

A representational theory of morphological information in phonology

I. The problem

- (1) familiar treatments of morphological information:
the expression of morphological information is achieved
 - a. by juncture-phonemes american structuralism (e.g. Moulton 1947, Hockett 1955, 1958): "#" is a phoneme that enjoys the same status as /p/, /a/ etc.
 - b. by diacritics e.g. SPE: "#", "=", "+"
 - c. procedurally Lexical Phonology: FIRST an a phonological rule applies, THEN an affix is added, or vice-versa

- (2) it should be
 - a. phonological i.e. using ONLY objects that are known in phonology
 - b. privative contrasts are expressed through the presence vs. the absence of these objects, not through different values (plus vs. minus) thereof.

- (3) why diacritics are odd
 - a. they are arbitrary
 1. in number:
no theory can limit or predict their number, cf. Stanley (1973) with no less than 15 different boundary-diacritics for Navaho.
 2. in nature:
"#" is just as good as "pink horse". Naming them X or Y does provide no insight into their identity.
 3. in effect:
there is never a causal relation between a given boundary and an observed effect: "#" can trigger gemination, and it can inhibit gemination. No theory has even tried to propose that a given boundary has a predictable effect.
 - b. they are linguistic aliens
 1. nothing of the kind is known in phonology: they are no phoneme
nothing of the kind is known in morphology: they are no morpheme
nothing of the kind is known in syntax: they are no syntactic prime
nothing of the kind is known in semantics: they are no semantic prime
 2. what they are
the only statement a linguist can make is
"I know that these objects are real, I don't know what they are made of. Until I know better, I have to name them in an arbitrary way."

3. epistemologically speaking,
they enjoy the status of variables in scientific investigation: we have identified an object whose relevance is beyond any doubt. We will name it X until we know better. No science can afford to host X's and treat them on a par with objects whose identity is established.
Hence, every linguist should be eager to discover the real identity of diacritics, and feel uneasy when implementing aliens within his theory.
The general behaviour of phonologists is not in line with this statement. The legitimacy of diacritics is never questioned.

(4) non-diacritical proposals

a. boundary-phonemes

"#" etc. obviously do not behave like /p/ etc.

b. Lexical Phonology

has eliminated diacritics from the theory, although this was not intended: diacritics are replaced by a procedural device, i.e. the Lexical and Postlexical Modules (but other diacritics remain: brackets).

1. Lexical Phonology is "#", "+", "=" – free

2. the effect of boundaries is achieved by the procedural device. Rules never appeal to boundaries. Instead, they apply at different Lexical Levels.

3. the elimination of boundaries from the theory is a side-effect of the research-programme of Lexical Phonology. It does not feature among its intents.

4. one sole kind of diacritics remains: the brackets that indicate the edges of morphemes. Lexical Phonology Rules may make reference to these brackets. In the treatment of derived environment effects, the existence of these brackets is crucial, e.g. Polish [glód] – [[glódz] [e]] vs. [desant] (Rubach & Booij 1984). Palatalization applies in the presence of a palatal agent only if the palatalizable consonant occurs before "j".

II. The proposal

(5) representational, privative and non-procedural alternative:

a. morphology decides whether morphological information is projected into phonology or not.

b. the Signifiant of any morphological information projected into phonology is truly phonological. Its Signifié is morphological.

c. proposal for the phonological identity of "#" = "beginning of the word":
CV, i.e. an empty Onset followed by an empty Nucleus (Lowenstamm 1999).
Signifié: "beginning of the word"

Signifiant: CV = **representational**

d. hence, morphological information in phonology is **privative**:

1. "the beginning of the word" is materialized by "CV" if it is projected into phonology.

2. "the beginning of the word" is materialized by nothing if it is not projected into phonology.

e. boundary-treatments cannot be privative: "#" IS the beginning of the word. There is no way to refer to "the beginning of the word" without referring to "#".

f. because this alternative uses truly phonological objects and is representational, it makes predictions as to the effect of the boundary proposed: there is a causal relation between the phonological identity of the boundary and the phonological effect observed.

1. representational

"the beginning of the word" has a stable cross-linguistic identity if it is projected into phonology: CV. Thus, the effect thereof is also stable and predictable.

2. "#", "+", "="

no prediction of any kind. In language X, "the beginning of the word" may be a "strong" boundary when prefixation occurs, in a language Y, it may be "weak". No contradiction, no prediction.

3. Lexical Phonology

prefixation may be a level-1 or a level-2 process, "the beginning of the word" has no stable cross-linguistic identity. Hence, no predictions ensue.

(6) example: French gliding Dell (1976:109)

v...i,u,y + V → [v...ij, uw, yu V] vs. ...i,u,y + vV... → [i,u,y + V]

lier	"tie"	bi-annuel	[biannyɛl]
lais [lijɛ]	"I tied"	anti-existential	[ãntiɛgzistãsje]
lions [lijɔ̃]	"we tie"	archi-ondulé	[aχ(ɔ̃)dyle]
lia [lija]	"I tied" passé simple		

- a. classical interpretation: "strong" vs. "weak" boundary.
- b. Lexical Phonology-interpretation: suffixes are concatenated before phonology operates, but prefixes are joined after phonology is performed.
- c. representational interpretation: morphology projects a CV between prefix and root, but does not project anything between root and suffix.

"v # suffix" = v suffix
vs.
"prefix # v" = prefix CV v

French gliding applies in intervocalic context. This statement is given a new meaning now: [i_a] is intervocalic in "lia", but not in "biannuel".

C	V	-	C	V
l	i			a

lia [lija]

C	V	-C	V-	C	V	C	V
b	i				a	nnuel	

biannuel [bianɛl]

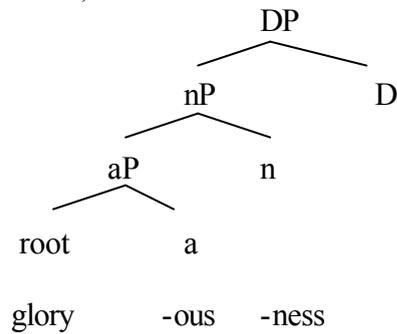
- (7) how do we know whether a morphological boundary triggers or inhibits phonological processes?
- a. Lexical Phonology: we do not know.
 - b. representational: if morphological information is projected into phonology, phonology decides how this object must be interpreted.
 1. if the phonological process at hand is a place-demander, e.g. gemination, then the presence of an empty CV will trigger this process.
 2. if on the other hand the process takes place in intervocalic contexts only, as is the case in the French example above, the presence of an empty CV will inhibit this process.
 - c. \implies the representational alternative makes predictions that may be falsified where Lexical Phonology only records the facts observed.

- (8) occurring empirical situations
the concatenation of two morphemes M_1 and M_2 may
- a. block a phonological process that involves heteromorphemic segments and takes place in case these segments are monomorphemic, or belong to a different couple of morphemes.
 - b. be a condition on the existence of a phonological process that involves heteromorphemic segments and does not take place in case these segments are monomorphemic, or belong to a different couple of morphemes.
 - c. play no role in phonological matters: the string behaves as if there were no morphological boundary.

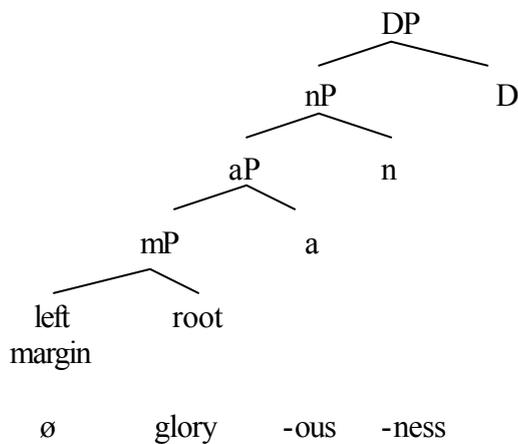
(9) summary of the three implementations

	Lexical Phonology	representational	Kaye (1995)
a morphological boundary blocks a phonological process	Lexical Module the phonological rule applies at level X, while the affixation of the relevant morphemes takes place at level X+n.	presence of a CV the phonological process at stake needs adjacency	analytic domain not specified
a morphological boundary triggers a phonological process	Lexical Module Derived Environment Effect the phonological rule is sensitive to bracketing and applies at level X. Affixation of the triggering morphemes takes place at level X+n, and Bracket Erasure is performed at the end of each level.	presence of CV the phonological process at stake needs extra skeletal space	Analytic domain not specified
a morphological boundary has no effect on phonology	Postlexical Module	absence of CV	non-analytic domain

- (10) seen from above:
morphological representation of the DP in Distributed Morphology
(e.g. Halle & Marantz 1993)



- (11) possible amendment thereof



III. What can make you believe in empty Nuclei?

- (12) basic pattern of Slavic vowel-zero alternations

	C	C-V	C	C-∅	C	C-CV	
Czech	lok	∅t-e	loket	-∅	loket	-ní	gloss "elbow" GENsg, NOMsg, adj.
Polish	woj	∅n-a	wojen	-∅	wojen	-ny	"war" NOMsg, GENpl, adj.
etc.							

- (13) naive analysis thereof
- alternation-sites are mute in open syllables
alternation-sites are vocalized in closed syllables
 - their vocalization is a consequence of syllable structure: the immediate trigger is the presence of a Coda in the same syllable.
 - the presence or the absence of a following vowel has only an indirect incidence on their vocalization.

(14) however

	open syllable		closed syllable		gloss
	zero C__C-V	C__C-yer CV	vowel C__C-ø	C__C-CV	
Czech	dom- ø k-u	dom-ec-ek- ø	domek- ø	dom-ec- ø k-u	house dim.GENsg, double dim. NOMsg, dim. NOMsg, double dim. GENsg
Slovak	kríd- ø l-o	kríd-el-iec- ø	kríd-el- ø	kríd-el- ø c-e	wing dim.NOMsg, double dim. GENpl, dim. GENpl, double dim. NOMsg
Polish	bul- ø k-a	bul-ecz-ek- ø	bul-ek- ø	bul-ecz- ø k-a	bread row dim. NOMsg, double dim. GENpl, dim. GENpl, double dim. NOMsg
Serbo-Croatian	vrab- ø c-a	vrab-ac-a	vrab-ac- ø		sparrow GENsg, GENpl, NOMsg

(15) generalisation

- alternation-sites are vocalized in open syllables iff the following vowel alternates with zero itself.
- vowels that alternate with zero are called yers in Slavic for historical reasons.
- hence, zero occurs in closed syllables and before yers.
- theory is called to be able to refer to this disjunctive context in a uniform fashion. The closed-syllable analysis is contrary to fact.
- hence, generalisation of the yer-context (leaving aside the debate on insertion-deletion, as well as the question of the fate of yers that never appear on the surface (stray erasure, erasure by rule etc.)):

alternation-sites are vocalized iff followed by a yer in the next syllable.

?,? → e,o / __C₀ {?,?}

Havlíkovo pravidlo 1889 (Havlík 1889), Lower: Lightner (1965), Rubach (1984), etc.

- price to pay: underlying yers have to be postulated where they never appear on the surface.

Underlying yers (Y) occur

possible
motivation

example

morpheme-initially

by

adj. /-Yn/: /lokYt-Yn-í/ → loket-**ø**n-í

alternation

nemoc-n-**ý** – nemoc-en-**ø**

dim. /-Yk/: /dom-Yk-u/ → dom-**ø**k-u

dom-ek

etc.

word-finally

GENpl /kríd-Yl-Y/ → krídel

there was

< krid-el-?

NOMsg /básYn-Y/ → básen

always a

< ba-sn?

NOMsg /dYn-Y/ → den

historical yer

< d?n?

- triggering yers are either historically real, or show in alternations.

Alternating yers are not always historically real:

feminine i-stems

NOMsg píseň-**ø** - GENsg písň-**ě** < NOMsg psl *pě-sn̩

NOMsg básěň-**ø** - GENsg básň-**ě** < NOMsg psl *ba-sn̩ < IE *bhā

etc.

- thus, the synchronically underlying object "yer" = /Y/ is an abstract theoretical vowel, not a diachronic reality.

(16) consequences

- a. vowel-zero alternations are not triggered by the presence or absence of a consonant in a given syllable (Coda-analysis), but by an intervocalic communication.
- b. we face a relation between two yers.

(17) however, this distributional pattern extends beyond vowel-zero alternations

	open syllable		closed syllable		gloss
	C C-V	C C-yer	C C-ø	C C-CV	
Czech VV-V	žáb-a	žabek-ø	žab-ø	žab-øk-a	frog NOMsg, dim. GENpl, GENpl, dim. NOMsg
	jádr-o	jader-ní	jader-ø		stone (of a fruit) NOMsg, nuclear, GENpl
Czech u-o	nož-e	nuž-ek-ø	nuž-ø	nuž-øk-y	knife GENsg, scissors (=dim.) GENpl, knife NOMsg, scissors NOMpl
Polish ó-o	krov-a	krów-ek-ø	krów-ø	krów-øk-a	cow NOMsg, dim. GENpl, GENpl, dim. NOMsg
Polish a-e	zeb-a	zab-ek	zab-ø	zab-øk-u	tooth GENpl, dim. NOMsg, NOMsg, dim. GENsg

(18) hence

- a. vowels behave alike in closed syllables and in open syllables iff the following vowel is a yer.
Or: vowels in open syllables that occur before yers behave like if they stood in closed syllables.
- b. if the identity of this distribution with the one known from vowel-zero alternations is not accidental, the generalisation in order must be as follows:
 1. vocalic alternations in Slavic languages are triggered by yers.
 2. triggering yers are abstract vowels that occur overtly after Onsets, and underlyingly after Codas and in word-final position.
 3. target-vowels may be yers themselves (vowel-zero alternations), but may be regular vowels as well.
 4. The generalisation may not be achieved using the yer-vocalisation rule (15)e. It is of more general intervocalic nature.
 5. triggering and alternating yers are not the same.

(19) however, this distributional pattern extends beyond Slavic French [ɛ] – schwa alternation

closed syllable εC#	open syllable		
	εCə	əCV	
mɔχsɛ l	mɔχsɛ ləmə	mɔχsə lɔ̃, mɔχsə le	1) je, tu, il, ils morcèle(s)(nt), 2) morcèlement, 3) nous morcelons, 4) inf./ part./ vous morceler/ -é/ -ez
apɛ l	apɛ lɔra	apə le	j'appelle, appellera, appellation
ãɔχsɛ l	ãɔχsɛ ləmə	ãɔχsə le	j'ensorcèle etc., ensorcèlement, ensorcèler etc.
aχsɛ l	aχsɛ ləmə	aχsə le	je harcèle etc., harcèlement, harceler etc.
aʃɛ v	aʃɛ vəmə	aʃə ve	j'achève etc., achèvement, achever etc.
sɛ vɛ	sɛ vɛəvə	sə vɛe sə vɛəʒ	elle sèvre, sèvrera, sevrer, sevrage

(20) French ATR-alternations of mid vowels

	closed syllable	open syllable		
		__Cə	__CV	
e	fɛt	sɛləʁi	fɛtɛ	je fête, céleri, fêter
	pɛʁdy	bɛtəʁav	pɛʁiʁ	perdu, betterave, périr
	səʁɛn	səʁɛnəmã	sɛʁɛnite	sereine, sereinement, sérénité
o	kɔd	mɔkəʁi	kɔdɛ	code, moquerie, coder
	rɔz	rɔzəʁɛ	rɔzʁɛ	rose, roseraie, rosier
	sɔbɛ	sɔbɛəmã	sɔbʁijɛtɛ	sobre, sobrement, sobriété
ø	øʁœz	øʁœzəmã	apøʁɛ	heureuse, heureusement, apeuré
	œvɛ	bœvəʁi	øvʁɛ	œuvre, beuverie, œuvrer
	ʒœn	vœləʁi	ʒønɛs	jeune, veulerie, jeunesse

(21) Romance diphthongisation of latin short tonic [e,o] in Italian

	__CV		__CCV		__CV if V=reduced since latin	
é	sedet	siede	fěsta	fěsta	hědera	ědera
	fele	fiele				
	petra	pietra				
ó	novum	nuovo	córpus	córpo	móbilis	móbile
	*morit	muore			pópulus	pópolo
	*potet	puo				

Latin "internal apophony":

the distribution of penults in proparoxytons is reduced to [i,u]:
 facilis vs. difficilis latin doublets: optímus, optumus

- fr. facile – difficile
 barbe – imberbe
 chaste – inceste
 ami – ennemi

(22) generalisation

- +ATR and schwa occur in open syllables
- ATR and [ɛ] occur in closed syllables AND in open syllables if the following vowel is a schwa.

Or:

-ATR and [ɛ] occur in closed syllables AND in open syllables if the following vowel is alternating with zero itself.

(23) hence, if all this is not accidental

a. there must be yers in French underlying representations:

	open syllable		closed syllable	
	no yer	yer after Codas, present in []	word-finally	yer after Codas, absent in []
	C__C-V	C__C-YCV	C__C-Y	C__C-YCV
Slavic	krɔv-a	króv-Yk-Y	króv-Y	króv-Yk-a
French	səʁɛnɛ	səʁɛnɪmã [səʁɛ nɔmã]	səʁɛn-Y	səʁɛnɪmã [səʁɛ nɔmã]

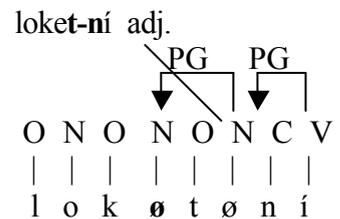
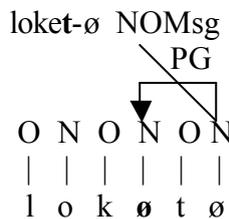
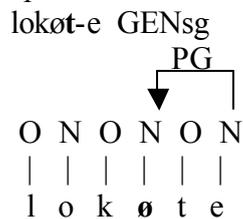
- b. there are no yers in French. What kind of vocalic object could be common to both Slavic and French ?
- c. the generalisation must be formulated as a rule of intervocalic communication.

(24) what about this ?

- a. we said that triggering yers are "abstract vowels that do not appear on the surface". What is an "abstract vowel" in autosegmental representations?
It is an empty Nucleus: Anderson (1981), Spencer (1986), Kaye et al. (1990), Kaye (1990), Scheer (1998a,b).
- b. we said that the relevant generalisation must be formulated as an intervocalic communication. What is an "intervocalic communication" if the vowels concerned are "abstract vowels" in the sense of a) ?
It is not intervocalic, but internuclear.

(25) welcome to Government Phonology

- a. triggering yer = empty Nucleus
- b. the internuclear relation at stake = Proper Government (PG)
- c. syllabic structure is present in underlying representations.
- d. application to vowel-zero alternations:
the phonological Empty Category Principle (Kaye et al. 1990)
1. an empty Nucleus may remain phonetically unexpressed iff it is properly governed or domain-final.
 2. a Nucleus that is properly governed may not act as a governor.
 3. empty Nuclei that escape PG must be phonetically expressed. They are subject to epenthesis.



- e. later on (Scheer 1997,1998c), d3) was abandoned in favour of an analysis where alternating vowels are underlyingly present, for the reasons that are described e.g. in Rubach (1993:135ff).
1. alternating vowels are underlyingly unattached to their Nuclei: they are floating.
 2. non-alternating vowels are underlyingly attached to their Nuclei.
 3. floating vowels whose Nucleus is not sentenced to muteness because it is properly governed attach to this Nucleus and become audible.
 4. this move is exactly parallel to the one taking the linear analysis of Lightner (1965) to an autosegmental level: Kenstowicz & Rubach (1987), Rubach (1986). The only difference is structure-preservation: non-phonetic yers are deleted or subject to stray-erasure under the latter analysis, they are present at any level under the former. The latter does not recognize empty Nuclei, the former does.

underlying representation in CVCV:

O N O N O N	O N O N O N	O N O N O N C V
l o k e t e	l o k e t ø	l o k e t e n í

surface representation in CVCV:

		
O N O N O N	O N O N O N	O N O N O N C V
l o k e t e	l o k e t ø	l o k e t e n í

underlying representation according to Kenstowicz & Rubach (1987), Rubach (1986):

x x x x x	x x x x	x x x x x x
l o k e t e	l o k e t Y	l o k e t e n í

(26) welcome to CVCV

- a. non-Slavic evidence enforces to look for an identity of the alleged "abstract vowels" that is different from "yers" and shared by all languages.
- b. genuine Government Phonology-claim (Kaye 1990): words that are phonetically C-final end in fact in an empty Nucleus. word-final consonants are not Codas, but the Onset of a syllable whose Nucleus is empty.
- c. CVCV says (Lowenstamm 1996, Scheer 1998a,b, Ségéral & Scheer forth): the two consonants that are commonly analyzed as a Coda-Onset sequence do pertain to two different Onsets which are separated by an empty Nucleus.
There are no Codas.

- d. the postulated empty Nuclei instantiate exactly the position of triggering yers.

	open syllable		closed syllable	
	no yer	yer after Codas, present in []	word-finally	yer after Codas, absent in []
	C C-V	C C-YCV	C C-Y	C C-YCV
Slavic	krǫv-a	krǫv-Yk-Y	krǫv-Y	krǫv-Yk-a
French	səʁenite	səʁɛnYmã [səʁɛnəmã]	səʁɛn-Y	səʁɛnYmã [səʁɛnəmã]

- e. The Coda Mirror (Ségéral & Scheer forth):
phenomena other than vowel-zero alternations are driven by Proper Government.
=> "strength" vs. "weakness" of Consonants, vowel-length.

IV. Missing pieces for CVCV

- (27) missing piece for CVCV all over the place: branching Onsets

- a. syllable structure burns down to a strict consecution of non-branching Onsets and non-branching Nuclei. There are no Codas and no branching constituents.

"T" = any obstruent, "R" = any sonorant

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	V	C ø	T ø R V

- (28) basic generalisations I

open vs. closed syllable

if a "yer" = empty Nucleus separates a "Coda" from the following Nucleus, the syllabic constituent "Coda" may not be used in order to refer to Closed-Syllable phenomena.

How is this most basic of all phonological opposition achieved in CVCV ?

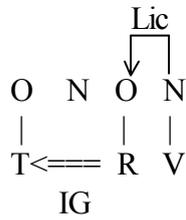
- a. consonants may interact. C₁ may govern C₂ iff

1. it is more complex than C₂ Harris (1990)
2. it is licensed by its Nucleus = Government Licensing Charette (1990,1991)
3. the relation established by C₁ over C₂ is called Infrasegmental Government (IG) Scheer (1996,1998b,c, 2000)
4. a Nucleus enclosed by a domain of IG is phonetically absent hence, a Nucleus is inaudible iff
 - it is struck by PG
 - it is enclosed within a domain of IG
5. Sonorants are more complex than Obstruents. Scheer (1996, 1998b)
Sonorants are governors, Obstruents are governees

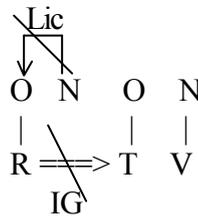
b. one consequence:

progressive IG is ruled out because only Rs are governors, and in a $C_1\emptyset C_2V$ sequence, only C_2 's Nucleus is filled. Only audible Nuclei are licensors. Thus, C_1 will always fail to be licensed.

regressive IG



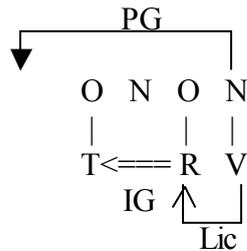
progressive IG is ruled out



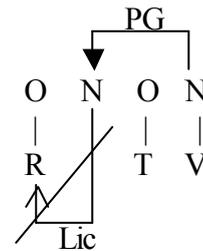
c. another consequence:

1. the empty Nucleus enclosed within a $T\emptyset RV$ cluster does need no care from V because it is enclosed within a domain of IG.
2. the empty Nucleus enclosed within a $R\emptyset TV$ cluster requests PG from V since it will never be able to satisfy the ECP through IG.
3. hence, in the case of $T\emptyset RV$, but not in $R\emptyset TV$ sequences, the PG coming from V can reach beyond the entire cluster.

PG can reach beyond TR because it does not have to take care of the empty Nucleus



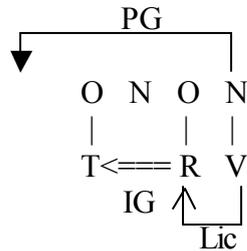
PG cannot reach beyond RT because it must take care of the empty Nucleus



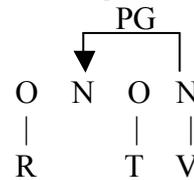
(29) basic generalisations II

a Consonant in a "Coda" is a Consonant that occurs before an empty Nucleus that is properly governed.

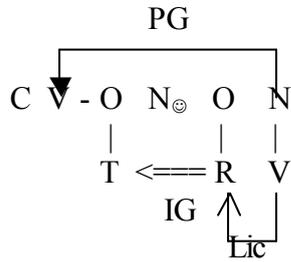
T occurs before an empty Nucleus which is not properly governed
 \implies T does not "belong to a Coda"



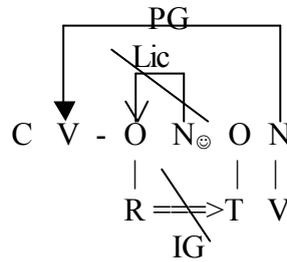
R occurs before an empty Nucleus which is properly governed
 \implies R "belongs to a Coda"



- (32) hence, if "#" = CV, then
 #TRV is well formed
 because the ECP of the initial V is satisfied



- #RT is ill-formed
 because the ECP of the initial V is not satisfied.

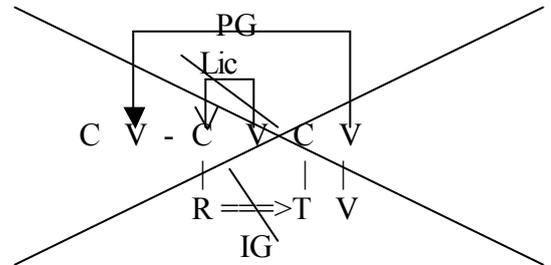
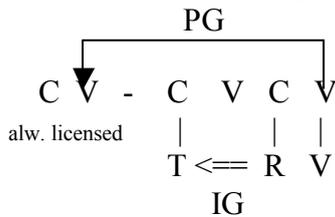


there is a direct causal relation between the presence of the initial CV and the impossibility of #RT-clusters.

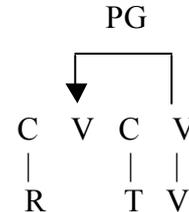
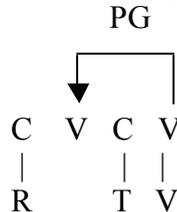
If the initial CV is absent, no such restriction obtains: initial clusters are predicted to be free.

- (33) the initial CV is present in #TR-only languages
 the initial CV is absent in anything-goes languages

- a. initial cluster in a #TR-only language



- b. initial clusters in an anything-goes language

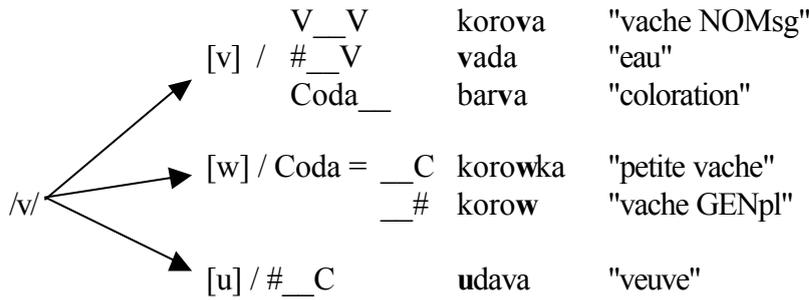


- (34) benefits

- a. one single parameter derives the entire empirical picture:
 presence of the initial CV ==> #TR-only languages **privative**
 absence of the initial CV ==> anything-goes language
- b. if the initial CV is present, the absence of #RT is predicted.
- c. if the initial CV is absent, any #CC is predicted to be able to occur.
- d. the absence of #RT-only languages is predicted.

5.1. Bielorussian: word-boundaries play (almost) no role

(35) Bielorussian /v/



- (36) a. taja wdava "cette veuve"
 brat udavy "le frère de la veuve"
 b. taja vada "cette eau"
 brat vady "le frère de l'eau"

(37) /v/ next to word-boundary

word-internal	result
...C # _C = #_C	[u] brat u davy = u dava
...C # _V = Coda_	[v] brat v ady = bar va
...V # _C = Coda	[w] taja w davy = korow , korowka
...V # _V = V_V, #_V	[v] taja v ada = korova

- (38) generalisation
 a. utterances are headed by a CV-unit.
 b. within utterances, no CV-units are distributed.

<p>(39) /v/ following empty Nuclei</p>	<p>/v/ preceding empty Nuclei</p>
<p>/v/ with no adjacent empty Nucleus</p>	<p>/v/ within two empty Nuclei</p>

- (40) analysis so far
- every orphan empty Nucleus (=ungoverend and not enclosed with an IG-domain) must receive a melodic identification.
 - Belorussian distributes a CV-unit at the beginning of utterances, and only in this location.
 - identical sequences, whether word-internal or not, produce the same effect.
 - ...C # _C = #_C
 - ...C # _V = Coda__
 - ...V # _C = Coda
 - ...V # _V = V__V, #_V

- (41) Belorussian i-epenthesis
- | | |
|--------------|-------------------------|
| lew | "lion NOMsg" |
| ilva | "lion GENsg" |
| tam jość lew | "il y a un lion là-bas" |
| brat ilva | "le frère du lion" |
| malady lew | "jeune lion" |
| śastra lva | "la sœur du lion" |

- (42) site of epenthesis in context site of epenthesis in isolation result
- | | | | |
|--------------------|---------------|-------------------|----------------|
| ...C # _C = #_C | epenthesis | brat il va | = il va |
| ...C # _V = Coda__ | no epenthesis | tam jość lew | = lew |
| ...V # _C = — | no epenthesis | śastra lva | = — |
| ...V # _V = — | no epenthesis | malady lew | = — |

(43) summary

<p>empty site of epenthesis followed by a plain Nucleus</p> <pre> Gvt / \ / \ C V C V C ø ø l e w [lew] jość ø l e w [tam jość lew] </pre>	<p>filled site of epenthesis followed by an empty Nucleus</p> <pre> C V C V C V ś a s t r a l ø v a [śastra lva] </pre>
<p>filled site of epenthesis followed by a plain Nucleus</p> <pre> C V C V C m a l a d y l e w [malady lew] </pre>	<p>empty site of epenthesis followed by an empty Nucleus</p> <pre> Gvt Gvt / \ / \ / \ / \ C V C V C V b r a t l v a [brat ilva] ø l v a [ilva] ↑ epenthesis [i] </pre>

5.2. Slavic vs. Moroccan Arabic

- (44) #RT-sequences occur chiefly in two locations on the globe, within two groups of languages whose members share a clear genetic definition:
1. modern occidental Afro-Asiatic (Algerian, Tunesian, Moroccan Arabic, Berber)
 2. Slavic
- cf. the list of #RT-languages in Clements (1990)

Moroccan Arabic

- (45) all logically possible combinations of #CC occur

#C ₁ C ₂	#C ₂ C ₁	
brid	rbiT	refroidir, lier
Drib	rDa	frapper, accepter
gliŷ	lga	retirer, trouver
bka	kbir	pleurer, grandir
nzil	zna	descendre, commettre l'adultère
dna	ndim	s'approcher, regretter
bqa	qbil	rester, accepter

- (46) diachronic situation

Classical Arabic		Moroccan Arabic
VV	>	V
V	>	schwa

schwas alternate with zero as usual

- (47) hence: domino-alternations

- a. CØC ə C - ø
k ø t i b - ø < katab-a "il a écrit" arabe
- b. CəCØC - V
k i t ø b - u < katab-uu "ils ont écrit" arabe
- c. for all Arabic verbs in 3sg active perfective,

#C₁VC₂VC₃-u > #C₁C₂iC₃ Classical Arabic > Moroccan Arabic

- (48) Slavic

- a. do all logically possible #CC-clusters occur? Not at all. Slavic instantiates only a small subset of logically possible #RT-sequences.
- b. Semitic: 50% of the lexicon is #TR, the other 50% is #RT
Slavic: there are 47 #RT-roots in the entire lexicon
- c. is the diachronic situation the same?
yes, insofar as #RT < #RvT
no because only 2 out of 11 vowels became schwa and fell out: the yers
in Arabic, ALL short vowels became schwa and fell out
- d. diachronic generalisation holding for both Slavic and Arabic:
 1. there were no #RT-clusters in the ancient languages
 2. all modern #RT-clusters are the result of a vowel-syncope
#RT < #RvT

- (49) some examples
cf. the list of 47 Slavic roots in 14 Slavic languages at
<http://www.unice.fr/dsl/rt/slavicRT.htm> and Scheer (2000)
of which (50) is a summary

	Czech	Common Slavic	
	NOMsg	GEN sg	(NOMsg)
	lev	lva	*l\vx lion
	den	dne	*d\n\ jour
	sen	snu	*sXnX rêve
	rez	rzi	*rXdja rouille
	ret	rtu	*rXtX lèvres
	lež	lži	*lXg- mensonge
	lest	lsti	*l\st\ ruse
	mest (GENpl)	msta (NOMsg)	*m\t-t\ vengeance

(50)	Common Slavic	#RT	gloss CS	modern example		Common Slavic	#RT	gloss CS	modern example
j	1 j-\dO	jd	walk 1sg	tch jdu	l	26 lXb-	lb	skull	tch lbi (GENsg)
	2 j\go	jh	yoke	tch jho		27 lXg-ati	lg	lie inf, 1sg	tch lhát
	3 j\m	jm	seize	tch jmout		28 l\g-	lg	light	tch lhostejný
	4 \n-	jm	name	tch jméno		29 lXk	lk	mourn	tch lkát
	5 j-es-m\	js	be 1sg	tch jsem		30 l\p-	lp	cling, stick	tch lpět
r	6 štrXbX	rb	fragment	s-cr rbina	31 l\sk-	ls	shine, twinkle	tch lštíti se	
	7 rXbadiga	rb	Herbaticum	cr rbadiga	32 l\st\	ls	cunning, ruse	tch lsti (GENsg)	
	8 r\k	rc	say, imper 2sg	tch arch rei !	33 l\v\	lv	lion GENsg	tch lva (GENsg)	
	9 uncertain	rč	hamster	s-cr rčak	34 s\z	lz	tear	pol lza	
	10 rXd	rd	go red, flush	tch rdít se	35 lXž-	lž	spoon	tch lžíce	
	11 str\ža	rd	core, essential	pol rdzeň	m	36 mXd-lX	md	faint, weak	tch mdlý
	12 gXr(t)+dusi ti	rd	strangle, choke	tch rdousit		37 mXchX	mch	moss	tch dial mšina
	13 rXdXky	rd	radish	s-cr rdakva		38 mXk	mk	sudden movement	pol mknáč
	14 rufijanX	rf	procurer, pimp	sle rfjan			yielding an unforeseen result		
	15 rusX	rs	yellow, blond	sle rsa	39 m\t-t\	ms	revenge	tch msta	
	16 rXta	rt	ice-skate	rus rta	40 mXstX	ms	must, fruit juice GENsg	tch arch mstu	
	17 rXtXt\, rXtont\	rt	quicksilver	tch rtut'	41 mXtX	mt	gym swing GENsg	tch arch mtu	
	18 rXt\	rt	peak, point	tch rty (NOMpl)	42 m\zda	mz	salary	tch mzda	
	19 rXvati	rv	tear, rip, snatch	tch rvát	43 mXzg-	mz	spoil	rus mzgnut'	
	20 rXjO	rv	dig	rva (GENsg)	44 m\ša < lat	mš	mass	tch mše	
	21 rjuti	řv	roar, scream	tch řvát	45 mXšica	mš	greenfly, aphid	tch mšice	
	22 rXž\	rž	rye	tch rži	46 m\chelX	mš	earnings, profit	rus mšeIX	
	23 rXzati	rž	neigh, whinny	tch ržát	47 m\g-	mg	fog	mhlavý	
	24 drXg-	rž	tremble	h-sor ržec					
	25 ržz-	rž	cut	pol ržnác					

(52) numeric situation

#RT	nb of roots coming from #RvT		uncertain origin
	< #RyerT	< #RvT	
#jC	4	1 (5 j-es-m\)	1 (9 s-cr rčak)
#rC	15	4 (14 rufijan\ 15 rusX 21 rjuti 25 rez)	
#iC	10	0	
#mC	12	0	
	41	5	Total 47

(53) summary

- a. Slavic is a true anything-goes language: grammar does impose no co-occurrence restrictions on initial clusters.
- b. the fact that only a small subset of possible #RT-clusters occurs is due to a historical accident: only 2 out of 11 vowels fell out, and hence only 2/11 of #C1VC2-sequences ended up as #C1øC2.
- c. the numeric disproportion in Slavic (only 47 #RT-roots) is due to the same cause.

(54) if synchronic Slavic grammar does not impose any co-occurrence restriction on #CC-clusters, a prediction is made to the effect that #RT-sequences may freely enter the language. What could be the origin thereof?

- a. Czech acronyms, but people usually vocalise them

ČVUT	České vysoké učení technické
LFUK	Lekařská Fakulta University Karlova
JČU	Jihočeská Universita
JSA	Jazyk symbolických adres
LFOP	Lidová Fronta pro Osvobození Palestiny
LSU	Liberální Sociální Unie
LŠU	Lidová Škola Umnění
- b. what about acronyms in other Slavic languages?
- c. Russian borrowings from Georgian without epenthetic vowel

data from Alexei Kochetov, pc
kh=[x], ch=[ʃ]

apart from #[mx], none of the initial clusters occurs occur in Russian native words

Mcyri	poem by Lermontov, and the corresponding character'
Mtacminda	mountain in Tbilisi
Mziuri	Georgian dance band
Mkhedrioni	Georgian paramilitary group
Mckheta	town in Georgia
rkaciteli	popular brand of wine
Rza	personal name (from Turkic/North Caucasian?)

VI. Conclusion

- (55) general summary
- a. phonology makes reference to all kinds of information: morphological, syntactic, (semantic).
But the only objects it makes reference to are of truly phonological nature. No diacritics, no extra-phonological objects.
 - b. the morphological component is autonomous and decides whether morphological information is available to phonology. If so, this information is projected onto phonology as a truly phonological object, e.g. of syllabic nature: CV.
 - c. morphological information in phonology is always PRIVATIVE: either an object X is projected onto phonology, or it is not (presence vs. absence of the initial CV). Under the usual diacritical approach, it is logically impossible to refer to the beginning of the word without referring to "#".
 - d. the parameter "initial CV present vs. absent" derives all and only the initial situations encountered cross-linguistically.
 - e. it does so without releasing ANY of the devices that have been established in order to account for #TR-only languages. No extrasyllabicity, exceptional Onsets etc.
 - f. prediction: if #RT-clusters of any kind and any number occur in a language, the phonology of this language does not impose any co-occurrence restrictions on initial clusters. Any #CC can freely enter such a language.
 - g. two major #RT-families: Slavic and Afro-Asiatic
the important difference in number and nature of occurring #RT-sequences is a consequence of the historical accident that made yers fall out. Slavic is the exception, Afro-Asiatic is the regular pattern.

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