts in (8).[11] As for (9d), the indeterminacy we are predicting here is also correct, like the one of (8d), but in a somewhat different sense. Here there *is* evidence distinguishing the two metrifications, and different dialects appear to make different choices, as shown. The evidence is provided by vowel reduction, which affects the *o* of *ory* when unstressed as in the British pronunciation, though not the long *i* of *i:le*, *i:ne*, etc. in (8). This difference follows from the general fact that vowel reduction affects short vowels, but not long ones. We take the vowel preceding *ry* in (6b) to be short because of the general effect of *r*, which "laxes" preceding vowels, even though that vowel must be "metrically" long (at least when stressed) to yield a well-formed foot ($H\sigma$).[12] Note now that, while British and American English thus coincide in (9a) and (9c), they diverge not only in (9d) but in fact also in (9b), the British metrification being here *(réperto)ry*, not directly predicted by the above discussion. The latter reflects the noted fact, perhaps partly idiosyncratic but general, that the British metrification is only σ*)ry*. The initial stress of these cases, e.g. *(réperto)ry*, we still attribute to the light-like behavior of syllables closed by sonorant, like that of their American counterparts, although some additional factor must be involved, to distinguish this case from the seemingly

11 The case of *dispénsary* in (6b) is in violation of the generalization of (9b), but the reason is stress preservation from *dispénse*.

12 This divergence between phonetic realization and a more abstract representation relevant to metrical conditions is parallel to the one found with geminate consonants (3.3 above).

parallel *(*ágenda*).[13] Let us now return to the assumption that the two metrifications (σ*ry*) and σ)*ry* compare in well-formedness, necessary to account for (9). On close scrutiny, the latter assumption seems less than well justified. On the proposed criteria, metrification of the overt final syllable, as in (σ*ry*) should be preferred. Thus, British σ)*ry* may seem idiosyncratic. Note, however, that there is plausibly only one rather than two degrees of "misalignment" in that metrification, since the syllable preceding *ry* is not phonetically heavy, and hence likely *not* to violate the preference for stress on heavy syllables, when unstressed. Note further that consideration of stress preservation effects, which in fact often invoke the metrification σ)*ry*, as in *contradíct* → *contra(dícto)ry* will provide further justification for it, as we see in 9.3.6 below.

To sum up, while Fudge's description of the suffixes in (6) as instantiating the pattern "P 1/2" is in fact not completely accurate given the systematic class of exceptions in (7), we have seen that the correct pattern follows from supposing: (i) that these suffixes are intrinsically indifferent as to whether or not the final weak syllable is metrified; and (ii) that metrification aims first to align heavy syllables with stresses, and second to be (left-hand) exhaustive. The intrinsic indifference of the suffixes follows for the cases in (6a) from a reasonable general notion of metrical alignment, while for those in (6b) it follows from that same notion in part, and is in part idiosyncratic.

Note now that it is possible to predict that the suffixes in (5a), *ant*, etc. will not be equally "indifferent" as those in (6a), and hence *not* give rise to e.g. *(*ábun*)(*dàntφ*), *(*íncum*)(*bèntφ*) parallel to (*mércan*)(*tì:le*), (*sátur*)(*nì:ne*) of (7a). The reason is that it is plausible to suppose that the attested metrifications *an*)*tφ*, *en*)*tφ* etc. do *not* violate alignment in the manner of *i:*)*le*, *i:*)*ne*, precisely because the unstressed syllable is here closed by a sonorant, hence (quasi-)light in the usual sense. In contrast, the alternatives *antφ*), *entφ*) would violate alignment by metrifying the null vowel, whence their disfavored status.

13 In chapter 4, fn. 10, we proposed a historical explanation for this apparent exceptionality. The late-eighteenth-century British metrification appears to have been (*réper*)(*tòry*), and quite generally (σry). In the switch to σ)*ry*, the metrification (*réperto*)*ry* would have followed as a preservation of the earlier main stress, in the manner discussed for *wáshington* and other cases in 3.4 above.

Cases like (*mércanti*)*le*, (*ínfanti*)*le* (with a short *i*), exactly parallel to British (*réperto*)*ry*, are perhaps amenable to the same analysis, i.e. preservation from an earlier (*mércan*)(*tì:le*), etc.

To conclude, then, Fudge's pattern "P 1/2" results in general from our foot typology and the fact that the relevant suffixes are metrically monosyllabic. Metrical monosyllabicity follows from the phonetic structure of the suffix and appropriate assumptions concerning metrification of final weak syllables, which in turn follow from general considerations, except for some residual idiosyncrasies. A certain subset of cases revealing a more complex pattern than in Fudge's classification (those of (6)) is accounted for by supposing that the suffix alternates here between monosyllabic and bisyllabic metrifications, in ways which, again, seem predictable from general principles.

7.4 "Pre-stressed 2" and other patterns

In contrast to the "P 1" and "P 1/2" patterns, which we have taken to identify metrical structures smaller than a foot, specifically a foot minus the suffix itself, we take Fudge's "P 2" pattern, equivalently described by Liberman and Prince's term "Strong Retraction," to correspond to a full stress iteration, or foot.

As we argued in 3.7.5 above, we see a principled connection between occurrence of a word-internal binary foot ($\sigma_1\sigma_2$) in which σ_1 need not be heavy, and which therefore sits at the lower end of the weight scale for feet (of 5.4 above), and a final "weak" foot, namely (*HW*), which is also at the lower end of the scale, for word-final feet. The connection is provided by a hypothesis we called "constant transition," which appears relevant to both foot and word prosodies. In 3.7.5 we proposed that this hypothesis subsumes the so called "Arab rule," that is, that it accounts for the covariance in the quantity of syllables within the same foot, as in *(arə)b/(a:ræ)b*, *(provəs)t/(pro:vo:s)t*, *(presən)tation/(pre:sen)tation*, and other cases. We further proposed that the "P 2" or "Strong Retraction" pattern is a similar phenomenon at the word level, linking a smaller-size rightmost foot with a correspondingly smaller internal one, hence excluding the ternary option for the latter. The general intuition is thus that both foot and word prosodies tend to rise or fall evenly, maintaining fixed transitional characteristics.[14] From this point of view, our

14 There are, however, various degrees of degeneracy, weak feet being one case in point, as they have a weak syllable, sometimes associated with no acoustic output, right next to a very prominent one. Another, more radical case of degeneracy is provided by word-initial feet such as the one we postulated for e.g. *(ϕ ban)(danna)* in 4.2.1 above. Still, degeneracy seems to be constrained to specific conditions, in particular word edges.

prediction is then that the "P 2" pattern should be found with all and only the suffixes which constitute weak feet (*HW*). The ones in (10), representing one portion of Fudge's (p. 42) "P 2" list, seem to fulfill that prediction. The analyses are ours, as usual.[15]

		Suffix	*Examples*
(10)			
	a.	(a:te)	(désig)nà:te, de(líbe)rà:te
		(i:ze)	(récog)nì:ze, an(tágo)nì:ze
		(i:te)	(éxpe)dì:te
	b.	(a:te)	per(mánga)nà:te
		(e:ne)	a(céty)lè:ne
		(i:ne)	(cólum)bì:ne, (túrpen)tì:ne
		(ci:de)	in(fánti)cì:de, para(síti)cì:de
		(i:te)	(árgen)tì:te, her(máphro)dì:te
		(oirϕ)	(réser)vòir
		(o:se)	(bélli)cò:se, (céllu)lò:se

There is, however, a difference between (10a) and (10b). The former cases are predicted to instantiate "P 2" or "Strong Retraction" directly, while the latter are predicted to instantiate it only in the indirect sense of (8b, d), (9b, d) above. The reason is that the suffixes in (10a) form verbs, which we suppose consistently metrify the final null vowel.[16] In contrast, those of (10b) form nouns or adjectives, which we expect to metrify a final null vowel only to optimize metrification of the stem, as in (8b, d) *(mércan)(tì:le)*, and, ambiguously, *(álka)(lì:ne)/(álkali:)ne*, as we argued. From this point of view, the cases *(cólum)bì:ne*, *(túrpen)tì:ne*, *(árgen)tì:te*, *(ré:ser)vòir* of (10b) are then just like those in (7) above, analyzed as in (8b), (9b). We therefore find no distinction between the (nominal) *i:ne* of *columbine* in (10b) and the (adjectival) one of *elephantine* in (6) above. Our classification of the suffixes in (10b) and Fudge's are not equivalent with respect to the position of the main stress, since ours predicts that a heavy syllable preceding the suffix should be stressed if either not closed by a sonorant, as in (8a) above *pro(jécti:)le*, or if not in second position,

15 Fudge distinguishes the *o:se* of *bellico:se* from that of *cellulo:se* in (10b). Analogously, he also distinguishes the *i:te* of *argenti:te* from that of *hermaphrodi:te* in (10b), and both from that of *muscovi:te*. As we did in other cases, we ignore such distinctions, mostly irrelevant to our goal of linking phonological structure with the stress pattern.

16 Recall (pp. 165–67 above) that stress preservation normally overrides Strong Retraction, whence *óxygen* → *óxygenà:te*, *pérsonal* → *pérsonalì:ze*. There are also occasional idiosyncratic cases, like *cátamaràn*, also attested as *càtamarán* (see fn. 30 below).

as in (8c) above *ele(phánti:)ne*. In contrast, such a syllable should always be unstressed by Fudge's "P 2." The cases in (11) – Fudge's "exceptions" – fulfill our predictions.

(11) a. sta(lágmi:)te, sta(lácti:)te
b. archi(mándri:)te

These contrast as predicted with *désignàte*, *récognìze* of (10a), which are *true* cases of "P 2."[17] However, the variants *stálagmìte*, *stálactìte*, conforming with Fudge's classification (and hence somewhat exceptional for us) are also attested.[18] We note further that in variations like *(récon)(dì:te)/re(cóndi:)te* (noted in *SPE*, p. 153), the second variant violates either classification.[19] We know of no other case that would distinguish the two analyses.

In sum, our analysis thus places the verbal suffixes in (10a) in the true "P 2"/"Strong Retraction" class, but those in (10b) into the same class as the suffixes of (6) above, which are descriptively intermediate between the patterns "P 1/2" and "P 2." Empirical evidence is generally in accord with this classification, except for a few cases, which we regard as the usual share of idiosyncrasy.

17 However, as noted in part in 6.3.3, in a certain number of cases, verbs both in *a:te* and in *i:ze* must fail to metrify the final null vowel to account for a stressed heavy penultimate, as in (i).

(i) a. sequéstra:te
b. adúmbra:te, defálca:te, incúlca:te, imprégna:te, delécta:te
c. anthropomórphi:ze, metamórphi:ze
d. amórti:ze, aggrándi:ze

The cases in (a) and (c) can be taken to preserve the stress of their stems *sequéster* (Hayes 1985a, p. 169), *anthropomórphy*, *metamórphosis*. The ones of (b) and (d), which exist only as possible variants, appear to preserve the early-nineteenth-century stress (Hayes 1985a, p. 162, citing Halle and Keyser 1971). See also Bolinger (1981, p.54), who cites the *Oxford English Dictionary* characterization of forms like *confíscate*, *demónstrate*, *dessíccate*, *altérnate* as "familiar to middle-aged men."

18 Apparently conforming with Fudge's classification is also *gélignì:te*, which we attribute to its etymology, related to *gél*.

19 Still, the latter is less surprising in our system, which has two contending requirements – exhaustiveness and stress on heavy syllables, weaker for those closed by sonorants. Each variant then satisfies one of the requirements.

Partly similar are the non-verbs in *a:te* of (i), noted in Hayes (1985a, p. 162).

(i) a(pósta:)te, a(rísta:)te, e(cósta:)te, i(ntésta:)te

These cases are like the text's *re(cóndi:)te* if syllables closed by *s* are analogous to those closed by sonorant, and like (11a) *stalàgmite* otherwise.

The remainder of Fudge's "P 2" suffixes is given in (12), in our analyses.

(12)		*Suffix*	*Examples*
	a.	is)mϕ	me(tábolis)m
		is)tϕ	re(cídivis)t
		as)tϕ	en(thúsias)t
		men)tϕ	in(stálmen)t, (dócumen)t
	b.	tu)de	si(mílitu)de
		go)nϕ	(óctago)n
	c.	fy:)	per(sónify)
	d.	er)	as(trónomer)
		y)	mo(nópoly)
	e.	a)ble	de(lécta)ble, (ámica)ble
		a)cy	(éffica)cy

In contrast to those in (10), we will analyze all of these as metrically *mono*syllabic. For those in (12a, b), this analysis follows from our view that non-metrification of the null vowel is the norm with non-verbs. For the case of *fy* in (12c) it follows from non-existence of a null vowel here (recall discussion in 3.2 above).[20] The cases in (12d) follow from normal metrification of phonetically realized weak syllables, and those in (12e) from specific reasons that we will consider in a moment. Monosyllabic metrification will of course predict the pattern "P 1/2," just as in (4) and (5) above, rather than Fudge's "P 2." The evidence deciding between these two classifications is again rather slight, but clearly no more inconsistent with our view than with Fudge's. That evidence of course consists of cases with a heavy syllable immediately preceding the suffix, like *instálment*, *cantónment*, *deléctable*, *obscurántist*, *anabáptist*, all of which support our analysis.[21] On the other hand, Fudge cites *éxorcist*, *éxorcism*, *sólipsism*, and the variant *obscúrantist* as evidence for the P 2 pattern.[22] For these cases we must postulate exceptional metrification of *ist*, *ism* as weak feet, i.e. *(éxor)(cìstϕ)*, etc. In fact, for the cases in which the

20 The case of *sátisfy* we regard as (exceptionally) analogous to *órchestra*, discussed in 3.4.

21 In contrast, cases like *apártment*, *depártment*, *compártment*, *enjámbment*, *escárpment* would be consistent with the "P 2" pattern as well if we were right in 3.6 above in supposing that these have a word-internal null vowel, as in *apartϕment*.

22 As well as *ánarchist*, *ánarchism*, which, however, are readily interpretable as preservations from *(ánar)chy*.

pre-suffixal syllable is closed by a sonorant, *ist*, *ism* would appear to simply (though exceptionally) follow the pattern of the suffixes in (6)–(7) above, metrifying as feet to ensure (left-hand) exhaustiveness.[23] Note that metrification as a foot is independently required for *écume(nìsmϕ)*, *témpera(mèntϕ)*, where "P 2" does not obtain.[24]

In the foregoing, we have attributed *ist* and *ism* the same syllabic structure *HW*, as in *is.tϕ*, *is.mϕ*, overlooking the difference between the phonetic structures [ist], [izM], with a phonetically syllabic *m* (or perhaps *əm*). This analysis is motivated by the fact that the two suffixes behave quite generally alike, and is supported in particular by the fact that only the structure *HW* as in *is.mϕ* can be analyzed as a weak foot and hence account for the noted *écumenism*, *éxorcism*, *sólipsism*. In contrast, reliance on the phonetic structure [i.zM], which would parallel that of *able*, [a.bL] would predict **e.cu(mé.ni.sM)*, **e(xór.ci.sM)*, **so(líp.si.sM)* instead. We must therefore take the metrically relevant structure to be indeed *is.mϕ*, hence distinct from, or more "abstract" than, the phonetic representation – an assumption similar to the ones we made relative to null vowels or geminate consonants.

Returning to the evidence deciding between the "P 2" and "P 1/2" patterns for (12), none is found for the cases in (b, c), as suffixes *tude*, *on*, *fy:* happen to be always preceded by a light syllable. These cases are thus consistent with our claim.[25] As for the behavior of the weak syllables *er* and *y* of (12d), it was already discussed in 3.6 above, where we argued it follows from the proposed criteria, in particular left-hand exhaustiveness, and metrification of overt weak syllables – also a form of exhaustiveness. When the two kinds of exhaustiveness exclude one another, we took the resolution to be idiosyncratic, as in *(cárpen)ter*, *(cóntuma)cy*,

23 This then points to some difference between syllables closed by *s*, such as those of *is.t*, *is.m*, and syllables closed by sonorants, such as those of *an.t* and the other suffixes in (5a). Intuitively, the former "attract" stress more than the latter. This is consistent with some of 3.4 above.

24 The non-rightmost ternary foot despite the final weak one in *(écume)nìsm* follows as a weak preservation from *ècuménic*. This case is still relevant to our discussion *despite* preservation, because it does not fit into Fudge's "stress-neutral" class, as it does not maintain the primary of *ecuménic*. It is thus an exception in Fudge's system, but accommodated in ours. Jumping ahead a bit, non-neutrality here is straightforward, since both **ecu(ménis)m* and **ecu(ménismϕ)* have ill-formed feet *$(L\sigma)$ and *$(\sigma H\sigma)$, respectively. The ternary of *(témpera)mènt* might analogously also follow from the stress of *témper*.

25 We take the *on* of *óctagon* in (12b) to be unstressed, like that of *agamémnon*, or *eléctron* (see discussion of (64), chapter 3). This accounts for *octágonal*, while the alternative view would predict **octagónal*, like *tibétan*.

versus *se*(*méster*), *an*(*tipathy*). We therefore do *not* see a "P 2" pattern here, but rather alternation between "P 1/2," due to metrification of the final syllable, and "P 2/3" due to non-metrification. As a result, many cases will have stress two syllables away from the suffix, giving the impression of a general "P 2" pattern.[26] We also do not grant a special status to *acy* of (12d), which we take to be representative of the class of items in *y* more generally, the extrametricality of the final syllable here simply mirroring that of other cases, like (*áppeten*)*cy*. As Fudge notes, there is in fact variation within the *acy* subclass itself, as (*éffica*)*cy* of (12e) contrasts for example with *di*(*plómacy*), as we would expect.

Finally, in *able* of (12e), the weak syllable *ble* is generally extrametrical, for reasons related to stress preservation as already noted, with occasional departures from the norm, like *des*(*pícable*), *hos*(*pítable*), *ap*(*plícable*).[27] We therefore make no distinction between *able* of (12d) and either *uble* of (3) or *ible* of (4c) above, postulating only one *ble* which is generally extrametrical, and idiosyncratically metrified in a handful of cases.

Turning now to another set of suffixes, Fudge (pp. 43f., 140), in agreement with Hayes (1985a, pp. 186f.), LP (p. 277), attributes the pattern "P 2/3" to "Greek" suffixes, like *crat*, *gram*, *graph*, *nym*, *phone*, *scope*, *stat*, which occur as in (13).

(13)	a.	méritо*crat*	arístо*crat*
	b.	cárdio*gram*	eléctro*gram*
	c.	hélico*graph*	laryńgo*graph*
	d.	hétero*nym*	pséudo*nym*
	e.	rádio*phone*	mícro*phone*
	f.	sídero*scope*	astígmo*scope*
	g.	bactério*stat*	thérmo*stat*

The italicized sequences in (13) must clearly bear a secondary stress, to account for the primary on the pre-antepenultimate in the left-hand cases. From our perspective, this will be straightforward for *scope* and *phone*, which have long vowels, and hence yield well-formed feet (*sco:pe*)

26 Fudge attributes the pattern "P 2" only to the agentive suffix *er*, which follows it with some consistency, and not to other occurrences of the same syllable, which violate it as in *seméster*. From our point of view, any such asymmetry is accidental. Note in any event that the asymmetry holds only in one direction, since *sínister*, *cýlinder* (non-agentive *er*) parallel *bárrister*, *cárpenter* (agentive *er*).

27 Stress preservation from *despí:se*, *applý:* can, however, plausibly be appealed to.

and (*pho:ne*) if the null vowel is parsed. The other cases require postulating in addition that the final consonants are bipositional, in the sense of 3.3 above, hence as in (*crattϕ*), (*grammϕ*), etc. This view is independently confirmed by the short vowel of cases like *dysgr*[æ]*phia*, *paragr*[æ]*phia*, where an open syllable would predict a long vowel by "C*i*V" lengthening (5.5 above), just as in *dysphr*[ey]*sia*, *paraphr*[ey]*sia*. As for what forces metrification of the null vowel, exceptional for non-verbs, we suppose, following Fudge, Hayes, LP, that these suffixes have "quasi"-word status, that is that words containing them are partially similar to compounds. This will force the suffix to have its own stress, with consequent metrification of the null vowel, as with other phonetic monosyllables, like *can* etc. (see 2.5 above).

If the suffixes in (13) bear stress, we correctly predict they should bear only secondary, since they constitute "weak" feet. However, on our proposed generalizations, this will also predict "P 2" (= "Strong Retraction") rather than "P 2/3" (= "Long Retraction"). Some of the evidence does in fact conform with this prediction, as shown by (14), contrasting with (13) (†: other variants).

(14) hu(mídi)stat, dac(týlo)gram, †chro(máto)gram, ac(tíno)graph, ki(néto)graph, po(láris)(cope)

Note too that the cases in (13b, e, g) and others, like *héliograph*, are in fact consistent with Strong Retraction, given the parallel (*órien*)*tà:te*, (*álie*)*nà:te*, *a*(*mélio*)*rà:te* (noted in LP, p. 277; Hayes 1985a, p. 188) involving "Strong-retracting" *a:te*. As we noted in 5.5 above, sequences of two short Vs behave as bisyllabic sequences only in some respects, evidently not with respect to the Strong Retraction condition (see fn. 24, chapter 5). As for the other cases in (13), we will again follow Fudge, Hayes, and LP in appealing to compound-like status, which will require that, like the suffix, so the stem should have the metrical structure of an independent word. This property apparently holds to different degrees for different stems, given the difference between (13) and (14).[28] In sum, we suppose the suffixes in (13) constitute weak feet, which, as such, induce the "P 2" pattern, actually attested in some cases. In other cases, the more independent, word-like, status of the

28 As noted in Hayes (1985a, p. 187) the sequence of three stressless syllables in cases like *hèterosyllábic*, *hèterogenéity*, *hèterogenétic* independently force one to treat the sequence *hetero* of (13d) as an independent word.

stem prevails, yielding the "P 2/3" (penultimate/antepenultimate) pattern of independent words. We will return to the stress shifts that occur when further monosyllabic suffixes are added to the ones in question, as in *búreaucràt* → *bureáucracy*, and – comparably – in *telégraphy/ist*, *synónymy/ous*, *teléphony/ist*, *metróscopy*.

Suffixes of one final group have the structural properties of weak feet but appear to attract primary rather than secondary stress. These are Fudge's (p. 41) "auto-stressed" suffixes, listed in (15).[29]

(15)		*Suffix*		*Examples*
	a.	a:de		cannoná:de
		aire		millionáire
		aise		polonáise
		een		velvetéen
		eer		auctionéer
		e:se		portugué:se
		eur		connoisséur
		ier	([iyr])	gondolíer
		i:ne	([iyn])	tambourí:ne
		i:que	([iyk])	mozambí:que
		i:se	([iys])	expertí:se
		oon		macaróon
	b.	esque		picturésque
	c.	elle		mademoisélle
		enne		comediénne
		esse		politésse
		ette		novelétte
	d.	ee		repartée
		oo		kangaróo

For our analysis, as for others, these cases, not particularly numerous and mostly borrowings, are exceptional. We express this exceptionality by taking these items to follow a special version of the principle for primary stress (given in (4) on p. 166 above), one that makes no

29 In contrast to the text cases, suffixes that attract primary stress only in bisyllables or in verbs, such as the ones in (i), also given by Fudge as "auto-stressed," do not for us depart from the usual principles (see discussion of (17b) in 3.2).

(i) creá:te, un*í:te*, fer*mént*, coal*ésce*, verb*ó:se* reference to "weak" feet, and simply assigns stress to the rightmost foot. In addition, all rightmost feet in (15) have exceptional features of their own. Those in (15a, b, c) parse a null element: the norm only for verbs, and those of (15c) must also parse a consonant bipositionally (consistently with their orthography). The cases in (15d) must also parse a null element/syllable, and one which is not independently required by syllabification principles (i.e. the need to syllabify a final consonant as an onset). That is to say, the final null syllable in (15d) is motivated solely by the position of stress itself, and the inability of the system to construct monosyllabic feet (see discussion in 3.1 above. Also relevant is the case of verbs in *fy:*, discussed in 3.2).[30] Items bearing the suffixes in (15) are occasionally integrated into the autochthonous vocabulary, e.g. as in (16) (†: other variants).

(16) †cávalcade, †máyonnaise, †cígarette, †ámateur, †mágazine

The cases in (16) can be taken to have the same analysis as the ones in (8) above, hence for example *(cával)(cà:de)*, like *(mércan)(tì:le)*, but ambiguously *(mága)(zì:ne)/(mágazi:)ne*, like *(álka)(lì:ne)/(álkali:)ne*.

To conclude this section, we have argued that the position of main stress relative to the suffix, which Fudge employs as a classificatory criterion, is predictable from the structure of the suffix itself in the manner indicated by (17), which ignores the "compound-like" cases of (13) and the "auto-stressed" cases of (15), both somewhat exceptional.

(17)

	Suffix	*Pattern*	*Examples*
a.	(weak ft)	P 2	de(líbe)r*à:te*, (démon)(str*à:te*)
b.	L σ)	P 1	ana(tóm*icϕ*), milita(ríst*icϕ*)
c.	σ)	P 1/2	me(dícin*a*)*l*, pa(rént*a*)*l*

The range of structures on the left-hand side of (17) corresponds in fact to the range of existing possibilities listed in (2) of 6.2 above, leaving out only the case of a suffix which is a strong foot. For the latter kind of suffix, we would predict that non-final feet should be allowed to be trisyllabic under the usual conditions (that is, we predict no "Strong

30 Note that the prosodically strong (though structurally weak) character of the final feet in (15) might predict that they should not induce "Strong Retraction," but rather the binary/ternary pattern instead. Although relevant evidence is rather limited, this prediction seems fulfilled by *(càrabi)néer*, and the variant *(càtama)rán*.

Retraction" effect). Although the suffixes of this type are very few, the cases in (18) seem to fulfill this prediction.[31]

(18) a. (ònoma)(tólogy), (cỳtopa)(thólogy)
b. (spèctropho)(tómeter), (sphỳgmoma)(nómeter)

Despite the occasional unpredictability related to the variable metrification of final weak syllables, the predictive power of our analysis is thus clear, contrasting with the non-predictive character of Fudge's classification. In particular, we predict that a suffix with the structure VC (with a short V), like *ic*, *al*, could only be associated with either the "P 1" or "P 1/2" patterns, since such a suffix cannot be a foot, hence excluding "P 2." Also, we predict that a suffix with the structure V:C, or VCC, like *i:ne*, *ent*, respectively, could not be associated with "P 1," since such a suffix can only be metrified either as a syllable, hence yielding "P 1/2," or as a weak foot, yielding "P 2." We further predict that a suffix with the structure of a strong foot, like those in (18), should not be associated with any of the patterns in (17). The correctness of these predictions shows that the notion of stress assignment at a distance, useful for classificatory purposes, has no role in the theory.

7.5 Stress preservation and Fudge's generalizations

7.5.1 Secondary assignment "by suffix"

As we noted, Fudge (p. 46) argues that one of the modalities of assignment of secondary stress is "by suffix." That is, when a suffix finds itself in a position relatively internal to the word because of further suffixation, it may assign a secondary a certain number of syllables away, in the same way that it would assign a primary if it were in final position, as illustrated in (19) for the suffix *a:t* (analyses ours).

(19) a. e(quívo) (c*à:te*)
b. e(quìvo) (c*á:t*io)n

It is easy to see that the phenomenon in (19) is simply the stress preservation of chapter 6. In our terms, (19) is a case of "0" shift (of the boundary

31 As usual, stress preservation has an overriding effect, whence *e(quívo)(càtio)n*, etc. of (41), chapter 6, despite the final strong foot. Still, speakers find ?*(èquivo)(cátio)n* more acceptable than **(équivo)(càte)*, supporting the claim of the text.

between the two feet). According to Fudge (p. 46), this phenomenon is a characteristic of each of the sequences in (20).

(20) abil + ity, al + ity, ar + ity, ary + an, ate + ion, cide + al, faction (= fy + ct + ion), fy + c + ate + ion, ibil + ity, ment + al, ment + ary, os + ity, ubil + ity

In considering the suffixes in (20), we will distinguish two different subsets, the first of which is given in (21), with relevant examples, in our own analyses.

(21)

	Suffix sequences	*Examples*
	abil + ity	as(*sì*mila)(bílity)
	ary + an	he(*rè*di)(tária)n
	ate + ion	ac(*cè*le)(rátio)n
	cide + al	bac(*tè*ri)(cí:da)l
	fy + c + ate + ion	per(*sò*nifi)(cá:tio)n

As we saw in (50), chapter 6, all the cases in (21) are indeed just like the one in (19), all involving a "0" shift.[32] Preservation is therefore systematically predicted, accounting for Fudge's generalization.

Matters are somewhat different with the second subset, given in (22), with examples.[33]

(22)

	Suffix sequences	*Examples*
a.	ibil + ity	di(*vì*si)(bílity)
	ubil + ity	in(*sò*lu)(bílity)
b.	al + ity	me(*dì*ci)(nálity)
c.	ar + ity	fa(*mì*li)(árity)
	faction (fy + ct + ion)	(*lì*que)(fáction)
	ment + al	ex(*pè*ri)(méntal)
	ment + ary	in(*tè*gu)(ménta)ry
	os + ity	re(*lì*gi)(ósity)

As we saw in 6.3.1, unlike those in (21), the cases in (22) instantiate "–1" shifts. That is, in all of these cases a formerly word-final syllable, forming

32 Aside from the *mentary + an* class, which involves a "+ 1" shift, as in *(pàrlia)(ménta)ry* ⇒ *(pàrliamen)(tária)n*. Aside also from the few cases like *a(dúmbra:)te* ⇒ *(àdum)(brá:tio)n* ((43), chapter 6), which remetrify as expected under a "–1" shift.

33 The case of *(lìque)(fáctio)n* was not given in chapter 6 because it is only *consistent* with stress preservation, but does not establish it. The case of *in(tègu)(ménta)ry* was given in fn. 4, chapter 6.

part of a final foot, is taken over by the new foot that the outer suffix gives rise to. But, as we saw, unlike "0" shifts, "–1" shifts are not always stress-preserving. They are in only one of the two logically possible cases, both illustrated in (23), where preservation is with respect to the italicized boundary.

(23) a. Preserving: . . . (σ_1 L_2 σ_n) ⇒ . . . (σ_1 L_2)(σ_n . . .)
b. Non-preserving: . . . (H_1 σ_n) ⇒ . . . H_1)(σ_n . . .)

The non-preserving configuration in (23b) does not arise in the cases in (22a), which will therefore be always preserving, like the ones in (21). The reason is that the syllable preceding the final foot (hence preceding σ_n in (23)), which is part of the suffix in (22a), is always light (*si, lu* of the examples). In contrast, (23b) should arise in principle in the other cases in (22), predicting non-preservation, hence violating Fudge's generalization. The prediction is correct, as shown by (24) (which repeats (28a), chapter 6), where the non-preserved stem stress is italicized.

(24) (ùniv*e*r)(sálity), (còmm*u*)(nálity), (ìmm*o*r)(tálity), (ìnstrum*e*n)(tálity), (ìnf*o*r)(málity), (ìnt*e*r)(nálity), (sèntim*e*n)(tálity), (èxt*e*r)(nálity)

While the cases in (24) all contrast with (22b), an exhaustive search of the classes in (22c), which are relatively small, reveals no case with a heavy syllable preceding the final foot, presumably an accidental gap. This means that, from our perspective, Fudge's generalization is partly true for principled reasons, namely with respect to (21) and (22a); partly true for accidental reasons, namely with respect to (22c); and partly false, namely with respect to (22b) as shown by (24).

Note also that, as we saw in chapter 6, the phenomenon of stress preservation occurs with other suffix sequences beside those cited by Fudge (which in fact he gives as a non-exhaustive sample). In particular, it occurs with the sequences in (25), but again not indiscriminately as one would expect on the assumption that the stress "is assigned" by the inner suffix. Rather, remetrification is found only in some cases, as shown in (25), which repeats examples of chapter 6.[34]

34 The data relative to *atory* in (25) are those of American English. The "secondary by suffix" effect of this case is indeed noted by Fudge (p. 63).

(25)		*Sequence*	*Preserving*	*Non-preserving*
	a.	ist + ic	an(*tà*go)(nístic)	(pròpa*gan*)(dístic)
		ology + ic	bac(*tè*rio)(lógic)	(*èn*do)(crì*no*)(lógic)
		ate + ory	ar(*tí*cula)(tòry)	*com*(pénsa)(tòry)
		oid + al	bac(*tè*ri)(óida)l	(èl*lip*)(sóida)l
	b.	ast + ic	en(*thù*si)(ástic)	
		or + ity	su(*pè*ri)(órity)	

The cases in (25a) are therefore like those in (22b) or (24) in being exceptions to Fudge's generalization. Those in (25b) on the other hand are like those in (22c) in being consistent with that generalization, but – we presume – only because of a fortuitous gap in the corpus. Note further that the preservation effect we identified goes beyond Fudge's "secondary assignment by suffix," since, as we expect, it is not contingent on the presence of an inner suffix. This is shown by (26) (which, again, repeats examples of chapter 6).

(26) a. na(*pó*leo)n ⇒ na(*pò*le)(ónicϕ)
  b. bac(*té*riu)m ⇒ bac(*tè*ri)(óidϕ)

Fudge's generalization is therefore both too weak and too strong: the former because it fails to exclude the remetrifying cases of (24) and (25), the latter because it fails to include cases like (26).

7.5.2 Secondary assignment by rhythmic principle

In contrast to the sequences in (20) above, Fudge (p. 48) argues that, with those in (27) below, secondary stress is "placed" by a general ("rhythmic") principle, rather than by the inner suffix.

(27) age + ous, ant + i + al, ent + al, ent + i + al, ic + al, ic + i + an, ic + ity, id + ity, ine + ity, ive + ity, oid + al

In (27), we will need to distinguish three subsets, the first given in (28) with examples.

(28)	*Suffix sequences*	*Examples*
	ic + i + an	(àca*de*)(mícia)n
	ic + ity	(àu*then*)(tícity)
	id + ity	(ìn*tre*)(pídity)

In (28), secondary stress falls on a different syllable than the one where the inner suffix would "place" it, which is italicized (compare *académic*). Hence, in Fudge's (p. 31) characterization, secondary stress is assigned here by a general "rhythmic principle," whose direct translation into feet is $(H\sigma)/(\sigma L\sigma)$ – hence very close to our own factual assumptions. While in Fudge's system this choice is simply stated, in ours it is predicted. The reason is that "assignment by suffix" in (28) would give rise to adjacent stresses. So, consider that, when final, the inner suffixes *ic*, *id* "place" stress on the immediately preceding syllable, because they have the structure $L\sigma$), as we argued.[35] The outer suffixes have exactly the same property, for the same reasons. In addition, the outer suffix attaches here by syllable overlap (supplanting the final null vowel of the inner one). This combination of properties means that outer suffixation induces the transformation in (29), in which the position of new stress is next to that of the old one.

$$(29) \quad \ldots.(\sigma_1 \ +L_2\ \sigma_3) \atop \qquad\qquad +L\ \sigma) \ \Rightarrow \quad \ldots\sigma_1)(+L_2\ +L_3\ \sigma_4)$$

Thus, if we suppose that Fudge's secondary "by suffix" is simply stress preservation, we correctly predict it will never be found in (28) since the stress on σ_1 of (29) cannot be preserved, as there are no monosyllabic feet.

The second subset of (27), with only one member, is also straightforward (in fact trivial), as in (30).

(30)	*Suffix sequences*	*Examples*
	ic + al	(àna)(*tó*mica)l

As we saw in 7.2, the *ic* and *ical* classes have identical stress patterns. A secondary stress can therefore never be where the primary was, simply because the primary itself is still there.

The third and final subset of (27) is given in (31), in which again italics in the examples mark the position of the primary prior to the outer suffixation.[36]

35 *ial* is obviously just like *ion* of (3b) above.

36 In the *ant* + *i* + *al* class, also cited in (27) as assigning secondary by the rhythmic principle, we find that the only derived cases are those in (i).

(i) a. *fi*(náncia)l, *sub*(stántia)l
b. (*cír*cum)(stántia)l

These are all stress-preserving, supposing the cases in (ia) have a secondary on the initial syllable in the manner of 4.2.1 above. Hence, they could just as well be classified as having a secondary "by inner suffix."

	Suffix sequences	*Examples*
(31)	a. age + ous	(àd*van*)(tágeou)s
	ant + ial	
	ine + ity	(clàn*des*)(tínity)
	ive + ity	(òb*jec*)(tívity)
	b. ent + al	(ànte*ce*)(dénta)l
	ent + ial	(è*xis*)(téntia)l
	c. oid + al	(èl*lip*)(sóida)l

As the examples indicate, all of the bisuffixal sequences in (31) constitute well-formed rightmost feet. In contrast, by themselves, the inner suffixes of (31) metrify as single syllables, hence "placing" primary stress by the "P 1/2" pattern aside from *oid* in (31c), which is slightly more complex, as we saw in 7.3. What this means is that outer suffixation generally brings about a "–1" shift in (31), just as it did in (22) above. Therefore, exactly the same predictions ensue as in the latter case, and as schematically indicated in (32), which repeats (23) above.

(32) a. Preserving: $\ldots (\sigma_1\ L_2\ \sigma_n) \Rightarrow \ldots (\sigma_1\ L_2)(\sigma_n \ldots)$
b. non-preserving: $\ldots (H_1\ \sigma_n) \Rightarrow \ldots H_1)(\sigma_n \ldots)$

That is to say, unlike Fudge's discussion, our principles see no difference between (22) and (31). Thus, just as we predicted that the preserving ("secondary by suffix") cases of (22) should have non-preserving counterparts, so we predict that the non-preserving ("secondary by rhythmic principle") cases of (31), which happen to conform with (32b), should have preserving counterparts, conforming with (32a). Indeed, this is the case, as shown by (33), contrasting with (31b).[37]

(33) co(*ín*ciden)t ⇒ co(*ìn*ci)(dénta)l
ex(*pé*rien)ce ⇒ ex(*pè*ri)(éntia)l

We find no case with the relevant structure (32a) within either classes of (31a, c) – another accidental gap, we presume. Therefore, just like Fudge's first generalization, "secondary assignment by suffix," so its complement, "secondary assignment by rhythmic principle," turns out to be sometimes true for principled reasons, as with (28), (30); sometimes

37 For the *ivity* class, note also the preservation in (i) - a case of "0" shift from chapter 6.

(i) as(*só*cia)tive ⇒ as(*sò*cia)(tívity) true accidentally, as with (31a, c); and sometimes false, as with (31b), (33).

In conclusion, Fudge's important generalizations concerning secondary stress in suffixed words approximate the predictions that our principles make, yet it is our principles rather than the latter generalizations which better approximate the facts. This shows that, as in the case of primary, so in the case of secondary, stress assignment "by suffix" has no real status.

7.6 "Mixed" suffixes

Fudge (pp. 40ff.) notes that some of the suffixes we discussed in the previous sections have a "mixed" behavior in that, in contrast to the patterns we discussed, when the stem is a "free" (rather than "bound") form, namely when it constitutes an independent word, these suffixes maintain the stress of the stem – they are "stress-neutral." This apparent duplicity is illustrated in (34), where the analyses are ours.[38]

(34)		*Suffix*	a. *Stress-placing*	b. *Neutral*		
	I	able	i(névita)ble	intérpret	⇒	intérpretable
		age	ad(vánta)ge	bróker	⇒	brókerage
		ism	me(tábolis)mϕ	absentée	⇒	absentéeism
		ance	(cóuntenan)ce	delíver	⇒	delíverance
		ant	(ádjutan)t	inhábit	⇒	inhábitant
		ary	vo(cábu)(làry)	imágine	⇒	imáginary
		ery	(céme)(tèry)	conféction	⇒	conféctionery
		ory	(dórmi)(tòry)	inhíbit	⇒	inhíbitory
	II	i:te	(ménno)(nì:te)	béthlehem	⇒	béthlehemi:te
		i:ze	an(tágo)(nì:ze)	américan	⇒	américani:ze

38 In (34), we do not give secondary stresses in (b), reserving the full analysis of stress-neutrality for later on. Note, too, that the two occurrences of *ish* in (34III) do not represent the same suffix. Yet, to the extent that our goal is to relate stress to phonological structure, this will be of no consequence.
The *ary/ery/ory* cases in (34) are given in their American variants.

III	acy	(éffica)cy	conspíre	⇒	conspíracy
	er	as(trónomer)	ínterview	⇒	ínterviewer
	ish	a(bólishϕ)	yéllow	⇒	yéllowish
	ist	an(tágonis)tϕ	américan	⇒	américanist
	ment	in(stálmen)t	accómplish	⇒	accómplishment
	y	(léthar)gy	expíre	⇒	†expíry
	ous	stu(péndou)s	cávern	⇒	cávernous
	ure	(fúrnitu)re	árchitect	⇒	árchitecture

This behavior contrasts with that of the complementary set of suffixes, which induce remetrification of the stems in the manner exemplified in (35), though only in the partial sense discussed in chapter 6.

(35)	gérman	⇒	germánic
	párent	⇒	paréntal
	súburb	⇒	subúrban
	áctive	⇒	actívity

The question that arises in this connection is why should some suffixes have a "mixed" behavior, rather than just behave uniformly with both bound and free stems. Past accounts provide only descriptively adequate answers. Within the context of Lexical Phonology of Kiparsky (1982a, 1982b), the suffixes in (34b) are neutral because they are attached at "level II," a derivational level at which stress rules no longer apply. In the alternative model of HV, Halle and Vergnaud (1987b), Halle (1990), Halle and Kenstowicz (1991), neutrality is due to the fact that those suffixes are "non-cyclic," hence triggering only rules of the non-cyclic "block," which – for reasons we will return to – fail to interact with the suffix. Either characterization provides little reason why the language learner should not make the assumption which seems most natural that the suffixes of (34), which are standardly metrified in (a), should also be so metrified in (b). In the next few chapters, we will challenge those characterizations, and argue that in fact there is never any "evasion" to metrification of any sort, and that the suffixes in (34b) are indeed fully metrified, just like those in (34a), as a language learner might assume.

As already mentioned on pages 165–67 above, we will argue that stress neutrality does not result from *evading* metrification, but rather from *selecting*, among the different metrifications available, the one yielding stress preservation. From this point of view, any difference between (34a) and (34b) reduces to the simple fact that stress preservation is irrelevant to the former, selection of metrifications being then done here by other factors – the various forms of metrical alignment discussed above. Note in any event that, in the cases in (34I), the "mixed" behavior is illusory, since the "neutral" pattern is just identical to the non-neutral one. At least for these cases, stress "evasion" is thus superfluous, beside being conceptually suspect as noted. The cases in (34II) are also rather similar to those in (I), in that it is easy to show that (b) only differs from (a) by a larger internal foot – a difference already predicted by the discussion of chapter 6. Thus only in (34III) is there a relevant difference between (a) and (b), but only a descriptive one, as we will argue below.

7.7 Conclusion

In this chapter, we have considered the various stress patterns occurring with different suffixes aside from the "neutral" pattern, and argued that these are predictable from the phonological structure of the suffixes themselves, granted the appropriate choice of whether or not to parse the final weak syllable. The latter choice is to a good degree predictable in turn, arbitrary only in some cases.

We have argued further that the phenomenon that Fudge describes as "secondary assignment by suffix" is subsumed under the stress preservation of chapter 6, while the complementary phenomenon of secondary assignment "by rhythmic principle" correspondingly identifies predicted exclusions of stress preservation. Finally, we have noted, reporting Fudge's further observation, that while all suffixes exhibit the predictable pattern when attached to "bound" stems, when they are attached to "free" ones (i.e. independent words), they break down into two different subsets. Some continue to metrify a "free" stem much as they would a bound one, aside from the ("weak") preservation of chapter 6, while others maintain the metrical structure of the stem in full, thus being "neutral." Within the domain of free stems, we are thus observing a bifurcation into the two preservation phenomena noted on pages 165-67 above: the "weaker" preservation of chapter 6, and the "stronger" or more radical preservation represented by "stress neutrality." In the next few chapters we will seek a link between these two phenomena, and argue that they both instantiate the same effect of preservation or consistency of metrical structure, the distinction between weak and strong preservation ultimately following from differences in the phonological structures of the suffixes themselves, hence requiring no stipulation.

At various points in this chapter, we have noted that suffixes often exhibit a "consistency" effect in the way they parse a final weak syllable, two different illustrations of which are given in (36) and (37).

(36) a. Free stem: in(térpreta)ble
b. Bound stem: i(névita)ble

(37) a. Free stem: ger(mánicϕ)
b. Bound stem: em(píricϕ)

We will argue in the next chapter that the parse in (36a) follows from stress preservation (from *intérpret*). The one in (36b), we take to be simply consistent with it. In contrast, in (37b), we have motivated the parse of the weak syllable in terms of the stem maintaining the stress it has in *em(pírica)l*, another form of metrical consistency of stems, like stress preservation. We can then take (37a), which has no corresponding form **ger(mánica)l*, to instantiate a parse of the suffix consistent with that of (37b). We will return to the question of why (37a) should not work just like (36a), preserving the stress of the stem *(gérma)n* instead, as in **(gérmani)cϕ*. We consider here a couple of other questions.

One question is how to represent the consistency of suffixes. As suggested in 7.2, we suppose that consistent suffixes simply have lexical representations like those in (38), which includes right foot boundaries.

(38) a. a)ble
b. icϕ)

This view is in line with our general approach that takes metrical information to be present underlyingly. Since there is no reason to privilege some metrical information, such as stress or left foot boundaries, we expect right foot boundaries to be represented as well, whence (38).

Another question is why suffixes should be consistent. (Note that both (38a, b) violate the more general condition proposed above that right phonetic edges should align with metrical structure, and hence are not just a reflex of that condition.) While we will see that many suffixes are in fact not-consistent, a property crucial to their stress neutrality, we take consistency of suffixes where it obtains to be fundamentally the same kind of phenomenon as the various consistencies of stems, like stress preservation, so that one must in fact countenance metrical consistency of morphemes generally, as stated in (39).

(39) *Metrical consistency*
Every morpheme must be as metrically consistent as possible.

Again, from our perspective that takes metrical structure to be present underlyingly, the nature of (39) is rather transparent. Taking a "morpheme" to be a unit that exhibits consistency of form and meaning, and metrical structure to be just another aspect of lexical representation, metrical consistency will follow from the very definitional property of morphemes.

We will see in some of the following chapters how the distinct demands imposed by (39) on stems and suffixes interact with one-another.

8 *Strong preservation*

8.1 Introduction

In this chapter and the next, we consider the phenomenon of stress neutrality, which we also refer to as "strong preservation." Our task will be to revise the long-standing assumption, implemented in various ways, that the phenomenon in question is due to the ability of certain suffixes (and, more generally, affixes) to "evade" stress assignment. We will argue instead that strong preservation results from the same principle of stress preservation that we saw at work in chapter 6 (a reflex of metrical consistency (39) of 7.7), this time in conjunction with the second major indeterminacy of metrical structure – the one related to weak syllables. In contrast to weak preservation, which, as we saw, is made possible by the indeterminacy of the choice between $(L\sigma)$ and $(\sigma L\sigma)$ for word-internal feet, we will see that strong preservation is made possible by the ambiguity of weak syllables, namely by the availability of both $\ldots W)$ and $\ldots)W$ at the end of words. By thus linking stress neutrality of suffixes to the independent property of English of having weak syllables, we will correctly predict that stress neutrality of suffixes should be a language-specific property of English.

We begin by considering that, for a notable number of "stress-neutral" suffixes, neutrality is in fact not always true – a fact which is surprising if those suffixes have the ability to evade stress, but which will be quite consistent with our approach, as we will see. We will then see further that the distinction between suffixes that permit only "weak" preservation, and the fully neutral ones can in fact be systematically reduced to differences in their phonological structure.

8.2 Exceptions to neutrality

8.2.1 Preliminaries

Accounts of stress neutrality of the past several years have relied on one of the two following hypotheses: (i) neutral suffixes evade stress completely, by being inserted beyond the point of application of the stress rules; (ii) neutral suffixes evade the stress rules in part, by activating only the "post-cyclic" subset of the stress rules. The former hypothesis is advanced within the framework of "Lexical Phonology," proposed in Kiparsky (1982a, 1982b), and based on the "Level Ordering" hypothesis of Siegel (1974), Allen (1978), while the latter is proposed within the "Cyclic Phonology" of HV, Halle and Vergnaud (1987b), Halle and Kenstowicz (1991). In what follows, we will begin by showing that the total evasion of stress of Lexical Phonology cannot be maintained, and then consider the partial evasion of Cyclic Phonology.

8.2.2 Non-neutrality of *able*

The suffix *able*, which derives adjectives from verbs, is generally stress-neutral, and for this reason often regarded as "level II" or "non-cyclic" (Halle and Kenstowicz 1991, p. 459 and references there). Typical examples are those in (1), given in our proposed analyses.

(1) a. pre(véntϕ) $\Rightarrow$ pre(vénta)ble
    b. in(hábitϕ) $\Rightarrow$ in(hábita)ble

Our thesis is that neutrality results from the fact that the first syllable of *able* systematically replaces the null vowel which is part of the final foot of verbs, while the final syllable *ble* of the suffix remains extrametrical, just as in underived items like (*végeta*)*ble*.[1] This will systematically result in preservation of the stem stress, without motivating any stress evasion. However, unlike stress evasion, our analysis does not predict that *able* should *always* be neutral. It does predict in particular that a heavy syllable preceding *able* should always bear main stress. This prediction would be equivalent to neutrality if verbs ending in a sequence *H.C* (i.e. a "superheavy" syllable) always bore main stress on that *H*, indeed as in (1a). This is not true in (2), however, and other cases we discuss below.

1 Giegerich (1985, p. 106) proposes a similar account for suffix *al* of *perúse* → *perúsal.*

(2) (dócu)(mèntφ) ⇒ (dòcu)(ménta)ble

While the verb in (2) is metrified to include the final weak syllable like verbs in general, the structure has a sufficient number of syllables to give rise to *two* feet, the final one of which receives only secondary stress because "weak." In contrast, the final foot of the adjective in (2) is not "weak," since *ta* is not a weak syllable, whence the different position of the primary stress here. The cases in (3) show that this fact is quite general.[2]

(3)	a.	(áscer)(tàinφ)	⇒	(àscer)(táina)ble
	b.	(éxtra)(dì:te)	⇒	(èxtra)(dí:ta)ble
	c.	(próse)(cù:te)	⇒	(pròse)(cú:ta)ble
	d.	(réa)(lì:ze)	⇒	(rèa)(lí:za)ble
	e.	(día)(gnò:se)	⇒	(dìa)(gnó:sa)ble
	f.	(cúlti)(và:te)	⇒	(cùlti)(vá:ta)ble

The cases in (4) are also rather similar.

(4)	a.	(prótes)tφ	⇒	pro(tésta)ble
	b.	(tránsla:)te	⇒	tran(slá:ta)ble

The verbs in (4) are exceptional in that they exhibit the metrification of nouns.[3] For the one in (4a) this is due to the fact that it is *derived* from a noun – another instance of stress preservation. For the one in (4b) it is due to reasons specific to the *a:te* class, which permits the metrification *a:)te* (which was general at earlier stages of the language, as noted in fn. 17, chapter 7 and references there) when it is left-hand exhaustive, as in this case. Given the heavy stem-final syllables, the shifts in (4) are then

2 This characterization idealizes the actual data somewhat. Although the text facts are well attested, it appears that for some speakers (and many dictionaries), the position of the primary stress does *not* shift in these cases. We will make no precise attempt to accommodate this idiolect, apparently more conservative, but only note that this is one of several cases which call for a partial qualification of the main view of the text that preservation does *not* extend the range of allowed metrical structures. If we are right in maintaining that all suffixes are metrified, then the stress pattern of *(dócu)(mènta)ble*, with a secondary on a non-weak foot, would show that stress preservation *can* partially subvert the principles controlling the position of primary stress, creating patterns unattested with underived items. A similar case is that of syllables closed by sonorants or *s*, which function as light quite regularly to satisfy stress preservation, but not – or much less regularly – otherwise. The full range of cases of this sort is discussed in 9.5 below.

3 Although both also have the non-exceptional variants *protést*, *translá:te*, while the adjectives only have the variants given.

precisely as predicted by the thesis that *able* is metrified. The latter thesis correctly predicts the shift in (5) as well.

(5) (módify:) ⇒ (mòdi)(fi:a)ble

The metrical structure of the verb in (5) is the one argued for in 3.2 above, and results from the fact that there is no final consonant to induce a null vowel. The antepenultimate stress here is thus like that of nouns (e.g. *américa*). When *able* is attached, the heavy stem-final syllable will necessarily attract stress, whence the shift, just as in (4).

Consider now also that the suffix *able* occurs with *a:te* verbs not only in the manner of (4b), but sometimes (in fact, more often) with "truncation" of that suffix, as in (6).

(6) re(cúpe)(ràte) ⇒ re(cúpera)ble

In general, *able* is "neutral" with this class as well, as shown by (6) and other cases (like *as(símila)ble*, *e(límina)ble*, etc.). However, as we predict, *able* is never neutral when the verb has the structure . . .*(σH)(a:te)*, since then the heavy syllable preceding *able* will again attract stress. This is shown in (7).[4]

(7) a. (démon)(strà:te) ⇒ de(mónstra)ble
b. (ímpreg)(nà:te) ⇒ im(prégna)ble

While the verbs in (7) are about the only ones attested that make this point, intuitions seem clear that the hypothetical cases in (8) would only have stress immediately before *able*, just like those in (7), and not the initial stress of the corresponding *a:te* verb indicated.

(8) ??cómpensable, ??cóncentrable, ??íncarnable,
??ínfiltrable, ??cónfiscable, ??prómulgable

Other cases in which *able* requires remetrification are those of (9).

(9) a. (rémedy) ⇒ re(mé:dia)ble
b. (súrvey) ⇒ sur(véya)ble

4 Note that, while the verb *impregnate can* also bear primary stress on the second syllable, the point of the text stands since *impregnable* cannot bear stress on the first. The latter point stands as well for the variant *démonstrable*, the relevant asymmetry still being provided by standard *demónstrable* versus *demónstrate*, only attested as archaic (fn. 17, chapter 7). We analyze the former variant as *(dé.mon.stra)ble*, with the syllable closed by a sonorant functioning as light, as in *(cóm.for.ta)ble*, and other cases discussed below in the text.

Whereas in the previous cases remetrification was due to the presence of a heavy syllable immediately preceding *able*, in (9) it is due to the fact that the stem has a trisyllabic foot, which cannot be expanded to incorporate the suffix. Note that the antepenultimate stress of the verbs in (9) is predicted in the same way as for the one in (5) *módify*, namely because there is no final consonant to motivate a null vowel.[5]

In contrast to the above analyses, if *able* could evade stress as formerly maintained, there would be no reason why remetrification should occur in any of the cases noted, which we now summarize and further exemplify in (10).

(10) a. d*o*cuméntable = circumventable, implementable, recompensable, interchangeable, manifestable
b. *a*scertáinable = reconcilable, extraditable, realizable, criticizable, recognizable, utilizable, oxidizable, generalizable, diagnosable, prosecutable, executable, substitutable, cultivatable, regulatable, manipulatable
c. pr*o*téstable = diagrammable, programmable
d. tr*a*nslá:table = locatable, updatable, vacatable
e. m*o*difí:able = acidifiable, clarifiable, falsifiable, identifiable, satisfiable, amplifiable, classifiable, verifiable, justifiable, rectifiable, certifiable, notifiable, qualifiable
f. d*e*mónstrable = impregnable
g. r*e*mé:diable = surveyable

Our proposed analysis may seem to have a few difficulties of its own, however, given the cases in (11), in which stress averts a heavy syllable next to *able*, mirroring instead the stress of the stem.

(11) a. ad(mínistra)ble, (hárvesta)ble,
b. (pátenta)ble, (cómforta)ble, (wárranta)ble, (lícensa)ble

Yet, on closer scrutiny, these cases are not problematic, since they all follow from the noted fact that syllables closed by sonorants or *s* can function as light, especially when stress preservation is involved. In fact, consider the verbs in (12).

5 Recall, however, that vowel-final verbs, like nouns, can still end up with final stress, as in *de(fý:ϕ)*, like *kanga(róoϕ)* (fn. 7, chapter 3). Note that, while *survey* may also be stressed on *ey*, *surveyable* cannot have initial stress, hence still sustaining the text discussion.

(12) a. ad(mínister)
b. re(cóverϕ)

While the one in (12b) has the normal stress, the one in (12a) is exceptional in having antepenultimate stress, which will require assuming that no null vowel is metrified here (and an equivalent assumption in other frameworks). Note further the skipped heavy penultimate *nis* in (12a), perhaps due to preservation from *mínister*, in which the final weak syllable is likely to be extrametrical. Because there is no empty slot in the final foot of (12a), the suffix *able* cannot be incorporated into that structure. But this now explains in fact why syncope occurs in *ad(mínistra)ble*, though not in *re(cóvera)ble*, *dis(cóvera)ble*, *de(cíphera)ble*, *ma(néuvera)ble*. Syncope is thus a reflex of stress preservation, required to obtain a well-formed (ternary) foot. Again, if *able* could simply evade metrification, there would be no reason for this, and **admínisterable* would be expected, just like *recóverable*.[6]

8.2.3 Non-neutrality of *ly*

The adverbial suffix *ly* preserves the stress pattern of the corresponding adjective in general, as in (13).

6 Stress preservation seems insufficient to induce the noted behavior of syllables closed by *s*, in **prótestable* of (4a). Plausibly, however, the latter form may be undercut by the alternative *protéstable*, which also satisfies stress preservation, given *protést*.

The case of *régistrable* will invoke the same considerations as *admínistrable*, but the alternative orthography *registerable* may be a residual problem if indicative of actual pronunciation. The same problem arises in any event in *mónitorable*, and a few other similar cases, which would invoke (highly exceptional) tetrasyllabic feet. In this connection, recall fn. 1 above, as well as *(clássifica)(tòry)*, of fn. 19, chapter 6.

Note that the hypothesis that stress preservation can force syllables closed by sonorants or *s* to behave like light ones actually enables us to see verbs like *pátent*, stress-preserving from the corresponding nouns, as having the structure *(pátentϕ)*, with a metrified null vowel as with verbs in general, rather than *(páten)tϕ*, which is the likely structure of the noun. In turn, this may shed light on the asymmetry in (i), discussed in Kiparsky (1982a, p. 12) (analyses ours).

(i) a. tor(méntϕ)$_V$ ⇒ (tórmen)tϕ$_N$ / *tor(méntϕ)$_N$
b. (pàtter)nϕ$_N$ ⇒ (pátternϕ)$_V$ / *pat(térnϕ)$_V$

The asymmetry would follow from supposing that - at least with this class of cases - a final null vowel is metrified according to the usual canons regardless of stress preservation, hence metrified with verbs and not with nouns. Stress preservation would then be impossible in (ia), while *páttern* (ib) would be just like *pátent* above, both being analogous to *(cáver)n* → *(cávernou)s* and other similar cases.

(13) a. (hónes)t ⇒ (hónes)tly
b. at(táina)ble ⇒ at(táina)bly

Such apparent neutrality follows from supposing that, whenever stress preservation demands, *ly* can be extrametrical as in (13), like other comparable final syllables, e.g. the one of (*gála*[k)s]*y*, or (*éffica*)*cy*. In other cases, such as the one in (14), we may suppose *ly* is metrified, again like comparable syllables, e.g. that of *an*(*típathy*).

(14) (déepϕ) ⇒ (déeply)

While it seems difficult to imagine empirical differences between this view and the claim of past analyses that *ly* is altogether ignored by stress, in fact there are some differences. One is represented by the cases in (15).

(15) a. (órdi)(nàry) ⇒ (òrdi)(nárily)
b. (mánda)(tòry) ⇒ (mànda)(tórily)

In American English, while many adjectives in *ary*/*ory* have a final weak foot (as we saw in 4.2.2), for most speakers the same foot becomes strong in the corresponding adverbs in *ly*. This fact follows from the analyses given in (15), namely from supposing that in these cases *ly* is metrified. Then, the final foot, which was weak in the adjective because binary and containing a weak syllable *ry*, becomes strong in the adverb because ternary, whence the stress shift. However, while metrified in (15), *ly* must not be metrified in cases like (16), which is in this respect like (13).

(16) sàtis(fácto)ry ⇒ sàtis(fácto)rily

On our analysis, the adverb in (16) has a sequence of two extrametrical syllables. This is a situation we find elsewhere (see 3.6 above, and below), and which our theory permits. Turning then to the contrast between (15) and (16), recall that, alongside of our "first pass" generalization that all weak syllables may or may not be metrified, we also postulate an asymmetry between weak syllables that are overt and those that are not, to the effect that the former are tendentially metrified, while the latter are not, pending further discussion of verbs, which are so far an exception. As noted at various points earlier, we take this asymmetry to reflect a general alignment of metrical structure and phonetic structure, which may seem natural.[7] Preference for metrification of overt syllables will

7 This of course can only hold language-specifically given, for example, Arabic, in which final null vowels are systematically metrified.

then be satisfied in (14) *(déeply)*, and (15) *òrdi(nárily)*, while in (13) *(hónes)tly*, and (16) *sàtis(fácto)rily*, we take stress preservation to overrule that preference, forcing non-metrification. The case of (15) *(òrdi)(nárily)* will continue to be consistent with stress preservation if we suppose that maintaining stresses on the same syllables is sufficient, even though the prominence relation *between* the stresses has changed. Alternatively and perhaps more naturally, we may suppose the (partial) preservation of (15) satisfies stress preservation in part, and that the partial violation is offset by the inclusive parsing of *ly*.[8]

The above discussion predicts of course that affixation of *ly* should cause a shift in primary stress not only in the *ary/ory* classes, but more generally with any adjective that ends in a weak foot. This seems correct, as shown by (17).[9]

(17) a. (ími)(tà:tive) ⇒ (ìmi)(tá:tively)
b. au(thóri)(tà:tive) ⇒ au(thòri)(tá:tively)

The cases in (17) contrast with those in (18) and many others, in which the adjective does not have a weak final foot, hence yielding no shift.

(18) a. al(térna)tive ⇒ al(térna)tively
b. (cúmula)tive ⇒ (cúmula)tively

The lack of stress shift in (18) – in which we again note the plurisyllabic extrametrical sequence – is thus analogous to that of (13) and (16). In contrast, the facts in (15), (17) are completely unexpected if *ly* can evade metrification.

8 Note that, as for the cases of fn. 2 above, there are speakers for whom shifts like the one in (15) do not occur, and also that most dictionaries do not report such shifts, systematically stressing the adverb like the corresponding adjective. Nonetheless, (15) is by far the most common pronunciation in contemporary American English.

The fact that no comparable shifts occur in British English is entirely predicted, since the latter dialect does not place stress on *ory/ary*, hence patterning systematically like *satisfáctory* in (16).

9 The cases in (i) are also often produced with primary stress on the final foot, in contrast to the corresponding adjectives, which bear only a secondary on the final foot.

(i) (àbso)(lútely), (òppor)(túnely)

Here, for our account to apply, the final foot of the adverb must be trisyllabic (so as to be non-weak). This means that the null V (orthographic *e*) is still present despite its word-internal position. Shifts are not to our knowledge attested with similar words, such as *déstitutely, résolutely*, which we attribute to the single-foot structure of the corresponding adjective, i.e. *(déstitu)te*, etc., in contrast with the two feet in (i).

Suffixation of *ly* does not only alter the selection of which foot is to bear primary stress as in the above cases, but, in others, it alters the position of the rightmost stress itself, as in (19), which obtain for many speakers of American English.

(19) a. (èle)(ménta)ry ⇒ (èlemen)(tárily)
b. (còmpli)(ménta)ry ⇒ (còmplimen)(tárily)

These cases too will follow from our analysis, as we see in the following discussion.

Recall that the metrification of items in *ory/ary* is determined by the interaction of the three conditions in (20), which partially repeats (9) of chapter 7.

(20)

		I	II	III
		#(. . .	(H . . .	ry)
a.	per(fúncto)ry	*	ok	*
	*(pérfunc)(tòry)	ok	*	ok
b.	(mómen)(tàry)	ok	?	ok
	*mo(ménta)ry	*	ok	*
c.	(èle)(ménta)ry	ok	ok	*
	*(élemen)(tàry)	ok	?	ok
d.	(órdi)(nàry)	ok	na	ok
	*(órdina)ry	ok	na	*

Condition I imposes left-hand exhaustiveness; II imposes stress on heavy syllables; and III metrification of the final syllable *ry*. The first two equal (4d) and (4b) on page 166 above, respectively, and are quite general. The third we take to reflect the condition, which is also general, that overt weak syllables be metrified. As schematically indicated in (21) below in the order, (20a) now indicates that II overcomes the conjunction of I and III; (20b) that the "weaker," residual violation of II ("IIres") that obtains when the heavy syllable is closed by a sonorant is overcome by the conjunction of I and III; (20c) that the latter residual violation overcomes III alone; while (20d) shows the effect of III by itself. There are no inconsistencies among any of (21).

(21) a. II > I + III
b. IIres < I + III
c. IIres > III
d. III

When *ly* is attached, two further conditions come into play. One is the noted preferential metrification of that syllable, the other is stress preservation (SP). The question then is why, only in the case of (20c), these further conditions essentially reverse the choice between the two alternatives, whence *(èlemen)(tárily)*. For (20b, d) the answer is straightforward, since **mo(ménta)rily*, **(órdina)rily* would only violate both of the added conditions, in addition to the earlier violations. The remaining cases (20a, c) are a bit more complex, and can be computed as in (22a, b), respectively.

(22)			I	II	III	IV	V
			#(. . .	(H ..	ry)	SP	ly)
	a.	per(fúncto)rily	*	ok	*	ok	*
		*(pèrfunc)(tórily)	ok	*	ok	*	ok
	b.	*(èle)(ménta)rily	ok	ok	*	ok	*
		(èlemen)(tárily)	ok	?	ok	?	ok

The case in (22a) is automatically accounted for by the fact that, as we know, SP overrules parsing of *ly*, as shown by (13a) *(hónes)tly* above, the other three principles still playing out as in the adjective. As for (22b), note that the grammatical variant contravenes SP only partially, since the stress on the initial syllable is maintained. This case is in fact one of "weak" preservation in the sense of chapter 6. We may then presume that parsing of *ly* overcomes the partial violation of stress preservation, and furthermore – in conjunction with condition III – also the partial violation of II, hence reversing the resolution in (21c). In other words, we take the two asterisks in (22b) to jointly overrule the two question marks.

The point of the above exercise is that, within the hypothesis that adverbial suffix *ly* is treated by stress like any comparable syllable, there is a coherent and plausible account of the stress shifts in (19) above, closely related to the account of the shifts in (15), (17), and – like the latter – relying on the interaction of stress preservation and preference for the metrification *ly*). In contrast, if *ly* had the ability to evade stress as maintained in the past, there would be little reason why that ability should be suspended in exactly the cases of (15), (17) and (19).

We note further that stress shifts occur under suffixation of *ly* also with certain bisyllabic items in *ary/ory*, as illustrated in (23a, b) (which hold with some idiolectal variation).[10]

10 There is a certain amount of idiosyncratic variation here. for example, *(cúrsori)ly* does not shift.

(23) a. (príma)ry ⇒ pri(márily)
b. (cóntra)ry ⇒ con(trárily)

Here, the adjectives satisfy left-hand exhaustiveness but not parsing of *ry*, as indicated by the analyses. Presence of *ly* can then be taken to weigh in favor of the latter, reversing the choice, much as with the cases in (19).[11]

In (24) below we thus summarize the cases in which *ly* fails to exhibit its usual "neutral" behavior, and which therefore argue against overall immunity to stress assignment.[12]

(24) a. *o*rdinárily = arbitrarily, customarily, extraordinarily, hereditarily, involuntarily, literarily, mercenarily, militarily, momentarily, monetarily, necessarily, sanguinarily, sanitarily, secondarily, sedentarily, solitarily, temporarily, unnecessarily, voluntarily

b. m*a*ndatórily = conciliatorily, derogatorily, explanatorily, interrogatorily, peremptorily, premonitorily, preparatorily, statutorily, transitorily

c.[13] *i*mitátively = accommodatively, accumulatively, administratively, adumbratively, agglutinatively, aggregatively, alliteratively, annotatively, authoritatively, connotatively, contemplatively, corroboratively, deliberatively, demonstratively, illustratively, imitatively, legislatively, meditatively, multiplicatively, penetratively, qualitatively, quantitatively, reiteratively, vegetatively

d. elem*e*ntárily = complimentarily, documentarily, fragmentarily, rudimentarily

e. pr*i*márily = contrarily, summarily

11 Stress preservation could still obtain partially here, as in the structure (*ϕprì*)(*márily*).

12 The metrification of *ly* is confirmed further by the observation of Halle and Mohanan (1985, p. 59, fn. 3). They note that tensing of "stem-final" non-low vowels as in *city*, *happy*, which is not inhibited by the presence of *ness*, *hood*, as in *happiness* (with tense *i*), is in fact inhibited by the presence of *ful* and *ly*, as in *beautiful*, *happily* (with lax *i*). We find it plausible to suppose that the relevant (necessary, though perhaps not sufficient) condition for tensing is "foot final." Then, if *ly* is incorporated into the last foot whenever possible, as we will argue below is also the case with *ful*, the noted inhibiting effect will follow. In contrast, *ness* and *hood* will not have a comparable effect because, unlike *ly* and *ful* they can be metrified as a separate (weak) foot, as we see below.

13 The list in (24c) presupposes the metrification ...(*a:tive*), with a long *a*, for the adjective, which, however, may not obtain in all cases for all speakers.

8.2.4 Non-neutrality of *ness*

Like *ly*, the nominalizing suffix *ness* is also generally neutral, as in (25).

(25) a. corrúpt ⇒ corrúptness
b. carnívorous ⇒ carnívorousness

However, in cases like (26), a non-neutral pattern obtains for many American speakers.

(26) a. (árbi)(tràry) ⇒ (àrbi)(tráriness)
b. (líte)(ràry) ⇒ (lìte)(ráriness)

The fact that the final foot of the nouns in (26) bears primary stress is for us an indication that it is not weak and hence ternary, like the final foot in the *arily/orily* cases of (15) above. The stress shifts attested with *ness* are in fact rather similar to those found with *ly*. We propose that, like *ly*, *ness* can be metrified as a single syllable, as in (26). As for its neutrality, illustrated by (25), we may not resort to extrametricality as we did for *ly*, since syllables comparable to *ness* are not generally found to be extrametrical. However, we may assume that *ness* can constitute a foot, like the comparable syllables in (27).

(27) a. ex(céssϕ) = success, caress, duress
b. con(féssϕ) = repress, oppress, possess

In (27), we must suppose the final *s*'s have geminate status, in the sense of 3.3 above, yielding a heavy syllable and a well-formed foot ($H\sigma$). The alternative, single syllable, metrification of *ness* as in (26), mirrors that of the comparable syllables in (28), contrasting with those in (27).

(28) (ábsces)s = address, congress, mattress, process

We thus interpret the "neutral" behavior of *ness* as due to the fact that one of the two metrifications it allows is always stress preserving. More specifically, let us say that, if the foot which precedes *ness* is not maximal (i.e. ternary), then *ness* is incorporated into that foot as a syllable, while if it is maximal, *ness* is metrified as a separate foot. The analyses of (25a, b) can now be taken to be as in (29).

(29) a. corrúptϕ ⇒ cor(rúptϕnes)s
b. carnívorousϕ ⇒ car(nívorous)(nèssϕ)

With regard to the stem-final null vowels in (29), we suppose that null vowels are generally eliminated under suffixation, unless they are needed for syllabification. This seems natural since, as we argued, syllabification principles determine the presence of null vowels in general. On this view, the null vowel is thus eliminated in (29b), but maintained in (29a) because of the preceding biconsonantal cluster. As in the case of *ly*, stress preservation thus seems sufficient to ensure compatibility with the stem metrical structure and hence yield the general neutrality of *ness*. While integration of *ly* is always possible because this suffix can be either extrametrical or metrified as a syllable, integration of *ness* is always possible because it can be metrified either as a syllable or as a foot. Since the latter foot will be weak, it will not affect the position of the primary stress. However, the primary stress will shift when either *ly* or *ness* are incorporated into a *weak* foot, causing it to become strong, as in (26) above, and the analogous cases in (30).[14]

(30) a. (ími)(tà:tive) ⇒ (ìmi)(tá:tivenes)s
b. au(thóri)(tà:tive) ⇒ au(thòri)(tá:tivenes)s

Note that preference for metrification of *ness* as a syllable is plausibly analogous to that of *ly*, in the sense that both alternatives *)ly* and *(nessϕ)* misalign metrical structure with the phonetic structure. In contrast to (30), there is no change of primary stress in (31) below, which mirrors the *ly* cases in (18) above, since there is no final weak foot here.

(31) a. al(térna)tive ⇒ al(térna)tive(nèssϕ)
b. i(mágina)tive ⇒ i(mágina)tive(nèssϕ)

In the nouns in (31), we postulate the presence of extrametrical syllables word-medially – a situation that obtains elsewhere under similar conditions of stress preservation, as in *(chàrac)teri(zá:tio)n* and other cases noted in 9.5 below.[15]

The suffix *ness* further mirrors the behavior of *ly* with respect to the cases in (32), analogous to those in (19) and (23) above respectively, again – we presume – for analogous reasons.

(32) a. eleméntary ⇒ elemen(tárines)s
b. prímary ⇒ pri(márines)s

14 Stress shifts seem also possible, as expected in *àbsolúteness, bèllicóseness.*

15 Cases like *(éarnes)tϕ(nèss)*, which will have a stem-final null vowel on the criterion just proposed, will then also have a medial extrametrical syllable.

Hence, once again, our hypothesis accounts both for the general stress neutrality of *ness* and for the various classes of exceptions, which cannot be reconciled with an account of neutrality in terms of stress evasion.

We summarize the non-neutral cases of *ness* in (33), with further examples.

(33) a. *a*rbi(trárines)s = literariness, momentariness, solitariness, sedentariness, sanitariness
b. *i*mi(tátivenes)s = authoritativeness, meditativeness, penetrativeness, vegetativeness, quantitativeness
c. elem*e*n(tárines)s = complementariness
d. pr*i*(márines)s = contrariness, summariness

8.2.5 The metrical status of inflectional suffixes

Inflectional suffixes *ing* and *ed* epitomize stress neutrality, and yet we will propose that they too are subject to normal metrification. Their behavior is illustrated by (34), given in our proposed analyses.

(34) a. pre(véntϕ) ⇒ pre(véntin)g/pre(vénte)d
b. in(hábitϕ) ⇒ in(hábitin)g/in(hábite)d
c. (dócu)(mèntϕ) ⇒ (dócu)(mèntin)g/(dócu)(mènte)d
d. (légis)(là:te) ⇒ (légis)(là:tin)g/(légis)(là:te)d

We attribute the neutral behavior of *ing* and *ed*, especially as in (34c, d), to the fact that they constitute weak syllables – a view consistent with the quality of the vowel, in both cases comparable to the extrametrical *y*/*i* of *(áccura)cy*, *(génera)tive*, etc. Their neutrality is thus due to the fact that, when affixed, they systematically replace another weak syllable – the one with a null vowel. Of course when the *e* of *ed* is phonetically not realized it is itself just the same null vowel. In the rare cases in which the structure of the verb does not include a null vowel that the suffix could replace, the suffix will be extrametrical, e.g. as in *(rémedy)ing*, *so(lídify)ing*. We then see the cases in (34d) *(légis)(là:tin)g*/*(légis)(là:te)d*, as fully parallel to (35a–c), involving other weak syllables.

(35) (légis)(là:te) ⇒ a. (légis)(là:ti)ve
b. (légis)(là:tu)re
c. (légis)(là:to)r

Support for our hypothesis comes from cases like (36), in which, for many speakers, affixation of *ly* causes the primary stress to shift forward, at least as an option.[16]

(36) a. dis(crími)(nà:tin)g ⇒ dis(crìmi)(ná:tingly)
b. pre(médi)(tà:te)d ⇒ pre(mèdi)(tá:tedly)

The behavior of *ly* is duplicated again by *ness*, as in (37).[17]

(37) (díssi)(pà:te)d ⇒ (dìssi)(pá:tednes)s

Suffixes *ing* and *ed* thus behave like other weak syllables here, for example like *ive* of (38) (which repeats earlier examples).

(38) a. (ími)(tà:tive) ⇒ (ìmi)(tá:tively)
b. au(thóri)(tà:tive) ⇒ au(thòri)(tá:tivenes)s

In contrast to (36), no shift occurs when *ing/ed* are not part of a weak foot, as in (39).

(39) a. as(tónishin)g ⇒ as(tónishin)gly
b. (límite)d ⇒ (límited)(nèssϕ)

The reason for this behavior is that the verbs of (39) have already maximal feet, which will not be able to incorporate *ly* or *ness*. The suffixes will therefore be respectively extrametrical and metrified as a weak foot, as argued earlier. Hence, if our previous account of the stress shifts with *ly* and *ness* is correct in attributing them to metrification of those suffixes, then in (36) and (37), *ing/ed* must necessarily also be metrified, since they are within the same final foot as *ly/ness*, contrary to past accounts of their neutrality.

We list the relevant cases with further examples in (40).

(40) a. discr*i*miná:tingly = accommodatingly, aggravatingly, agonizingly, captivatingly, deprecatingly, devastatingly, exasperatingly, excruciatingly, fascinatingly, forebodingly, frustratingly, hesitatingly, humiliatingly, infuriatingly, ingratiatingly, intoxicatingly, irritatingly, nauseatingly, penetratingly, ruminatingly, scintillatingly, suffocatingly, tantalizingly

16 We leave open the question of how exactly to account for idiolects in which the stress shifts do not occur, placing it under the general scope of fn. 2 above.

17 We find no relevant cases of *ingness*.

b. prem*e*ditá:tedly = animatedly, dissipatedly, exaggeratedly, unmitigatedly, unsophisticatedly
c. d*i*ssipá:tedness = complicatedness, exaggeratedness, incorporatedness, opinionatedness, premeditatedness, unsophisticatedness

8.2.6 Metrical consistency

The hypothesis that inflectional suffixes *ing*/*ed* – the former in particular – are metrified can in fact shed light on the so far puzzling fact that verbs distort the usual alignment of metrical and phonetic structures by parsing a null vowel. We have seen elsewhere (3.6, 4.2) that this kind of distortion is usually traceable to some of the other conditions that govern metrification listed in (4) on page 166 above, to which we must add stress preservation. Once we reinterpret the latter principle as suggested in 7.7 above, as a more general principle of "metrical consistency," we can see that verbs will generally be able to be metrically consistent in their occurrences with and without gerundive/present participial *ing* (which are extremely productive alternations) only if both *ing* and a stem-final null vowel are extrametrical, as in **(préven)tϕ*/**(préven)ting*, or if both are metrified, as in *pre(véntϕ)*/*pre(véntin)g*. Since either choice involves a form of misalignment between metrical structure and phonetically realized material, we must find a reason why the latter rather than the former choice is made. We find a plausible reason in the fact that verbs serve as a base not only for *ing*, but also for other – relatively productive – monosyllabic suffixes, like the ones exemplified in (41).

(41) a. in(hábitϕ) ⇒ in(hábita)ble
b. de(dúctϕ) ⇒ de(dúcti)ve
c. de(féndϕ) ⇒ de(féndan)t
d. dis(tríbu)te ⇒ dis(tríbuto)r

In (41), metrification of the null vowel with the bare verb results in the "metrical alignment" of each of the suffixes in (b, c, d). Metrical alignment does not obtain with *able* of (a), where the overt syllable *ble* is extrametrical, but irrelevantly, since the stem parse of the null vowel is still crucial, just to achieve stress neutrality. Our proposal is therefore that verbs metrify a final null vowel because they are productive bases for monosyllabic suffixation, so that the latter metrification results in metrical consistency with the suffixed forms, and a maximal degree of alignment. To put it slightly differently, we are essentially taking the final null vowel of verbs as a sort of null (inflectional) suffix, to be replaced in word-formation by overt suffixes, in the same metrical structure.

The above proposal implies of course that, to the extent that they do not metrify a null vowel, other categories must not be equally productive bases for monosyllabic suffixation, which seems true. In particular, beside verbs, only nouns exhibit inflectional suffixes, which are the more productive suffixes, in the form of the plural morpheme. However, plural (*e*)*s*, like its homophonous third person singular counterpart (or past-tense *ed*), yields an overt syllable only in certain phonological classes (e.g. *churches*), and is thus incomparable to *ing* in this respect and in motivating a stem parse of a null vowel. In the (relatively few) cases in which plural *es* cannot be incorporated into the structure of the stem, it can be readily analyzed as extrametrical, as in (*cálculu*)*ses*, hence limiting misalignment to a small class. As for derivational suffixes, adverbial *ly* would seem to be the most productive. Thus we might expect it to have some impact on its adjectival bases. In this connection, let us consider suffixed adjectives first. With these, while parsing of null vowels would translate into metrification of adverbial *ly* under metrical consistency, e.g. **per*(*sónalφ*) → **per*(*sónally*), there are, however, many cases in which metrical consistency is in fact served by *not* metrifying the final null vowel, such as those in (42).[18]

(42)	a.	pérson	⇒	(pérsona)lφ
	b.	dánger	⇒	(dángerou)sφ
	c.	distríbute	⇒	dis(tríbuti)ve

Specifically, with suffixed adjectives such as those in (42), exclusion of the null vowel of the suffix yields some degree of metrical consistency with their own bases. Although this consistency only obtains in a subset of cases (e.g. not in parent → parental), it seems nonetheless a factor of

18 The reason is that the metrifications *alφ*), *ousφ*), would place stress on the immediately preceding syllable, and hence be stress-preserving only with oxytonic stems, which are rare for both of these suffixes, attaching to nouns. As for *ive*, which attaches to verbs, oxytonic stems are not rare, so that *ive*) would in fact be often stress-preserving. However, the alternative metrification *i*)*ve* results in stress preservation always, with both oxytonic and paroxytonic stems, and is therefore still preferable. See 8.4 below for a more systematic discussion of metrical interaction between stems and suffixes.

some significance, and hence a plausible reason why null vowels are generally extrametrical with suffixed adjectives. Once again metrical consistency ((39) of 7.7) seems to be the driving force in the system.

The above generalization about suffixed adjectives has one exception, however, in the already noted case of *icϕ)*. As we argued in 7.2 above, metrical consistency sheds light on this exception as well, given the rather systematic alternation of *ic* with *ical*, as in *anatómic/anatómical*. It is only if *ic* and *al* metrify as *icϕ)* and *a)lϕ* respectively that metrical consistency of stems can be achieved across all such pairs.

If consistency with their stems is then the correct reason why suffixed adjectives, except those in *ic*, do not parse a null vowel, unsuffixed ones should behave differently. As noted in 3.1 above following in part *SPE*, this is indeed the case. Here, we find oscillation between metrification and non-metrification, as in *abs(tráctϕ)*, *ro(bústϕ)*, versus *(áwkwar)dϕ*, *(hónes)tϕ*. We may therefore suppose that in this case the adverbial alternants in *ly* do indeed have an effect in inducing parsing of the null vowel in their bases. This, effect, however, is apparently weaker than the one due to verbal *ing*, which induces it systematically – a difference which we may attribute to the different productivity/frequency of use of the two suffixes (*ing* being more productive).

In sum, we have proposed that stress preservation/metrical consistency is the crucial factor in determining how right edges are parsed, not only with "neutral" suffixes, but in fact also with non-neutral ones and with unsuffixed stems, determining in particular that a null vowel will be parsed with verbs and with adjectives in *ic*, and also – to a lesser extent – with unsuffixed adjectives. Parse of a null vowel has the effect of "preparing" the metrical structure to host monosyllabic suffixes, thus satisfying metrical consistency.

We must note that, if the above characterization is correct, then it is the notion "morphologically related" that is crucial to metrical organization, rather than the notion of morphological derivation. The reason is that we find not only "forward" metrical consistencies, as in *medícinal* → *medìcinálity*, or *prevént* → *prevéntable*, but also "backward" consistencies, as in *anatómic*, consistent with *anatómical*, and *inhábit*, consistent with *inhábiting*. To maintain a derivational perspective, one would have to postulate a "reverse" derivation, hence derive *anatómic* from *anatómical* by *de*suffixation, as well as *inhábit* from *inhábiting*. In the case of *ic* adjectives, this is precisely the analysis of *SPE* (p. 88). However, there is no independent support for this kind of move in either case, the more logical conclusion being rather that the order of derivation is irrelevant. Notice further that one also finds *cross*-derivational consistencies. As noted, suffix *ic* is consistently *icϕ*), as in *ana*(*tómicϕ*), *aca*(*démicϕ*), *napole*(*ónicϕ*), *ger*(*mánicϕ*) etc., beyond the existence of *ical* counterparts and despite the lack of connection between/among respective derivations.[19] These derivationally heterogeneous cases all point to the generalization of 7.7 above that tendency to metrical consistency is just a general property of *morphemes*. The latter thus select whichever metrical structure can be maintained most consistently throughout their different occurrences. Hence, the morpheme *napoleon* occurs with (partial) consistency in both *napóleon* and *napòleónic*; *anatómic* is consistent with *anatómical*, and *ic* is consistently *icϕ*) in both *ana*(*tomicϕ*) and *napole*(*onicϕ*), despite the non-existence of **napole*(*ónica*)*l*. As noted in 7.7 and earlier, if metrical structure is part of underlying representation, metrical consistency is just part of the consistency of sound and meaning that morphemes have. If stress is assigned by rule, there is no reason why any metrical property should generalize beyond identical derivations.

To conclude this section, we have thus argued that a certain number of suffixes which are generally stress-neutral, namely those in (43), are in fact subject to normal metrification.

(43) a. able, ly, ness
     b. ing, ed

For the suffixes in (43a), the relevant evidence is that they are in fact stress-shifting under particular conditions. For those in (43b), the evidence is that they can occur between a stressed syllable and *ly*/*ness* of (43a) within the same foot. We have shown that supposing that stress preservation can exploit the metrical duplicity of final weak syllables is sufficient to account for the neutral behavior of these suffixes.

8.3 Non-cyclic stress

Having dismissed the hypothesis that the suffixes in (43) above enjoy total stress immunity, we now briefly consider the view that the suffixes in (40) are "non-cyclic," hence subject to only a proper subset of the

19 Note also cases like (*bérnar*)(*dì:ne*), (*cáro*)(*lì:ne*), whose metrification reflects that of (*bèrnar*)(*dí:na*), (*càro*)(*lí:na*), respectively (as noted in Burzio 1987), despite the lack of any obvious derivational link.

stress rules – those of the "non-cyclic" block. The latter view is that of Halle and Vergnaud (1987b), HV, Halle and Kenstowicz (1991). The former two do not, however, discuss explicitly how the non-cyclic stress rules would affect "non-cyclic" suffixes. Putting aside Halle and Kenstowicz (1991) for the moment, we may still test the proposed analysis by simply applying the non-cyclic rules of the HV framework to the suffixes in (43) above. It appears that two rules would be of relevance: HV's (21) "Rhythm rule" (RR), and their (5a–c) "Alternator." We begin with the former.

The cases in (44) may seem to be handled correctly by the RR.

(44) a. [dòcumént] able
b. [òrdinåry] ly
c. [àrbitráry] ness

In HV's analysis, the bracketed portions in (44) have the indicated stresses at the end of the stem cycle. If no affixes are present, the correct pattern is derived via the RR, which essentially retracts the primary stress onto a non-final foot, leaving the final one with a secondary stress. However, if the suffixes are present, the RR would in fact be blocked, yielding the desired results. The reason why the suffixes in (44) can make the RR inoperative is that the latter rule is presumed to apply only when the rightmost stress is on the final syllable (as was briefly discussed in 3.6 above) as is the case with *dócumènt* of (44a). As we noted in 3.6, cases like (44b, c) are supposed to meet the RR condition via the hypothesis (which follows *SPE*, p. 85, pp. 130ff.) that the final *y* undergoes "late" syllabification, so that when the RR applies, that syllable is not present.[20] We note the near-paradox in (44b), where the *y* of *ary* must not be visible to the RR, while the one of *ly* must be. Aside from this, however, the cases in (44) would be derived correctly.[21] Consider now those in (45).

(45) a. [dócumènt] ing, [dócumènt] ed
b. [législàt] ing, [législàt] ed

Parity of reasoning will now predict the same stresses for (45) as for (44). While the final foot in (45) is perhaps arguably less "weak" when the

20 As already noted, it remains unclear how the RR could apply to cases like *authóritàtive*. Presumably, both *i* and *v* would have to syllabify after the RR.

21 Other non-neutral cases discussed in 8.2, such as *modifiable, remédiable*, would not be amenable to this kind of analysis, however.

suffixes appear than when they do not, the primary stress is still clearly on the initial syllable, unlike that of the suffixed variants of (44). Within this general approach, it would therefore not be sufficient to distinguish cyclic from non-cyclic suffixes. It would also be neccessary to distinguish two different classes of non-cyclic suffixes: those which are "seen" by the RR, like the ones of (44), and those which are not, like the ones of (45).

An account of (44) above based on the RR is also insufficient for the cases in (46).

(46) a. [elem*e*ntáry] ly
b. [complem*e*ntáry] ness

As we saw above, the items in (46) have the indicated stresses when suffixed, but are stressed on the italicized vowel otherwise. While our analysis succeeded in adequately relating (46) to (44), the same would seem unlikely under the framework in question, since in (46) these suffixes would have to exceptionally trigger the *cyclic* rules, for no apparent reason.

Let us now consider HV's second rule, their (5a-c) "Alternator," whose function is to stress every other syllable, and which is presumed to operate both cyclically and non-cyclically. Its application in (47) would then place a stress on the italicized vowel, while respecting the stresses of the bracketed portions.

(47) a. [inhábit]*a*ble
b. as[tónish]*i*ngly
c. [límit]*e*dness

Since the primary stresses in (47) are assigned by the cyclic rules, the italicized vowels would receive only secondary stresses, yet this seems incorrect (note that at least the *a* of *able* is clearly reduced). Note too that there could be no recourse to destressing here, since there are no adjacent stresses. Furthermore, while the cases in (47) provide bisyllabic sequences, the "Alternator" is supposed to apply (by default) to monosyllabic sequences as well, e.g. to the initial syllable of *bàndánna*, etc. This means that even simpler cases like *astónishing/límited* would be incorrectly derived with stresses on *ing/ed*.

In sum, within the HV analysis of the suffixes in (43) above as "non-cyclic," there is no obvious account either of their neutrality or of the various deviations from neutrality we noted.

The inadequacy of the latter type of account, which, as mentioned is only implicit in HV's discussion, is confirmed by the fact that Halle and Kenstowicz (1991), who provide a more explicit discussion of neutral suffixes, do *not* uphold it. As noted in 3.7.4, while supposing with HV that neutral suffixes are "non-cyclic," Halle and Kenstowicz crucially claim in addition that non-cyclic application of the "Alternator" proceeds from left to right. In conjunction with a general "crossover" constraint that they postulate, which prevents stress rules from "jumping over" existing metrical structure (here constructed by the cyclic rules), the left-to-right parse will result in non-cyclic suffixes remaining unmetrified. This will then reduce Halle and Kenstowicz's analysis of neutral suffixes to stress–evasion, which is then subject to all of our earlier criticism, as inherently incapable of dealing with the noted deviations from neutrality.

In conclusion, we find no version of the "non-cyclic" stress theory that can account for the behavior of the suffixes in (43) above, although Halle and Kenstowicz (1991) argue that that general approach can adequately handle other facts in various languages.

8.4 The basis of stress neutrality

We have so far argued that stress neutrality follows from normal metrification under stress preservation in a few cases. We now consider more systematically what makes stress neutrality possible.

We begin by noting that, with the exception of V*logy* and V*meter*, whose behavior was discussed in 7.4 above, and a few others which we ignore for the time being, the structure of English suffixes does not exceed two syllables.[22] This gives us the three structural possibilities in (48).

(48) a. -σ
b. -Lσ
c. -Hσ

We note further that, with few exceptions, English suffixes end in a weak syllable, namely either in a consonant, followed by a null vowel, or in *y*,

22 The cases we ignore here are *atory*, *itory*, *ation* and *ici:de*, which we discuss in chapter 9 below.

ive, *ure*, or a syllable with a sonorant nucleus.[23] The three possibilities of (48) thus become those of (49).

(49) a. -W e.g. -ly
b. -LW e.g. -i.cɸ
c. -HW e.g. -is.tɸ

Recall now also how we noted that there are two typical ways in which a suffix can be attached to a metrified stem. One is by "concatenation," that is by placing it in a position completely external to the existing metrical structure, as in (50a). The other is by overlapping it partially – and generally by one syllable – with the existing metrical structure, as in (50b).

(50) a. Concatenation: a(mérica)n_ → americanist
ist

b. Syllable overlap: (pròpa) (gánd*a*) → propagandist
ist

The interaction of (49) and (50) will yield the six logical possibilities of (51), in which ")" is the rightmost foot boundary of the stem.

(51)		I	II
		Concatenation	*σ-overlap*
a.	-W	) W	W)
b.	-LW	) L W	L) W
c.	-HW	) H W	H) W

It is now obvious that, if the rightmost foot boundary of the stem ")" of (51) can be preserved as it is, then the rest of the metrical structure can be preserved as well. Hence, the question of which stem–suffix combination can result in neutrality essentially reduces to the question of which of the six structures in (51) is well formed. The answer to this question is rather simple and is that all cases in (51) except the (italicized) one in (Ib) are well formed. The well-formedness of (Ia) and (IIb, c) is due to the fact that a weak syllable is allowed to be extrametrical; that of (IIa), to the fact that a weak syllable is also allowed to be metrified; and that of (Ic) to

23 A notable exception to the final weak syllable generalization is the suffix *fy:*. Since a final weak syllable is crucial in yielding stress-neutrality as we see in the text, we correctly predict that *fy:* should not be neutral, as in *sólid* → *solídify*, etc., already discussed in 3.2.

the fact that the sequence *HW* can stand as a separate foot. Since that foot is a "weak" foot, it will attract only secondary stress, leaving the primary on the stem, whence the impression of "neutrality." In contrast, the sequence *LW* of (Ib) can neither be extrametrical, nor be parsed as a foot, hence requiring that the boundary to its left be moved. This bars full-scale neutrality, permitting it only in specific cases, e.g. hypothetical *(*gérmani*)*cϕ*, which we put aside for now. The predictions we are therefore making as to which suffixes can be stress-neutral are as in (52).[24]

(52) a. -W: always stress-neutral
b. -LW: stress-neutral only under σ-overlap
c. -HW: always stress-neutral

All suffixes discussed so far behave as predicted by (52). Instances of (52a) are *ly*, *ing*, *ed* discussed in 8.2.3, 8.2.5 above. The case of (52b) under σ-overlap is instantiated by *able*, discussed in 8.2.2, while *ic*, *al*, *ity*, discussed in chapter 6 are cases of (52b) under concatenation, hence non-neutral, although they will still give rise to the "weak" preservation as we saw. Instances of (52c) are *ness*, discussed in 8.2.4, and *ist*. We further illustrate (52a, b, c) in (53), where italics mark stem stress.

(53) a. (h*ó*nes)tly, in(h*á*bitin)g
b. in(h*á*bita)ble, *nap*ó*leonic, **á*ccidental
c. (corr*ú*ptϕnes)s, propa(g*á*ndis)t, a(m*é*rica)(nìstϕ)

Hence, the reason why *able* systematically contrasts with *ic* and *al* as in (53b) is that the former is attached to verbs, whose metrical structure systematically includes a null vowel that *able* supplants, or "overlaps" with, while the latter are attached to nouns, whose metrification does not in general include a null vowel. An even more minimal contrast is provided by non-neutral adjectival *al* of (53b) versus neutral nominalizing *al* of (54).

(54) ap(próva)l, re(vérsa)l, re(bútta)l

24 Of course (52) does not supersede the earlier predictions that even neutral suffixes should change the stress in some cases. Those predictions concern more specific circumstances than (52) considers.

Again, the neutrality of the suffix in (54) is due to its overlap with the metrical structure of the verb.[25]

8.5 Stress preservation and vowel length

The notion of stress preservation which we have introduced in the last few chapters has now undercut our account of vowel length in chapter 5 above, where we took the different positions of stress in (55) to result in the difference in vowel length.

(55) a. blas(phé:me)
 b. (blásphemou)s

The reason is that stress preservation now predicts the same stress in both of (55), and in turn the same vowel length, hence **blas(phé:mou)s*. The case in (55) contrasts with the one in (56), however, in which stress preservation is fulfilled.

(56) a. de(sí:re)
 b. de(sí:rou)s

As we will see in the course of chapter 9, stress preservation fails variably, in the manner of (55) versus (56), but – essentially – only in cases in which stem stress falls on a long vowel. In fact, all of the alternations in vowel length like (55) or *aspí:re/áspirant* – descriptively, the class of "morphological shortenings" of 5.2.2 above – are now all stress-preservation failures. This means that long vowels have a special status, and requires that we modify our analysis of chapter 5 accordingly. In particular, we must reconsider our assumption that vowel length is entirely driven by metrical structure. The necessary modification, which we introduce here briefly, returning to it in chapter 10, consists of supposing that long vowels are present underlyingly to a greater extent than proposed in chapter 5, but tend to shorten in the context of an affix – a process or tendency that we will refer to as "generalized shortening." When the latter and stress preservation are in conflict, as in (55b), (56b) above, either one will prevail in apparently idiosyncratic fashion. Thus, in

25 Note, however, that nominalizing *al* is further constrained to occurring with oxytonic stems, as in all of (54), versus e.g. **édital*, the only exception being *búrial*. We have no account for this fact at the moment. A similar constraint holds also for *en* of both *wooden* and *freshen*, as we note in 9.2 below.

(55b) shortening prevails, while in (56b) stress preservation prevails – satisfaction of both being excluded by the usual foot conditions, barring *($L\sigma$), as in **blas(phémou)s*/**de(sírou)s* (with short *e*/*i*).

8.6 Conclusion

In this chapter we have argued that the phenomenon of stress neutrality does not consist of stress evasion, but rather of a mode of metrification which abides by the usual range of possible feet, but also aims to preserve the stem structure. We have argued that the suffixes that are not neutral are predictably the ones that cannot be integrated into the stem structure. Implicit in our discussion was the assumption that all suffixes that *can* be neutral will be. This fact will follow from the postulated "metrical consistency" requirement, except for the fact that consistency of a stem is achievable at the expense of consistency of the suffix by alternate metrifications of a final weak syllable, as in *a(mérica)(nìst*ϕ) versus *(pròpa)(gándis)t*ϕ. We must therefore suppose that stem consistency is the stronger requirement, overruling suffix consistency, which obtains only when the former is unattainable. We will return to the exact nature of this hierarchy, which we simply state, for now, as in (57).

(57) *Metrical consistency hierarchy: a > b*
   a. Stem consistency
   b. Suffix consistency

The hierarchy in (57) will now correctly describe Fudge's "mixed" suffixes discussed in chapter 7. As we saw, the latter are suffixes which are neutral when attached to a free stem, hence satisfying (57a) (e.g. *a(mérica)(nìst*ϕ)), but impose a fixed stress pattern otherwise (e.g. *an(tágonis)t*ϕ, *re(cídivis)t*ϕ, etc.), hence satisfying (57b) when (57a) is irrelevant.

9 *The range of neutral suffixes*

9.1 Introduction

In this chapter, we will undertake a systematic review of English suffixes, with the goal of showing that the distribution of stress neutrality is indeed the one predicted by 8.4 above. Although some further elaborations will be required, the latter goal will be essentially achieved. Our inquiry will follow the classification proposed in 8.4, considering the structures *W*, *HW*, *LW*, in that order. As in some of the previous chapters, we will rely extensively on Fudge (1984) for facts and descriptive generalizations.

9.2 Weak syllables

One group of suffixes which we take to have the structure *W* is given in (1).

(1)

		Suffix	*Examples*		
I	a.	ly	(hónes)t	⇒	(hónes)tly
	b.	ing	(ségre)(gà:te)	⇒	(ségre)(gà:ti)ng
	c.	ed	(ségre)(gà:te)	⇒	(ségre)(gà:te)d
II	a.	er	(ínter)(vìewϕ)	⇒	(ínter)(vìewer)
	b.	or	(ági)(tà:te)	⇒	(ági)(tà:tor)
	c.	y	(hónes)t	⇒	(hónes)ty
	d.	ive	pro (híbitϕ)	⇒	pro(híbiti)ve
	e.	ure	de (pártϕ)	⇒	de(párture)

The cases in I were discussed in 8.2, and will require no further comment. The cases in II were also discussed earlier. In chapter 7, we noted that, when they are not attached to a free stem, these suffixes generally behave like normal monosyllabic sequences, placing stress one or two syllables away – the "mixed" behavior described by Fudge.[1] Here, we take the suffixal weak syllable to be parsed in all of (a, b, d, e), while being extrametrical in (c). Stress preservation is thereby achieved, since in all cases the suffix replaces a syllable with a null vowel – another weak syllable – in the same structure. For this reason, the final feet of (IIa, b), which are weak in the stem, remain weak in the derived word.[2]

In the cases in (2), preservation of stem stress fails. This, however, is due to the "generalized shortening" we postulated in 8.5 above, so that these cases are a class apart.[3]

(2)	a.	(súbma)(rì:ne)	⇒	sub(márine)r	(*i:* = [iy])
	b.	(éxe)(cù:te)	⇒	e(xécuto)r	
		†(cóntri)(bù:te)	⇒	con(tríbuto)r	
		†o(rá:te)	⇒	(órato)r	
	c.	le(ní:te)	⇒	(léniti)ve	
		(áppe)(tì:te)	⇒	ap(pétiti)ve	
	d.	blas(phé:me)	⇒	(blásphemy)	
		(fá:me)	⇒	(ínfamy)	
		(tó:ne)	⇒	mo(nótony)	
		(téle)(phò:ne)	⇒	te(léphony)	
		(métros)(cò:pe)	⇒	me(tróscopy)	

1 In chapter 7, we did not report *ive* as a "mixed" suffix because we were simply citing Fudge, who (p. 85) only gives it as Pre-stressed 1/2. However, there are approximately 100 items like the one in (IIId) that attest to its neutral behavior.

2 Note, however, the case in (i), where the suffix enables the final foot to attract primary stress.

(i) (ìnter)(cèptφ) ⇒ (ìnter)(céptor)

While we have no exact account of the difference between (II a) and (i), it is clear that there is a sense in which the syllable *or* is less "weak" than *φ*, resulting in a less weak foot.

In contrast to the cases in (IIIa, b), the syllable *er* is perhaps extrametrical in *(márylan)der*, *new(énglan)der*, although an alternative assumption would be that the median syllable, closed by a sonorant, functions as a light one. Cases like *(èxhi)(bítion)er* may also have an extrametrical *er*, but need not, since the alternative would have a structure comparable to attested cases, like *obser(vátiona)l*, or *(méntiona)ble*, in which the sequence *iV* is parsed monosyllabically.

3 Note also the exceptionally non-preserving *(ínfini)te* → *in(fíniti)ve*, where consistency of the suffix, which metrifies prevalently as *i)ve*, exceptionally prevails over stem consistency, in apparent violation of (57), chapter 8. Note, however, that the result is stress-consistent with *(fí:ni:)te*

Given the shortening of the vowel, stress preservation can no longer be achieved – a point which we will address more specifically below. We put aside here the *ative*, *ature* subcases of *ive*, *ure*, which we will discuss separately in 9.4 below.

A further group of suffixes which we analyze as consisting of one weak syllable is that of (3).

(3)	*Suffix*	*Examples*		
a.	es	a(pòca)(lỳpse)	⇒	a(pòca)(lỳpse)s
b.	ce	(tòleran)t	⇒	(tòleran)ce
c.	cy	(àdequa)te	⇒	(àdequa)cy

Plural *es* of (3a) is for us quite analogous to *ed* of (11c). While metrified in the above example, it must be extrametrical in cases like *(cálculu)ses*.[4] The cases in (3b, c) are rather straightforward. In (3b) one null vowel is replaced by another, while in (3c) the null vowel is replaced by *y*. We take the suffix of (3c) to be non-distinct from the *y* of (1II c), the *c* (= [s]) resulting here from spirantization of the preceding *t* (Rubach 1984, p. 28). We maintain a parallel account for *ce* of (3b), where we presume spirantization is induced by the null variant of *y* (to maintain an *SPE* [p. 229] -type of account, as in 3.5 above). Note in this connection the productive alternation *ence/ency* (e.g. *e(quívalen)ce/e(quívalen)cy*), whose identical stresses are unsurprising from our viewpoint.

There is systematic failure of stress preservation in . . .*crat/*. . .*cracy* alternations, as in *dèmocràt/demócracy*. This, we attribute to a process analogous to the "generalized shortening" of vowels, here degeminating a stem consonant under affixation: . . .*crat.tφ* → . . .*cra.t + y*. Although rarer than vowel shortening, this is found in other cases as well, like *infér/ínference*, contrasting with non-degeminating, and hence non-stress shifting *occúr/occúrrence*. We will return to this later on.

We consider now the neutral suffixes of (4).

(4)	*Suffix*	*Examples*		
a.	er	(tàllφ)	⇒	(tàller)
b.	en	(wòodφ)	⇒	(wòoden)
c.	en	(fréshφ)	⇒	(fréshen)

4 Our thesis that the plural morpheme is metrified is supported as well by some cases in which it in fact remetrifies the stem, like *(làryn)x/la(rýnge)s*, *(phàlan)x/pha(lànge)s*, *(phàryn)x/pha(rýnge)s*, *(syrin)x/sy(rínge)s*, although non-remetrifying plurals *(làryn)xes*, *(phàlan)xes*, etc. also exist.

The assumption that these suffixes constitute weak syllables would seem plausible, given their phonetic characteristics, specifically the fact that the final sonorant is plausibly a syllable nucleus. This, however, is not required to account for their neutrality. The reason is that each suffix only attaches to oxytonic stems, with some exceptions like *happier*. This guarantees their integration into the preexisting metrical structure as normal (non-weak) syllables, still yielding stress neutrality. The question then is whether one could look at things the other way round and in fact derive the oxytonic constraint from the assumption that the suffixes in (4) must be metrified. We could thus either suppose that these suffixes do *not* constitute weak syllables, or simply appeal to the observed preference for metrification of overt weak syllables. On this view, the oxytonic constraint is in fact fully derivable from stress preservation for (4c). The reason is that the derived form here is a verb, and as such presumably metrified with a null vowel, which, added to *en*, forms a bisyllabic sequence *en*ϕ. Then, only oxytonic words, namely those with the structure ". . .($\sigma_i\phi$)" will be able to incorporate that sequence, yielding ". . . (σ_i*en*ϕ)." The same considerations do not quite extend to (4a), however, predicting only oxytonic *or* paroxytonic stems here. This is to some extent correct, given the noted *happier*, *cozier*, etc., as well as attested, though not very common *commoner*, *solider*, *slenderer*. In contrast, however, the case in (4b) (*wooden*) appears to have no exceptions to the oxytonic requirement. Furthermore, for both (4b) (*wooden*) and (4c) (*freshen*), the requirement is actually stronger, in that not only oxytonic, but rather *monosyllabic* stems seem to be required. We are thus facing two possibilities: (i) take the oxytonic/paroxytonic constraint as a primitive, in which case the stress neutrality is accounted for whether or not these suffixes constitute weak syllables; (ii) take stress neutrality/preservation as the primitive, in which case, if these suffixes are metrified, the oxytonic/paroxytonic constraint is derived, though only in part. We tentatively opt for (ii) despite the residual problem, since stress preservation is an independently established principle, while we find no independent reason for an oxytonic/paroxytonic constraint.

Note that, under option (ii) above, the suffixes in (4) will be so far unparalleled, since we have seen that stress preservation generally obtains only to the extent that stem and suffix permit, with stem remetrification occurring otherwise. Here, in contrast, stems which *would* require remetrification seem to be excluded. We will see later on that this phenomenon extends to other cases, and that the distinction between suffixes that can reparse the stem and those that cannot, and hence exclude stems with which they cannot be integrated, is an important one.[5]

Turning to one final case with the structure *W*, the neutrality of the suffix in (5) will be straightforward, reducible to the usual two options of metrification or non-metrification of the suffix.

(5)	*Suffix*	*Examples*		
	y	(góssi)p	⇒	(góssipy)
		(chócola)te	⇒	(chócola)ty

In conclusion, our claim that suffixes analyzable as a single weak syllable will always be stress-neutral seems correct.

9.3 The structure Heavy–Weak

9.3.1 Introduction

We now turn to the fairly sizable number of suffixes with the structure *HW*, arguing that our account of neutrality holds here as well, *modulo* certain extensions. We will first examine the "mixed" suffixes, which attach to both bound and free stems, and then turn to those that attach to free stems only. At the end of the section we will consider a third subclass, made up of suffixes that essentially attach only to bound stems. The organization will follow further subdivisions based on the internal structure of the suffix, such as vowel- versus consonant-initial, and closed syllable versus syllable with a long vowel.

9.3.2 *ist, ism*

The two suffixes in (6) behave quite similarly.

(6)		*Suffix*	*Examples*		
	a.	ist	a(mérica)n	⇒	a(mérica)(nìstϕ)
	b.	ism	(còsmo)(pólita)n	⇒	(còsmo)(pólita)(nìsmϕ)

5 A similar kind of account for *dom*, *some*, exemplified in (i), is suggested by the fact that in general these suffixes (not very productive) occur only with relatively short stems.

(i)	a.	(dúke)	⇒	(dùkedo)m
	b.	(quárre)l	⇒	(quàrrelso)me

A few cases, like (*shériff*)*dom*, (*frólic*)*some*, may perhaps suggest that the suffix (which has a reduced vowel) can also be extrametrical.

Among other stems, these suffixes are rather productively attached to adjectives in *al*, *an*, *ar*. In many such cases, like those in (6), the suffix cannot be incorporated into the final foot of the stem which is already maximal (i.e. ternary). As we did in 8.2.4, we presume the suffix is in these cases metrified as a separate weak foot, bearing secondary stress. We have noted at various points that perceptual evidence is generally ambiguous as to the presence of secondary stress on heavy syllables with unreduced vowels. That is true here as well. Hence the evidence that the suffix bears stress is only indirect, or theory-internal, represented by our account of stress neutrality, and is in this respect like the evidence that there is no stress on the final syllable of *alumni:*, or *adirondack* (3.2, 3.7.2 above).

Note too that, as argued in 7.4, we take the relevant syllabification of the suffix in (6b) to be *is·mφ*, parallel to *is·tφ*, rather than *i·sM*, with a syllabic *m*, which would have the structure *LW*, analogous to *a.bL*, with a syllabic *l*. Support for this analysis comes from the independent fact that *ism* can constitute a foot in, e.g. *écumenìsm*, where the structure *LW* would predict **e.cu.mé.ni.sm*. A phonetically comparable sequence must obviously also be metrified as a foot in *schísm*, *prísm*, etc. (while a foot *áble*, with a short *a* is quite unattested).

In contrast to the examples in (6), we suppose that, when the stem has a binary and hence expandable foot, the suffix is metrified as a syllable, as in *(ló:calis)m*, *(lé:galis)t*, *(pá:ganis)m* (we will return to the fact that stem vowels stay long in these cases), hence satisfying its own metrical consistency as well (recall 7.4 above). Syllable metrification will also be presumed for the rather frequent occurrence of these suffixes after *ic*, where they systematically replace the null vowel of *icφ*), as in *or(gánicφ)* → *or(gánicis)t*. The same syllable metrification can also be maintained for the numerous stems in *ology*, e.g. *(ànthro)(pólogy)* → *(ànthro)(pólogis)t*, and likely also for those in *ion*, e.g. *iso(látio)n* → *iso(látionis)m*, parallel to *organi(zátiona)l*.

Note that, in the case of syllable metrification into a *weak* foot, stress shifts ought to occur due to the new foot being strong. This is true, though (as in the case of *ness/ly*) with some idiolectal variation, as shown in (7), where primary stress on the final foot seems quite acceptable, perhaps more in (a) than in (b), for unclear reasons.[6]

6 We note the contrast between *(òppor)(túnis)m*, with (possible) stress shift, and *(ábsolu)(tìsmφ)*, with no shift. The contrast is predictable from the fact that *(ábsolu)te*

(7) a. (òppor)(túnis)t = (anec)(dotis)t, (metal)(lurgis)t, (para)(chutis)t

b. (mə̀ni)(cúris)t = (mono)(loguis)t, (motor)(cyclis)t, †(saxo)(phonis)t

Unlike all of the above cases, stress preservation fails in (8), but again because of generalized shortening.[7]

(8)	a.	(téle)(phò:ne)	⇒	te(léphonis)t
	b.	(métros)(cò:pe)	⇒	me(tróscopis)t
	c.	hyp(nó:si)s	⇒	(hýpnotis)t
	d.	(míli)(tà:ry)	⇒	(mílita)(rìstϕ)
	e.	(álle)(gò:ry)	⇒	†al(légoris)t

It is easy to see that, once the pre-suffixal vowel is short, neither parse of the suffix will enable that vowel to be stressed, since, e.g. **tele(phónis)t*, **tele(phónistϕ)* are both ill-formed, as instances of (non-initial) ($L\sigma$), and ($\sigma H\sigma$) respectively.

9.3.3 *ant, ent, ance, ence*

Considering now the suffixes in (9), we note that those in (b) are just the spirantized counterparts of those in (a) in the sense of (3b) above.[8]

(9)		*Suffix*	Examples		
	a.	ant	in(hábitϕ)	⇒	in(hábitan)t
		ent	de(péndϕ)	⇒	de(pénden)t
	b.	ance	in(héritϕ)	⇒	in(héritan)ce
		ence	de(péndϕ)	⇒	de(pénden)ce

These suffixes are almost exclusively attached to verbs. Syllable metrification, replacing the final null vowel of the verb, will then suffice to yield

can be metrified in a single foot, while *(óppor)(tùne)* requires two, given the heavy syllable *por*. This will result in *(ábsolu)(tìsmϕ)*, with a weak final foot, versus *(òppor)(túnis)m*, with a non-weak one.

7 Note, however, that **(télepho)(nìstϕ)*, preserving the initial stress, would be expected, parallel to *(mílita)(rìstϕ)*. This discrepancy generalizes to **(télepho)ny*, **(éxecu)tor*, **(áppeti)tive*, **(démocra)cy*. In all of these cases, the preferred metrification of the suffix prevails over partial stress preservation, a residual idiosyncrasy.

8 Note also the further variants *ancy*, *ency*, which have the same metrical behavior as their counterparts in (9b).

the observed neutrality. Note that the syncope of (10a) below, versus no syncope in (10b), will make the same point as *administrable* of 8.2.2 above. That is, if these suffixes were neutral because simply invisible to the metrical principles, then **admínisterant*, **régisterant* should be equally possible as *delíverance*.

(10) a. ad(mínister) ⇒ ad(mínistran)t
b. de(líverϕ) ⇒ de(líveran)ce

Instead, we can account for the syncope in (10a) in terms of stress preservation, and the condition that the suffix be parsed as a syllable (rather than a foot), which in turn reflects the suffix's own metrical consistency. Both are satisfied without syncope in (10b).

Like the syncope of (10a), the truncation of (11a) versus the non-truncation of (11b) will also receive a natural metrical account.

(11) a. (óccupy:) ⇒ (óccupan)t
b. com(plý:ϕ) ⇒ com(plí:an)t

The verb in (11a) must not metrify a null vowel, the foot already including three syllables. But the one of (11b) must, monosyllabic feet being excluded. The assumption that the suffixes of (10) metrify as syllables will then again yield the desired results, since, for stress preservation to obtain, the suffix will have to displace the final *y* in (11a), but not in (11b). If *ant* was neutral because irrelevant to stress, **óccupi:ant* should have the same status as *complí:ant*. The contrast in (11) also supports our claim of 3.2 above that final syllables with long vowels need not carry stress. If the one of *occupy:* was stressed like that of *comply:*, then again **occupí:ant* should obtain.

Finally, we also predict the changes of stress in (12).

(12) a. (máni)(fèstϕ) ⇒ (màni)(féstan)t
b. (tríum)ph ⇒ tri(úmphan)t
c. (lúxury) ⇒ lu(xúrian)t

The change in (12a) follows from the fact that the final foot becomes strong under suffixation – a now familiar phenomenon. The ones in (12b, c) follow as cases of suffix consistency overruling stem consistency. This reversal of the usual pattern seems to shed light on the nature of (57) of 8.6: "stem consistency > suffix consistency."

Consider that, in general, suffix consistency, as with non-neutral suffixes, corresponds to remetrification of a large number of stems – a substantial portion of those that the suffix occurs with. In contrast, stem consistency, namely neutrality, corresponds to at most two different metrical structures for the suffix – one excluding and one including the final weak syllable. Thus, for each individual suffix, stem *in*consistency generally yields a much greater proliferation of metrical structures than suffix inconsistency. Supposing then that metrical consistency reflects a general "economy" of lexical representation, it is clear that such economy will be better served in general by stem consistency than by suffix consistency, whence their ranking as in (57) of 8.6. What is peculiar about the suffixes in (9) and a few others is that they generally satisfy *both* stem and suffix consistency, occurring schematically, as in: . . .*ϕ*) → . . .*an*)*t*. The reason is essentially that they attach primarily to verbs. Hence, unlike other cases, the number of stem remetrifications required to maintain suffix consistency here is very small – plausibly a cost worth bearing, whence exclusion of *(*tríum*)(*phàntϕ*), *(*lúxurì*)(*àntϕ*). We are unable, however, to account for the fact that the final vowel of *luxury* does not truncate like that of *occupy* in (11a), to yield *(*lúxuran*)*t*, like (*óccupan*)*t*.

Like others, the suffixes in (9) have their share of failed preservations due to generalized shortening, illustrated in (13).

(13) (ásp*i*ran)t, (ígn*o*ran)t, [in](cógn*i*zan)t, sig(níf*i*can)t, (cónf*i*den)t, (ábst*i*nen)t, (prés*i*den)t, (rés*i*den)t, (préc*e*den)t, co(ínc*i*den)t

Note also cases like *ap*(*plý:ϕ*)/(*ápplican*)*t*, (*sígnify:*)/*sig*(*nífican*)*t*, where, beside generalized shortening, insertion of *c* occurs – a process that generalizes to other vowel-initial suffixes, as in *appliCation*, *modifiCation*. Note here that *c* insertion and shortening cluster, as shown by *applicable* versus *deni:able*, *modifi:able* – a point to which we will return.[9]

9.3.4 *ment*

In partial similarity to the ones in (9), the suffix in (14) attaches only to verbs.

		Suffix	*Examples*		
(14)	a.	ment	ad(júst*ϕ*)	⇒	ad(júst*ϕ*men)t/ad(júst*ϕ*)(mènt*ϕ*)
	b.		de(vélop*ϕ*)	⇒	de(vélop)(mènt*ϕ*)

9 Stress-preserving *(*sígnifì*)(*càntϕ*) is excluded by the noted suffix consistency, imposing *an*)*tϕ*.

As discussed in connection with *ness* in 8.2 above, we suppose that stem-final null vowels are eliminated under suffixation except where needed by syllabification. This means that they are always eliminated when the suffix is vowel-initial. When the suffix is consonant-initial as in this case, elimination will occur up to the maximal syllable, hence in (14b) *de.ve.lop.men.tϕ*, but not in (14a) *ad.jus.tϕ.men.tϕ*. As a result of this, stress preservation will be possible in (14a) under either metrification, as indicated, but in (14b) only under foot metrification, since the alternative would yield **deve(lópmen)t*, *lop* being a heavy syllable. Various other cases in which the stem has a foot which is already maximal and does not include a null vowel, like those in (15), will also require foot metrification of *ment*.

(15) a. ac(cómpany) ⇒ ac(cómpani)(mèntϕ)
b. im(póveri)sh ⇒ im(póverish)(mèntϕ)

Note that the independent availability of foot metrification in (14b) explains why there is no remetrification in (15a, b), in contrast to (12b, c) *triúmphant*, *luxúriant*, which reflected consistent syllable metrification of the suffix.

The stress shift in (16) recalls other familiar ones.

(16) (ádver)(tì:se) ⇒ †(àdver)(tí:semen)t

We presume here that the null vowel is retained (i.e. *ad.ver.ti:.sϕ.men.tϕ*) for the same reasons as in (14a). When the suffix is metrified as a syllable as indicated, it will then render the final foot trisyllabic, thus non-weak, whence the shift. However, note that, if the suffix can also metrify as a foot as in (14a), hence as in *(adver)(ti:se)(mentϕ)*, then the last two feet would both be weak, no longer predicting the stress shift too obviously. Since the latter seems in fact less than obligatory, this result may not be problematic, but we will leave this as an open question (although we suggest later on that two consecutive weak feet may be excluded).

We regard the non-preserving variant of (16) above *advértisement* and the other similar cases in (17), as instances of generalized shortening.[10]

10 The non-preserving character of some of these cases is not entirely straightforward, however. On the text criteria, the stem-final null vowel should be dropped in *ad.ver.tis.men.tϕ*, if the vowel shortens. If the suffix is then metrified as a syllable, stress-preserving **adver(tísmen)t* seems incorrectly predicted, since the penultimate is heavy. In contrast to the latter possible problem, we correctly predict the stress differ-

(17) †chást*is*ement, †amórt*is*ement, íncr*e*ment, éxcr*e*ment

9.3.5 *ize, ite*

Continuing with suffixes that instantiate the structure *HW*, we now turn to those in which the heavy syllable results from a long vowel, such as the one in (18).

(18)		*Suffix*	*Examples*		
	a.	i:ze	(èuro)(péa)n	⇒	(èuro)(péa)(nì:ze)
	b.		a(mérica)n	⇒	a(mérica)(nì:ze)

As we argued above, we take stem-final null vowels to be always suppressed with vowel-initial suffixes like this. This suffix attaches productively to adjectives in *an/al/ar*, yielding verbs. In those cases, its neutrality will follow from metrification as a weak foot as in (18), which also conforms with the general metrification of verbs, parsing the final null vowel. This suffix is also found with a number of stems in *ic*, as in (19).

(19)				
	a.	ro(mánticϕ)	⇒	ro(mánti)(cì:ze)
	b.	i(tálicϕ)	⇒	i(táli)(cì:ze)

The same "foot" metrification of the suffix will correctly analyze these cases as well. Here, the suffix takes over the position of the stem null vowel, hence systematically reducing the preceding foot from ternary to binary. Because of this, the structure of verbs in *icì:ze* will be normal not only in metrifying the null vowel, but also in satisfying the "Strong Retraction" condition ((4a), p. 166 above), which imposes a binary foot before a final weak foot. Hence, in (19), stress preservation and the "Strong Retraction" condition concur.

In contrast, there are other cases in which the two above conditions do *not* concur. In those cases, we find that stress preservation usually prevails over Strong Retraction – the normal pattern, as in (18a) *a(mérica)(nì:ze)*. Yet, the items in (20), from *SPE* (p. 154), seem to instantiate the opposite resolution, satisfying Strong Retraction but not stress preservation (stem stress italicized).

ence between non-preserving *(íncremen)t*/*(éxcremen)t*, and equally shortening but preserving *im(pédimen)t*. The difference is due to insertion of *i*, presumably a spell-out of the stem-final null vowel, in the latter case.

(20) a. d*e*(mócra)(tì:ze), d*i*(plóma)(tì:ze)
b. c*a*(thóli)(cì:ze), p*o*(líti)(cì:ze)

To account for this, *SPE* (p. 154) proposed that *i:ze* has in fact two variants: one stress-neutral as in (18), which occurs with a word boundary "#" to its left (blocking the stress rules), the other non-neutral as in (20), which occurs with a morpheme boundary "+" (allowing stress rules to reapply). There is reason to believe, however, that more general factors than an idiosyncratic property of *i:ze* are at work. Beginning with (20a), recall (7.4 above) that we suppose the morpheme *crat* of *démocràt*, etc. bears stress, and is underlyingly /crattϕ/ – an assumption which we now extend to /mattϕ/ in *díplomàt*. As argued in 7.4, failure of stress preservation can be attributed here to a process of degemination parallel to the generalized shortening of vowels, an assumption applicable also to cases like *in(férrϕ)* → *(ínferen)ce*. This will now exclude stress on *crat*, *mat*, leaving the question of why partially preserving **(démocra)(tì:ze)*, **(díploma)(tì:ze)* do not obtain. Here we presume indeed that Strong Retraction prevails over stress preservation, but now facilitated by the fact that preservation would only be partial. There are in fact other cases where Strong Retraction also overrules (full) preservation, like *o(xýge)(nà:te)*, *hy(dróge)(nà:te)* (already noted, fn. 39, chapter 3), which exist alongside of the preserving variants *(óxyge)(nà:te)*, *(hýdroge)(nà:te)*, an oscillation also paralleled by *ge(láti)(nì:ze)/(gélati)(nì:ze)*. This shows that stress preservation generally prevails over Strong Retraction by a relatively narrow margin, plausibly eroded in (20a) by the factors noted. That the non-preservation of (20a) is thus not a peculiarity of *ize* is also shown by the fact that it extends to other suffixes attaching to the same stems as in *de(mócracy)*, *di(plómacy)* (versus preserving *(présiden)cy)*.

Turning now to the cases in (20b), we note that these have stems *(cátholi)c*, *(políti)c*, which instantiate the exceptional metrification *i)c*, versus normal *icϕ)*. The generalization that we find at work here, for which, however, we claim no precise understanding, is that exceptional metrifications are regularized in word-formation, as *(órchestra)*, where *ches* is treated as a light syllable, is also regularized to *or(chéstra)l*. Like the one in (20a), the phenomenon in (20b) is therefore also not a peculiarity of *i:ze*, as further shown by *ca(thólicis)m*. In sum, when Strong Retraction and stress preservation are in conflict, either may prevail, although the latter does so more generally. Other factors not specific to *i:ze* also contribute to the outcomes in (20), however, in particular degemination of *cratt/matt*, and regularization of stem stress under affixation.

Returning to the cases in which stress preservation does obtain, *i:ze* can in fact consistently maintain its normal metrification as a foot in most of those cases. Only a handful invoke syllable metrification, like the ones in (21), as well as the variant *ca(náli:)ze*, while the alternative *(cána)(lìze)* might be due to "degemination" from *ca(nállϕ)*.

(21) a. (ànthropo)(mórphy) ⇒ (ànthropo)(mórphi:)ze
b. (pròpa)(gánda) ⇒ (pròpa)(gándi:)ze

Generalized shortening occurs with the usual frequency with this suffix, affecting the italicized vowels in (22), which thus end up unstressed. We also note shortening *(cóncre)(tì:ze)*, alongside of the preserving variant *con(cré:ti:)ze.*

(22) (állego)(rì:ze), (mílit*a*)(rì:ze), (prósel*y*)(tì:ze), (ímm*u*)(nì:ze)

Notice that, while we are supposing that, in general, the same range of metrical structures (feet, etc.) needed for underived items suffices to account for stress preservation, we have also noted at various points that this is not entirely true. For instance, syllables closed by sonorants or *s* function as light under stress preservation with some frequency, as in the noted *(pátenta)ble*, but rather rarely otherwise.[11] Another case in point is word-medial (though never foot-medial) extrametricality, illustrated by (23).

(23) (chárac)ter ⇒ (chárac)te(rì:ze)

Note that the extrametricality of the final syllable of *character* is independent of our specific analysis of neutrality, since it is also required for *(chàrac)teri(zátio)n*, to which we will return, and in which two syllables appear to be extrametrical.

Turning now briefly to the nominalizing suffix *i:te*, neutrality in (24) requires parsing the suffix as a foot, while other cases, like *su(búrba)(nì:te)/su(búrbani:)te*, can be accounted for under either parse, and are perhaps ambiguous as discussed in 7.3.

(24) *Suffix* *Examples*
i:te (béthlehe)m ⇒ (béthlehe)(mì:te)
(ísrae)l ⇒ (ísrae)(lì:te)

11 Analogously in *(prótestan)t* (3.4 above), whence also *(prótestan)(tì:ze)*.

9.3.6 *ary, ory, ery*

The suffixes *ary/ory/ery* are also classified by Fudge as stress-neutral (i.e. "mixed"), like the ones we have so far considered. We take these to also have the structure *HW*, abstracting away from the *r*-induced laxing of the vowel – at work as well, for example, in *àuthoritárian*, where "C*i*V" lengthening would otherwise yield long *a*, as in *caná:dian*. As we saw in 7.3 and 8.2 above, with underived items, suffixes of the *σry* class metrify in American and British English as in (25I, II) respectively.

(25)		I *American*	II *British*
	a.	(H σ)ry: re(fécto)ry	(H σ)ry: re(fécto)ry
	b.	L(σry): vo(cábu)(làry)	L σ)ry: vo(cábula)ry

These metrifications, which result in part from dialect-specific choices, and in part (Ia) from the alignment of heavy syllables with stresses, turn out to automatically account for stress neutrality in most cases, like those in (26).

(26)				I *American*	II *British*
	a.	re(fráctɸ)	⇒	re(frácto)ry	re(frácto)ry
	b.	i(mágine)	⇒	i(mági)(nàry)	i(mágina)ry

The reason is that, in most cases, the stem is a verb, and the suffix is attached by σ-overlap, supplanting the null vowel. Then, when the final foot of the stem is a binary ($H_1\sigma_2$) as in (26a), the syllable preceding *ry* replaces σ_2 in the same foot, satisfying (25a) in both dialects. When the final foot of the stem is a ternary ($\sigma_1 L_2 \sigma_3$) as in (26b), the syllable preceding *ry* replaces σ_3, maintaining the same foot in British English and satisfying (25bII), while in American English it will reduce that foot to a binary ($\sigma_1 L_2$), followed by a weak foot (*σry*). The latter case will then also satisfy the "Strong Retraction" condition (binary foot) imposed by the final weak foot. The cases in (27a, a′) are all analogous to (26a), while those in (27b) are like (26b).

(27) a. Am./Br. di(récto)ry = distillery, dispensary, introductory, suspensory, contradictory

a′. Am./Br. ad(ví:so)ry = supervisory, refinery, cajolery, machinery, †secretory

b. Am. de(pósi)(tòry)/Br. de(pósito)ry = contributory, prohibitory, promissory, imaginary

Integration into the stem metrical structure and concurrent satisfaction of (25) is also possible with a number of nouns, as in the examples in (28).[12]

(28) a. Am./Br. buf(fóone)ry = lampoonery, exemplary, perfumery
b. Am. abo(lítio)(nàry)/Br. abo(lítiona)ry = evolutionary, exclusionary, inflationary, reactionary
c. Am. he(rédi)(tàry)/Br. he(rédita)ry
d. Am. (hóno)(ràry)/Br. (hónora)ry = planetary, statuary, tributary, statutory, budgetary, customary, urinary

So far, stress preservation has been consistent with the general conditions for underived items in (25). To see whether it has any detectable effect, we should consider cases in which the syllable preceding *σry* is heavy and unstressed in the stem. That syllable should then become stressed if (25a) above prevails, but not if stress preservation prevails. The items in (29) may suggest the former.

(29) (cómplemen)t ⇒ Am./Br. (còmple)(ménta)ry = alimentary complimentary, documentary, elementary, filamentary, parliamentary, rudimentary, supplementary, testamentary, codicillary

Yet, while non-"neutral," the cases in (29) are still (weakly) preserving, the ternary foot of the stem being merely reduced to binary ("–1" shift). In fact, these cases are just like Am. *i(mágine)* → *i(mági)(nàry)*, *he(rédity)* → *he(rédi)(tàry)* of (26)/(28), except that in (29) the primary stress is demoted to secondary, the new final foot being strong. But we independently know that stress preservation does not necessarily enforce the distinction between primary and secondary stresses, witness *(mìli)(tárily)*, *(òppor)(tú:nis)t*, *(màni)(féstan)t*, *(àdver)(tí:semen)t*. Hence,

12 The cases in (i), involving monosyllabic stems, are also in (28a).

(i) bindery, bravery, brewery, bribery, cannery, clownery, deanery, fishery, foolery, forgery, greenery, gunnery, hatchery, hosiery, mockery, quackery, scenery, sensory, shrubbery, slavery, smeltery, snobbery, tannery, thievery, trickery, trumpery, winery, witchery

Note the expected shift in *(déma)(gò:gue)/(dèma)(gó:gue)ry*, in contrast to *còntradict/còntradictory*, in which the stem *contradict* exceptionally bears primary stress on the final weak foot. Note also the predictable difference *(díscipli)ne* → Am. *(díscipli)(nàry)*, versus non-preserving Br. *disci(plína)ry*, due to the ill-formed foot of *(dísciplina)ry*, although Br. (syncopated) *(dísciplin-)ry* is also attested.

while being exceptions to Fudge's "neutral" classification, the cases in (29) are in fact as we predict, and they still satisfy both (25) and stress preservation.

Another set of cases in which (25) and stress preservation may appear to conflict is that of (30).

(30) (cómmen)t ⇒ Am. (cómmen)(tàry)/Br.(cómmenta)ry = fragmentary, momentary, legendary, secondary

These cases are stress-preserving in both dialects, and would seem to violate (25a). Yet they do not. For recall (4.2.3) that syllables closed by sonorants are treated as light by (25a) above, as shown by underived Am. *(séden)(tàry)*/Br. *(sédenta)ry*; Am. *(réper)(tòry)*/Br. *(réperto)ry*, though only when left-hand exhaustiveness is thereby achieved, hence not in (29) *compleméntary*. Descriptively, the condition in (25a), repeated in (31a), thus manifests the class of exceptions in (31b), in which "H_n" is a syllable closed by sonorant.

(31)	I *American*	II *British*
a.	(H σ)ry: re(fécto)ry	(H σ)ry: re(fécto)ry
b.	#(σ H_n)(σ ry): (réper)(tòry)	#(σ H_n σ)ry: (réperto)ry

Note now finally that (31b) has itself the class of "exceptions" in (32a), from HV (p. 259), to which we add those in (32b), repeated from (27)–(28) above.

(32) a. Am./Br. dis(pénsa)ry = infirmary, compulsory, responsory, placentary

b. Am./Br. sus(pénso)ry = exemplary, distillery

These cases – exceptions to the rule of "sonorant destressing" of HV (see 4.2.3 above) – are for us the predicted cases of stress preservation (from *infírm*, *dispénse*, *compél*, etc.), precisely as claimed in Kiparsky (1979, pp. 430f.), and in fact the only cases where stress preservation is detectable (i.e. non-vacuous).[13] Our account of (32) is thus in essence that stress preservation overrules exhaustiveness (which is part of (31b)), as it does in general. The "alignment" condition (31a) is in fact satisfied in (32),

13 The fact, noted by HV, that the relation between *compel* and *compulsory* is not straightforwardly expressible in phonological terms, raises no great concern here, since we are not associating stress preservation with formal derivations, but only with the notion of "related words," arguably satisfied by this pair.

because syllables H_n, while (near) light when unstressed, are still *bona fide* heavies when stressed.[14]

Alongside of the above preservation cases, we find of course the usual share of failures due to generalized shortening, given in (33).

(33) Am. (éxcr*e*)(tòry), (sál*i*)(vàry), (ánt*i*)(quàry), (súppl*e*)(tòry)

These cases contrast with those in (27a′) *adví:sory*, where preservation succeeds, and also with their preserving British counterparts *ex(cré:to)ry*, *sa(lí:va)ry*, *an(tí:qua)ry*, *sup(plé:to)ry*. We will return to this quasi-systematic difference between the two dialects (already noted in 4.2.2).

The considerable degree of empirical equivalence that we have noted between the conditions in (25) above and stress preservation may in fact help us further motivate the latter conditions, given the independent existence of stress preservation. Recall that in 7.3 above we claimed that the alternating American metrification $(H\sigma)ry/L(\sigma ry)$ results from the interplay of two forms of metrical alignment: stress on heavy syllables, and right-hand exhaustiveness, with the former prevailing over the latter. However, we had also noted that the invariant British $\sigma)ry$ systematically violates exhaustiveness for no apparent reason. One reason has come to light since, however, and is suffix consistency, which the American dialect violates. By itself, this will be insufficient to distinguish British English from a hypothetical dialect with the consistent metrification (σry), which, however, does not seem to exist. The ranking of stem consistency over suffix consistency of (57) in 8.6 above will make that distinction, however, since it is clear that this third hypothetical dialect would fail to achieve stem consistency (= stress preservation), e.g. *refráct* → *(*réfrac*)(*tòry*). The three *a priori* conceivable dialectal variants thus pattern with respect to the relevant principles as in (34) – American and British instantiating different resolutions of the conflict between right-hand (RH) exhaustiveness and suffix consistency, while the third variant is excluded as non-stress-preserving ("%": partially satisfied).[15]

14 This discussion has left out just a few cases, like (*báptiste*)*ry*, (*sávage*)*ry*, (*ímage*)*ry*, all preserving but idiosyncratically metrified as ...*e*)*ry*, even in American English. The light syllable-like behavior of *Vs* in *baptistery* is familiar from other examples, like (*prótestan*)*t*, (*órchestra*) or British (*mónaste*)*ry*.

15 As we saw in fn. 10, chapter 4, however, late-eighteenth-century British was rather similar to III of (34). We may perhaps conjecture that final syllable *ry* was at that stage not a "weak" syllable in the sense relevant to extrametricality.

(34)

	I American (Hσ)ry/ L(σry)	II British Hσ)ry	III * (σry)
Stress preservation	yes	yes	no
Suffix consistency	no	yes	yes
RH exhaustiveness	%	no	yes

9.3.7 Word suffixes: *ness, hood, less, ful*

Whereas the suffixes examined so far in this section were all "mixed," namely neutral when attached to a free stem and metrically consistent when attached to a bound stem, the group of suffixes we turn to now are purely "neutral," because they attach only to free stems, namely independent words. One of these is *ness*, discussed in 8.2.4 above, where we argued that it can be parsed either as a syllable, as in (35a, b), or as a foot, as in (35c).

(35) a. cor(rúptϕ) ⇒ cor(rúptϕnes)s
b. (árbi)(tràry) ⇒ (àrbi)(trárines)s
c. car(nívorou)s ⇒ car(nívorous)(nèssϕ)

The analyses in (35) are consistent with our general view that a stem-final null vowel is preserved only if required by syllabification, hence essentially only with consonant-initial suffixes and stems ending in a "superheavy" syllable, as in (35a).

A suffix rather similar to *ness* is of course *less*, illustrated in (36), to which we extend the same analysis.[16]

(36) a. (láwϕ) ⇒ (láwles)s
b. (chárac)ter ⇒ (chárac)ter(lèssϕ)

We have seen that medial extrametrical syllables as in (36b) arise elsewhere, as in *(chárac)te(rì:ze)*.[17] In its behavior illustrated in (36), *less*

16 The view that *less* is metrified is consistent as well with the fact, noted in Gussenhoven (1988), that its presence has an inhibitory effect on backwards stress shifts due to phrasal "rhythm," as in (ib) contrasting with (ia) (our examples).

(i) a. [sécond hòme] táx bill (compare [sècond hóme])
b. [sècond hómeless] white family

17 The analysis of *ness*, *less*, extends also to feminine suffix *ess*, e.g. *príncess*. However, in this case, consistent syllable metrification suffices to account for its neutrality. The only

differs noticeably from its antonym *ful*, which seems to attach only to stems that can integrate it as a syllable, as illustrated in (37).

(37) a. (láwϕ) ⇒ (láwfu)l
b. (plénty) ⇒ (pléntifu)l
c. (póver)ty ⇒ *(póverti)ful

In the data bases consulted, this suffix appears in approximately 200 items, roughly 90 percent of which have oxytonic stems, like the one in (37a). The remainder 10 percent have paroxytonic stems, like the one in (37b), while none have proparoxytonic stems like the one in (37c).[18] In this connection, note that, in contrast to *distréssful* and *suspénseful*, **prógressful* and **récompenseful* do not exist and seem clearly ill-formed. With rare exceptions, we also do not find paroxytonic stems with a heavy final syllable, which would give an ill-formed foot *$(\sigma Hfu)l$*. Cases like *cólorful*, *flá:vorful*, *wónderful*, etc. are accounted for by the usual relaxation of the notion of heavy syllable for sonorants, and for *s* in the case of *púrposeful* ([pə:.pəs.fəl]). This leaves *wórshipful* as the only real exception, which we must leave unaccounted for.[19]

There are isolated cases in which *ful* does attach to stems whose metrical structure cannot take in an additional syllable, but in those cases neutrality does not obtain, as shown in (38).

(38) a. (fóre)(thòughtϕ) ⇒ (fòre)(thóughtfu)l
b. (ínsigh)t ⇒ in(síghtfu)l

In (38a), the final weak foot becomes strong through the added syllable, as in *(míli)(tàry)* → *(mìli)(tárily)*, etc. In (38b), remetrification is due to the heavy pre-suffixal syllable, which will attract stress. A partially ana-

possible exceptions are *áncestress*, *shépherdess*, *stéwardess*, where, however, we may take the medial syllables closed by sonorants or *s* to function as light ones, as in numerous other cases.

18 Although some dictionaries actually give *cháracterful*, which speakers judge odd. We speculate that, as a marginal possibility, *ful* can be extrametrical, analogously to the second syllable of *able*.

19 Suffix *ful* indicating measure exhibits a somewhat similar distribution, also being attached primarily to oxytones and paroxytones. However, a non-negligible number of cases, like *pócketful*, *básketful*, *búcketful* and others, cannot be reduced to syllable metrification, the penultimate syllable being closed by an obstruent, hence predicting **poc(kétfu)l*, etc. instead. This contrasts with adjectival *ful*, with which this difficulty only arises in *wórshipful*, which perhaps has an extrametrical *ful* as in the case of the previous footnote. The difference seems to correlate with the fact, noted by Fudge (p. 72), that, unlike adjectival *ful*, measure *ful* can be pronounced with a full vowel, suggesting it may also be a foot.

logous cases are also *(résour)ce/(resóur)ce*, versus *re(sóurcefu)l*/ **(résourcefu)l*, and the attested *cóntent* → *conténtful.*[20] Remetrification is extremely rare, however, limited to these few case, the constraint to oxytonic/paroxytonic stems holding generally instead. The latter constraint, also noted in Fabb (1988, p. 528 and references) is rather obscure if neutral suffixes simply evaded stress, but is accounted for on our approach, provided that we make two additional assumptions in (39).

(39) a. *ful* cannot be parsed as a foot
 b. *ful* cannot remetrify the stem

The assumption in (39a) follows from supposing that the final *l* of *ful* is not to be parsed as a geminate, hence like that of *al*, and unlike the *s* of *ness*, *less*. Thus, like *al*, *ful* would have the structure *LW* – not a possible final foot. This assumption is quite unproblematic, aside from the usual scarcity of independent evidence for geminate versus non-geminate status.[21] The assumption in (39b) distinguishes *ful* from *al* and other remetrifying suffixes, and places it rather with comparative *er* (*taller*), adjectival *en* (*wooden*), and verbal *en* (*freshen*), which also restrict the class of stems they attach to, as we noted in 9.2. There is another respect in which *ful* is in fact like *er* and the two *en*s, in that it attaches only to free stems, namely words, while remetrifying suffixes like *al* and others attach to bound stems as well, e.g. *arbore + al*. Suppose, then, that we express the latter restriction as in (40), where "SUF_w" is a suffix of the class of *ful*, which attaches only to words.

(40) $\ldots_{word}]\ SUF_w$

If we now simply regard (40) as holding in derived structure, i.e. as an output condition, the constraint against stem remetrification will also follow from it. If remetrification occurred, the sequence preceding *ful*

20 Syllable metrification of *ful* is further confirmed by the fact that, as noted for *ly* in fn. 13, chapter 8, it inhibits stem-final tensing (Halle and Mohanan 1985, fn. 3). Thus *beauty*, with tensed final *i*, contrasts with *beautiful*, with lax *i*. As we suggested earlier, we take the relevant condition for tensing to be foot-final position. The tense *i* of *happiness* will then follow from the foot metrification of *ness*, contrasting with the syllable metrification of *ful*. This requires slightly different assumptions than in the text, however, where we have taken *ness* to metrify as a syllable to the extent possible, which would predict *(háppines)sφ*. We might suppose instead that *ness* metrifies as a foot to the extent possible, but this would not work for *(àrbi)(trárines)s*, where we argued it must metrify as a syllable. We thus leave the question open.

21 *Ful* would have a geminate *l* when it indicates measure, given fn. 19 above.

would – from a metrical point of view – no longer be a word, much as **parént* in *paréntal* is not. The condition in (40) must also apply to *ness*, *less*, since they also fail to take bound stems (with extremely rare exceptions: *hapless*). The fact that, unlike *ful*, they do not restrict the class of stems follows from their ability to metrify either as a syllable or as a foot, guaranteeing integration with *any* stem.

The condition in (40) has in fact an even broader scope. For it is clear that the phenomenon we have been referring to as "generalized shortening" is systematically absent in the context of "word" suffixes, which roughly correspond to the Germanic class of suffixes. Thus, alongside of *adm*[i]*rable*, *appet*[i]*tive*, *teleph*[o]*nist*, *res*[i]*dent*, *or*[a]*tor*, which have Latinate suffixes, we only find *deli:ghtful*, *deceitful*, *a:geless*, *cri:meless*, *dri:verless*, *vo:calness*, *fla:vorless*, etc. all with long vowels. Other segmental changes are also comparably absent from this class.

Etymology only partially lines up with the noted distinction, since the suffixes of *kep-t*, *wid-th*, *fif-th* are etymologically "Germanic" and yet do not enforce (40), given the segmental changes they induce. We will nonetheless maintain this use of the labels "Germanic," "Latinate" to refer to this distinction, abstracting away from this slight inaccuracy.

Such "exceptions" to the behavior of the Germanic class can be usefullly compared with inflectional suffixes *ing*, *(e)d*, plural and third person *(e)s*, which are also Germanic, and normal in enforcing (40). The difference in (41), noted in 3.5, can in fact be reinterpreted simply as the result of (40).

(41) a. see.pϕ ⇒ see.pedϕ
b. kee.pϕ ⇒ kep.tϕ

In 3.5 above, we postulated that the "regular" past tense morpheme *(e)d* preserves the null vowel of the stem, whereas the "irregular" one *t* suppresses it, causing resyllabification and shortening of the stem vowel. We may now simply suppose that this is because (40) holds for the suffix in (41a), but not for the one in (41b). The effect of (40) in (41a) will thus be that of inhibiting segmental changes in the stem, which in turn requires that stem syllabification, and hence and the null vowel be retained. On this view, the different direction of voicing assimilation in (42a, b) will also follow.

(42) a. bri:be ⇒ bri:b[d] (progressive assimilation)
seep ⇒ seep[t] (progressive assimilation)

b. leave ⇒ le[f]t (regressive assimilation)
   keep ⇒ ke[p]t (regressive assimilation)

Since (40) holds in (42a), it will impose stem consistency, requiring that voicing assimilation, if any, necessarily affect the suffix. In contrast, in (42b), stem consistency is independently compromised by the noted resyllabification and vowel changes, so that voicing assimilation will then predictably comply with *suffix* consistency instead, and hence affect the stem. The conclusion is then that there is no difference at all between the two variants of the past tense morpheme other than just (40) holding for one but not for the other, with a single underlying form /t/.

The progressive assimilation of (42a) extends as predicted to other instances in which (40) holds, such as *decide*[z], *blade*[z], etc., while the regressive assimilation of (42b) corespondingly extends to instances in which (40) does not hold, such as *fi*[f]*th*, *descri*[p]*tive*, etc.

Alongside of "irregular" past tenses, there is also a small number of irregular plurals, like *larynges*, *phalanges*, *pharynges*, *syringes*, which coexist with the regular ones *larynxes*, *phalanxes*, *pharynxes*, *syrinxes* (as noted in fn. 4 above). The condition in (40) will also come into play here, and account for the fact that stress neutrality and segmental invariance go together. In the "irregular" cases, (40) must not hold, given the segmental changes. Then, predictably, metrification ceases to be bound by stem consistency, yielding the metrically normal outcome *la*(*rýnge*)*s*, etc. In contrast, in the regular cases, (40) imposes stem consistency, thus forcing the metrically "abnormal" (*láryn*)*xes*, with an extrametrical overt syllable.

The condition in (40) is of course closely reminiscent of the word-boundary "#" of *SPE*, whose intended effect was that of inhibiting phonological rules, including those of stress. However, we differ from *SPE* in two major respects. First, in supposing that even suffixes with which the condition is operative are metrified, hence accounting for the noted stem restrictions. Secondly, in seeing our condition as coextensive with the inability to take bound stems rather than with stress neutrality.[22] Yet, we will argue later on that a version of (40) actually holds for the other (i.e. Latinate) neutral suffixes as well, thus bringing our analysis somewhat closer to that of *SPE*.

22 In distinguishing two different kinds of stress neutrality, one obtaining with Germanic suffixes, the other with Latinate ones, we concur with Gussenhoven (1988), although we differ on the exact account.

The case of the suffix *hood* is straightforward. We find that there are no constraints on its stem, as shown by (43).[23]

(43) a. a(dúltϕ) ⇒ a(dúltϕ)(hòodϕ)
b. (líkely) ⇒ (líkeli)(hòodϕ)
c. (báchelor) ⇒ (báchelor)(hòodϕ)

This will follow from the ability of *hood* to metrify as a foot, which is consistent with its long vowel, contrasting with the short one of *ful*.

Some special comments are required by the sequence *lessness*, whose distribution is considerably more restricted than that of *ness* alone, and in fact comparable to that of *ful/fulness*. While dictionaries and electronic data bases vary, we find the list in (44) to be typical. All items listed are attested with *less* alone, while those marked with an asterisk are unattested with *lessness*.

(44) a. humorlessness
*carbonlessness, *censurelessness, *colorlessness, *driverlessness, *enginelessness, *errorlessness, *featherlessness, *featurelessness, *flavorlessness, *flowerlessness, *futurelessness, *hammerlessness, *harborlessness, *honorlessness, *hungerlessness, *incomelessness, *lusterlessness, *meaninglessness, *mortarlessness, *motherlessness, *powerlessness, *rudderlessness, *savorlessness, *shelterlessness, *victimlessness, *weaponlessness, *purposelessness
b. effortlessness
*clientlessness, *comfortlessness, *hazardlessness, *jacketlessness, *knowledgelessness, *licenselessness, *motivelessness, *precedentlessness, *profitlessness, *spiritlessness, *stipendlessness, *warrantlessness
c. ___
*characterlessness, *consciencelessness, *incidentlessness, *propertylessness, *signaturelessness, *substancelessness

To account for the asymmetries between attested and unattested cases in (44) and the similarity in the distribution of *lessness* and *fulness*, we will tentatively suppose that, in *lessness*, the first suffix is required to metrify as a syllable, like *ful*, perhaps because sequences of two weak feet as in

23 This suffix is only moderately productive, occurring in approximately forty items.

(lessϕ)(nessϕ) are excluded, although the exact reasons for this would remain unclear. One possibility is that in *lessness*, the null vowel of *lessϕ* is suppressed, reducing the structure to a single syllable *les*. In turn this would follow from the proposed criterion of suppression up to syllabification, if we took what we have referred to as geminates to be in fact ambiguous, hence also syllabifiable as single consonants. Let us review the cases in (44) from this angle. Beginning with (44c), syllable incorporation of *less* would give rise here to an ill-formed tetrasyllabic foot, as in **(characterless)ness*, whence the total exclusion of these cases.[24] In (44a, b), the same incorporation of *less* would yield a ternary foot *($\sigma H \sigma$), also generally ill-formed, hence accounting for the general exclusion of this class as well. However, in (44a) *(húmorless)ness*, the heavy syllable is closed by a sonorant, accounting for the occasionally attested cases in a way similar to *(wónderfu)l*, *(álterna)te* and others. In contrast, in (44b) **(cóm.fort.less)ness*, the heavy medial syllable is not closed by a sonorant, predicting complete exclusion. For the sporadic cases still attested, like *(éf.for.tless)ness*, we may suppose the sequence *tl* is marginally syllabifiable as an onset, which would reduce this case to *(hú.mor.less)ness*, etc. We have no account of the internal variation in either of (44a, b), which we regard as idiosyncratic. While the foregoing account is tentative, it still contrasts with the lack of any conceivable account within the traditional view that suffixes like *less* and *ness* are simply immune to metrification.

9.3.8 Residue and conclusions

In this long section, devoted to suffixes with the structure *HW*, we first examined those that are classified as "mixed" in Fudge (1984), and then the ones that seem to be purely neutral. In essence, we argued that that distinction reduces to the ability of a suffix to take bound stems. If a suffix with the structure *HW* has that ability, it will be "mixed" – systematically neutral with free stems for the reasons given in 8.4, but not neutral with bound ones, where neutrality is just irrelevant. Otherwise, it will be exclusively neutral, for obvious reasons.

There are, however, a number of suffixes with the structure *HW* which are not listed by Fudge as being either neutral or mixed, which we must

24 Beside metrifying as a syllable, *less* must be metrified with the stem, rather than as in ...*(lessnes)s*, which would constitute a strong foot and hence attract primary stress. Plausibly, this is excluded as a violation of (40), as is the analogous ...*(fúlnes)s*.

now consider. As it turns out, they just instantiate the third logical possibility, occurring essentially only with bound stems. Those suffixes, like the "mixed" ones, were all examined in chapter 7, and will be briefly reexamined here from the present perspective, beginning with those in (45) and (46).

(45)		*Suffix*	*Examples*
	a.	i:te	(gélig)(nì:te)
	b.	i:te	her(máphro)(dì:te)
	c.	a:te	per(mángana:)te

(46)		*Suffix*	*Examples*
	a.	i:te	(éxpe)(dì:te)
	b.	a:te	(démon)(strà:te), de(líbe)(rà:te)

We find no free stems at all in the classes of (45), except for *bi/tri(párti:)te*, preserving as predicted from *párt/párty*. The small class of verbs in *i:te* of (46a) also presents no instance of free stems. The much larger class of verbs in *a:te* of (46b) presents a small number, given in (47).

(47) a. (ánn*o*)(tà:te), (ánt*i*)(quà:te), (sál*i*)(và:te), (vácc*i*)(nà:te)
b. h*a*(bítu)(à:te), *i*ns(tánti)(à:te), tr*i*(ángu)(là:te)
c. (*á*cti)(và:te), (*á*lie)(nà:te), a(m*á*lga)(mà:te), (*á*rbi)(trà:te), as(s*á*ssi)(nà:te), (c*á*pti)(và:te), (c*á*rbo)(nà:te), (chl*ó*ri)(nà:te), do(m*é*sti)(cà:te), en(c*á*psu)(là:te), (*ó*rches)(trà:te), (p*ó*lli)(nà:te), qua(dr*ú*pli)(cà:te), (s*ý*nco)(pà:te), (*ú*ri)(nà:te)
d. (*ó*xyge)(nà:te) = (h*ý*droge)(nà:te)

All of the cases in (47) have stems or related words with a stress on the italicized vowel. In (47c), the stress of the stem is simply consistent with the normal accentual pattern for this type of word ("Strong Retraction"), so that stress neutrality is not observable. In (47d), preservation of stem stress alters that pattern, although the alternative, non-preserving, outcome *o(xýge)(nà:te)*, etc. is also attested as already noted. The non-preserving cases of (47a) fall into the usual pattern of non-preservation of stresses on vowels affected by generalized shortening. As for (47b), in the last two cases, preservation is excluded by the intervening heavy syllable.[25] The remaining case *habítuàte*, we may regard as consistent with

25 Note that the reason why these cases do not abide by the claim of 8.4 that neutrality is always achievable with suffixes whose structure is *HW*, is that they (exceptionally) insert an epenthetic *i/u*, adding one more syllable, their structure thus effectively being *LHW*.

habitual rather than *hábit*. In sum, verbs in *a:te* take relatively few free stems, which we regard as an idiosyncratic fact, and for most of those cases the metrification operative with bound stems is also stress-preserving, whence Fudge's classification of these as involving a fixed pattern, rather than being neutral. In the remaining few cases, results are much as predicted, and *a:te* in fact behaves just like *i:ze* of 9.3.5 above, "stress-neutral" in Fudge's classification.

Next we consider the suffixes of (48).

(48)	*Suffix*	*Examples*
a.	i:de	hy(dróxi:)de, (sácchari:)de
b.	i:le	pro(jécti:)le, (dómici:)le
c.	i:ne	ele(phánti:)ne, (álkali:)ne
d.	i:ne	(cólum)(bì:ne), (túrpen)(tì:ne)

A few free stems occur with the suffixes of (48b) and (48c), as in *pro(jécti:)le*, *per(cénti:)le*, *pro(trácti:)le*, *re(trácti:)le*. These all conform with the modalities discussed in 7.3 for bound stems – compare *hy(dróxi:)de*. The same holds for *élephant* → *(èle)(phánti:)ne*, which is only weakly preserving, like other similar cases e.g. *élement* → *(èle)(ménta)ry*. In contrast to the latter cases, preserving *(sérpen)(tì:ne)* parses the suffix as a foot, again consistently with underived items, e.g. *(túrpen)(tì:ne)* (recall 7.3 above). None of the other cases in (48) have free stems. In sum, we again find that, to the extent that free stems occur, the expected stress preservation obtains, though this is typically non-distinct from the metrification of underived items.

Analogous considerations hold for the suffixes in (49), with which stems either standing as, or closely related to, independent words occur in the few instances in (50).

(49)	*Suffix*	*Examples*
a.	oid	el(lípsoi)d, (créti)(nòidϕ)/(crétinoi)d
b.	tu:de	si(mílitu:)de
c.	e:ne	a(cétyle:)ne
d.	o:se	(bélli)(cò:se)/(béllico:)se
e.	o:se	(céllu)(lò:se)/(céllulo:)se

Note too that, since in *insTANtiate* the heavy syllable is closed by a sonorant, we would ordinarily expect preservation to still obtain, overruling the preferred parsing of that syllable as heavy. This case is different, however, since here the "Strong Retraction" is also weighing against preservation, forcing *ins(tántì)(à:te)*.

(50) a. (céntroi)d = (cretinoi)d, (crystalloi)d, cy(lindroi)d, el(lipsoi)d, (sinusoi)d, sala(mandroi)d
||(bacteroi)d, ||mol(luscoi)d
·(protei)(noidφ)
b. (ámplitu:)de = (aptitu:)de, de(crepitu:)de, e(xactitu:)de, (habitu:)de, i(neptitu:)de, in(quietu:)de, (plentitu:)de
||in(finitu:)de
c. (éthyle:)ne = (carote:)ne
d. (grándi)(ò:se)/(grándio:)se = lachrymo:se

In (50), all examples with no marks are stress-preserving and metrify the suffix just as with bound stems (7.3 above). The one marked "·" *(prótei)(nòidφ)* achieves stress preservation (← *prótein*) via the foot parse of the suffix. Of the cases marked "||," *mol(lúscoi)d* is consistent with *mollúscus* (as noted in 3.4), though not *móllusk*, while in *(bácteroi)d* stress preservation is impossible due to the short *e*, both parses . . . *(teroi)d*/. . .*(teroidφ)* being ill-formed, respectively as ($L\sigma$), and ($\sigma H\sigma$). The short *e* is here either short underlyingly (and lengthened in *bacté:rium*), or perhaps affected by generalized shortening. The general reason why *oid* fails to be stress-preserving here despite its structure *HW* is that it in fact supplants two stem syllables *ri.um* rather than just one as most cases. As for *in(fínitu:)de* of (50b), it satisfies suffix consistency with respect to *tu:)de* rather than stress preservation (← *ínfinite*), as in other cases in which the number of stem remetrifications is small (recall *triúmphant* of 9.3.3).

Finally, we consider the cases in (51).

(51)	*Suffix*	*Examples*
a.	ci:de	in(fánti)(cì:de) /in(fántici:)de
b.	oir	(réser)(vòirφ)
c.	ast	en(thúsias)t

The suffix in (51a) is generally non-preserving, as in *infánticide*, *paréntícide*, *insécticide*, *rodénticide*, but the obvious reason is the epenthetic *i*, which adds one syllable. The structure of the suffix is therefore actually *LHW*, rather than *HW*, and as such not a preserving sequence. Turning to (51b), this suffix occurs with no free stems, disregarding the possibility that *reservoir* is relevantly related to *reserve*. Lastly, suffix *ast* of (51c) has also no free stems, except for *i:(cónoclas)t*, in which suffix consistency prevails, hence remetrifying this single stem *(í:co)n*.

To conclude then, we have seen that suffixes with the structure *HW*, presumably like suffixes more generally, break down into three categories: those that attach to both free and bound stems; those that attach only to free stems; and those that attach only to bound stems. We have seen that neutrality obtains as applicable, hence with the first and second classes, obviously not with the third, thus accounting for Fudge's classification. We have taken exclusive occurrence with bound stems as accidental to the extent to which it holds, and have seen that it does only as a rough approximation. In contrast, we have regarded exclusive occurrence with free stems as principled. We have seen that this property, stated in (52a), in fact clusters systematically with the ones in (52b, c), all holding of Germanic suffixes.

(52) a. no bound stems
 b. no stem remetrifications
 c. no segmental changes

As the optimal way to capture the cluster in (52), we have proposed a requirement, expressed in (40) above, that Germanic suffixes attach to unmodified words in derived representation. This means that if a suffix of this class has the structure *HW*, there are now *two* sets of reasons for its neutrality: those discussed in 8.4; and (52b), resulting from (40). The independent existence of (52b) as a second source of neutrality is established by cases that do not have the structure *HW*, like *ful*. With those cases, neutrality still obtains, but now predictably only at the cost of excluding certain classes of stems.

On this view, the distribution of segmental changes is therefore the result of (52c), and crucially does *not* mirror that of stress neutrality, as assumed in the past. As we have noted, neutral suffixes of the Latinate class all induce our "generalized shortening," much like non-neutral suffixes, and unlike the Germanic suffixes. The distinctions between Germanic and Latinate suffixes thus drawn by (52) remain clear despite occasional crossings of the boundaries, in particular the noted fact that Germanic *ness* and *ly* minimally remetrify their stems in some cases (8.2 above), as does *ful* in a few.[26] Note further that some segmental readjustments also occur with Germanic *er*, in *lonGer*, *stronGer*, which have a pronounced *g*, contrasting with *long*, *strong*, as well as *longing*, *stringing*, etc., but still leaving the general distinction quite clear.

26 Furthermore, both *ful* and *ly* "readjust" some stems by inhibiting stem-final tensing (as in *beautiful*, etc.), as we noted in fn. 12, chapter 8 and fn. 20 above.

9.4 The structure Light–Weak

9.4.1 *able, age*

We now consider the last class of suffixes – those with the structure *LW*. As we noted in 8.4, our predictions are that these should be stress-neutral only when attached by syllable overlap. We begin with the suffixes in (53), which Fudge gives as "mixed," namely neutral when attached to a free stem, as in the examples, given in our analyses.

(53)	*Suffix*	*Examples*		
a.	able	in(térpretϕ)	⇒	in(térpreta)ble
b.	age	(bróke)r	⇒	(brókera)ge

The neutrality of *able* was discussed in 8.2.2, where we argued that syllable overlap and extrametricality of *ble* sufficed to account for it. The overlap is due to *able* replacing the final null vowel of the verb to which it is attached. However, *able* does not attach to verbs exclusively. In a small number of cases, it also attaches to nouns, and yet appears to preserve the stem stress in those cases too, as shown in (54) (stem stress italicized).

(54) (p*á*lata)ble, (p*éa*cea)ble, (p*é*rsona)ble, (pl*éa*sura)ble, (fl*á*mma)ble, (r*éa*sona)ble, (s*éa*sona)ble, (tr*éa*sona)ble, (kn*ó*wledgea)ble, (m*á*rriagea)ble, (ch*á*rita)ble, (m*é*mora)ble, (m*é*rchanta)ble, ob(j*é*ctiona)ble, ex(c*é*ptiona)ble, im(pr*é*ssiona)ble, (*á*ctiona)ble, (f*á*shiona)ble

The reason for the neutrality in (54) is that the stress of these stems is in fact non-distinct from that of verbs, hence allowing *able* to still incorporate into the last foot as in the earlier cases.[27] Thus (although these represent a relatively small class) no case is attested, or seems possible, in which the stem has a trisyllabic foot, as in *(*ásteriska)ble*, or a bisyllabic one with a heavy median syllable, as in *(*ádjuncta)ble*. Once again, this restriction only follows if *able* is metrified as we are arguing, and not if it could evade stress assignment.

As it stands, however, our analysis would only predict that with certain stems *able* could not be neutral, not that it should not occur. To account for that fact, we must further impose that *able*, which is neutral generally,

27 In (*chárita)ble*, (*mémora)ble*, neutrality is possible because the suffix supplants the final *y* of the stem. The case (*mérchanta)ble*, is like (*cómforta)ble*, discussed in 8.2.2.

must *always* be (putting aside the "exceptions" of 8.2.2 above, e.g. *demónstrable*, for a moment). This requirement seems interpretable as yet another "consistency" effect, indicating that not only must a stem exhibit metrical consistency to the extent possible, but also that a suffix must be as consistent as possible in satisfying stem consistency, hence excluding **adjúnctable*, etc. We can in fact implement this idea by extending the scope of (40) above, repeated in (55).

(55) $\ldots_{\text{word}}]\ \text{SUF}_{\text{w}}$

Putting aside for a moment the important respects in which Latinate *able* must be distinguished from Germanic suffixes like *ful* that we have noted, by thus extending (55) we are essentially taking the view that metrical consistency has two major reflexes: suffix consistency and stem consistency, and that each suffix is diacritically marked for either. The marking for stem consistency (= stress neutrality) is now (55). The two effects and the two markings are not mutually exclusive, since e.g. *able* is both stem- and suffix-consistent, a point to which we return.

The provision in (55) and the distinction between neutral and non-neutral suffixes in terms of lexical markings now seems to bring our analysis rather close to others. In particular, and as noted earlier, the provision in (55) is closely reminiscent of the word boundary (#) of *SPE*. Fundamental differences remain, however. One is that, for us, neutrality is never non-metrification. Another is that, while we take (55) to be a lexical primitive for the Germanic suffixes, for suffixes like *able* and the others of the Latinate subclass, it has a predictable distribution, in the sense of 8.4 above. That is, suffixes that *can* generally preserve the metrical structure of the stem will do so, resulting in the marking in (55). The latter marking, thus holding for *able*, will now inhibit stem remetrifications, hence excluding the noted **ásteriskable*, etc. The remetrifications discussed in 8.2.2 (e.g. *demónstrable*, *remédiable*) will continue to make our earlier point that *able* is metrified, but are now exceptions to (55). We take this to mean that, with this suffix and Latinate ones more generally, (55) holds more "weakly" than with the Germanic suffixes, namely only as a general tendency.[28] This view is confirmed by the fact that the other two effects of (55) in

28 We stress again the difference between this and other theories. Cases like *re(média)ble*, now exceptions to (55), are also "exceptions" in past accounts of neutrality. However, in the latter, they are *accidental* exceptions to neutrality, whereas our analysis *predicts* them. The introduction of (55) complicates matters, because it gives rise to two possibilites for cases in which neutrality is unattainable: (i) stem remetrification; (ii) stem exclusion. The question of which of (i) and (ii) will obtain in any specific instance is an interesting one, but not a point of comparison between this theory and others, since only the former is capable of predicting this disjunction of (i) and (ii). However, as far as *able*

(52) above, namely "no bound stems," and "no segmental changes," while detectable, are also weaker or less systematic than with Germanic suffixes. Thus, with *able* we do find generalized shortening as in *adm*[i]*rable*, *rev*[o]*cable*, as well as the pronounced *n* of *damNable*, contrasting with the unpronounced one of *damn*, *damning* (as noted in Gussenhoven 1988).[29] However, we do *not* find the full set of segmental readjustments of other Latinate suffixes, witness *si:gnable*, which has an unpronounced *g*, like *si:gn*, *si:gning* and unlike *siGnature*. Shortening also occurs in relatively few cases, for instance not in *desi:rable*, *reli:able*, *deci:dable*, *oppo:sable*, or *fa:vorable*, *re:asonable* and others. The condition in (55) can in fact help explain certain clustering effects, such as that of *c*-insertion and shortening in *apply:* → *applicable*, versus *deny:* → *deni:able*. In the former case, (55) is evidently violated by shortening, and hence must not hold, thus removing the obstacle to *c* insertion. In the latter, (55) holds, blocking *c* insertion. Another similar case is the clustering of stem remetrification and C*i*V lengthening in *rémedy* → *remé:diable*, versus the absence of both in *lévy* → *léviable*.

The third effect of (55), namely exclusion of bound stems, like that of *formid+able*, also obtains in a comparably "intermediate" fashion – bound stems accounting for approximately 8 percent of total occurrences of this suffix, in contrast to much higher percentages with non-neutral ones, and near zero with the Germanic suffixes.[30]

Let us now turn to *age* of (53b), which is rather similar to *able*. It is frequently attached to verbs, yielding the same neutrality, for the same reasons, as illustrated in (56a), and the analogous cases in (56b).

is concerned, it would appear that (i) obtains with verbs, whereas (ii) obtains with nouns. Intuitively, this seems related to the fact that *able* is *productively* attached to verbs, but not to nouns. Simply put: with nouns, *able* "does not have to" occur.

29 Truncation of *a:te* as in *demonstra:te* → *demonstrable* obviously also violates (55).

30 We may briefly compare here *able* with *ible*, while the third variant *uble* has too few occurrences to yield any discernible pattern. The variant *ible* takes a higher percentage of bound stems (approximately 50 percent), e.g. *plaus+ible*, which seems to correlate with more frequent stem modifications, as in *admit/admissible*, *correct/corrigible*, suggesting (55) is systematically "weaker" with *ible* than with *able*. We take *di*(*ví:de*)/*di*(*vísible*) to instantiate generalized shortening, and be like *ad*(*mí:re*)/(*ádmira*)*ble*, except for stress preservation, made possible in the former case by the exceptional metrification *ble*), found also in *com*(*pátible*).

We note the pair (*cóntro*)(*vèrtφ*)/(*còntro*)(*vérti*)*ble*, parallel to (*áscer*)(*tàinφ*)/(*áscer*)(*táina*)*ble* of 8.2.2 above.

(56) a. (cóverϕ) ⇒ (cóvera)ge
b. ap(pénda)ge, as(sémbla)ge, (márria)ge, (pílfer)age, re(pórta)ge, (stóppa)ge

Like *able*, *age* is also attached to nouns, in which case it continues to be neutral, presumably because incorporated into the last foot, like *able*, as in (57a), and the similar cases of (57b).

(57) a. (pérso)n ⇒ (pérsona)ge
b. (hérmita)ge, (órphana)ge, (pílgrima)ge, (pátrona)ge, per(cénta)ge, (vássala)ge, (vícara)ge

Just like *able*, when attached to nouns, *age* places restrictions on its stem, as shown by the impossibility of the hypothetical items in (58), again mysterious if "neutrality" was just stress evasion.

(58) *gýmnastage, *fórecastage, *icónoclastage, *péderastage, *médicinage, *cánnibalage

We then suppose that *age* too is subject to the condition in (55), as predicted by the fact that it is neutral for independent reasons in the majority of cases, namely when attached to verbs. As with *able*, segmental readjustments occur relatively sporadically with *age*, as in *pá:tronage*, attested with both a long and a short *a* in the first syllable, while its stem *pá:tron* has only *a:*. Numerous other cases, e.g. *pí:lotage*, exhibit no shortening. Analogous "exceptions" to "trisyllabic" shortening with other neutral suffixes, such as *ló:calism*, *pá:ganism*, were noted in 9.3.2 above.[31]

We note finally that the cases in (59) are also parallel to corresponding *able* cases.

(59) a. (cóncu)(bì:ne) ⇒ con(cúbina)ge
b. (vága)(bòndϕ) ⇒ (vàga)(bónda)ge
c. (páren)t ⇒ (párenta)ge
d. (brígan)d ⇒ (brígan da)ge

31 There is a difference, however, in the size of the class of bound stems (e.g. *aver + age*, *bever + age*), which is approximately 26 percent for *age*, in contrast to the 8 percent of *able*. There is also a difference in the size of the class in which neutrality obtains independently of (55), that is the class of verb stems. *Age*, which is found in approximately 140 items in contrast to the over 900 for *able*, occurs with verb stems in 35–70 percent of cases, depending on whether one takes cases like *brokerage*, *anchorage* to have nominal or verbal stems. This leaves at least 30 percent of nominal stems for *age*, in contrast to the 10 percent of *able*. The above apparent correlation suggest a gradient interpretation for (55), the degree to which it holds being determined by the statistical extent to which stress neutrality is independently achieved, as it is with verb stems.

The one in (59a) instantiates non-preservation induced by generalized shortening, as in *ad(mí:re)/(ádmira)ble*, *re(vó:ke)/(révoca)ble*. The one in (59b) (at least possible, with shift of the main stress) is analogous to *áscertàin/àscertáinable* of 8.2.2.[32] The cases in (59c, d) are analogous to *(cómforta)ble*, *(pátenta)ble*, and exhibit the usual behavior of syllables closed by a sonorant.

To sum up, our general hypothesis of 8.4 correctly predicts that both *able* and *age* should be stress-neutral when they are attached to verbs, since their initial light syllable replaces the final one of the stem in the same metrical structure. We have also seen, however, that, when they are attached to nouns, these suffixes continue to be neutral by selecting stems whose metrical structure can incorporate them. We have argued that, in a sense, this continued neutrality extends the former one. Specifically, we have supposed that suffixes "select" for either stem consistency or suffix consistency, though in that order of preference, as stated in (57) of 8.6 above. Hence, those suffixes which can be neutral over a substantial range of cases select for the former, now expressed as in (55) above, while the others select for the latter.

9.4.2 *ous, al*

In contrast to clearly remetrifying *al* of *(páren)t/pa(rénta)l*, Fudge (1984, p. 95) lists *ous* as stress-neutral with free stems, on the strength of cases like (60), given in our analyses.

(60) a. de(sí:re) ⇒ de(sí:rou)s
b. (cáver)n ⇒ (cávernou)s
c. (házar)d ⇒ (házardou)s

While the cases in (60) are indeed stress-preserving, from our perspective we do not expect *ous* to be neutral any more than *al*, since, like *al*, and unlike *able/age*, this suffix attaches primarily to nouns, which do not provide for the metrical "overlap" (of *pre(véntϕ)* ⇒ *pre(vénta)ble*) necessary for neutrality. The cases in (60) are in fact not fully indicative, since the preservation of (a) is due to the fact that the stem – a noun – is exceptionally metrified like a verb, while that of (b, c) follows from the

32 We also predict *(chápe)(rò:nϕ)* → *(chàpe)(ró:na)ge*, like (59b), but judgments on this item are not too clear.

behavior of the syllables closed by sonorants as light, common under stress preservation. Fudge's classification has in fact the "exceptions" in (61), which are just the remetrifications we would expect (stem stress italicized as usual).[33]

(61) a. *a*n(tónymou)s, h*y*(drógenou)s, c*i*r(cúitou)s, g*e*(látinou)s, m*o*(méntou)s, p*o*r(téntou)s, r*i*(dículou)s, m*i*(ráculou)s
b. *i*n(céstuou)s, m*u*ci(láginou)s, t*e*m(péstuou)s, t*u*(múltuou)s, v*e*r(tíginou)s, v*o*(lúminou)s

Note that in (61b), the suffix surfaces as *uous*, *inous*, hence with an extra syllable. While we will make no attempt to identify the conditions under which such insertions occur, we simply note that metrification is in all cases as expected from syllable structure, and consistent with our claim. In contrast, if *ous* was "neutral," and if neutrality was stress evasion, there would be no particular reason why even the additional syllable of (61b) should make any difference. The numerous instances of *ious*, *eous* illustrated in (62) also metrify non-neutrally as predicted.

(62) a. *e*ffi(cáciou)s, f*a*l(láciou)s, pr*o*(dígiou)s, t*e*n(déntiou)s
b. f*e*(lóniou)s, h*a*r(móniou)s, *i*n(dústriou)s, *i*n(júriou)s, l*u*(xúriou)s, m*e*(lódiou)s, m*y*s(tériou)s, p*e*(núriou)s, p*e*r(fidiou)s, v*a*(gáriou)s, v*i*c(tóriou)s
c. adv*a*n(tágeou)s, c*ou*(rágeou)s, *i*nstan(táneou)s, *ou*(trágeou)s, *u*m(brágeou)s
d. *au*s(píciou)s, *a*va(ríciou)s, c*o*nsci(éntiou)s. l*i*(céntiou)s, m*a*(líciou)s, s*e*n(téntiou)s,
e. c*e*n(sóriou)s, l*a*(bóriou)s, r*e*(bélliou)s

Here, the extra syllable *i/e* is plausibly just the final vowel of the stem, overt or null. For those in (a, b), it is the final *y* of *efficacy*, *felony*, etc., while for those in (c) it is the final null vowel of *advantage*, etc., as we argued in 3.5 above. As was briefly suggested in fn. 25, chapter 3, we may then take a final null vowel to be preserved under suffixation not only when it is needed by syllabification, but also when it affects the

33 If we were correct in 6.3 above in analyzing *nym* of *antonym* as stressed and hence as (*nýmmφ*), then *antónymous*, as well as *antónymy*, are analogous to *demócracy*, etc., discussed in 9.3.5 above, due to degemination of the suffix-final consonant. *Antonymous* is thus also an exception to Fudge's generalization, but for this special reason.

Fudge acknowledges that *ous* is not neutral when an extra syllable is inserted as in (61b), hence listing only (61a) as individual exceptions.

quality of the preceding consonant, inducing spirantization or palatalization, as a form of preservation of the relevant context. This predicts preservation in (62c), correctly, as was argued in 3.5, and arguably in (62d) as well, in analogous fashion.[34] The cases in (62b) *félony* → *felónious* may be taken to indicate that a stem-final *y* is preserved not only when it affects the preceding consonant as in (62a), but occasionally also when it does not. Extending this view to null vowels would cover (62e) *cénsorϕ* → *censórious*, where ϕ comes to be spelled out as *i*. In sum, there is some reason to believe that the *i/e* before *ous* in each of (62) may be part of the stem.[35] The more relevant point, however, remains that all metrifications are just as predicted from the sequences of syllables, and that the overall behavior of *ous* is that of remetrifying the stem, much like *al*. As we predict from the "word" condition of (55) above not holding, *ous* also does not restrict the class of stems in the manner of *able/age*. With *ous*, the percentage of stems remetrified rather than excluded is in fact quite comparable to that of prototypically stress-changing *al*.[36] Hence *ous* and *al* are quite analogous, metrifying as *ou)s*, *a)l* respectively and consistently, as we saw in 7.3 above. This will not exclude stress preservation in certain specific classes. In particular, stem-final feet ($H\sigma$) will all be predicted to give stress preservation, by expanding to incorporate the suffixal syllable, as in (63).

(63) a. in(tésti)ne ⇒ in(téstina)l
 b. ad(véntu)re ⇒ ad(vénturou)s

Recall that in 8.2.6 we took the systematic preservation of this subclass to be the reason why these suffixes do not metrify as *ousϕ)*, *alϕ)* instead.

34 This means that there is an extra syllable also in *(knówledgea)ble*, and an apparently tetrasyllabic foot. The problem arises independently, however, as in *ob(jéctiona)ble*, *obser(vátiona)l*. We argue below that, under certain circumstances, sequences *iV* can be parsed monosyllabically - the sequence ϕV of *knowledgϕable* being evidently analogous.

35 The type of suffixation in (62) and (61b) can thus be seen as yet a third one beside the noted "concatenation" and "syllable overlap" (8.4 above). Here, the suffix is set one syllable apart from the rightmost foot boundary of the stem, as in *(ávari)ce* + *ous* → *ava(ríciou)s*. While in 8.4 we abstracted away from this case, it is worth noting that it is not limited to *ous*. Suffixes *al* and *an* also occur as *ial*, *ian* in analogous fashion, e.g. *(ártifi)ce* + *al* → *arti(fícia)l*.

36 With *ous*, stem remetrification occurs in approximately 31 percent of cases, compared with the 22 percent of *al*. The lower figure with *al* is due to the fact that it is systematically preserving in the *ical* and *ional* classes, both rather numerous, the latter discussed below.

Our claim that there is no fundamental difference between *ous* and *al* still seems to leave unexplained the divergence between (64a), which repeats in part (60), and the otherwise comparable cases in (64b).

(64) a. (cávernou)s, (házardou)s, (chívalrou)s
b. pa(rénta)l, or(chéstra)l

The cases in (64a) give stress preservation via the parsing of syllables closed by sonorants as light, which we have seen extends to syllables closed by *s*, as in *(hárvesta)ble* parallel to *(pátenta)ble*. Given (64b), we must, however, refine earlier assumptions, and suppose that such behavior is not automatically licensed by stress preservation. Let us then suppose that it is licensed by the stronger condition in (55), which holds for example with *able*, whence *(pátenta)ble* (and the rest of (11), chapter 8). Given (64a), we would also have to suppose, however, that simple stress preservation can still occasionally induce the light-like parsing, although this brings us back to the unexplained difference between (64a) and (64b). That difference is eliminated, however, by a more extensive search, which reveals a comparable number of "exceptional" cases with *al* as well, given in (65) ("†": other variant attested; "‡": attested as archaic).

(65)	a.	cl(í:en)t	⇒	†cl(í:enta)l
	b.	(sínis)ter	⇒	(sínistra)l
	c.	(ánces)tor	⇒	‡(áncestra)l
	d.	(spíritϕ)	⇒	(spíritua)l

The case in (65a) is parallel to (64a) *(cávernou)s*, while (65b, c) bear the parallel exceptionality relative to *s*. The case in (65d) is exceptional in allowing a monosyllabic parse of *ual*, generally bisyllabic as in *ha(bítua)l*, and parallel to the comparably bisyllabic *ial* of *o(ffícia)l* etc. Like the ones in (65), the cases in (64a) are clearly also isolated instances, witness *mo(méntou)s*, *por(téntou)s* of (61a) above.

In conclusion, *ous* and *al* are entirely comparable and not neutral in any systematic way, hence as predicted by our analysis.[37]

While the characteristics associated with the "word" condition (55) do not obtain with *ous/al* in general, we must note that they do obtain in one specific subclass, represented by items in *ional*, as exemplified in (66).

37 Little comment is required by *ar* – allomorphic variant of *al*, which behaves quite analogously, e.g. *(cónsu)l* → *(cónsula)r*, *(fámily)* → *fa(milia)r*.

(66) a. obser(vá:tio)n ⇒ obser(vá:tiona)l
b. e(mó:tio)n ⇒ e(mó:tiona)l

With this particular subclass, we find all three properties of (55), namely: (i) exclusive occurrence with free stems, the only exception being **congression/congressional*; (ii) non-remetrification of the stem; (iii) no segmental readjustments, witness the continued long *a/o* of (66) respectively, despite the structural conditions for "trisyllabic" shortening (a subcase of generalized shortening, as we will argue), the only exception here being the shortening of *ná:tion/nátional.* This contrasts with the occurrence of the full spectrum of vowel-length alternations in other *al/ous* contexts, as shown in (67), where both (b, c) reduce to generalized shortening as we see in 10.3 below. († : other variants attested).

(67) a. *Lengthening*
courá:geous, meló:dious, arté:rial, baró:nial, collé:gial, coló:nial, managé:rial, palá:tial, remé:dial, adjectí:val, maní:acal, substantí:val, zodí:acal
b. *Trisyllabic (= "generalized") shortening*
*o*minous, †*o*nerous, t*y*rannous, gr*a*dual, r*i*tual, †*e*pochal, lib*i*dinal, n*a*tural
c. *Morphological (= "generalized") shortening*
blasph*e*mous, gangr*e*nous, z*ea*lous, †vag*i*nal

Sequences with *ional* are thus descriptively exceptional, requiring a special treatment on any approach. We presume that non-remetrification of the stem in these cases is due to the monosyllabic parsing of the *iV* sequences.[38] As we have seen (5.5 above), such sequences are generally parsed bisyllabically, witness the fact that final *ion*, *ial*, *ian*, *ia*, *ium* exclusively stress the preceding syllable. It is clear that monosyllabic parsing is possible *only* under stress preservation. Yet stress preservation does not seem sufficient, given the difference between (68) and (69), both equally stress-preserving.

(68) a. (méntiona)ble, ob(jéctiona)ble
b. obser(vátiona)l, e(mótiona)l
(69) a. *(mélodiou)s, *(árteria)l, *(báronia)l, *(bóstonia)n, *(cánadia)n, *(róllegia)l, *(cólonia)l
b. *(mániaca)l, *(própriety)

38 The only exception to this is the variant *em(brí:ona)l.*

One could not simply attribute the actual stress of (69) *me(ló:diou)s* to the long vowel attracting stress onto a heavy penultimate. One reason is that the long vowel in both (69a, b) is itself due to stress (5.3 above), rather than the other way around. A second reason is that stress is no different when there is no heavy syllable, as in *málice* → *ma(líciou)s*, not **(máliciou)s*, and many similar cases (*i* being immune to "C*i*V" lengthening). A stronger condition than stress preservation is thus required to license monosyllabic parsing of *iV*, and we will take that condition to be precisely (55) above, in its specific instantiation of (70).

(70) . . .ion $_{\text{word}}$] al

The cases in (68b) will now be permitted because (70) licenses the monosyllabic parsing;[39] those in (68a), because a similar condition to (70) holds for *able*, as we saw, while none holds for the cases in (69).[40]

9.4.3 Remaining "neutral" cases

We have so far considered a number of suffixes with the structure *LW* among the most productive, showing that the partition between the neutral ones like *able*, *age*, and non-neutral ones like *al*, *ous*, is as predicted. We now deal with the remaining suffixes of that structure, considering again neutral ones first, and still using Fudge's (1984) classification as a point of reference. The latter classification gives the suffixes in (71) as "mixed."

(71)	*Suffix*	*Examples*		
a.	acy	con(spí:re)	⇒	con(spíracy)
b.	ish	(fé:ve)r	⇒	(fé:veri)sh

The majority of items in *acy* of (71a) have counterparts in *ate*, e.g. *advocacy*/*advocate*. For these, a more appropriate analysis of the suffix would seem to be *cy* of (3c) above – in fact just *y* inducing spirantization

39 The parallelism between (68a) and (68b) therefore shows that the exceptionality of (68a) is not due to extrametricality of *al*, as would be *a priori* conceivable given the extrametricality of other syllables with sonorants, e.g. *(pártici)ple*.

40 The ultimate reason why the cases in (69) do not invoke the condition in (70) being that they do not form a recognizably consistent class like the *ional* and *able* cases.

Note that the condition in (70) is in fact slightly more general than stated in the text, affecting also cases like *be(há:viora)l*.

of the preceding *t* as argued. When not amenable to this kind of analysis, the sequence *acy* occurs with free stem only in two items: *cons(píracy)*, and *su(prémacy)*. Given the "trisyllabic shortening" effect of both, we must presume that the metrification of the suffix is here *acy*), satisfying both preservation and right-hand exhaustiveness. The neutrality of these instances is thus due to the fact that both stems *cons(pí:re)*, *su(pré:me)* happen to be oxytonic, hence allowing incorporation of the full suffix into the same foot.

Turning to *ish*, its neutrality is transparently of the same sort as that of *ful* (*/en*) discussed in 9.3.7, since it exhibits all the characteristics of the "word" condition (55) above, specifically: it does not remetrify stems, but limits them instead to oxytonic/paroxytonic, as in *(blácki)sh*, *bab(bóoni)sh*, *(yéllowi)sh*, *(tí:geri)sh*, excluding **ví:oletish*, **élephantish*; it does not induce segmental changes, whence the long vowels of *(tí:geri)sh*, *(fé:veri)sh* etc., despite the conditions for "trisyllabic" shortening; it also excludes bound stems, with rare exceptions, like *peev* + *ish*. Note here that Fudge's classification of this suffix as "mixed," which presupposes occurrence also with bound stems, only results from conflating adjectival *ish* of (71b) with verbal *ish* of *aston* + *ish*, which we will, however, keep separate.

We further note in passing that analogous to the neutrality of *ish* is also that of diminutive *let*, given the now familiar restriction of *(stréamle)t*, *(rívule)t*, *(éagle)t*, *(pígle)t*, versus **tórrentlet*, **sérpentlet*.

Together with *ful*, discussed in 9.3.7 (as well as nominalizing *al* – e.g. *rebuttal* – touched on in 8.4), our review of suffixes with the structure *LW* has thus exhausted the "neutral" subclass. We have seen that the neutrality of *LW* suffixes is predictably limited to cases in which at least the first syllable of the suffix can be incorporated into the final foot of the stem, with the second, weak, syllable generally remaining extrametrical.

9.4.4 *an, ate*, and other stress-placing cases

We consider now the remaining suffixes with the structure *LW* which Fudge lists as stress-placing, verifying that this characteristic is again in line with our analysis. We begin with the cases in (72).

(72)

		Suffix	*Examples*		
I	a.	an	(cómedy)	⇒	co(mé:dia)n
	b.	al	(páren)t	⇒	pa(rénta)l
II	a.	ad			(dý:a)d
	b.	is			sy(nópsi)s
	c.	on			e(léctro)n
	d.	um			ad(déndu)m
	e.	us			a(lúmnu)s
III	a.	ine			clan(déstin)e
	b.	ate			de(génera)te

The case of *an* in Ia is quite parallel to the already discussed *al* of Ib, both requiring no further comment, except to note that in nationality adjectives *an* often replaces the final vowel of the stem, e.g. *a(mérica)/ a(mérica)n*, resulting in neutrality – not a systematic property, however, given e.g. *(ítaly)/i(tália)n.*

For the suffixes in II, we find no free stems, so that the issue of stress preservation does not arise.

Turning to III, *ine* appears with only a handful of free stems, all of which are metrified as predicted, as in *(médici)ne*, *(pálati)ne*, *(úteri)ne*, which are coincidentally stress-preserving, in contrast to restressing *ada(mánti)ne.*

A few remarks are in order for IIIb *ate*. The normal pattern for this suffix, which sometimes appears as *a:te*, is heavy-penultimate/antepenultimate, as with nouns in general. This holds for the given example *degénerate*, as well the cases in (73) ("†" indicates other variants: cf. (74)).[41]

(73) a. patri(árcha)te, †con(dénsa:)te, †al(térna)te, †con(súmma)te, in(cárna)te/in(cárna:)te

b. a(pósta:)te, e(cósta:)te, in(tésta:)te, a(rísta:)te

However, some cases, such as those in (74), depart from this generalization, having antepenultimate stress despite a heavy penultimate (italicized).

(74) a. †(cón*den*sa:)te = †(ál*ter*na)te, †(cón*sum*ma)te, (dé*sig*na)te/ (dé*sig*na:)te

b. (pó*ten*ta:)te

41 The cases in (73b) are from Hayes (1982, p. 247).

We interpret the apparent exceptionality of the cases in (74a) as reflecting metrical consistency with the corresponding *a:te* verb, which holds for the *in(cárna)te/in(cárna:)te* case of (73a) as well (verb: *incárna:te*), and more generally, as in adj. *(módera)te*/verb *(móde)(rà:te)*, etc. The case in (74b) we attribute to analogous consistency with the item *pótent*. Aside from *designate*, the metrification of the items in (74) relies on the usual characteristic of syllables closed by sonorants, and, for *cónsummate*, the plausibly parallel one of syllables closed by geminates (recall *(cápil)(làry)* versus *re(fécto)ry* of 4.2.2 above). In other words, when nominal *ate* is preceded by one of these syllables, metrification oscillates betweeen stressing that syllable, as in (73), and preserving the main stress of the corresponding *a:te* verb or other relevant item, as in (74). This is the usual pattern, as in *mo(méntou)s*, versus *(cávernou)s*, discussed in 9.4.2 above. The case *(désigna)te*, exceptional on any account (compare LP, p. 273, fn. 10), remains exceptional here, but now at least with a reason for its exceptionality, i.e. consistency with the corresponding verb *désignà:te*.[42]

As for the variation between the long and the short *a* of (73)–(74), we suppose it reduces to the usual generalized shortening, modulo further plausible assumptions. One of these is that occurrence of *ate* – primarily a verbal suffix – in a nominal structure is comparable to occurrence in an affixed environment, hence triggering generalized shortening. Recall that lack of stress is insufficient to induce generalized shortening; witness *a(lúmni:)*, *a(dúmbra:t)e*, affixation being also required. On the other hand, as we discuss further in 10.3 below, the conjunction of both affixation *and* lack of stress induce generalized shortening systematically (e.g. *defá:me* → *dèfamá:tion*, etc.), in contrast with the unsystematicity of (73)–(74). We then make a second assumption, or simply qualify the first, to the effect that nominal items in *ate* are "intermediate" between suffixed and unsuffixed ones, whence the variable applicability of shortening, the exact pattern of variation being apparently idiosyncratic.

9.4.5 *ative, ature*

Suffixes *ative* and *ature* instantiate the structure *LW* under consideration when they occur with a short *a*, since *ive/ure* are weak syllables (3.6

42 The case of *(mágistra)te/(mágistra:)te* is also not immediately accounted for in these terms, since there is no corresponding *a:te* verb.

above). Fudge classifies them as Pre-stressed 1/2 – a behavior that would follow if the weak syllable was consistently extrametrical, as in *a)tive/ a)ture*. While this classification appears generally correct, there are, however, cases like *pe(jórati)ve*, *de(rívati)ve* which violate it. We must also consider that *ative/ature* with short *a*, alternate with *a:tive/a:ture*, e.g. *legisla:tive/legisla:ture*, a fact that also needs to be expressed. In 5.2.3 above, we took such alternation in vowel length to reflect a difference in stress, simply taken as underlying. As noted in 8.5, however, it is no longer possible to assume such idiosyncratic distribution of stress once stress preservation is factored in. In particular, suffixal sequences *ative/ ature* will now be expected to preserve the stress of *(à:te)*. Revising our analysis accordingly, we thus take vowel length to be determined by the interaction of stress preservation (SP), and the rule or principle of "generalized shortening" (GS), which requires that vowels shorten in the context of an affix, as discussed in 8.5. The proposed schema is illustrated by (75).

(75)

				GS	*SP*
a.	de(sí:re)	⇒	de(sí:rou)s	no	yes
b.	blas(phé:me)	⇒	(blásphemou)s	yes	no

In (75), GS and SP cannot both be satisfied at the same time, since **de(sírou)s/*blas(phémou)s* instantiate impossible (non-initial) feet (*Lσ*). The two different outcomes in (75) then represent satisfaction of either principle at the expense of the other, the choice being apparently idiosyncratic. The variations *ative/a:tive*, *ature/a:ture* will now be quite analogous, as illustrated in (76).

(76)

			GS	*SP*
a. in(véstig)(à:te)	⇒	in(véstig)(à:ti)ve	no	yes
b. (géne)(rà:te)	⇒	(génerat)ive	yes	no

The case in (76a) is fully stress-preserving from the corresponding verb, the weak syllable *ive* simply replacing another weak syllable, i.e. the null vowel of the verb. In contrast, in (76b), GS obtains (in the context of *ive*), prevailing over preservation of the stress of *(à:te)*.[43] The other stress, however, is still preserved, by recourse to extrametricality of *ive*, as

43 Recall (5.2.3) that we are excluding the metrification of the null vowel in *ive*, as with suffixed adjectives in general, and as independently required by the non-existence of **pri(mítive)*, or any such case.

indicated. Again, we regard the choice between the two options (a/b) as idiosyncratic. Further examples of each of (76a, b) are given in (77), where individual items may in fact vary idiolectally between the two classes. We will return below to *ature/a:ture*, which is found in only a small number of cases.

(77) a. (génera)tive = agglutinative, appreciative, associative, collaborative, commemorative, commiserative, communicative, cooperative, copulative, cumulative, decorative, discriminative, elaborative, federative, iterative, manipulative, operative, palliative, remunerative, ruminative, speculative, terminative, vituperative

b. in(vésti)(gà:ti)ve = accommodative, accumulative, agglutinative, aggravative, aggregative, alliterative, annotative, corroborative, deliberative, elucidative, imitative, innovative, irritative, meditative, penetrative, reiterative, vegetative

While making no predictions on the choice between *ative* and *a:tive* in the cases in (77), this analysis – like the preliminary one of 5.2.3 – nonetheless makes other predictions. One is that, when the *a:te* verb has the structure . . .*(σL)(a:te)*, only the metrifications of (76a/b) *a:ti)ve/a)tive* should be found, excluding . . .*ati)ve*, as for instance in **ge(nérati)ve*. The reason is that the latter metrification violates SP by failing to maintain the leftmost stress, without providing any further satisfaction of GS. This exact same structure is in fact possible with bound stems, with which preservation is not at work, whence the noted *pe(jórati)ve*, *pre(rógati)ve*, exceptions to Fudge's classification.[44] A further prediction is that, with verbs that have the structure . . .*(σH)(a:te)*, only the *a:tive* variant of the adjective should be stress-preserving, as is indeed the case in (78), where the cases in (78c) occur as either of (78a, b). Preserving but unattested variants like **(désigna)tive* are excluded, as instances of *(σHσ)*.[45]

44 The latter metrification is right-hand exhaustive, in contrast to the left-hand exhaustive *(nómina)tive* – an idiosyncratic variation, we presume, like that of *(éffica)cy/an(típathy)* discussed in 3.6.

45 In the case of *adumbrative* in (78c), both metrifications can be taken to be stress-preserving, given both *a(dúmbra:)te*, and *(àdum)(brà:te)*. Analogously for some of the other cases in (78c), in some idiolects.

(78) a. (désig)(nà:ti)ve, (cónsum)(mà:ti)ve
b. *a*l(térnati)ve, d*e*(mónstrati)ve
c. administrative, adumbrative, compensative, concentrative, contemplative, illustrative, maturative

Thus, once again, the choice is between SP (= 78a), and GS (= 78b). The cases in (78b) indicate that GS can overrule preservation of *two* stresses simultaneously: the one on the stem, and the one on *a:te*. Note further that, while some of the heavy syllables in (78) are closed by sonorants or *s*, we expect that only when the word condition (55) above holds, should such syllables systematically behave as light to satisfy stress preservation and otherwise do so only sporadically (again, witness *moméntous/cávernous*). Cases like *(législa)tive*, *ad(mínistra)tive*, contrasting with the cases in (78), thus represent the expected pattern.[46]

Yet a third prediction we make has to do with *ative* adjectives from verbs not in *a:te*, such as those in (79).

(79) a. af(fírmϕ) ⇒ af(fírmati)ve
b. (álterϕ) ⇒ (áltera)tive/(álter)(à:ti)ve

Here, we correctly predict that only *ative* should occur with oxytonic stems like that of (79a), while both *ative/a:tive* may occur with paroxytonic ones, like that of (79b). The reason is that the missing variant **(áffir)(mà:ti)ve* would violate both SP and GS, while (79a) *af(fírmati)ve* violates neither. In contrast, both variants in (79b) preserve the stem stress. In addition, *(álter)(à:ti)ve* also preserves the stress of *(à:te)* (which is part of its lexical representation), while *(áltera)tive* satisfies GS instead – the usual variation. This means that even **(áffir)(mà:ti)ve* would now be partially preserving, but without changing the earlier predictions. While both variants are partially preserving, only (79a) *af(fírmati)ve* also satisfies GS. The patterns of (79a, b) are general, as shown in (80).[47]

46 The "misalignment" in *a)tive* may perhaps also contribute to the relative exclusion of this structure by compounding with the would-be-exceptional "light" metrification of the heavy syllables in question.

47 There are two exceptions to this generalization, represented by the non-preserving variant (italicized) in each of (ia, b).

(i) a. re(cí:te) ⇒ *(réci)(tà:ti)ve*/re(cí:tati)ve
b. ap(plý:ϕ) ⇒ *(áppli)(cà:ti)ve*/ap(plícati)ve

(80) a. con(fírmati)ve, at(téstati)ve, con(sérvati)ve, con(súltati)ve, de(fórmati)ve, ex(hórtati)ve, ex(péctati)ve, fer(méntati)ve, in(fórmati)ve, mani(féstati)ve, pre(sérvati)ve, pre(véntati)ve, re(fórmati)ve, repre(séntati)ve, trans(fórmati)ve, u(súrpati)ve
b. de(rívati)ve, e(vócati)ve, ex(clámati)ve, pro(vócati)ve
c. i(mágina)tive, (límita)tive

The cases in (80a) are like (79a) *af(fírmati)ve*, while those in (80c) are like (79b) *(áltera)tive*. As for those in (80b), they are analogous to those in (80a) in being stress-preserving, but they also involve GS of a stem vowel (cf. *deri:ve*, etc.). Unlike (75) above, **de(sírou)s*, GS does not exclude SP here, since the latter can be satisfied by parsing *ive* into a ternary foot. We thus predict that GS should *(quasi-)systematically* affect the stem vowel in these cases (as in all trisyllabic feet), which seems correct.[48] In contrast to this account, *derív* + *ative* and the other cases in (80b) are further exceptions to Fudge's "Pre-stressed 1/2" classification of *ative*.[49]

Let us thus summarize the various cases of *ative/a:tive* so far discussed as in (81), where SP-1 is preservation of stem stress, and SP-2 preservation of stress on *a:te*.

(81)

		SP-1	*SP-2*	*GS*
a.	in(véstig)(à:ti)ve	y	y	n
a′.	(génera)tive	y	n	y
a″.	*ge(nérati)ve	n	n	y
b.	pre(rógati)ve		n	y
c.	(désig)(nà:ti)ve	y	y	n
c′.	de(mónstrati)ve	n	n	y
c″.	*(démonstra)tive	y	n	y
	*(désigna)tive			

These do not follow from the text discussion, which would predict only **re(cítati)ve*, *ap(plícati)ve*, both simultaneously preserving and shortening.
In contrast to (i), the two variants in (ii) are both preserving, though the second only "weakly."

(ii) (múltiply) ⇒ (múltipli)(cà:ti)ve/(mùlti)(plícati)ve

48 In the cases in (i) GS applies (somewhat) vacuously, given the (relative) "laxing" induced by the following *r* in the stem.

(i) com(párati)ve, de(clárati)ve, ex(plóra)tive, re(párati)ve, res(tórati)ve

49 Note that Fudge's classification cannot refer to *underlying* vowel length, since it would give, e.g. **blasphémous*.

		SP-1	*SP-2*	*GS*
d.	af(fírmati)ve	y	n	y
d′.	*(áffir)(mà:ti)ve	n	y	n
e.	(áltera)tive	y	n	y
e′.	(álter)(à:ti)ve	y	y	n
f.	de(rívati)ve	y	n	y
f′.	*de(rí:vati)ve	y	n	y

In essence, the ungrammatical cases are those that have more "n's" (and hence greater ill-formedness) than their alternatives. Predicted exceptions to this are (c′), where we argued that GS has sufficient weight to make up for the "double" non-preservation; (c″), excluded as having an ill-formed foot; and (f′), excluded by the predicted GS of the stem vowel.

We may note here for comparison how HV's (pp. 261f.) analysis based on the "*ative* rule," briefly discussed in 5.2.3, would fare. First, the latter *cannot* draw the distinction between (c) and (d′), which have identical syllabic structures, since it does not recognize the role of stress preservation over this class. Second, by having a special rule to destress *ative*, the latter fails to relate the cases in (81) to those in (75). Third, it provides no reason why the rule does not produce (c″) **démonstrative*, from *démonstrà:tive*, on a par with (a′) *génerative*.

We note finally a few cases in which *ative* occurs with non-verbal stems, such as those in (82).

(82) a. au(thóri)(tà:ti)ve, (quáli)(tà:ti)ve, (quánti)(tà:ti)ve
  b. (fígura)tive
  c. (àrgu)(méntati)ve

All of these are stress-preserving as predicted, although the one in (82c) only "weakly" (cf. *árgument*). While the difference between (a) and (b) seems idiosyncratic (but the items in (a) also occur with the structure of (b)), the case in (c) seems again predictable, to the exclusion of **(árgumen)(tà:ti)ve*. The reason is "alignment" of heavy syllables with stresses. Supposing that *ative/à:tive* are – by themselves – equivalently well-formed variants, the choice between them will then be determined by the stem, like the choice between the two variants of *ary/ory*, *i:ne*, *i:te*, *oid* discussed in 4.2.2, 7.4 above. The case in (82c) *(àrgu)(méntati)ve* is in fact exactly parallel to *(èle)(ménta)ry*, *(èle)(phánti:)ne*, *(àrchi)(mándri:)te*, *(sàla)(mándroi)d*, the first two also "weakly" preserving, and all "aligning" a stress with a heavy pre-suffixal syllable by choosing the unstressed version of the suffix. Note that the lack of suffix stress results in GS in *argument*[a]*tive*, but has no effect on e.g. *elephant*[i:]*ne*, where *i:ne* is not "in the context of an affix" (8.5 above, 10.3 below), while the *a:te* of *a:tive* is in the context of *ive*. In contrast, the *o/a* of *ory/ary* are kept short by the *r*-induced "laxing," and simply reduce when unstressed.

Turning now to *ature*, this suffix appears in much fewer instances than *ative*, yet its behavior seems parallel – the cases in (83a, b), which have *a:te* verb counterparts, being analogous to the ones in (77a, b) above, respectively.

(83) a. (légis)(là:tu)re
b. (cándida)ture

The item in (83b) is also related to, and stress-consistent with, the noun *(cándida)te*. Analogously, *(mágis)(trà:tu)re* is consistent with the noun *(mágis)(trà:te)*.[50] The cases in (84) are parallel to the ones in (80a) and conform with the same generalization, choosing *at)ure* to preserve the stress of the oxytonic stem.

(84) (sígnat)ure, de(clí:natu)re

However, we must note the failed shortening in the second item in (84) (parallel to that of *reci:tative* of fn. 47), which we can only class with other exceptions, like *obe:sity*, and other known failures of "trisyllabic" shortening.

In conclusion, the two suffixal sequences *ative* and *ature* come in two varieties: one with a short and unstressed *a*, the other with a long and stressed *a* – a variation which reduces to generalized shortening, along with many others found throughout the Latinate lexicon. Despite Fudge's "stress-placing" classification, we have thus seen that these suffixes exhibit the same pattern of stress preservation as suffixes standardly classified as neutral (e.g. *ist*, *ism*), and – like those – are non-preserving only to satisfy generalized shortening. It is in fact precisely the stress-preservation requirement that sheds light on the complex distribution of the two variants illustrated in (81).

50 Parallel to the cases in (78) we only find the infrequent *demárcature*.

9.4.6 *ic, ity, ion*

Turning now to one final set of suffixes, we note that *ic*, *ity* instantiate the structure *LW* on our criteria, the former because of the final null vowel, the latter because of the final *y* comparable to that of *(áppeten)cy*, *(éffica)cy*, etc. Our discussion in 8.4 above correctly predicts that these suffixes should *not* be neutral, because they do not attach by syllable overlap. The reason for this is in turn that (unlike *able/age/ative*), they do not attach to verbs, but rather to nouns and adjectives respectively, as illustrated in (85).

(85) a. (déspo)t ⇒ des(póticφ)
b. ab(nórma)l ⇒ (àbnor)(málity)

Thus unable to attain stem consistency (= neutrality), these suffixes abide by suffix consistency instead, in accordance with (57) in 8.6 above, namely they metrify the right edge to consistently either include or exclude the weak syllable. As we argued in 8.2.6, we take the specific metrification *icφ)* to be motivated by consistency across *ic/ical* pairs, as in *aca(démicφ)/aca(démica)l*. As for the metrification *ity*), it simply instantiates the normal, right-hand exhaustive, metrification of overt weak syllables. Consider, however, that, in claiming that stress preservation could not be achieved by the suffixal structure *LW* unless attached by overlap, the discussion in 8.4 was in fact oversimplified. If stress preservation could dictate the parsing of final weak syllables on a case-by-case basis, then it should do so in (86).

(86) a. (gérma)n ⇒ *(gérmani)c
b. (nórma)l ⇒ *(nórmali)ty

That is, in general, stems ending in a final foot (*Hσ*) should still yield neutrality when followed by a suffix *LW*, since that foot can expand to take in the first syllable of the suffix, resulting in the well-formed structure *(HσL)W*. In addition, neutrality would also be expected in occasional cases of σ-overlap, such as *(mélody)* → **(mélodi)c*. The actual interplay of stem and suffix consistency can therefore not be that the former is chosen over the latter in each individual instance, but only that the choice is made once and for all for each suffix. An adequate characterization of this generalization is in fact already provided by the assumption of this chapter that, even with Latinate affixes, stress neutrality is diacritically encoded in lexical representation, in the manner illustrated in (87) for *ist*.

(87) *Lexical marking for stem consistency*
. . . $_{\text{word}}$] ist

In the case of *ic*, *ity*, the marking in (87) cannot hold, and the alternative diacritic marking for suffix consistency will thus obtain instead. We take the latter to be in the form of a right foot boundary, as argued in 7.2 above, and as illustrated in (88) for *ic*.[51]

(88) *Lexical marking for suffix consistency*
icϕ)

The ranking of stem consistency over suffix consistency of (57) in 8.6 above is now to be interpreted as imposing (87) over (88) whenever possible. As we argued in 9.3.3, we take the ranking to follow from "numerical" weight. Consider that, when (87) stem consistency holds, the proliferation in metrical structures resulting from suffix inconsistency is relatively small. Since any suffix only has two possible metrifications, i.e. . . . *W*) and . . .)*W*, suffix inconsistency can at most increase the number of metrical structures by one. In contrast, when (88) holds, forcing stem remetrifications, the proliferation is typically larger, involving a considerable number of stems that must receive new metrical structures. From this point of view, we might expect that a plausible principle of "economy" of lexical representation would indeed rank (87) over (88). As we have already noted in passing, the two conditions in (87), (88) are not necessarily incompatible. Attachment by syllable overlap (of suffixes *HW*/*LW*/*W*) will give stress preservation with a single parse of the suffix, and hence systematically satisfy both, e.g. *in(hábita)ble*/*pre(vénta)ble*. Hence, we take a suffix like *able* to be "doubly" marked, as in (89).

(89) *Lexical marking for both stem and suffix consistency*
. . . $_{\text{word}}$] a)ble

We underscore again that with Latinate suffixes the condition in (87) holds only "weakly" (though detectably), hence compatibly with certain

51 In 7.6, 8.6 above, we noted that even suffixes like *ist* exhibit suffix consistency, when they take bound stems. We may take the latter type of consistency to simply reflect right-edge alignment, whence *is)tϕ* rather than *istϕ)*, hence not requiring a specific mark like the one in (88).

stem remetrifications, cases of vowel shortening and other segmental readjustments, as well as bound stems. This is rather similar to occasional violations of *suffix* consistency, such as *(cátholi)cφ*, *(árabi)cφ* and others. Recall too that when (87) and (88) are in conflict only over a small class of stems (a few units), then suffix consistency prevails over stem consistency, as in *(trí:um)ph* ⇒ *tri:(úmphan)t*, not **(trí:um)(phàntφ)* (9.3.3 above), confirming the proposed "numerical" basis for the ranking of the two.

Both *ic* and *ity* are well known to trigger "trisyllabic" shortening, as in (90), where the italicized vowels are long in the stem.

(90) a. (cónicφ) = diab*e*tic, m*i*mic, osm*o*tic, ph*o*nic, sph*e*ric, st*a*tic, t*o*nic, volc*a*nic

b. aus(térity) = bellic*o*sity, ch*a*stity, div*i*nity, grandi*o*sity, in*a*nity, medi*o*crity, obsc*e*nity, op*a*city, prof*a*nity, r*a*rity, s*a*nity, ser*e*nity, sev*e*rity, sinc*e*rity, v*a*nity, verb*o*sity

Within the present analysis, trisyllabic shortening simply reduces to generalized shortening, induced generally by Latinate affixes. As we see in more detail in 10.3, the fact that it differs descriptively from other instances of generalized shortening, in particular in being systematic, follows from independent principles. In (90), stress preservation and generalized shortening are not mutually exclusive as they are in (75), (76) above, the ternary feet being well formed with a short vowel, in contrast to the binary of **blas(phémou)s*, etc. "Trisyllabic" shortening is thus merely generalized shortening in an antepenultimate syllable, while "morphological" shortening is the same in a penultimate syllable.

In sum, the non-neutrality of *ic* and *ity* are as predicted, as is the vowel shortening they induce.

We will also briefly note here the suffix *ion*, which is like *ic* and *ity* in placing stress on the immediately preceding syllable and hence in being non-neutral, although its structure is not *LW*, but more appropriately *LLW* (*i.o.nφ*). Its metrification *io)n* is normally "aligned" with phonetic structure, requiring no special provision, and the bisyllabic parsing of *io* also normal, like that of other *iV* sequences. The *i* could perhaps be taken to be a spell-out of the final vowel of each stem, as suggested above for that of *ious/eous*, *ial*, *ian*. However, unlike those other suffixes, this one does not occur *without* the *i* – a difference which would remain unexplained. Unlike *ic/ity*, this suffix does not induce trisyllabic shortening, e.g. *de(lé:tio)n*. The reason is that it induces "C*i*V" lengthening instead;

witness *cri(té:rio)n*, *con(tá:gio)n*, etc., the account of which, related to that of *va(rí:ety)*, *sponta(néity)*, *alge(bráicφ)*, etc. remains that of 5.5 above.

9.5 Conclusion

In this chapter, we have considered English suffixes from the point of view of 8.4 above, where we predicted that all suffixes with the structure *W* or *HW* should be stress-neutral, while those with the structure *LW* should be neutral only when attached by "overlap." Aside from the further elaboration of the preceding section introducing stem consistency (87), those predictions were generally correct, at least for the Latinate subclass.

A comparison of this chapter with chapter 7 reveals that the metrifications needed for our account of neutrality are often independently required for cases of bound stems. This is illustrated in (91) (similar to (34), chapter 7).

(91)		*Bound stems*	*Neutrality*
	a.	an(típathy)	†ex(pí:ry)
	a′.	(léthar)gy	(hónes)ty
	b.	as(trónomer)	con(tróller), (ínter)(vièwer)
	c.	ap(pósiti)ve	pro(híbiti)ve
	d.	(fúrnitu)re	de(pártu)re, (árchi)(tèctu)re
	e.	(éffica)cy	(ádequa)cy
	f.	pro(tágonis)t	(pròpa)(gándis)t
	f′.	(sólip)(sìstφ)	a(mérica)(nìstφ)
	g.	an(tágonis)m	fa(náticis)m
	g′.	(écume)(nìsmφ)	(cánniba)(lìsmφ)
	h.	con(cómitan)t	in(hábitan)t
	i.	in(stálmen)t	de(vélopmen)t
	i′.	(témpera)(mèntφ)	ac(cómpani)(mèntφ)
	j.	vo(cábu)(làry)	i(mági)(nàry)
	k.	(dórmi)(tòry)	in(híbi)(tòry)
	l.	(céme)(tèry)	con(féctio)(nèry)
	m.	in(dómita)ble	in(térpreta)ble
	n.	ad(vánta)ge	(brókera)ge

Since the metrifications needed for bound stems thus suffice to account for neutrality with free stems, the recourse to "stress evasion" of past analyses is also superfluous, beside being inadequate as argued.

In contrast to Latinate suffixes, we have seen, however, that Germanic suffixes impose stress neutrality independently of their specific structural properties. We have argued that this reflects a requirement that they attach to a well-formed word in derived representation. This requirement differs from the similar one postulated for neutral Latinate suffixes in two respects: (i) it is not computable from the structure of the suffix, but is rather a primitive characteristic of the whole class; (ii) it is stronger, permitting virtually no exceptions. This requirement accounts simultaneously for all characteristics of Germanic suffixes, namely stress neutrality, lack of bound stems and lack of segmental readjustments, most notably generalized shortening. Our general thesis that there is no stress evasion continues to hold for Germanic suffixes as well, and is supported by the fact that Germanic suffixes whose structure does not guarantee integration with all stems, like *ful*, *ish*, *let*, in fact occur only with those stems whose structure permits it (whence **povertiful*, **elephantish*, **torrentlet*, etc.).

Like past analyses, we therefore draw a basic distinction between two different classes of affixes, but draw it along very different lines. We see a primitive distinction not between neutral and non-neutral affixes, but rather between Latinate and Germanic ones. The latter distinction is drawn by the distribution of segmental changes and concurrently that of bound stems, etymology correlating only coincidentally and partially.

In contrast, stress neutrality cuts along rather different lines. The criss-crossing of the two distinctions is highlighted by (92), which shows that vowel shortening is a general property of Latinate affixation, whether neutral or not.

(92) a. *"Neutral" suffixes*
submár*i*ner, blásph*e*my, teléph*o*nist, ásp*i*rant, éxcr*e*ment, mílit*a*rìze, sál*i*vary, ádm*i*rable, concúb*i*nage

b. *Non-neutral suffixes*
vág*i*nal, gángr*e*nous, mémbr*a*nous

c. *Prefixes*
ínf*i*n*i*te, omníp*o*tent, unív*a*lent, bíc*y*cle, súbs*e*quent, ímm*i*grant

To these examples must be added all the cases of "trisyllabic" shortening, e.g. *nátural*, *athlétic*, *divínity* – now subsumed under generalized shortening as we have argued, as well as shortenings of several other descriptive varieties, to which we will return.

The cases in (92a) above provide further counterargument to the traditional approach. They show that neutral suffixes are no longer neutral when stem vowels shorten. If neutral suffixes could evade stress, there would be no reason for this. The alternative assumption that they are parsed like all other syllables explains it immediately.[52] All of **blas(phémy)/*blas(phé)my*, **tèle(phónis)t/*tèle(phónistϕ)*, etc. have ill-formed feet, as we have seen.[53]

Despite generalized shortening, we have taken neutral suffixes of the Latinate class to enforce a weak form of the "word" condition on their stems as well. Intuitively, we see this as an effect propagating from neutrality itself, which enables the stem to remain an unmodified word with regularity. The result of this is then the same three effects found with Germanic suffixes, though in a weaker form, as indicated in (93).

(93) a. no (/fewer) bound stems
  b. no (/fewer) stem remetrifications
  c. no (/fewer) segmental changes

The effect in (93a) was discussed for *able* and *age* in 9.4.1. The one in (93c) is detectable in *si:gnable* (versus *siGnature*), though not in *damNable*, contrasting with *damning*. It is also detectable in *(lo:ca)(lize)*, *(le:ga)(lize)*, which fail to match the shortening of *o(bliga)(tory)*, and is detectable as well in the failed "trisyllabic" shortening of *(lo:calis)m*, *(pa:ganis)m*, and other cases. As for (93b), recall that it is now what overrules suffix consistency, as in *pròpa(gándis)t*, versus *américa(nìstϕ)*. We also take (93b) to result in a certain number of

52 It will not help to suppose that "neutral" suffixes are systematically ambiguous between level I/cyclic and level II/non-cyclic, since it would then be a mystery why they are the former (i.e. non-neutral) *only* when shortening is involved, never otherwise. For a more detailed discussion of this point, see Burzio (1991).

53 Recall (fn. 7) that we attribute the failed partial preservation of **(télepho)ny*, **(télepho)(nìstϕ)* to suffix consistency prevailing, as it does, in **(áppeti)tive*. These cases contrast with *(génera)tive*, etc., where the opposite outcome obtains. Numerical weight may again shed light on this. Since the *ative* class is large, giving up consistency of *i)ve* over this class yields partial stem consistency over a relatively large number of stems, in contrast to the other cases, which involve very few stems.

exceptional metrical properties that we have noted through the previous sections, in particular the ones in (94), absent or rare elsewhere.

(94) a. *Word-medial extrametricality*
(chárac)te(rì:ze)
b. *Monosyllabic parsing of "iV" sequences*
ob(jéctiona)ble, com(pániona)ble
c. *Parsing of syllables closed by sonorants or s as light*
(pátenta)ble

We have seen that the phenomena in (94b, c) are not licensed (at least not systematically) by simple stress preservation, witness *(*máliciou)s*/ *(*mániaca)l*, *(*párenta)l*. As for the one in (94a), there are no comparable instances with non-neutral suffixes (whose structure is *LW*), since these can never constitute a foot to the right of the extrametrical syllable. Yet it seems natural to group this effect with the other two, and there are further reasons to do so, as we see shortly.[54]

Intuitively, what we are thus postulating is that the notion of well-formed word is not only at work with the overall result of word-formation, but also with its internal parts. With non-neutral suffixes, stems are prevented from satisfying that notion generally, because they are often remetrified into accentual patterns that compromise their word status. With neutral suffixes, however, the tendency towards word status of stems can be satisfied, and manifests itself in the various ways we have seen. A question that now arises is whether the word integrity of stems obtaining with neutral suffixes continues to obtain under *further* suffixation, the answer to which seems to be affirmative. Thus consider (95a, b).

(95) a. (chárac)te(rì:ze)
b. (chàrac)teri(zá:tio)n

The fact to observe in (95b) is that the sequence *teri* is not parsed into either foot. Parsing with *charac* would cause the stress to shift onto the heavy syllable *rac*. This situation would follow if the sequence preceding *i:ze* was required to maintain its metrical properties as a word, just as it is in (95a), although here its stress is necessarily subordinated to the primary

54 This is not entirely true, since there are a few "larger" non-neutral suffixes, like *ólogy*. From the point of view of the text, both *chàracterólogy*, and *chàracterológic*, are surprising, contrasting with the expected *èndocrinológic*, *pàrasitológic*, and the other cases of (34), chapter 6, suggesting some special property of the stem *character*. We must leave this question open.

of *á:tion*. Obligatory preservation of stress would then force the syllables *teri* (= [tRi]) to remain extrametrical, even word-medially. The shortened *i* would be extrametrical here like the *i* of *(génera)tive*, while the plurisyllabic extrametricality of this case would be comparable to that of *(génera)tively*.

The preservation of the structure to the left of *i:ze* contrasts with the remetrification of *i:ze* itself and its loss of vowel length, which follows from the fact that stem integrity (as per (87) above) holds only relative to *i:ze* and not *a:tion*. The cases in (96), in which four syllables separate primary and secondary stresses, also call for this kind of analysis, but with only one syllable extrametrical.[55]

(96) a(mèrica)ni(zá:tio)n, (pèrsona)li(zá:tio)n, (pàlata)li(zá:tio)n, (nàtiona)li(zá:tio)n

While, in the dialects illustrated by (95b), (96), the *i* of *i:ze* is shortened under further suffixation, in other dialects – mostly British – the *i* remains long, giving *i:za:tion*. We presume this oscillation reflects the usual conflict between generalized shortening and stress preservation, the former succeeding in one case, the latter in the other. For the British dialects, we postulate the analysis . . .*(ì:ze)(á:tio)n*, with preservation of stress on *ì:ze* and a null vowel even medially, to allow for the presence of the relevant foot.

The cases in (97a, b) are relevant in the same general connection.

(97) a. de(sí:ra)ble
 b. de(sì:ra)(bílity)

One fact of note here is insertion of *i*, giving *ble* → *b*[i]*lity*. Given *desírably*, *prevéntably*, *públic*, and other cases, one might rather expect **desiráblity*, **preventáblity* etc. It is easy to see, however, that the insertion of *i* is in fact necessary if the material preceding *able* is to maintain its stress.[56] A second fact of note is that, just like the metrical characteristics, so all the segmental characteristics of the material preceding *able* are

55 In contrast to (96), cases like *(àllego)(rì:ze)*, which do not fully preserve the metrical structure of the stem *(álle)(gòry)* seem to "restore" such structure before *ation*, as in *(álle)(gòri)(zá:tio)n*, at least as a possible variant.

56 Note, however, *(noble)/no(bility)*, despite the fact that **(noblity)* would be stress-preserving. The sequence *blity* is in fact totally absent, the text only accounting for partial absence.

preserved when *ity* follows. Thus, the long vowel of (97a) *desi:rable* and many other cases remains long in the corresponding *desi:rability* (97b). Only the occasional short vowels of cases like *(ádm*[i]*ra)ble*, *di(v*[í]*sible)*, surface as short in the corresponding *(àdm*[i]*ra)(bílity)*, *di(v*[í]*sì)(bílity)*. Note that the long vowel of *de(sì:ra)(bílity)*, like those of *(ló:ca)(lì:ze)*, *(lé:ga)(lì:ze)*, is in a metrical environment that generally induces shortening, witness *ob(l*[í]*ga)(tory)*, etc. (see 10.3 below). Analogously, the preservation effects of *ob(jéctiona)ble* and *(pátenta)ble*, invoking (94b, c) respectively, persist in *(pàtenta)(bílity)*, *ob(jèctiona)(bílity)*.[57] In sum, both the segmental and the metrical structure of the material preceding *bility* is preserved to the exact extent that it is preserved when it precedes *able*. This will follow from supposing that the word integrity *able* imposes on its stem (occasionally violated, as in *admirable*) is in fact still in force when *ity* follows.[58]

A third set of cases suggesting the same kind of conclusion is given in (98), discussed in Goldsmith (1990) (citing Strauss [1983] for the original observation).

(98)	a.	fáscist	⇒	fascístic
	b.	cartóonist	⇒	*cartoonístic
	c.	réalist	⇒	rèalístic

In (98a), *ist* is attached to a bound stem, differently than in (98b, c). The generalization represented by (98b) and noted by Goldsmith (/Strauss) is that the sequence *istic* is excluded with oxytonic stems (further examples in Goldsmith 1990, p. 268). The case in (98c) does not violate that generalization because *réal* is paroxytonic, and the one in (98a) because there is no word **fasc*.

The above generalization will follow from our proposal that stems attached to neutral suffixes maintain their word integrity under further suffixation. In *fascístic* (98a), the word integrity condition is inoperative, since **fasc* is not a word, hence there is no violation. In (98b), however, *cartóonist* maintains the word integrity of *cartóon*, which would be lost in *cartoo(nísticϕ)*, whence the violation. In contrast, no violation is incurred in (98c) *rèalístic*, since the inner stem *réal* preserves its own stress, albeit

57 This phenomenon thus contrasts with the one found in other environments, where, as we noted, exceptional stress patterns are regularized, e.g. *órchestra* → *orchéstral*.

58 Analogously, word integrity in the context of *al* preceded by *ion* of (70) above, as in *e(mó:tiona)l*, persists in *e(mò:tio)(nálity)*.

only as a secondary, hence analogously to (97) *desíre* → *desírable* → *desìrabílity*.[59]

The effects that we have just described, thus all point to the same generalization that, in the configuration (99), where suf_1 is stress-neutral, the presence of suf_2 can affect at most suf_1, but not the stem.[60]

(99) stem + suf_1 + suf_2

As we argued, this generalization follows from our hypothesis that in (99) suf_1 imposes word status on the stem, in the variable manner noted, and that this is not affected by the presence of suf_2. Comparing this account with past analyses, we find that only the one in *SPE* seems adequate in this connection (although our other reasons for departing from it remain). This is because *SPE* took neutral suffixes to be preceded by a "word" boundary #, whose presence was presumed to have an inhibitory effect on stress and other rules. The generalization relative to (99) would then be captured as in our system, namely by supposing that suf_2 has no effect in removing that boundary. In contrast, within both the "Lexical Phonology" and the "Cyclic Phonology" approach, when suf_2 in (99) is a "level I" or "cyclic" suffix, such as *ation*, *ity*, *ic*, it should trigger the full battery of level I/cyclic rules, just as it does in *àdmirátion*, *ìnformálity*, *allérgic*, etc., with no provision to shield the stem, thus wrongly predicting **amèricànizátion*, **des*[i]*rabílity* (with a short *i*) **càrtooníst ic*, etc.

59 There are exceptions, however, such as *simplistic*, *cubistic*, *stylistic*, *opportunistic*, *propagandistic*. Note that the text does not necessarily exclude oxytonic stems which are monosyllabic and hence have initial stress. The reason is that initial heavy syllables tolerate stress adjacency, as in (*ϕbàn*)(*dánna*) (4.2.1 above). This may accommodate the noted *sìmplístic*, *cùbístic*, *stylístic*, but will then fail to rule out **sèxístic*, and other cases noted by Goldsmith – a question that we leave open.

Goldsmith proposes to account for (98b) in terms of a prohibition against stress clashes across an "open juncture." Although rather similar to ours, Goldsmith's condition does not cover the further phenomena we aim to capture in (95)–(97).

Goldsmith's observations further extend to the sequence *mental* exemplified in (i), as does our text discussion.

(i) a. devélopment ⇒ devèlopméntal
b. emplóyment ⇒ *èmployméntal

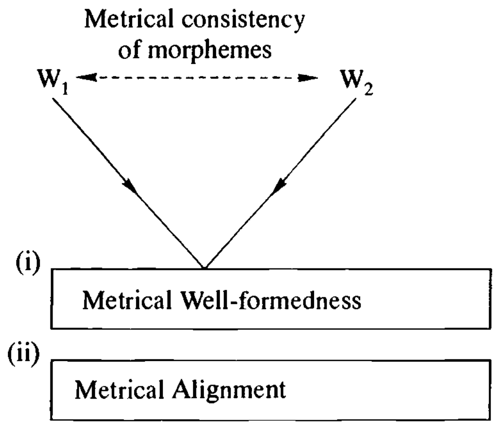
60 The text condition relative to (99) thus accounts for all of (94a, b, c), further supporting grouping them together.

10 *Extensions and refinements*

10.1 Introduction

In the past four chapters, we have essentially maintained that stress relies on the type of lexical organization in (1).

(1) a. Lexicon



b. Conditions on representation

The general hypothesis of (1) is that all words are subject to the same conditions on metrical structures given in (1b), which break down into two subsets. "Metrical Well-formedness" (1bi) designates the range of possible feet (as in (1) on p. 165 above), and that of possibly extrametrical syllables (given in (2) on p. 16). "Metrical Alignment" (1bii) refers to a collection of ancillary conditions, specifically: the Strong Retraction condition, constraining feet preceding a weak one to binary; Alignment of heavy syllables with stresses; Alignment of metrical structure with left and right phonetic edges (= exhaustive parse). The latter conditions were given in (4) on page 166 above, the further condition that verbs parse a null element having now been derived (as in 8.2.6 above, (3d) below). With words morphologically unrelated to others, nothing else is involved, and they in fact give no particular reason to break up the conditions of

(1b) into two subsets. With words morphologically related to others, however, the metrical consistency of morphemes (1a) comes into play, causing certain deviations from the pattern imposed by (1b). Subdividing the conditions in (1b) is what enables us to characterize those deviations. Specifically, we suppose that metrical consistency is overruled by (1bi), hence never extending the range of possible feet or of extrametrical syllables, while it overrules the conditions in (1bii), in the hierarchical ranking given in (2).

(2) a. Metrical Well-formedness
b. Metrical consistency
c. Metrical Alignment

In essence, we are thus claiming that the general conditions on metrical structure have a "hard core" (Metrical Well-formedness) which holds under all circumstances, and a "softer" periphery (Metrical Alignment), which yields to pressure for metrical consistency.

The system in (1) seems simple and rather natural, as was argued for (1b) in Part I. In Part II we have so far shown that the single principle of Metrical consistency (1a) successfully subsumes a variety of formerly unrelated phenomena, which we list in (3).

(3)	*Metrical consistency*	*Example*	/ *consistent with*
a.	Weak stress preservation	me(dìci)nálity	/ medícinal
b.	Strong stress preservation	a(mérica)nìst	/ a(mérica)n
c.	*Suffix* consistency	ger(mánicϕ)	/ icϕ)
d.	"Misalignment" of verbs	pre(véntϕ)	/ pre(véntin)g
e.	"Misalignment" of *ic* items	aca(démicϕ)	/ aca(démica)l
f.	Stem selection	(pléntifu)l	/ plénty
		*po(vértifu)l	/ *povérty

In this final chapter, we will further extend our account to a few other areas. Specifically, in the next section we argue that a single difference in the role of weak syllables yields a considerable number of observed differences between English and Italian, and we will also see how the latter language provides additional support for the principle of metrical consistency. In section 10.3, we will present a revised analysis of English vowel length, integrating stress preservation into the general approach of chapter 5. Finally, in 10.4, we will consider the issue of linear order of English affixes, considering the issue of the so-called "bracketing paradoxes," and arguing that our approach successfully deals with those matters as well.

10.2 Metrical consistency in Italian

10.2.1 The weak-syllable "parameter"

The framework developed so far makes possible a unitary account of certain differences between English and Italian, which is not possible otherwise. The primitive, or "parametric" difference that we need to postulate between the two languages concerns the nature of word ends. In essence, what we need to suppose is that Italian word ends are prosodically "sharp," in the sense that metrical structure is required to be always perfectly aligned with those ends. This is in contrast with English word ends, which are correspondingly "fuzzy," in the sense that there are final syllables that may or may not be parsed, resulting in certain misalignments.[1] This view is partially qualified by the fact that, like English, Italian too has a class of oxytonic words, like *cittá*, *ré*, etc., parallel to English *kangaróo*, *denýý*, etc., for which we have postulated a null syllable, and hence a misalignment of metrical and phonetic structures. In what follows, we will abstract away from this class.

The absence of weak syllables and hence of syllables with null nuclei in Italian (aside from the cases just noted) will immediately account for an otherwise curious divergence in the conditions governing final syllables. Whereas English final syllables are apparently permitted to be larger than the normal CVC structure, as in *preVENT*, *roBUST*, Italian ones are in fact required to be smaller, constrained to CV, as in *robusTO* "robust," *amaNO* "they love" (cf. Latin *aMANT*, parallel to the English cases), *soNO* "I am" (cf. Latin *SUM*). As argued in 3.5, the postulated null elements of *preventϕ*, *robustϕ*, *genericϕ*, etc. reduce the final-syllable conditions of English to those of Italian, namely to a prohibition against word-final codas, the apparent difference following from the absence of syllables with empty nuclei in Italian, which we take to reflect the more general absence of weak syllables.

Certain notable differences in stress patterns will follow as well. In particular, it will follow that Italian should lack the "shorter" stress

1 If weak syllables are acoustically weak, as suggested in 3.6, then the phenomenon of weak syllables is plausibly related to that of vowel reduction, both instantiating syllables with attenuated nuclei, and both missing in Italian.

pattern of English verbs, e.g. *in(hábitϕ)*, with stress on a light penultimate. The absence of the extra long pattern of *génerative*, *índustry*, *cháracter*, with stress on a pre-antepenultimate or on an antepenultimate next to a heavy penultimate, will also follow from the absence of weak syllables.[2] Absence of weak syllables also accounts for the absence of weak feet in Italian, and hence of the pattern *bérnardì:ne*, *désignà:te*, in which a heavy penultimate again fails to be stressed. A further important difference that follows is the absence of stress-neutral suffixes in Italian. This fact supports our analysis of stress neutrality, which attributed a crucial role to final weak syllables (see 8.4). In contrast, if neutrality was due to "level II" affixation or some other form of stress evasion, there would be no reason why Italian should differ from English in this regard.[3]

The cluster of differences which we are thus capturing by means of a weak-syllable "parameter" is thus as summarized in (4).

(4)	*Phenomenon*	*English*	*Italian*
a.	Apparent maximal structure of final syllables:	CVCC	CV
c.	"Short" stress pattern: (prevént, inhábit)	yes	no
b.	"Extra long" stress pattern: (génerative, índustry)	yes	no
d.	Weak feet: (bérnardìne, désignàte)	yes	no
e.	Stress neutral suffixes: (américanìst, propagándist)	yes	no

10.2.2 Morpheme exclusion

While it lacks some of the metrical-consistency effects of (3) above due to the lack of weak syllables, Italian exhibits other phenomena reducible to

2 An exception to this are third person plural forms like *te(léfona)no* "they phone." Indeed these require viewing the final syllable *no* as extrametrical, like English weak syllables. The non-restressing character of clitics, e.g. *véndere* "sell"/*véndertelo* "sell it to you," is also not accounted for by the text.

3 Recall that, in contrast to neutrality/strong preservation, Italian does have weak-preservation effects comparable to those of English, as expected (fn. 12, chapter 6; Vogel and Scalise 1982).

metrical consistency, studied in DiFabio (1990). Some of these concern the distribution of the morpheme *isc*, which is inserted between the stem and the inflectional endings of certain verbs of the *ire* conjugation, with the particular distribution illustrated in (5) for *fin-ire* "to finish."

(5)	a.	fin-ísc-o	"I finish"
	b.	fin-ísc-i	"you finish"
	c.	fin-ísc-e	"he finishes"
	d.	fin -iámo	"we finish"
	e.	fin -íte	"you finish"
	f.	fin-ísc-ono	"they finish"

DiFabio argues that the pattern in (5) simply results from the lexical representation in (6), in which *isc* bears stress.

(6) ísc

The absence of the infix in (5d, e) will then follow from metrical consistency. In those cases, since the stress falls on the next syllable, and presuming as usual that there are no monosyllabic feet and hence no adjacent stresses, *isc* would be forced to be stressless and hence inconsistent with (6), and is thus suppressed instead. As DiFabio argues, exactly the same account is applicable to the distribution of the suppletive form *vad* of the verb *andare* "go" in (7), presuming the lexical representation in (8), parallel to (6).

(7)	a.	vád-o		"I go"
	b.	vád-i	[→ vai]	"you go"
	c.	vád-a	[→ va]	"he goes"
	d.	and-iámo		"we go"
	e.	and-áte		"you go"
	f.	vád-ono	[→ vanno]	"they go"

(8) vád

Once again, the cases in which *vad* fails to occur are those in which it would fail to bear stress and which would thus be inconsistent with the representation in (8). In those cases, *vad* gives way to the suppletive form *and.*

DiFabio shows further that metrical markings in underlying representation are also the appropriate way to express the distinction between the two subconjugations in *ere* exemplified in (9).

(9) a. pérd-e-re "to lose"
b. vol-é-re "to want"

In particular, taking underlying representation to be just as in (9a, b) with the given stress marks provides a straightforward account of a number of cases of syncope, like the one illustrated in (10), with respect to which the two classes differ.

(10) a. pérd-e-r-ó ⇒ perderó "I will lose"
b. vol-é-r-ó ⇒ volró [→ vorró] "I will want"

As DiFabio notes, the contrast in (10) is superficially surprising, since the syncope affects the stressed vowel of (10b), while sparing the unstressed one of (10a) –just the opposite of what is common. Yet this follows again from metrical consistency, since the deleted vowel is the one whose stress could not be maintained, due to its adjacency to the stressed future marker *o*. A second instance of syncope concerns past participial forms like those in (11).

(11) a. pérd-ú-to ⇒ pérso /perdúto "lost"
b. vol-ú-to ⇒ volúto "wanted"

The asymmetry in (11) follows from metrical consistency once again. Syncope of stressed *u* in (11a) *pérd-ϕ-to* [→ *pérso*] enables the stem stress to be maintained, satisfying metrical consistency, while no comparable motivation for syncope holds in (11b), where the stem is unstressed. Syncope in cases like (11a) is not systematic, however, and when it does not obtain stem remetrification necessarily occurs, as in *pérd* → *perdúto*. There are also idiosyncratic cases that cross the line the other way, e.g. *ved-ére)/vísto*. Yet, as DiFabio argues, the overall correlation between syncope of *u* and stem stress remains clearly detectable.[4]

The above characterization of the two subconjugations in *ere/ére* turns out to be useful in characterizing further properties of the infix *isc* of (6) above. While being a fairly general characteristic of verbs in *ire*, *isc* fails

4 DiFabio argues further that the same type of correlation, amenable to the same account, is also found with syncopated preterits, as exemplified in (i).

(i) a. pérdere / pérsi "to lose / I lost"
b. potére / potéi "to be able / I was able"

However, the distribution of syncope in (i) is also compatible with the hypothesis that simple lack of stress is the controlling factor. For it is clear that the *e* of the preterit, e.g. *potéi*, is the same thematic vowel of the infinitive, compare *mangiAre/mangiAi*.

to appear in a substantial minority of cases, like the one in (12a), which contrasts with the majority case in (12b).

(12)	a.	part-í-re / párt-o	"to leave / I leave"
	b.	fin-í-re / fin-ísc-o	"to finish / I finish"

DiFabio argues that the bifurcation in (12) for *ire* verbs is much of the same kind as the one in (9) for *ere* verbs, the stems in (12) having the lexical representations in (13).

(13) a. párt
b. fin

On this view, *isc* is excluded in (12a) for the same reasons it is excluded in (5d, e) above, namely metrical consistency, since its stress would "clash" with that of the stem *párt*. The difference between (9a) *pérd-e-re* and (12a) *part-í-re* despite the stressed stem in both, is predictable from the fact that *íre* exists only in the stressed variant, contrasting with the two variants *ere/ére*, whence the necessary stem remetrification of *párt* → *part-íre*. As for the inability of *isc* to remetrify the stem in **partísco*, in contrast to the ability of the infinitival and other suffixes (e.g. *partíte* "you-pl. leave," etc.) to do so, it seems natural to distinguish between functionally "essential" morphemes, which cannot be deleted, and inessential ones, which can. The infix *isc* clearly belongs to the latter class, since it makes no contribution to the meaning, while infinitival *íre* and person–number suffixes like *íte* belong to the former. Past participial *ú* alternates between exclusion (*pérso*) and stem remetrification (*perdúto*), and this seems consistent with its contribution to meaning, which is less than essential. Even morphemes which are normally "essential" become obviously inessential when a suppletive form exists, and are then also regularly suppressed, as in *vád/and-iámo*. The range of possibilities triggered by metrical inconsistency is therefore as in (14), with (14b) limited to functionally inessential morphemes as noted, while remetrification (14c) is a "last resort."

(14)		*Metrical inconsistency*		
	a.	Avoid, by suppletion	*vád*:	*and*-iámo
	b.	Avoid, by exclusion	*ísc*:	fin-ϕ-ite, párt-ϕ-o
			é:	vol-ϕ-ró
			ú:	pérd-ϕ-to
	c.	Accept, by remetrifying	*pérd*:	*perd*-éte, *perd*-ú-to
			párt:	*part*-íte, *part*-í-to

Note that the case of *pèrd-ere* (9a) is in a sense also a subcase of suppletion (14a), since stem remetrified **perd-ére* is avoided by recourse to the alternative, unstressed, form of the suffix *ere*. Note too that non-existent English forms like **povérti-ful* are subcases of exclusion (14b), despite the fact that the excluded stem is obviously not "inessential." This follows from the non-availability of the last resort (14c) for this particular class of cases, due to the metrical "word" condition that *ful* imposes on its stems, argued for in 9.3.7 above.

Returning to the *ire* verbs that do not take *isc*, like *part-ire/part-o* of (12a) above, it appears that in several regional dialects these verbs have been reanalyzed, and shifted to the *ere* conjugation, thus fully regularizing the *ire* conjugation with respect to selection of *isc*. This seems a rather natural development, as it serves to clean up a residue of history (as argued by DiFabio), and simplify language acquisition. The interesting fact, however, is that it is invariably the case that the *isc*-less verbs in *ire* become verbs in *ere* of the *un*stressed, rather than the stressed (i.e. *ére*) subconjugation, so that *partire* becomes *pártere*, rather than *partére*. This may seem rather surprising, since the form *partíre* is on the surface surely closer to *partére* than to *pártere*. Yet this fact is immediately accounted for by the analysis in (13a) *párt*. On that analysis, these verbs simply maintain their stem stress in switching conjugations, former *partíre* being merely a result of remetrification as in (14c).

The stem stress of *isc*-less verbs in *ire* is further confirmed by the fact that their past participles syncopate much more frequently than those of their *isc* counterparts, which would follow as in some of the previous cases from the clash between stem and suffixal stresses. This is illustrated by (15a, b), which are thus parallel to (11a, b), respectively.

(15)	a.	appár-ire	→	appar-íre		"to appear"
		appár-isc-o	→	appár-ϕ-o	[→ appáio]	"I appear"
		appár-i-to	→	appár-ϕ-to	[→ apparso]	"appeared"
	b.	spar-íre	→	spar-íre		"to disappear"
		spar-isc-o	→	spar-isc-o		"I disappear"
		spar-íto	→	spar-í-to		"disappeared"

In sum, DiFabio's study shows that a superficially complex pattern of exclusion of morphemes such as the one summarized in (14) above receives a straightforward metrical account. That account crucially presupposes that stress is part of underlying representation as we argued in the previous chapters. If stress was rather assigned by rule, no reason would be at hand why certain morphemes should be excluded when specific metrical conditions obtain. One could stipulate a condition to this effect, but this would remain completely unrelated to the stress preservation phenomena discussed in the previous chapters.

To conclude this section, we have considered two major respects in which Italian supports the framework we have developed for English. One is that, within that framework, several differences between English and Italian all reduce to existence versus non-existence of weak syllables. The other is that the phenomenon of morpheme exclusion of Italian is interpretable as yet another reflex of the postulated principle of metrical consistency.

10.3 Vowel length reconsidered

10.3.1 Generalized shortening

In chapter 5 above we saw that stress lines up with derived, rather than underlying vowel length, and proposed to capture this by supposing that stress is present underlyingly while vowel length adjusts accordingly to achieve metrical well-formedness. While this general thesis remains correct, the specific implementation of it must now be changed, for two reasons. One is that we now know that the position of stress is not arbitrary in individual words, but constrained by stress preservation (SP). Given this, in cases like *blásphemous/áspirant*, we will need an account of the non-preservation of stress from *blasphé:me/aspí:re*, respectively. The other reason (hinted at in 5.2) is that stress is in fact insufficient to account for vowel length, as shown by (16), in which the same morphemes *a:te*, *i:ze* are unstressed in both (a) and (b), and yet appear with short vowels only in (b).

(16) a. a(dúmbr*a:*)*te*, meta(mórph*i:*)*ze*
b. (mánd*a*)(*t*òry), (òrgan*i*)(*z*átio)n

We will show in what follows that both problems are resolved by postulating the general condition in (17), requiring that vowels be short in the context of an affix.

(17) *Generalized shortening*
V must be short in: ... ___ ...-affix
(linear order irrelevant)

We can immediately see that the condition in (17) draws the correct distinction between (16a, b), since it is only in the latter cases that *a:te*, *i:ze* occur in the context of an(other) affix: respectively *ory*, and *ation*. While the examples in (16) show that affixation is a necessary condition for shortening, the ones in (18) show that, in some sense, it is also sufficient, since shortening is found with all classes of affixes: both neutral and non-neutral suffixes, as well as prefixes, as already noted in 9.5.[5]

(18) a. *"Neutral" suffixes*
ádm*i*rable, cómp*a*rable; concúb*i*nage; *á*ppl*i*cant, ásp*i*rant, ígn*o*rant, rés*i*dent, próv*i*dent, cónfident, coínc*i*dent; éxcr*e*ment, íncr*e*ment; ór*a*tor, submár*i*ner, exéc*u*tor; lén*i*tive, appét*i*tive, constít*u*tive, exéc*u*tive; blásph*e*my, teléph*o*ny, micróscop*y*; teléph*o*nist, hýpn*o*tist; álb*i*nism

b. *Non-neutral suffixes*
vág*i*nal, centríf*u*gal; gángr*e*nous, mémbr*a*nous, carnív*o*rous, monót*o*nous

c. *Prefixes*
ímp*i*ous, ínf*a*mous, ínf*ini*te, omníp*o*tent, unív*a*lent, bíc*y*cle, súbs*e*quent, ímm*i*grant, antíth*e*sis

There is of course one class which is systematically spared by GS (17) – that of Germanic affixes, like *ness*, *less*, *ful*. This fact does not require any modification of the formulation in (17), however, since it follows from the "word" condition ((55) of chapter 9) that these affixes impose on their stems, which we assume is able to override GS (17). Even within the Latinate class, however, it is clear that not all instances of affixed stems are affected by shortening. That too requires no changes in the formulation of (17), however, since the "failed" applications of (17) are predictable from metrical theory, as we see below.

To see how the various, descriptively different, categories of shortening which were reviewed in chapter 5 can be correctly covered by GS (17), we begin by considering three of those categories, to which we will argue all others can be effectively reduced. These are given in (19), along with the relevant metrical environment, and their distribution in terms of relative systematicity.

5 Recall that, when GS applies, "neutral" suffixes in fact cease to be neutral, as our analysis correctly predicts (9.5 above).

(19) a. *"Morphological" shortening* — unsystematic
blasphé:me → blásphemou)s — /...σ σ)
desí:re → desí:rou)s

b. *Shortening in unstressed position* — systematic
defá:me → defa)(mátio)n — /...σ)

c. *"Trisyllabic" shortening* — systematic
diví:ne → divínity) — /...σ σ σ)

In both (19b, c), we abstract away for the moment from the occasional exceptions which we had considered in chapter 5, and rather focus on the contrast between the relative systematicity of (19b, c) and the much more massive unsystematicity of (19a), illustrated by the *blasphemous/desi:rous* contrast. As (19) shows, systematicity of shortening obtains in foot-final and in foot-antepenultimate syllables, while unsystematicity obtains in foot-*pen*ultimate syllables. This means that the difference between systematicity and unsystematicity is predictable as a function of metrical structure and should *not* be taken to motivate different shortening processes as was done in past analyses. The correct results in fact ensue from the interaction of GS (17) and stress preservation (SP), as we now see.

Beginning with "Morphological" shortening (19a), we can see here that GS and SP cannot both be satisfied at the same time. The reason is the ill-formedness of word-rightmost (and non-initial) binary feet *(*Lσ*), thus excluding both **blas(phémou)s*, and **de(sírou)s* (with a short *e/i*). Recall too that the "suffix consistency" of *ous* requires the metrification *ou)s*, excluding *ousφ)* and hence the possibility of a ternary foot in **blas(phémousφ)*.[6] The only possibility then is either to violate SP, extending the foot to ternary as in *(blásphemou)s*, or to violate GS so as to attain a well-formed foot (*Hσ*), as in fact in *de(sí:rou)s*. The oscillation between these two options is further exemplified by the contrast between the shortening cases in (18), and all the stress-preserving cases in (20).

(20) a. oppó:sable, restó:rable, excí:tant, pollú:tant, antecé:dent, perseve:rance, endú:rance, cajó:lement, replá:cement, engá:gement, diví:sor, incí:sor, diví:sive, extré:mist, encyclopé:dist, escá:pism

6 In contrast, in **tele(phónistφ)* the ternary foot is excluded as an ill-formed *(*σHσ*) (as noted in 9.5).

b. homic*í*:dal, anecd*ó*:tal, dec*ó*:rous
c. bip*ó*:lar, subl*ú*:nar, prem*ó*:lar

We will regard the choice between these two options, satisfying either GS or SP, as idiosyncratic, although further study might well reveal additional principles.

Note that our GS (17) is relatively similar to Kiparsky's (1979, p. 421) rule discussed in chapter 5 and repeated in (21) below.

(21) *Kiparsky's ("morphological") shortening*
"a lexically conditioned vowel shortening rule which applies to the presuffixal vowel in certain words prior to the assignment of stress."

GS (17) is merely more general than (21), applying to *all* affixed stems, not just those with suffixes (recall (18c)), and to *all* long vowels within such stems, not just the "presuffixal" ones (compare, e.g. *in-f*[i]n[i]*te*, or *n*[æ]*tur-al*). Aside from this, it is in itself no more enlightening, in the sense that we can claim no deeper understanding of why vowels should shorten under affixation.[7] The advantage of our system over Kiparsky's or any past formulation, however, is that GS (17) yields *most* vowel-length alternations, not just "morphological" shortening, as we see directly.

Turning then to shortening in unstressed position (19b), we note that here there is no conflict between GS and SP. The reason is that SP as in **de(fà:)(mátio)n* is impossible given the non-existence of monosyllabic feet. GS will then be free to apply systematically, as indeed it does.

Trisyllabic shortening (19c) is partly analogous, in presenting no conflict between GS and SP. Here the reason is that trisyllabic feet ($LL\sigma$) are well formed, so that both GS and SP can be satisfied simultaneously, whence the systematic character of this kind of shortening.

In sum, the three cases in (19) above are accounted for by the interaction of GS and SP in the manner illustrated in (22).

7 It is tempting, however, to see a generalization to the effect that affixation removes any special features that the stem might have. As already noted, exceptionalities in stress are lost under affixation, as in *órchestra* ⇒ *orchéstr-al*, despite the fact that suffix *al* adds no syllables, or *cátholic* ⇒ *cathólic-ism*, despite the fact that *ism* is generally stress-neutral. Lexical markings for vowel length might then perhaps be regarded as special in some relevant sense. Perhaps, too, the effect of affixation is that of inducing a general loss of all stem-internal "structure," in a sense discussed in 10.4.5 below.

(22)

				GS	*SP*
a.	blasph*é*:me	→	blásph*e*mou)s	ok	*
a′.	des*í*:re	→	des*í*:rou)s	*	ok
b.	def*á*:me	→	def*a*)(mátio)n	ok	___
c.	div*í*:ne	→	div*í*nity)	ok	ok

Several other alternations, which we consider next, will also be subsumed under the same kind of mechanism.

10.3.2 Further alternations

Beginning with the case of "bisyllabic" shortening illustrated in (23a, b), we correctly predict it to be of the "systematic" variety, like trisyllabic shortening.

(23) a. o(bl*í*:ge) ⇒ o(bl*í*ga)tòry
  b. (ϕr*è*:)fúte ⇒ (r*è*fu)tátion

The reason is that the binary feet of the right-hand forms in (23), being non-rightmost, are well formed as ($L\sigma$) (see p. 165 above), hence with a short vowel. Thus, as in the "trisyllabic" case, there is no conflict between GS and SP, which are therefore both satisfied, accounting for the systematicity of shortening. For further examples of each of (23a, b), see (12b, c) of chapter 5. Note that the long vowels of the left-hand forms in (23) are also predicted by our general analysis. The one in (23a) because rightmost feet exclude *($L\sigma$); the one in (23b) because initial syllables can be footed only if heavy, in the manner discussed in 4.2.1.

We will no longer have an exact account of the "exceptions" to each of shortening in unstressed position, trisyllabic and bisyllabic shortening, exemplified in (24a, b, c), respectively.

(24) a. (ìnt*o*:)nátion, (dèn*o*:)tátive
  b. (l*í*:belou)s, (sc*é*:nicϕ)
  c. (ph*ò*:ne)tícian, (m*í*:gra)tòry

In chapter 5, we supposed that, while vowels were preponderantly short underlyingly, the italicized ones in (24) were long. In the present analysis we must suppose instead that these are all "exceptions" to generalized shortening, apparently idiosyncratic, although, again, further study might reveal hidden subregularities.[8] Further examples like (24a, b, c) were given in (30a), (14a, b) of chapter 5, respectively.[9]

Recall now that feet ($L\sigma$), generally possible in non-rightmost position as in (23), are not totally excluded in rightmost position either. As we saw in 5.3 above, their subspecies (*LH*) is allowed in rightmost position, though only in bisyllabics, like *(chémis)t*, and not in e.g. **al(chémis)t*. This will now correctly predict application of GS in (25).

(25) (plé:ase) ⇒ (pléasan)t

The structure of *pleasant* in (25) is well formed with a short vowel because it is an instance of #(*LH*), like *chémist*, while *please* requires a long vowel because its final syllable is not heavy, as was discussed in 5.3. The class of cases like (26) is not very numerous. It includes *south/southern*, *abound/abundant*, but also has exceptions, like *mi:gra:te/mi:grant* (noted in 5.3, discussion of (45)), which we will (tentatively) place with those of (24).

Another case which is straightforwardly accounted for is that of "*ative*" shortening, illustrated in (26), which is correctly predicted to be unsystematic, as was already discussed in detail in 9.4.5 above.

(26) a. in(véstig)(*à:*te) ⇒ in(véstig)(*à:*ti)ve
b. (géne)(r*à:*te) ⇒ (gener*at*)ive

The reason for the variable success of shortening in (26) is the same as that of the *desi:rous/blasphemous* case of (19a) = (22a, a′) above, namely the fact that the syllable affected would be foot-penultimate under stress preservation. Stress-preserving and non-shortening (26a) *invésti(gà:ti)ve* is thus just like *de(sí:rou)s*, while shortening, non-preserving (26b) *(génera)tive* is like *(blásphemou)s*, though only in part. In the former, the first of the two stem stresses is still preserved, by recourse to extrametricality of the final syllable *ive*.

An almost identical account applies to the difference between two subdialects of British English illustrated in (27), and relative to items in *atory*.

8 We also no longer have an account of the fact noted by Ross (1972), that stressed penultimates in verbs rather generally have short vowels, as in *dev*[è]*lop*, a fact which we reduced to trisyllabic shortening in chapter 5. That interpretation does not carry over to the present account, which has affixation as a precondition for shortening.

9 Some of those examples are now correctly predicted, however. For instance, *(prò:cre)à:te*, *(prè:ma)tù:re* maintain the long vowels because prefixes *pro:*, *pre:* are not in the context of another affix, hence not in the context of GS (17).

(27) *British*

a. ar(tícu)(l*à*:te) ⇒ ar(tìcu)(l*á*:to)ry

b. ar(tícu)(l*à*:te) ⇒ ar(tícul*a*)t-ry

Again, this oscillation follows as a subcase of (19a), the candidate vowel being in a foot-penultimate syllable, as shown in (27a). Foot-penultimate position here is due to the general fact that British English takes the final weak syllable of *ory/ary* items to be extrametrical, as we saw in 4.2.2. The case in (27a) is thus entirely parallel to (26a), failing to shorten to preserve stress. Analogously, (27b) is parallel to (26b) in losing the second stress but maintaining the first. What seems to make this possible here is the syncope of the *o* in *ory*, which, in conjunction with the extrametricality of the final weak syllable *ry*, yields a well-formed ternary foot. Note that we correctly predict for this class that, when a heavy syllable precedes *a:te*, as in *cómPENsà:te*, preservation of the first stress should only be possible for the *a:tory* variant, as in *(cómpen)(sà:to)ry*. In contrast, shortening as in *com(pénsato)ry* implies loss of that first stress, the structure **(cómpensa)t-ry* being excluded as an instance of ($\sigma H \sigma$). Other similar cases, patterning in the same way, are *confiscatory*, *exculpatory*, *inculpatory*. This situation is parallel to that observed in 9.4.5 above for *ative* items, as represented by *(cómpen)(sà:tì)ve/com(pénsatì)ve*, but not **(cómpensa)tive*. As we noted for *com(pénsatì)ve*, so in British *com(pénsato)ry*, GS on *a:te* appears to overcome preservation of two stem stresses.

In contrast to British English, items in *atory* in American English exhibit the invariant pattern illustrated in (28).

(28) *American*

ar(tícu)(l*à*:te) ⇒ ar(tícul*a*)(tòry)

This follows as well, since American English generally parses the final syllable of *ary/ory* items, unlike British English, hence resulting in a final foot (*tory*). This has the effect of placing the long *a* in foot-*final* position, as shown in (28), thus making this a subcase of (19b) above "shortening in unstressed position," whence its systematic character. The difference between British (27) and American (28) thus reflects a general difference relative to *ary/ory* items, not one specific to the *atory* class, as is also shown by the fact that British *sa(lí:va)ry* and American *(sáli)(vàry)* (and a few other similar cases noted in 4.2.2) contrast in just the same way as (27a) *ar(tícu)(là:to)ry* and (28) *ar(tícula)(tòry)*, respectively.[10]

The oscillating character of initial, pre-tonic syllables, illustrated in (29), also follows.

(29) (c*í*:te) ⇒ c*i*(tátio)n / (ϕc*ì*:)(tátio)n

The reason is that (as noted for (23b)) such initial syllables can be footed only if they are heavy (4.2.1). Hence, shortening implies no stress and *vice versa*, a conflict between GS and SP exactly analogous to that of the "morphological shortening" case (19a) (despite the non-foot-penultimate position), whence the analogous oscillation. Further relevant examples, like *fatality*, *legality*, *locality*, *psychiatry*, also showing the same oscillation, were given in (34), chapter 5. The distribution of vowel length in these cases in fact confirms our analysis of 4.2.1 and the thesis that pre-tonic initial heavy syllables are stressed. If they were not, shortening in cases like (29) should be systematic (as with shortening in unstressed position) rather than variable.

The cases of "lengthening" in (30) are also accounted for.

(30) a. e(lízabe)th ⇒ e(lìza)(bé:tha)n
b. (hércule)s ⇒ (hèrcu)(lé:a)n / her(cúlea)n

Note that GS (17) is derivationally neutral, merely imposing that vowels be short in affixed contexts. From that point of view, *elizabe:th-an* in (30a) violates GS, just like *desi:r-ous* in (22a′), in fact for the same reason, namely SP, since non-lengthening **eli(zábetha)n* would fail to preserve the stress of *elízabeth*. The same holds for *ádjective* ⇒ *(ádjec)(tì:va)l/*ad(jéctiva)l* and a few other similar cases noted in 5.3 above. Given the conflict between GS and SP, we in fact predict oscillation here. This seems correct, given cases like (30b), where the first variant is stress-preserving via lengthening, like the case in (30a), while the second is non-preserving but in compliance with GS, maintaining a

10 The text discussion is not challenged by the fact that American English can resort to the British metrification to stress a heavy syllable preceding *ary/ory*, as in *re(fécto)ry*. The reason is that we take the relevant condition "(*Hσ*)*ry*" discussed in 4.2.2, 7.3, 8.2.3 to be a condition on derived representation, hence irrelevant to cases in which GS has eliminated the heavy syllable, like *ar(ticula)(tòry)*.

short *e*.[11] This view also predicts that no lengthening should ever occur when it does *not* serve stress preservation, whence e.g. *prométheus* ⇒ *prométhean*, not *pròmethé:an*. Further examples within these categories were given in (36)–(38), chapter 5.

The equal applicability of our system to shortening and lengthening just illustrated will now reduce the alternation of (31) to the one of (29) above.

(31) (pr*ó*duc)t ⇒ pr*o*(dúctio)n/(ϕpr*ò:*)dúction

That is, as in (29) *citátion/cì:tátion*, so in (31), the variant with the long vowel defies GS and obeys SP, while the one with the short – and in fact reduced – vowel, complies with GS and fails to preserve stress. Several other cases of this sort, like *projéction, progréssion, polítical, solídify*, were given in (40)–(41) of chapter 5. We note again that, as discussed in 5.3, alternations like *próduct/prò:dúction* of (31), and *pléase/pléasant* of (25) above, provide a rather direct argument against syllable extrametricality. That argument runs as follows:

> Syllable extrametricality cannot obtain in *(pléa)* < *sant* >, *(pró)* < *duct* >, for two reasons. One is that "monomoraic" feet must be excluded in any theory, given **bànána*, etc. The other is that there would be no metrical basis for drawing vowel length distinctions between these cases and their counterparts *(plé:ase)*, *(prò:)dúction*, since the same type of monosyllabic foot would obtain in all. Hence *pleasant, product* must have *bi*syllabic feet, which means that feet (σH) must be allowed.
>
> Syllable extrametricality is now inconsistent with the generalization that heavy penultimates attract stress, since the conjunction of binary feet (σH) and syllable extrametricality will straightforwardly permit the structure **(ágen)* < *da* >.

To summarize, the same interplay of GS and SP postulated for the cases in (22) above provides an adequate account of a number of other cases, in the manner similarly illustrated in (32).

11 The initial stress of *hércules* is presumably preserved in *hèrcúlean*, with an initial foot (*ϕher*). Recall, however, that the latter kind of foot violates metrical "alignment," as argued in 5.4. Hence GS is still, indirectly, in conflict with SP as assumed in the text, because simultaneous satisfaction of both requires violating some other principle. Note too that the discussion of (29) remains unaffected by this qualification, since in that case both variants equally "misalign" a foot boundary with the phonetic edge (as argued in 5.4).

(32)

				GS	*SP*
a.	o(bl*í*:ge)	⇒	o(bl*í*ga)tory	ok	ok
b.	(ϕr*è*:)fúte	⇒	(r*è*fu)tátion	ok	ok
c.	(pléase)	⇒	(pléasan)t	ok	ok
d.	in(véstig)(*à*:te)	⇒	in(véstig)(*à*:ti)ve	*	ok
d′.	(géne)(r*à*:te)	⇒	(géner*a*t)ive	ok	*
e.	Br. ar(tícu)(l*à*:te)	⇒	ar(tìcu)(l*á*:to)ry	*	ok
e′.	Br. ar(tícu)(l*à*:te)	⇒	ar(tícul*a*)t-ry	ok	*
f.	Am. ar(tícu)(l*à*:te)	⇒	ar(tícul*a*)(tòry)	ok	—
g.	(c*í*:te)	⇒	(ϕc*ì*:)(tátio)n	*	ok
g′.	(c*í*:te)	⇒	c*i*(tátio)n	ok	*
h.	(hércul*e*)s	⇒	(hèrcu)(l*é*:a)n	*	ok
h′.	(hércul*e*)s	⇒	her(cúl*e*a)n	ok	*
i.	(pr*ó*duc)t	⇒	(ϕpr*ò*:)dúction	*	ok
i′.	(pr*ó*duc)t	⇒	pr*o*(dúctio)n	ok	*

The above discussion has thus reinterpreted most of the vowel-length alternations examined in chapter 5. For the remaining ones, like those of *canada/cana:dian* (CiV lengthening), *various/vari:ety*, *si:gn/signature*, the earlier analyses will continue to hold.

10.3.3 Some consequences and extensions

Our revised account of vowel length upholds the general thesis of chapter 5 that metrical theory plays the key role in vowel length allomorphy, although we have now seen that metrical theory alone is not sufficient, and that generalized shortening must be postulated as well. The latter shortening is thus a requirement or condition on word-formation defining a set of exceptions to the general condition on word-formation which is "consistency," or preservation of structure. With respect to the chapter 5 analysis, the present one has the advantage of making stronger predictions on the position of stress, but the disadvantage of introducing one further piece of machinery, GS. This notwithstanding, the substantial advantage over other theories, claimed in chapter 5, remains. Another conclusion of chapter 5 which remains is that English vowel length provides an argument against stress assignment by rule. The structure of that argument is rather simple, although now slightly different.

Consider that there are two major subcases of vowel shortening: systematic and unsystematic, and that the difference is metrically controlled: foot-final and foot-antepenultimate positions yielding systematic shortening, while foot antepenultimate position yields *un*systematic shortening ((19) above). In order to correctly draw this distinction within a rule system and still have a single shortening device, metrical structure – namely stress – must clearly be assigned prior to shortening. Note that phonological structure, or distance from the end of the word, fails to be telling, given shortening *tonicϕ* versus non shortening *to:nalϕ*, which are only metrically distinct, and otherwise quite parallel. Hence metrical structure is indeed required to determine the scope of shortening, as stated in (33).

(33) *Rule ordering*
a. Stress assignment
b. Shortening

The order in (33) is precisely the one assumed by HV (p. 262-3) for both trisyllabic/bisyllabic shortening (HV's (57)) and shortening in unstressed position (HV's (37)).

However, we have also seen that, within the "unsystematic" cases of shortening, the position of stress itself depends on whether or not shortening has applied, as in *blásphemous* versus *desí:rous*. This then presupposes the ordering in (34), opposite that of (33).

(34) *Rule ordering*
a. Shortening
b. Stress assignment

Indeed the ordering in (34) is the one postulated in Kiparsky (1979) for "morphological" shortening.[12]

Within a rule system, any attempt at unification will thus fail, forcing one to regard shortening phenomena as due to at least two unrelated

12 Note that HV (pp. 262-3) order the "ative" destressing rule (which ultimately results in vowel-shortening), as well as the shortening of *citá:tion* (a subcase of shortening in a "stress well") after stress assignment, despite the fact that both cases are of the "unsystematic" kind in our sense. The results they attain are incorrect, however. In the *citátion* type case, because they predict that shortening to be systematic. In the *ative* case, for reasons discussed in 5.2.3, and in essence because, depending on how one interprets their system, either the type **désignative* (with a short *a*) or the type **affírmá:tive* are incorrectly predicted.

rules.[13] In addition, lengthening (as in (30)) would also remain unrelated to any shortening. In contrast, our system faces no paradox, since our proposed conditions require no ordering, but apply simultaneously, computing both stress and vowel length at the same time. Furthermore, output conditions will correctly treat lengthening and failed shortening alike.

The above analysis also confirms our hypothesis on the range of possible feet, in particular the exclusion of monosyllabic ones. If the latter were possible, non-shortening in cases like **de(fà:)mátion* should occur just as it does in *de(sì:rou)s* and the cases in (20). At the same time, the above analysis also confirms the exclusion of feet ($L\sigma$) in rightmost position (except for (*LH*) in bisyllabic words). If they were possible, then stress-preserving **blas(phémou)s*, **as(píran)t*, etc. should be equally possible as *di(vínity)*. This in turn confirms the correctness of our analysis of cases like *banána*, *vanílla*, etc. of 3.3 above, which did not resort to such ($L\sigma$) feet, but postulated "long," or geminate consonants instead. There is in fact another consideration relative to shortening which confirms the existence of the "geminates." This is that, although in a less systematic way, they too seem to undergo "shortening," like long vowels, as shown by (35a) parallel to (35b).

(35) a. re(fé*rr*ϕ) ⇒ (réfe*r*en)t
b. as(p*í*:re) ⇒ (ásp*i*ran)t

While our limited understanding of vowel-shortening endures in the case of consonant-shortening, it is clear that there is little reason for the parallelism in (35), unless both cases involved a long segment, both contrasting with clusters, which are totally stable under affixation, as in *consúlt* → *consúltant*, etc.[14] Other "degeminating" cases, some discussed in 9.3.5, are given in (36) (where we distort orthography in the usual ways to represent the postulated consonant length).

13 The problem is even more serious, since even Kiparsky's "morphological" shortening can also be shown to take account of metrical structure, in that it never affects bisyllabics, like *vo:cal, lo:cal, fe:cal*, etc. where stress could not move onto an antepenultimate syllable. This follows from our postulated foot types, as was discussed in connection with (46), (47), chapter 5.

14 In 3.3 above, we actually argued for geminates on the basis of the complementary observation, which is that to a considerable degree geminates do behave like clusters under affixation, as in *re(míttφ)* → *re(míttan)t*, *de(térrφ)* → *de(térren)t*. There is no contradiction here. Both points are relevant.

(36) a. ex(cé*ll*ϕ) ⇒ (éxce*l*en)t
b. (démo)(crà*tt*ϕ) ⇒ de(mócra*c*y)
c. (díplo)(mà*tt*ϕ) ⇒ di(plóma*c*y)
d. (téle)(grà*pph*ϕ) ⇒ te(légra*ph*y)
e. (ána)(lò*gg*ϕ) ⇒ a(nálo*g*y)

The cases in (36b–e) are less than fully accounted for by this view, since we might expect partially stress-preserving *(*démocra*)*cy*, etc. instead, parallel to (*généra*)*tive*, a problem that we must leave aside, noting that it is related to that of *(*démocra*)(*tì:ze*), noted in 9.3.5.

The proposed principle of generalized shortening (17) correctly accounts for the often noted fact that shortening does not affect morphologically underived items, such as those in (37) and others like them given in (15), chapter 5.

(37) a. (ví:tami)n
b. (rhò:do)(déndro)n

The reason is that the long vowels of (37) are not in the context of an affix. Note that our system has a different empirical content than the account of (37) given in earlier literature, which maintains that "cyclic" rules such as trisyllabic shortening and others do not apply to underived items (Kiparsky 1982a, p. 35; Halle and Mohanan 1985, p. 95; HV, p. 80). The difference is that GS (17) correctly restricts shortening not only to affixed items, but to affixed *stems*. This accounts for the fact that, in e.g. *satir-i:ze*, *oxyd-i:ze*, stem vowels shorten (cf. *sati:re*, *oxy:de*), while the long vowel of the suffix *i:ze* remains long. However, when the same suffix is itself in the context of another affix, then it too is correctly made the target of shortening, whence, e.g. *organ-iz-ation*. Analogously, in *saliv-a:te*, the *i* of the stem is short (cf. *sali:va*), while the *a* of *a:te* remains long. Yet in (Am.) *articul-at-o:ry* the *a* of *a:te* shortens in the context of the other affix *ory*, whose *o* is (metrically) long, attracting stress. In turn, the latter shortens in *álleg-or-ì:ze*, where it fails to attract stress (in contrast to the pre-suffixal syllable of *ànthropomórph-i:ze*). While GS thus correctly distinguishes between stem and (outermost) affix, the notion that shortening rules do not apply to underived items, incorrectly makes stem and affix equal targets, hence further requiring that the immunity of the affix be stipulated in the formulation of the rules themselves. This can be seen in Kiparsky's (1979, p. 431) formulation of "morphological" shortening, which stipulates that the rule "applies to the presuffixal vowel" ((21) above), as well as in HV's formulation of shortening "in a stress well" ((31), chapter 5 above), which stipulates that the vowel to be shortened be followed by at least one syllable.

As noted in 6.3.4, the overall lexical organization we are proposing enables us to also deal at least in principle with some of the facts of vowel reduction noted in 4.3 above, in particular the contrast in (38).

(38) a. cond[é]nse ⇒ cònd[e]nsátion
b. cómp[ə]nsàte ⇒ còmp[ə]nsátion

Within that organization, well-formed surface representations are defined by two different sets of conditions. One is conditions on word-formation, or on related words, such as GS and SP; the other is conditions that hold of all surface forms, both morphologically derived and underived, such as "Metrical Well-formedness" and "Metrical Alignment" of (1b) above. Conditions from the two different sets are sometimes in conflict with one-another as we saw, so that a characterization of well-formed surface forms must include ways to resolve such conflicts. With regard to (38) then, we argued in chapter 4 that unstressed vowels reduce not only in open syllables, but also (though less regularly) in syllables closed by sonorants. We take the two cases of (38b) to follow from this directly. Then, in (38a), reduction is obviously blocked by stress in *condénse.* In *còndensátion,* we see the same conditions imposing reduction in (38b) as conflicting with a preservation effect from *condénse,* imposing a full vowel. Recall that we take preservation or consistency to be the general principle holding between related words, GS being the (so far unexplained) exception. Since we independently know that reduction in syllables closed by sonorants is imposed relatively weakly (sometimes it does not occur: *ìncAntátion*), it seems plausible to suppose that the latter preservation effect prevails, yielding the unreduced vowel of *còndEnsátion.* As mentioned in chapter 4, we are unable to define the precise modalities by which this kind of conflict is resolved at the moment, only noting that other cases give the opposite resolution, e.g. *infórm* ⇒ *ìnfərmátion* (a parallel inability obtaining in all past accounts).

To sum up, in this subsection we have attempted to establish a number of points related to our analysis of vowel length, which can be summarized as follows:

1 A unitary account of vowel length comparable to the one we have proposed is not possible within a system of ordered rules.

2 Our analysis of vowel length confirms the correctness of the foot types we have postulated, and in particular the non-existence of unary feet.
3 GS appears to apply to some extent to "long consonants" (geminates) as well, hence confirming their existence.
4 GS correctly confines shortening not only to "derived" items, but in fact to stems, excluding (outer) affixes.
5 The same approach based on contending well-formedness conditions that accounts for vowel length seems appropriate for other phenomena as well, like vowel reduction.

10.4 Linear order of affixes

10.4.1 Morpho-phonology line-up

In this section, we consider the linear order in which English affixes occur. In contrast to past classifications, the one we are proposing is consistent with linear order generalizations. The affixes we referred to as "Germanic" are always external to the "Latinate" ones. Recall that these two terms are only convenient (and partially inaccurate) labels, and that the classification is based on two main diagnostics: occurrence of segmental changes in the stem, and attachment to bound stems. These play out as in (39a, b), which correlate both with each other and with (39c).

(39)		*Germanic*	*Latinate*
a.	Stem segmental changes	no	yes
b.	Attachment to bound stems	no	yes
c.	Position in linear order	outer	inner

The generalization in (39c) is illustrated by the contrast between (40) and (41).

(40)	*Latinate*	*Germanic*	*Examples*
a.	ary	ness	momentariness
a′.	ory	ness	contradictoriness
b.	ent	ness	inconsistentness
c.	ic	ness	graphicness
d.	al	ness	naturalness
e.	ous	ness	adventurousness
f.	able	ness	aceptableness

g.	ive	ness	coerciveness
h.	ent	less	precedentless
i.	ion	less	expressionless
j.	ary	ly	complementarily
j′.	ory	ly	preparatorily
k.	ant	ly	compliantly
k′.	ent	ly	antecedently
l.	ic(al)	ly	algebraically

(41)

	*Germanic	Latinate	Examples
a.	ness	ize	*boldnessize
b.	ness	ist	*awarenessist
c.	less	ize	*childlessize
d.	less	ist	*crimelessist
e.	less	ity	*faithlessity
f.	ful	ist	*carefullist
g.	ful	ize	*faithfullize
h.	ful	ity	*doubtfullity
i.	ly	ize	*kinglyize
j.	ly	ity/ety	*friendliety
k.	ly	ist	*orderlyist
l.	ed	ist	*acceptedist
m.	ed	ity	*amazedity
n.	ing	ist	*attackingist
o.	ing	ity	*charmingity

In contrast to the impossible sequences of (41), sequences of Germanic suffixes are possible, as shown in (42), as are of course sequences of Latinate suffixes, as shown in (43).

(42)

	Germanic	Germanic	Examples
a.	ful	ness	eventfulness
b.	less	ness	defenselessness
c.	ed	ness	affectedness
d.	ing	ness	abidingness
e.	ly	ness	friendliness
f.	ed	ly	admittedly
g.	ing	ly	correspondingly

(43)

	Latinate	*Latinate*	*Examples*
a.	ic	al	anatomical
b.	ic	ity	rhythmicity
c.	al	ity	tonality
d.	ous	ity	porosity
e.	ic	ist	organicist
f.	ic	ize	metricize
g.	al	ize	criminalize
h.	ant	y	inhabitancy
i.	able	ity	curability
j.	ist	ic	animalistic
k.	ent/ant	(i)al	referential
l.	ment	al	developmental
m.	ize	ation	characterization

In all of (43i–m) a neutral suffix occurs internally to a non-neutral one – a point which will be of interest shortly. Before considering how the "*Germanic-Latinate" generalization in (41) could be accounted for within our framework, we will first review past accounts.

10.4.2 Lexical phonology and bracketing paradoxes

The assumption that the phonological characteristics of affixes correlate with the morphological "layer" in which they occur was the basic intuition behind the "level ordering hypothesis" first formulated in Siegel (1974) and subsequently integrated into Kiparsky's (1982a, 1982b) "Lexical Phonology" model. According to "level ordering," different morphological layers are associated with different sets of phonological rules. This view distinguished in particular two different morpho-phonological layers; level I and level II, although various additional ones were postulated in specific formulations, all interpreted as different stages in a derivational sequence. Thus, supposing that a word is literally built up piece by piece starting from an inner kernel, level I morpho-phonology would place the inner layer of affixes and perform the phonological changes appropriate to those affixes, while level II morpho-phonology would place the outer affixes and perform the phonological changes appropriate to those, perhaps none. This approach is in principle consistent with the generalization in (41), and generally capable of expressing a line-up of morphology and phonology, which was in fact its main motivation as noted. Certain inadequacies remain, however, to which we return in 10.4.5 below.

In contrast to Lexical Phonology, the model known as "Cyclic Phonology" (inspired by Mascaró 1976), developed in Halle and Vergnaud (1987b), HV, Halle and Kenstowicz (1991), Halle, Harris and Vergnaud (1991), essentially characterizes phonological and morphological properties as independent, and denies the existence of a morpho-phonology "line-up." The basis for this view is the presumed "bracketing paradoxes," illustrated in (44).

(44) a. [[[animal] ist] ic]
     b. [[un [grammatical]] ity]

Following Aronoff and Sridhar (1983), Cyclic Phonologists have taken cases like (44a), to represent "paradoxes" or counterexamples for the level-ordering hypothesis, a point that would extend to all of the cases in (43i–m) above. The reason is that, in the past, phonologists have generally taken stress neutrality to be the prime diagnostic for "level II" phonology, thus placing neutral *ist*, *able*, *ent*, etc. of (44a), (43i–m) in the same class as *less*, *ness*, etc. On this view, level ordering will then predict that they should occur only external to suffixes that exhibit "level I" phonology, like *ic*, *ity*, etc., hence never as in (44a), (43i–m).

The case of (44b), brought to attention by Pesetsky (1985), is somewhat different. Here *un* is taken to be a "level II" prefix based on its phonological characteristics, specifically the fact that it does not affect the structure of its stem, as in *un-abA:ted*, *un-ashA:med*, etc., which preserve long vowels, versus *im-pIous*, *in-fAmous*, *im-mIgrant*, *in-fInIte*, all shortening the capitalized vowels. Hence, phonologically, *un* of (44) is of the "external" kind, and yet it occurs internally on semantic criteria. The reason is that we know this suffix generally modifies adjectives and not nouns, e.g. *un-kind* versus **un-citizen*. Hence in (44), it must be semantically attached to *grammatical*, not *grammaticality*, and therefore internal to "level I" *ity*, apparently another paradox.

There is an important difference between the two "paradoxes" of (44a, b), however. The one in (44a) would be – on the relevant criteria – a *morpho-phonological* paradox, falsifying the presumed line up of morphology and phonology. In contrast, the one in (44b) is rather a *phono-semantic* paradox, showing that phonologically diagnosed outer layer (level II) does not correspond to outer layer for semantics/categorial selection. Of course any phono-semantic paradox like (44b) would become also a morpho-phonological paradox, like the presumed one in (44a), if one could assume – as is sometimes done – that semantics and morphology themselves line up. The latter, however, is not a fact, but an open empirical question, which we consider shortly below.

Proponents of Cyclic Phonology have taken facts like those in (44) to show that phonology and morphology operate independently. They have thus proposed that affixes bear diacritic marks, either "cyclic," or "non-cyclic," to indicate their phonological class and that these marks are unrelated to and unpredictable from the position in morphological structure. Its specific mark will determine whether an affix triggers the "cyclic" rules, or only the the "non-cyclic" ones, applying only once per word, at the end of all "cycles." On this view both *un* of (44b) and *ist* of (44a) can now be regarded as non-cyclic suffixes for the purposes of their phonology, while still being allowed to occur on an inner morphological layer. In "cyclic" phonology, all "bracketing paradoxes" are thus avoided by simply relaxing the theory, severing the phonology–morphology connection. Note, on the other hand, that the "Cyclic Phonology" program implicitly upholds the connection between morphology and semantics, both taken to be consistent with the kinds of structures given in (44). In what follows, we challenge both aspects of this approach. The consistency of morphology and semantics will be challenged in the next subsection, on the basis of the existence of morpho-semantic mismatches. The dissociation of phonology and morphology is challenged by the generalization of (39a, c) above.

As the last few chapters have shown, there are no bracketing paradoxes of the type of (44a), (43i–m), for the simple reason that stress neutrality is *not* a diagnostic of phonological class, as established by two facts. One is that there is an account of neutrality consistent with "level I" phonology, as we have shown. The other is that the neutrality of Latinate affixes fails to correlate with any other "level II" diagnostic. In particular, it does not correlate with inability of the suffix to induce segmental changes in the stem, witness vowel-shortening as in *telephOnist*, or velar softening as in *empiriSist*. Furthermore, it does not correlate with the inability of the suffix to take bound stems, witness *antagon-ist*, etc., while the latter two diagnostics correlate with one another quite precisely, as in (39) above. By reinterpreting stress neutrality as a phenomenon partially independent of phonological class, our approach removes the confounding factor from the classificatory criteria, and reestablishes the morpho-phonology connection presumed by Lexical

Phonology, leaving only the *ungrammaticality*-type structure as an apparent paradox. As noted, the latter does not entail a mismatch of phonology and morphology, however, but rather of phonology and semantics. The status of morphology depends on whether we have reasons to suppose it lines up with either semantics or phonology. Our conclusion – expressed in (39) – that it lines up with phonology now implies that *ungrammaticality* is a *morpho-semantic* mismatch, with *un* morphologically external, while semantically internal. This conclusion seems welcome, since it places the *ungrammaticality* case in good company, as we see next.

10.4.3 Morpho-semantic mismatches

Recent literature, and especially the two rather insightful discussions of Beard (1991) and Stump (1991), make it abundantly clear that morpho-semantic mismatches are a very common phenomenon. The main focus of Stump's article are cases involving inflectional morphology like (45a), while that of Beard's are cases of nominal modification like (45b).

(45) a. *Breton* (Stump 1991)

ki-dour	⇒	chas-dour
dog water		dogs water
"otter"		"otters"

b. (Beard 1991)

nuclear physics ⇒ nuclear physicist

The peculiarity of (45a) is that pluralization is carried out morphologically on the head *ki*, which becomes *chas*, as in the simple pluralization of "dog": *ki* → *chas*, while semantically affecting the compound *ki-dour* "otter," to yield "otters." Essentially the same phenomenon is found in English *mothers-in-law*, *passers-by*, which are plurals, respectively of *mother-in-law*, *passer-by*, as well as in compounds like *school masters*, in so far as plural inflection is morphologically attached to the head *master*, while semantically pluralizing the compound as a whole. The corresponding peculiarity of (45b) is that the adjective *nuclear* does not modify the noun *physicist*, but rather its internal part *physics*, yielding the reading "someone who does [nuclear physics]," rather than "*someone nuclear who does physics." Alternatively, one may say that the suffix *ist*, plainly attached to *physic(s)* morphologically, semantically modifies the whole phrase *nuclear physics*.

If we wished to map the morphological structure of (45a) into its semantic structure then, we would have to imagine a transformation like (46).

(46) [dog-plural water] ___

This type of derivation brings to mind the "LF movement" account of the *ungrammaticality*-type mismatches of Pesetsky (1985). In itself, this is of little significance, however. Whenever two different levels of representation stand in a non-identity relation as in this case, there is always a sense in which mapping one level into another will involve "movement" of some substructure. The question is whether, beside this essentially metaphorical sense in which there must be "movement," there is also the specific formal sense argued by Pesetsky. Here, Stump maintains – correctly in our judgment – that the answer is negative, since too often with such "mismatches" there is no formal object to which movement could reasonably apply. For example, in (45a) there is no identifiable "plural" morpheme, since the plural of *ki* "dog" is a suppletive form *chas*. Hence, while some bridge has to be cast between morphological and semantic representations, movement as we know it, say from the theory of syntax, does not seem to be the correct means.

Turning to Beard's *nuclear physicist* case in (45b), the corresponding morphology-to-semantics mapping in that case would be as in either of (47).

(47) a. nuclear [___ physics]-ist

b.[nuclear physic-ist] ___

Once again, (47b) may suggest affix raising, but, like Stump, Beard argues this suggestion should be resisted, on the basis of cases like (48a), which are interpreted in the manner of (48b).

(48) a. electrical engineer

b. electrical [someone who does [___ engineering]]

The significance of (48) is that, again, the correct interpretation cannot be attained by simply moving some identifiable morphological structure as in (47b) (or, alternatively, by "rebracketing" the structure). Rather, what one must assume, as Beard argues, is that adjectival modification of nominals has access to the internal semantic structure of the nominal, so as to target one of the semantic subconstituents of that structure. Hence, of the two alternatives in (47), the one in (a) seems the correct one, except that semantic, rather than morphological structure seems relevant, along the lines of (48b). Other relevant cases cited by Beard are given in (49) along with their semantic interpretations (in our own terms).[15]

(49) a. structural linguist
"someone who does [*structural* linguistics]"
b. old friend
"someone who holds [an *old* friendship]"
c. probable hero
"someone who will [*probably* be a hero]"
d. former diplomat
"someone who [was *formerly* a diplomat]"

The solutions proposed by Stump and Beard to morpho-semantic mismatches are in a very broad sense similar, though the specific implementations offered are essentially mirror images of one-another. Stump postulates a range of semantic functions, which he refers to as "paradigm functions," one of which is the function "plural," and defines principles for morphological realization of such functions. According to Stump, there is a universal tendency for functions associated with inflectional categories and applying to "endocentric" structures (structures whose head is of the same category as the whole), to have morphological reflexes on the head of those structures (Stump's "Head application default" (26), p.688)). Hence the plural function of Breton "dog water" ("otter") results in a morphology like "dog-plural water" by "head application." This solution is essentially as diagrammed in (46) above, except that its specific implementation maps semantics into morphology, so that the arrow must be reversed. Under the specific conditions that

15 As Beard notes, there is one very interesting constraint on this type of morpho-semantic mismatches, which is that the modifier must have a sufficient degree of "abstractness." Thus, *expensive violinist* cannot be interpreted as "*someone who plays an expensive violin" (compare *first violinist*).

Stump discusses, the morphology is thus able to "jump" across semantic layers, yielding inner realization of outer semantic functions.

Beard's solution goes the other way, supposing that semantic interpretation can "penetrate" layers of morpho-syntactic structure, and – crucially – also layers of lexical semantic structure. Specifically, presupposing semantic representations along the lines of Jackendoff (1983, 1987), Beard proposes a principle whereby the semantic features of an attribute like *electrical* of (48b) combine with one and only one semantic feature of its head like "engineering" as a subpart of *engineer* (Beard's principle of "Decompositional Composition" (21), p. 208).

The question to consider at this point is whether either Stump's system, mainly motivated by inflectional morphology, or Beard's, motivated by adjectival modification of nouns, can be appropriately extended to derivational morphology, to account for *ungrammaticality*-type mismatches as well. Stump actually does attempt an extension to derivational morphology, arguing that his system can in fact handle the *nuclear physicist*-type mismatches as well. Noting that the latter is an endocentric structure (same category as its head), Stump proposes that this is simply another case of "head application" of a semantic function, here the function "ist," which gives a certain type of personal nominalization from abstract nouns. Applying to *nuclear physics*, that function will trigger the appropriate morphological change on the head of the whole structure, whence *physic-ist* in *nuclear physic-ist*, parallel to Breton "dog-s" in "dog-s water" ("otters"). As Stump realizes, however, such presumed morphological operations on the "head" of nominal structures exhibit a wild pattern of variation, underscored in Beard's discussion, and illustrated in (50).

(50)		*Abstract N*	*Personal N*	*Sample "mismatch"*
	a.	physics	physic-IST	nuclear physicist
	b.	grammar	grammar-IAN	transformational grammarian
	c.	linguist-ICS	linguist	structural linguist
	d.	engineer-ING	engineer	electrical engineer
	e.	philosoph-Y	philosoph-ER	moral philosopher
	f.	compos-ITION	compos-ER	serial composer

In deriving the personal noun from the abstract noun, the morphology would be wildly inconsistent, being augmentative in (50a, b), adding *ist/ian*; "subtractive" in (50c, d), removing *ics*, *ing*; and both at the same time in (50e, f), removing *y*, *ition*, and adding *er*. The position that Stump (p. 720) takes in the light of this is that "in some cases, the values of a derivational paradigm-function *f* for a particular argument may simply be lexically listed." However, the very absence of a morphological generalization in (50) makes this approach, described in (51a), less than satisfactory compared with Beard's, which we describe in (51b).

(51) a. Stump's (1991) proposal
Personal nominalization of a structure [A N] may be performed by means of a *morphological operation* on the head noun N.
b. Beard's (1991) proposal
In a structure [A N], the adjective A can modify a *semantic subconstituent* of the head noun N.

The problem for (51a) is that, as noted, in (50) there is no morphological generalization corresponding to the italicized phrase in (51a). In contrast, there is a *semantic* generalization, as the relation between abstract and personal noun is consistently of the same sort, a "physicist/linguist/philosopher..." being "one who does or studies physics/linguistics/philosophy...," so that there is in fact no comparable problem relative to the italicized phrase in (51b). In sum, Stump's system extends only somewhat unnaturally to derivational morphology and Beard's cases. Note that, in contrast, there seems to be no difficulty in principle in extending Beard's system to Stump's "inflectional" cases, like "dog-plural water" ("otters"). From that point of view, "water" will be expected to combine with the substructure "dog" contained within the semantic structure "dog-plural" to yield the same compositional meaning as in the singular. Analogously, in English cases like *passers-by*, *mothers-in-law*, the outer constituents *by*, *in law* will continue to modify *passer*, *mother*, contained within the larger structures *passers*, *mothers*.

Turning to our *ungrammaticality* case, it seems consistent with Stump's system in the sense that a semantic function corresponding to the type of nominalization performed by *ity* would apply to the adjective *ungrammatical*, while having as a morphological reflex only the nominalization of its "head" *grammatical*, turning it into *grammaticality*. We will see later on, however, that this kind of case too is spread across different morphological classes, like the *A-N* cases in (50), hence making the type of approach proposed by Beard more desirable. Leaving open the question of whether Stump's analysis should still be maintained for the "inflectional" cases he discusses, we will thus propose that Beard's interpretive analysis should be extended from the phrasal cases in (52a, b) to derivational cases like (52c), in the manner therein illustrated.

(52) Beard's (1991) interpretive hypothesis extended

a. NUCLEAR physicist
[one who does [___ PHYSICS]]

b. STRUCTURAL linguist
[one who does [___ LINGUISTICS]]

c. UN grammaticality
[the condition of being [___ GRAMMATICAL]]

On the analysis in (52c), there will be no violation of the morpho-phonology line-up, since *un*, which has the phonology of "outer" affixes, is indeed morphologically external, being attached to *grammaticality*. The fact that it semantically modifies *grammatical* fits into the general pattern of morpho-semantic mismatches, like those in (52a, b). We must note that, in fact, Beard (pp. 197f.) does *not* advocate the extension in (52c). Rather, he assumes (with HV) that the *ungrammaticality* case can be resolved by dropping the once hypothesized line-up of phonology and morphology, to permit a morphological analysis [ungrammatical]-*ity* consistent with the semantics. As we argued above, this view is not tenable, however, so that the extension in (52c) is indeed in order despite Beard's reluctance. This extension turns out to be cost-free, since Beard's apparatus is sufficient. In contrast, the "Cyclic Phonology" solution to *ungrammaticality* is costly, since it does not extend to the other cases in (52). This is because there is surely no morphological bracketing [nuclear physics]-*ist* mirroring its semantics, and because no imaginable bracketing of morphological material could serve as the interpretation of *structural linguist*.

An important qualification must now be added, however, to the assumption that morphology and semantics can simply be "mismatched." At least in English, there is clearly never any mismatch with sequences of derivational affixes. Consider (53).

(53) a. *met(e)r-ize-ic
b. metr-ic-ize

In (53a), if the outer suffix *ic* could have inner scope, modifying *meter*, then this example or this suffixal sequence should be possible on a par with (53b), but they are not. The left-hand cases and sequences in (54) are also correspondingly excluded, in contrast to their right-hand counterparts.

(54) a. *rhythm-ity-ic / rhythm-ic-ity
b. *pore-ity-ous / por-os-ity
c. *cure-ity-able / cur-abil-ity
d. *character-ation-ize / character-iz-ation

With sequences of derivational suffixes, morphology and semantics thus never appear to be mismatched. This generalization is responsible for the wholesale exclusion of many sequences, such as the ungrammatical ones in (53), (54). For instance, in (53a) *ize-ic* is excluded because *ic* requires a nominal base, while *ize* yields verbs. Categorial mismatch is thus what is behind the exclusion, but crucially only if outer suffix *ic* cannot be interpretively linked to what precedes *ize*.

Unlike the grammatical suffixal sequences in (53), (54), some sequences like *ic-ist* do permit mirror-image counterparts, as in (55).

(55) a. ??evangel-ist-ic / evangel-ic-ist
a′. ??organ-ist-ic / organ-ic-ist
b. *propagand-ic-ist / propagand-ist-ic
b′. ?? cub-ic-ist / cub-ist-ic

However, interpretation is again consistent with morphological position, members of each pair in (55) not being at all synonymous. The reason why *ist* and *ic* combine in either order is merely that either order satisfies the categorial matching, essentially because *ist* forms nouns, supplying a base for *ic* affixation, and also attaches to adjectives, which *ic* affixation produces.

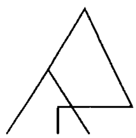
The same morpho-semantic consistency is true of sequences of prefixes, as shown by the non-ambiguity of (56), noted by Stump.

(56) re-mis-match
a. "re- [fail to match]"
b. "*fail to [re-match]"

The case in (56) is of particular significance in the context of Stump's discussion, since the impossible interpretation would in fact satisfy Stump's "head application," given the structure's endocentricity (in turn due to the general fact that prefixes – unlike suffixes – do not change lexical category). Thus, as Stump notes, any account of morpho-semantic mismatches must be appropriately constrained to exclude them with sequences of prefixes/suffixes. Stump has no concrete proposal on this point, and we will also just state it.

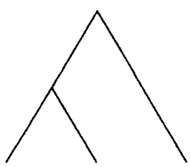
The above qualification has no implication for prefix–suffix combinations, however, and hence does not return the *ungrammaticality* case to the class of "paradoxes." The logical independence of the two cases can be seen by comparing the two examples in (57), where the tree diagrams stand for the respective interpretations.

(57) a.



*meter-ize-ic
"metricize"

b.



un- grammatical-ity

In the unwanted case (57a), interpretation must cross over a piece of derivational morphology, whereas nothing comparable occurs in (57b), so that our assumption that there are constraints excluding the former case does not imply a comparable exclusion of the latter.[16]

In sum, as both Beard and Stump show, morphology and semantics are often "misaligned" in natural languages. And, while, in English, they are never misaligned with sequences of derivational suffixes or prefixes, there

16 This of course predicts comparable mismatches with other "level I" suffixes beside *ity*. A few such cases, like *untruth*, are given in (59) below. Other cases, while unattested, seem possible. Thus, *unproductivist* seems well-formed referring to someone who preaches unproductive values. Analogous status have, to our ear, *unanglicize*, *unpopularize*, *unglamorize*, and other similar cases. Comparable mismatches are also predicted with other "level II" prefixes. This is the case, for example, in *re-analyz-able*, which only has the reading [re-analyz]-*able*, and not *re*-[analyz-able]. For further relevant examples, and valuable discussion, see Badecker (1991).

seems good enough reason to suppose that they could be with prefix-suffix combinations. The *ungrammaticality* case can then be straightforwardly analyzed as a morpho-semantic mismatch in the manner of (52c) above, on a par with the other cases in (52). This view makes certain obvious predictions, which we consider next.

10.4.4 More on *ungrammaticality*

Since we have seen that Germanic affixes require their bases to be words, the above hypothesis that *un* is attached to *grammaticality* rather than *grammatical* predicts that all such [adjective-*ity*] nouns, rather than just the adjective alone, should exist as independent words. This is indeed true for all of the approximately two dozen words of this type, a sample of which is given in (58).

(58) *un* -accountability/-ambiguity/-availability/-clarity/ -constitutionality/-familiarity/-reality/-popularity/-predictability

The same obtains for parallel occurrences of *un* with other "level I" suffixes such as those in (59), in which the bases are nominalizations from *true/acceptant/important*, respectively. We take the suffix in the two latter cases to be a null element with an appropriate feature content, as discussed in 3.5 (ex.(45)), and 9.2 (ex. (3b)) above.

(59) *un* -truth/-acceptance/-importance

The above correct prediction is not necessarily made by the alternative analysis in which nominalizing suffixes *ity*, *th*, ϕ would be attached to [*un*-adjective] structures. The reason is that none of these suffixes attach to all adjectives, compare **awkward-ity*, **free-th*, **calmanc-*ϕ. It would then be conceivable that, for some adjectives, the suffix might attach to the structure [*un*-adjective] without attaching to the bare adjective itself, resulting for example in a form [*un*-adjective]-*ity* lacking an [adjective]-*ity* counterpart, which is not the case.

Note that the text solution would extend to the other often cited case *unhappier*. Here, however, we do not find it very clear that there is any morpho-semantic mismatch. Past literature finds one by holding that comparative *er* does not attach to trisyllabic bases, so that it must attach to *happy*, not to *unhappy* (see Stump 1991 and references). The latter condition is quite mysterious, however, and hence not obviously correct. In 9.2, we suggested instead that *er* attaches to bases with final or penultimate stress. This would enable it to attach to *unhappy* just as well as to *happy*, yielding no mismatch.

A further and important prediction of our analysis relying on (52c) above is that *un* should be able to modify nominals with the semantic structure "the condition of being [adjective]" even when the adjective is not part of the *morphological* structure of that nominal. This seems correct as well, given cases like those in (60), (61).

(60)	*un-nominal*	*adjective*
	un-balance	balanc-ED
	un-concern	concern-ED

(61)	*un-nominal*	*adjective*
	un-sophisticat-ION	sophisticat-ED
	un-circumcis-ION	circumcis-ED
	un-justific-ATION	justifi-ED

To establish a morphological derivation from adjective to nominal here, one would have to suppose that the morphology is augmentative in (58), (59), adding *-ity*, *-th*, *-ϕ*; subtractive in (60), dropping *-ed*; and both subtractive and augmentative in (61), removing *-ed* and adding *-(at)ion*. From this angle, *un-Noun* cases are now looking more and more like the *nuclear physicist/structural linguist* cases of (50) above, and thus support our extension of Beard's analysis of those cases. That is, as in those cases, there is here no *morphological* generalization behind the objects that *un* attaches to, but only a semantic one, confirming our view that *un* modifies an (adjective-like) semantic substructure. That view is also supported by the cases in (62).

(62)	*un-nominal*	*adjective*
	un-belief	believing
	un-employment	employed
	un-conformity	conforming

In (62), *belief*, *employment*, *conformity*, all refer to the condition of being in a certain state, roughly described by the term under "adjective" in (62), and the function of *un* is to modify – i.e. negate – that state.

Finally, of further significance is the fact that *un* is found not only attached to nouns, like those of (58)–(61), but also to a substantial number of verbs (over 100), exemplified in (63).

(63) a. unbind, unbolt, unbrace, unbuckle, unbutton, uncork, ungird, unglue, unhang, unhitch, unhook, unlatch, unlink,

unlock, unpeg, unpin, unprop, unscrew, unsew, unshackle, unstrap, untack, untie, unwedge, unzip

b. unbag, unbox, uncage, uncart, unseat

c. unbandage, uncap, uncloak, unclothe, uncrown, uncurtain, undress, unglove, unhood, unmask, unmuzzle, unsaddle, unsheathe, unshroud, unveil, unwrap

d. uncoil, uncrumple, uncurl, unfold, unfreeze, unfurl, unharden, unknot, unlist, unmix, unpack, unpile, unreel, unroll, unstack, unstuff, untangle, untuck, untwist, unwind

It is immediately clear that the negative prefix *un* in these cases does *not* modify the whole verb to which it is attached, but only some inner semantic substructure. Thus, plainly, *un-bind/un-bag/un-clothe/un-coil* do not mean "not to bind/bag/clothe/coil." Considering then the internal semantic structure of these verbs, it appears that, for each of the four classes exemplified in (63a–d), the latter may be roughly characterized as in (64a–d), respectively, where *x* is the syntactic direct object of the verb.

(64) a. render ("put")
[a certain kind of fastening/closure for x ON]
e.g.: lock the door

b. render ("put") [x INTO some kind of enclosure]
e.g.: bag the groceries

c. render ("put") [a certain kind of gear ON x]
e.g.: mask your face

d. render ("arrange")
[x INTO some kind of shape/form/state]
e.g.: freeze the fish

In essence, all the verbs targeted by *un* affixation in (63) describe a state of affairs expressed by the proposition in square brackets in one of (64), which is brought into existence or caused by the subject of the verb. This causation is expressed in (64a–d) by the abstract causative predicate *render*, given along with a more transparent English gloss. The effect of affixing *un* to these structures can now be defined as the negation of the inner predicate, the one within the bracketed proposition, hence essentially turning the capitalized ONs to OFFs, and the INTOs to OUT-OFs, as for example in (65).[17]

17 Note that, with many of these verbs, the causative component "render" alternates with inchoative "become," yielding transitive/unaccusative alternations like *John (un)locked*

(65) UN-render

[a certain kind of fastening for x [___ON]]

= OFF

E.g.: un-lock the door

The above facts provide a strong argument for our analysis since, if the *un* that attaches to verbs can modify a semantic subconstituent as in (65), there is little reason why the *un* that attaches to nouns, like *grammaticality* could not do the same, as in fact in (52c) above. But the argument is in fact even stronger, since now we need not even suppose that there are *two* different *un*'s. On the above analysis, we may simply postulate a single *un* instead, with the ability to modify "states." This correctly predicts its occurrence with adjectives, as well as other constituents whose semantic structure may contain a "state," like various nouns and verbs.

In conclusion, while the exact conditions under which morpho-semantic mismatches are permitted will no doubt need to be studied further, continuing the important work of Beard (1991) and Stump (1991), there is good reason to believe structures like *ungrammaticality* are morpho-semantic mismatches on a par with any of those in (66), which we have examined above.

(66) a. ELECTRICAL engineer
"someone who does ELECTRICAL engineering"
b. UN-concern
"the condition of being NOT concerned"
c. UN-latch
"to put a latch NOT on"

If this account is correct, then semantic criteria give no direct indication of morphological structure, and morphology and phonology can be taken to line up without exception, the "Germanic" affixes being always morphologically more external than the "Latinate" ones – a generalization which we must now attempt to capture.

the door/The door (un)locked (i.e. "became (un)locked"). We presume the inchoative structure involves syntactic movement of the object to subject position (Burzio 1986 and references). Note that the inchoative variant is more frequently attested with *un + verb than with the bare verb, e.g. The bracket unscrewed from the wall/??The bracket screwed to the wall.* We presume this is for essentially "pragmatic" reasons; i.e. things get often *un*done, and seldom done, by themselves.

10.4.5 Word-based affixes

As discussed earlier, expressing the correlation between morphological and phonological characteristics of affixes was one of the goals of Siegel's original "level ordering" hypothesis and of the Lexical Phonology model. Within that hypothesis and model, our claim that Germanic suffixes are both on an outer layer compared with Latinate ones and have different phonological characteristics could be expressed as in (67).

(67)

Level I Latinate affixation Phonology 1	
	↓ derivation
Level II Germanic affixation Phonology 2	

While generally correlating linear order of affixes and their phonological characteristics, the approach in (67) remains inadequate in important respects, which we list in (68).

(68) a. It is unclear how the systematic "stress neutrality" of Germanic affixes versus the variable neutral/non-neutral status of Latinate affixes can be accounted for by placing the relevant rules/principles in different phonological blocks, since the rules/principles involved in both cases appear to be the same ones, as argued in 9.3.7 above, requiring that all material be metrified into the same types of well-formed feet.

b. There seems to be no particular reason from the point of view of (67) why Latinate affixes should take bound stems, while Germanic ones do not.

c. There is no reason why "level I" phonology should be very rich, causing many changes in the stem, while "level II" phonology is very poor, causing no changes. The model in (67) could describe the opposite situation just as well.

As we argued in earlier chapters, the appropriate way to capture the full range of properties of Germanic affixes is to suppose that they are affixes that attach to "word" bases, namely which are required to occur in derived representation in the context of (69), or its mirror image for prefixes.

(69) $[_{\text{word}} \ldots]$ ___

This hypothesis immediately solves the problem in (68a), since it forces the stems to which Germanic affixes are attached to maintain their stress as independent words, even though the affixes are themselves subject to normal metrification, as we saw in 9.3.7. It also solves the problem in (68b), excluding bound stems, since, by definition, these are not "words." We will put aside the problem in (68c) for the moment.

The question now is what, from the point of view of (69), may prevent Latinate affixes from occurring more externally than Germanic ones. An adequate answer would seem to come from the hypothesis in (70), extensively defended in Anderson (1992).

(70) *Structureless Words Hypothesis*

Words, unlike phrases, do not have internal structure.

Supposing that Latinate affixation yields "words" in the sense referred to by (70), the illicit order would give rise to the ill-formed structure in (71) (or its symmetric counterpart).

(71) * $[[[_{\text{word}} \ldots] -\text{Af}_{\text{Ger}}-\text{Af}_{\text{Lat}}\ _{\text{word}}]$

Such a structure violates the hypothesis in (70) in that a "word" created by Latinate affixation contains the (word) structure of (69), required by the inner Germanic affix. Of course to make the "word" condition on Germanic affixes (69) consistent with the "structureless words" hypothesis (70) we must further suppose that the structures created by Germanic affixation are not themselves "real" words in the sense of (70). We might then regard them as more akin to compounds, for which it seems clear, as Anderson in fact argues, that "structurelessness" (70) must not hold. That Germanic affixation yields some sort of "higher level" structures is independently shown by the fact that, at least with certain frozen expressions, it can apply to phrases as well, as in *stick-to-it-ness*, *do-it-yourself-ness*, while Latinate counterparts, like **do-it-yourself-ity* seem far more unlikely. In sum, we are thus proposing that Germanic affixation produces near-phrasal structures, which are *required* to contain words, like phrases in general, while Latinate affixation produces simple words, which – by their nature – are required *not* to contain any structure.

While thus accounting for the obligatorily external position of Germanic affixes, this view also solves the remaining problem of (68c). That is, on the proposed analysis, the fact that the phonology triggered by inner suffixes is rich while the one triggered by outer ones is poor is no longer accidental. The reason is that the outer position of an affix in this system is a reflex of the condition in (69), which is the same one that inhibits all phonological changes in the stem.

Certain qualifications to the above account will be required however, by the fact that in 9.4 and 9.5 above we suggested that there *is* some internal structure, in the form of a weaker version of the "word" condition (69), with some Latinate affixes as well, specifically the stress-neutral ones, which seems inconsistent with the hypothesis in (70). We will argue that the kind of internal structure identified in 9.4, 9.5 above is in fact consistent with a weaker version of the structurelessness hypothesis (70) which we will adopt, and that the latter is sufficient to preserve the previous account of linear order.

What we need to suppose, to define an appropriate version of (70), is that lexicalization and assignment of structure are complementary aspects of mental representation, which tend to exclude one-another. Thus, in general, sentences and phrases cannot exist as lexical entries, because they are infinite in number and potentially of infinite length. Their mental representation and interpretation must therefore rely on general principles of compositionality, computing the whole on the basis of its parts and their structural relations. In contrast, words can in general exist as "stored" lexical items, since they are finite in number and of finite length. Compositionality appears to play a role in the lexicon as well, however, but we must presume a fundamentally different one than in syntax (as argued in Anderson 1992), and one which is in some sense subordinate to the "listedness" of lexical items. This difference is reflected in the fact that, unlike the principles of syntax, those of word-level morphology are not fully productive, and tolerate idiosyncratic deviations of form and meaning. We may then think of compositionality, a notion which we take to be congruous with that of internal structure, as being not an all-or-nothing category, but rather a gradient one, largely but not totally complementary to the degree of lexicalization or listedness. Adopting this view, we will then regard words as having a maximal degree of listedness and a minimal one of compositionality, which, however is not null in the case of "derived" words. In contrast, phrases and sentences will have a maximal degree of compositionality and a minimal one of listedness, although that too is not null in many cases, to wit idioms and other frozen expressions. If compositionality is gradient, then other categories may naturally fall in between these two extremes. In particular, compounds seem to qualify as an intermediate class between words and phrases.

With the latter overall picture in mind, we now note that, while words and compounds can be contained within phrases and sentences, the opposite is not true, suggesting that central to the architecture of grammar must be a principle like (72).

(72) *Structure-transparency Principle*
A structure with a degree of compositionality *n* may not contain a structure with a degree of compositionality greater than *n*.

The non-occurrence of Germanic affixes internally to Latinate ones will now follow from (72) arrived at independently, if we suppose that Latinate affixation has a lower degree of compositionality, and correspondingly a greater degree of listedness, than Germanic affixation – a characterization which seems quite consistent with the clearly greater productivity of Germanic affixation. We may then suppose the ranking of the various structures under consideration to be as in (73).

(73)

		compositionality	*listedness*
a.	underived words	min	max
		.	.
b.	words derived by Lat. affixn.	.	.
		.	.
c.	words derived by Germ. affixn.	.	.
		.	.
d.	compounds	.	.
		.	.
e.	syntactic phrases and sentences	max	min

It may seem obvious here that the different "ranks" in (73) are similar to the different derivational levels of various versions of Lexical Phonology. Our proposed conception is in fact parallel to Lexical Phonology in important respects. In essence, it is its non-derivational, and representational, counterpart. That is, whereas in the Lexical Phonology model results are constrained by the linear order of the derivation, in our proposal they are constrained by the representational notion of "containment," employed to define which structures may contain which others, as in the principle (72). Despite the important similarities, the reasons for choosing the representational approach remain as discussed in connection with the problems of (68a, b, c).

From the revised perspective of the principle in (72), then, it is no longer necessary to suppose that Latinate affixation yields *no* internal structure, but only that it yields *less* structure than Germanic affixation. We can thus continue to uphold the conclusion of 9.4 and 9.5 above that neutral Latinate affixes give rise to a weak form of the "word" condition on their stems (69). Supposing that all Latinate affixes belong to the same class with respect to (73), we can also continue to maintain the conclusion of 9.5 that, whenever it arises, the "word" condition is maintained under further suffixation, whence, for example, the non-shortening in *desi:r-able* ⇒ *desi:r-abil-ity*, in which *desire* remains word-like throughout, despite the context for shortening in **de*(*sì:ra*)(*bílity*), parallel to *cons*(*pìra*)(*tória*)*l*. Such preservation of the structure *desi:r* even when non-neutral *ity* is attached to *desi:r-able* follows from the fact that both *able* and *ity* are in the same class (73b), so that whatever internal structure one tolerates, the other will too. Analogously, supposing that all Germanic suffixes belong to the same class in (73) will account for the fact that Germanic affixation can apply to its own output (e.g. *plenti-ful-ness*). The reason is again that (72) permits structures of any level of compositionality to contain structures of that same level, though not of a higher one. In contrast to the present account, the earlier one we attempted based on (70) and the notion that words may not contain other words would have forced us to conclude that the result of Germanic affixation – which must contain a word by (69) above – must not itself be a word, leaving unaccounted for the fact that it can undergo *further* Germanic affixation.

Summing up, the outer position of Germanic affixes follows from supposing that they yield higher-level structures – a view consistent with the fact that their stems remain unaltered words, and with their greater productivity. On this view, inner position of Germanic affixes will be excluded by the same general principles that preclude sentences and phrases from being contained within words and compounds, and we presume all higher-level structures from being contained within lower-level ones.

10.5 Conclusion

The three different topics that we have addressed in this final chapter have provided further confirmation for the correctness of our general approach.

The first section comparing English and Italian has confirmed that the stress neutrality of English suffixes crucially depends on the existence of final weak syllables, and has confirmed as well the existence of the principle of "metrical consistency," responsible for a complex pattern of exclusion of various morphemes in Italian.

The second section, reworking the analysis of vowel length of chapter 5, has provided further evidence against the existence of monosyllabic feet, and has confirmed as well that stress is "checked" by well-formedness conditions, rather than assigned by rule.

The third section, on linear order of affixes, has further confirmed our analysis of stress neutrality, showing that the latter lines up phonological generalizations with morphological ones, hence making it possible to maintain a more highly constrained theory of the lexicon, in which morphology and phonology are interdependent.

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Subject index

Page numbers in bold indicate a main section on each particular subject.

Index of names

Index of languages

Index of suffixes