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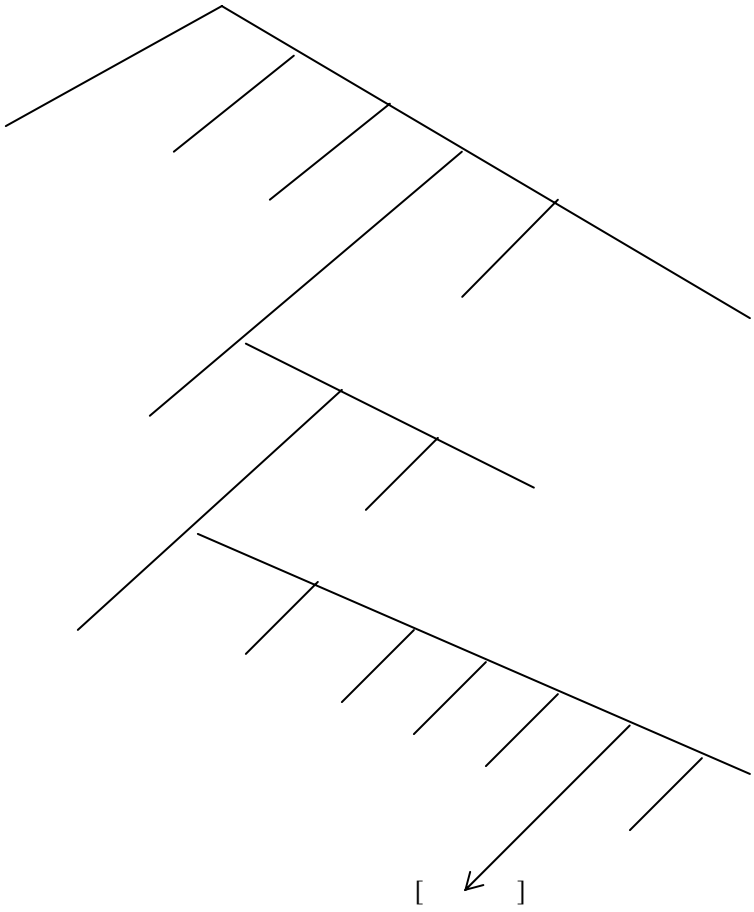
Handout week 2

HOW THE BIG GUYS (MORPHOLOGY, SYNTAX, SEMANTICS) TALK TO PHONOLOGY, AND WHAT THEY TELL HER

1. The general picture: parallel modules + postcards

(1) ordinary picture (Selkirk 1984 etc.):
phonology is some remote terminal structure of the syntactic tree



syntax - semantics
way up there

narrow syntax

morphology

phonology

prosodic words

feet

syllable structure

internal structure
of segments
phonetics

(2) Jackendoff (1992,1997,2002): this syntactico-centristic view is wrong. phonology is not just some narrow syntax.

a. parallel construction of phonological and syntactic structure: the relation between snytax-semantics-morphology and phonology is not up-down but parallel.
b. one advance of minimalism is the evacuation of phrase-structure rules (and lexical insertion). Hence within syntax, the picture now is bottom-up, rather than top-down.
c. communication between modules is not top-down the big tree, but via postcards: when one module needs information from another module, or needs to hand over information to another module (Phase), this information is packed on a shuttle which travels through space and lands in the other module. Jackendoff calls that corresponence rules.
d. this is needed anyway since "higher" levels and phonology do not speak the same language: "animated, noun, countable etc." are categories that are relevant in syntax, morphology and semantics; they are unknown in phonology. And vice-versa: labial, Coda etc.
e. TRANSLATION: something that is never addressed by phonologists when they talk about phonologically relevant morpho-syntactic information.
   the exchange of information across modules supposes an item-by-item translation: a dictionary-like input-to-output relation. A lexical access. I argue that the lexicon, on the phonological side, contains exactly 4 items:
   1. order: be silent (FEN)
   2. order: be a good governor (FEN)
   3. order: be a good licensor (FEN)
   4. insert a CV unit
f. these four outputs can be accessed by any higher structure, and the way higher divisions are mapped onto the phonological output is an exclusive decision made by higher levels. Phonology executes whatever order it receives.
g. the phonological module is governed by two rules:
   1. the purely phonological rule
   2. the intervention of non-phonological higher level rule
h. higher level rule always overrides the domestic phonological rule.
i. higher levels have only bearing on a very limited area:
   1. the environment immediately adjacent to m-s boundaries
      hence
      - m-s modification of the phonological rule only at morpheme-edges, not morpheme-internally.
      - the only rule that is active morpheme-internally is phonological.
   2. higher levels are blind for anything that is going on below the skeleton. The only objects that they see are located above the skeleton, i.e. syllabe structure etc. Hence there is no such thing as “turn [p] into [r] before this morpheme boundary”.

j. consequence: the only objects that can be modified by higher intervention are (at some intersection of two morphemes)
   1. the last Nucleus of the preceding morpheme
   2. the first Onset of the following morpheme
   Since Onsets are only passive (they arenever the source of any lateral relation), this set reduces to morpheme-final Nuclei.
   But since contentful Nuclei are 1) not silent, 2) always good licensers, 3) always good governors, their phonological properties may not be modified. Therefore, the only object that experiences the higher level rule are FEN.

k. this means that
   1. higher level orders can only augment the lateral power of phonological players: there is no such thing is "you full vowel receive the order to be unable to govern/ license".
   2. only consonant-final morphemes are subject to higher level intervention. This has a direct correlate: all ms-conditioned phonological processes involve C-final words (e.g. extrasyllabicity). There is no such thing as extrasyllabicity of vowels.

l. consequences:
   1. diacritics are out of business (they don't qualitfy anyway)
   2. every module has its own language
   3. nothing withstands the existence of substantial variation in the mechanics of different modules. For example, the presence of a tree-building device (Merge) in syntax and morphology, against its absence in phonology.

2. Higher level intervention in absence of concatenation

(3) variation occurs at word-edges. No variation occurs morpheme-internally.
   a. right edge: usually accounted for by extrasyllabicity (reason 2 below)
   b. left edge: usually goes unnoticed

RIGHT EDGE: effect either on Codas or the preceding vowel
Effects on Codas

(4) Internal ≠ final Coda: French l-vocalisation (diachronic event)

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

(5)

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

Effects on the vowel preceding Codas

(6) Internal ≠ final Coda

Icelandic (Gussmann 2002): Closed Syllable Shortening only in internal closed syllables

long VV		short V	
a. CVVCV	b. CVVTRV	c. CVVRTV	
staara	nɛɛp^{h}ja	kampʏr	stara "stare", nepja "bad weather", kambur "comb"
luuða	pɛɛt^{h}rɪ	haulvʏr	lúða "halibut", betri "better", hálfur "half"
fai:rɪ	aap^{h}ril	ha̰rka	færi "opportunity", apríl "April", harka "severity"

(7)

long VV			short V	
a. CVV#	b. CVVT#	c. CVVTR#	d. CVRT#	
puu	θaak^{h}	p^{h}ʏʏk^{h}r	sai̯̊lt	bú "estate", þak "roof", pukr "secretiveness", sælt "blessed neut."
t^{h}vɔɔ	hœi̯:s	sœœt^{h}r	pœlv	tvo "two, acc.masc.", haus "head", sötr "slumping", bölv "cursing"
fai̯:	k^{h}vœœl	snʏʏp^{h}r	k^{h}ʏmr	fæ "I get", kvöl "torment", snupr "rebuking", kumr "bleating"
	prjɛɛv			bréf "letter"

(8) Internal = final Coda

Closed Syllable Shortening in both internal and final closed syllables

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

EXTRASYLLABICITY

Enforced underparsing

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

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

Deliberate underparsing

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

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

Extrasyllabicity is not one: initial and final extrasyllabic consonants show contrastive behaviour

(12) Rubach & Booij (1990) show that word-final extrasyllabic consonants (due to enforced underparsing) and their word-initial peers do not behave alike

a. 1. teatr [tɛatr] – teatry [tɛatrɨ], hence /-t/
teatr wojenny [tɛadr vɔjɛnnɨ] "war theatre"
voice-assimilation affects the /t/ across 1) a word-boundary and 2) a word-final extrasyllabic consonant

But no such assimilation across word-initial extrasyllabic consonants:

2. no devoicing
pod mchem [pəd mxɛm] "under the nose"
od mszy [od mʃɨ] "since the mass"

3. no voicing
brak rdzy [brak rd͡zɨ]

b. 1. degemination = deletion of extrasyllabic consonants, i.e. the second part of a geminate is extrasyllabic in Coda-position
flotylla [flɔtɨlla] "fleet NOMsg" - flotyll [flɔtɨl] "fleet GENpl"
Sybilla [sɨbilla] "sibilla" - Sybilski [sɨbilski] "sibilla, adjective"
hence: Sybil<l>-ski, flotyl<l>

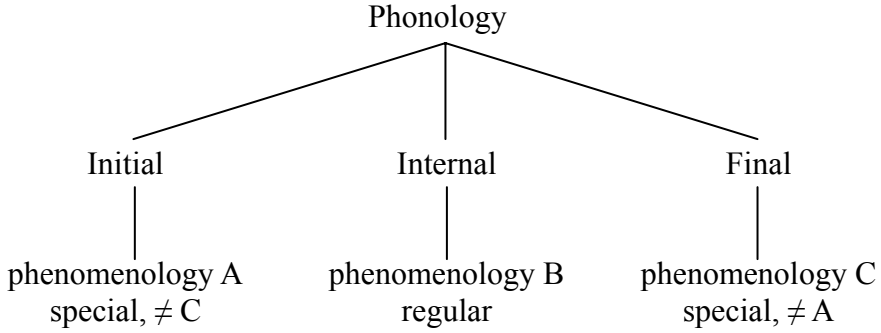
2. no initial degemination of extrasyllabic consonants
ssać [ssat͡ɕ] "suck"
na czczo [tt͡ʃɔ] "on empty stomach"
dżdżysty [d͡ʒd͡ʒɨstɨ] "rainy"

c. two possible conclusions

1. procedural: Rubach & Booij (1990)
two different adjunction rules that apply at different derivational levels
1. "Initial Adjunction" – early: before voice-assimilation and degemination
2. "Housekeeping Adjunction" – late: after voice-assimilation and degemination

2. representational:
"extrasyllabic" consonants at both word edges are special, but they are special in two different ways. That is, the identity of the beginning of the word and of the end of the word is not the same. "Extrasyllabic" consonants do not form a homogeneous class.
Or, in other words, it is a mirage to believe that there are two phonologies, regular (=internal) vs. extrasyllabic. There are three phonologies: regular (=internal) vs. initial vs. final.
Phonological theory is called to find out about the identity of the two locations that produce special phonologies.
1. initial: the phonological identity of the beginning of the word "#" is an empty CV unit (Lowenstamm 1999).
2. final: all consonant-final words end in an empty Nucleus. It is the special properties of this final empty Nucleus that cause the special final phonology.
More on final "extrasyllabicity" below.

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



Why is there no language with 7 or 23 extrasyllabic consonants ?

(13) prediction made by extrasyllabicity

a. in case of enforced underparsing, the algorithm leaves astray all consonants that cannot be parsed.
b. in case of # rtV, [r] remains unparsed; in case of # rgtV, [rg] remain unparsed and so forth: there can be as many underparsed consonants as the lexicon submits, hence no restriction on their number.
c. in order to be phonetically interpreted, extrasyllabic consonants are adjoined to some constituent at a later derivational stage (reintegration into the Prosodic Hierarchy).
d. whatever the particular constituent chosen, it does not impose any restriction on the sonority slope or the number of consonants that it dominates.
   ==> there is no restriction on the number of extrasyllabic consonants.
   [e.g. Hall (2000:248): sonority sequencing governs "deeper", but not phonetic representations]
e. sequences of three, five or eleven extrasyllabic consonants do not occur in natural language. For the left edge, it seems that the maximum number of extrasyllabic consonants is one.
f. it is a pervasive feature of all cases of extrasyllabicity, left- and right-edge alike, that there is only one extrasyllabic consonant at a time. Why should that be?

Extrasyllabic once, extrasyllabic forever

there is no language on record where C# are extrasyllabic in regard of process X, but not of process Y. The contrary is predicted by regular serially managed extrasyllabicity.

Summary so far

(14) we have seen that

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

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

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

LEFT EDGE

(15) Coda Mirror vs. Greek (Seigneur-Froli 2003):

{#,C}__ strong in the former languages, only C__ in the latter

a. diagnostics

1. presence vs. absence of exotic word-initial clusters, i.e. #RT, #RR, #TT
2. (in)stability of the first vowel
3. strength vs. weakness of the first consonant

b. it looks like these are systematically paired in languages

c. examples

	#RT present ?	first vowel stable ?	first C strong ?
Slavic (Polish,Czech)	yes	no	(no ?)
Spanish	no	yes	?
Greek	yes		no

(16) Lenition of Classical Greek stops in Modern Greek (part 1)

	Post-Coda (obstruent Codas)				**initial and intervocalic Onset**			
	after initial Coda		after internal Coda		initial prevoc.		intervocalic	
	#C__		VC__		#__V		V__V	
ph	*	*	*	*	**ph**ero φερώ	**f**ero φερω	a**ph**iksis ’άφιξις	a**f**iksi αφιξη
th	ph**th**ino	f**t**ino f**θ**ino φθινω	oph**th**almos ’οφθαλμός	of**t**almos of**θ**almos ’οφθαλμός	**th**alasa θάλασσα	**θ**alasa θαλασσα	o**th**onjon ’οθόνιον	o**θ**oni οθονη
kh	*	*	*	*	**kh**aris χαρίς	**x**ari χαρη	bra**kh**os βράχος	vra**x**os βραχος
					khelus χέλυς	**ç**elona χελωνα	epo**kh**ε ’εποχή	epo**ç**i εποχη
p	*	*	ek-**p**leo ’εκπλέω	ek-**p**leo	**p**ater πατήρ	**p**atera πατερας	e**p**eidε ’επειδή	e**p**iði επειδη
t	**t**eruks πτέρυξ	f**t**ero φτερο	klep**t**es κλεπτης	kleftis κλεφτης	**t**eleutaios τελευταίος	**t**elefteos τελευταιος	a**t**omos ’άτομος	a**t**omos ατομος
k	*	*	*	*	**k**ajros καιρός	**k**eros καιρος	e**k**ei ’εκεί	e**k**i εκει
b	*	*	*	*	**b**iblion βιβλίον	**v**ivlio βιβλιο	a**b**ebajos ’αβέβαιος	a**v**eveos
d	gdonpeo γδουπέω	v**ð**omas βδομας	og**d**os ‘όγδος	og**ð**os ογδος	**d**eksia δεξιά	**ð**eksia δεξια	i**d**ea ’ιδέα	i**ð**ea ιδεα
g	*	*	*	*	**g**oneus γονεύς	**ɣ**onis γονεις	a**g**alma ’άγαλμα	a**ɣ**alma αγαλμα
					gelos γελως	**j**elos γελιο	a**gj**os άγιος	a**j**os αγιος

(17)	Lenition of Classical Greek stops in Modern Greek (part 2)			
	Coda			
	inititial		internal	
	# __ C		V __ C	
ph	**ph**thino	**f**tino, **f**θino φθινω	o**ph**thalmos 'οφθαλμός	o**f**talmos, o**f**θalmos 'οφθαλμός
th	*	*	*	*
kh	**kh**thες χθές	**x**tες χθες	o**kh**thos 'όχθος	o**x**tos, o**x**θos οχθος
p	**p**teruks πτέρυξ	**f**tero φτερο	kle**p**tες κλεπτης	kle**f**tis κλεφτης
t	*	*	*	*
k	**k**tizdo χτιζώ	**x**tizo χτιζω	o**k**to 'οκτο	o**x**to οχτο
b	*	v**ð**omas βδομας	(h)e**b**domas 'εβδομάς	ε**v**δomas εβδομας
d	*	*	*	*
g	*	*	o**g**dos 'ογδος	ο**γð**os ογδος

(18)	**Post-Coda (obstruent Codas)**		**initial and intervocalic Onset**		**Coda**	
	after initial Coda	after internal Coda	initial prevoc.	intervocalic	initial	internal
	#C__	VC__	#__V	V__V	#__C	V__C
ph			>	>	>	>
th	= (>)	= (>)	>	>		
kh			>	>	>	>
p		=	=	=	>	>
t	=	=	=	=		
k			=	=	>	>
b			>	>	>	>
d	>	>	>	>		
g		>	>	>		>

(19) perfect symmetry between the left and the right edge

a. right edge:
word-final Cs can be either strong or weak; if weak, they match with internal Codas

b. left edge:
word-initial Cs can be either strong or weak; if strong, they match with internal post-Codas

c. in other words, the only rule morpheme-internally is phonological. Higher levels have no access and do not intervene.
At edges, the overall situation is the result of mixed phonological and m-s rule.
According to pure phonological rule, both edges are weak:
1. initial C = intervocalic C
2. final C = C in Coda position
Higher intervention can change their fate:
1. FEN are enabled to license ==> final Cs become non-weak
2. an initial CV is distributed ==> initial Cs become strong

3. Higher level intervention on morphologically complex strings

(20) possible effects of morpho-syntactic structure in phonology
given two morphemes M_1 and M_2, their concatenation may
a. have no effect at all: phonology works as if there were no morpho-syntactic division, i.e. as if the sequence of sounds were monomorphemic.
b. block a process that would apply if the morpho-syntactic division were not there.
c. be a condition on the application of a process that would not take place if the morpho-syntactic division were not there. These cases are known as derived envirnoment effects.

(21) boundary blocking a process:
in- vs.un- in English: impossible, incredible intolerable etc. vs. unpredictable etc.
French gliding
a. the stem does not contain any glide: inflected forms with zero endings

je lie	[li]	I relate
je loue	[lu]	I rent
je sue	[sy]	I sweat

b. vowel- initial suffixes do not contain any glide: C-final stems (*chant-* "to sing")

chant-er	[ʃãt-e]	-e infinitive	chant-ons	[ʃãt-ɔ̃]	-ɔ̃ 1sg pres
chant-ez	[ʃãt-e]	-e 2pl pres	chant-a	[ʃãt-a]	-a 3sg pasé simple
chant-ais	[ʃãt-ɛ]	-ɛ 1,2sg pret	chant-e-ra	[ʃãt-ə-ʁa]	-ə future, conditional

c. concatenation of a V-final stem and a V-initial suffix

	-er inf. -ez 2pl pres	-ais 1,2sg pret	-ons 1sg pres	-a 3sg pasé simple	-e- future, cond.
li-er	[li-j-e]	[li-j-ɛ]	[li-j-ɔ̃]	[li-j-a]	[li-j-əʁa]
lou-er	[lu-w-e]	[lu-w-ɛ]	[lu-w-ɔ̃]	[lu-w-a]	[lu-w-əʁa]
su-er	[sy-ɥ-e]	[sy-ɥ-ɛ]	[sy-ɥ-ɔ̃]	[sy-ɥ-a]	[sy-ɥ-əʁa]

d. concatenation of a V-final prefix and a V-initial stem

bi-annuel	[bi-anyɛl]	*[bi-j-anyɛl]	"bi-annuel"
anti-existentiel	[ãti-ɛksistãsjɛl]	*[ãti-j-ɛksistãsjɛl]	"anti-existential"
anti-alcoolique	[ãti-alkoolik]	*[ãti-j-alkoolik]	"anti-alcoholic"
archi-ondulé	[aχʃi-ɔ̃dyle]	*[aχʃi-j-ɔ̃dyle]	"very undulated"
archi-ennuyeux	[aχʃi-ãnyɥijø]	*[aχʃi-j-ãnyɥijø]	"very boring"

(22) boundary triggering a process (derived environment effect)
Puyo Pongo(Quicha, Eastern Ecuador, cf. Orr 1962)
obstruent voicing after heteromorphemic nasals

a. within a morpheme, obstruents may be voiced or voiceless after nasals

	voiceless T in N__	voiced T in N__	
p-b	pampalʲina	hambi	"skirt, poison"
t-d	t͡ʃuntina	indi	"to stir the fire, sun"
t͡s-d͡ʒ	ɲukant͡ʃi	pund͡ʒa	"we, day"
k-g	ʃiŋki	t͡ʃuŋga	"soot, ten"

b. after a nasal and a morpheme boundary, obstruents are only voiced

	V-__	N-__	
/-ta/	wasi-ta	kan-da	"house, you"
	ajt͡ʃa-ta	atan-da	"meat, the frog"
	puru-ta	wakin-da	"gourd, others"
/-t͡ʃu/	ali-t͡ʃu	kan-d͡ʒu	"is it good?, you?"
	lumu-t͡ʃu	tijan-d͡ʒu	"manioc?, is there?"
	mana-t͡ʃu	t͡ʃarin-d͡ʒu	"isn't it?, does he have?"

(23) how morphological information should be treated in phonology

a. syntactic and morphological structure exists independently of phonology, and no phonological event can ever modify this structure (i.e. there is no bottom-up conditioning).
b. PRIVATIVITY
some parts of the morpho-syntactic structure are projected onto phonology, others are not.
c. the projection is done in way that is unpredictable and arbitrary from the phonological point of view: there is no way to know when a particular piece of higher information is shipped off to phonology, nor which part that will be.
d. only some broad tendencies can be formulated such as "prefix boundaries are more often projected onto phonology than suffix boundaries", and this results in the usually exceptional behaviour of phonology at prefix boundaries, as opposed to usually regular behaviour at suffix boundaries.

(24) SPE and boundaries

a. SPE recognises three different boundaries, i.e. "#", "+" and "=".
b. they are an amorphous set of unranked and unordered [-segment] segments (Chomsky & Halle 1968:371).
c. as for all other segments, the internal contrast among boundaries has to be achieved by some features, and a three-way distinction requires two binary features: [±word boundary (WB)] and [±formative boundary (FB)]. The object "#", then, is specified as [+WB, -FB], while "+" comes along as [-WB, +FB], and "=" identifies as [-WB, -FB] (Chomsky & Halle 1968:66s).
d. the boundary # is distributed over the linear phonological string according to criteria that are exclusively morpho-syntactic: # is inserted at the beginning and at the end of each major category, i.e. noun, verb, adjective, and also on each side of higher constituents that dominate major categories, i.e. NPs, VPs, sentences etc. (Chomsky & Halle 1968:12s,366ss).

e. the other two boundaries + and = are born into phonology according to lower-level morphological (rather than syntactic) structure. In contrast to #, they are recorded in the lexicon. All and only those lexical entries that are morphologically complex bear a = or a +. The former is only found in some learned vocabulary such as *per=mit*, *de=signate*, *con=de=scend* and the like (Chomsky & Halle 1968:94s), while the latter is the morphological default. It occurs at all morpheme boundaries within a lexical entry, as well as at its edges, hence for example /+para+site+/.

f. absolute contextual ban against boundaries: boundaries may not occur inside morphemes; they must always reflect a morpho-syntactic division.

g. boundary mutation rules
   # → +, ## → #, + → # etc.
   1. Selkirk (1972,1974) makes extensive use of boundary mutation rules for the description of French liaison, which is largely sensitive to morphological and syntactic information (e.g. *ils [z] ont* "they have" where liaison is mandatory, against *ont-ils eu* "have they had" where liaison is impossible: **ont-ils [z] eu*). That is, Selkirk further simplifies the maximum boundary cluster ## that comes down from syntax in liaison environments (## → #), and then writes a rule that triggers liaison in single # environments, but not when double ## is present.
   2. SPE: the English velar nasal
      for example, there are two homophone suffixes *–er* in English, one being a comparative (*long – long-er*, *quick - quick-er*), the other an agentive (*sing - sing-er*). The latter does, but the former does not trigger a rule which is presented as /g/-deletion in Chomsky & Halle (1968:85s,369s): /long-er/ --> lo[ŋg]er vs. /sing-er/ --> si[ŋ]er. If the analyst is lucky enough, a given root supports both affixes, as would be the case in English if the verb *to long* produced an agentive derivation using *-er*, i.e. a hypothetical *longer* "persion who is longing". This would then bring about the minimal pair: *longer* lo[ŋg]er "comparative of long" vs. *longer* lo[ŋ]er "person who is longing". In this case, the distinction must be ascribed to the existence of two different boundaries, i.e. agentive /sing#er/, /long#er/ vs. comparative /long+er/. On the account of Chomsky & Halle (1968:369s), a boundary mutation rule has transformed the original comparative /long#er/ into /long+er/. The rule that deletes /g/, then, contains # in its structural description and hence is inoffensive in regard of /long+er/. Of course, it also leaves morphologically simplex forms such as *finger* /finger/ untouched. Note that the /g/ of /sing##/, where ## represents the word boundary, will also be deleted.

(25) SPE is playing tricks
   a. it is obvious ly not true that boundaries are just a little peculiar kind of segments. They are fundamentally different from /p/, /u/ etc.
   b. Still more serious than this special status of boundaries are the two following things that grammar cannot do to boundaries, but should be able to. Since anything can be turned into anything in SPE, and since boundaries are ordinary segments, some process should be able to transform a boundary into a regular segment: + --> a / C__C, turning, say, /dog+s/ into /dogas/. This, of course, is barbarian and unheard of in natural langauge. The other impossibility that Pyle (1972:524) points out is the peculiar "invisible" status that Chomsky & Halle (1968:364ss) assigns to boundaries. That is, rules are supposed to apply irrespectively of boundaries unless a specific boundary condition is mentioned in their structural description. Hence, any rule that applies to the string XYZ also applies to X+YZ, XY+Z and X+Y+Z. If boundaries are not any different from regular segments, the latter should also be able to be "invisible" at times. But of course, there is no rule in natural language that ignores, say, /p/s unless a /p/ is explicitly mentioned in its structural description.

(26) privativity
   a. as a matter of fact, phonology is heavily underfed with morpho-syntactic information: not all m-s divisions have a phonological effect.
   b. example: the Coda context
      if boundaries can be eliminated without any morpho-syntactic surrogate, were they "real" boundaries in the first place? Recall that the definition of a boundary that was worked out above appeals to a phonological effect that is produced by a morpho-syntactic division. Now in the case of the Coda context __{#,C}, a morpho-syntactic division, i.e. the "end of the word", has been replaced by a purely phonological object, i.e. the Coda. And the associated effect, which is resident across all accounts anyway, is now accounted for without appeal to any higher level.
      This leads to doubt that the # of the Coda context is of any morpho-syntactic relevance at all. Therefore, the objects that were referred to as "boundaries" in the early generative period, and uniformly represented as "#", "+" and the like, in fact fall into two categories: 1) those that represent a morpho-syntactic reality and 2) those that do not. In other words, higher level information has a privative existence in phonology.
      ==> it is not true that all phonological effects which occur at some morpho-syntactic intersection are due to morpho-syntactic action.

(27) procedural vs. privative creation of the relevant morpho-syntactic information in the input string to phonology
   a. privative – Chomsky et al. (1956)
      only the subset of morpho-syntactic information that is phonologically relevant is projected onto phonology.
   b. procedural – Chomsky & Halle (1968)
      all morpho-syntactic information is projected onto phonology. The phonologically irrelevant part is somehow erased at a later derivational stage.

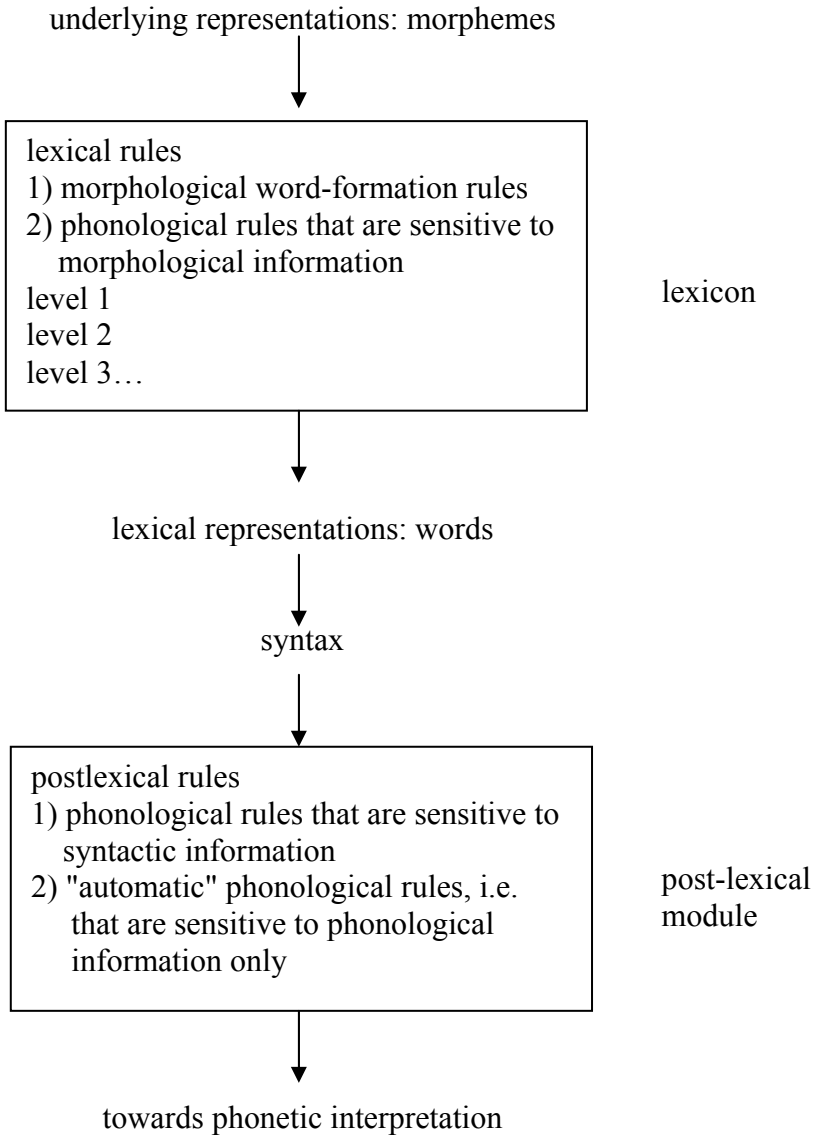
(28) hot issues concerning boundaries
   a. their identity: what are they? What could be the identity of an object that roots in morphology, syntax (and probably semantics), but produces a phonological effect?
   b. their transformation: how is morpho-syntactic information transformed into a phonologically relevant object? How is this object inserted in the phonological structure?
   c. their privative existence: how does privativity come into being?

(29) morpho-syntacticinformation must be TRANSLATED into the phonological language

One section of Devine & Stephens' (1980:73) article is called "The phonologization of boundaries". What they mean is that boundaries are morpho-syntactic at origin, but become phonological players, i.e. precisely the line of argument developed here.

> "A theory which operates directly with syntactic boundaries as environments is unsatisfactory, for not only does it fail to explain the phonological nature of the most basic and fundamental boundary sensitive processes, but by definition it denies them phonological status and thereby the very possibility of receiving non-arbitrary analysis." (Devine & Stephens 1980:73)

(30)



(31) level 1 vs. level 2 suffixes in English
(Siegel 1974)

a. list
   1. level 1
      -in, -ity, -ic, -ian, -ory, -ary, -ion, -ate, the adjectival *-al* and the noun-forming *–y*
   2. level 2
      un-, -ness, -less, -hood, -like, -dom, -ful, -ship, the adjectival *-ed* and the noun-forming *–ing*

b. class membership is determined according to distribution: affixes of a given class can freely attach to stems that already contain an affix of the same class (I: univers-al-ity, II: beauty-ful-ness). Also, class II affixes can hook onto a class I affix (univers-al-ness). However, sequences of class II – class I affixes do not occur (*piti-less-ity, *guard-ed-ity etc.) (see Mohanan 1986:15ss for more related evidence).

c. Lexical Morphology covers this distributional pattern procedurally. That is, class I affixation takes place *before* class II affixes are concatenated, hence level 1 vs. level 2 under (30). This guarantees that a stem may take on (a number of) class I affixe(s) and then move on to level 2 where another affix may join. However, a class II affix could never be closer to the stem than a class I affix because this would imply an "upward" move from level 2 "back" to level 1.

(32) Lexical Phonology: diacritics evacuated by serialism

a. The procedural architecture of Lexical Phonology offers an account for this "boundary effect" that does not appeal to boundaries at all. The formulation of Trisyllabic Shortening does not bear any morphological clause at all. Rather, Trisyllabic Shortening occurs at level 1, and only at level one. Therefore, /san-ity/ is concatenated at level 1, and Shortening will apply. By that time, however, /maiden-hood/ does not exist yet, and hence cannot be subject to that rule. When /maiden-hood/ is created at level 2, Trisyllabic Shortening is not active anymore and thus *maidenhood* comes out of the lexicon without being altered.
As may be seen, this account does not involve any boundary at all: no mention is made of either "#" or "+", nor of any other diacritic. Also, boundaries are not "strong" or "weak". The contrast is encoded in purely sequential fashion.

b. price to pay for the elimination of boundaries from phonological rules:
- every rule must be marked for the lexical level(s) at which it applies
- mention is made of a new device: brackets. These inform on the edges of morphemes, and Lexical Phonology cannot live without them.

c. role of brackets in derived environment effects:
Rubach & Booij (1984:3ss). In Polish, a certain kind of palatalisation targets preceding dental consonants, but only if the palatal trigger and the dental patient belong to two different morphemes. For example, the stem-final [s,d] of *grymas*, *głód* "grimace, hunger" turn into [ɕ,d͡ʑ] before a front vowel such as the LOCsg [ɛ], *gryma*[ɕ-ɛ], *gło*[d͡ʑ-ɛ], or the infinitival class marker [i] in *gryma*[ɕ-i]ć, *gło*[d͡ʑ-i]ć "to make a grimace, XXXaffamer". However, no palatalisation occurs in indentical phonetic environments if the triggering sequence occurs within a morpheme: [dɛ]*sant,* [di]*nosaur, pro*[tɛ]*st* "landing, dinosaur, protest".
Hence, the bracketed structure of *grymas* is [grymas], whie the morphologically complex item *grymasić* identifies as [[głod] [i] [ć]]. The rule which states palatalisation, then, crucially mentions backets in its structural description: s,d —> ɕ,d͡ʑ / __] [i,e. This is why [[głod] [i] [ć]] will be affected, but not /*dinosaur*/ where the /d/ does not precede any bracket.

(33) bracket erasure
English [gN] – [N] and [mn] – [m] alternations

	__#	__-V	
		class II suffixes	class I suffixes
a. [gN] – [N]	[N]	[N]	[gN]
	sign	sign-ing	sign-ature, sign-al, sign-ify
	resign	resign-ed	resign-ation
	assign	assign-ment	assign-ation
	design	design-ed, design-s	design-ate
	malign	malign-ing, malign-ed	malign-ant, malign-ity
	benign	—	benign-ity, benign-ant
	paradigm	—	paradigm-atic
b. [mn] – [m]	[m]	[m]	[mn]
	solemn	—	solemn-ity
	damn	damn-ing	damn-ation
	condemn	condemn-ing	condemn-ation
	hymn	hymn-ing, hymn-ed	hymn-al, hymn-ology, hymn-ary, hymn-ic
	column	column-s, column-ed	column-al
	autumn	—	autumn-al

(34) a. g deletion, domain: level 2
g —> ø / __ [+nasal]]
b. n deletion, domain: level 2
n —> ø / [+nasal] __]

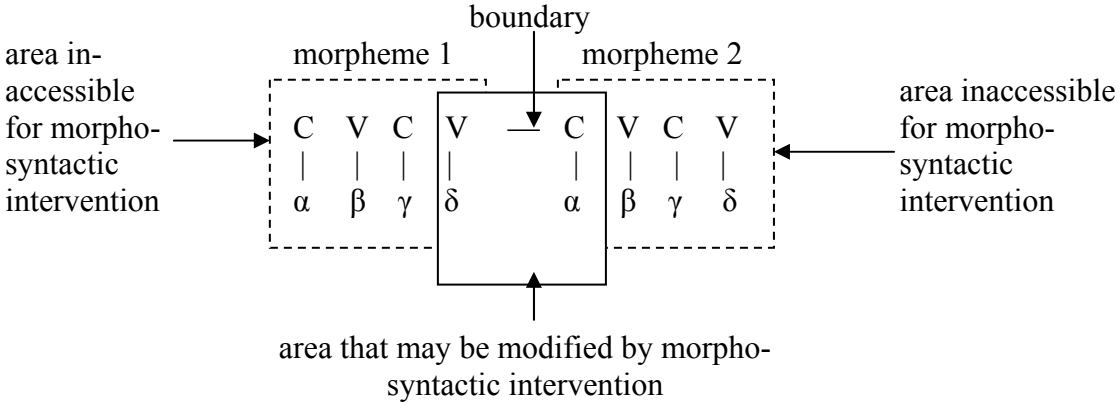
(35) English strong [ŋ], strong-ly [ŋ] vs. finger [ŋg], strong-er [ŋg]
a. Lexical Phonology
1. -er is fed into the derivation at level 1
2. -ly is fed into the derivation at level 2
3. brackets are erased at the end of each level
4. g deletion, domain: level 2
g —> ø / n__]
in prose: "g deletes when occurring after /n/ and before a bracket"
5. implementation: /g/ does not delete in *finger* because there is no internal morphological structure, hence no bracket. It does not delete in *stronger* because -er is fed into the derivation at level 1, creating [[strong] [er]], but all brackets are erased before level 2, where thus [strong-er] is submitted. The rule applies only at level 2, where the structural description is not satisfied. On the other hand, /g/ is deleted in *strong* because it is word-final and hence followed by a bracket at all levels. The rule also applies to *strongly* because -ly arrives at level 2 and hence creates the proper input for g-deletion, i.e. [[strong] [ly].

b. Kaye (1995), see the detail in section III,5.6.1.4
   1. -er is a non-analytic suffix
   2. -ly is an analytic suffix
   3. the phonological process at hand erases /g/ domain-finally, i.e. before an empty Nucleus that is followed by a bracket
   4. implementation: *finger* is morphologically simplex and hence does not possess any internal brackets; no /g/-deletion can apply. The same holds true for *stronger* because it is non-analytic, i.e. [strong-er]. On the other hand, the /g/ of *strong* occurs in domain-final position [strongø], and so does the /g/ in the analytic *strongly* [[strongø] ly]. These items satisfy the structural description of the process.

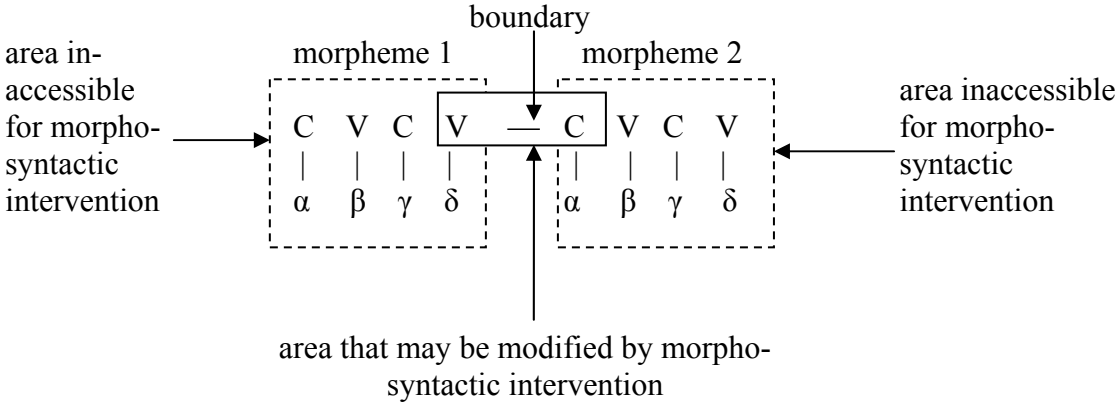
(36) how morpho-syntactic information should be treated in phonology
   a. syntax, semantics and morphology share a module where all components speak the same language. Phonology belongs to a different module where another language is spoken.
   b. morpho-syntactic operations are carried out without any regard to phonology (there is no bottom-up conditioning).
   c. some parts of the morpho-syntactic structure are projected onto phonology, others are not.
   d. in the actual state of our knowledge, the projection is unpredictable: there is no way to know when a particular piece of higher information is shipped off to phonology, nor which part that will be. In any event, the decisions are language-specific. They are an exclusive privilege of the morpho-syntactic module. The key to the system, if any, must be sought on the morpho-syntactic side. Phonology is entirely passive: it receives orders without participating in their elaboration (see section XXX).
   e. orders are issued by the morpho-syntactic module. In order to be understood by phonology, they need to be translated into the phonological language. This is done by a lexical access (on which more below): a non-phonological input is matched with a phonological object, which is inserted into the phonological representation.
   f. once the phonological object of morpho-syntactic origin exists in phonological representation, it is treated exactly as any other phonological object.
   g. phonology operates only once all pieces of information are assembled. That is, all morphemes must be concatenated, lexical insertion must have taken place, and morpho-syntax must have sent boundary information.

(37) two simple hypotheses about the transformation of m-s into phonological information
   a. locality: morpho-syntactic orders can only bear on the local environment of boundaries.
   b. morpho-syntax can bear only on the UPPER area

(38) locality requirement: areas not adjacent to the seam cannot be accessed by higher levels.



(39) locality and UPPER requirement: areas not adjacent to the seam cannot be accessed by higher levels, nor can melody.

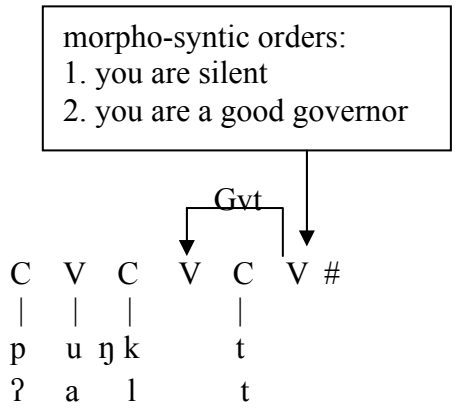


(40) phonological properties of Nuclei that are adjacent to morpho-syntactic divisions depend on the sovereign decision of higher levels.
In every language and for every boundary, morpho-syntax decides whether
a. the adjacent Nucleus is governed or not.
b. the adjacent Nucleus is able to govern or not.
c. the adjacent Nucleus is able to license or not.

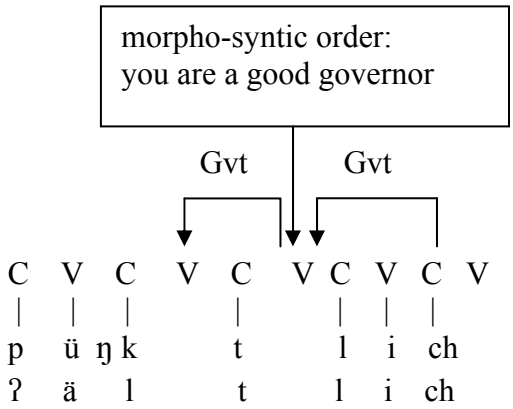
(41) Four and only four cases of morpho-syntactic action
how morpho-syntax can act on phonology. It may
a. insert an empty CV unit
b. modify the phonological properties of morpheme-final empty Nuclei
   1. the ECP of a final empty Nucleus may be satisfied upon a morpho-syntactic order.
   2. the final empty Nucleus of the preceding morpheme may acquire Licensing power upon a morpho-syntactic order.
   3. the final empty Nucleus of the preceding morpheme may acquire Governing power upon a morpho-syntactic order.

(42) final empty Nuclei can govern in German

a. German final RT# and TT# clusters



b. German RT and TT clusters before another morpheme



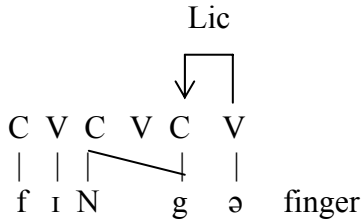
(43)

a. [ŋ] + suffix							
root	agentive – er	progressive -ing	-able	diminutive -y		adverbial -ly	
-ŋ#	-ŋə	-ŋɪŋ	-ŋabl̩	-ŋ#	-ŋi	-ŋ#	-ŋlɪ
sing	sing-er	sing-ing	sing-able	thing	thing-y	long	long-ly
hang	hang-er	hang-ing	hang-able	string	string-y	strong	strong-ly
bring	bring-er	bring-ing	bring-able				
bang	bang-er	bang-ing	bang-able				
long	long-er ?	long-ing	long-able				

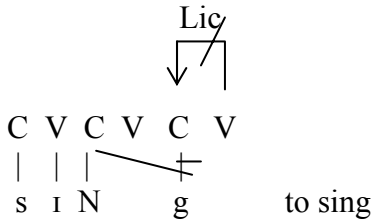
b. [ŋg] + suffix comparative -er	
-ŋ#	-ŋgə
long	long-er
strong	strong-er
young	young-er

(44) schwa dispenses Licensing

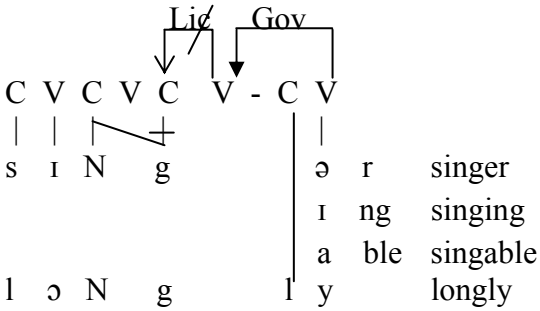
a. only [ŋg] occurs morpheme-internally



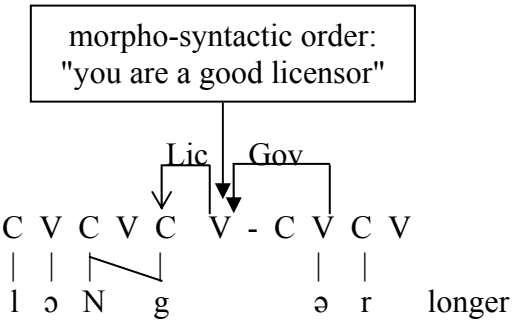
b. only [ŋ] occurs word-finally



c. before (43)a (word-level) suffixes



d. before (43)b (root level) suffixes



(45) distribution of [ŋ] and [ŋg] in German

a. [ŋ]

__#		__C		__ə	
[ ]	spelling	[ ]	spelling	[ ]	spelling
laŋ	lang	ʔaŋst	Angst	ʔɪŋə	Inge
dʁaŋ	Drang	pɪŋpɔŋ	Pingpong	ʔaŋəl	Angel
dɪŋ	Ding	hɛŋst	Hengst	fɪŋɐ	Finger
ʔɛŋ	eng	ʔaŋʃtχøm	Angström	maŋəl	Mangel
ʁɪŋ	Ring	bɛŋt	Bengt (family name)	hʊŋɐ	Hunger
				bɛŋəl	Bengel

b. [ŋg]

__V	
[ ]	spelling
ʔɪŋgoo	Ingo
taŋgoo	Tango
ʔaŋgiinaa	Angina
zɪŋgʊlaa	Singular
ʔʊŋgaan	Ungarn
ʔɛfaŋgeelɪʃ	evangelisch
ʔaŋgeelɪka	Angelika

(46) German: g-deletion occurs before Nuclei that are unable to license

	context	/g/ occurs before	why is the Nucleus unable to license?	example
a.	word-final	a final empty Nucleus	parameter setting	sing [zɪŋ]
b.	before schwa	a Nucleus that contains schwa	parameter setting	sing-en [zɪŋən] Inge [ʔɪŋə]
c.	before a sufix	a governed empty Nucleus	because it is governed	sing-t [zɪŋt]

(47) lateral actorship of schwa (yers)

	schwa (yers) may	
	govern	license
modern Slavic	no	no
French, German	yes	no
Havlík (Old Czech, Old Polish)	yes	?
English	?	yes

(48) word-edge uniformity hypothesis
word-edges are universal: if shipped off to phonology, they enjoy a uniform phonological identity across languages

a. the end of the word is phonologically expressed by three parameters:
   1. final empty Nuclei are or ore not governed
   2. final empty Nuclei can or cannot govern
   3. final empty Nuclei can or cannot license
b. the beginning of the word is phonologically expressed by one single parameter: an empty CV unit is or is not projected onto phonology

(49) parameterisation of consonantal strength

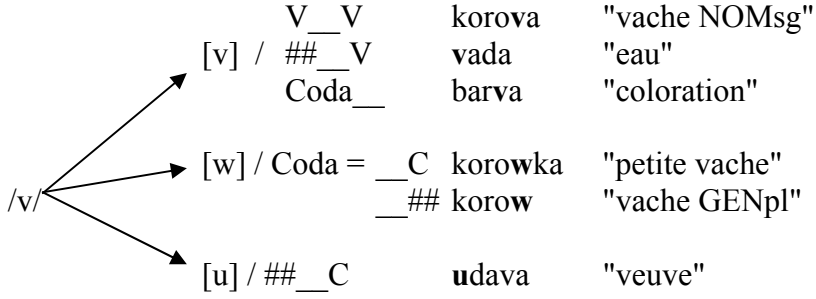
	location in the morpheme				
	left edge #__ morpho-syntactic action		internal …__… no morph-synt	right edge __# morpho-syntactic action	
	no	yes: initial CV	action possible	no	yes: FEN = licensors
strong position	weak = V__V	promoted to strength = C.__	C.__ always strong	__	__
Coda	—	—	__.C always weak	weak = __.C	promoted to strength = V__V

(50) predictions made by privativity regarding the left edge of the word

a. the initial CV may or may not be projected onto phonology. Its presence or absence is a language-specific parameter.
b. its presence excludes #RT clusters and hence produces #TR-only languages.
   its absence produces anything-goes-languages where both #TR and #RT occur.
c. #RT-only languages are not a human possibility. This is correctly predicted by the parameterised presence of the initial CV.
d. #TR-only languages imply the strength of word-initial consonants (and vice-versa), anything-goes-languages imply their weakness (and vice-versa).
e. in no language can consonants be strong in word-initial position, but weak after Codas.
f. the strength of morpheme-internal positions is not parameterised (post-Codas are always strong, internal Codas are always weak). The strength of positions at edges is subject to parametric variation: the left edge may or may not be strong, while the right edge may or may not be weak.

Languages where phonology applies across word boundaries

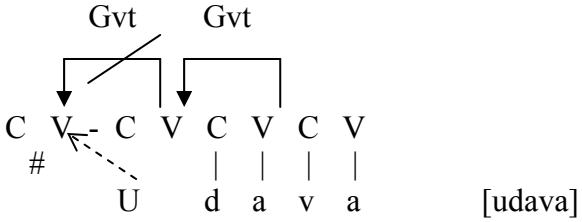
(51) distribution of Bielorussian /v/



(52) behaviour of /v/-initial words in context

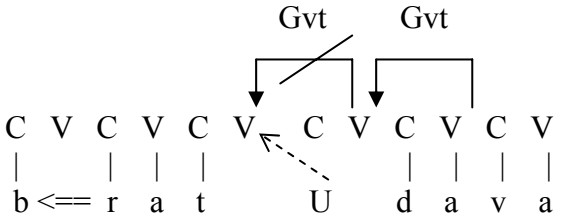
a.	taja **w**dava	this + widow NOMsg	"this widow"
	brat **u**davy	brother NOMsg + widow GENsg	"the brother of the widow"
b.	taja **v**ada	this + water NOMsg	"this water"
	brat **v**ady	brother NOMsg + water GENsg	"the brother of the water"

(53) /vdava/ in isolation = /CV vdava/



[udava]

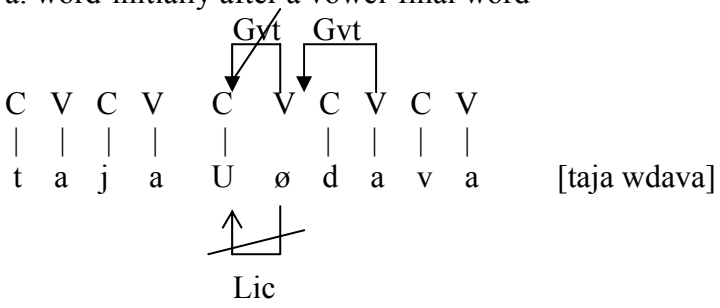
(54) /vdava/ preceded by a C-final word



[brat udava]

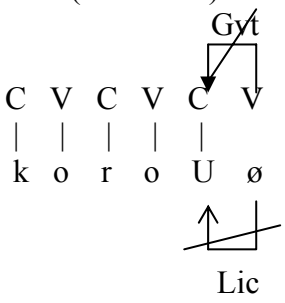
(55) [w] is produced when /v/ is neither licensed nor governed

a. word-initially after a vowel-final word



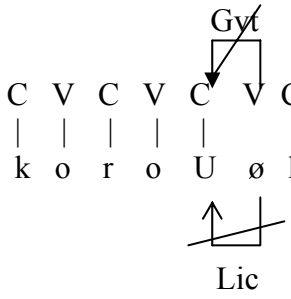
[taja wdava]

b. in (utterance-) final Codas



[korow]

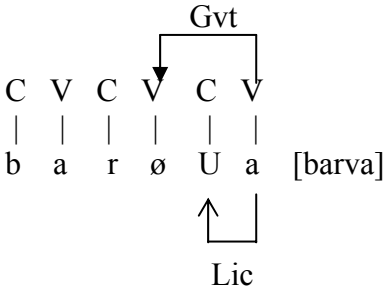
c. in internal Codas



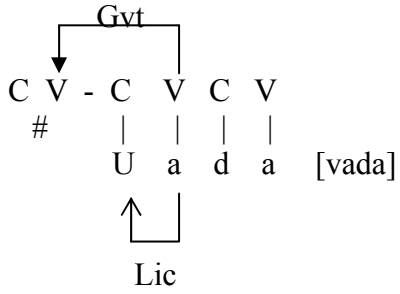
[korowka]

(56) /v/ after an empty Nucleus

a. after a word-internal Coda

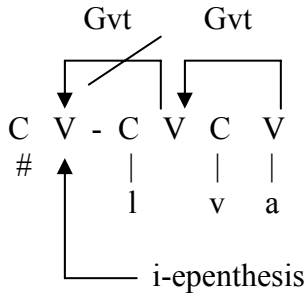


b. in utterance-initial position

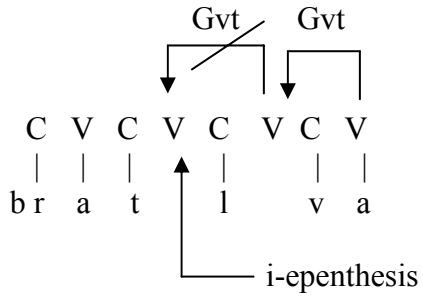


(57) presence of a preceding orphan empty Nucleus

a. epenthesis into the (utterance-) initial CV



b. epenthesis into the final empty Nuclues of the preceding word



(58) location and causality of Bielorussian i-prothesis

all and only those empty Nuclei that do not satisfy the ECP are subject to epenthesis.

(59) typology of parametric choices regarding the initial CV

	a CV unit is distributed upon morpho-syntactic order		
	utterance-initially	word-initially	
a.	yes	no	Bielorussian, Central Italo-Romance
b.	yes	yes	typical IE, i.e. English, French etc.
c.	no	no	Moroccan Arabic
d.	no	yes	?

Initial clusters in Slavic

(60) distribution of #RT clusters among Slavic languages

				West					South		East		
#RT cluster		Cz	Sk	Psh	USo	LSo	Ka	Bu	Mac	SC	Sn	Ru	Uk	Bru
j+T	jd	+			+									
	jh	+												
	jm	+	+										+	
	js	+												
r+T	rb̲									+				
	r͡ts̲	+		+										
	r͡ʧ	+								+				
	rk, řk̲	+												
	rd, r͡dz, r͡dʑ	+		+						+		+		
	rz	+								+				
	rʒ	+		+	+					+		+	+	
	rf													
	rs													
	rt	+		+						+		+	+	
	rv, řv	+		+						+		+	+	
l+T	lb	+		+								+		
	lg, lh	+		+			+					+	+	
	lʒ	+										+	+	
	lz	+		+	+									
	lk	+		+										
	lp	+												
	ls, lɕ	+		+								+		
	lʃ												+	
	lv	+		+								+	+	
m+T	md	+	+	+										
	mg, mh	+	+	+			+					+	+	
	mʒ	+		+								+	+	
	mz													
	mx			+								+		
	mʃ	+	+	+	+		+					+	+	
	mk̲	+		+			+					+		
	m͡tʃ												+	
	ms, mɕ	+		+								+	+	
	mz	+	+	+	+							+	+	
	mt	+												
n+T	absent													

(61) The choice among possible #RT made by Czech and Polish

Polish

C_2 \ C_1	j	l	r	ɲ	n	m	
p							p
t			+				t
k		+				+	k
b		+					b
d			+			+	d
ɡ		+				+	ɡ
t͡s			+				t͡s
t͡ʃ							t͡ʃ
t͡ɕ							t͡ɕ
d͡z			+				d͡z
d͡ʒ							d͡ʒ
d͡ʑ							d͡ʑ
f							f
v		+	+				v
s		+				+	s
z		+				+	z
ʃ						+	ʃ
ʒ			+			+	ʒ
ɕ		+				+	ɕ
ʑ							ʑ
x						+	x
	j	l	r	ɲ	n	m	

Czech

C_2 \ C_1	j	l	r	ɲ	n	m	
p		+					p
t			+			+	t
k		+	+			+	k
b		+					b
d	+		+			+	d
ɡ							ɡ
t͡s			+				t͡s
t͡ʃ			+				t͡ʃ
c							c
ɟ							ɟ
f							f
v		+	+				v
s	+	+				+	s
z		+	+			+	z
ʃ						+	ʃ
ʒ		+	+			+	ʒ
x							x
h	+	+				+	h
	j	l	r	ɲ	n	m	

Out of 126 possible #RT sequences in Polish (6 sonorants, 21 obstruents), Polish selects 22, which represents about 18%. Czech, on the other hand, attests 27 combinations out of 108 possible clusters (6 sonorants, 18 obstruents), which amounts to 25%. In other languages, the pool of possibilities will be even less exploited.

(62) in all languages with #RT clusters such as Czech, Polish, Russian and the like
   a. those #RT clusters that do not occur are accidental distributional gaps.
   b. grammar does not object to the existence of any unsubstantiated #RT cluster.
   c. hence, non-occurring #RT clusters may freely enter the language as loans, neologisms, acronyms and so forth.

(63)		Common Slavic	#RT	gloss CS	modern example
j	1	j-ь-dǫ	jd	walk 1sg	Cz jdu
	2	jьgo	jh	yoke	Cz jho
	3	jьm	jm	seize	Cz jmout
	4	ьn-	jm	name	Cz jméno
	5	j-es-mь	js	be 1sg	Cz jsem
r	6	štrъbъ	rb	fragment	S-Cr rbina
	7	rъbadiga	rb	Herbaticum	Cr rbadiga
	8	rьk	rc	say, imper 2sg	Cz arch rci !
	9	uncertain	rč	hamster	S-Cr rčak
	10	rъd	rd	go red, flush	Cz rdít se
	11	strъža	rd	core, essential	Pol rdzeń
	12	gъr(t)+ dusiti	rd	strangle, choke	Cz 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	rъtъtь, rъtontь	rt	quicksilver	Cz rtuť
	18	rъtь	rt	peak, point	Cz rty (NOMpl)
	19	rъvati	rv	tear, rip, snatch	Cz rvát
	20	rъjǫ	rv	dig	Cz rva (GENsg)
	21	rjuti	řv	roar, scream	Cz řvát
	22	rъžь	rž	rye	Cz rži
	23	rъzati	rž	neigh, whinny	Cz ržát
	24	drъg-	rž	tremble	U-Sor ržeć
	25	rěz-	rž	cut	Pol rżnąć

		Common Slavic	#RT	gloss CS	modern example
l	26	lъb-	lb	skull	Cz lbi (GENsg)
	27	lъg-ati	lg	lie inf	Cz lhát
	28	lьg-	lg	light	Cz lhostejný
	29	lъk	lk	mourn	Cz lkát
	30	lьp-	lp	cling, stick	Cz lpět
	31	lьsk-	ls	shine, twinkle	Cz lštíti se
	32	lьstь	ls	cunning, ruse	Cz lsti (GENsg)
	33	lьvь	lv	lion GENsg	Cz lva (GENsg)
	34	slьz	lz	tear	Pol łza
	35	lъž-	lž	spoon	Cz lžíce
m	36	mъd-lъ	md	faint, weak	Cz mdlý
	37	mъchъ	mch	moss	Cz dial mšina
	38	mъk	mk	sudden movement	Pol mknąć
	39	mьt-tь	ms	revenge	Cz msta
	40	mъstъ	ms	must, fruit juice GENsg	Cz arch mstu
	41	mъtъ	mt	gym swing GENsg	Cz arch mtu
	42	mьzda	mz	salary	Cz mzda
	43	mъzg-	mz	spoil	Rus mzgnut'
	44	mьša < lat missa	mš	mass	Cz mše
	45	mъšica	mš	greenfly, aphid	Cz mšice
	46	mьchelъ	mš	earnings, profit	Rus mšelъ
	47	mьg-	mg	fog	Cz mhlavý

The result is summarised under (64).

(64)

diachronic origin of modern Slavic #RT clusters			
#RT	number of roots < #RvT		uncertain origin
	< #RyerT	< #RvT	
#jC	4	1 (5 j-es-mь)	
#rC	15	4 (14 rufijanь, 15 rusъ, 21 rjuti, 25 rez)	1 (9 s-cr rčak)
#lC	10	0	
#mC	12	0	
	41	5	1

Total 47

(65) borrowings of Georgian words with non-Russian #RT clusters into Russian

#RT		
#m͡ts	Mcyri	poem by Lermontov, and the corresponding character
#mt	Mtacminda	mountain in Tbilisi
#mz	Mziuri	Georgian dance band
#m͡ts	Mckheta	town in Georgia
#rk	rkaciteli	popular brand of wine
#rz	Rza	personal name

(66) Czech acronyms with non-native #RT clusters

LFUK	Lekařská Fakulta University Karlova	school for nurses
JČU	Jihočeská Universita	University of Southern Czechia
JSA	Jazyk symbolických adres	language of symbolic addresses
LFOP	Lidová Fronta pro Osvobození Palestiny	people's front for the liberation of Palestine
LSU	Liberální Sociální Unie	liberal social union (political party)
LŠU	Lidová Škola Umnění	people's school of Arts

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