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A BETTER SOLUTION FOR EXTRASYLLABICITY THAN EXTRASYLLABICITY

(1) in a nutshell
   a. why is there extrasyllabicity in phonological theory? Two and only two reasons:
      1. reason 1: **enforced underparsing**, too many consonants at word edges, syllabification algorithms break down.
      2. reason 2: **deliberate underparsing** in case word-final consonants do not behave like Codas [interestingly, no parallel for word-initial consonants].
      [like many other traditional devices, extrasyllabicity has been recast in OT under a different label: misalignment (Prince & Smolensky 1993, chapter 4, McCarthy & Prince 1993). Misalignment is but another way of expressing the idea that a consonant is standing astray: in …$VC_1.C_2$], C_2 is extrasyllabic = misaligned because the syllable- and the word-boundary do not coincide. Everything that will be said about extrasyllabicity applies also to its OTed version]
   b. **overgeneration**: reason 1 sets up a mechanism that makes a wrong prediction: there could be sequences of any number of extrasyllabic consonants, i.e. #tplfkbrmkV… where #tplfkbrm is an extrasyllabic string. Needless to say, such a situation is not found in natural language. In actual fact, there does not seem to be cases where more than one consonant at a time is extrasyllabic.
   c. reason 2 is **theory-dependent**: what could a word-final consonant be if it is not a Coda? There is another candidate constituent that accommodates consonants: the Onset. However, classical syllabic theories based on Kahnian syllabification algorithms cannot conceive of word-final consonants as Onsets. Hence, they must stand astray by default. Government Phonology can imagine that word-final consonants are Onsets, it actually claims that ALL word-final consonants are Onsets.
   d. on the other hand, there are two reasons why there can be no extrasyllabicity in Government Phonology:
      1. strings are fully syllabified in the lexicon; there is no syllabification algorithm.
      2. resyllabification is outlawed, hence nothing can stand astray at some derivational stage and "later" be adjoined to some constituent.
   e. **undergeneration**: however, Standard Government Phonology (Kaye et al. 1990, Kaye 1990) has a serious problem of empirical coverage: it is unable to accommodate both situations, i.e. where word-final consonants show paired vs. impaired behaviour in regard of word-internal Codas. A wrong prediction is made to the effect that word-final consonants NEVER behave like word-internal Codas.
   f. **purpose of this talk**:
      Government Phonology is often criticised because of Final Empty Nuclei (FEN). FEN have come into being for reasons that are entirely independent of extrasyllabicity. Extrasyllabicity is telling us that edges are special. I show that FEN **are** the in-built peculiarity of the right edge: nothing needs to be added to the theory. FEN only need to be fertilised.
      If syllable-based processes are the result of contrasting **lateral relations** among segments, rather than of syllabic arborescence, the parameter "paired vs. impaired behaviour of word-final consonants" can be expressed as "FEN cannot vs. can license/ govern".
      At the same time, a prediction is made to the effect that there can be only one extrasyllabic consonant at a time.

1. HOW EXTRASYLLABICITY WORKS: PROCEDURAL MECHANICS

(2)　a.　strings are unsyllabified in the lexicon.
　　　b.　they are assigned syllable structure by a syllabification algorithm in the course of the derivation.
　　　c.　the algorithm underparses the string (either forced or deliberately) and leaves some consonants unsyllabified.
　　　d.　regular phonological rules apply.
　　　e.　somewhere at a later stage in the derivation, the stray consonants are reintegrated into the Prosodic Hierarchy by some Adjunction Rules. Common autosegmental background: no segment can have a phonetic existence if it is not attached to some constituent ("stray erasure").
　　　f.　there are various opinions on the precise object to which extrasyllabic consonants are adjoined: syllabic constituents (e.g. Hall 1992:122ss), the prosodic word, the phonological word (e.g. Rubach & Booij 1990, Rubach 1997), the foot etc.
　　　g.　development of the notion of extrasyllabicity since the late 70s
　　　　　1.　the notion of extrametricality is in phonology since Liberman & Prince (1977)
　　　　　2.　it was extended to syllabic analysis by Clements & Keyser (1983) on French floating consonants
　　　　　3.　extrasyllabic consonants
　　　　　　-　simply stand astray (e.g. Hall 1992, Wiese 1996)
　　　　　　-　are dominated by a constituent called "Appendix" (Halle & Vergnaud 1980, Kiparsky 1979)
　　　　　　-　are dominated by a constituent called "Termination" (Fudge 1969)

2. ENFORCED UNDERPARSING

(3)　situations that give rise to extrasyllabic interpretations I
　　　reason one at the left edge: enforced underparsing, too many consonants around[1]
　　　a.　word-initial #RT-sequences (T=any obstruent, R=any sonorant)
　　　　　example: Czech rty "lips", lhát "to lie", etc.
　　　b.　cross-linguistic situation
　　　　　IE languages on record: Slavic (massive), Greek (only #pt-, #kt-, #mn-)
　　　　　non-IE languages: Modern Occidental Arabic (e.g. Moroccan Arabic) and Berber
　　　　　Other languages with initial #RT-clusters exist, but their distribution over the globe and according to genetic kinship appears to be erratic, cf. Clements (1990).

(4)　situations that give rise to extrasyllabic interpretations II
　　　reason one at the right edge: enforced underparsing, too many consonants around
　　　a.　heavy word-final clusters
　　　　　example: English sixths, apt, German Herbst "autumn" etc.
　　　b.　cross-linguistic situation: common, BUT
　　　　　1.　a whole lot of these clusters are heteromorphemic, e.g. English:
　　　　　　　six-th-s [sɪks-θ-s], no such monomorphemic final (nor internal) clusters
　　　　　　　interpretation in Government Phonology: domain-final empty Nuclei, [[[sɪksø]θø]sø]
　　　　　2.　these clusters are restricted by some melodic property, e.g. German(ic), English: "supernumerary" consonants are always coronals.

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[1] There is another case argued for in the literature on Polish (Rubach & Booij 1990, Rubach 1997 etc.): so-called trapped consonants. Example: the [r] in trwać "to last", the [n] in czosnku "garlic GENsg". This is problematic since there is a broad consensus that extra-X (-syllabic, -metrical, -pedal etc.) objects can only occur at edges of the respective units: see e.g. Roca (1994:213), Spencer (1996:246).

3. DELIBERATE UNDERPARSING

(5)   situations that give rise to extrasyllabic interpretations I
      reason two: deliberate underparsing, word-final consonants do not behave like Codas
      a.   absence of Coda-effect on word-final consonants themselves:
           internal Codas react, but final Codas do not.
           example: l-vocalisation in French.
           compare with Brazilian Portuguese, where [ɫ] vocalises in both internal and final Codas.
      b.   absence of Coda-effect on the vowel preceding final consonants:
           vowels in internal closed syllables react, but they remain untouched in final closed syllables.
           example: Icelandic Closed Syllable Shortening.
           compare with Czech, where vowels shorten in both internal and final closed syllables.

Effects on Codas

(6)

Internal ≠ final Coda: French l-vocalisation (diachronic event)							
Onset						Coda	
#__		C__		V__V		__#		__C
lamina	lame	plaga	plaie	vela	voile	sal	sel	alba	aube
levare	lever	flore	fleur	mula	mule	mel	miel	talpa	taupe
luna	lune	*implire	emplir	dolore	douleur	caball(u)	cheval	sol(i)dare	souder
lepore	lièvre	fab(u)la	fable	valere	valoir	fil(u)	fil	poll(i)ce	pouce

(7)

Internal = final Coda: Brazilian Portuguese l-vocalisation								
V__V			V__#			V__C		
Bras.	Europ.		Bras.	Europ.		Bras.	Europ.	
sa[ɫ]eiro	sa[ɫ]eiro	salt cellar	sa[w]	sa[ɫ]	salt (noun)	sa[w]-gar	sa[ɫ]-gar	to salt
ca[ɫ]adu	ca[ɫ]adu	who is silent	ca[w]	ca[ɫ]	lime	ca[w]sa	ca[ɫ]sa	trousers
ma[ɫ]a	ma[ɫ]a	suitcase	ma[w]	ma[ɫ]	badly	ma[w]-vado	ma[ɫ]-vado	nasty
mu[ɫ]a	mu[ɫ]a	mule	su[w]	su[ɫ]	South	su[w]co	su[ɫ]co	furrow
vi[ɫ]a	vi[ɫ]a	town	vi[w]	vi[ɫ]	mean	fi[w]tro	fi[ɫ]tro	filter

Effects on the vowel preceding Codas

(8)   Internal ≠ final Coda
      Icelandic (Gussmann 2001): Closed Syllable Shortening only in internal closed syllables

long VV		short V	
a. CVVCV	b. CVVTRV	c. CVVRTV	
staara	nɛɛpʰja	kampʏr	stara "stare", nepja "bad weather", kambur "comb"
luuða	pɛɛtʰrɪ	haulvʏr	lúða "halibut", betri "better", hálfur "half"
fai:rɪ	aapʰril	haɾ̥ka	færi "opportunity", apríl "April", harka "severity"

(9)

long VV			short V	
a. CVV#	b. CVVT#	c. CVVTR#	d. CVRT#	
puu	θaakʰ	pʰʏʏkʰr	sa͡i̥lt	bú "estate", þak "roof", pukr "secretiveness", sælt "blessed neut."
tʰvɔɔ	hœi:s	sœœtʰr	pœlv	tvo "two, acc.masc.", haus "head", sötr "slumping", bölv "cursing"
fa͡i:	kʰvœœl	snʏʏpʰr	kʰʏmr	fæ "I get", kvöl "torment", snupr "rebuking", kumr "bleating"
	prjɛɛv			bréf "letter"

(10) Internal = final Coda
Closed Syllable Shortening in both internal and final closed syllables

		open syllable __CV	closed syllable __C.CV	__C#	
a.	Turkish	mer**aa**k-ɨ	merak-tan	merak	curiosity NOMsg, poss., NOMpl
b.	Czech	kr**aa**v-a	krav-ka	krav	cow NOMsg, diminutive NOMsg, GENpl
c.	Classical Arabic	ʔa-q**uu**l-u	ta-q**u**l-na	q**u**l	say 1sg, 2pl fem, imperative 2sg

4. EXTRASYLLABICITY IS NOT ONE: INITIAL AND FINAL EXTRASYLLABIC CONSONANTS SHOW CONTRASTIVE BEHAVIOUR

(11) Rubach & Booij (1990) show that word-final extrasyllabic consonants (due to enforced underparsing) and their word-initial peers do not behave alike
  a. 1. teatr [tɛatr] – teatry [tɛatrɨ], hence /-t/
        teatr wojenny [tɛadr vɔjɛnnɨ] "war theatre"
        voice-assimilation affects the /t/ across 1) a word-boundary and 2) a word-final extrasyllabic consonant
      But no such assimilation across word-initial extrasyllabic consonants:
    2. no devoicing
        pod mchem [pəd mxɛm] "under the nose"
        od mszy [od mʃɨ] "since the mass"
    3. no voicing
        brak rdzy [brak r͡dzɨ]
  b. 1. degemination = deletion of extrasyllabic consonants, i.e. the second part of a geminate is extrasyllabic in Coda-position
        flotylla [flɔtɨlla] "fleet NOMsg" - flotyll [flɔtɨl] "fleet GENpl"
        Sybilla [sɨbilla] "sibilla" - Sybilski [sɨbilski] "sibilla, adjective"
        hence: Sybil<l>-ski, flotyl<l>
    2. no initial degemination of extrasyllabic consonants
        ssać [ssa͡tɕ] "suck"
        na czczo [t͡tʃɔ] "on empty stomach"
        dżdżysty [d͡ʒd͡ʒɨstɨ] "rainy"
  c. two possible conclusions
    1. procedural: Rubach & Booij (1990)
        two different adjunction rules that apply at different derivational levels
        1. "Initial Adjunction" – early: before voice-assimilation and degemination
        2. "Housekeeping Adjunction" – late: after voice-assimilation and degemination

2. representational:

"extrasyllabic" consonants at both word edges are special, but they are special in two different ways. That is, the identity of the beginning of the word and of the end of the word is not the same. "Extrasyllabic" consonants do not form a homogeneous class.

Or, in other words, it is a mirage to believe that there are two phonologies, regular (=internal) vs. extrasyllabic. There are three phonologies: regular (=internal) vs. initial vs. final.

Phonological theory is called to find out about the identity of the two locations that produce special phonologies.
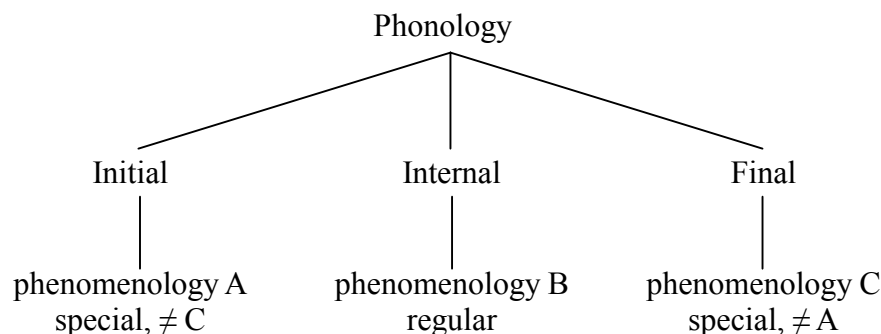
1. initial: the phonological identity of the beginning of the word "#" is an empty CV unit (Lowenstamm 1999).

2. final: all consonant-final words end in an empty Nucleus. It is the special properties of this final empty Nucleus that cause the special final phonology. More on final "extrasyllabicity" below.

d. the mirage of a uniform both-edge extrasyllabicity is a direct consequence of syllabification algorithms: the two phenomenologies at the left and the right edge share nothing but the fact that sometimes there are too many consonants around, which causes the breakdown of the algorithm. Nobody would have had the idea of equating the word-initial and the word-final situation if the world had not been looked at through the prism of syllabification algorithms. You only find what you are looking for: "le point de vue crée l'objet" [the point of view cerates the object] (Saussure 1915:23).

[this is a typical case of the worrisome SPE- and post-SPE heritage in OT (Hulst & Ritter 2000): OT itself is non-(and anti-) derivational, but it is loaded with derivational luggage. Here, the result of a derivational world-view, extrasyllabicity, continues its life in OT under another name. If the 80s had not produced extrasyllabicity but some non-derivational solution, the OT mechanism would not be misalignment, but some OTed version of the alternative]

```
                          Phonology
                 _____|_____
                /           |           \
           Initial      Internal       Final
              |             |             |
     phenomenology A  phenomenology B  phenomenology C
       special, ≠ C       regular       special, ≠ A
```

5. WHY IS THERE NO LANGUAGE WITH 7 OR 23 EXTRASYLLABIC CONSONANTS ?

(12) prediction made by extrasyllabicity

a. in case of enforced underparsing, the algorithm leaves astray all consonants that cannot be parsed.

b. in case of # rtV, [r] remains unparsed; in case of # rgtV, [rg] remain unparsed and so forth: there can be as many underparsed consonants as the lexicon submits, hence no restriction on their number.

c. in order to be phonetically interpreted, extrasyllabic consonants are adjoined to some constituent at a later derivational stage (reintegration into the Prosodic Hierarchy).

    d.   whatever the particular constituent chosen, it does not impose any restriction on the sonority slope or the number of consonants that it dominates.
==> there is no restriction on the number of extrasyllabic consonants.
[e.g. Hall (2000:248): sonority sequencing governs "deeper", but not phonetic representations]

    e.   sequences of three, five or eleven extrasyllabic consonants do not occur in natural language. For the left edge, it seems that the maximum number of extrasyllabic consonants is one.

    f.   it is a pervasive feature of all cases of extrasyllabicity, left- and right-edge alike, that there is only one extrasyllabic consonant at a time. Why should that be?

6. SUMMARY SO FAR

(13) we have seen that

    a.   reason one: for initial and final extrasyllabicity, "too many consonants around" probably reduces to "one supernumerary consonant around".

    b.   enforced underparsing (reason one) makes a wrong prediction: it allows for monster-sequences of extrasyllabic consonants.

    c.   deliberate underparsing (reason two) is theory-dependent: we are sure that word-final consonants in some languages do not belong to Codas. A theory that can conceive of them belonging to Onsets does not need to go down the extrasyllabic road at all.

7. AN ALTERNATIVE: LATERAL RELATIONS INSTEAD OF SYLLABIC ARBORESCENCE

(14) rigid syllabification

    a.   classical:
the "regular" syllabification of word-final consonants is as a **Coda** (syllabification algorithms do this job). Only exceptionally are they demoted to a floating status.

    b.   Standard Government Phonology (Kaye 1990):
the "regular" syllabification of word-final consonants is as an **Onset** (Coda Licensing).
- No solution for cases where they do not behave like Onsets (paired behaviour)
- attempts to discuss away all the Coda __{C,#} evidence of the 70s (e.g. Harris 1994:202, Gussmann & Harris 2002:21ss).
identity of word-internal Codas and word-final consonants

word-internal Coda   word-final consonant

```
    R         O                        R
    |\        |                        |
    N \       |                    O   N
    |  \      |                    |   |
    x   x     x                    x   x
    |   |     |                    |   |
    V   C     C                    C   ø  #
```

(15) CVCV can
    1. accommodate both patterns
    2. without appealing to extrasyllabicity
  a. What is CVCV ?
      goal: the lateralisation of structure and causality in phonology.
      [Lowenstamm 1996, Scheer 1999, in press, Szigetvári 1999]
  b. syllabic constituency boils down to a strict consecution of non-branching Onsets and non-branching Nuclei. Some basic phonological objects:

```
closed syllable      geminate      long vowel      [...C#]        "branching Onset"
O  N  O  N          O  N  O  N      O  N  O  N      ...O  N        O  N  O  N
|  |  |  |           \  /   |        |   \  /         |  |         |  |   |  |
C  V  R  ø            C     V        C      V         C  ø         T  ø   R  V
```

  c. instead of being translated into the familiar arborescence, syllabic generalisations are described by two lateral relations:
    1. Government (destructive)
    2. Licensing (supporting)
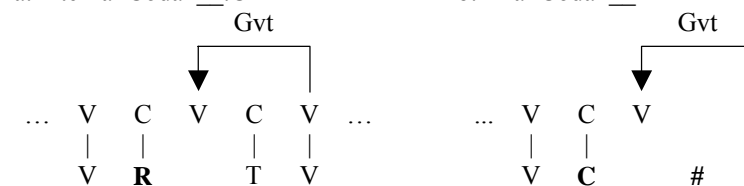   cf. Ségéral & Scheer (2001)   (R = any sonorant, T = any obstruent)
  d. **lateralisation of structure**:
    structure is exclusively defined in lateral terms.
    identity of the Coda: a consonant belongs to a Coda iff it occurs before a governed empty Nucleus.

```
a. internal Coda __.C                    b. final Coda __#
              Gvt                                     Gvt
       ┌──────┐                              ┌────────┐
       ▼      │                              ▼        │
 ... V  C  V  C  V ...              ... V  C  V
     |  |     |  |                      |  |
     V  R     T  V                      V  C        #
```
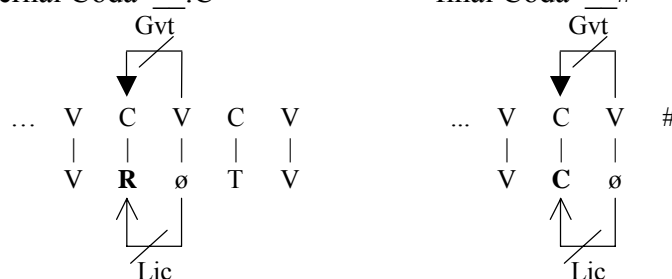
  e. **lateralisation of causality**: the reason for the existence of syllable-related processes are lateral relations.
    WHY are Codas weak? Because they are ungoverned and unlicensed, viz. the Coda Mirror (Ségéral & Scheer 2001).
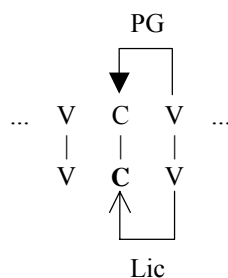
CODA: ungoverned and unlicensed

```
internal Coda __.C                    final Coda __#
        Gvt                                   Gvt
      ┌──┐                                  ┌──┐
      ▼  │                                  ▼  │
 ... V  C  V  C  V                  ... V  C  V  #
     |  |  |  |  |                      |  |  |
     V  R  ø  T  V                      V  C  ø
        ↑  │                               ↑  │
        └──┘                               └──┘
        Lic                                 Lic
```

ONSET: governed and licensed

```
        PG
      ┌──┐
      ▼  │
 ... V  C  V ...
     |  |  |
     V  C  V
        ↑  │
        └──┘
        Lic
```

(16)   expression of Codahood in CVCV
       ==> in CVCV Codahood depends on whether the consonant in question is licensed (and governed):
       C is licensed = it is an Onset
       C is not licensed = it is a Coda
       hence
       in languages with paired behaviour, Final Empty Nuclei **cannot** license (and govern)
       in languages with impaired behaviour, Final Empty Nuclei **can** license (and govern).
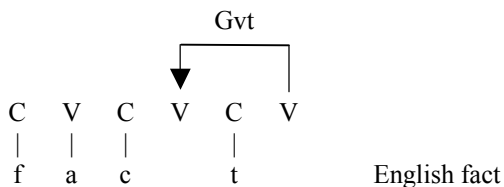
       [same for Coda-effects on preceding vowels].

(17)   reason one "too many Cs around" = Government
       reason two "C# does not behave like a Coda" = Licensing
       a.   reason one
            word-final TT clusters: FEN can govern
            since all empty Nuclei must be governed and only final, not internal empty Nuclei may be granted governing ability, it is predicted that there can be only one "extrasyllabic" consonant: otherwise there would be an orphan internal empty Nucleus.

```
                      Gvt
                  ┌────────┐
                  ▼        │
        C   V   C   V   C   V
        |   |   |       |
        f   a   c       t            English fact
```

       b.   reason two
            word-final consonants do not behave like Codas: FEN can license (and govern)

```
                    Gvt
                ┌────────┐
                ▼        │
        ...   V   C   V
              |   |   |
              V   C   ø   #
                  ∧───┘
                  Lic
```
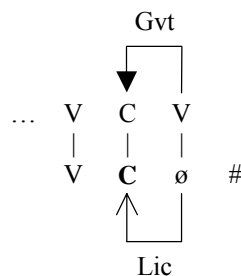
(18)   general comparison reason two: C# does not behave like a Coda

		CVCV: FEN can **license**	extrasyllabicity
Closed Syllable Shortening occurs	before both internal and final Codas	NO	OFF
	only before internal Codas	YES	ON
lenition occurs	in both internal and final Codas	NO	OFF
	only in internal Codas	YES	ON

(19)   general comparison reason one: too many consonants around

	CVCV: FEN can **govern**	extrasyllabicity
language with heavy TT# etc. clusters	YES	ON
language without heavy TT# etc. clusters	NO	OFF

(20)   conclusion
    a.   extrasyllabicity overgenerates monster-sequences of extrasyllabic consonants.
    b.   no word-final consonant needs to be extrasyllabic if theory can conceive of it as an Onset.
    c.   Standard Government Phonology can. But it cannot express the parameter regarding the paired vs. impaired behaviour of internal and final Codas.
    d.   CVCV can do both: doing away with extrasyllabicity and accommodating the two patterns. This is because of its very essence: the description of structure and causality by lateral, rather than by arboreal means.
    e.   we have seen how CVCV accounts for right-margin extrasyllabicity, and why there can be only one extrasyllabic consonant at the right edge. But what about word-initial extrasyllabic consonants? Can CVCV avoid monster-sequences of extrasyllabic consonants? Yes: CVCV actually predicts that there can be one word-initial extrasyllabic consonant at most. More on this another time… (Scheer in press).

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