

The foot as a segmental domain

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Abstract & outline

The coda is widely cited as a prime neutralisation site, one which disfavours the appearance of marked feature specifications. Great play is often made of the claim that the coda subsumes two linearly defined contexts, preconsonantal and word-final. The paper focuses on another pair of contexts which conspire to condition segmental distributions — word-final and intervocalic.

Extending the coda-based account to this conjunction involves subverting core syllabification by allowing an intervocalic consonant to be captured by the first syllable. In fact there is a simpler available alternative, one which identifies the foot as the unitary context. The conclusion is that the foot, no less than the syllable, is capable of conditioning both segmental and metrical phenomena. One advantage the foot-centred approach enjoys over one based on the coda is that it allows us to unify prosodically sensitive vowel and consonant neutralisation.

- Packaging segmental information: syllables vs. feet
- The VCV/VC] context
- Coda-based account: coda capture
- Against coda capture
- Foot-based account

Packaging segmental information

1. Asymmetric packaging of segmental information
 - (a) Packaging of segmental information in units of various sizes, segmental and suprasegmental (syllable, foot, word).
 - (b) Asymmetries in the distribution of segmental information within suprasegmental units: distinctions maintained in certain positions are neutralised in others.

- (c) Segmental markedness: neutralisation typically favours the unmarked member of an opposition. E.g. voice contrast maintained in syllable onset but suspended in coda. E.g. Mid vowels supported in the head nucleus of a foot but barred from the weak nucleus.
2. Claims for the coda as a condition on segmental distribution
 - (a) The $_ \{C, \#\}$ chestnut. Unify under coda (Kahn 1976, Clements & Keyser 1983, James Harris 1983). Claimed as evidence that the coda is a favoured neutralisation site.
 - (b) Another conjoined set of contexts: VCV (specifically within a foot) and word-final C (VC]). Examples below. On one view, the coda is again the unifying context.
 3. Uniting VCV and VC]
 - (a) String-based: refer to segmental or boundary contexts. SPE, recent reactions against syllable-based accounts (Steriade 1997, Blevins 1999).
 - (b) Coda-based: both Cs are codas. Extension of (2a). Assumptions:
 - (i) VC] is a coda,
 - (ii) manoeuvre C in VCV into coda of first syllable (coda capture, maybe with ambisyllabicity).
 - (c) Foot-based: both Cs fall outside the foot head. The foot tail is a favoured neutralisation site. On one view, both Cs are onsets.
 4. The foot: metrical and segmental evidence
 - (a) Metrical: primary and secondary word stress; trochaic vs. iambic rhythm; foot binarity.
 - (b) Segmental: foot-domain rules (Kiparsky 1989, Nespor & Vogel 1986).

| | | |
|-----------------------------------|-----------------|-----------------------|
| (i) English: | YES | NO |
| Aspiration | time | shatter, night |
| <i>l</i> -devoicing | eye-slip | ice-lip |
| Diphthong shortening | ice-lip | eye-slip |
| Obligatory <i>n</i> -velarisation | ink | increase |
| Mutual <i>k-r</i> assimilation | crew | back-rub |

- (ii) Amoy Chinese gemination and stop devoicing (Yip 1980)
- (iii) Applecross Gaelic nasalisation (van der Hulst & Smith 1982)
- (iv) Žu'hōasi (Namibia) phonotactics (Smith 1986).
- (v) Dutch poetic rhyme (van der Hulst 1984)

5. Foot-internal asymmetries

- (a) Foot head: initial C_0V of foot (excluding any 'coda'). Foot tail: the residue.
- (b) Weight: exclusion of heavy syllables from tail.
- (c) Vowels: maximal systems in head nucleus; contracted systems in tail nucleus. In languages with vowel length, related to (b).
- (d) Consonants: head is a 'strong' or 'protected' position (Lass & Anderson 1975, Scheer & Ségéral 1999); tail is 'weak'. Maximal systems in head; neutralisation, lenition in tail.

| | |
|-------------|--------------|
| STRONG | WEAK |
| [CV | V <u>C</u> V |
| C. <u>C</u> | V <u>C</u>] |
| | <u>C</u> .C |

6. Main arguments

- (a) Clear evidence of at least some prosodic conditioning. For V_1CV_2 to pattern with VC],
 - (i) prosodic status of V_2 is irrelevant, but
 - (ii) V_1 must occur within the same foot as C.
 - (i) suggests right-hand context is string-based; (ii) potentially favours coda-based or foot-based accounts.
- (b) Independent motivation
 - (i) Ambisyllabicity and coda capture in general are primarily motivated on the basis of the very segmental phenomena they are supposed to explain.
 - (ii) In contrast, a foot-based account of segmental distributions invokes a prosodic entity for which there is clear independent metrical evidence.

(c) Vowel-consonant parallels

- (i) Coda capture forces an intrinsically paradoxical treatment of the relation between vowel and consonant neutralisation: a reduction-prone consonant is forced into the very syllable where vowels resist reduction.
- (ii) Foot-based account unifies vowel and consonant neutralisation: both occur in the foot tail.

7. The derivational side-show

- (a) The competition among the three approaches revolves around representational issues: (i) is the unitary site involved in VCV and VC] prosodically defined, and (ii), if so, is the site defined by the coda or the foot?
- (b) The derivational issue: by what mechanisms is the definition in (a) achieved? This is in principle quite independent of representational issue. All three accounts in (3) can be implemented in terms of input-oriented transformational rules or output-oriented constraints (e.g. conjoined positional and markedness constraints (Zoll 1998), or positional faithfulness constraints (Beckman 1997)).
- (c) Resyllabification can be achieved serially, by transforming initial representations. Or it can be simulated by constraint ranking: e.g. candidate V.CV parse bested by VC.V parse.
- (d) Most restrictive theory is one which eschews transformational resyllabification and constraint-derived deviation from core syllabification.
- (e) In output-oriented theory, the fundamental question here has to do with the nature of the constraints themselves or perhaps with the nature of the phonological generator. Are there constraints which favour deviation from core V.CV syllabification? Does the set of candidate forms for VCV inputs even include VC.V?

VCV/VC] examples
8. English defective *h*

- (a) **ve[h]ícular** **véhicle**
pro[h]íbit **pròhhibition**

| | | General English | Celtic fringe |
|--------------------|-------------------|-----------------|---------------|
| (b) C ^v | hip, ahead | <i>h</i> | <i>h</i> |
| C ^{v̥} | Doherty | Ø/ <i>k</i> | <i>h</i> |
| C] | lough | <i>k</i> | <i>h</i> |

9. English tapping and glottalling

| | | GLOTTALLING | TAPPING |
|---------------------|-----------------------|--------------|-----------------|
| (a) C ^v | time, boutique | Plosive | Plosive |
| (b) C] | get | Glottal stop | Unreleased stop |
| (c) C ^{v̥} | better | Glottal stop | Tap |
| (d) C]v̥ | get a | Glottal stop | Tap |
| (e) C]v̥ | get on | Glottal stop | Tap |

- (f) Coda-based account (e.g. Kahn 1976, Hoard 1971, Wells 1982, Gussenhoven 1986, Giegerich 1992): (i) coda capture within a foot (e.g. **pi.ty** → **pi.t.y**); (ii) a word-final coda is captured into a following unoccupied word-initial onset (e.g. **get. a** → **ge.t. a**); (iii) *t* taps when ambisyllabic.

10. English *aw*C

- (a) **aw*+labial, **aw*+dorsal
- (b) VC] **shout, loud, couch, mouse, browse, mouth (n.), mouth (v.), mount, mound, pounce, joust**
- (c) VCV **doughty, powder, tousle, mountain, scoundrel, council**

11. English pre-fortis clipping (Wells 1990)

- (a) VC] CLIPPED **seep, bake, face, slant, pulp**
 UNCLIPPED **bleed, slab, phase, band, bulb**
- (b) VCV CLIPPED **people, bacon, sofa, winter, hamper, filter**
 UNCLIPPED **feeble, wiggle, over, cinder, clamber**
- (c) V] [CV UNCLIPPED **sea port, day care, reselect**
 UNCLIPPED **sea board, ray gun, rezone**

12. Danish (South Fyn)

- (a) ‘Voice’ contrast maintained [CV
pil [p^h]il ‘arrow’ **bil** [p]il ‘car’
tale [t^h]ale ‘to speak’ **dale** [t]ale ‘valleys’
ko [k^h]o ‘cow’ **god** [k]od ‘good’
- (b) Contrast maintained v̥C^v
kopi ko[p^h]í ‘copy’ **bebude** be[p]úde ‘to foretell’
atom a[t^h]óm ‘atom’ **bedyre** be[t]ýre ‘to proclaim’
akut a[k^h]út ‘acute’ **igen** i[k]én ‘again’
- (c) Contrast neutralised in internal coda
faktor fa[kt]or ‘factor’ **fagter** fa[kt]er ‘gestures’
scepter sce[pt]er ‘sceptre’ **gabte** ga[pt]e ‘yawned’
- (d) Contrast neutralised VC]
lap la[p] ‘patch’
lab la[p] ‘paw’
sæt sæ[t] ‘set (imper.)’ **mad** ma[ð] ‘food’
læk læ[k] ‘leak (n.)’ **lag** la[y] ‘layer’
- (e) Contrast neutralised v̥C^{v̥}

Historical vocalisation

- peber** pe[w]er ‘pepper’
modig mo[ð]ig ‘brave’
koge ko[(w)]e ‘to cook’

Ambiently voiced stops

| | | | | | |
|---------------|---------|----------|--------------|--------|------------|
| næppe | næ[b]e | 'hardly' | ebbe | e[b]e | 'low tide' |
| frakke | fra[g]e | 'coat' | lægge | læ[g]e | 'to lay' |

Tapping

| | | | | | |
|--------------|--------|----------|--------------|---------|---------|
| sætte | sæ[r]e | 'to set' | brede | bre[r]e | 'width' |
|--------------|--------|----------|--------------|---------|---------|

- (f) Prosodic conditioning of tapping, cf. English

| | | |
|------|-------------------|--------------------|
| Stop | | Tap |
| Cv | tale, atom | Cṿ sætte |
| C | sæt | C]ṿ sæt og |
| C]C | sæt på | C]ṿ sæt op |

13. Ibibio (Lower Cross, Nigeria; Urua 1990) (accents mark tone)

- (a) Inflected verb stem circumscribed by heavy-light trochee: defines a prosodic maximum and, for some paradigms, a prosodic minimum (Akinlabi & Urua 1992).

- (b) Voice contrast maintained [CV

| | | | |
|------------|--------|-----------|---------|
| <i>kpá</i> | 'die' | <i>bá</i> | 'exist' |
| <i>tá</i> | 'chew' | <i>dá</i> | 'stand' |
| <i>ké</i> | 'at' | | |

- (c) Contrast neutralised in VC] and VCV

| | | | |
|-------------|-------------|--------------|-----------------------|
| <i>díp</i> | 'hide' | <i>díβé</i> | 'hide oneself' |
| <i>déép</i> | 'scratch' | <i>dééβé</i> | 'not scratching' |
| <i>bèt</i> | 'push' | <i>bèré</i> | 'push oneself' |
| <i>kóót</i> | 'read/call' | <i>kóóró</i> | 'not reading/calling' |
| <i>fák</i> | 'cover' | <i>fáyó</i> | 'cover oneself' |
| <i>fáák</i> | 'wedged' | <i>fááyá</i> | 'not wedged' |

- (d) Cross-word VC]V

| | | | |
|------------|--------|-----------------|-----------------|
| <i>kòp</i> | 'lock' | <i>kòβ úsáy</i> | 'lock the door' |
| <i>bèt</i> | 'push' | <i>bèr ówó</i> | 'push someone' |
| <i>kàk</i> | 'shut' | <i>kày úsáy</i> | 'shut the door' |

- (e) Geminate inalterability (cf. Hayes 1986): negative paradigm with fixed trochaic template

| | | | |
|---------------|------------|---------------|------------------|
| <i>díp-pé</i> | 'not hide' | <i>dóm-mó</i> | 'not bite' |
| <i>yét-té</i> | 'not wash' | <i>màn-ná</i> | 'not give birth' |
| <i>kòk-kó</i> | 'not spew' | <i>kòη-ηó</i> | 'not knock' |

- (f) Contrast maintained in VCV, where C is initial in root/foot

| | | |
|-------------------|-----------------|-------------------------|
| <i>ú-[táy]</i> | * <i>úráη</i> | 'plaiting' |
| <i>ú-[káp]</i> | * <i>úyáp</i> | 'covering' |
| <i>í-[bàt-tá]</i> | * <i>íβàttá</i> | '(s)he is not counting' |

- (g) In VCV, *k* of suffix *-ká* lenites within foot but not when extrapedal

| | | | |
|-------------------|------------------|-----------------|-------------|
| <i>[sée-yé]</i> | 'not look' | <i>[dád-yá]</i> | 'not stand' |
| <i>[dápá]-ké</i> | * <i>dáppáyé</i> | 'not dream' | |
| <i>[fááyá]-ké</i> | * <i>fááyáyé</i> | 'not argue' | |

14. Basaa (Narrow Bantu, Cameroon; Janssens 1986, Hyman 1990) (accents mark tone)

- (a) VC] unreleased stop

| | | | |
|------------|-------------------|---------------|---------------------|
| <i>hép</i> | 'to breathe' | <i>híβ-íl</i> | 'to breathe for/at' |
| <i>két</i> | 'to pick (fruit)' | <i>kér-êl</i> | 'to pick for/at' |
| <i>bók</i> | 'to break' | <i>búy-úl</i> | 'to break for/at' |

VCV vocalisation

- (b) VCV but initial in root/foot: no vocalisation

| | |
|---------------|----------|
| <i>li-pan</i> | 'forest' |
| <i>li-tám</i> | 'fruit' |
| <i>li-kuy</i> | 'owl' |

15. Confirmation of prosodic conditioning

| | | | |
|------|-------------------|-----------------|------------------|
| | English | Danish | Ibibio |
| Stop | bou[tíque] | a[tóm] | <i>ú[táy]</i> |
| Tap | [get] óff | [sæt] óp | <i>[bèr] ówó</i> |

Vowels in $\acute{v}C\check{v}$ feet

16. English vowels

- (a) Stressed: Long-short contrast (heavy vs. light foot head)
Full set of quality contrasts
- (b) Unstressed: $i \neq \partial$ ($\neq \partial^*$)

17. Romansch (Kamprath 1987)

| | | | | | | | |
|------------|----------|------------|---------------|----------|------------|----------|----------|
| Stressed | <i>i</i> | <i>e</i> | ε | <i>a</i> | ɔ | <i>o</i> | <i>u</i> |
| Unstressed | <i>i</i> | ∂ | | | <i>u</i> | | |

18. Neapolitan Italian (Bafile 1997)

| | | | | | | | |
|---------------|--------------|----------|---------------|------------|----------|----------|----------|
| Stressed | <i>i</i> | <i>e</i> | ε | ɔ | <i>o</i> | <i>u</i> | <i>a</i> |
| Unstressed | | | | | | | |
| Phrase-medial | i/∂ | | | <i>u</i> | | | <i>a</i> |
| Phrase-final | ∂ | | | | | | <i>a</i> |

Coda capture?

19. Against final codas

- (a) Syllabification of word-final consonants
- Western view: any consonant following the last vowel of a word belongs to a coda.
 - Eastern view: the last consonant of a word belongs to the onset of a 'dull' (vowelless) syllable.
- (b) Why the west was wrong (references and discussion in Harris & Gussmann 1998)
- VC typology shows internal codas to be independent of final Cs.

- Quantity: final C
 - does not force closed-rhyme shortness;
 - does not contribute to the weight of the preceding rhyme;
 - behaves either extra-metrically or catalectically.
- Phonotactics: final CC] clusters are phonotactically identical to either
 - internal coda-onset clusters or
 - branching onset clusters.

- (c) Conclusion: final C] behaves like an internal onset rather than an internal coda.

20. Coda capture

- Subversion of core V.CV syllabification by moving C into the first syllable, thereby violating onset maximisation.
- Crisp capture: captured C severs all connection with the onset (Hoard 1971, Selkirk 1982, Borowsky 1986).
- Ambisyllabicity (sloppy capture): captured C retains affiliation with the onset (Kahn 1976, Wells 1990, Borowsky 1986, Giegerich 1992).

21. Native-speaker judgments

- Claim: native-speaker preference for ambisyllabicity supposedly revealed in tasks requiring subjects to repeat, transpose, or insert pause-breaks between syllables in polysyllabic forms (Fallows 1981, Giegerich 1992, Rubach 1996, Hammond & Dupoux 1996). (However, some results show clear preference for the maximal-onset parse (Derwing 1992).)
- Contra: these judgments probably tell us more about phonological words than about syllables. Minimal phonological word in English: (bimoraic) foot (McCarthy & Prince 1986). The phonological word constitutes the minimal utterable domain in the production of English. If this constraint is allowed to carry over into syllabification experiments, it is likely to mean that the sound chunks offered by subjects are in fact words rather than syllables. Subject splits **pity** as *pɪt* and *ti*, because *pɪ* is not a possible word. Possible to produce individual tokens of the shape *pɪ* — but only by switching out of English mode, in which case it is not at all

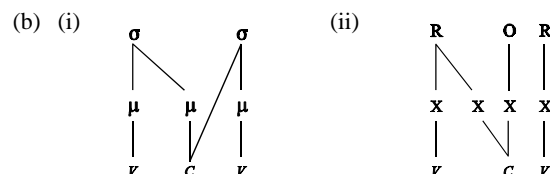
clear what the judgments reveal about English syllable structure.

22. Syllable edges in speech

- (a) Claim: ambisyllabicity accords with observation that syllable edges are not neatly delimited in speech (Treiman & Danis 1988).
- (b) Contra: the observation, while correct, is not unique to syllable structure. No phonological category — feature, segment, syllable — is consistently delineated sharply in speech. Observation provides no specific support for ambisyllabicity but accords more generally either (i) with a radically non-segmental view of phonology, in which all categories potentially overlap (cf. Local 1992, Coleman 1994), or (ii) with some clearly articulated theory of how categorical phonological information is mapped non-linearly and non-categorically onto the speech continuum.

23. Syllable weight

- (a) Claim: ambisyllabicity satisfies weight requirements. Coda capture typically only invoked when the syllable preceding the target consonant is stressed; necessary to guarantee that this syllable be heavy (Giegerich 1992). Stressed syllables containing a short vowel would remain light if not closed by the captured consonant.



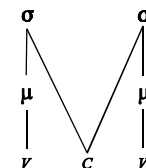
- (c) Contra: argument is self-serving unless there is some independent evidence of weight-to-stress in languages allegedly exploiting ambisyllabicity. One independent sign provided by geminates: intervocalic C contributing to the weight of the first syllable is of greater duration than one that doesn't (with stressed vowel being necessarily long before a non-geminate, as in Italian and Norwegian).

Type of representation in (b) coincides exactly with that usually proposed for geminates. Leads to prediction that no language will have a contrast between geminate and ambisyllabic consonants (Borowsky, Itô & Mester 1984). Demonstrably false: some languages have, in the same

context, both short intervocalic consonants that meet the definition of ambisyllabicity and authentic geminates.

- (d) Ibibio: single consonants lenite; geminates inalterable.
áà-fìùβè 'who sucks' *fìppé* 'remove from mouth'
áà-sìurè 'who blocks' *sìtté* 'unblock'
áà-fààyà 'who wedges' *fákká* 'remove wedge'

- (e) Salvage operation 1: allow geminates and ambisyllabic consonants to contrast within the same language by assuming that, while the former show 'weight by position' (Hayes 1989, as in (b)), the latter are non-moraic:



Contra: immediately undermines any weight-based argument for ambisyllabicity. Allows weight by position to be simultaneously switched on and off within the same grammar.

- (f) Salvage operation 2: in the absence of independent durational evidence, single intervocalic C could be syllabified as a 'covert' geminate. Contra: many of the specific regularities ambisyllabicity is called on to deal with involve lenition. Exactly the opposite of what we find with overt geminates, which display inalterability.

24. Allophony

- (a) Claim: ambisyllabicity defines a unique and necessary conditioning environment for phonetic realisation (Kahn 1976, Gussenhoven 1986, Wells 1990, Giegerich 1992,...).
- (b) Contra: stipulating that a captor syllable must be stressed amounts to saying that the VCV context forms a trochaic foot (explicitly formalised in these terms in some accounts, e.g. Borowsky 1986). Begs the question: why not characterise the relevant patterns of phonetic realisation by referring directly to the foot, without having to call on some intermediate mechanism of resyllabification? Unlike ambisyllabicity, the foot has impeccably independent credentials,

confirmed by the indispensable role it plays in stress and weight.

25. Extension to vowel asymmetries

- (a) Claims for coda capture: none I can think of.
- (b) Contra: coda capture forces an intrinsically paradoxical treatment of this general asymmetry; a reduction-prone consonant fetches up in the very syllable where vowels resist reduction.

Foot-based approach

26. Foot-based account of tapping

- (a) Kiparsky 1979: prevocalic *t* taps when not foot-initial (cf. Harris & Kaye 1990, Jensen 1993, Harris 1994).
- (b) Plosive: **[time], bou[ti]que**
 Unreleased stop: **[get] |, [get] Carl**
 Tap: **[letter], [get] ón**

27. General distributional asymmetries within the trochee

- (a) Contrastive potential unequally divided across different positions within the foot, to the advantage of the head.
- (b) Foot-centred approach directly captures the distributional parallels between nuclear and non-nuclear positions within the foot: vowel and consonant reduction occur within the tail.

28. Foot-internal structure

- (a) Final C is onset of null-vowelled syllable (eastern view, syllabic writing, Kaye, Lowenstamm & Vergnaud 1990)
- (b) Null-vowelled syllable is recessive member of a trochaic foot (Giegerich 1985, Burzio 1994, Harris 1997, Harris & Gussmann 1998, Rowicka 1998).

- (c) Foot-based unification of VCV and VC]: C in both cases is the onset of the recessive syllable of a trochee.

| | |
|-----------|-----------|
| (i) VCV | (ii) VC] |
| (* .) | (* .) |
| O N O N | O N O N |
| | |
| [x x x x] | [x x x x] |
| | |
| p t i | p t |

- (d) Potential consequence: no moraic-vs-syllabic parameter in foot binarity. FOOTBIN means all feet minimally contain two nuclear positions

29. Specific analyses

- (a) English defective *h*: *h* only licensed in foot head.
- (b) English pre-fortis clipping/pre-lenis drawing: duration of V is conditioned by co-pedal C.
- (c) English restriction on *awC* operates within foot.
- (d) Danish coronals

| | Foot head | Foot tail |
|---------------|-----------|-----------|
| Aspiration | ✓ | ✗ |
| Noise burst | ✓ | ✗ |
| Stop interval | ✓ | ✗ (_V) |

- (e) Ibibio C

| | Foot head | Foot tail |
|---------------|-----------|-----------|
| Prevoicing | ✓ | ✗ |
| Noise burst | ✓ | ✗ |
| Stop interval | ✓ | ✗ (_V) |

- (f) Basaa: in foot tail, (i) noise burst suppressed, (ii) stop interval suppressed prevocally.

- (g) Vowel neutralisation: subset of resonance categories that are licensed in foot head are not licensed in foot tail.

References

- Akinlabi, A. & E-A. E. Urua (1992). Prosodic target and vocalic specification in the Ibibio verb. In J. Mead (ed.) *WCCFL11: Proceedings of the 11th West Coast Conference on Formal Linguistics*, 1-14. Stanford, CA: CSLI.
- Bafile, L. (1997). L'innalzamento vocalico in napoletano: un caso di interazione fra fonologia e morfologia. In L. Agostiniani (ed.), *Atti del III Convegno Internazionale della Società Internazionale di Linguistica e Filologia Italiana*, 1-22. Napoli: Edizioni Scientifiche Italiane.
- Beckman, J. N. (1997). Positional faithfulness, positional neutralisation and Shona vowel harmony. *Phonology* 14. 1-46.
- Blevins, J. (1995). The syllable in phonological theory. In J. A. Goldsmith (ed.) *The Handbook of Phonological Theory*. Oxford, Blackwell. 206-244.
- Blevins, J. (1999). Understanding phonotactic constraints. Ms, University of Cambridge.
- Borowsky, T. J. (1986). *Topics in the lexical phonology of English*. PhD dissertation, University of Massachusetts. Distributed by Indiana University Club.
- Borowsky, T., J. Itô & R-A. Mester (1984). The formal representation of ambisyllabicity: evidence from Danish. *North Eastern Linguistics Society* 14. 34-48.
- Burzio, L. (1994). *Principles of English stress*. Cambridge: Cambridge University Press.
- Clements, G. N. & S. J. Keyser (1983). *CV phonology: a generative theory of the syllable*. Cambridge, MA: MIT Press.
- Coleman, J. (1994). Polysyllabic words in the YorkTalk synthesis system. In P. A. Keating, (ed.), *Papers in Laboratory Phonology III: Phonological structure and phonetic form*, 293-324. Cambridge: Cambridge University Press.
- Derwing, B. L. (1992). A 'pause-break' task for eliciting syllable boundary judgments from literate and illiterate speakers: preliminary results for five diverse languages. *Language and Speech* 35. 219-235.
- Fallows, D. (1981). Experimental evidence for English syllabification and syllable structure. *Journal of Linguistics* 17. 309-317.
- Giegerich, H. J. (1985). *Metrical phonology and phonological structure: German and English*. Cambridge: Cambridge University Press.
- Giegerich, H. J. (1992). *English phonology: an introduction*. Cambridge: Cambridge University Press.
- Gussenhoven, C. (1986). English plosive allophones and ambisyllabicity. *Gramma* 10. 119-41.
- Hammond, M. & E. Dupoux (1996). Psychophonology. In Durand & Laks 1996, vol. 1, 281-304.
- Harris, James (1983). *Syllable structure and stress in Spanish*. Cambridge, MA: MIT Press.
- Harris, John (1997). Licensing Inheritance: an integrated theory of neutralisation. *Phonology* 14. 315-370.
- Harris, John & E. Gussmann (1998). Final codas: why the west was wrong. In E. Cyran (ed.), *Structure and interpretation: studies in phonology*, 139-162. Lublin: Foliun.
- Harris, John (1994). *English sound structure*. Oxford: Blackwell.
- Harris, John & J. Kaye (1990). A tale of two cities: London glottalling and New York City tapping. *The Linguistic Review* 7. 251-274.
- Hayes, B. (1986). Inalterability in CV phonology. *Language* 62. 321-51.
- Hayes, B. (1989). Compensatory lengthening in moraic phonology. *Linguistic Inquiry* 20. 253-306.
- Hoard, J. (1971). Aspiration, tenseness, and syllabification in English. *Language* 47. 133-140.
- Hulst, H. van der (1984). *Syllable structure and stress in Dutch*. Dordrecht: Foris.
- Hulst, H. van der & N. Smith (1982). Prosodic domains and opaque segments in autosegmental

- phonology. In H van der Hulst & N. Smith (eds.), *The structure of phonological representations*, Part II, 311-336. Dordrecht: Foris.
- Hyman, L. M. (1990). Non-exhaustive syllabification: evidence from Nigeria and Cameroon. *CLS* 26. 2. 175-195.
- Hyman, L. M. (1998). Positional prominence and the 'positional trough' in Yaka. *Phonology* 15. 41-75.
- Janssens, B. (1986). Eléments de phonologie et de morphologie historique du basaa (Bantou A43a). *Africana Linguistica* 10. 147-211.
- Jensen, J. T. (1993). *English phonology*. Amsterdam: Benjamins.
- Kahn, D. (1976). *Syllable-based generalizations in English phonology*. PhD dissertation, MIT. Published 1980, New York: Garland.
- Kamprath, C. K. (1987). Suprasegmental structure in a Raeto-Romansch dialect: a case study in metrical and lexical phonology. PhD dissertation, University of Texas at Austin.
- Kaye, J., J. Lowenstamm & J-R. Vergnaud (1990). Constituent structure and government in phonology. *Phonology* 7. 193-231.
- Kiparsky, P. (1979). Metrical structure assignment is cyclic. *Linguistic Inquiry* 8. 421-42.
- Lass, R. & J. M. Anderson (1975). *Old English phonology*. Cambridge: Cambridge University Press.
- Local, J. K. (1992). Modelling assimilation in non-segmental rule-free synthesis. In G. J. Docherty & D. R. Ladd (eds.), *Papers in Laboratory Phonology II: Gesture, segment, prosody*. Cambridge: Cambridge University Press. 190-223.
- McCarthy, J. J. & A. S. Prince (1986). Prosodic morphology. Ms, University of Massachusetts.
- Nespor, M. & I. Vogel (1986). *Prosodic Phonology*. Dordrecht: Foris.
- Steriade, D. (1997). Phonetics in phonology: the case of laryngeal neutralization. Ms, UCLA.
- Rubach, J. (1996). Shortening and ambisyllabicity in English. *Phonology* 13. 197-237.
- Rowicka, G. (1999). *On ghost vowels*. HIL dissertations, Leiden. den Haag: HAG.
- Scheer, T. & P. Ségéral T. (1999). The coda mirror. Ms, Université de Nice & Université Paris 7.
- Selkirk, E. O. (1982). The syllable. In H. van der Hulst & N. Smith (eds), *The structure of phonological representations*, Part II, 337-84. Dordrecht: Foris.
- Smith, N. (1986). Evidence for the foot as a hierarchical unit in Žu'ǎhōasi. Ms, University of Amsterdam
- Treiman, R. & C. Danis (1988). Syllabification of intervocalic consonants. *Journal of Memory and Language* 27. 87-104.
- Urua, E-A. E. (1990). Aspects of Ibibio phonology and morphology. PhD dissertation, University of Ibadan.
- Wells, J. C. (1982). *Accents of English*. 3 vols. Cambridge: Cambridge University Press.
- Wells, J. C. (1990). Syllabification and allophony. In S. Ramsaran (ed.), *Studies in the pronunciation of English: a commemorative volume in honour of A. C. Gimson*. London: Routledge. 76-86.
- Yip, M. (1980). *The tonal phonology of Chinese*. PhD dissertation, MIT. Published 1990, New York: Garland.
- Zoll, C. (1998). Positional asymmetries and licensing. Rutgers Optimality Archive.