

### Class 13: Lexical Phonology II (more levels)

#### To do

- Turn in **source report** by end of tomorrow and have talked to me.
- Due Monday: Steriade **reading questions**
- Next **HW**: due Tuesday, Nov. 15 in class (because of holiday)

**Overview:** Last time we looked at a model where phonological processes are divided into lexical and postlexical (driven by Observation I: two kinds of rule), and there was cyclicity (Obs. II: complex words look like the words they come from) within the lexical component. Now we'll add one more piece of structure.

#### 1. Observation III: two classes of affix in English (and many other languages)

<i>suffix examples</i>	<i>-al, -ous, -th, -ate, -ity, -ic, -ify, -ion, -ive, -ize</i>	<i>-ship, -less, -ness, -er, -ly, -ful, -some, -y, -ish</i>
stress shift?	párent vs. parént-al spécify vs. spécif-ic	párent vs. párent-less cáreful vs. cáreful-ly
trisyllabic shortening?	ev[ou]ke vs. ev[a]c-at-ive der[ar]ve vs. der[r]v-at-ive	s[ou]l vs. s[ou]l-less-ness gr[er]teful vs. gr[er]teful-ly
velar softening?	opa[k]e vs. opa[s]-ity cliti[k] vs. cliti[s]-ize	opa[k]e vs. opa[k]ish cliti[k] vs. cliti[k]-y
<i>prefix examples</i>	<i>in-, con-, en-</i>	<i>un-, non-</i>
can bear main stress?	cón-template, ín-filtrate	-- (rarely)
obligatory assim. of nasal?	il-legal, com-prehend	un-lawful, non-plus
<i>both</i>		
attach to bound morph.?	caust-ic, con-flict	-- (rarely)
ordering	act-iv-at-ion-less-ness <sup>1</sup> , non-in-com-prehens-ible <sup>2</sup>	
semantics	riot vs. riot-ous margin vs. margin-al	riot vs. rioter fresh vs. fresh-ness

Watch out for prefixes that come in two flavors: *re-*, *de-*, *sub-*, *pre-*; (also homophones: there are two totally different *-ys*) and of course there are exceptions...

<sup>1</sup> “the correspondingly predicted near-**activationlessness** of the reaction” ([www.pnas.org/cgi/content/full/101/46/16198](http://www.pnas.org/cgi/content/full/101/46/16198))

<sup>2</sup> “great cast, snappy dialogue, non-boring **non-incomprehensible** non-insane plotting” ([www.thepoorman.net/archives/002732.html](http://www.thepoorman.net/archives/002732.html))

## 2. Solution in Lexical Phonology: lexical component is broken into levels

...each with its own WFRs and phonological rules

- WFR = word formation rule (i.e., a morphological operation). Could be adding an affix, could be something else (e.g., *sing* → *sang*).

*English* (amalgam of (Kiparsky 1982a; Kiparsky 1982b), Mohanan 1986, who proposes 4 levels for English—you will see many variations on this):

Level 1	WFRs	irregular inflection (tooth/teeth) “primary” derivational affixes (- <i>al</i> , - <i>ous</i> , - <i>ant</i> , <i>in-</i> etc.), including some Ø affixes
	Phon. rules (selected)	stress ( <i>paréntal</i> ) trissyllabic shortening ( <i>opacity</i> ) obligatory nasal assimilation ( <i>illegal</i> ) syllabification, including rule that C syllabified in onset if followed by V ( <i>cyclic</i> ) velar softening ( <i>electricity</i> )
Level 2	WFRs	secondary derivational affixes (- <i>ness</i> , - <i>er</i> , <i>un-</i> , etc.) compounding ( <i>blackbird</i> )
	Phon. rules	compound stress ( <i>bláckbìrd</i> ) $n \rightarrow \emptyset / C\_ ]\#$ ( <i>damning</i> vs. <i>damnation</i> ) $g \rightarrow \emptyset / \_ [+nas]\#$ ( <i>assigning</i> vs. <i>assignation</i> <sup>3</sup> )
Level 3	WFRs	regular inflectional affixes (- <i>s</i> , - <i>ed</i> , - <i>ing</i> )
	Phon. rules	sonorant resyllabification is only optional $\_V$ ( <i>cycling</i> )
Postlexical	Phon. rules	aspiration, tapping (no morphology occurs after the lexical component, so no WFRs)

Compare to the OT version you read about ((Kiparsky 2000)), with just 2 lexical levels (*Stem and Word*)

- If a word bears  $n$  affixes from the same level, it goes through that level’s phonology  $n$  times.
- The output of each level (or, depending on the author, the output of each cycle) is a lexical item. (Everyone clear on the difference between cycle and level?)
- How does this explain why Level 2 affixes can’t attach to bound roots?

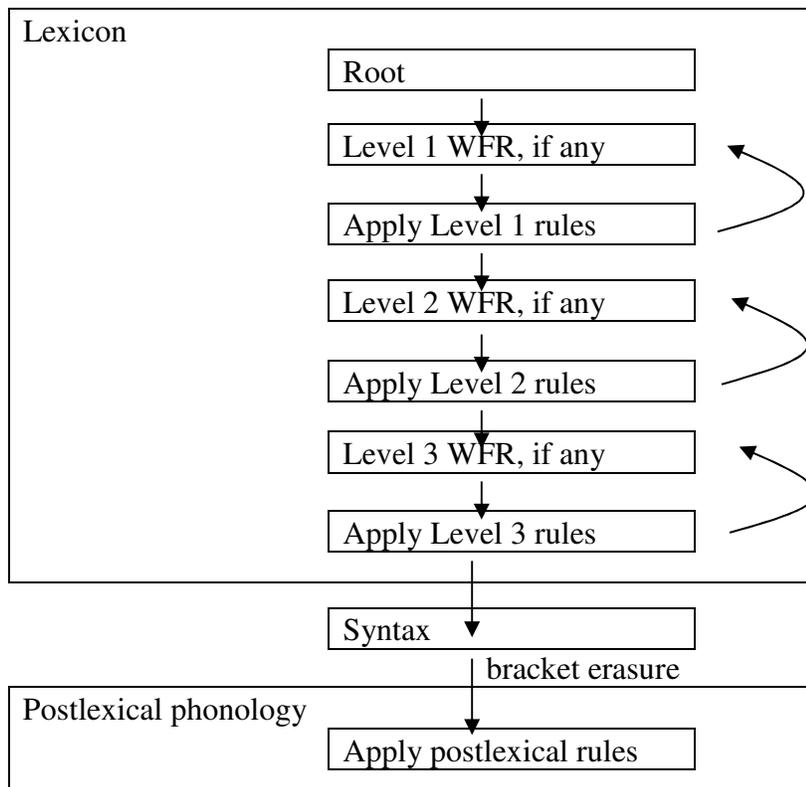
<sup>3</sup> though also some problematic cases like *?assigner*. For a completely different view of all this, see Hay 2003.

- Compare the derivations for *damnation* [dæmn-eɪʃən] and *damning* [dæm-ɪŋ].

- How is the following (disputed!) asymmetry in compounds explained in the model?

tooth marks	teeth marks	claw marks	*claws marks
louse-infested	lice-infested	rat-infested	*rats-infested

### 3. Putting it all together



Should the root pass through the Level 1 rules first thing? Or should it first undergo a Level 1 WFR (if there is one), as illustrated? Not clear (empirical question).

In adapting the theory to OT (“Stratal OT”), Kiparsky tends to employ just two lexical levels: **Stem Level** and **Word Level**, plus a Postlexical Level (e.g., Kiparsky 2000).

#### 4. Exercise: Conservative European Spanish again (based on (Harris 1983))

- Palatal and alveolar nasals and laterals contrast:
 

ka.na	‘grey hair’	po.lo	‘pole’
ka.ɲa	‘cane’	po.ʎo	‘chicken’
  
- But the contrast is neutralized in some environments
 

dezðeɲ+ar	‘to disdain’	donθeɲ+a	‘maiden’
dezðeɲ+os+o	‘disdainful’	donθeɲ+a+s	‘maidens’
dezðeɲ	‘disdain (N)’	donθeɲ	‘swain’
  
- What about these forms—what can we conclude about levels in Spanish? Try writing a derivation that orders morphological operations and phonological rules.
 

dezðeɲ+es	‘disdain (N, plural)’	donθeɲ+es	‘swains’
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#### 5. Dissent to Lexical Phonology

- Some have argued that affixes don’t fall neatly into 2-3 discrete categories (e.g., Level 1, 2, 3)
  - and/or that an affix’s behavior can be predicted from its phonological makeup (e.g., C-initial vs. V-initial) and its distribution ((Plag 1999; Hay & Plag 2004; Raffelsiefen 1999; Hay 2003)).
- Some argue that a word “sees” (in OT, is faithful to) not just its immediate morphological predecessor, but also other related words ((Steriade 1999), (Burzio 1998))
- One postlexical phonology probably isn’t enough.
  - Some have argued that different postlexical rules can be assigned to different-sized phonological domains such as phonological phrase, intonational phrase, utterance ((Selkirk 1978; Selkirk 1980; Nespor & Vogel 1986), (Jun 1993))
  - Others argue that these phonological domains influence phonological rules quantitatively, not categorically ((Féry 2004)), so the postlexical level can’t be neatly divided up.
- And how productive are early-level phonological rules anyway?
  - See (Pierrehumbert 2006) for evidence that English velar softening is pretty productive—but only for novel words that resemble the existing targets of the rule (syllable count, stress pattern, quality of last vowel...)

## 6. One last bit about the model: Non-derived-environment blocking (NDEB)

- We won't try to solve this problem, but you should be aware of the phenomenon.

*Finnish* ((Kiparsky 1973), pp. 58-60 plus a few dictionary and (Verbix) examples)

Ignore various other rules: vowel harmony, degemination, a~o...

<i>to X</i>	<i>Let him/her X!</i>	<i>'active instructive infinitive II'</i>	<i>she/he was Xing</i>	
halut+a	halut+koon	halut+en	halus+i	'want'
noet+a	noet+koon	noet+en	nokes+i	'smudge (?)'
piet+æ	piet+køøn	piet+en	pikes+i	'pitch'
filmat+a	filmat+koon	filmat+en	filmas+i	'film'
<i>These show that the [t] above isn't part of the suffix:</i>				
oll+a	ol+koon	oll+en	ol+i	'be'
aja+a	aja+koon	aja+en	ajo+i	'go'
puhu+a	puhu+koon	puhu+en	puhu+i	'speak'

- The data above suggest  $t \rightarrow s / \_ i$ . Can we modify the rule for these cases?

tila	'room'	lahti	'Lahti'	cf.	
æiti	'mother'	mæti	'roe'	paasi	'boulder'
silti	'however'	limonaati	'lemonade'	sinæ	'you (sg.)'
valtion	'public'			kuusi	'six'

- Another rule is needed to account for this vowel alternation:

joke+na	'river' essive sg.	joki	'river' nom. sg.
mæke+næ	'hill' essive sg.	mæki	'hill' nom. sg.
<i>These suggest the above words end in /e/</i>			
æiti+næ	'mother' essive sg.	æiti	'mother' nom. sg.
kahvi+na	'coffee' essive sg.	kahvi	'coffee' nom. sg.

- How should the two rules be ordered, given these data? (ignore h~k alternation)

vete+næ	'water' essive sg.	vesi	'water' nom. sg.
kæte+næ	'hand' essive sg.	kæsi	'hand' nom. sg.
yhte+næ	'one' essive sg.	yksi	'one' nom. sg.

- What's the problem in *vesi*?

- The phenomenon is known as **non-derived environment blocking (NDEB)**.
  - See also (Kiparsky 1985; Kaisse & Shaw 1985; Booij & Rubach 1987; Hualde 1989; Kean 1974) ...
- The proposal in Lexical Phonology: the "Strict Cycle Condition" ((Mascaró 1976))
  - lexical rules (at least those that change feature values, rather than filling in underspecified feature values or adding syllable structure) can apply only to environments newly made, by either a morphological operation or a phonological rule *in the same cycle*.

- In my opinion, this solution was never totally satisfactory, so I don't want to go through the details of the proposals.
- As Wolf 2008 discusses, there are only about 3 cases in which some derived-environment-only rule can be fed by either a morphological or a phonological operation, and they can be re-analyzed (e.g., Hammond 1991 for Finnish).
  - So maybe we don't need a general theory of NDEB, just a theory of morphology-sensitivity (which we already have) and a theory of "needing to be fed by phonological rule"
  - For some alternative theories, see Wolf 2008, McCarthy 2003, (Lubowicz 2002)

### 7. Exercise: Cairene Arabic from reading questions

- Determine the order of these two phonological rules, plus the "add object suffix" and "add subject suffix" word-formation rules:

preconsonantal shortening:  $a \begin{bmatrix} -\text{cons} \\ -\text{syll} \end{bmatrix} a (C) C \rightarrow \begin{bmatrix} 2 \\ +\text{syll} \end{bmatrix} 4 5$   
 (targets /aya/ and /awa/)

final and prevocalic glide deletion  $\begin{bmatrix} -\text{cons} \\ -\text{syll} \end{bmatrix} \rightarrow \emptyset / a\_a (C) \left\{ \begin{matrix} \# \\ V \end{matrix} \right\}$

/šayal/ (gets subject suffix -ti)

/šayal/ (gets subject suff  $\emptyset$  & object suff -ni)

[šilti] 'you carried'

[šaalni] 'he carried me'

- What does this tell us about levels in Arabic?

**8. Quick exercise: Kiparsky’s OT+levels analysis of Arabic**

○ Fill in the derivation for ‘he understood’—I already filled in GOODSTRESS

STEM /fihim/	GOODSTRESS	*COMPLEXONSET	MAX-STRESSEDV	MAX-V	No [i]	IDENT(stress)
<i>a</i> f ihim	*!					
<i>b</i> f íhim						
<i>c</i> f íhm						
<i>d</i> fhím						

WORD / /	GOODSTRESS	*COMPLEXONSET	MAX-STRESSEDV	No [i]	MAX-V	IDENT(stress)
<i>e</i> f ihim	*!					
<i>f</i> f íhim						
<i>g</i> f íhm						
<i>h</i> fhím						

○ Fill in the derivation for ‘he understood us’

STEM /fihim/	GOODSTRESS	*COMPLEXONSET	MAX-STRESSEDV	MAX-V	No [i]	IDENT(stress)
<i>i</i> f ihim	*!					
<i>j</i> f íhim						
<i>k</i> f íhm						
<i>l</i> fhím						

WORD / + na /	GOODSTRESS	*COMPLEXONSET	MAX-STRESSEDV	No [i]	MAX-V	ID(stress)
<i>m</i> f ihimna	*!					
<i>n</i> f íhimna	*!					
<i>o</i> f íhímna						
<i>p</i> f íhmna						
<i>q</i> fhímna						

○ Fill in the derivation for ‘we understood’

STEM /fihim/	GOODSTRESS	*COMPLEXONSET	MAX-STRESSEDV	MAX-V	No [i]	ID(stress)
<i>r</i> f ihim	*!					
<i>s</i> f íhim						
<i>t</i> f íhm						
<i>u</i> fhím						

STEM / na / +	GOODSTRESS	*COMPLEXONSET	MAX-STRESSEDV	MAX-V	NO [i]	ID(stress)
v f íhimna	*!					
w f íhimna	*!					
x f íhímna						
y f íhmna						
z fhímna						

WORD / /	GOODSTRESS	*COMPLEXONSET	MAX-STRESSEDV	NO [i]	MAX-V	ID(stress)
aa f íhimna	*!					
bb f íhimna	*!					
cc f íhímna						
dd f íhmna						
ee fhímna						

**9. Exercise: resolving the Icelandic ordering paradox (see (Kiparsky 1984) for more)**

- Determine the order of these two phonological rules, plus the relevant word-formation rules.

*syncope, roughly:* certain unstressed Vs → Ø / C \_\_ {l,r,n,ð,s}+V

*u-umlaut:* a → ö / \_\_ C<sub>0</sub> u (where “u” usu. = [y], “ö” = [œ])

/katil/ (gets dative pl. suffix *-um*)    /jak/ (gets diminutive suff. *-ul* & dat. sg. suff. *-e/i*)

/kötulum/

/jökli/

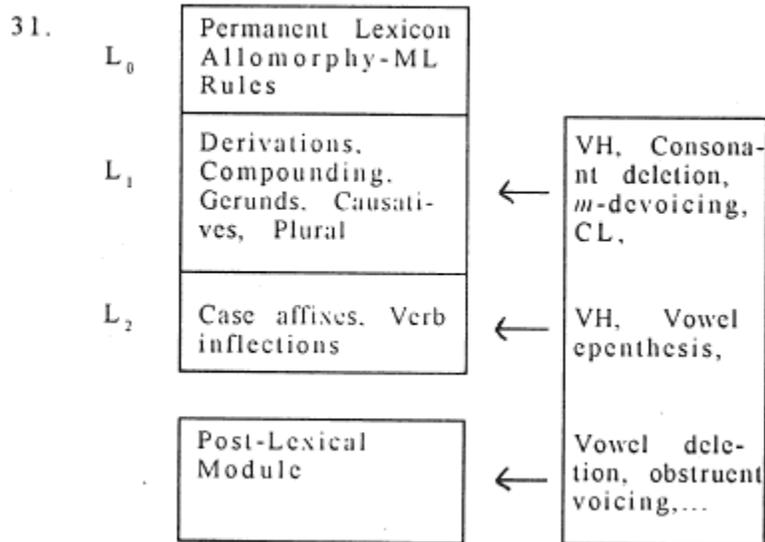
**10. I thought it would be fun to see partial boxologies proposed for some more languages**

- German, per (Wiese 1996) (p. 128, partial):

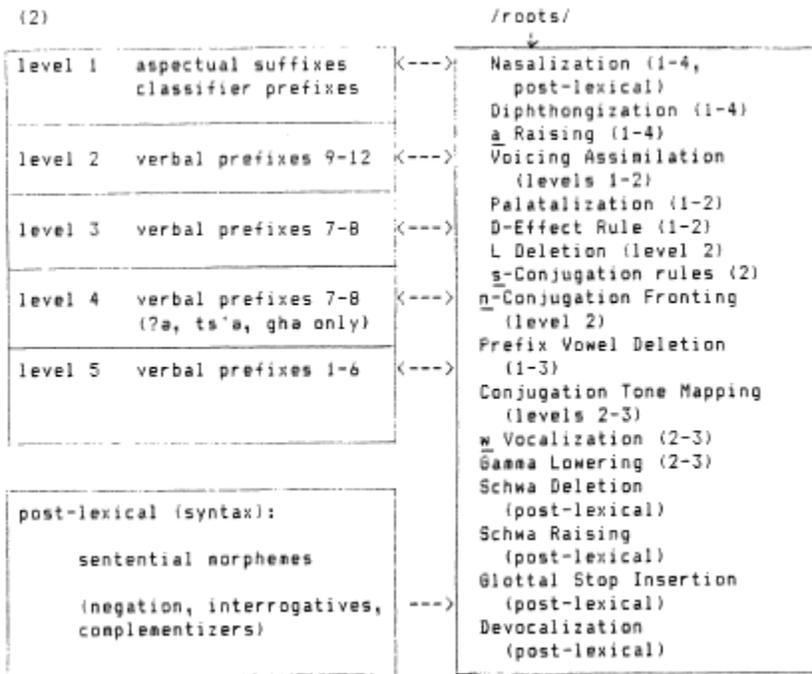
(18) Lexicon of German

	morphology	phonology
level 1	irregular inflection class I affixes	⇒ Word Stress
level 2	compounding class II affixes	⇒ Compound Stress
level 3	regular inflection	⇒ Schwa Epenthesis

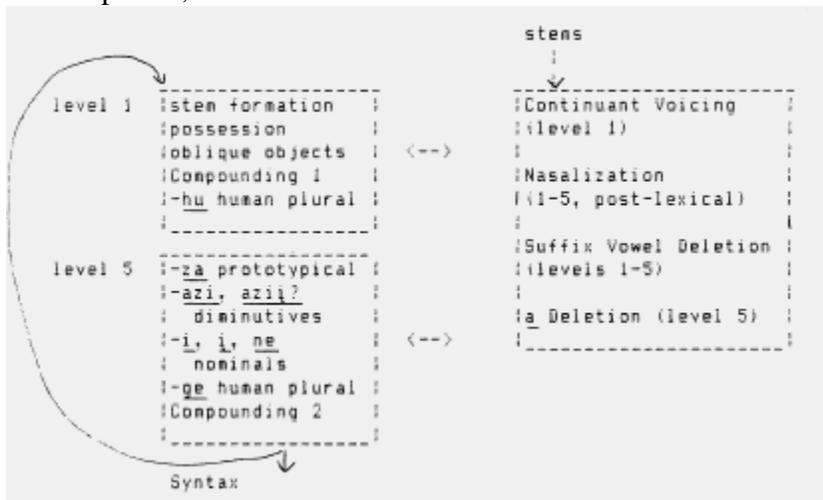
- Telugu, per (Sailaja 1995) (Dravidian language of India with 70 million speakers [(Lewis 2009)]) (p. 108):



- Sekani, per (Hargus 1985) (Na-Dene language of Canada, nearly extinct [(Lewis 2009)])
  - p. 75, verbs:



- p. 197, nouns:



Next time. The too-many-solutions problem.

### References

Booij, Geert & Jerzy Rubach. 1987. Postcyclic versus postlexical rules in lexical phonology. *Linguistic Inquiry* 18. 1-44.

Burzio, Luigi. 1998. Anaphora and soft constraints. In Pilar Barbosa, Danny Fox, Paul Hagstrom, Martha McGinnis & David Pesetsky (eds.), *Is the Best Good Enough? Optimality and Competition in Syntax*, 93-113. Cambridge, Mass.: MIT Press.

- Féry, Caroline. 2004. Gradient prosodic correlates of phrasing in French. In Trudel Meisenburg & Maria Selig (eds.), *Nouveaux départs en phonologie*. Tübingen: Narr.
- Hammond, Michael. 1991. *Deriving the strict cycle condition*.
- Hargus, Sharon. 1985. The Lexical Phonology of Sekani. UCLA.
- Harris, James. 1983. *Syllable Structure And Stress in Spanish: a Nonlinear Analysis*. Cambridge, Mass.: MIT Press.
- Hay, Jennifer. 2003. *Causes and consequences of word structure*. Routledge.
- Hay, Jennifer & Ingo Plag. 2004. What Constrains Possible Suffix Combinations? On the Interaction of Grammatical and Processing Restrictions in Derivational Morphology. *Natural Language & Linguistic Theory* 22(3). 565–596.
- Hualde, Jose. 1989. The strict cycle condition and noncyclic rules. *Linguistic Inquiry* 20. 675–680.
- Jun, Sun-Ah. 1993. The Phonetics and Phonology of Korean Prosody. Ohio State University.
- Kaisse, Ellen M & Patricia Shaw. 1985. On the theory of lexical phonology. *Phonology* 2. 1–30.
- Kean, Mary-Louise. 1974. The strict cycle in phonology. *Linguistic Inquiry* 5. 179–203.
- Kiparsky, Paul. 1973. Abstractness, opacity and global rules. In O. Fujimura & O. Fujimura (eds.), *Three Dimensions of Linguistic Theory*, 57–86. Tokyo: TEC.
- Kiparsky, Paul. 1982a. Lexical Morphology and Phonology. *Linguistics in the Morning Calm*. Hanshin Publishing Co.
- Kiparsky, Paul. 1982b. From cyclic phonology to lexical phonology. In Harry van der Hulst & Norval Smith (eds.), *The Structure of Phonological Representations*, vol. 1, 131–175. Dordrecht: Foris.
- Kiparsky, Paul. 1984. On the lexical phonology of Icelandic. In C. C Elert, I. Johansson, E. Stangert, C. C Elert, I. Johansson & E. Stangert (eds.), *Nordic prosody III*, 135–164. Ume? University of Ume?
- Kiparsky, Paul. 1985. Some consequences of Lexical Phonology. *Phonology* 2. 85–138.
- Kiparsky, Paul. 2000. Opacity and cyclicity. *The Linguistic Review* 17. 351–367.
- Lewis, M. Paul (ed.). 2009. *Ethnologue: languages of the world*. 16th ed. Dallas, TX: SIL International.
- Lubowicz, Anna. 2002. Derived Environment Effects in Optimality Theory. *Lingua* 112. 243–280.
- Mascaró, Joan. 1976. Catalan Phonology and the Phonological Cycle. MIT.
- McCarthy, John J. 2003. Comparative Markedness. *Theoretical Linguistics* 29(29). 1–51.
- Mohanan, K. P. 1986. *The Theory of Lexical Phonology*. Dordrecht: Reidel.
- Nespor, Marina & Irene Vogel. 1986. *Prosodic Phonology*. Dordrecht: Foris.
- Pierrehumbert, Janet B. 2006. The statistical basis of an unnatural alternation. In Louis M Goldstein, D. H. Whalen & Catherine T. Best (eds.), *Laboratory Phonology 8*. Walter de Gruyter.
- Plag, Ingo. 1999. *Morphological productivity: structural constraints in English derivation*. Berlin: Mouton de Gruyter.
- Raffelsiefen, Renate. 1999. Phonological constraints on English word formation. In Geert E Booij & Jaap van Marle (eds.), *Yearbook of Morphology 1998*, 225–287. (Yearbook of Morphology 8). Dordrecht: Kluwer.
- Sailaja, Pingali. 1995. *Issues in lexical phonology*. Booklinks Corp.
- Selkirk, Elisabeth. 1978. On prosodic structure and its relation to syntactic structure. In T. Fretheim (ed.), *Nordic Prosody*, vol. 2, 111–140. Trondheim: TAPIR.
- Selkirk, Elisabeth. 1980. Prosodic domains in phonology: Sanskrit revisited. In Mark Aronoff & Mary-Louise Kean (eds.), *Juncture*, 107–129. Saratoga, CA: Anma Libri.
- Steriade, Donca. 1999. Lexical conservatism in French adjectival liaison. In J. -Marc Authier, Barbara Bullock & Lisa Reid (eds.), *Formal Perspectives on Romance Linguistics*, 243–270. Amsterdam: John Benjamins.
- Verbix. Verbix verb conjugator -- Finnish verb conjugation. <http://www.verbix.com/languages/finnish.shtml> (27 February, 2012).
- Wiese, Richard. 1996. *The Phonology of German*. Oxford: Clarendon Press.
- Wolf, Matthew. 2008. Optimal Interleaving: serial phonology-morphology interaction in a constraint-based model. University of Massachusetts Amherst.