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TERNARY STRESS FEET IN ENGLISH[1]

Bruce Hayes

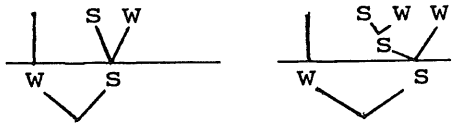
1. In a previous paper (this volume) I proposed a restriction on the universal theory of stress rules to the effect that no rule may assign maximally ternary feet. I argued that the theory becomes more restrictive if ternary feet are constructed instead by the joint efforts of extrametrical syllable assignment, binary foot construction, and Stray Syllable Adjunction. An interesting challenge to the theory is the stress pattern of English, which abounds in ternary feet. Below I will briefly sketch out analyses for the more common patterns, then present a more detailed account for the most difficult case. I assume throughout a theory in which the feature [+stress] is replaced by the use of separate foot and word tree levels, where every stressed syllable is contained in a foot, and every foot contains exactly one stressed syllable. (For discussion see Selkirk (1979).)

2. Most of the ternary feet of English can be handled in the way mentioned above: by marking a syllable as extrametrical, assigning a maximally binary foot, and adjoining the extrametrical syllable by Stray Syllable Adjunction. The strategy works well, since the syllables that must be marked as extrametrical usually occur in clearly definable morphological contexts. For example, English nouns, in contrast to verbs, typically have maximally ternary final feet, as in América, lábyrinth, postérity. The noun pattern follows from a rule of the form (1), marking the final syllable of nouns as extrametrical:

1) $\sigma \rightarrow [+ex] \; / \; \_\_]_N$

The derivation of posterity under this theory would be:

2) posterity → posteri $\begin{bmatrix} \text{ty} \\ +\text{ex} \end{bmatrix}$ → posteri(ty) → postérity



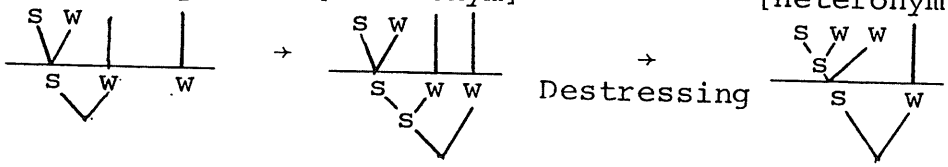
Adjectives often have ternary final feet as well, but only when they end in suffixes such as -ous, -al, -ant, or -ent (cf. pérsonal, magnánimous vs. intrépid, titánic, divíne). The contrast can be accounted for by marking the relevant suffixes as extrametrical in the lexicon. Other morphemes could be lexically marked as extrametrical, too: -fic-, the allomorph of the verbal suffix -fy, typically induces the construction of ternary feet: cf. clàssificátion, jùstificátion vs. the more normal assìmilátion, contàminátion. The -at- of -atory could also be marked as extrametrical, as in célebratòry, assímilatòry vs. inhíbitòry, admónitòry. Note that when two extrametrical syllables occur in succession, a quaternary foot is formed, as predicted: clássificatòry, jústificatòry.

Liberman and Prince (1977, p. 276) observe that the sequence ĭV̆ induces the construction of ternary feet, no matter what mode of foot construction would otherwise apply: cf. méteoròid vs. pyrámidòid, detérioràte vs. manípulàte. This could be handled by an extrametricality rule of the form

3) $\breve{V} \rightarrow [+ex] \; / \; \breve{I} \_\_\_ \left\{ \begin{matrix} \# \\ F \end{matrix} \right\}$

The ternary feet of words like àcademícian, Làcedaemónian pose no problem for the theory: they result from the destressing of a syllable stressed on a previous cycle: àcadémic, Làcedaémon. (For more details see Liberman and Prince (1977, pp. 283-291) and Kiparsky (1979).) The same process can derive the ternary feet of Greek prefixes, as in héteronỳm, hélicogràph, síderoscòpe. If we assume that the -o of these prefixes is underlyingly tense, and that Greek prefixes constitute a cyclic domain, the derivation will be as follows:

4) [[hetero][nym]] → [heteronym] → Destressing → [héteronỳm]



Note that the prefixal -o is probably not extrametrical, since it may be stressed on later cycles: heterónymous, helicógraphy

The above analyses are very tentative, subject to refinement and revision. I have presented them in order to give some initial plausibility to the idea of eliminating ternary feet from the English stress assignment rules. Further discussion will appear in my forthcoming dissertation.

3. The remaining place in the English stress system where ternary feet systematically occur is in long, monomorphemic words, such as Wìnnepesáukee, Tàtamagóuchi. Here, the use of extrametricality would be totally ad hoc, since there is no context in which syllables could regularly be designated as extrametrical. It turns out, however, that such a solution is unnecessary, since a theory not using extrametricality can account for an interesting generalization that would be missed in other theories.

The following words:

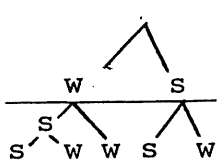
5) I. àbracadábra
Lùxipalílla
Pèmigewássett
Okefenókee
Nèbuchadnézzar
pàraphernália
Kìlimanjáro

II. Mamáronèck
Escúminàc
Gennésarèt
Assínibòine
Àldébaràn
Àshurbánipàl
Genádenhùtten

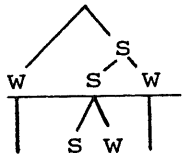
III. Kàlamazóo
Hàrdecanúte
Àllamakée
Illilouétte
Mattamuskeet
Àntigonísh
Gallipolís

display a pattern typical among long monomorphemic words in English: if the rightmost foot of the word is the strongest, as in I, then the foot that precedes it is ternary. If the rightmost foot is weak, the foot that precedes it is binary. The contrast is illustrated in (6):

6)



abracadabra



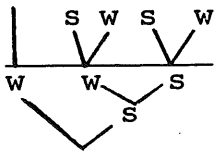
Aldebaran

Note that the relevant factor is in fact the labeling of the final foot, rather than its syllable count: in the words of column III, we find monosyllabic final feet that are idiosyncratically strong preceded by ternary feet; whereas in the name Genádenhùtten ([jənéydn̩hʌ̀tn̩]), a disyllabic terminal foot that is idiosyncratically weak is preceded by a binary foot.

This relationship initially seems to pose an ordering paradox: the word tree, which establishes the relative prominence of the feet, must surely be drawn after the feet are constructed. But the construction of the feet seems to depend here on the labeling of the word tree. Even if the word tree is constructed by adding one foot at a time, along the lines of Liberman and Prince (1977), the paradox persists: since the labeling s-w has only a relative meaning, the labeling of the final foot can be accomplished only when the preceding foot with which it is paired has already been constructed.

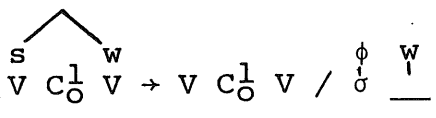
The paradox can be surmounted if we assume a somewhat more complex derivation for words like abracadabra. Suppose that the stress retraction in such words is binary rather than ternary, so that at an intermediate stage of the derivation the word contains three feet instead of two:

7) abracadabra



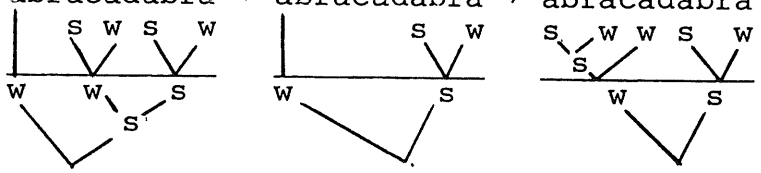
The correct output can then be derived if a rule applies to delete the middle foot of the word, with the stray syllables joined with the preceding foot by convention. The rule would be formulated as in (8):

8)



That is, delete a binary foot structure which is in metrically weak position, is preceded by a monosyllabic foot, and which contains no internal consonant cluster. (8) applies as in (9):

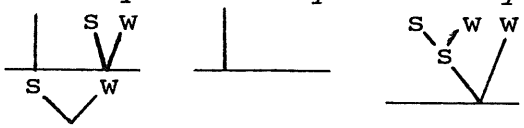
9) abracadabra → abracadabra → àbracadábra



In words like Aldébaràn, rule (8) could not apply, since the foot to be removed is in metrically strong position. Thus the analysis captures the distinction between the two classes of words without encountering an ordering paradox.

Interestingly, the rule (8) needed to implement the solution is already motivated elsewhere: it is the Post-Stress Destressing rule needed to account for the destressed alternants of suffixes like -ory, -ary, and -ative following stressed syllables--cf. advísory vs. admónitòry, infírmary vs. córollàry, àltérnative vs. ímitàtive, etc. The derivation of a typical case, cursory, is quite parallel to that of abracadabra:

10) cursory → cursory → cúrsory



Just as before, a foot must be metrically weak in order to be reduced: cf. McGróry, canáry, creátive.

The analysis also accounts for an unexplained observation made in Liberman and Prince (1977, p. 276): whenever stress retraction occurs across a domain of four syllables, the normal case is for two binary feet to be created, rather than a non-branching and a ternary one:

11)	Pòpocàtepétl	Àppalàchicóla
	ìpecùcuána	ònomàtopóeia
	Okalòacóochee	Hànamànióa
	Hàleàkalá	

This follows from the claim that stress retraction always produces binary feet, coupled with the formulation of rule (8) to destress feet only when they are preceded by a non-branching foot. The words of (11) are thus parallel in their behavior to words like prómissòry, apóthecàry, and ímitàtive.

Another bit of evidence that it is the same rule applying in both contexts is that in both cases, destressing is blocked if the two syllables of the foot to be removed are separated by a consonant cluster, as in (12):

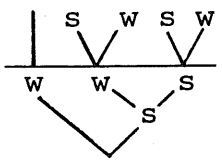
12)	Monòngahéla	cárbùncle
	Atàscadéro	áncèstor
	Tìcònderóga	áutòpsy
	Òmpòmpanóosuc	nécròpsy

Note that in the words of the first column, the initial syllable remains metrically weak, since the following two syllables are

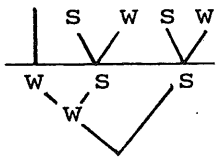
not joined to it but retain foot status. The initial syllable accordingly destresses when it meets the right segmental requirements, as in Monongahela and Atascadero.

A potential problem for the theory arises from the claim of Kiparsky (1979) that word-level trees may be constructed freely as right or left branching. Kiparsky's proposal is intended to account for the two possible stressings of words like Ticonderoga, Ompompanoosuc; as in (13):

13) 2 3 1 Ticonderoga

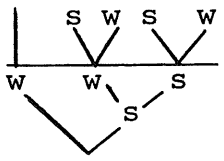


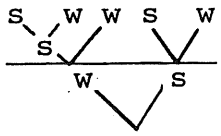
3 2 1 Ticonderoga



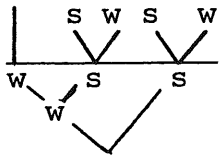
If the word-level branching is in fact free, the analysis here would predict stress doublets for words like abracadabra as well:

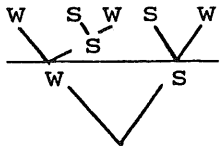
14)a. abracadabra → àbracadábra





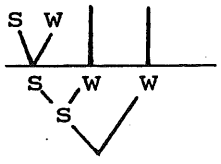
b. abracadabra → abràcadábra





In (14)b, the foot braca would be immune from Destressing since it is metrically strong, with the phonetic output *[əbrəkadábra] derived by Initial Destressing. Fortunately for the analysis, it appears that Kiparsky's proposal is wrong, as it makes an incorrect prediction for words that have two final monosyllabic feet, such as Adiróndàcks, Màssapéquòd. The left branching word level bracketing:

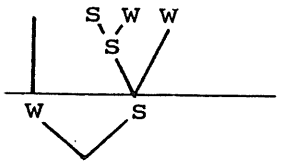
15) Adirondacks

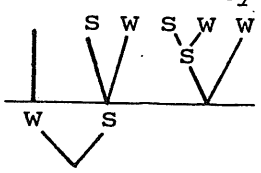


1 3 2
would produce the incorrect stressing *Adirondacks. Thus it appears that word level bracketing in English must always be right branching when it is not determined by the morphology.
3 2 1
The stressing option Ticonderoga remains a mystery, but the theory proposed here is preserved.

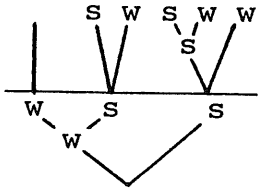
Another proposal of Kiparsky (1979) receives support from the present analysis. In contrast to monomorphemic words, derived words typically have binary instead of ternary feet preceding a strong final foot--compare, for example, sublìmináⁱlity with àbracadábra, contàmináⁱtion with Lùxipalílla, and Macàssarése with Gàllipolís. The difference is explainable under Kiparsky's proposal that metrical structure is preserved throughout the cyclic derivation. Words like subliminality will have their medial feet labeled as strong on a previous cycle. The labeling subsequently protects the foot from destressing, as in (16):

16) [subliminal]ity → subliminality →



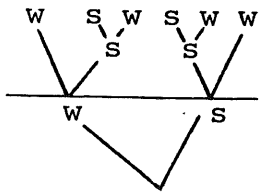


subliminality →



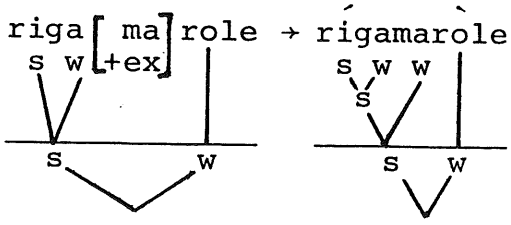
Prefix Destressing

sublìmináⁱlity



It remains to deal with the exceptions to the generalization of (5). On one hand we find words like Epàminóndas, Atchàfaláya, and Agèsiláus, where a strong final foot is preceded by a binary foot rather than a ternary one. These words must be marked as exceptions to the Destressing rule (7), and are thus similar to words like cúrmùdgeon, Hóbòken, prímàry, líbràry. In the other direction we find words like rígamaròle, cátamaràn, Mánitowòc, where the penultimate foot is ternary even though the final foot is weak. The exceptionality of these words can be captured by marking their penultimate syllables as extrametrical in the lexicon. The derivation will be as follows:

17) riga[ma]role → rígamaròle



Thus the role of extrametricality in the lexicon is severely constrained, as it can only be used to mark exceptions to more general patterns.

4. I have tried to show here how a descriptively adequate account of English stress can be achieved in a theory lacking rules that assign ternary feet. In the most difficult case, that of long monomorphemic words, a new analysis was presented,

compatible with the theory, which captured a generalization missed under previous accounts. The analysis is an example of how impoverishing the resources of the grammar has two advantages: it helps explain how language can be acquired, and it functions as a heuristic device, leading to the discovery of new patterns in the fabric of a language.

FOOTNOTES

1. I would like to thank Morris Halle and Paul Kiparsky for helpful discussions of the work presented here.