At the right edge of words (again)

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SUMMARY

The paper tackles an important parametric variation in phonology, the one that distinguishes between those languages where word-final consonants count as codas and accordingly produce effects both on their own body and on preceding vowels, and those where they do not. Four implementations of this parameter are discussed: 1) traditional extrasyllabicity, 2) the parameterized distribution of empty nuclei in internal coda clusters as practised in Standard Government Phonology (SGP), 3) Glyne Piggott's parameterization of Coda Licensing, and 4) the variable lateral actorship of final empty nuclei (FEN) that is proposed in CVCV (or Strict CV). Problems with the SGP analysis are pointed out, and the alternative expression of the parameter in the environment of CVCV is discussed. This leads to a readjustment of the network of lateral relations that define syllable structure in CVCV, i.e. to a revision of the Coda Mirror.

RESUME

Cet article étudie une importante variation paramétrique en phonologie, celle qui distingue les langues où les consonnes finales de mot ont le statut de codas et donc produisent des effets qui sont visibles sur elles-mêmes autant que sur les voyelles à leur gauche d'une part, et les langues où les consonnes finales ne produisent pas d'effet coda. Quatre implémentations de ce paramètre sont discutées: 1) l'extrasyllabicité traditionnelle, 2) la distribution paramétrisée de noyaux vides dans les groupes consonantiques internes telle qu'elle est pratiquée en Phonologie de Gouvernement Standard, 3) la paramétrisation du Coda Licensing proposée par Glyne Piggott, et 4) la capacité variable des noyaux vides finaux de licencier qui est proposée en CVCV (ou CV Strict). Les difficultés de l'analyse en Phonologie de Gouvernement Standard sont indiquées, et l'expression alternative du paramètre dans l'environnement CVCV discutée. Cela conduit à la modification du système de relations latérales qui définissent la structure syllabique en CVCV : ainsi la version 2 de la Coda Miroir voir le jour.

1 INTRODUCTION

Natural language offers a binary choice regarding the syllabic identity of word-final consonants, which may or may not behave like their pre-consonantal peers. In case they show identical behaviour, the pattern at hand instantiates the well-known coda disjunction __{#,C}, and both consonants identify as codas on regular syllabic assumptions. If on the other hand word-final consonants do not produce the same effects as their pre-consonantal peers, they are usu-

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ally taken to be extrasyllabic. Interestingly, the opposite pattern, i.e. where a coda effect is observed on the final, but not on the internal item of the coda disjunction, does not appear to be on record.

Coda effects may concern the coda consonant itself, but also the preceding vowel, in which case they are usually called closed syllable effects. The vocalic side of the coin has exactly the same properties as its consonantal counterpart: either both vowels before pre-consonantal consonants and before word-final consonants react, or only the former do. The reverse pattern, i.e. where a closed syllable effect is visible only on vowels before word-final consonants, does not appear to exist.

Phonological theory is thus called to express this binary parametric choice, and whatever the parameter, it must be able to cover both consonantal and vocalic effects. On the pages below, I discuss four implementations of this parameter: 1) traditional extrasyllabicity, 2) the parameterized distribution of empty nuclei in internal coda clusters as practised in Standard Government Phonology (SGP), 3) Glyne Piggott's parameterization of Coda Licensing, and 4) the variable lateral actorship of final empty nuclei (FEN) that is proposed by CVCV (or Strict CV), a development of Standard GP. This is where the first part of the article ends (sections 1 to 7): it describes the way from traditional extrasyllabicity over Standard GP to parameterized lateral relations in CVCV and shows the advantages of the latter approach.[1]

The second half of the article (sections 8-12) evaluates the result (i.e. the parameterization of licensing abilities of FEN) on the backdrop of the complete environment of CVCV: government and the Coda Mirror are taken into account. A number of problems are pointed out: the free combinability of government and licensing produces overgeneration. Therefore the right edge is the motor for a revision of the Coda Mirror, whose v2 is developed in the remainder of the article.

2 TWOFOLD BEHAVIOUR OF WORD-FINAL CONSONANTS: ILLUSTRATION

The literature abounds in phenomena that illustrate the paired behaviour of final and internal codas: the coda context __{#,C} has played a prominent role in the rehabilitation of syllable structure in the 1970s.[2] On the other hand, the pattern where word-final consonants do not show the same effects as internal codas is discussed in the literature on extrasyllabicity, and also in GP. The latter has concentrated on the accumulation of cases which show that word-final consonants are not just non-codas (i.e. extrasyllabic), but in fact true onsets (more on this literature in section 4).

For the sake of illustration, below I have chosen two relatively common phonological processes: l-vocalization and closed syllable shortening (or open syllable lengthening, which amounts to the same thing). The former represents coda effects on the coda itself, while the latter makes preceding vowels react. Both processes occur in both flavours: they are either triggered by pre-consonantal and final consonants alike, or only by the former.

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1 This first part was originally an independent article written in 2003 for the Phonologica volume of the traditional 2002 Vienna conference, but unfortunately the volume was never published. Scheer (2004:§524) features an extended version of the original text. Sections 1-7 of the present article are a revised version of the book chapter which, on account of two anonymous reviews, in addition tackles the question what the actual Standard GP attitude is regarding consonantal effects of type B languages. The second half of the article (sections 8-12), where the inquiry on the right edge is continued from the viewpoint of CVCV, recapitulates an independent article that focuses on the Coda Mirror v2, and which is co-authored by Markéta Ziková (Scheer & Ziková 2010).

2 See the evidence for example in Ewen & Hulst (2001:123ff), Kaye (1989:70ff), Carr (1993:198ff), Roca (1994:134f), Lass (1984:250ff), Blevins (1995:209), Piggott (1991, 1999, 2003), Rice (2003).

2.1 TYPE A LANGUAGES: INTERNAL ≠ FINAL CODAS

In the history of French, Latin <l> has a different fate in internal and final codas. The modern French alternation illustrated by *cheval* [ʃəval] - *chevaux* [ʃəvo] 'horse sg, pl' represents traces of a process whereby <l> is vocalized. Note that while l-vocalization is inactive in modern French (cf. recent loans: *carnaval* - *carnavals* "carnaval", *chacal* - *chacals* "jackal" etc.), it was a synchronically active process in Old French (e.g. Anglade 1949:61f).

L-vocalization is a common process that occurs for example in (the history of) Polish, Brazilian Portuguese, (London) English or Serbo-Croatian. Some French evidence appears under (1) below where in each column, the Latin origin is followed by its French reflex (see e.g. Bourciez & Bourciez 1967:187ff).

(1) l-vocalization in French: word-final consonants do not react[3]

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	fab(u)la	fable	dolore	douleur	fil(u)	fil	poll(i)ce	pouce
lepore	lièvre	C.__		valere	valoir	cabal-l(u)	cheval	sol(i)dare	souder
		mer(u)lu	merle						

L-vocalization thus occurs only in pre-consonantal position. In all other instances, including word-finally, Latin <l> is faithfully restored as such in French.

The vocalic counterpart of this pattern is found for example in Icelandic, as reported by Gussmann (2002:157ff, 2006). Icelandic possesses eight vowels [i,ɪ,ʏ,ɛ,œ,u,ɔ,a] and five diphthongs [e͡i,a͡i,a͡u,o͡u,œ͡i]. Each of the monophthongs and diphthongs appears in its lengthened version under stress when certain syllabic conditions are met. This process is commonly called Tonic Lengthening, and illustration is provided under (2) below.

(2) Icelandic lengthening: vowels before final consonants do not react[4]

word-internal				word-final	
long VV			short V	long VV	
a. CVVCV	b. CVVTRV		c. CVVRTV	d. CVV#	e. CVVC#
staara	nɛɛpʰja		kampʏr	puu	θaakʰ
luuða	pɛɛtʰrɪ		haulvʏr	tʰvɔɔ	hœ͡i:s
fai:rɪ	aapʰril		haŗka	fa͡i:	kʰvœœl

As may be seen, vowels are lengthened if they are separated from the following vowel by a single consonant (2a) or by two consonants that qualify as a branching onset (2b). By

[3] Note that the lateral combines with the preceding consonant after syncope in case a good branching onset is produced (*fab(u)la* > *fable*), but ends up in post-coda position when the result does not allow for the constitution of a solidary cluster (*mer(u)lu* > *merle*). Glosses (of the French part): #__ 'blade, to lift, moon, rabbit'; C__ and C.__ 'wound, flower, fable, blackbird'; V__V 'sail, mule, pain, to be worth'; __# 'salt, honey, thread, horse'; __C 'dawn, mole, thumb, to weld'. Spelling in internal codas: Modern French <au> is [o] and represents the merger of former [aw], which is still visible in Occitan. Modern French <ou> is [u] and results from the merger of former [ow]. In all cases, thus, the modern (vocalized) representative of Latin <l> in spelling is <u>.

[4] "R" is shorthand for sonorants, "T" for obstruents, and "RT" refers to coda-onset sequences (hence subsumes RT, TT and RR). Glosses (left-to-right, up-down): '1) stare, bad weather, comb, estate, roof; 2) halibut, better, half, two, head; 3) opportunity, April, severity, I get, torment'.

contrast, no lengthening occurs in case the two intervening consonants have a falling sonority slope (2c). Word-finally, vowel length freely occurs in absolute word-final position (2d) and before word-final consonants (2e).

2.2 TYPE B LANGUAGES: INTERNAL = FINAL CODAS

L-vocalization in Brazilian Portuguese is the same as in French, except that it also goes into effect word-finally. It is a synchronic distributional fact (i.e. surface-true: there is no *[lC] or *[l#] in the language) as much as a diachronic process: Brazilian Portuguese has the same ancestor as European Portuguese, which has conserved the lateral in all positions.

(3) l-vocalization in Brazilian Portuguese: word-final consonants react[5]

a. V__V		b. V__#		c. V__C	
Braz.	Europ.	Braz.	Europ.	Braz.	Europ.
sa[ɬ]eiro	sa[ɬ]eiro	sa[w]	sa[ɬ]	sa[w]-gar	sa[ɬ]-gar
ca[ɬ]adu	ca[ɬ]adu	ca[w]	ca[ɬ]	ca[w]sa	ca[ɬ]sa
ma[ɬ]a	ma[ɬ]a	ma[w]	ma[ɬ]	ma[w]-vado	ma[ɬ]-vado
mu[ɬ]a	mu[ɬ]a	su[w]	su[ɬ]	su[w]co	su[ɬ]co
vi[ɬ]a	vi[ɬ]a	vi[w]	vi[ɬ]	fi[w]tro	fi[ɬ]tro

It may be seen that the lateral vocalizes in both pre-consonantal and word-final position (while intervocalic laterals do not react).

On the vocalic side, table (4) reports on three cases where short vowels are found both before pre-consonantal and word-final consonants (while long vowels appear in open syllables).

(4) Closed Syllable Shortening: vowels react before word-final consonants[6]

		open syllable	closed syllable	
		__CV	__R.TV	__C#
a.	Turkish	meraak-ɨ	merak-tan	merak
b.	Czech	kraav-a	krav-ka	krav
c.	Classical Arabic	ʔa-quul-u	ta-qul-na	qul

The patterns discussed afford the following conclusion: word-final consonants are a locus of variation, but pre-consonantal consonants are not. While the latter invariably produce coda effects, the former may or may not do so. In other words, no case appears to be on record (regarding either consonantal or vocalic effects) where word-final consonants do, but internal codas do not provoke a coda effect. The parameter at hand must thus somehow target the right margin of the word.

Another generalization that appears to hold true (but is not made explicit in the literature as far as I can see) concerns the solidarity of consonantal and vocalic effects. That is, if word-final consonants produce an effect on their own body, preceding vowels will also react, and vice-versa (Palestinian Arabic is a case in point, cf. Kenstowicz 1994:274ff). Cases where

[5] Glosses (left-to-right, up-down): '1) salt cellar, salt, to salt; 2) who is silent, lime, trousers; 3) suitcase, badly, nasty; 4) mule, South, furrow; 5) town, mean, filter'.

[6] Data from Kaye (1990) (Turkish), Scheer (2006) (Czech), Taki (1995) (Classical Arabic). Glosses (left-to-right, up-down): '1) curiosity Npl, id. possessive, id. Nsg; 2) cow Nsg, diminutive Nsg, Gpl; 3) say ipf act 1sg, id. ipf act 2pl fem, imperative 2sg masc'.

consonantal effects are observed without being paralleled by a reaction of the preceding vowel (if of course there is a relevant process in the language at hand) do not appear to exist.

3 TWO IMPLEMENTATIONS OF THE PARAMETER

3.1 EXTRASYLLABICITY

Since the reintroduction of syllable structure into generative theory in the late 1970s, the regular way of encoding the parameter at hand is extrasyllabicity.[7] No particular proviso is needed for type B languages: the syllabification algorithm will parse word-final consonants as regular codas; phonological rules that refer to codas and closed syllables then apply to both internal and final locations. In type A languages, however, word-final consonants are lexically marked as extrasyllabic, which leaves them unparsed by the syllabification algorithm. For example, Icelandic *θaak*^{h} will be /θa<k^{h}>/ (where the consonant in angled brackets is extrasyllabic). Phonological rules that make reference to codas and closed syllables then apply as before; they will have an effect word-internally, but not word-finally since at that derivational stage there are no word-final codas or closed syllables. Finally, extrasyllabic consonants are "reintegrated" into the Prosodic Hierarchy (since otherwise they would remain unpronounced).

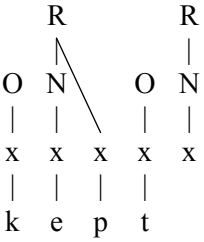
The extrasyllabic idea thus relies on the insight that word-final consonants are temporarily absent from syllable structure, and that syllable-sensitive rules apply precisely at this derivational stage.

3.2 STANDARD GP: TWO DISTINCT CAUSALITIES

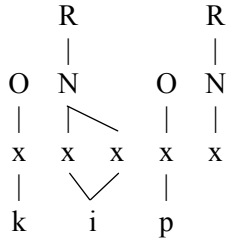
Standard Government Phonology has a different take. Kaye (1990) studies closed syllable shortening; he compares type A (English: *keep* vs. *kept*) and type B languages (Yawelmani, Turkish) and concludes that word-final consonants are onsets (of empty nuclei) *in all languages*. The onsethood of word-final consonants directly explains pattern A: vowels before word-final consonants will never react on closed syllable constraints because they are not followed by a coda. This shown under (5) below.

(5) analysis of type A languages in Standard GP (Kaye 1990)

a. shortening before internal coda clusters. Reason: ban on super-heavy rhymes. English *kept*



b. no shortening before C#. Reason: there is no super-heavy rhyme. English *keep*



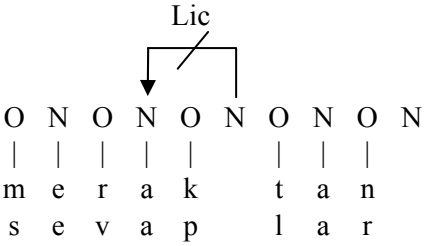
In type B languages, Kaye argues for an entirely different causality: what appears to be closed syllable shortening has in fact nothing to do with closed syllables. Rather, vowels before word-final consonants shorten (i.e. their nucleus cannot branch) because they fail to be

[7] E.g. Hall (1992:122ff), Rubach & Booij (1990). Scheer (2004:§339) provides an overview of extrasyllabicity in phonological theory.

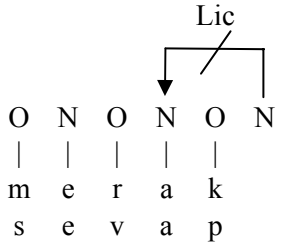
licensed by the final empty nucleus (FEN).[8] The same internuclear relation, then, is responsible for the shortening of vowels before internal clusters, which also enclose an empty nucleus.

(6) analysis of type B languages in Standard GP (Kaye 1990): Turkish

a. shortening before internal CCs



b. shortening before C#



Examples are from Turkish. Since in GP strings are fully syllabified in the lexicon, the root /merakø/ ends in a FEN. Computed as such under (6b), the FEN, being empty, fails to license the preceding nucleus, which therefore cannot branch: the result is a short vowel. Under (6a), the last root vowel is short no matter what the sonority slope of the following cluster: the typical interlude [kt] produces a short result as much as [pl], which looks like a good branching onset. This is the critical observation made by Kaye, which leads him to conclude that vowel length in Turkish has got nothing to do with syllable structure. What all clusters have in common is the presence of an empty nucleus in their midst. The existence of this empty nucleus under (6a) is also warranted by the fact that resyllabification does not exist in GP: a root-final consonant that is syllabified as an onset in the lexicon cannot become a coda during the derivation. Hence even when a suffix-initial liquid (as in *-lar*) is concatenated to a root-final stop, the result cannot be a branching onset even though the cluster satisfies relevant sonority requirements.

In sum, thus, GP denies the unity of what looks like one single process on the surface. That is, type A languages disallow long vowels before internal RT clusters because of the universal prohibition of superheavy rhymes: since the first member of the cluster is a true coda, the preceding nucleus cannot branch. We are thus in presence of a regular "vertical" causality, i.e. where the effect observed is a consequence of the *arboreal* status of a consonant.

By contrast, type B languages have a *lateral* causality: the reason why vowels are long or short is not the syllabic affiliation of any consonant. Rather, on the backdrop of a monotone sequence of onsets and nuclei without any coda (see (6)), the mechanism that controls vowel length is internuclear licensing: a nucleus may branch iff the following nucleus is contentful and hence able to dispense licensing. In presence of an empty nucleus to their right, vowels are thus short; this is the case before word-final consonants and also, at least in the Turkish example, before any kind of internal cluster.

A critical prediction made by this analysis is that all type B languages must follow the Turkish pattern irrespectively of the morphological status of their internal clusters, and of their sonority slope. That is, the only way for SGP to capture pattern B is to apply the lateral causality. This, in turn, means that all internal clusters that cause the shortness of the preceding vowel must be separated by an empty nucleus. This is so even in case they are tautomorphemic (unlike in the Turkish example), and even if they do not host a vowel-zero alternation (as in Yawelmani). The analysis may thus be viewed as a step towards CVCV in the sense that word-internal empty nuclei are introduced that never appear on the surface: as soon as a

[8] The internuclear relation at hand was left unnamed in Kaye (1990). Yoshida (1993) identifies it as government-licensing, and Kaye (1995:299f) agrees.

language is of type B (i.e. has word-final consonants that produce coda effects on the preceding vowel), all internal clusters enclose an empty nucleus.

This prediction in fact extends to all type B languages and includes consonantal effects, which are discussed in the following section.

4 PROBLEMS WITH EXTRASYLLABICITY AND GP-MULTICAUSALITY

4.1 THE EDGE IS SPECIAL BECAUSE IT IS THE EDGE

Both extrasyllabicity and Standard GP are exposed to the following objection: they do not recognize any extra-phonological responsibility. Or, in other words, they do not acknowledge any special status for the right edge of words (or morphemes). The solutions proposed are purely phonological: the question why variation is encountered at morpheme-margins, but not morpheme-internally (rather than the reverse), is not instructed. It is quite obvious, however, that this distribution is not accidental – and that the morpheme margin shows variation not because of any reason peculiar to phonology. Rather, morphological rule governs into phonological matters at morpheme edges. That there can be no morpho-syntactic intervention inside morphemes is clear from observation, and also constitutes a ground rule in generative theory.[9]

If the extra-phonological causality of right-edge variation is admitted, solutions such as extrasyllabicity and GP multicausality must be on the wrong track since they encode the parameter without any reference to extra-phonological forces. That is, both approaches would still work if the locus of variation were found to be morpheme-internal, rather than word-final (more on this in Scheer 2004:§378). This may also be seen from the fact that the restriction of extrasyllabic consonants to the (right) edge needs to be stipulated independently by the so-called Peripherality Condition (e.g. Clements 1990:290, Hayes 1995:57f): otherwise the wrong prediction is made that the mirror-A pattern could exist (i.e. where coda effects would be observed word-finally, but not word-internally).

4.2 SGP-CONSEQUENCES ON THE VOCALIC SIDE: MASSIVE ALLOMORPHY

In order to further evaluate the solution proposed by Standard GP, its consequences need to be made explicit. For one thing, items that show type A alternations cannot be derived from one another. The example discussed by Kaye (1990) is the pair *keep* [kiip] - *kept* [kɛpt]. Recall that type A alternations are due to a true coda effect: the vowel in *kept* cannot be long because it is followed by a coda consonant. By contrast, the vowel in *keep* may be long: it is followed by an onset. As a consequence, the stem-final consonant *-p* has two distinct syllabifications in *keep* (onset) and *kept* (coda). Given that resyllabification is prohibited in GP, both items cannot be derived from one another: they must represent two distinct lexical entries that are related by an allomorphic relation (of the type *go* - *went*). In the particular case of the pair *keep* - *kept*, this is indeed quite plausible a scenario: children have to learn irregular past tense forms by heart and may well regularize them in case they are not kept in memory by high token frequency (*drive* - *drived* etc.).

It is important to understand, though, that Standard GP enforces this allomorphic relationship for all type A alternations irrespectively of their morphological status. One has then to be prepared to accept that entirely regular alternations that involve inflection are the result

[9] Structuralism allowed for juncture phonemes inside morphemes (e.g. Z. Harris' 1951: 87f analysis of final devoicing in German: the identity of *Teil* "piece" is /d#eil/, and "final" devoicing then applies to /d/ before #). The historical development of morpho-syntactic intervention inside morphemes is described in Scheer (2011:§§65ff).

of allomorphy, rather than of phonological derivation. This is actually the case of Icelandic, as reported in great detail by Gussmann (2002:163ff; 2006:36ff): stem-final vowels must be onsets after long vowels as in *heim* [hei:m] "world Asg", ljúf [ljuuv] "dear, fem", but codas when following short vowels elsewhere in the same inflectional paradigm: *heim-s* [heims] "id., Gsg", *ljúf-ri* "id., Dsg".

Hence the Standard GP analysis of pattern A produces massive allomorphy even within inflectional paradigms. Put mildly, this may raise some suspicion.

4.3 SGP-CONSEQUENCES ON THE CONSONANTAL SIDE: TYPE A LANGUAGES

Let us now turn to consonantal effects of pattern A. In the Old French alternation *cheva[l]* - *cheva[w]-s* "horse sg, pl", the original lateral must belong to an onset in the former, but to a coda in the latter form: effects of pattern A are due to the codahood of pre-consonantal consonants. As before, thus, a close grammatical relationship, regarding number this time, must be declared allomorphic.

But on the consonantal side things are actually worse: cases are on record where a type A language shows the consonantal effect also on the first member of tautomorphemic clusters which enclose an empty nucleus that is established on the grounds of a vowel-zero alternation. This situation is predicted not to occur since coda effects due to empty nuclei are precisely the definition of pattern B: the SGP distribution of type A and type B languages is falsified.

Polish illustrates the pattern at hand (see Scheer 2004:§579): in this language the palatal nasal /ɲ/ implodes and surfaces as a nasal glide [j̃] in pre-consonantal position. This statement is surface-true (i.e. there are no *[ɲC] sequences at all).

(7) Polish: implosion of the palatal nasal in pre-consonantal position[10]

	_#		_C		_C#		_V		_øC	
a.	koń	kɔɲ	koń-ski	kɔj̃ski			koni-a	kɔɲa		
	drań	draɲ	drań-ski	draj̃ski			drani-a	draɲa		
b.			drań-stwo	draj̃stvɔ	drań-stw	draj̃stf				
			hań-ba	xaj̃ba	hań-b	xaj̃b				
c.			tańczyć	taj̃t͡ʃɨt͡ɕ	tańcz !	taj̃t͡ʃ	tan-iec	taɲɛt͡s	tań-c-a	taj̃t͡sa
			kończyć	kɔj̃t͡ʃɨt͡ɕ	kończ !	kɔj̃t͡ʃ	kon-iec	kɔɲɛt͡s	koń-c-a	kɔj̃t͡sa

That Polish is a type A language appears when the bare stem of nasal-final items such as *koń* "horse" is compared with forms that take vowel-initial and consonant-initial suffixes under (7a). The nasal remains undamaged in the former two cases, but implodes in the latter. (7b) shows that the nasal also implodes before word-final consonants. Finally, (7c) provides the critical evidence: following regular vowel-zero alternations that are found elsewhere in the language (as well as in other languages), the *-ie-* is present before a word-final consonant (*taniec*), but absent if that consonant is followed by an (inflectional) vowel (*tańc-a*). In GP, this necessarily means that the cluster in the latter form is separated by an empty nucleus; its first member is necessarily an onset: /taɲøc-a/.

[10] Words appear in spelling and are followed by IPA transcriptions. Glosses (left-to-right): "horse Nsg, of the horse (adj), horse Gsg, rogue Nsg, of the rogue (adj), rogue Gsg, meanness Nsg, id. Gpl, shame Nsg, id. Gpl, to dance (inf), dance (2sg imperative), dance Nsg, id. Gsg, to finish (inf), finish (2sg imperative), finish Nsg, id. Gsg".

This onset consonant, then, shows the coda effect at hand (implosion to a nasal glide) in /tąɲøc-a/. In type A languages (like Polish), however, on the SGP analysis coda effects are due to the codahood of pre-consonantal consonants. The Polish pattern is thus predicted not to exist. It ruins the alleged distinction between the true-coda- (pattern A) and the empty-nucleus causality (pattern B).

4.4 SGP-CONSEQUENCES ON THE CONSONANTAL SIDE: TYPE B LANGUAGES

The typological split proposed by SGP has also unwarranted consequences for type B languages. The effects in these, recall, have got nothing to do with the codahood of consonants; rather, they are due to the action of an empty nucleus. On the vocalic side, it is the inability of empty nuclei to dispense internuclear licensing that does not allow the preceding nucleus to branch; this is true word-finally (e.g. Turkish /merakø/) as well as word-internally (/merakø-tan/), and also applies to monomorphemic clusters: there are no long vowels before any kind of consonant sequence in Turkish (e.g. *orkinos* "tunny fish", *kudret* "power", i.e. /orøkinos/, /kudøret/). Even though there is no positive reason for a CøC analysis of monomorphemic clusters, the fact that long vowels never occur in this environment would have to be ascribed to a strange lexical accident on a branching onset analysis.

On the consonantal side, a prediction is made to the effect that all clusters in a type B language enclose an empty nucleus, irrespectively of their sonority slope and of whether they are mono- or heteromorphemic. For example, if the uniform cause of l-vocalization in Brazilian Portuguese, a type B language, is the presence of an empty nucleus to the right of the lateral, the bare stem *sa[w]* "salt" (European Port. *sa[ɫ]*) must have been /sałø/ when the lateral vocalized, *sa[w]-gar* "to salt" (European Port. *sa[ɫ]-gar*) was /sałø-garø/, but /ɫ/ must also have been followed by an empty nucleus when involved in monomorphemic clusters: *ca[w]sa* "trousers" (European Port. *ca[ɫ]sa*) must have been /całøsa/.[11]

In the SGP perspective, thus, the parameter that we are after separates languages into two distinct syllabic patterns: word-internal monomorphemic RT clusters are true coda-onset sequences in type A languages (their first member is the coda that causes the effects observed), while they are separated by an empty nucleus in type B languages (where this empty nucleus is responsible for the effects observed). In other words, the behaviour of word-final consonants decides on the syllabification of internal monomorphemic RT clusters: in case they behave like an onset (type A), internal RTs are true coda-onset clusters; if they pattern with codas (type B), internal RTs are fake clusters (separated by a nucleus).

Hence the syllabic identity of a cluster neither depends on its sonority slope nor on its own behaviour; rather, it is deduced "at distance" by the behaviour of word-final consonants. This result is certainly unwarranted. Given the lexical recording of syllable structure, nothing

[11] There is a tendency in SGP to reject diachronic evidence out of hand. The argument goes that we cannot control what has really happened between stage X and Y, hence this uncontrolled area may have contributed critical elements to the output, which then bias the analysis. It is to be observed, though, that SGP practitioners who reject diachronic data often do not observe the ban on diachrony themselves. For example, any kind of comparison between dialects should be forbidden since the only thing that unites them is a common ancestor. Also, the study of diachronic evidence over the past 150 years or so has shown that what is met in this area (objects and processes) is not really different from what is encountered in synchronic variation (see Scheer forth b). Not to mention the task of telling synchronic from diachronic processes. Be that as it may, a consequence of the ban on diachronic evidence, were it applied, is that monomorphemic clusters are lost for phonological analysis altogether (Harris 1994:165 is explicit on this). Since they are not subject to any alternation due to morphological activity, nothing but their eventual origin proves that something has happened to them: Braz. Port. *ca[w]sa* could just be /cawsa/, while *sa[w]* and *sa[w]-gar* could be /sałø/ and /sałø-gar/, respectively. The only synchronic process, then, would be the regular type B vocalization before empty nuclei. This is obviously not what happened diachronically, but that fact would be irrelevant.

in the theory prevents the two patterns that the type A - type B dichotomy excludes to exist: (some) word-internal monomorphemic RTs could well be separated by an empty nucleus in type A languages, and (some of them) could well be true coda-onset clusters in type B languages.

4.5 INSTEAD OF EXTENDING KAYE (1990) TO CONSONANTAL EFFECTS, SGP DENIES THE EXISTENCE OF PATTERN B

But anyway, discussing the position of SGP with respect to consonantal effects of the type A - type B parameter is rather pointless: the entire SGP literature since Kaye (1990) that is concerned with coda effects tries to show that word-final consonants are onsets because they behave as such. Examples are J. Harris (1994, 1997), Gussmann & Harris (1998, 2002) and Gussmann (2002). These authors have accumulated evidence for pattern A in order to entertain the idea that all word-final consonants in all languages are onsets. Rather than applying Kaye's (1990) multicausal view of the parameter to consonantal effects, the SGP literature has always tried to deny the existence of pattern B (or the phonological relevance thereof): either the evidence (which abounds in the literature and in textbooks) was simply ignored, or it was attempted to discuss away the data, or putative coda analyses were doomed misanalyses. The following quotation from Harris' (1994) textbook provides illustration.

> "Underlying particular analyses of lenition is a more general assumption that melodic restrictions on domain-final consonants closely match or duplicate those operating in domain-internal codas. If this were true, it would provide some support for the view that both contexts are codas. It certainly is the case that there can be distributional overlap between the two positions, which co-occur in many classic examples of lenition and defective distribution. However, this evidence cannot be considered sufficient to clinch the case for the coda assignment of final consonants. Even if we set aside the theoretical reasons we now have for rejecting this analysis, it is flatly contradicted by the substantial body of other empirical evidence reviewed in 2.2.4.
> In any case, the distributional relationship between internal codas and final consonants is by no means as close as is often supposed. The evidence discussed in 2.2.4 shows that, in this respect, the two contexts are in fact quite different in English. Moreover, some of the best-known examples from other languages which supposedly demonstrate the relationship turn out, under close inspection, to be rather less than convincing." (Harris 1994: 202)

Hence Harris denies the factual reality of pattern B, even though he admits some "distributional overlap".[12] He also adopts the black-or-white attitude that runs through the entire SGP literature: either final consonants are onsets, or they are codas, and there is no possible parametric variation across languages (see also Gussmann & Harris 1998:141, 2002:4ff). It is hard to see why the parametric option, which is admitted for exactly the same pattern on the vocalic side, is denied for consonantal effects. In fact, another property of the SGP literature on the onsethood of final consonants is that no parallel is ever drawn between the consonantal facts studied and the vocalic effects of the same pattern that were at the origin of the SGP venture regarding final consonants (i.e. Kaye 1990).

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[12] This notion is explained in his footnote 95: in Lardil (native Australian), both internal codas and word-final consonants are restricted to coronals; the former, however, admit only coronal sonorants, while coronal stops are also found in the latter. The denial of the existence of pattern B runs through the entire SGP literature; examples are Gussmann (2002:106), Gussmann & Harris (2002:21ff) and Harris (1997). In the latter article Harris writes: "Assumption (12a), that a word-final consonant occupies a coda, sits uneasily with the observation that this position systematically fails to display characteristics associated with codas which can uncontroversially be identified as occurring word-internally" (Harris 1997:324).

The consequences of applying Kaye's parameterization to consonantal effects have been examined above: they are not really enjoyable, to say the least, and in the case of the Polish pattern (consonantal effect before empty nuclei in a type A language), SGP's multicausal perspective is outright falsified.[13]

Beyond the empirical issue and the trouble mentioned, denying the factual existence of pattern B on the consonantal side is inconsistent with the simple observation that codas may produce effects on their own body as well as on preceding vowels. And hence that a unified treatment is in order.

5 AT PIGGOTT'S RIGHT EDGE: GEAR DOWN JONATHAN, CODA LICENSING IS PARAMETERIZED

One year after the publication of Kaye's Coda Licensing, Glyne Piggott (1991:313ff) proposes an alternative way to express the variation that is found at the right edge of words. His solution is couched in the conceptual environment of SGP, but at the expense of abandoning the universal validity of Kaye's Coda Licensing, i.e. of the idea that word-final consonants are onsets of empty nuclei *in all languages*. Piggott accepts the existence of final empty nuclei, but shows empirically that type B languages cannot be discussed away or declared phonologically irrelevant.

Piggott (1991:315) points out that Coda Licensing makes the prediction that "there could not be a language in which a co-occurrence restriction between a nucleus and a coda also holds between a word-final consonant and an immediately preceding vowel". Unfortunately, this distributional situation exists, and Piggott provides relevant illustration.

Piggott's (1991) conclusion is that Coda Licensing is a valid constraint on syllable structure, but rules only over some languages. That is, he demotes Coda Licensing from a universal condition on syllable structure to a language-specific parameter. Coda Licensing is thus switched on in type A languages, while it is inactive in type B languages, where word-final consonants are true codas. This is shown under (8) below.

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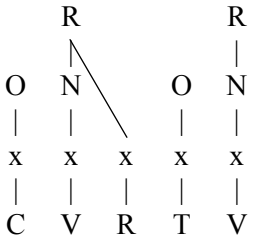
[13] Two anonymous reviewers mention another way out for GP when it comes to the reduction of the coda context __{#,C} to a non-disjunctive statement. Reference could be made to "positions that are not directly licensed by a filled nucleus". Rather than a positive identity ("things happen in positions that have property X"), this is a negative solution: "things happen in positions that do not have property X". For one thing, negative statements are unwarranted and artificial when phonological processes make positive reference to the environment at hand: this is massively the case for the coda context. Also, following the same logic, the disjunctive character of the coda context in a linear SPE environment could as well be discussed away: items concerned are "consonants that are not followed by a vowel" (with a proviso regarding the sonority slope of CC clusters, which is needed anyway for the formulation of the basic __{#,C}). If negative and positive statements are equivalent, the history of phonology will have to be rewritten: the argument in favor of autosegmental structure that builds on the coda disjunction would turn out to be vacuous. This perspective cannot be seriously entertained; only a positive description of disjunctions captures the fact that the positions at hand are phonologically active (see Scheer 2004:§556).

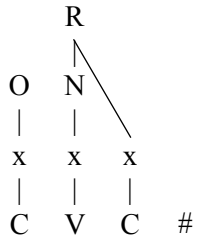
(8) type A vs. type B languages according to Piggott

a. internal situation, both type A and type B



b. final situation, type A language

c. final situation, type B language



A couple of years later, Piggott (1999) reiterates the same argument and solution in a TLR paper, and his contribution to Jonathan Kaye's Festschrift (Piggott 2003) is about the same thing, this time illustrated by data from Selayarese (Austronesian, Indonesia). In the same Festschrift, Rice (2003) joins his view in a finely argued article on the contrasting behaviour of word-final consonants in Ahtna (Athapaskan, Alaska).

Making Coda Licensing a parameter indeed gets all data right: it may be considered a version of extrasyllabicity, except that word-final consonants that do not behave like codas are onsets, rather than extrasyllabic (i.e. floating until they are reintegrated into prosodic structure). Abandoning the claim that all morphemes end in a nucleus, however, has a number of consequences that undo basic principles of Government Phonology: the existence of coda-final morphemes entails the return of resyllabification, which is outlawed in GP: in case a vowel-initial suffix is added, the resulting CVC-V sequence will normally behave as two open syllables where the stem-final consonant is the onset of the suffixal vowel.

The question is thus whether under the empirical pressure mentioned Government Phonology needs to abandon its two founding statements regarding syllable structure, i.e. the ban on word-final codas and on resyllabification. Going this way would also mean to undo an important part of its basic research programme which contends that syllable-based generalizations should be expressed by *lateral* (Coda Licensing, licensing of long vowels by a following vowel), rather than by arboreal structure (more on this below). Reintroducing word-final codas would be a serious setback on the way towards the lateralisation of structure and causality.

It is shown below that there is yet another way of having the cake and eating it: we do not need to step back from the lateralisation of structure and causality, but on the contrary should to go down all the way. That is, the key to the right edge problem is deforestation, i.e. the elimination of the arboreal structure that remains in SGP. It is shown below how this move offers a natural way of introducing the relevant parameter on word-final consonants without turning back the wheel: arboreal structure cannot be parameterized, but lateral relations can. In sum, the purpose of the pages below may be defined as follows:

- yes, pattern B exists and is phonologically real
- yes, pattern A-B variation needs to be encoded by a parameter
- no, this does not mean that the universality of final empty nuclei needs to be abandoned.

6 LATERALIZATION OF STRUCTURE AND CAUSALITY

Scheer (2004:§166, also Scheer 2011:§42) argues that the core contribution of Government Phonology to phonological theory is the lateralization of structure and causality: (syllable)

structure and causes of phonological processes are understood in terms of lateral, rather than vertical (arboreal) relations.

The introduction of empty nuclei in Standard Government Phonology has lateralized structure: preceding consonants were considered codas before (e.g. *-t* in *sit*), but now are onsets (*si.tø*), to the effect that the rhyme does not branch anymore. Also, closed syllable shortening in type B languages, which is due to a branching rhyme on the traditional analysis, becomes a lateral phenomenon in GP: rather than the presence of a coda, it is the inability of a following empty nucleus to establish an internuclear licensing relation that causes shortening of the preceding vowel.

When looking back at the coda phenomena discussed, it appears that three out of four patterns have already been lateralized in Standard GP (regarding both structure and causality): in type B languages, both internal pre-consonantal and final consonants have a lateral identity (they are followed by an empty nucleus), and their (consonantal or vocalic) effect is due to a lateral relation that the following empty nucleus cannot dispense. In type A languages, word-final consonants have a lateral identity (they occur before an empty nucleus), while internal pre-consonantal consonants conserve an arboreal definition (they are true codas). Also, the (consonantal or vocalic) effects associated have a vertical causality: something (does not) happen(s) because of the codahood of a consonant.

Government Phonology has thus introduced the lateral idea into phonological theory. Its application, however, has only concerned selected pieces of syllable structure, and the causality of some phenomena. That is, the first implementation of the lateral perspective has produced a *hybrid* model, Standard Government Phonology, where more or less important vertical residues were conserved. The kind of trouble that is encountered when vertical and lateral philosophies cohabitate in the same grammar is discussed in Scheer (2004:§165). The most harmful consequence is certainly the one that Takahashi (1993) has pointed out as early as in 1993: if, as proposed in hybrid SGP, arboreal constituent structure is a consequence of lateral relations among segments, it merely restates these lateral relations and therefore is entirely redundant. Having arboreal and lateral structure cohabitate is making the same generalizations twice.

CVCV (or Strict CV) is a development of Government Phonology that completes the lateral programme which was initiated by Kaye, Lowenstamm, & Vergnaud (1990): constituent structure boils down to a sequence of strictly alternating non-branching onsets and non-branching nuclei, and the only causality of phonological processes are the lateral forces government and licensing. CVCV was introduced by Lowenstamm (1996) and is currently entertained in a number of brands.[14]

In the following section it is shown how a fully lateral perspective where no arboreal residue is left in either structure or causality is able to do away with the shortcomings that the hybrid Standard GP solution suffers from.

7 LICENSING ABILITY OF FEN PARAMETERIZED

On the Standard GP analysis, word-final consonants in all languages as well as the first member of RT clusters in type B languages are onsets of empty nuclei. Only the R of monomorphemic RT clusters in type A languages is a true coda.[15] Suppose that, following CVCV, an

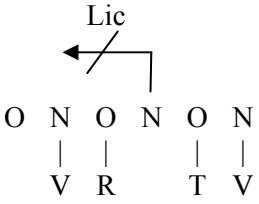
[14] Work in CVCV includes Cyran (2010), Rowicka (1999), Szigetvári (2001, 2007), Polgárdi (2003), Scheer (2004), Ségéral & Scheer (2001, 2008), Szigetvári & Scheer (2005).

[15] To be precise, except the first member of *tl*, *dl* (*atølas*), *ks* (*tekøst*) and non-homorganic NC clusters (*seemød* [siimd]).

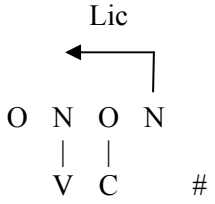
empty nucleus also separates RT clusters in type A languages. This is depicted under (9) below.

(9) type A vs. type B languages in CVCV

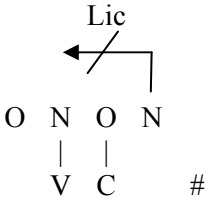
a. word-internal situation (type A and B)



b. word-final situation (type A)



c. word-final situation (type B)



Let us first note that the coda disjunction __{#,C} has a non-disjunctive identity: consonants in this position occur before an empty nucleus.[16] Internal empty nuclei enclosed by RT clusters are always governed by the following vowel (a relation not indicated under 8a). Following GP standards, governed nuclei are unable to dispense lateral relations. The empty nucleus under (8a) is thus unable to license (and also to govern), as indicated.

The relevant lateral force for coda phenomena is licensing: the Coda Mirror (which is introduced at greater length in the following section) has disentangled government and licensing, which were confused in Standard GP where for example government was a form of licensing (Scheer 2004:§136 provides further discussion). In CVCV, lateral forces are defined according to their effect: government inhibits the segmental expression of its target, while licensing backs it up. Hence segments that fail to be licensed are weak and potential candidates for lenition. By contrast, licensed segments are supported and therefore shielded against lenition.

As a consequence, neither vowels preceding RT clusters nor the first members of these clusters will be licensed in any language: the nucleus to their right is empty and governed (as under 8a).[17] Word-final consonants are not weak in type A languages (they escape coda effects), and long vowels occur to their left. This indicates that they receive licensing. By contrast in type B languages, long vowels before word-final consonants react just like long vowels before internal codas, which means that they fail to be licensed. The parameter that we are after in this article thus concerns the ability of FEN to license.

(10) CVCV: parameter distinguishing between type A and type B languages
   a. type A (internal, but no final reaction): FEN are able to license (9a)
   b. type B (both internal and final reaction): FEN are unable to license (9b)

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[16] If TR clusters, i.e. classical branching onsets, also enclose an empty nucleus (i.e. identify as /TøR/), the definition needs to be refined: it is argued in Scheer (1999, 2004:§14) that empty nuclei in TøR clusters are silenced not because they are governed, but because of a lateral relation contracted by the flanking consonants (Infrasegmental Government). In this environment, then, coda consonants occur before a *governed* empty nucleus. Another option is to consider TR clusters monopositional, i.e. a kind of affricate. This position is held by Lowenstamm (2003) for all languages with concatenative morphology (i.e. which are not of the Semitic kind). Ségéral & Scheer (2005) argue for a possible affricate status on a case-by-case basis: at least some TR clusters (e.g. in French) behave as anything but single consonants and therefore must be bi-positional.

[17] As in Standard GP, TR clusters may of course be analyzed as non-solidary /TøR/ if there is good reason to do so (as in Semitic for example, or in Turkish heteromorphemic TR clusters for that matter). Also, the precise representation of long vowels in CVCV is not relevant for the present discussion (Scheer 2004:§220 provides discussion). It is enough to understand that just as in Standard GP, vowels can only be long if they are licensed.

Encoding the parametric variation displayed by type A and B languages in terms of the ability of FEN to license does not suffer from the problems mentioned in section 4. Vocalic and consonantal coda effects are monocausal: segmental reaction is due to the absence of licensing. Also, extensive allomorphy is not needed, and the Polish pattern whereby a consonantal coda effect occurs before an empty nucleus in a type A language is now harmless: coda effects are due to the inability of following empty nuclei to license in all languages, type A and B alike.

Making FEN the vector of the parametric choice also promotes the genuine idea of Government Phonology, which was only half-heartedly applied in Standard GP: the parametric variation at hand is now a matter of a lateral relation, rather than of contrasting syllabification. This way of looking at parameters was introduced by Kaye (1990) (parametric licensing of FEN) and further developed by Charette (1991, 1992, 2003), Harris (1994), Scheer (1998, 2004:§426) Cyran (2010) and Rizzolo (2002).

The solution proposed also responds to two requests that have been worked out earlier in the article: on the one hand, consonantal and vocalic coda effects should have the same causality and parameterization; on the other, the fact that the locus of variation is found at the edge of the word (rather than in internal position) is not fortuitous: as will be explained in section 12 below, this is due to the fact that lateral relations are right-headed, and hence the rightmost item of a linear chain is the first to be computed (FEN are phase-initial).

In order to see in which way this approach to the right edge relates to the general environment of CVCV, and also which kind of unwarranted effects it produces, the following section briefly recapitulates the key ideas of the Coda Mirror.

8 THE CODA MIRROR

The central idea of the Coda Mirror (Ségéral & Scheer 2001, 2005, 2008, Szigetvári 2008) is that positional strength of consonants depends on the distribution of empty nuclei. The five relevant positions cluster into two disjunctions, the coda __{#,C} and its mirror, the Strong Position {#,C}__, plus the intervocalic position V__V. As may be seen under (11) below, the two disjunctions are reduced so that consonants in coda position occur *before* empty nuclei (ø), while consonants in the Strong Position (i.e. in the Coda Mirror) are found *after* empty nuclei (and intervocalic consonants are not adjacent to any empty nucleus).

(11) the five positions and their interpretation in the Coda Mirror

	position	usual name			
a.	#__V	word-initial	Strong Position	ø__	
b.	VC.__V	post-coda			
c.	V__.CV	internal coda	coda	__ø	weak positions
d.	V__#	final coda			
e.	V__V	intervocalic	V__V	no adjacent ø	

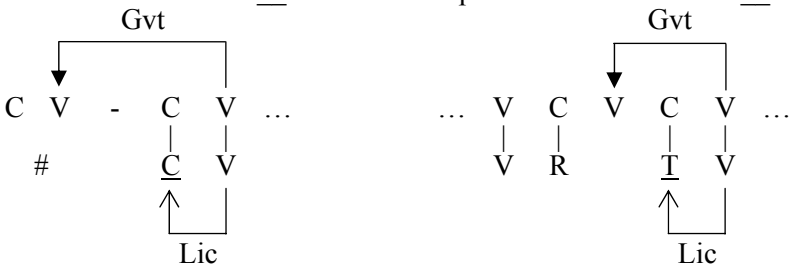
The Coda Mirror builds on the Mirror effect. It can hardly be accidental that the coda and its mirror are exactly symmetric not only as far as their structural description is concerned (__{#,C} vs. {#,C}__), but also regarding their effect: coda consonants are weak, while coda mirror consonants are strong. The reduction of both disjunctions to non-disjunctive statements, an insuperable obstacle in a traditional syllabic environment, produces the same symmetry (__ø vs. ø__). The question why the former, rather than the latter is weak (and the latter, rather than the former strong) is answered by the lateral relations (government and licens-

ing) that define syllable structure in CVCV (which is thus built on lateral dependency-type relations, rather than on trees).[18]

Government spoils the segmental expression of its target, while licensing provides support. Each nucleus that is a good lateral actor (i.e. that can dispense lateral relations) can govern and license, and will always do so (a nucleus cannot "decide" not to govern or not to license). Empty nuclei require government from the following nucleus, which is therefore unable to govern its own onset. This is the reason why empty nuclei introduce a disruption of the intervocalic equilibrium. Table (12) below shows the effect of empty nuclei on following consonants, which stand in Strong Position (target consonants are underscored). Finally, following Lowenstamm (1999) the beginning of the word is represented by an empty CV unit (see e.g. Scheer 2004:§83, Ségéral & Scheer 2008 for discussion).

(12) consonants in Strong Position: ungoverned but licensed

a. initial consonant #__ b. post-coda consonant C.__

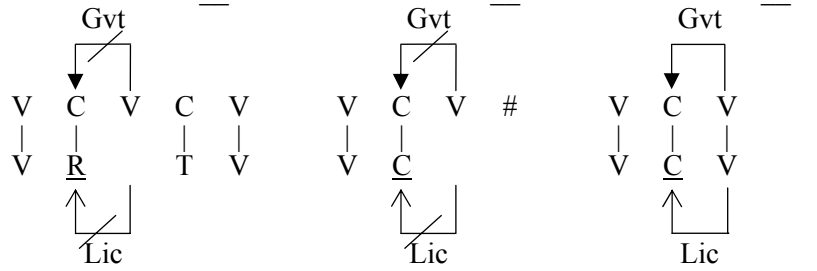


The nucleus following word-initial and post-coda consonants is called to govern its preceding peer, which is empty. It cannot govern its own onset for that reason. At the same time, the nucleus in question has no specific licensing duties and therefore licenses its own onset. A consonant in strong position is thus licensed but ungoverned.

Table (13) below shows the situation of the three remaining positions.

(13) consonants in codas: ungoverned and unlicensed
intervocalic consonants: both governed and licensed

a. internal coda __.C b. final coda __# c. intervoc. V__V



Consonants in the coda disjunction (13)a,b occur before an empty nucleus; they are both ungoverned and unlicensed for that reason: empty nuclei are laterally disabled. On the other hand, intervocalic consonants are not adjacent to any empty nucleus. They are therefore governed and licensed: their nucleus is contentful (and hence a good lateral actor), but unlike under (12) has no governing duties.

In sum, the two lateral relations define the five positions in the following way.

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[18] Below the system of Ségéral & Scheer (2001 and following) is exposed. An alternative definition of the lateral network that produces the empirical picture under (11) is exposed in Szigetvári (2008).

(14)

licensing	government	position	segmental health according to predictions
+	–	Coda Mirror	splendid
	+	V__V	unfavourable
–	–	Coda	unfavourable
	+	impossible	—

The fourth logical possibility, i.e. where a consonant is governed but not licensed, was held to be impossible by Ségéral & Scheer (2001) because a nucleus that cannot license will also be unable to govern. It may be called the nightmare position since consonants will be spoiled (by government) and in addition unsupported (by licensing). The nightmare position will play a prominent role below.

9 FEN: FREE COMBINABILITY OF GOVERNMENT AND LICENSING OVERGENERATES

9.1 FOUR LOGICAL POSSIBILITIES

On the assumption that government and licensing apply independently and have the combined effects on their targets that are discussed in the previous section, a four-way parametric space for the situation at the right edge of consonant-final words is created. This is illustrated under (15) below (which is also the state of affairs in Scheer 2004:§545).

(15) word-final situation: four-way parametric system of Scheer (2004:§545)

	FEN can		vowels before word-final consonants	word-final consonants are in
a.	+ license + govern	type A language	behave like in open syllables	intervocalic position
b.	+ license – govern			post-coda (strong) position
c.	– license + govern	type B language	behave like in closed syllables	nightmare position
d.	– license – govern			coda position

That this system overgenerates was already made explicit in Scheer (2004:§543), and is also pointed out in Cyran's (2006:534ff) review of Scheer (2004). Namely, the two grey-shaded cells under (15) stand without empirical echo.

The analysis of this picture shows that it is government, rather than licensing, that makes the system overgenerate. In type A languages where FEN can license, word-final consonants do not behave like codas (i.e. they are extrasyllabic) because they are licensed (cf. (15)a,b). On the other hand, word-final consonants behave like true codas in case FEN are unable to license, which is the case in type B languages (cf. (15)c,d). Unfortunately, the binary choice that is produced by licensing alone is further expanded when government comes into play: FEN that are able to license may or may not be able to govern, just as FEN that cannot license. According to the standards of the Coda Mirror, licensed word-final consonants are intervocalic when also governed ((15)a), but stand in strong position when remaining ungoverned ((15)b). On the other hand, unlicensed word-final consonants are only true codas when also ungoverned ((15)d). Otherwise, they are in the weakest possible situation, the nightmare position ((15)c).

9.2 THE NIGHTMARE POSITION IS UNWARRANTED

The nightmare position, however, does not appear to have any empirical response: there are no super-weak consonants (which on top of that occur only in word-final position). In the same way, there are no cases where word-final consonants are strong, i.e. pattern with consonants that stand in the Coda Mirror.

Also, the nightmare position falls foul of an empirical generalization that was mentioned in section 2.2. That is, the variable item of the two disjunctions (the coda and its mirror) is always located at the edge: either both internal and final coda consonants behave like codas (type B languages), or only internal coda consonants do (while C# are non-codas: type A languages). The reverse pattern where word-final consonants behave like codas but internal coda consonants do not, is not on record. The same is true for the Strong Position: either both word-initial and post-coda consonants are strong like in Romance, or only the internal member of the disjunction, i.e. post-coda consonants, is strong, while word-initial consonants show intervocalic behaviour (the latter pattern is found in Greek, see Seigneur-Froli 2003, 2006). The reverse pattern where word-initial consonants are strong, but post-coda consonants are not, does not appear to occur.

It follows from this generalization that edge consonants can only deviate from the internal member of their disjunction in the opposite direction of strength: codas are weak, and word-final consonants may be non-weak (i.e. extrasyllabic); coda mirror consonants are strong, and word-initial consonants may be non-strong (i.e. intervocalic). Nightmare consonants, however, would deviate from the strength pattern of their disjunction by being weaker than codas. This violates the generalization.

9.3 ONLY TWO PATTERNS HAVE AN EMPIRICAL ECHO

In sum, only two cases out of four seem to make sense: those which have concordant values for government and licensing. Either word-final consonants are both governed and licensed as under (15)a, which makes them intervocalic, or they are neither governed nor licensed as under (15)d, in which case they are true codas.

What needs to be done in order to eliminate overgeneration is thus to get rid of (15)b and (15)c. Translated into lateral terms, this means that government and licensing must not be independently parameterized: either FEN can dispense both, or none.

Note that the reduction from four to two options is neutral with respect to coda effects on vowels: since vowel length in final syllables depends only on licensing, all that is needed in order to cover the pattern is a binary distinction between FEN that can and FEN that cannot license. The reduced system offers this contrast.

Finally, as before consonantal and vocalic effects of extrasyllabicity are covered by the same parameter, i.e. the (in-)ability of FEN to license.

It thus seems that the reduction of the parametric possibilities to just those which have concordant values for government and licensing allows for a better fit with the empirical situation. While this is certainly an encouraging result, more needs to be done: the following section shows that the system continues to produce the nightmare situation (15)c.

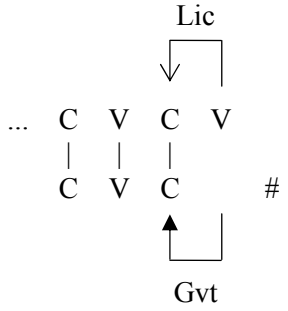
9.4 THE NIGHTMARE POSITION IS A NIGHTMARE FOR THE THEORY

Even though the shrunk parametric system of FEN does not produce the nightmare position (15)c anymore, it continues to occur elsewhere in the system.

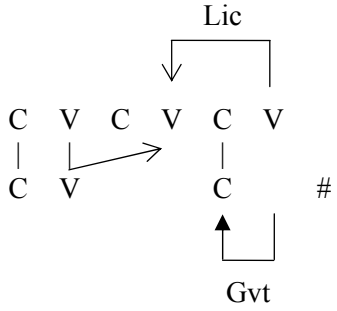
In type A languages where FEN can license, vowels in final closed syllables are long. In such a language word-final consonants should also be extrasyllabic since they will be licensed by the FEN. This, however, is only true when they follow a short vowel: they fail to be licensed (while still being governed) when preceded by a long vowel because the FEN is called to license the preceding nucleus. The relevant situation is depicted under (16) below.

(16) type A languages (i.e. where FEN can license and govern)

a. C# following a lexically short vowel: intervocalic position



b. C# following a lexically long vowel: nightmare position



Word-final consonants thus experience different conditions according to whether they are preceded by an underlyingly short or long vowel. In the former case (16)a, they are intervocalic in terms of the Coda Mirror (both licensed and governed), while they face nightmare conditions in the latter (governed but unlicensed, (16)b). This kind of variable consonantal strength according to whether the preceding vowel is long or short hardly meets any empirical echo.

The second instance of the nightmare position is the word-internal equivalent of (16)b, i.e. where a long vowel precedes an intervocalic consonant (/VVCV/). This configuration is identical to (16)b, except that the consonant in question is followed by a contentful nucleus, which is called to license the preceding long vowel as before. The consonant enclosed will therefore be unlicensed but governed, that is super-weak.

It may be doubted that some empirical response is waiting out there, whether in internal or in final position.[19] The nightmare position may thus be considered a nightmare for the theory: it needs to be done away with.

10 THE CODA MIRROR V2: GOVERNMENT AND LICENSING MUST NOT BE EQUAL-RIGHTED

10.1 UNITARY ABILITIES OF FEN CANNOT BE THE ONLY ANSWER

The preceding discussion has identified the overgeneration that the parametric system of FEN has produced in Scheer (2004), as well as its origin, the independent application of government and licensing. That is, overgeneration at the right edge of the word can be eliminated if the lateral abilities of FEN reduce to an on/off setting: either FEN are lateral actors and can both govern and license, or they are not, in which case they can dispense neither lateral force.

[19] Balogné-Bérces (2005:144ff) mentions data from English that seem to show that if anything, word-internal consonants before short vowels are weaker than before long vowels, i.e. the reverse of the situation predicted by (16). That is, in some dialects tapping appears to occur after short vowels as in *latter*, but not after long vowels as in *later*.

This move prevents the system from generating word-final consonants in strong and nightmare position.

While this offers a correct description of the situation at the right edge, we have seen in section 9.4 that the Coda Mirror as it stands produces the nightmare position also word-internally. This is motivation enough for engaging into a revision of the lateral network, that is of the Coda Mirror as such. Following Cyran (2006), the guiding idea will be that government and licensing are not equal-righted. We will see that a side-effect of the revised system also offers a better definition of the opposition between open and closed syllables.[20]

10.2 GOVERNMENT OVER LICENSING

In his review of Scheer (2004), Cyran (2006:534) recommends to formalize the interaction between government and licensing. The revision of the phonological engine of CVCV that is proposed below follows this advice. The challenge is to modify the rule of the game so as to get rid of the nightmare position while not losing any of the generalizations regarding syllable structure and the Coda Mirror. Touching any piece of the puzzle impacts the mechanics elsewhere: this is of course warranted, but severely restricts the room for modifications.

The guiding idea is that government and licensing do not act independently of one another; rather, they obey a natural hierarchy that determines their behaviour when they could in principle apply simultaneously.[21]

(17) government over licensing
No constituent can be governed and licensed at the same time. In case a constituent can potentially be subject to both lateral forces, it will be governed.

The following sections discuss the impact of this principle first on the Coda Mirror itself (the general word-internal situation), then on the parametric situation at the right edge.

10.3 CONSEQUENCES FOR THE CODA MIRROR: INTERVOCALIC CONSONANTS

(17) impacts most directly the identity of intervocalic consonants: while they were both governed and licensed before, they are now only governed.

This move also addresses a critique that is sometimes levelled against the Coda Mirror (among others by Cyran 2006:530ff, 537): how could the reaction of an onset be calculated if its melodic expression is simultaneously inhibited and enhanced? Intuitively, opposite forces cancel each other out. The Coda Mirror has always been explicitly agnostic regarding the interpretation of simultaneously governed and licensed constituents. The only thing that was important was the ability of the theory to formally distinguish the two weak positions, intervocalic and coda ("two ways of being weak", cf. Scheer 2004:§131, Szigetvári 2008), while making sure that both of them are weaker than the Strong Position.

As a matter of fact, thus, the relative strength of both weak positions remained an open question (see Scheer 2004:§§130f). On the assumption of (17), the theory now makes a clear statement: consonants are weaker in intervocalic than in coda position since the former are spoiled (and only spoiled), while the latter do not experience any lateral influence. One could

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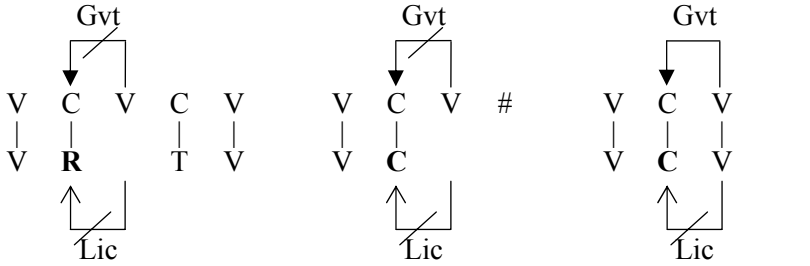
20 Note that the Coda Mirror v2 is based on joint work with Markéta Ziková. It is introduced at greater length in Scheer & Ziková (2010) and Scheer (forth a).

21 In a different environment, Balogné-Bérces (2001:53) has also argued that "[a] consonant […] cannot be simultaneously governed and licensed by the same vowel." In case a vowel could in principle dispense both lateral forces, the conflict is resolved according to stress on her analysis: stressed vowels (in English) prefer to license, while unstressed vowels rather govern their onset.

say that they appear "naked" on the surface, i.e. in the positional conditions that are produced by the absence of phonological computation. Figures (18)a,b below recall the situation of coda consonants, which is unchanged, while (18)c shows intervocalic consonants when (17) is applied.

(18) Coda Mirror v2
consonants in codas: ungoverned and unlicensed
intervocalic consonants: governed but unlicensed

a. internal coda __.C b. final coda __# c. intervoc. V__V



The confrontation with the empirical record must show whether it is true that intervocalic consonants are weaker than consonants in coda position. A hint that this could be correct is the implicational relationship that appears to govern spirantisation patterns across languages: spirantisation in codas only seems to occur if it is also observed intervocalically; by contrast, in many systems intervocalic consonants spirantize without spirantization affecting codas. Hence the attack of spirantization appears to first consider the weakest targets – intervocalic consonants –, and may then optionally extend to more solid codas (see Szigetvári 2008 on this issue).

The general conditions that consonants experience when (17) is applied appear under (19) below. Note that the only situation that is modified with respect to the Coda Mirror v1 is the intervocalic position: the definition of the Strong Position and the coda is as before.

(19) Coda Mirror v2

position		definition in terms of lateral relations
a. Strong Position	{#,C}__	licensed but ungoverned
b. coda	__{#,C}	unlicensed and ungoverned
c. intervocalic	V__V	governed (but unlicensed)

The fourth logical possibility, i.e. a constituent that is both governed and licensed, is ruled out by (17). Also note that the configuration "governed but unlicensed" characterized the nightmare position before, but now describes regular intervocalic onsets. Therefore the system is unable to produce a situation where a consonant is weaker than both codas and intervocalic onsets. In other words, (17) kills two birds with one stone: the equal-rightedness of government and licensing is done away with, and the nightmare position is eliminated.

The following section shows that the nightmare position is really absent from the plot, also when it comes to the representation of vowel length.

10.4 INTERVOCALIC RELATIONS

10.4.1 LONG VOWELS

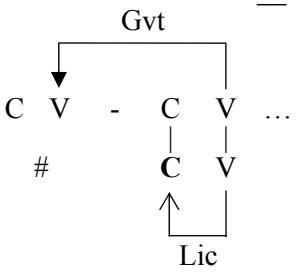
The revised lateral identity of intervocalic onsets has also consequences for internuclear relations. In order to see that, consider the ground rules that are recalled under (20) below. Note that they have not varied since Scheer (2004) and the Coda Mirror v1 (except for (20)c2, which is a consequence of (17)).

(20) origin and application of lateral relations
- a. nuclei exhaust their lateral potential: those which are enabled to govern do govern, those which are enabled to license do license (Scheer 2004:§148).
- b. by default, nuclei target their own onset, i.e. "choose" the shortest move.
- c. they target other nuclei in two situations:
  1. when they are called to either govern or license a preceding empty nucleus.
  2. when they govern their onset and therefore cannot license it simultaneously.

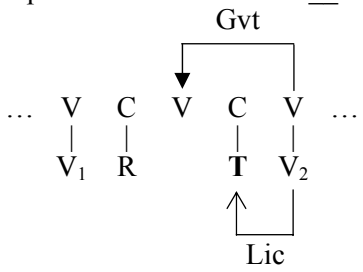
In a language where the initial CV marks the beginning of the word, the Strong Position is thus unchanged, as shown under (21) below.

(21) consonants in the Coda Mirror: ungoverned but licensed

a. initial consonant #__



b. post-coda consonant C.__

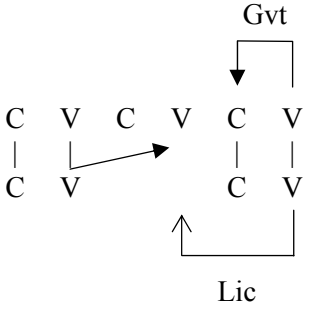


Regarding government, the two situations at hand are instances of (20)c1: the government of the contentful nucleus is called to apply to the preceding empty nucleus.

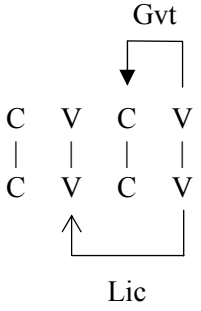
The symmetric case occurs when the empty complement nucleus of a lexically long vowel calls for licensing from the nucleus to its right. This configuration is shown under (22)a below.

(22) intervocalic licensing

a. long vowels



b. intervocalic consonants



(22)b shows the situation of an intervocalic consonant that occurs after a short vowel. The comparison with the long vowel under (22)a demonstrates that unlike in the original system, intervocalic consonants after long and short vowels experience the same conditions: they are governed (and unlicensed). Recall from section 9.4 (figure (16)b) that in the original system, (22)a was the configuration that placed the intervocalic consonant in the infamous nightmare position.

The configuration has not changed (the consonant is governed and unlicensed as before), but the interpretation is not the same anymore. That is, being governed (but unlicensed) as under (22)b are now the conditions that are experienced by regular intervocalic consonants because of (17): no constituent can be simultaneously governed and licensed. Since for that reason the source nucleus cannot license its own onset, it must exhaust its licensing potential by licensing the preceding nucleus (see (20)a).

10.4.2 CLOSED VS. OPEN SYLLABLES

In the new system, contentful nuclei that are preceded by another contentful nucleus cannot license their own onset anymore. A welcome by-product of this situation is a distinction between vowels in open and closed syllables that could not be expressed before.

(23) definition of open vs. closed syllables
  a. vowels in open syllables are licensed.
  b. vowels in closed syllables are unlicensed.

That this is indeed what the new system produces may be seen when comparing the situation of (22) (where long and short vowels in open syllables are depicted) with the configuration of (21)b that shows a vowel in an internal closed syllable: V_1 under (21)b is followed by a governed empty nucleus, which is thus unable to dispense either government or licensing. That is, vowels in closed syllables are unlicensed by definition because they are followed by a laterally disabled empty nucleus.

The definition of open vs. closed syllables that was proposed in Scheer (2004:§163) is less precise and also less adequate: a vowel was supposed to sit in an open syllable iff it was subject to either government or licensing. According to the new definition, vowels in open syllables can only be licensed. This makes sense: licensing enhances the segmental expression of its target. Hence vocalic inventories in open syllables are expected to express the full range of melodic possibilities, while only a curtailed inventory should occur in closed syllables, which lack support from licensing. This is precisely the pattern that is pervasively observed across languages (e.g. Harris 1997).[22]

11 THE PARAMETERISATION OF FEN WITH NON-EQUAL RIGHTED GOVERNMENT AND LICENSING

Recall from section 9 that word-final consonants in Strong Position (15)b and in the nightmare position (15)c are unwarranted: the revised version of the Coda Mirror should not be able to produce them anymore. Also, unlike in the old system and like in the new system in word-internal position (section 10.4.1), word-final consonants should experience the same conditions after long and short vowels.

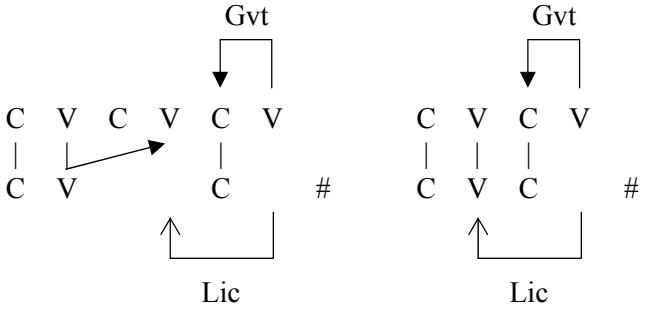
[22] The new system of lateral relations is entirely transparent for branching onsets (on these see Ségéral & Scheer 2005, Brun-Trigaud & Scheer 2010).

The word-final situation in type A languages where FEN are sound lateral actors is shown under (24) below.

(24) Coda Mirror v2: at the right edge in type A languages

a. /VVC#/ comes out long, C# after long vowels is in intervocalic position

b. C# after short vowels is in intervocalic position



Under (24)a, vowels in final closed syllables may be long because the FEN is able to license their complement nucleus. Since the FEN can also govern, the final consonant following the long vowel is governed, which means that it experiences intervocalic conditions. The same holds true for word-final consonants that occur after a short vowel as under (24)b: they will be governed by the FEN; since they cannot be simultaneously licensed, the preceding vowel benefits from support, which means that it stands in an open syllable.

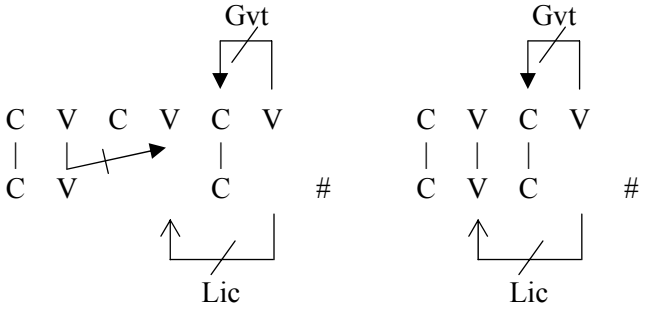
In sum, thus, all word-final consonants are intervocalic in this type of language, and vowels followed by word-final consonants always stand in open syllables. Also, word-final consonants never experience different conditions according to whether they are preceded by a long or a short vowel – exactly what we wanted to achieve.

Let us now turn to type B languages where FEN cannot dispense lateral forces. Table (25) below shows the right edge of words in this system.

(25) Coda Mirror v2: at the right edge in type B languages

a. /VVC#/ comes out short, C# is in coda position

b. C# is in coda position



Since FEN are laterally disabled, word-final consonants are always ungoverned (and of course unlicensed), after long as much as after short vowels. That is, they stand in coda position. Also, vowels in final closed syllables cannot be long since the nucleus of their second leg will fail to be licensed by the FEN. Finally, note that both long and short vowels experience the conditions of closed syllables: they suffer from the absence of licensing.

12 WHY THERE IS NO WORD-INITIAL VARIATION AND WHY ONLY C-FINAL WORDS PRODUCE VARIATION

12.1 MORPHEME-FINAL IS PHASE-INITIAL

Before concluding, let us consider two questions: why do languages display parametric variation at the right, but not at the left edge of words? And why is the right-edge variation only encountered with consonant-final words? Or, put differently, why are there extrasyllabic consonants, but no extrasyllabic vowels? Nothing withstands a scenario where word-final vowels are extrasyllabic (Scheer 2004:§549): in some languages, vowel-final words could behave as if the vowel were not there: the preceding consonant would then have coda status. In other languages where final vowels are not extrasyllabic, the preceding consonant would be a regular onset. This kind of variation is not on record.

The answer to these questions is in-built in CVCV and the way it conceives of phonological computation. Let us first make explicit the fact that the stretch of the linear string whose right edge we are talking about is the phase (or the cycle in more traditional phonological terminology, or the domain in GP-coined terms). Cyclic (or inside-out) derivation, a cornerstone of generative grammar, supposes that syntactic structure is interpreted piecemeal: rather than in one single go, phonological computation applies to strings of growing size from the most to the least embedded item. In modern phase theory, these are called phases (Uriagereka 1999; Chomsky 2000 and following, see Scheer 2008, 2011 for discussion of the value as computational domains that phases take on in phonology).

Let us now look at what happens when a phase-defined string arrives in phonology. On the account of CVCV, two properties of phonological interpretation are hard-wired: all strings end in a nucleus, and they are parsed from right to left, hence starting with the last nucleus. Regressive interpretation follows from the fact that all lateral relations (and almost all phonological processes) are head-final (Scheer 1998, 2004:§218). That is, phonological computation in CVCV consists of the application of government and licensing to a string that is made of onsets, nuclei and (eventually) associated melodic material. Given that lateral relations are head-final, the lateral status of constituents (i.e. whether they are governed and/or licensed, and in turn whether they can govern and/or license) is always determined by the lateral status of a constituent to their right. Therefore the computation of constituent *n* supposes that the phonological status of constituent *n+1* is already determined: phonological computation parses the string from right to left.

FEN are thus the last item in the string (from the point of view of Western spelling), but they are the first item to be processed by phonological computation: FEN are phase-initial.

12.2 THERE ARE NO EXTRASYLLABIC VOWELS BECAUSE CONTENTFUL NUCLEI COME WITH FULL LATERAL SPECIFICATIONS

If a consonant-final string is in fact FEN-final, and if FEN are phase-initial, it follows that variation is only encountered at the right edge of consonant-final words. The difference between an empty and a contentful nucleus is that the latter inherits full phonological abilities from its melodic content: contentful nuclei are always good governors and good licensors. Empty nuclei, on the other hand, have no phonological properties per se: their governing and licensing abilities depend on whether they are subjected to government or not.

In case the first item that is subject to phonological computation is a(n) (final) empty nucleus, its phonological properties must somehow be defined. Everywhere else in the string,

the lateral properties of constituents are determined by constituents to their right. In other words, phonological computation cannot begin unless the phonological properties of its first domino are defined. Since the phase-initial nucleus itself does not bear any in case it is empty, a surrogate mechanism must provide the information that is necessary in order to initiate the computation. This is done by a parameter setting. In case the last nucleus is contentful, no such crutch needs to be recurred to: contentful nuclei come with full lateral equipment.

This scenario also explains why there is no equivalent variation at the left edge of words (or phases): the left edge is computation-final; therefore nuclei never lack lateral specifications.

13 CONCLUSION

The paper has tackled an important parametric variation in phonology, the one that distinguishes between those languages where word-final consonants count as codas (type B) and those where they do not (type A). Starting out from the traditional way of encoding this variation, extrasyllabicity, the treatment of the question in Government Phonology was discussed. The introduction of FEN, i.e. the idea that word-final consonants are onsets of empty nuclei, was the starting point of an evolution where the expression of the parametric variation at hand was progressively shifted from a contrast in constituent structure to a contrast in the ability of FEN to dispense licensing. This illustrates the lateralisation of structure and causality, i.e. the difference between Standard GP and CVCV: while the former is a hybrid lateral-arboreal approach, the latter has gone all the way towards a system where syllable structure is defined by lateral relations alone.

In a second step, this result was inserted into the complete environment of CVCV and the Coda Mirror where government and licensing apply independently from one another. This independence produces overgeneration. Against this backdrop and following Cyran (2006), a hierarchical relationship between government and licensing was introduced: in case a constituent could be subject to both forces, it will only be governed. This move modifies the engine of the Coda Mirror regarding intervocalic consonants, which are now only governed (while they were both governed and licensed before), and the parametric system of FEN is also revised according to the new rule.

The new system provides a comprehensive definition of the difference between open and closed syllables: nuclei in open syllables are always licensed, which explains why vowels in this position show maximized vocalic inventories. They are unlicensed (i.e. unsupported) in closed syllables and therefore typically host inventories whose melodic distribution is curtailed.

Finally, a virtue of the Coda Mirror v2 is that it does away with the schizophrenia of intervocalic consonants. These were both governed and licensed before, and it was unclear how they could obey both antagonistic forces at the same time, or why these forces do not cancel each other out. In the amended system, schizophrenic consonants do not occur anymore since no constituent can be simultaneously governed and licensed.

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