Outline

The prosodic hierarchy and the metrical grid

Prosodic phonology (and morphology)

- A representational theory of the interface

- Prosodic domains are inserted into phonological representations: these correspond to boundaries in SPE.

- The metrical grid results from the autosegmentalization of phonological representations.

The prosodic hierarchy and the metrical grid

Liberman & Prince (1977:249) argue for a theory of stress (and linguistic rythm) in which certain features of prosodic systems "are not to be referred primarily to the properties of individual segments (or syllables), but rather reflect a hierarchical rythmic structuring that organizes the syllables [...]": this is the ancestor of the prosodic hierarchy.
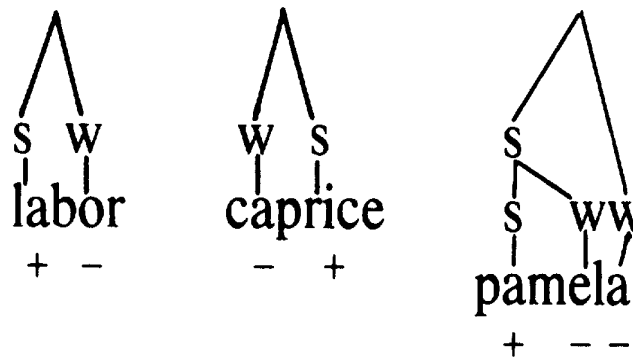
The prosodic hierarchy and the metrical grid

Hierarchical stress subordination is as characteristic of words as it is of phrases and compounds (Liberman & Prince 1977: 264):
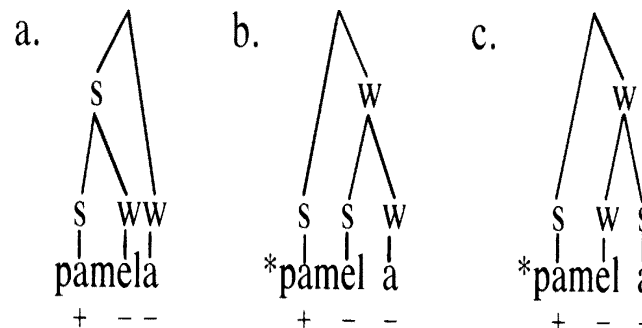
(25)   a.   *éxecùte* resembles *lábor ùnion*
        b.   *rèdców* resembles *pòntóon*

The prosodic hierarchy and the metrical grid

(26)   Stressed syllables are strong, unstressed syllables are weak

(27)   Condition (18): if a vowel is s, then it is [+stress]

The prosodic hierarchy and the metrical grid

a.	b.	c.
América	aróma	deféctive
canónical	Cardóna	referéndum
Éverest	hormónal	amálgam
aspáragus	horízon	eréctor
polýgamous	desírous	anárthrous
élephant	adjácent	Charýbdis

negate	anecdote	divine
repute	execrate	devote
erode	ballyhoo	mahout
balloon	complete	exploit

(28)   English Stress Rule (ESR)

English Stress Rule (ESR), Preliminary Version

$$V \rightarrow [+\text{stress}] / \underline{\quad} C_0 (\check{V}(C))(\check{V} \ C_0) \ \#$$

(29)   The distribution of stresses correlates with the shape of the penultimate syllable.

The prosodic hierarchy and the metrical grid

Slightly modified version of ESR in order to capture the following cases:

(30)   a.   -ate: *manipulate, articulate, salivate, rotate*, etc.

        b.   *anecdote, nightingale, recognize, sedentary*, etc..

        c.   ternary patterns: *Winnepesaukee, catamaran, toreador, ideological, hallucinatory, disciplinary*, etc.

        d.   other suffixes: -oid, -ite, -ode, etc.

(31)   English Stress Rule (ESR), iterative version

English Stress Rule, Iterative Version

$$V \rightarrow [+\text{stress}] / \underline{\quad} C_0 \, (V(C))_a \, (\quad V \quad C_0)_b \, (\quad V \quad X)_c \, \#$$
$$\langle -\text{long} \rangle_d \qquad [+\text{stress}]$$

Conditions:[12] ~c ⊃ d; ~a, ~b under certain morphological and lexical circumstances.

(32)   English Destressing Rule (EDR)

Initial Destressing (≈Halle's (22))

$$\begin{array}{c} V \\ [-\text{long}] \end{array} \rightarrow [-\text{stress}] / \#C_0 \underline{\quad} (C) \quad \begin{array}{c} V \\ [+\text{stress}] \end{array}$$

The prosodic hierarchy and the metrical grid

Metrical Bracketing

a. *Domain Provision*. Assign metrical structure to all syllables in domain of application.

b. *Alternation Provision*. Adjoin any unstructured material from previous iteration.

c. *Linkage Provision*. Adjoin any metrical structure provided by (a), (b) to structure created by previous iteration. Adjoin result of final iteration.

The prosodic hierarchy and the metrical grid

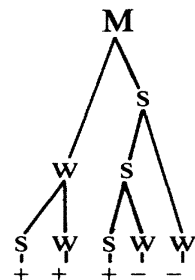/odontology/
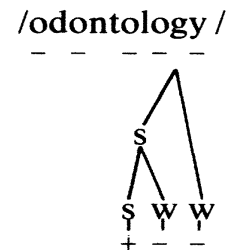
ESR, Domain Provision

ESR, Weak Retraction Subrule
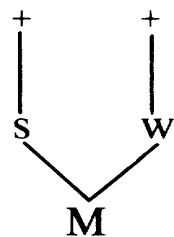
ESR

Alternation Provision, LCPR

Linkage Provision, LCPR

The prosodic hierarchy and the metrical grid

Interestingly, Liberman & Prince (1977: 293) agree with SPE: the affix -y of -ory, -ary, etc. is underlyingly the nonsyllabic glide /j/. This is represented as /j/ being an "extrametrical" syllable:

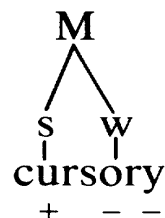/curs + ōry/

+ (−)   ESR

+   ESR

+   +   Alternation Provision, LCPR

S   W

   M

         o   EDR

$\begin{bmatrix} -\text{long} \\ -\text{stress} \end{bmatrix}$

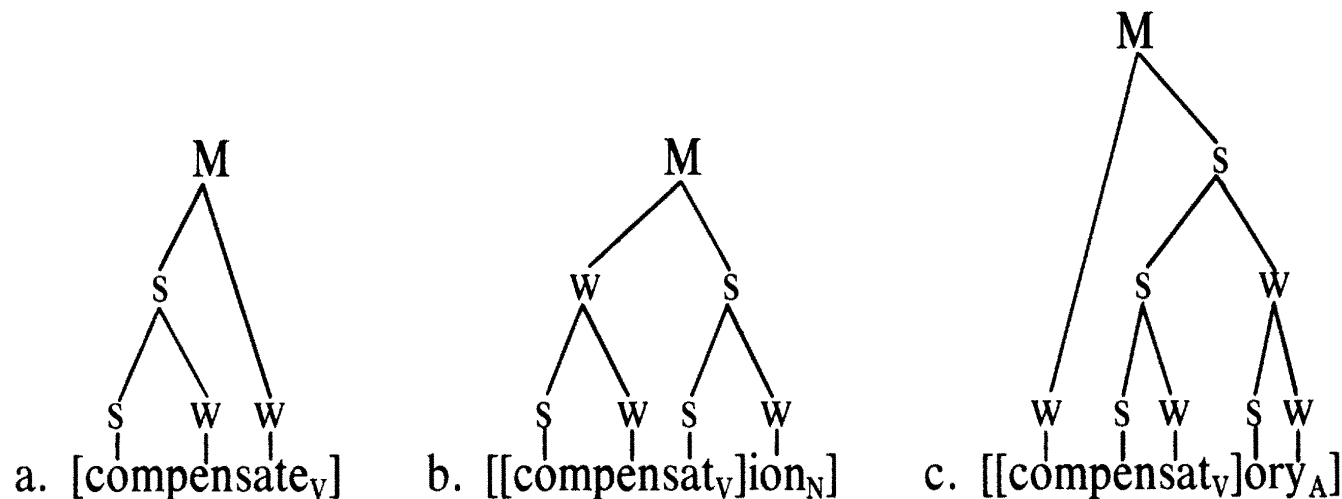   M   Output

 S   W

cursory

+   − −

The cycle and the prosodic hierarchy

Liberman & Prince (1977:298) claim that "[t]he prosodic constituent structure varies correspondingly, changing from word to word, regardless of the constants of morphological relatedness."

a. [compensate$_V$]   b. [[compensat$_V$]ion$_N$]   c. [[compensat$_V$]ory$_A$]

The cycle and the prosodic hierarchy

Let's observe the second syllable of each of these words:

a. stressed	b. unreduced	c. unstressed	d. reduced
a. *Base Type I*	b. *Embedded*	c. *Type II*	d. *Embedded*
advantage	advantageous	compensate	compensation
impregnate	impregnation	designate	designation
infest	infestation	orchestrate	orchestration
subjective	subjectivity	anecdote	anecdotal
abnormal	abnormality	demonstrate	demonstration
indent	indentation	concentrate	concentration
report	reportorial	recognize	recognition

"This kind of phonological dependency between complex words and the simpler words they contain is widespread in the lexicon of English and generally quite regular." (Liberman & Prince: 299)

The cycle and the prosodic hierarchy

A second, interesting case of "translexical redundancy":

a.	b.	c.
recíprocal	recíprŏcality	Tátămăgóuchi
corpóreal	corpórĕálity	Pássămăquóddy
artifícial	artifíciălity	cátămărán
oríginal	orígĭnálity	hétĕrŏdýne
munícipal	munícĭpálity	Wínnĕpĕsáukee
relígious	relígĭósity	Kálămăzóo
volúminous	volúmĭnósity	ánthrŏpŏmórphic

"The words in (b), which have a syllable structure identical in the relevant respects to that of the words in (c), show a second stress that falls one syllable short of its greatest possibilities (e.g. *oríginality)" (Liberman & Prince 1977: 300).

In other words, the derived word has the stress where its base has one.

The cycle and the prosodic hierarchy

It seems that Liberman & Prince (1977:300-301) acknowledge that their iterative ESR rule "has the capacity to place stress appropriately in *relaxation*, *originality*, etc. We need simply mark such words for weak retraction. To do so, however, would be to abandon the generalization that such stress positioning correlates with morphological composition."
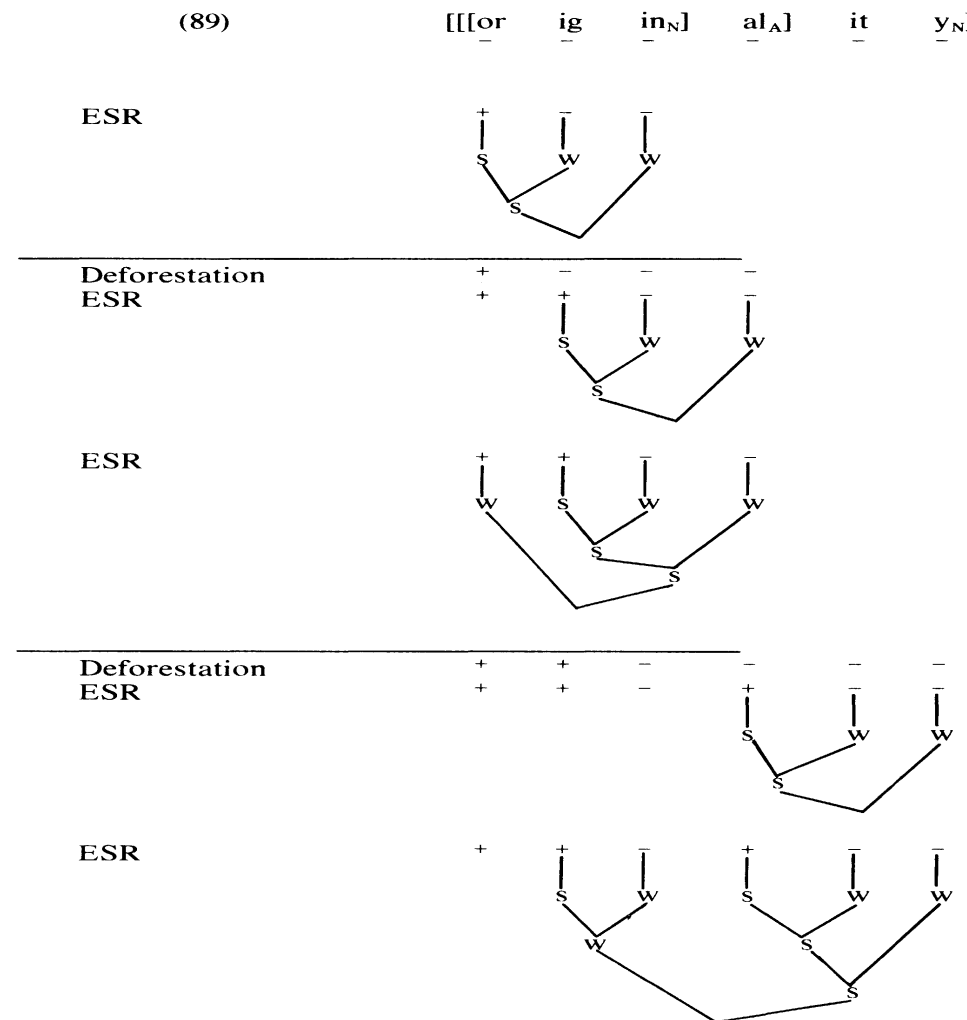
ESR (Cyclic Version)

$$V \rightarrow [+\text{stress}] / \underline{\quad} C_0 (\quad V \quad (C))_a (\quad V \quad C_0)_b (\acute{V}\, X)_{c\,\alpha]}$$

$$\begin{bmatrix} -\text{long} \\ -\text{stress} \end{bmatrix} \qquad [\langle -\text{long} \rangle_d]$$

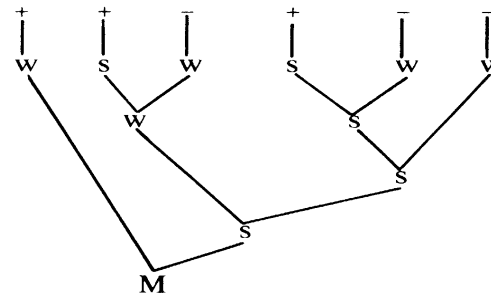Conditions: $\sim c \supset d$, α = N, A, V

The cycle and the prosodic hierarchy

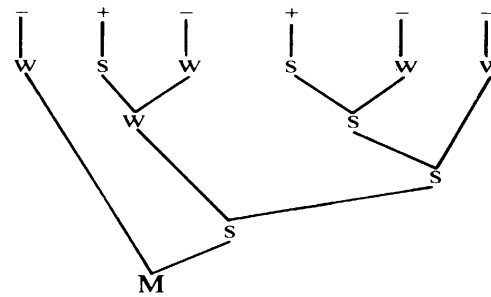Liberman & Prince (1977:301-304): *orígínality* and "deforestation" rule.

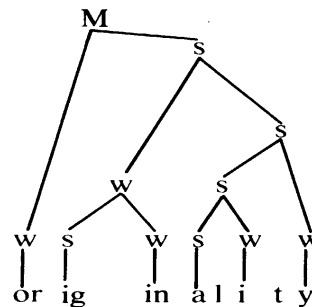# The cycle and the prosodic hierarchy

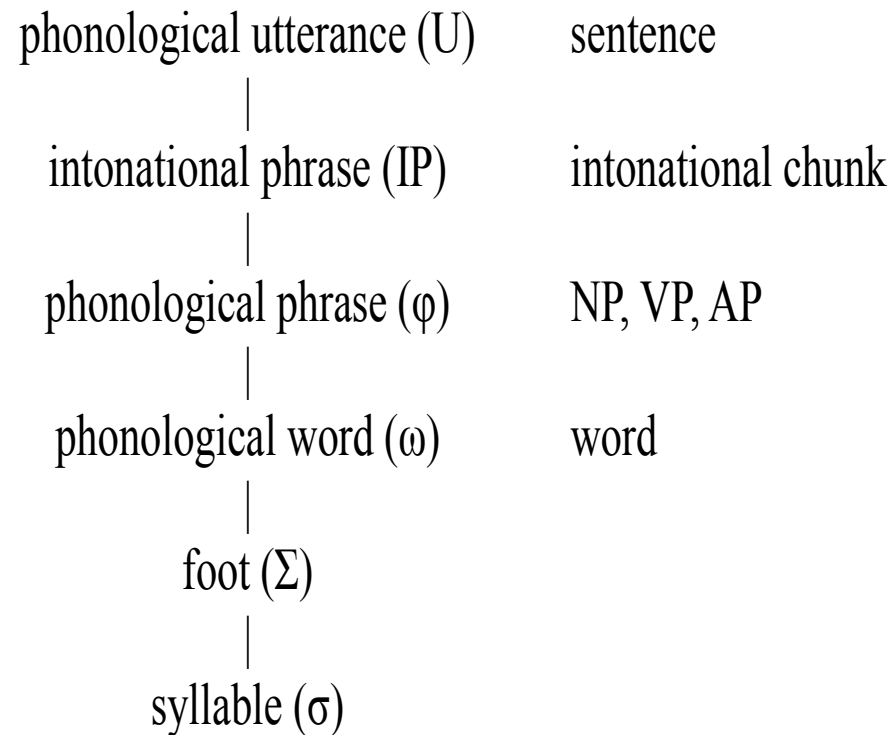# The cycle and the prosodic hierarchy

Liberman & Prince's theory:

- revises phonological representations

- gets rid of SPE boundaries and replaces them with hierarchy

- maintains the centrality of cyclicity as the core operation in phonology.

- maintains rules that apply to phonological representations

The tenets of Prosodic Phonology

the Prosodic Hierarchy according to Selkirk (1981 [1978])

|	
phonological utterance (U)	sentence
intonational phrase (IP)	intonational chunk
phonological phrase (φ)	NP, VP, AP
phonological word (ω)	word
foot (Σ)	
syllable (σ)	

(Image from Scheer 2011:321)

The tenets of Prosodic Phonology

- Language-specific parameters/settings establish what exactly belongs to each prosodic constituent.

- These choices are regulated by mapping rules, "which convert morpho-syntax into prosodic structure" (Scheer 2011:322).

- As Selkirk (1981:381) puts it, the rules of grammar "must 'know' about the categorial composition of a sentence; they must 'know', for example, that some string of phonemes constitutes a noun phrase and not a verb phrase. A phonological representation, I am arguing here, is no different from a syntactic representation on that score."

- There is an important difference, though: "The combinatorial possibilities of prosodic categories are far more restricted that those of syntactic categories" (Selkirk 1981:382).

The tenets of Prosodic Phonology

(33)   The representation of *irrespéctive* (Selkirk 1978:112):
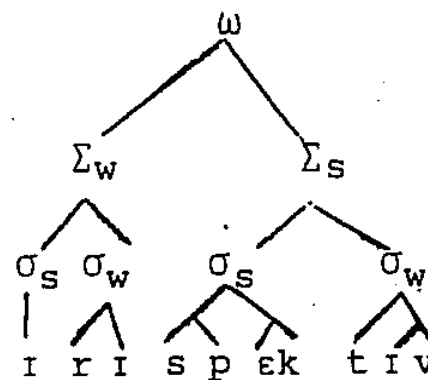
(34)   The prosodic word (Selkirk 1978:124):

The Prosodic Word: Constituency

The Σ are joined in a right branching structure.

The Prosodic Word: Prominence

Given a pair of sister nodes [N_1 N_2], N_2 is s iff it branches.
(This is the Liberman and Prince Lexical Category Prominence Rule.)

The tenets of Prosodic Phonology

(35)   Syntax-phonology relation:

a.   Although not radically different, syntactic and phonological representations are distinct

b.   Key question: "What, then, is the relation between the prosodic structure of a sentence and its syntactic structure?" (Selkirk 1981: 386)

c.   In the generative tradition, the phonological component is interpretative of syntax, e.g. the output of syntax feeds the input of phonology.

d.   Different categories, no syntactic analogues to the strong/weak relations of phonology, and no direct correspondence between the constituents (the words and phrases) of the syntax and those of the phonology. (Selkirk 1981: 387)

e.   Non isomorphism of syntactic representation to the phonological representation: mapping is not trivial.

The tenets of Prosodic Phonology

(36) Prosodic structure
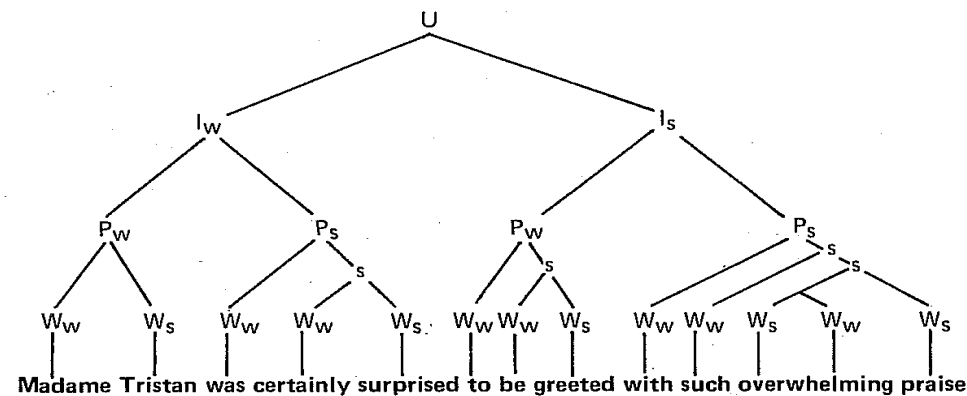
(37) Syntactic structure
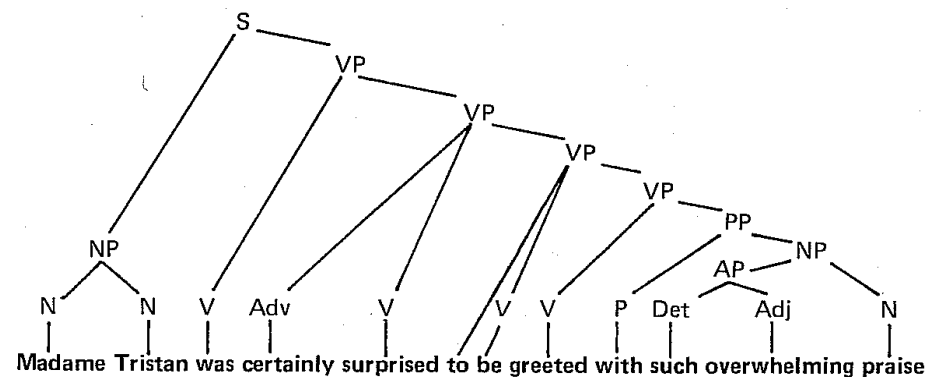
The tenets of Prosodic Phonology

(38)   Mapping

    a.   Selkirk (1981: 387) claims that "the well-formedness conditions for prosodic categories, made specific to designated syntactic domains, *are* the mapping."

    b.   Then, the well-formedness conditions must be seen as conditions on "*underlying* phonological representations".

    c.   Syntax-phonology mismatches: neutral suffixes in English are not part of the prosodic word, French pronouns belong to the same prosodic word as the verb they attach to.

    d.   Phonological rules are sensitive to prosodic structure, but not to syntactic structure: in other words, "prosodic structure mediates between syntax and phonetic realization".

   e.   Morpho-syntactic categories are invisible to the phonology.

The tenets of Prosodic Phonology

(39) Mapping

The Phonological Phrase: Constituency

(i) An item which is the specifier of a syntactic phrase joins

with the head of the phrase.

(ii) An item belonging to a "non-lexical" category (cf. Chomsky

1965), such as Det, Prep, Comp, Verb$_{aux}$, Conjunction,

joins with its sister constituent.

The tenets of Prosodic Phonology
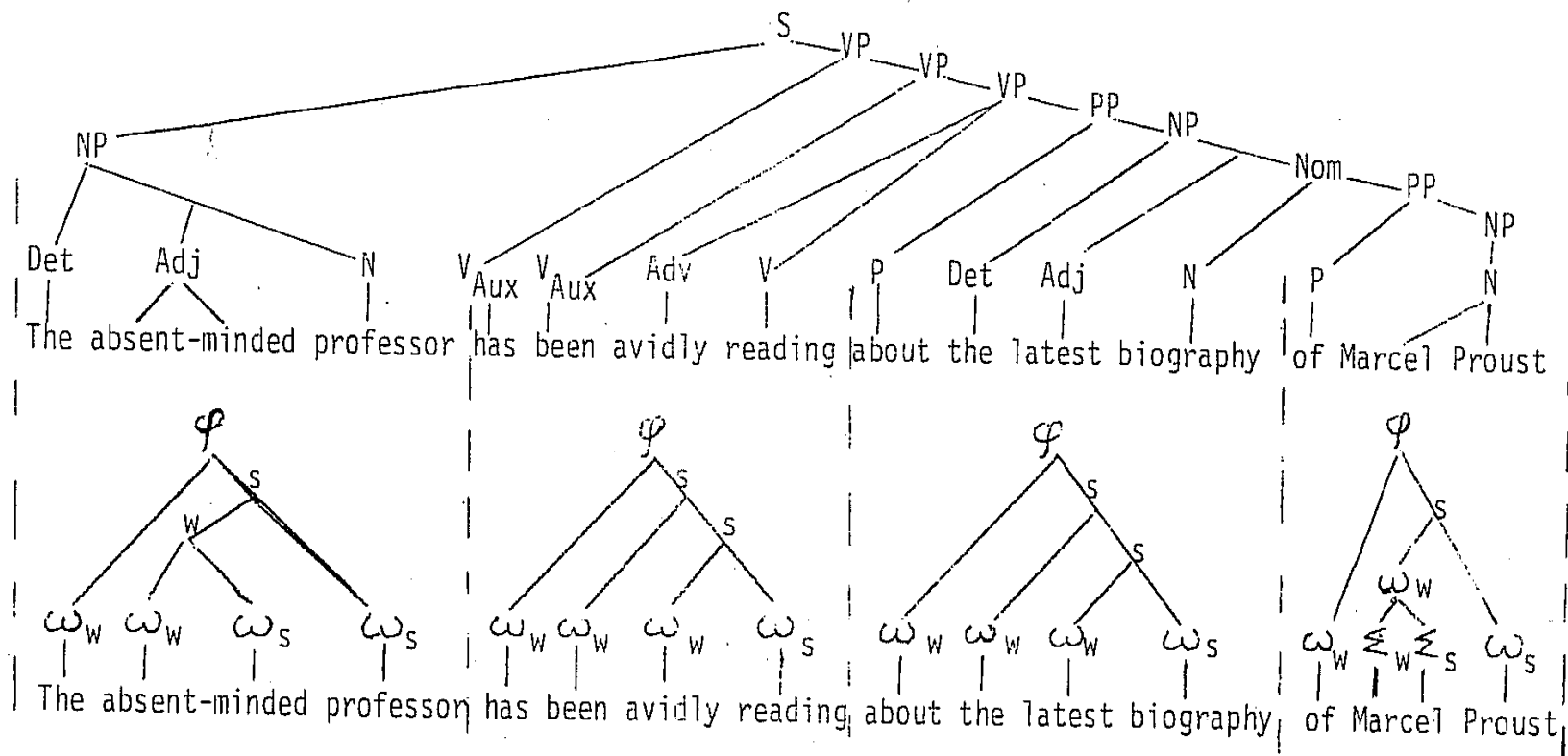
Selkirk (1978:127)

The tenets of Prosodic Phonology

As Scheer (2011:338-ff) notes, the main purpose of the Prosodic Hierarchy is the storage of morpho-syntactic information.

- Prosodic domains exist only because there are phonological processes that make reference to them.

- Basic prosodic units are those (and only those) that constitute the domain of application of a phonological rule.

- Prosodic constituency looks like a diacritic, just like hashtags in SPE.

Selkirk (1978:136) concludes as follows: "It should be noted that once prosodic categories form part of the phonological representation, the motivation for boundaries as part of phonological representation disappears. Boundaries are none other than an encoding in the string of segments of the higher prosodic structure organizing that string."

Prosodic Morphology

(40)   Principles of Prosodic Morphology (McCarthy & Prince 1996:318)

a.   Prosodic Morphology Hypothesis
Templates are defined in terms of the authentic units of prosody:
mora (μ), syllable (σ), foot (F), prosodic word (PrWd).

b.   Template Satisfaction Condition
Satisfaction of templatic constraints in obligatory and is
determined by the principles of prosody, both universal and
language-specific.

c.   Prosodic Circumscription
The domain to which morphological operations apply may be
circumscribed by prosodic criteria as well as by the more familiar
morphological ones.

Prosodic Morphology

Why is this theory interesting to us?

- Although it is not an interface theory, it does analyze morphological facts using phonological tools, namely the Prosodic Hierarchy.

- Prosodic Morphology claim that the shape of (some) morphemes (namely reduplicated and templatic) are surface manifestations of the Prosodic Hierarchy.

- It makes use of the notion of template, which we return to later when discussing CVCV phonology.

- It introduces two central mechanisms of OT: correspondence and alignment (see Scheer 2011:378-ff)

Prosodic Morphology

An example of reduplication (Suffixing reduplication in Manam, Austronesian language spoken in New Guinea)

salaga	salagalaga	"long"
moita	moitaita	"knife"
ʔarai	ʔarairai	"ginger species"
laʔo	laʔolaʔo	"go"
malaboŋ	malabomboŋ	"flying fox"
ʔulan	ʔulanlaŋ	"desire"

In Manam, reduplication involves a bimoraic sequence.

Prosodic Morphology

An example of Semitic template (root-and-pattern morphology):

Arabic Productive Plural and Diminutive

Singular	Plural	Diminutive	
ħukm	/ħakaam/	ħukaym	"judgment"
ʕinab	/ʕanaab/	ʕunayb	"grape"
jaziir+at	/jazaawir/	/juzaywir/	"island"
šaaɣil	šawaaɣil	šuwayɣil	"engrossing"
jaamuus	jawaamiis	juwaymiis	"buffalo"
jundub	janaadib	junaydib	"locust"
sulṭaan	salaaṭiin	sulayṭiin	"sultan"

"In Arabic, the productive plural and diminutive are expressed by imposing a LH iambic foot on the singular noun base. Because singular nouns come in diverse shapes, this iambic template is imposed on only a portion of the noun." (McCarthy & Prince 1996:240-241)

References of today's class:

- Liberman, M & A. Prince 1977. On Stress and Linguistic Rhythm. Linguistic Inquiry 8, 249-336.

- McCarthy, J. J. & A. Prince. 1996. Prosodic Morphology. In The Handbook of Phonological Theory. (ed) J. Goldsmith. pp. 318-366.

- Scheer, T. 2011. A guide to morphosyntax-phonology interface theories : how extra-phonological information is treated in phonology since Trubetzkoy's Grenzsignale (Part I, chap. 1 to 12, with special focus on chapters 5/6 and 11/12)

- Selkirk, E. 1981. On the nature of phonological representation. The cognitive representation of speech, edited by J. Anderson, J. Laver & T. Meyers, 379-388. Amsterdam: North Holland.

- Selkirk, E. 1978 [1981]. On prosodic structure and its relation to syntactic structure. In Nordic Prosody II, Thorstein Fretheim (ed.), 111-140. Trondheim: TAPIR.