

CVCV and the representation of morphological information in Phonology

(introduction, week 1)

Roadmap

1. Why CVCV ? – eight arguments
2. review: how morphological information is usually represented in phonology
3. proposal: a representational and privative alternative
4. why some languages without initial restrictions do possess initial restrictions
5. why initial consonants are weak in Greek

What is CVCV ?

- (1) CVCV (Lowenstamm 1996, Scheer 1998a,1999a,2000), Szigetvári (1999,2000), Dienes & Szigetvári (ms)

syllable structure boils down to a strict sequence of non-branching Onsets and non-branching Nuclei. No Codas, no branching constituents.

The following representations for basic phonological objects ensue:

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 C ø	C V	C V	C ø #	T ø R V

Why CVCV ?

1. languages without initial restrictions

since 1990: if languages without initial restrictions (e.g. Moroccan Arabic) do not possess branching Onsets, they must lack Coda-Onset sequences as well: #__ doesn't tell us what is a well formed branching Onset in this language.

Prediction: no open vs. closed syllable phenomena in this language.

Wrong prediction: e.g. vowel – zero alternations.

Hence, no way of making cross-linguistic generalisations on syllable structure with branching Onsets, Codas etc. So we are left with the option that all languages are like Moroccan Arabic.

2. yers: Rubach, Gussmann, Szpyra & Cie have always been CVCV, only did they not know they were

2.1. What can make you believe in empty Nuclei?

(2) basic pattern of Slavic vowel-zero alternations

	C C-V	C C-ø	C C-CV	gloss
Czech	lokøt-e	loket-ø	loket-ní	"elbow" GENsg, NOMsg, adj.
Polish	wojøn-a	wojen-ø	wojen-ny	"war" NOMsg, GENpl, adj.
etc.				

(3) naive analysis thereof

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

(4) however

	open syllable		closed syllable		gloss
	zero C C-V	C C-yer CV	vowel C C-ø	C C-CV	
Czech	dom-øk-u	dom-eč-ek-ø	domek-ø	dom-eč-øk-u	house dim.GENsg, double dim. NOMsg, dim. NOMsg, double dim. GENsg
Slovak	kríd-øl-o	kríd-el-iec-ø	kríd-el-ø	kríd-el-øc-e	wing dim.NOMsg, double dim. GENpl, dim. GENpl, double dim. NOMsg
Polish	buł-øk-a	buł-ecz-ek-ø	buł-ek-ø	buł-ecz-øk-a	bread row dim. NOMsg, double dim. GENpl, dim. GENpl, double dim. NOMsg
Serbo-Croatian	vrab-øc-a	vrab-ac-a	vrab-ac-ø		sparrow GENsg, GENpl, NOMsg

(5) generalisation

- a. alternation-sites are vocalized in open syllables iff the following vowel alternates with zero itself.
 - b. vowels that alternate with zero are called yers in Slavic for historical reasons.
 - c. hence, zero occurs in closed syllables and before yers.
 - d. theory is called to be able to refer to this disjunctive context in a uniform fashion. The closed-syllable analysis is contrary to fact.
 - e. 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.
ɤ,ɤ → e,o / __C₀ {ɤ,ɤ}
- Havlikovo pravidlo 1889 (Havlik 1889), Lower: Lightner (1965), Rubach (1984), etc.

- f. 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-øŋ-í	alternation	nemoc-n-ý – nemoc-en-ø
dim. /-Yk/: /dom-Yk-u/ → dom-øk-u		dom-ek
etc.		
word-finally		
GENpl /kříd-Yl-Y/ → křídel	there was	< křid-el-ъ
NOMsg /básYn-Y/ → báseň	always a	< ba-snъ
NOMsg /dYn-Y/ → den	historical yer	< dъnъ

- g. 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-snъ

NOMsg báseň-ø - GENsg básň-ě < NOMsg psl *ba-snъ < IE *bhā

etc.

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

(6) 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.

(7) 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		
Czech ů-o	nož-e	nůž-ek-ø	nůž-ø	nůž-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 ą-ę	zęb-a	ząb-ek	ząb-ø	ząb-øk-a	tooth GENpl, dim. NOMsg, NOMsg, dim. GENsg

(8) 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 (5)e. It is of more general intervocalic nature.
 5. triggering and alternating yers are not the same.

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

closed syllable εC#	open syllable		
	εCə	əCV	
mɔχsɛl	mɔχsɛlɐmã	mɔχsɛlɔ̃, mɔχsɛle	1) je, tu, il, ils morcèle(s)(nt), 2) morcèlement, 3) nous morcelons, 4) inf./ part./ vous morceler/ -é/ -ez
apɛl	apɛlɐra	apɛle	j'appelle, appellera, appellation
ãɔχsɛl	ãɔχsɛlɐmã	ãɔχsɛle	j'ensorcèle etc., ensorcèlement, ensorceler etc.
aχsɛl	aχsɛlɐmã	aχsɛle	je harcèle etc., harcèlement, harceler etc.
aʃɛv	aʃɛvɐmã	aʃɛve	j'achève etc., achèvement, achever etc.
sɛvɛ	sɛvɛɐβa	sɛvɛe sɛvɛaʒ	elle sèvre, sèvrera, sevrer, sevrage

(10) French ATR-alternations of mid vowels

	closed syllable	open syllable		
		__Cə	__CV	
e	fɛt	sɛlɐβi	fete	je fête, céleri, fêter
	pɛβdy	βɛtɐβav	pɛβiβ	perdu, betterave, périr
	sɛβɛn	sɛβɛnɐmã	sɛβɛnite	sereine, sereinement, sérénité
o	kɔd	mɔkɐβi	kɔde	code, moquerie, coder
	rɔz	rɔzɐβɛ	rɔzje	rose, roseraie, rosier
	sɔβɛ	sɔβɛɐmã	sɔβrijete	sobre, sobrement, sobriété
ø	øβœz	øβœzɐmã	apøβɛ	heureuse, heureusement, apeuré
	œvɛ	βœvɐβi	øvre	œuvre, beuverie, œuvrer
	ʒœn	vœlɐri	ʒønes	jeune, veulerie, jeunesse

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

	CV		CCV		CV if V=reduced since latin
é	sedet	siede	fēsta	fēsta	hēdera édera
	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: optimus, optumus

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

(12) generalisation

- a. +ATR and schwa occur in open syllables
 - b. -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.

(13) 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	krɔv-Yk-Y	krɔv-Y	krɔv-Yk-a
French	səʁɛnite	səʁɛnYmã [səʁɛnãmã]	səʁɛn-Y	səʁɛnYmã [səʁɛnãmã]

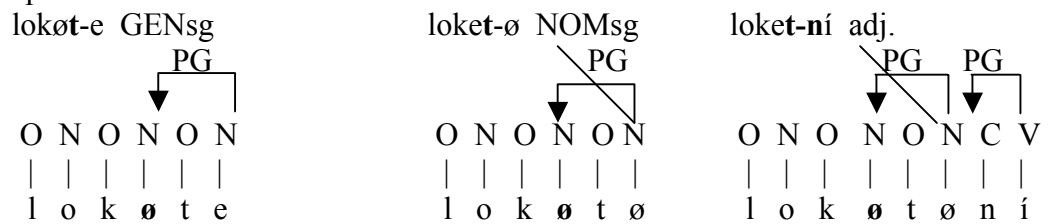
- b. there are no yers in French. What kind of vocalic object could be common to both Slavic and French ?
- c. the generalisation must be formulated as a rule of intervocalic communication.

(14) 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 (1982), Spencer (1986), Kaye et al. (1990), Kaye (1990a), Scheer (1998a,1999a).
- 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.

(15) 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, Lowenstamm and Vergnaud 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.

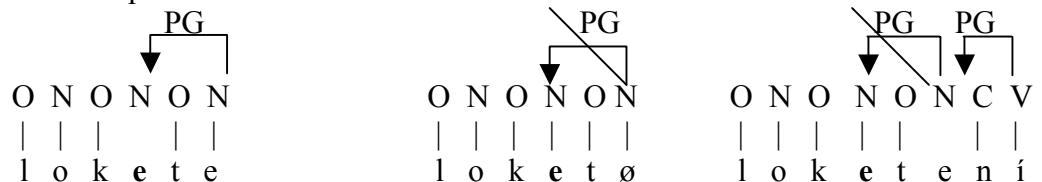


- e. later on (Scheer 1997,1998b), d3) was abandoned in favour of an analysis where alternating vowels are underlyingly present, for the reasons that are described e.g. in Rubach (1993:135ff).
 1. alternating vowels are underlyingly unattached to their Nuclei: they are floating.
 2. non-alternating vowels 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 & Rubach (1987), Rubach (1986).

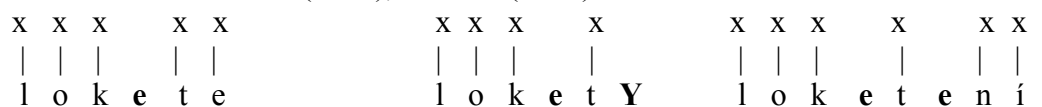
The only difference is structure-preservation: non-phonetic yers are deleted or subject to stray-erasure under the latter analysis, they are present at any level under the former. The latter does not recognize empty Nuclei, the former does.
underlying representation in CVCV:



surface representation in CVCV:



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



(16) 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 1990a): 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, 1999a, Ségéral & Scheer & Scheer in press): 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		krov-a	króv-Yk-Y	króv-Y	króv-Yk-a
French		sæɛnite	sæɛnYmã [sæɛnəmã]	sæɛn-Y	sæɛnYmã [sæɛnəmã]

- e. The Coda Mirror (Ségéral & Scheer in press): phenomena other than vowel-zero alternations are driven by Proper Government. ==> "strength" vs. "weakness" of Consonants, vowel-length.
- f. the phonotactics of vowel-zero alternations is cross-linguistically stable. Hence, they are likely to be driven by a single mechanism. If Slavic is incompatible with non-CVCV, only CVCV qualifies for a crosslinguistically uniform analysis.

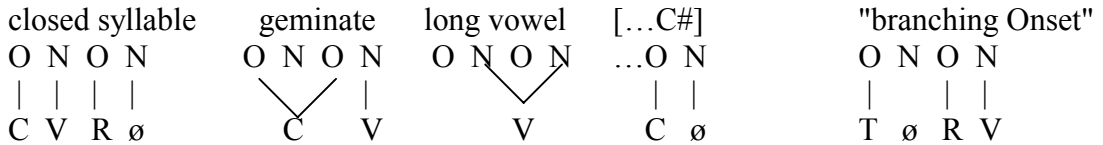
	open syllable: zero	closed syllable: vowel		gloss
	C _ C-V	C _ C-∅	C _ C-CV	
Moroccan Arabic	kit ∅ -u	k ∅ t ib -∅	k it t ib -∅	"write" perf.act.3pl, 3sg, 3sg causative
German (optional syncope)	inn ∅ -e	inn er -∅	inn er -lich	"inner+infl, inner, internal"
Tangale (Chadic)	dob ∅ -go	dob e	dob u -n-go	"called, call, he has called me"
Somali (Coushitic)	nir ∅ -o	nir ig -∅	nir ig -ta	"baby-camel" pl, sg indef, sg def
Turkish	dev ∅ -i	dev ir -∅	dev ir -den	"transfer" ACC, NOM, ABL
Slavic (e.g. Czech)	lok ∅ -e	lok e t-∅	lok e t-ní	"elbow" GEN, NOM, adj.
Hungarian	maj ∅ m-on	maj ∅ m-∅	maj ∅ m-ra	"monkey" superessive, NOM, sublative
Hindi	kaar ∅ k-õõ	kaar ∅ k-∅	kaar ∅ k-nee	"case" Oblique pl, NOMsg, agentive

2.2. Missing pieces for CVCV

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

a. syllable structure boils 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



(18) basic generalisation 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 ?

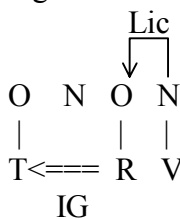
a. consonants may interact. C₁ may govern C₂ iff

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 Scheer
Infrasegmental Government (IG) (1996,1998b,1999a,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, 1999a)
Sonorants are governors, Obstruents are governees

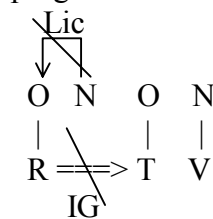
b. one consequence:

progressive IG is ruled out because only Rs are governors, and in a C₁øC₂V sequence, only C₂'s Nucleus is filled. Only audible Nuclei are licensors. Thus, C₁ will always fail to be licensed.

regressive IG



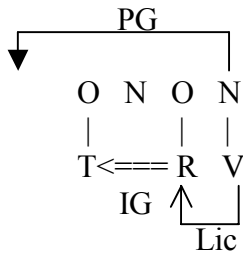
progressive IG is ruled out



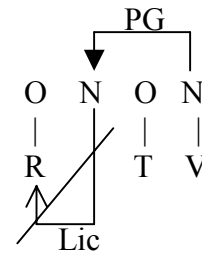
c. another consequence:

1. the empty Nucleus enclosed within a TøRV cluster does need no care from V because it is enclosed within a domain of IG.
2. the empty Nucleus enclosed within a RøTV cluster requests PG from V since it will never be able to satisfy the ECP through IG.
3. hence, in the case of TøRV, but not in RøTV 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



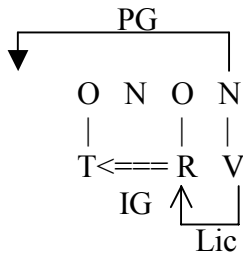
PG cannot reach beyond RT because it must take care of the empty Nucleus



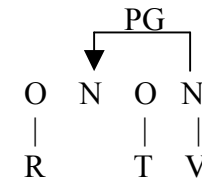
(19) basic generalisation II

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
 ==> T does not "belong to a Coda"



R occurs before an empty Nucleus which is properly governed
 ==> R "belongs to a Coda"



3. Morae are an optical illusion. Consonants NEVER count, whether Onsets or Codas

(20) basic generalisation III

morae do not exist, consonants NEVER count (Szigetvári 2000, Scheer 2000)

a. basic argument in favour of morae:

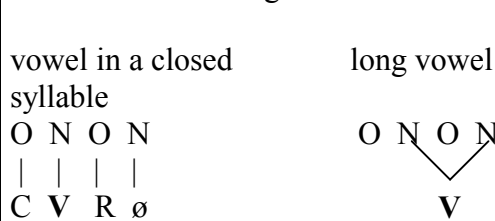
you cannot get the equivalence VV = VC in syllabic terms: counting morae give a correct result, but neither counting skeletal slots nor counting Rhymes does.

(+ compensatory lengthening targets only Codas, never Onsets: this is because Onsets may not be moraic)

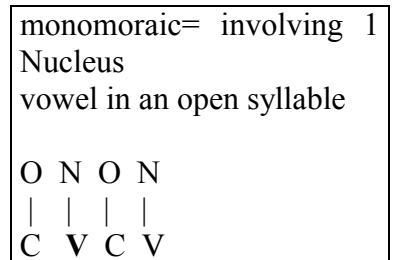
b. this equivalence is straightforward in CVCV

in a "Coda-counting" language

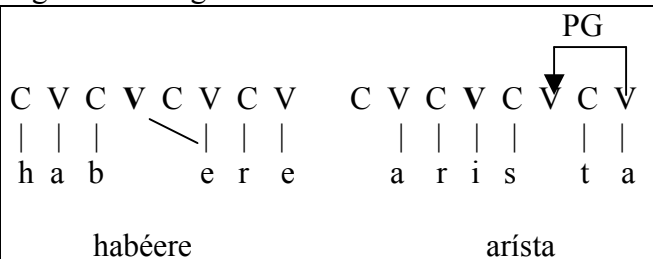
bimoraic = involving 2 Nuclei



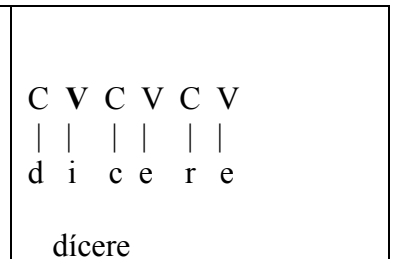
vs.



e.g. stress assignment in Latin: stress falls on the third but last Nucleus



vs.



- c. "Codas count" is an optical illusion: you do not count Codas, but the empty Nuclei that follow them.
Uniformisation: prosody does not sometimes count vowels alone, and sometimes vowels and certain consonants. Only Nuclei count.
- d. the parameter is not
"Coda-counting" vs. "languages that do not count Codas"
but
"languages that count empty Nuclei" vs. "languages that count only filled Nuclei"
- e. the **observation** that Onsets, as opposed to Codas, never count receives an **explanation**:
only Nuclei count. Codas occur before (properly governed) empty Nuclei, Onsets never do.
No such explanation available in Moraic Theory.

4. If final consonants sit in Onsets, what about cases of identical behaviour of final and internal Codas?

(21) sometimes internal and final Codas do not behave alike.

Typical Government-Phonology evidence for analysis final consonants as Onsets that are followed by an empty Nucleus (Kaye 1990, Gussmann & Harris & Harris 1998 etc.).

E.g. open syllable lengthening in Icelandic: stressed vowels are long iff they occur in open syllables (Gussmann in press).

long VV			short V	
CVVCV	CVVTRV		CVVRTV	
staara stara 'stare'	nœp ^h ja nepja 'bad weather'		kampyr	kambur 'comb'
luuða lúða 'halibut'	pœt ^h ri betri 'better'		haulvyr	hálfur 'half'
fai:ri færi 'opportunity'	aap ^h ril apríl 'April'		haṛka	harka 'severity'
CVV#	CVVT#	CVVTR#	CVRT#	
puu bú 'estate'	θa:k ^h þak 'roof'	p ^h yyk ^h r pukr 'secretiveness'	saiłt	sælt 'blessed neut.'
t ^h voo tvo 'two, acc. masc.'	hœi:s haus 'head'	sœœt ^h r sötr 'slurping'	pœlv	bölv 'cursing'
fai: fæ 'I get'	k ^h vœ:l kvöl 'torment'	snvyp ^h r snupr 'rebuking'	k ^h ymr	kumr 'bleating'
	prje:v bréf 'letter'			

alternating items:

CVVTRV		CVVTR	
p ^h yyk ^h ra	pukra 'be secretive'	p ^h yyk ^h r	pukr 'secretiveness'
sœœt ^h ra	sötra 'slurp'	sœœt ^h r	sötr 'slurping'
snvyp ^h ra	snupra 'rebuke'	snvyp ^h r	snupr 'rebuking'

vs.

CVVRTV		CVVRT	
k ^h ymra	kumra 'bleat'	k ^h ymr	kumr 'bleating'
pœlva	bölvá 'curse'	pœlv	bölv 'cursing'
emja	emja 'wail'	emj	emj 'wailing'

(22) but sometimes internal and final Codas DO behave alike.

Typical Kahnian late-70's evidence that led to the (re)introduction of syllable structure into the theory.

E.g. l-vocalisation in Portuguese, Serbo-Croatian etc.

Brazilian Portuguese (e.g. Harris 1997)

V__V		vs.	V__#		V__C	
saleiro	salt cellar			saw	salt (N)	sawgar
papelão	cardboard		papew	paper		

(23) Hence

- a. a good theory is a theory that can express both identical AND diverging effects of both 'Codas'. Standard theory can cope only with the former, standard GP only with the latter situation. How do we get out of this vicious circle?
- b. CVCV = standard theory = both Codas occur before an empty Nucleus
contrastive behaviour of both Codas begs the question.
- c. CVCV
 1. both 'Codas' occur before an empty Nucleus – TRUE
 2. both 'Codas' have the same status – FALSE
 difference: internal 'Codas' stand before an internal empty Nucleus
 final 'Codas' stand before a final empty Nucleus (FEN)
- d. FENs have special properties, this is a cornerstone of Gov Phon:
 1. they are mute although they escape PG
 2. they can properly govern empty Nuclei (parøkø "parc") (non-CVCV version: they can government-license their Onsets)
 sum: FEN are better lateral actors than non-final empty Nuclei. They can do more.
- e. thus, the fact that FEN may have a different effect on their Onset than internal empty Nuclei does not come as a surprise at all.
 Prediction: if both 'Codas' show contrasting behaviour, the final 'Coda' will be "stronger" since the FEN can do more.
- f. this seems to be a correct prediction:
 'Coda'-consonants are typically subject to lenition processes.
 In case both 'Codas' show contrastive behaviour, the final 'Coda' remains unaffected, whereas the internal 'Coda' reacts:
 Old French l-vocalisation (still visible in modern French)
 ʃəval cheval 'horse sg' - ʃəvaws 'horse pl' chevaux
 journal – journaux etc.
 There does not appear to be a system (of l-vocalisation) where lenition affects the word-final, but not the preconsonantal consonant.
- g. sum:
 1. there are two different causalities. Their superposition creates an optical illusion.1.
 1. **positional**: a phonological process may be triggered by the fact that a consonant occurs before an empty Nucleus.
 ==> responsible for identical behaviour of 'Codas'
 2. **lateral**: a phonological process may be triggered by the fact that an Onset is or is not licensed/ governed. FEN can license/ govern, internal empty Nuclei cannot.
 ==> responsible for contrastive behaviour of 'Codas'

5. disjunctive contexts
phonological processes that affect vowels that stand 1) in closed syllables and 2) in open syllables iff the following vowel is a schwa

(24) $_ _ \text{RTV} = _ _ \text{C}\text{ə}$

hence $\text{RT} = \text{C}\text{ə}$

where "ə" is a vowel that alternates with zero

a. naïve analysis (early generative)

schwa is absent from the lexicon. It is inserted by a rule of epenthesis.

Thus, $[_ _ \text{C}\text{əCV}] = / _ _ \text{CCV}/$, which means that $/ _ _ \text{CCV}/ = / _ _ \text{RTV}/ =$ we are fine.

b. this does not work for any of the languages quoted below since the location of a vowel that alternates with zero is not predictable.

E.g. French #s $_ _ \text{k}$: skier $[\text{skV}]$ vs. secouer $[\text{səkV}]$, Slavic (Cz) les – lesa vs. pes – psa

c. thus, challenge for phonological theory:

"how to get something for nothing" Anderson (1982)

1. schwa must be absent underlyingly, but

2. its location must be underlyingly specified

==> solution: empty Nuclei: schwa is melodically absent, but syllabically present.

the vowel is sensitive to the fact that the following Nucleus is empty (Kaye 1990a).

d. disjunctivity demands the same causes for the same effects, thus:

if $[_ _ \text{C}\text{əCV}] = / _ _ \text{C}\text{əCV}/$

then $[_ _ \text{RTV}] = / _ _ \text{R}\text{əTV}/$ ==> an empty Nucleus separates 'Codas' and Onsets

e. vowels that alternate with zero have no bearing on preceding Nuclei.

Illustration thereof

(25) overview of data illustrating the disjunctive context

"in closed syllables and if the following vowel is a schwa"

segmental effect (produced or inhibited)

French $[\text{ə}]-[\text{ɛ}]$	(26)	disqualifies schwa
French ATR	(27)	inhibits tenseness
Czech V-zero	(28)	inhibits zero
Slovak V-zero	(29)	inhibits zero
Serbo-Croatian V-zero	(30)	inhibits zero
Italien diphthongisation	(31)	inhibits diphthongisation

more evidence for the statement "schwa behaves as if it were not there"

Czech V-VV (32)-(34) inhibits root-length

Serbo-Croatian (35) is not counted as a syllable

(26)	closed syllable	open syllable		
	εC#	εCə	əCV	
	mɔχsɛl	mɔχsɛlɔmã	mɔχsɛlɔ̃, mɔχsɛle	1) je, tu, il, ils morcèle(s)(nt), 2) morcèlement, 3) nous morcelons, 4) inf./ part./ vous morceler/ -é/ -ez
	apɛl	apɛlɔra	apɛle	j'appelle, appellera, appellation
	ãɔχsɛl	ãɔχsɛlɔmã	ãɔχsɛle	j'ensorcèle etc., ensorcèlement, ensorceler etc.
	aχsɛl	aχsɛlɔmã	aχsɛle	je harcèle etc., harcèlement, harceler etc.
	aʃɛv	aʃɛvɔmã	aʃɛve	j'achève etc., achèvement, achever etc.
	sɛvɛ	sɛvɛɔvã	sɛvɛe sɛvɛaʒ	elle sèvre, sèvrera, sevrer, sevrage

(27)	closed syllable	open syllable		
		__Cə	__CV	
e	fɛt	sɛlɔvi	fete	je fête, céleri, fêter
	pɛɔdy	bɛtɔvã	pɛviɔ	perdu, betterave, périr
	sɛɛn	sɛɛnɔmã	sɛɛnite	sereine, sereinement, sérénité
o	kɔd	mɔkɔvi	kɔde	code, moquerie, coder
	rɔz	rɔzɔvɛ	rɔzje	rose, roseraie, rosier
	sɔbɛ	sɔbɛɔmã	sɔbrijete	sobre, sobrement, sobriété
ø	øɛɔz	øɛɔzɔmã	apøɛe	heureuse, heureusement, apeuré
	œvɛ	bœvɔvi	øvre	œuvre, beuverie, œuvrer
	ʒœn	vœlɔri	ʒønes	jeune, veulerie, jeunesse

(28)	Czech	Slovak	
	dům	dúm	maison
	dom-ek	dom-ek	id., diminutif NOMsg
	dom-øk-u	dom-øk-u	id., diminutif GENsg
	dom-eč-ek	dom-øč-ek	id., double diminutif NOMsg
	dom-eč-øk-u	dom-eč-øk-u	id., double diminutif GENsg

(29)	Slovak	
	krídel-o	krídel aile NOMsg, GENpl
	krídel-øc-e	krídel-iec id., diminutif NOMsg, GENpl
	vedør-o	vedier seau NOMsg, GENpl
	vedier-øc-e	vedier-ec id., diminutif NOMsg, GENpl

(30)	Serbo-Croatian	
	vrabac	moineau NOMsg
	vrapøc-a	id., GENsg
	vrabac-a	id., GENpl

- (31) Romance diphthongisation of short tonic [e,o] in Italian

	<u>CV</u>		<u>CCV</u>		<u>CV</u> if V=reduced since latin
é	sedet	siede	fěsta	fěsta	hédera édera
	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: optimus, optumus

fr. facile – difficile

barbe – imberbe

chaste – inceste

ami – ennemi

- (32) Czech V-VV: diminutive-schwa does not license length of the root-vowel

NOMsg	GENpl	diminutive	GENpl dim	
bába	bab	babka	babek	vieille femme; petite vieille
blána	blan	blanka	blanek	membrane; membranule
brána	bran	branka	branek	porte; arc, petite porte
jáma	jam	jamka	jamek	trou; petit trou
kláda	klad	kladka	kladek	poutre; poulie
kráva	krav	kravka	kravek	vache; vachette
vrána	vran	vranka	vranek	corneille; jument morelle
žába	žab	žabka	žabek	grenouille; petite grenouille

- (33) Czech V-VV: suffixal schwa does not license length of the root-vowel

jádro	jader	jaderný	"pépin", "à pépins, nucléaire"
játra	jater	jaterní	"foie", "hépatique"

- (34) Czech:

feminine diminutive schwa is unable to trigger <û-o>

but masculine diminutive NOMsg is

kůň	koně	cheval NOMsg, GENsg
dům	domu	maison, id.
nůž	nože	couteau, id.
nůžky	nůžek	ciseaux, NOMpl, GENpl
dům	domek	house NOMsg, diminutive

- (35) Serbo-Croatian: schwa does not count

prozor	prozor-i	fenêtre NOMsg, NOMpl
učitelj	učitelj-i	professeur, id.
most	most-ov-i	pont, id.
broj	broj-ev-i	nombre, id.
toranj	toranj-ev-i	tour (bâtiment), id.
mozak	mozog-ov-i	cerveau, id.

(36) cross-linguistic (?) generalisations

- a. within any configuration

CV₁CV₂

where V₁ alternates with zero but is phonetically expressed in spite of the presence of V₂, V₂ alternates with zero itself.

- b. ALL vowels that are not phonetically schwa but alternate with zero have been central vowels in former times.
c. hence, "schwa" has no phonetic, but a phonological definition: "any vowel that alternates with zero is a schwa and behaves as it were a phonetically central vowel".

6. The Coda Mirror

Ségéral&Scheer (in press)

(37) challenge

- a. why is it that

1. the initial and post-Coda position have the same influence on consonants?
2. that is, they guarantee them from lenition

- b. same effects, same causes. Hence, theory is called to be able to characterize both positions in a positive, unique and uniform syllabic object.

- c. {#,C}__ is the exact mirror of the Coda-context __{#,C}

both enjoy opposite structural descriptions AND they produce opposite effects:

consonants in Codas are prone to lenition - weakness

consonants in the Coda Mirror are guaranteed against lenition – strength

- d. this can hardly be accidental.

- e. standard syllable structure faces a dead-end: word-initial and post-Coda consonants are Onsets, but so are intervocalic consonants. However, these are explicitly excluded from the Coda-Mirror.

- f. CVCV:

1. the syllabic identity of a post-Coda consonant is

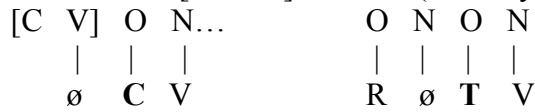
∅__ = occurring after an empty Nucleus

2. hence, word-initial consonants must also occur after an empty Nucleus

==> # = CV the phonological identity of the beginning of the word is an empty Onset followed by an empty Nucleus. Cf. Lowenstamm (1999) on different grounds.

(38) CVCV: descriptive adequacy

a. consonants stand in the Coda Mirror iff they occur **AFTER** an empty Nucleus
 word-initial: [#CV...] after a (heterosyllabic) consonant: [...RTV...]



b. consonants stand in Codas iff they occur **BEFORE** an empty Nucleus
 word-final: [...C#] before a (heterosyllabic) consonant: [...RTV...]



(39) Challenge due to the Mirror-effect

	structural description	=	segmental effect	=	syllabic analysis
Coda	__ {#,C}	=	weakness	=	before empty Nuclei
	vs.		vs.		vs.
Coda Mirror	{#,C}__	=	strength	=	after empty Nuclei

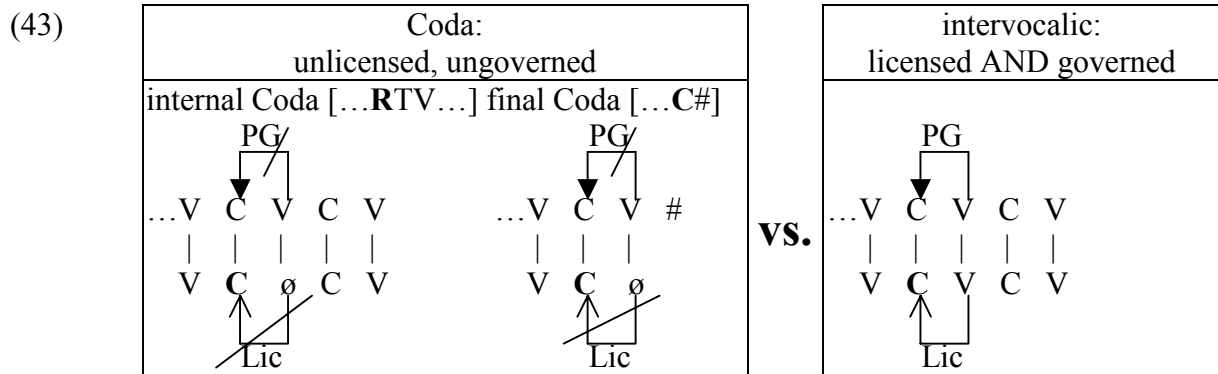
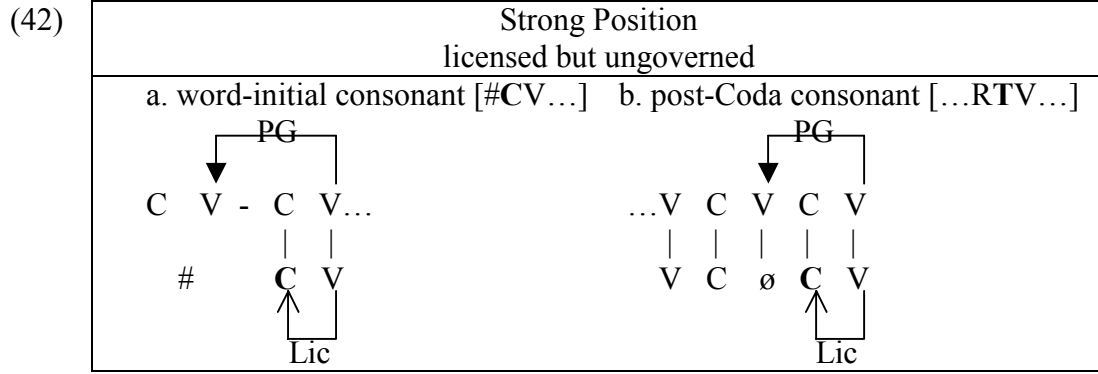
(40) Logical possibilities

Licensing	Government	gloss	segmental health according to predictions
+	-	Coda Mirror	splendid
+	+	V__V	unfavourable
-	-	Coda	unfavourable
-	+	<i>impossible</i>	---

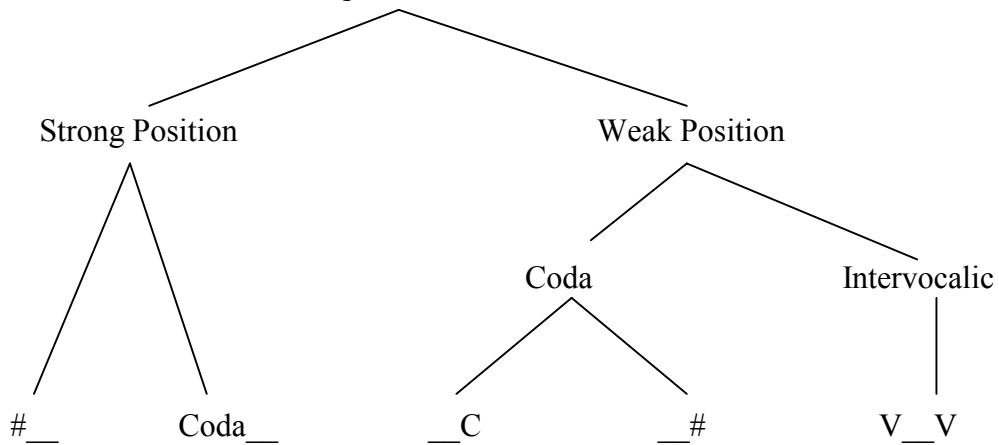
(41) CVCV: explanatory adequacy

- a. Government inhibits the segmental expression of its target
 cf. Proper Government
- b. Licensing backs up the segmental expression of its target
 cf. the overall idea of Licensing, within GP and elsewhere.

Hence:



Lenition and Fortition: Partition of the string
(44) Positional influence on segmental health



Lenition (more evidence in the paper, downloadable from <http://www.unice.fr/dsl/nis01/cvev.htm>)

- (45) diachronic evidence: Latin obstruents > French
- in the Strong Position, nothing happens: Latin = French
 - in the three weak positions, various lenition processes take place: loss, spirantisation, voicing etc.

(46)	a. #__	b. Coda__	c. Coda				d. V__V
			__C		__#		
p	porta porte	talpa taupe	rupta route		lup(u) [lu]	ripa rive	
b	bene bien	herba herbe	cub(i)tu coude		ub(i) où	faba fève	
t	tela toile	cantare chanter	plat(a)nu plane		marit(u) mari	vita vie	
d	dente dent	ardore ardeur	advenire avenir		nud(u) nu	coda queue	
k	cor cœur	rancore rancœur	facta faite		*verac(u) vrai	lactuca laitue	
g	gula gueule	angustia angoisse	rig(i)du raide			*agustu août	
f	fame faim	infernu enfer	steph(a)nu Etienne			deforis dehors	
s	serpente serpent	versare verser	musca mouche		nos [nu]	causa chose [z]	

- (47) synchronic evidence: Somali stops (voiced)
- in the the Strong Position, they appear as such
 - in Codas, they appear as unreleased stops
 - in intervocalic position, they spirantise

(48)	a. #__	b. Coda__	c. Coda		d. V__V	
	sg indef	1°sg	__C sg def	__# sg indef	pl	gloss
b	beer	garb-o pl	garab ^ʔ -ta dab ^ʔ -ka	garab ^ʔ dab ^ʔ	daβ-ab ^ʔ	field shoulder fire
d	dile	heb ^ʔ -aj he became tame	heβed ^ʔ -ka geed ^ʔ -ka	heβed ^ʔ geed ^ʔ	geeð-ad ^ʔ	killer tame animal tree
g	gaf	nirg-o pl	nirig ^ʔ -ta ɖeg ^ʔ -ta	nirig ^ʔ ɖeg ^ʔ	ɖey-o	error young fem camel ear

7. restrictions on word-initial consonant clusters

- (49) Typology of word-initial clusters (T=Obstruent, R=Sonorant), e.g. Clements (1990)

	#CV	#TR	#RT	example
a. #CV-only	yes	no	no	e.g. Ticuna (native indian, Colombia)
b. #TR-only	yes	yes	no	English, French etc.
c. #RT-only	yes	no	yes	does not exist
d. #TR and #RT	yes	yes	yes	modern occidental Semitic, Berber, Slavic

anything goes

- (50) problems

- syllabic theory was built in the 70's and 80's on the sole basis of #TR-only languages, i.e. the typical IE pattern.
=> Sonority Sequencing: "within a branching Onset, sonority increases (must increase)"
- what about anything-goes languages? Two possible solutions:
 - Sonority Sequencing does not operate in these languages, i.e. anything is a good branching Onset. => the properties of syllabic constituents are not universal, they are distributed accidentally over languages.
 - there are no branching Onsets in these languages, they are underlyingly CVCV supported by semitic morphology
- in any case, standard theory is unable to say why #TR-only languages are possible, but not #RT-only languages, rather than the reverse.

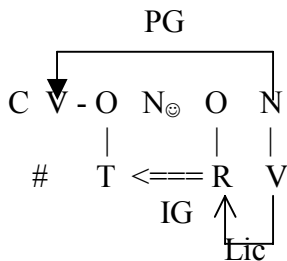
(51) goals

- a. build a theory that accounts for #TR-and-#RT languages without releasing any of the principles driving #TR-only languages.
- b. predict that #RT-only languages may not exist.
- c. non-circularity: achieve b) without simply implementing what we observe word-initially.

For #TR-only languages, why does the constraint say "within a branching Onset, sonority increases (must increase)" rather than the reverse? Because we observe that in these languages, it always does. This theory can do as well with a putative world where #RT-only languages do exist, but #TR-only languages do not. Build a theory that is unable to describe this kind of anti-world (Scheer (1999a,b).

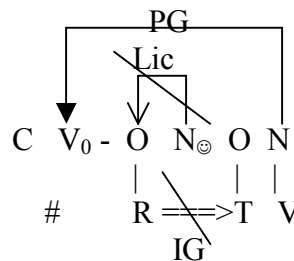
(52) hence, if "#" = CV, then

#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.



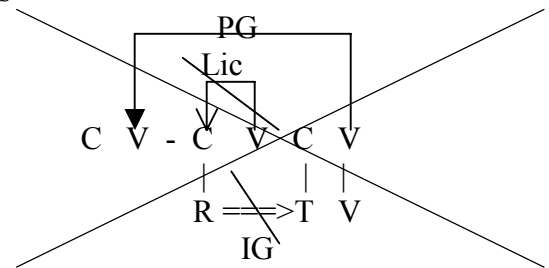
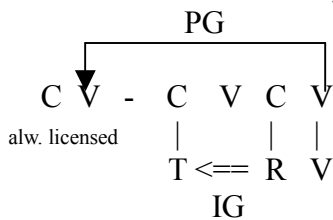
#RT is ruled out: R is necessarily unlicensed because its Nucleus is empty. Therefore, it cannot interact with T, and N calls for PG from V, which is unable to govern both V0 and N.

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

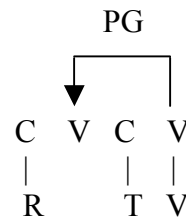
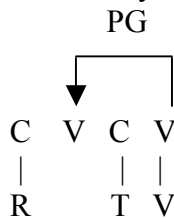
If the initial CV is absent, no such restriction obtains: initial clusters are predicted to be free.

(53) 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



- (54) 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. the absence of #RT-only languages is predicted.
 The presence of #RT-clusters implies the absence of the initial [CV]. This, in turn, releases any restriction on word-initial clusters. Hence, you can't get #RT without #TR (=absence of the initial [CV]), but you can get #TR without #RT (=presence of the initial [CV]).
 - c. this parameter setting does not harm any of the theoretical generalisations that explain the absence of #RT clusters in #TR-only languages
 - d. it is not circular: none of the tools implied have been built on the basis of word-initial data: Proper Government, Infrasegmental Government, Licensing, CVCV.

8. Slavic: why are syllabic consonants never syllabic word-initially ?

What is a syllabic consonant? Example from Czech

- (55) distributional definition of consonantal syllabicity
 [r,l] are syllabic iff they occur in-between two other consonants or word-finally after a consonant (but not word-initially before a consonant).
 C__C = [CĀC]: krk, slza, vlk, Vltava, prst, drtit, vrtit, trh
 C__# = [CĀ#]: kradl, vedl, tiskl, zábl, vítr, Petr
 but #__C = [CCV]: lhát, lžu, lkát, lpět, lva, rty, rdít se, rzivost, rvát

C__V krev vs. C__C krve

- (56) phonological definition of consonantal syllabicity:
 [r,l] are syllabic iff they behave like a vowel/ they endorse a vocalic function.
 In some grammars, [r,l] are presented as regular vowels
 tests:
- a. syllabic consonants "count" as vowels
 weight of infinitives: at least two morae
 in order to be well-formed, a Czech infinitive must bear at least
 - a. two short vowels dělat or
 - b. one long vowel znát or
 - c. one short vowel and one syllabic consonant trpět, vrtit, mlčet
 - b. syllabic consonants trigger vowel-zero alternations just like vowels do
 1. neslabičné prepositions vocalise if the following noun starts with "too many" consonants (floating behaviour):
 ve stromě ve třídě
 ze dřeva ve přírodě
 but there is no vocalisation at all if one of the noun-initial consonants is syllabic:
 CĀC = CVC

NOMsg	GENsg	DATsg	LOCsg	INSTRsg
vlk	z vlka	k vlkovi	ve vlkovi	s vlkem
krt	z krtá	ke krtovi	v krtovi	s krtem
prd	z prdi	k prdi	v prdi	s prdí
zrcadlo	ze zrcadla	k zrcadlu	v zrcadle	se zrcadlem

2. C-final prefixes are vocalised iff the following root occurs in zero-grade, cf. extra-handout:

[...Ce – CC...] iff CC = $\sqrt{C\emptyset C-V}$

vs.

[...C \emptyset – CC...] iff CC = $\sqrt{CCVC-V}$

\sqrt{CCC} never provoke vocalisation of the prefix, they behave exactly like \sqrt{CVC}

od-frknout	od-chrchlat si	roz-tržení	roz-vrstvit
roz-vlnit	pod-hrnout	pod-vrh	roz-vrtat
od-vlhnout			

(57) diachronic information

a. $CCC < CyerCC$ LŠB41,77

$CC\# < CCyer$

b. rarely TrHist228

$CCC < CCyerC$

psl kr-ъv-ъ > ně krev vs. psl kr-ъv-e > ně krve

slъz-a > slza

trъnožъ > trnož

klъnъ > klnu

c. "syllabic" [r,l] were not syllabic in stč, cf. versification. They had the same status as their Polish and Russian cognates, cf. Piotr, wiatr etc.:

CCC – floating behaviour in stč versification

$CC\#$ – floating behaviour in stč versification

... $VCCC$ – various treatments:

stč ... $VCCC$ > ně id.

stč ... VC_1C_2CV :

stč ... $VCCC$ >

$C_1, C_2 > \emptyset$

epenthesis

řemeslník > řemeslník

sedlka > selka

bidlko > bidélko

spravedlnost > spravedlnost

tkadlcě > tkalce

> jádérko

bratrský > bratrský

zrcadlko > zrcátko

> máselník

stříbrný > stříbrný

jablko > jabko, jablko

> jaterní

> opatrný

d. the modern situation is an idiosyncratic evolution of Czech, Slovak and Serbo-Croatian from non-syllabicity to syllabicity of "syllabic" consonants ("R"=[r,l]).

stč CRC > ně CR \dot{C}

stč CR# > ně CR \dot{C} #

but

stč #RCV > ně #RCV

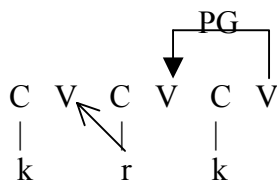
e.	< CъC		< CъC	
	psl	nč	psl	nč
r	C__C	търѣти	trpět	krk
		сѣмьртѣ	smrt	gъrdlo
		сѣгрѣ	srp	tъrgъ
	C__#	мыслѣ	mysl	bratrъ
		седмѣ	sedm	vedlѣ
	осмѣ	osm		
	#__C	лъна	lnu	гъty
				rty
				lhát
l		рѣлнѣ	pln-ý	> lu
		вѣлкѣ	vlk	mъlviti
				> prač mlviti

(58) generalizations

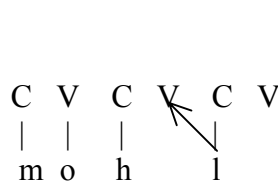
true for all Slavic languages (and more?)

- syllabic consonants are due to the diachronic loss of an adjacent vowel
- in case a consonant is adjacent to no vowel due to a), it
 - either may show no reaction – Polish situation
 - become syllabic – Czech, Slovak, Serbo-Croatian
- however, in case it becomes syllabic, out of the three possible configurations
 - #__C
 - C__C
 - C__#
 only the latter two provoke syllabicity
- there are no word-initial syllabic consonants – why?
- what is the phonological identity of a syllabic consonant?
 - ordinary analysis: a consonant sitting in a Nucleus – arrrgh
 - CVCV: a consonant that sits in an Onset but branches on the preceding empty Nucleus.

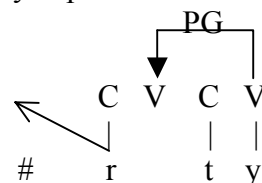
krk "throat"



mohl "could"



rty "lips"



Slavic is an anything-go language, thus does not possess the initial CV.

Therefore, initial consonants may not link up to a preceding Nucleus and are non-syllabic.

The representation of morphological information in phonology

1. The problem

(59) 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

(60) 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.

(61) 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.

(62) 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] – [[glód̥] [e]] vs. [desant] (Rubach & Booij & Booij 1984). Palatalization applies in the presence of a palatal agent only if the palatalizable consonant occurs before "]".

2. representational, privative and non-procedural alternative

(63) 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.

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

$\sqrt{\dots i, u, y} + V \longrightarrow [\sqrt{\dots ij}, uw, y\eta V]$	vs.	$\dots i, u, y + \sqrt{V} \dots \longrightarrow [i, u, y + V]$
lier "tie"		bi-annuel [biannyɛl]
liais [lijɛ] "I tied"		anti-existential [ãntiegzistãsje]l]
lions [lijɔ̃] "we tie"		archi-ondulé [aχ(iɔ̃dyle)]
lia [lija] "I tied" passé simple		

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

" $\sqrt{\#}$ suffix" = $\sqrt{\text{suffix}}$

vs.

"prefix # $\sqrt{\text{ }}$ " = prefix CV $\sqrt{\text{ }}$

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

C	V	-C	V-	C	V	C	V
b	i			a		n	nuel

lia [lija]

biannuel [bianyɛl]

(65) how do we know whether a morphological boundary triggers or inhibits phonological processes?

- Lexical Phonology: we do not know.
- representational: if morphological information is projected into phonology, phonology decides how this object must be interpreted.
 - if the phonological process at hand is a place-demander, e.g. gemination, then the presence of an empty CV will trigger this process.
 - 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.
- \implies the representational alternative makes predictions that may be falsified where Lexical Phonology only records the facts observed.

(66) occurring empirical situations

the concatenation of two morphemes M_1 and M_2 may

- 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.
- 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.

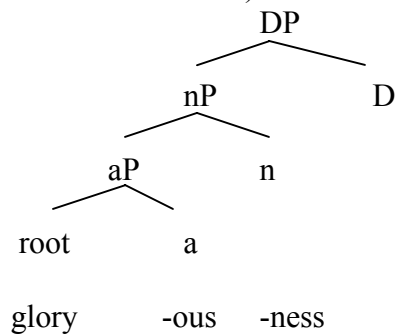
- c. play no role in phonological matters: the string behaves as if there were no morphological boundary.

(67) summary of the three implementations

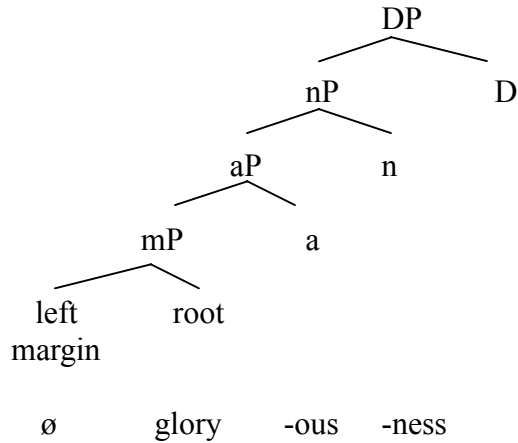
	Lexical Phonology	representational	Kaye (1995)
a morphological boundary blocks a phonological process	Lexical Module the phonological rule applies at level X, while the affixation of the relevant morphemes takes place at level X+n.	presence of a CV the phonological process at stake needs adjacency	analytic 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

(68) seen from above:

morphological representation of the DP in Distributed Morphology
(e.g. Halle & Marantz & Marantz 1993)



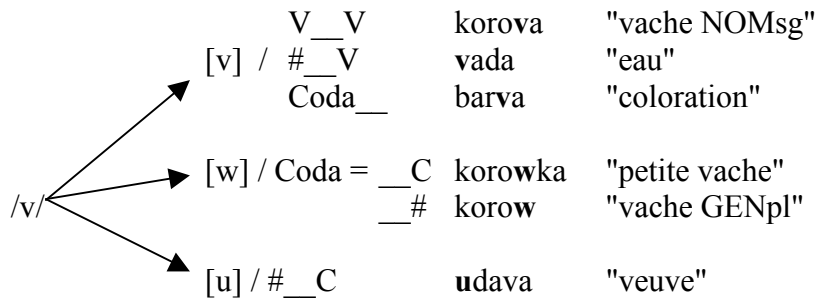
(69) possible amendement thereof



3. Case-study

Bielorussian: word-boundaries play (almost) no role

(70) Bielorrussian /v/



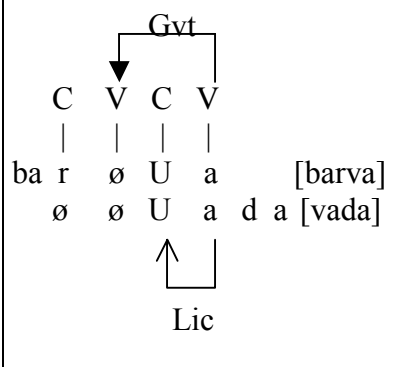
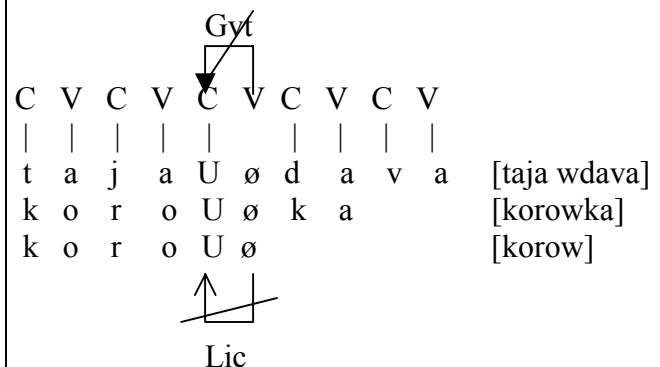
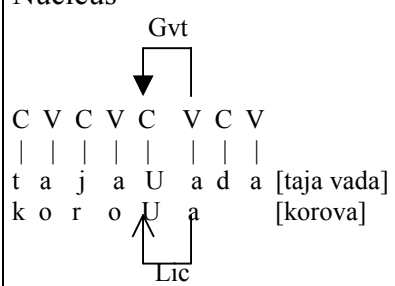
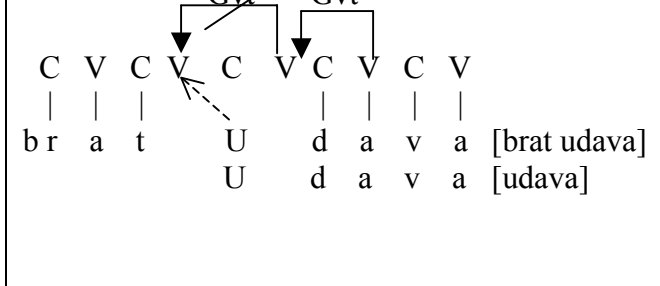
- (71) a. taja **w**dava "cette veuve"
 brat **u**davy "le frère de la veuve"
 b. taja **v**ada "cette eau"
 brat **v**ady "le frère de l'eau"

(72) /v/ next to word-boundary word-internal result

...C # __C	=	#__C	[u]	brat u davy	=	u dava
...C # __V	=	Coda__	[v]	brat v ady	=	barva
...V # __C	=	Coda	[w]	taja w davy	=	korow, korowka
...V # __V	=	V__V, #__V	[v]	taja v ada	=	korova

(73) generalisation

- a. utterances are headed by a CV-unit.
 b. within utterances, no CV-units are distributed.

<p>(74) /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> 

- (75) analysis so far
- every orphan empty Nucleus (=ungoverend and not enclosed with an IG-domain) must receive a melodic identification.
 - Bielorussian 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

- (76) Bielorussian 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" |

(77)

site of epenthesis in context	site of epenthesis in isolation	result
...C # __C	= # __C	epenthesis
...C # __V	= Coda__	no epenthesis
...V # __C	= —	no epenthesis
...V # __V	= —	no epenthesis

brat ilva	=	ilva
tam jość lew	=	lew
śastra lva	=	—
malady lew	=	—

(78) summary

<p>empty site of epenthesis followed by a plain Nucleus</p> <p style="text-align: center;">Gvt</p> <p style="text-align: center;">C <u>V</u> C V C</p> <p style="text-align: center;"> </p> <p style="text-align: center;">ø ø l e w [lew]</p> <p>jość ø l e w [tam jość lew]</p>	<p>filled site of epenthesis followed by an empty Nucleus</p> <p style="text-align: center;">C <u>V</u> C V C V</p> <p style="text-align: center;"> </p> <p style="text-align: center;">ś a s t r a l ø v a [śastra lva]</p>
<p>filled site of epenthesis followed by a plain Nucleus</p> <p style="text-align: center;">C <u>V</u> C V C</p> <p style="text-align: center;"> </p> <p style="text-align: center;">mal a d y l e w [malady lew]</p>	<p>empty site of epenthesis followed by an empty Nucleus</p> <p style="text-align: center;">Gvt Gvt</p> <p style="text-align: center;">C V C <u>V</u> C V C V</p> <p style="text-align: center;"> </p> <p style="text-align: center;">brat ø l v a [brat ilva]</p> <p style="text-align: center;">ø l v a [ilva]</p> <p style="text-align: center;">epenthesis [i]</p>

Why is there no strong position in Slavic?

Prediction on the synchronic status of misbehaving initial clusters in Slavic

- (79) #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 (Kaye 1990b), Berber)
 2. Slavic
- cf. the list of #RT-languages in Clements (1990)

Moroccan Arabic (Kaye 1990b)

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

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

- (81) diachronic situation

Classical Arabic	>	Moroccan Arabic
VV	>	V
V	>	schwa

schwas alternate with zero as usual

- (82) 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

- (83) Slavic

- a. do all logically possible #CC-clusters occur? Not at all. Slavic instantiates only a small subset of logically possible #RT-sequences.
- b. the existing vs. unattested initial clusters do not appear to reduce to any regularity, nor do they constitute a natural class according to whatever criterion (sonority etc.). This is a classical problem of Slavic phonology, especially in the Polish tradition, cf. Kuryłowicz (1952), Cyran & Gussmann & Gussmann 1998,1999).
- c. Semitic: 50% of the lexicon is #TR, the other 50% is #RT
Slavic: there are 47 #RT-roots in the entire lexicon

- d. 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
- e. 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

(84) 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 (85) is a summary

	Czech		Common Slavic	
NOMsg	GEN sg		(NOMsg)	
lev	lva		*lьvъ	lion
den	dne		*dьnъ	jour
sen	snu		*sьnъ	rêve
rez	rzi		*rьdja	rouille
ret	rtu		*rьtъ	lèvre
lež	lži		*lьg-	mensonge
lest	lsti		*lьstъ	ruse
mest (GENpl)	msta (NOMsg)		*mьt-тъ	vengeance

(85)	Common Slavic	#RT	gloss CS	modern example
j	1 j-ъ-dO	jd	walk 1sg	tch jdu
	2 jъgo	jh	yoke	tch jho
	3 jъm	jm	seize	tch jmout
	4 ъп-	jm	name	tch jměno
	5 j-es-мъ	js	be 1sg	tch jsem
r	6 ŝtrъbъ	rb	fragment	s-cr rbina
	7 rъbadiga	rb	Herbaticum	cr rbadiga
	8 rъk	rc	say, imper 2sg	tch arch rei !
	9 uncertain	rč	hamster	s-cr rčak
	10 rъd	rd	go red, flush	tch rdít se
	11 strъža	rd	core, essential	pol rdzeń
	12 gъr(t)+dusi ti	rd	strangle, choke	tch rdousit
	13 rъdъky	rd	radish	s-cr rdakva
	14 rufijanъ	rf	procurer, pimp	sle rfjan
	15 rusъ	rs	yellow, blond	sle rsa
	16 rъta	rt	ice-skate	rus rta
	17 rъtъtъ, rъtontъ	rt	quicksilver	tch rtut'
	18 rъtъ	rt	peak, point	tch rty (NOMpl)
	19 rъvati	rv	tear, rip, snatch	tch rvát
	20 rъjO	rv	dig	rva (GENsg)
	21 rjuti	řv	roar, scream	tch řvát
	22 rъžъ	rž	rye	tch rži
	23 rъzati	rž	neigh, whinny	tch ržát
	24 drъg-	rž	tremble	h-sor ržeć
	25 rěz-	rž	cut	pol ržnać

(86)	Common Slavic	#RT	gloss CS	modern example	
l	26 lъb-	lb	skull	tch lbi (GENsg)	
	27 lъg-ati	lg	lie inf, 1sg	tch lhát	
	28 lъg-	lg	light	tch lhostejný	
	29 lъk	lk	mourn	tch lkát	
	30 lъp-	lp	cling, stick	tch lpět	
	31 lъsk-	ls	shine, twinkle	tch lštíti se	
	32 lъstъ	ls	cunning, ruse	tch lsti (GENsg)	
	33 lъvъ	lv	lion GENsg	tch lva (GENsg)	
	34 slъz	lz	tear	pol łza	
	35 lъž-	lž	spoon	tch lžíce	
	m	36 mъd-lъ	md	faint, weak	tch mdlý
		37 mъchъ	mch	moss	tch dial mšina
		38 mъk	mk	sudden movement yielding an unforeseen result	pol mknąć
		39 mъt-тъ	ms	revenge	tch msta
		40 mъstъ	ms	must, fruit juice GENsg	tch arch mstu
41 mъtъ		mt	gym swing GENsg	tch arch mtu	
42 mъzda		mz	salary	tch mzda	
43 mъzg-		mz	spoil	rus mzgnut'	
44 mъša < lat missa		mš	mass	tch mše	
45 mъšica		mš	greenfly, aphid	tch mšice	
46 mъchelъ		mš	earnings, profit	rus mšelъ	
47 mъg-		mg	fog	mhlavý	

(87) numeric situation

#RT	nb of roots coming from #RvT		uncertain origin
	< #RyerT	< #RvT	
#jC	4	1 (5 j-es-мъ)	1 (9 s-cr rčak)
#rC	15	4 (14 rufijanъ 15 rusъ 21 rjuti 25 rez)	
#lC	10	0	
#mC	12	0	
	41	5	

Total 47

(88) diachronic generalisation

all Slavic #RT < #RvT

(89) 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.

(90) 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	Lekářská 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?)

(91) 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 PRIVATE: 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.

Why are initial consonants weak in Greek ?

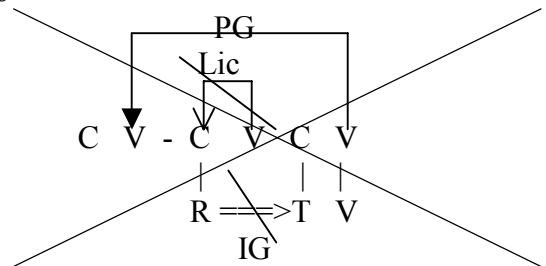
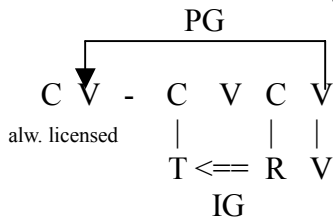
- (92) distribution of initial consonants in Classical Greek
- a. regular IE distribution:
C and V are free in #CV
C₁ and C₂ are subject to the usual restrictions in #C₁C₂V
 - b. PLUS

#πτ [pt]	#κτ [kt]
#φθ [phth]	#χθ [khth]
*##βδ [bd]	*#γδ ¹ [gd]
 - c. no #RT at all

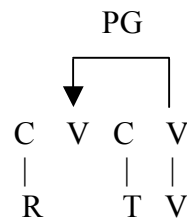
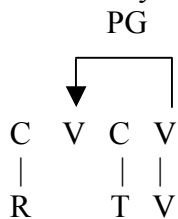
(93) so what is the status of the initial site in Classical Greek?

Recall that theory *predicts* that
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



¹ But a variant of δουπε-ω, that is γδουπε-ω.

(94) hence,

- a. the existence of #pt, #kt enforce the classification of Classical Greek as an anything-goes language: theory says that there cannot be an initial CV in words with #pt, #kt.

==> the initial CV is absent in Classical Greek

the initial site of Classical Greek looks exactly like in Slavic and Moroccan Arabic

- b. question: where do the heavy initial restrictions ("#TR-only plus #pt, #kt") come from?
- c. The same question was raised for Slavic.

Classical Greek is "worse" than Slavic:

observation

observation		phonological identity
1. #TR-only language	German etc.	#TR-only ==> presence of the initial CV
2. #TR-only plus #pt, #kt, no #RT	Greek	anything-goes ==> absence of the initial CV
3. #TR-only plus some #RT (47 roots)	Slavic	
4. #TR and #RT alike	Semitic	

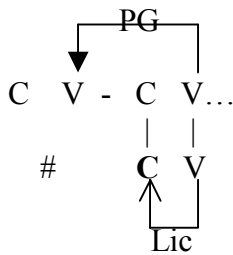
Predictions regarding Lenition

Recall that

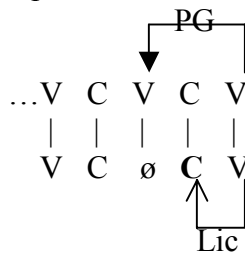
(95) Strong Position

licensed but ungoverned

a. initial consonant



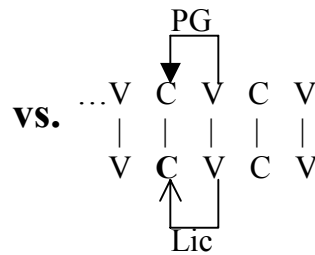
b. post-Coda consonant



Weak Position V__V

licensed and governed

intervocalic consonant



(96) as it stands, theory says

- a. Cs in the Strong Position are strong because they are licensed but ungoverned
- b. the existence of the initial CV is the reason why initial consonants are strong

(97) in case the initial CV is absent, theory predicts that

- a. post-Coda consonants are strong: they occur after an empty Nucleus
- b. initial consonants are weak: they do not occur after an empty Nucleus
- c. [#ptV] = [#pøtV], hence
 - p is a Coda (=occurs before an empty Nucleus)
 - t is a post-Coda (=occurs after an empty Nucleus)
- d. #__V = V__V initial prevocalic and intervocalic consonants behave alike
 - #__C = V__C initial preconsonantal consonants and Codas behave alike
 - #C__ = VC__ C₂ of initial clusters and post-Coda consonants behave alike
- e. hence, cross-linguistically
 - 1. regardless of the initial situation, post-Coda consonants are always strong
 - 2. initial consonants are strong in #TR-only languages
 - 3. initial consonants are weak in anything-goes languages

(98) Lenition of Classical Greek stops in Modern Greek (Seigneur-Froli 2001)												
	Post-Coda (obstruent Codas)				governed Onset				Coda			
	after initial Coda		after internal Coda		initial prevoc.		intervocalic		initial		internal	
	#C	VC	#	V	V	V	#	C	V	C		
ph	*	*	*	*	phero φερώ	fero φερω	aphiksis 'άφιξις	afiksi αφιξη	phthino φθινο	ftino φθινο	ophthalmos 'οφθαλμός	oftalmos 'οφθαλμός
th	phthino φθινο	ftino φθινο	ophthalmos 'οφθαλμός	oftalmos 'οφθαλμός	thalasa θάλασσα	thalasa θαλασσα	othonjon 'οθόνιον	othoni οθονη	*	*		*
kh	*	*	*	*	kharis χαρίς	xaris χαρη	brakhos βράχος	vraxos βραχος	khthes χθές	xtes χθες	okhthos 'όχθος	oxtos οχθος
p	*	*	ek-pleo 'εκπλέω	ek-pleo	pater πατήρ	patera πατερας	epeide 'επειδή	epidi επειδη	pteruks πτέρυξ	ftero φτερο	kleptes κλεπτης	kleftis κλεφτης
t	pteruks πτέρυξ	ftero φτερο	kleptes κλεπτης	kleftis κλεφτης	teleutaios τελευταίος	tefteios τελευταίος	atomos 'άτομος	atomos ατομος	*	*		*
k	*	*	*	*	kajros καιρός	keros καιρος	ekei 'εκεί	eki εκει	ktizdo χτιζώ	xtizo χτιζω	okto 'οκτο	oxto οχτο
b	*	*	*	*	biblion βιβλίον	vivlio βιβλιο	abebajos 'αβέβατος	aveveos	*	vdomas βδομας	(h)ebdomas 'εβδομάς	endomas εβδομας
d	gdonpeo γδουπέω	vdomas βδομας	ogdos 'όγδος	ogdos ογδος	deksia δεξιά	deksia δεξια	idea 'ιδέα	idea ιδεα	*	*	*	*
g	*	*	*	*	goneus γονεύς	gonis γονεις	agalma 'άγαλμα	agalma αγαλμα	*	*	ogdos 'ογδος	ogdos ογδος

(99) sum ">" = spirantisation "=" = no spirantisation						
	Post-Coda (obstruent Codas)		governed Onset		Coda	
	after internal Coda		initial prevoc.		initial	
	#C	VC	#	V	#	C
ph			>	>	>	>
th	= (>)	= (>)	>	>		
kh			>	>	>	>
p		=	=	=	>	>
t	=	=	=	=		
k			=	=	>	>
b			>	>	>	>
d	>	>	>	>		
g		>	>	>		>

(100) back to: where do the initial restrictions come from?

a. same answer as for Slavic: pre-classical Greek was a true #TR-only language.

Items with #pt, #kt have two different origins:

1. #pVt - loss of a vowel, identical to the genesis of Slavic #RT-roots

2. #pjV - strengtening of postconsonantal j > t

#psV - strengtening of postconsonantal s > t

	#	V V
pVt	pteron πτερόν "wing", cz pták, germ Feder, skr patara-ḥ etc. πέτομα "fly"	
pj	ptykhe πτύχη "pli d'étoffe" < *pj-ukh, skr pj-ukṣṇa	klepto < IE *klepjo "steal" melitta < *melitja "bee" kerutto < *karukjo "proclaim"
ks	ktupos κτύπος "noise" < *ksoudo, skr kṣōdati	

- b. this movement supposes the absence of the initial CV:
1. initial vowels cannot fall out in presence of the initial CV
 2. strengthening of supposes that j,s stood in post-Coda position
- c. however, we know from independent evidence that pre-classical Greek did possess the initial CV:
strengthening #j > #dz (e.g. Brixhe 1996:18ff, Lejeune 1955:§151)
IE *jug- > dzugon "yoke" = lat. iugum, skr. yugám, got. juk
IE *je(s)- > dze-oo "boil" = skr yásati, vha jesan
IE *yoos- > dzoostos = av yāstō, lit juóstas "belt"
- d. on the other hand, another set of words bears testimony of weakening of #j-
#j- > #h > ø (e.g. Lejeune 1955:§151)
IE *jek^w-r̥ > heepar = lat iecur, skr yákr̥-t, av yākarə, lit jaknos "liver"
IE *yoor- > gr hooraa = av yārə, got jeer, lat hoornus < *ho-yoor-nos
hos = phryg ios, skr yáh, OCS jego (gen sg) [vs. hom o-phra via Grassmann]
IE *yudh-s- > hysminee = skr yúdhyaati "combat"
- e. diachronic interpretation (e.g. Brixhe 1996:18ff):
- | | | |
|----------------------------------|-----------------------------------|---------------------|
| 1. initial consonants are strong | IE *jug- > dz ugon | pre-classical Greek |
| loss of the initial CV | | |
| 2. initial consonants are weak | IE *jek ^w -r̥ > heepar | pre-classical Greek |
| | | Classical Greek |
| 3. they are still weak | #Ch > fric spirantization | Modern Greek |

(101) result

- a. predictions are borne out
- b. not only is it true that the initial position is weak, but it is weak in the way predicted by the theory: initial consonants react like intervocalic consonants (both are governed and licensed), NOT like Codas (=ungoverned and unlicensed).
- c. two intriguing properties of Greek are due to the same cause:
#kt, #pt exist and the initial position is weak because there is no initial CV
- d. candidate for cross-linguistic validity:
 1. if a language X possesses non-#TR-clusters, its initial position will be weak.
 2. if the initial position is weak in language X, this language will possess non-#TR-clusters.

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