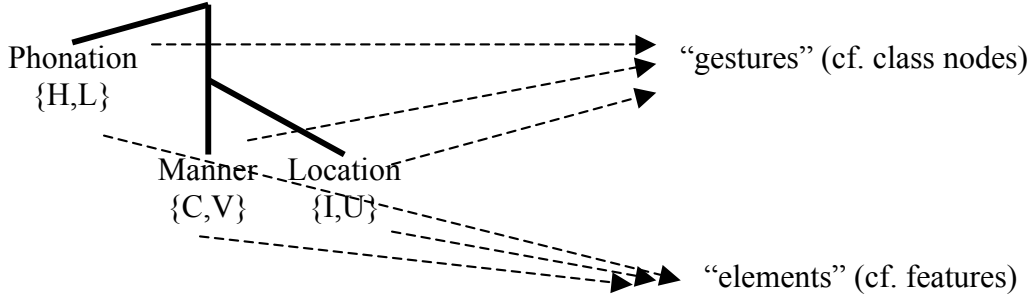


(2) Segmental Content I

- Each syllabic position allows a set of segments.
- A segment is a combination of PHONATION, MANNER and LOCATION (called “gestures” aka “class nodes”). Only manner (the head gesture) is obligatory.
- Each gesture allows a choice from two elements:

a. syllabic (skeletal) position



- Each element has multiple (related) phonetic interpretations (see below).
- Permissible combinations display the following maximal structure:

b.



- The occurrence of s- and d-dependent tends to be mutually exclusive.

c. Possible gesture structures per gesture

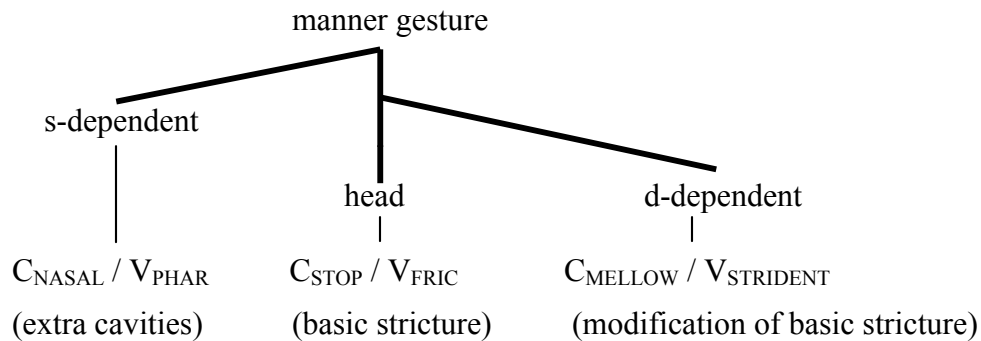
Basic structures: C C_V V_C V
 D-dependent (post-subscript)

Adjunction structures: ^CX ^VX
 S-dependent (pre-superscript)

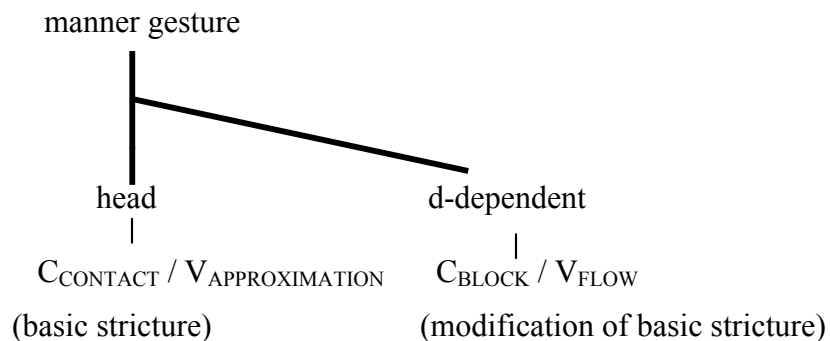
- As shown, an adjunct element tends to occur only with a simple basic structure.

d. **Enhancement:** Bare C and V are interpreted “as if” they have a C and V dependent:

$$C = C_C \quad \text{and} \quad V = V_V$$

e. Manner in **onset head** position (obstruents)

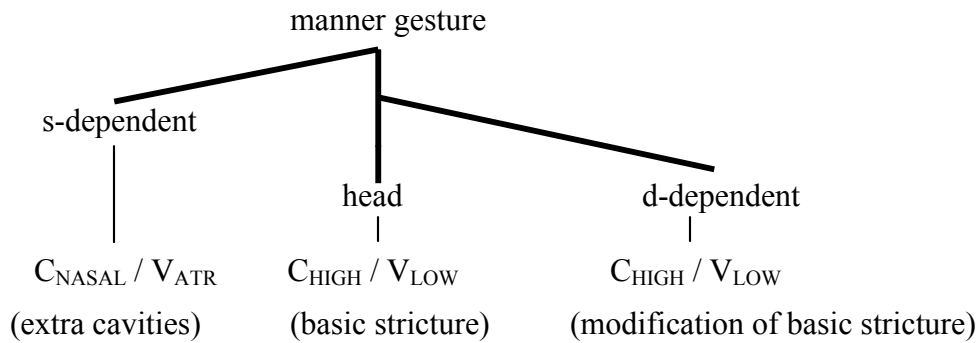
- f.
- | | | |
|----------------|---|--|
| C | a plain stop | (i.e. C _C : NON-stridency enhances stops) |
| C _V | a strident stop (i.e. affricate) | |
| V _C | a non-strident fricative | |
| V | a strident fricative | (i.e. V _V : stridency enhances fricativity) |
| ^C X | (pre) nasalized obstruent (or lateralized obstruents) | |
| ^V X | pharyngealized obstruent | |

g. Manner in **onset dependent** position (sonorant consonants)

- h.
- | | |
|----------------|----------------|
| C | a nasal |
| C _V | a lateral |
| V _C | a rhotic |
| V | an approximant |

- In onset dependent position only the basic structures occur.
- It is to be expected that head positions allow greater complexity than dependent positions (the fundamental head – dependent asymmetry).
- Note how occurrences of C and V correspond to traditional features labels in most, but not all cases.

i. Manner in **rhyme head** position (vowels)



- j.
- C a high vowel
 - C_V a high-mid vowel
 - V_C a low-mid vowel
 - V a low vowel

 - ^CX nasalized vowel
 - ^VX advanced vowel (ATR)

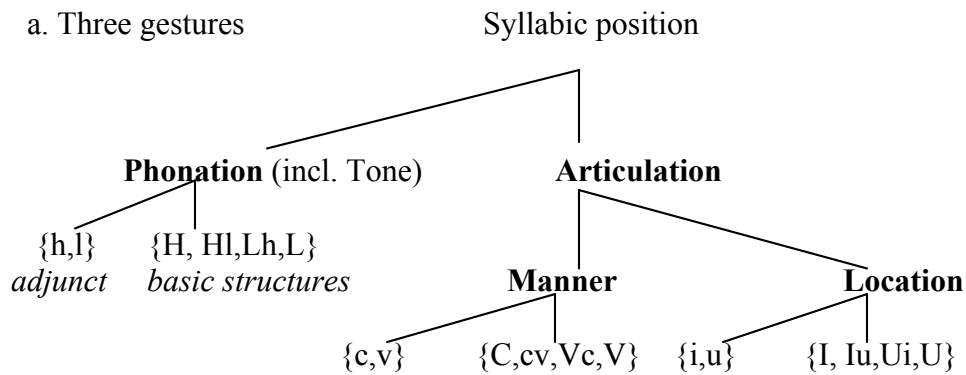
k. Manner in **rhyme dependent** position (consonantal sonorants)

As (2g)

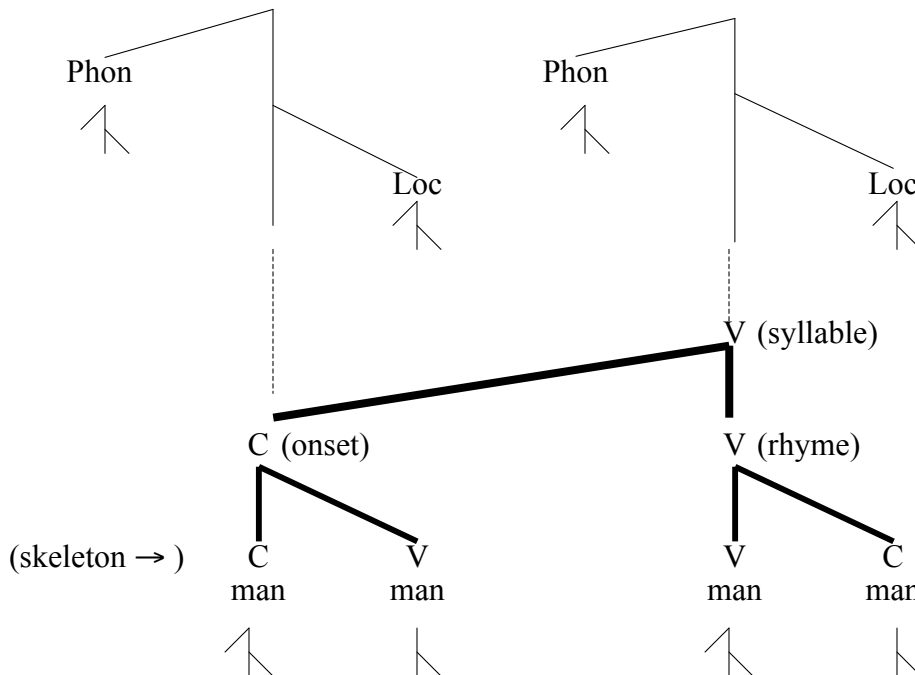
- The same elements and elemental structures are used for consonants and vowels or more specifically for onset heads, rhyme heads and dependent syllabic positions.
- Hence, we have a “unified set of manner structure”.
- There also are unified structures for Phonation and Location distinctions.

(3) Segment content II

a. Three gestures



b. Phonation and Location only apply to syllabic heads which we can (but do not have to) graphically represents by linking these gestures to syllabic head nodes:



- The fact that only syllabic heads have phonation and location is another (expected) head – dependent asymmetry.

c. The phonetic interpretation of elements is determined by:

- i. *Syllabic position* (four options)
 - onset head
 - onset dependent
 - rhyme head
 - rhyme dependent
- ii. *Subgestural role* (three options)
 - primary subgesture (head)
 - secondary subgesture (d-dependent)
 - adjunct (s-dependent)

- Note: the interpretation for both onset and rhyme dependents are the same, except that the rhyme dependent interpretations are phonetically “weaker”.
- For example: all sonorant consonants are stronger (i.e. articulated with more stricture) in the onset (a C-constituent) than in the rhymes (a V-constituent).
- This is why I call a sonorant in onset dependent position a “sonorant consonant” and a rhyme dependent (coda) sonorant a “consonantal sonorant”.

d. The phonetic interpretation of the elements

MANNER

Syllabic position	V	V _C	C _V	C
C (onset head) OBSTRUENT	strident fricative	plain fricative	affricate (strident stop)	plain stop
C _V (onset dependent) SONORANT	approximant	rhotic	lateral	nasal
V (rhyme head) VOWEL	low vowel	low-mid vowel	high-mid vowel	high vowel
V _C (rhyme dependent) CONSONANT	approximant	rhotic	lateral	nasal
<i>Adjunct</i>	onset: pharyngealized	rhyme: ATR		onset: nasal rhyme: nasal

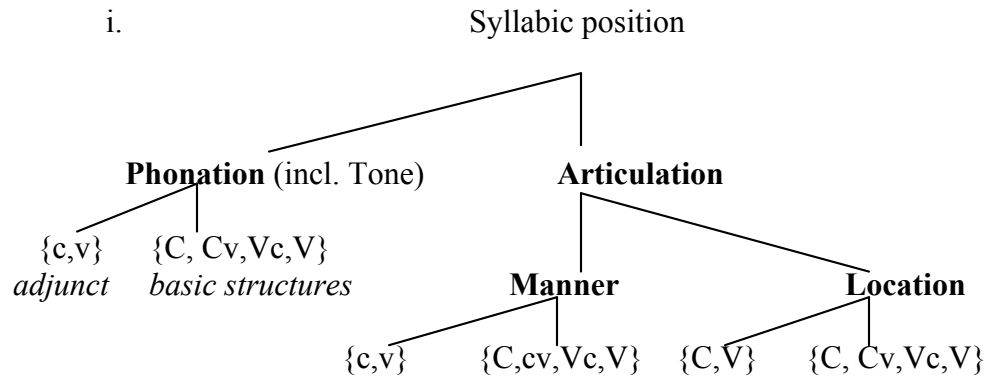
PHONATION

Syllabic position	L (V)	Lh (V _C)	Hl (C _V)	H (C)
C (onset head)	voiced	Creaky	Breathy	voiceless
V (rhyme head)	low tone	low mid tone	high mid tone	high tone
<i>Adjunct</i>	aspirated			glottalized

LOCATION

Syllabic position	U (V)	Ui (V _C)	Iu (C _V)	I (C)
C (onset head)	peripheral & labial, e.g. [p]	peripheral & coronal, e.g. [k]	coronal & peripheral, e.g. [ç]	coronal, e.g. [t]
V (rhyme head)	peripheral & round, e.g. [u]	peripheral & front, e.g. [ɨ]	front & peripheral e.g. [ɥ]	front, e.g. [i]
<i>Adjunct</i>	labialized			palatalized

e. RAA (“There are only two elements”)



ii. Cross-gestural equivalences

	Manner	Location	Phonation
C	C	I	L
V	V	U	H

f. The phonetic interpretation of elements is determined by (‘revised’):

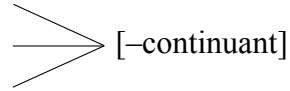
- i. *Syllabic position* (four options)
 - onset head
 - onset dependent
 - rhyme head
 - rhyme dependent
- ii. *Subgestural role* (three options)
 - primary division (head)
 - secondary division (d-dependent)
 - adjunct division (s-dependent)
- iii. *Gesture* (three options):
 - manner
 - location
 - phonation

g. Illustration: Interpretations of C

(“Traditional binary features are articulatory short hands for phonetic interpretation”)

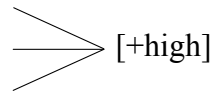
a. Syllabic position: onset head

b. Role: head

c. Gesture: head (**manner**)

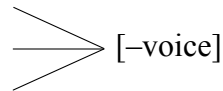
a. Syllabic position: rhyme head

b. Role: head

c. Gesture: head (**manner**)

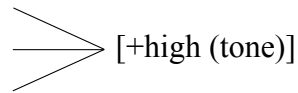
a. Syllabic position: onset head

b. Role: head

c. Gesture: head (**phonation**)

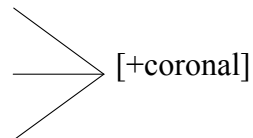
a. Syllabic position: rhyme head

b. Role: head

c. Gesture: head (**phonation**)

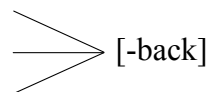
a. Syllabic position: onset head

b. Role: head

c. Gesture: head (**location**)

a. Syllabic position: rhyme head

b. Role: head

c. Gesture: head (**location**)

- In addition C has an interpretation as adjunct which is similar/the same for onset heads and rhyme heads:

Phonation: glottalized

Manner: nasalized

Location: palatalized

(4) The Syllable – Segment Connection: Preferences

a. The structure of non-branching onsets:



BIAS: C > V (in onset head position obstruents are preferred over sonorants).

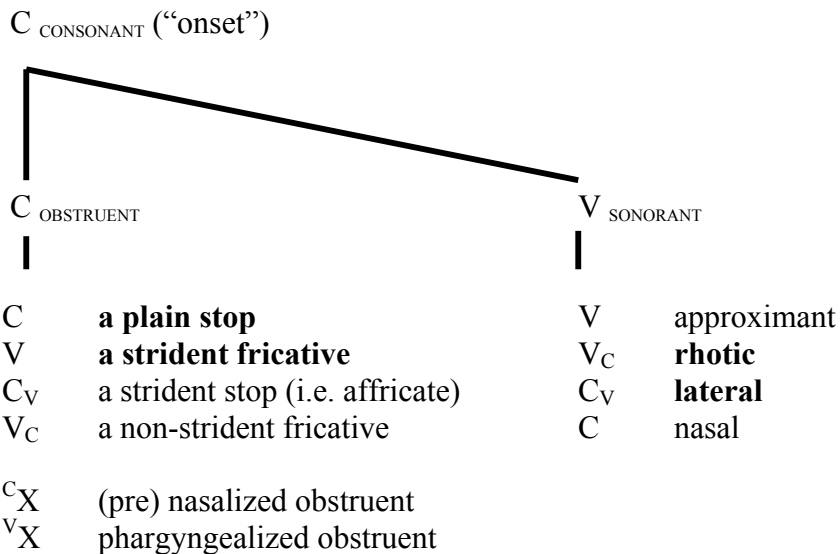
b. Within each of these two sets, simple (**enhanced**) structures are preferred over complex structures (ENHANCEMENT >> BIAS). Thus for head positions BIAS does not reach *into* the manner gesture. ENHANCEMENT creates perceptual distance, a force which we expect to affect head positions because head positions carry the contrastive load:

C	V	C _V	V _C
Stop	strident fricative	affricate	mellow fricative

C	V	C _V	V _C
Nasal	approximant	lateral	rhotic

(When two ‘paths’ are available *both* are followed, rather than one first and then the other. Hence stops and nasals will precede fricatives and approximants.)

c. Branching onsets



- In complex onsets, the head position tends to be a simple structure (C or V), but note that affricates *can* have onset dependents (German).
- As for the dependent position ENHANCEMENT plays no role here (or BIAS >> ENHANCEMENT) and we would expect the order of preference to be dictated by BIAS alone: $V > V_C > C_V > C$. Nasals indeed seem the least preferred, but are approximants preferred over liquids? Perhaps a *syntagmatic force* (the upcoming rhyme) militates against the approximant. Liquids, then, offer the perfect compromise.

d. The structure of non-branching rhymes:



“syllabic consonants”

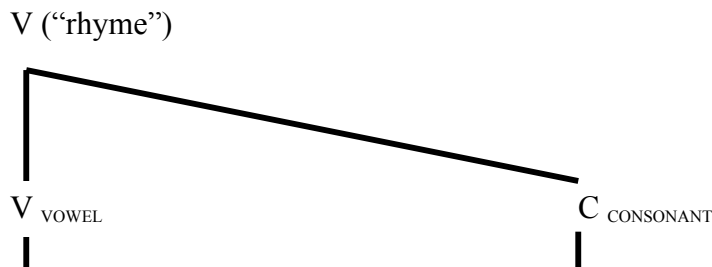
BIAS: $V > C$ (vowels are preferred over consonants)

b. Again, within each if these two sets simple (**enhanced**) structure are preferred over complex structures (ENHANCEMENT >> BIAS).

V	C	V_C	C_V
low vowel	high vowel	low-mid	high-mid

V	C	V_C	C_V
approximant	nasal	rhotic	lateral

c. Branching rhymes:



- | | | | |
|--------|---------------------|-------|----------------|
| V | a low vowel | C | nasal |
| C | a high vowel | C_V | lateral |
| V_C | a low-mid vowel | V_C | rhotic |
| C_V | a high-mid vowel | V | approximant |
| $^C X$ | nasalized vowel | | |
| $^V X$ | advanced vowel | | |

- In complex onset the head position tends to be a simple structure (C or V), but mid vowels can occur in closed syllables.
- But adjunct structures (nasalized and advanced vowels) are less likely in closed syllables.
- As for the dependent “coda” position ENHANCEMENT (or BIAS >> ENHANCEMENT) plays no role here and we would expect the order of preference to be dictated by BIAS alone: $C > C_V > V_C > V$. Nasals indeed seem the most preferred.
- The approximant coda option is a long vowel.
- The intrasyllabic syntagmatic force causes onsets following a coda to be obstruents, rather than also sonorants (‘Syllable Contact Law’).
- Note that codas can only be sonorants, not obstruents. **Alleged coda obstruents must be onsets.**
- Geminates: an empty coda position? Can dependent positions be empty?

(5) Phonological Licensing in RcvP

- a. Central Thesis of Government Phonology (van der Hulst 2006)
Marked syllabic structures require “phonological licensing”

(“A marked syllabic constituent [empty of branching] must be followed, and as such “licensed”, by an unmarked syllabic constituent”)

- b. Two types of licensing

- a. Homogeneous: between Rs or between Os
- b. Heterogeneous: between O and R or between R and O

- c. Emptiness (X_{\emptyset} = empty R or empty O; X_{\odot} = contentful R or O)

Empty rhyme

- (i) Homogeneous ($R_{\emptyset}R_{\odot}$): an empty rhyme must be followed by a contentful rhyme (= Proper Government)
- (ii) Heterogeneous ($R_{\emptyset}O_{\odot}$): an empty rhyme must be followed by a contentful onset (includes ‘Resolution’: $C\emptyset + \emptyset V = CV$)

Empty onset

- (iii) Homogeneous ($O_{\emptyset}O_{\odot}$): an empty onset must be followed by a contentful onset, i.e. no double hiatus (is questionable at best and perhaps only needed to exclude double occurrence of ghost consonant onsets)
- (iv) Heterogeneous ($O_{\emptyset}R_{\odot}$): an empty onset must followed by a contentful rhyme (i.e. a syllable must have content)

d. Branchingness

Branching rhyme

(i) Homogeneous ($R \wedge R_{\odot}$): a branching rhyme must be followed by a contentful rhyme: * VC . Cv (*parv**e**nir*)

(ii) Heterogeneous ($R \wedge O_{\odot}$): a branching rhyme must be followed by a contentful rhyme: * VC . $\{V, \#\}$ ('coda licensing')

Branching onset

(iii) Homogeneous ($O \wedge O_{\odot}$): a branching onset must be followed by a contentful onset: * $CC V$. cV (not empirically supported)

(iv) Heterogeneous ($O \wedge R_{\odot}$): a branching onset must be followed by a contentful rhyme: * $CC v$ (*libr**e**ment*)

e. Licensing between Os is not supported. Explanation: there is no onset projection level.

f. A marked rhyme (empty or branching) must be followed by an unmarked rhyme and an unmarked (or at least non-empty) onset:

A: $R_M O_{\odot} R_{\odot}$

g. A marked onset (empty or branching) must be followed by an unmarked rhyme:

B: $O_M R_{\odot}$

h. A and B are the basic laws of phonotactic organization, in addition to the law that phonological expressions are constituted by an alternation of onsets and rhyme which are maximally binary branching.

(6) Conclusions

This enterprise ("RCVP") maintains that it is worthwhile to express phonotactic regularities, i.e. regularities in phonological representations that are stored in memory. Furthermore, it explores the hypothesis that phonotactic wellformedness is based on limited (binary, headed) structural relations between two elements, C and V. The elements are not devoid of "phonetic content" in the sense that each structural occurrence of each element corresponds to certain phonetic properties which exist at the phonetic "utterance" level. Thirdly, whereas the syllabic constituents define constraints on the occurrence and combinations of segments, lateral licensing constraints on combinations of syllabic constituents prohibit local accumulations of marked constituents.

(7) Tentative Answers to the Questions in the Call for Papers

Do syllables exist?

Yes, twice. We have syllables at the level of memory representations (phonotactic phonology) and at the level of production/perception (utterance phonology). At the phonotactic level it might be argued that in addition to onsets and rhyme no further structure is necessary. As such a phonotactic syllable would not exist.

Are syllables derived? Is syllable structure lexically distinctive?

Syllable structure is part and parcel of lexical representations encoding major class distinctions. As such this structure is distinctive.

What is the internal structure of the syllable?

See (1) in this hand out which deals with the phonotactic syllable. Essentially, an onset – rhyme structure. Moras are simply rhyme positions. The utterance syllable could have a different, perhaps much flatter structure.

Are syllables hierarchically dominated by other prosodic categories?

Again, that depends on whether we talk about phonotactic or utterance syllables. Phonotactic rhymes may be organized into feet. Utterance syllables are organized into a metrical grid structure.

What principles guide the syllabification of a string of phonemes?

None, if syllable structure is part of the memory representations.

What aspects of syllables are referred to by morphological and phonological rules/constraints?

The primary role of phonotactic syllables is being part of the definition of the notion of phonotactic wellformedness.

How do phonetic syllables relate to phonological syllables (and vice versa)?

Phonetic syllables (here called utterance syllables) and phonological (here: phonotactic) syllables exist at different levels. Levels are not derivationally related; they represent different cognitive analyses of linguistic expressions. We can formulate systematic correspondence relations between the units at both levels.

What is the role of sonority for syllables?

At the phonotactic level “sonority” is the degree of V-ness (or the C-lessness).

References

Hulst, H. van der (2005). The molecular structure of phonological segments. In: P. Carr, J. Durand & C. Ewen (eds.). *Headhood, elements, specification and contrastivity*. Amsterdam: John Benjamins Publishing Company, 193-234.

Hulst, H. van der (2006). Licensing in phonology. *The Linguistic Review* 23/4, 383-428.