Challenges to Stratal Phonology

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Introduction

§1 On the grammatical side, the theory of phonologically driven alternations set out in this course crucially assumes
- stratification
- and
- parallel constraint-based computation.

(i) Stratification is needed, *inter alia*, to
- identify stem-level alternations as a class exhibiting special properties (◄❶, ►❸,❹),
- lay down the track for the diachronic life cycle of phonological patterns (►❺).

(ii) Parallel constraint-based computation[†] is needed, *inter alia*, to
- derive Chung's Generalization, which is one of the crucial properties of stem-level alternations (►❸,❹),
- drive the learning model assumed by the theory (§16 below, ►❸).

[†] Here 'parallel constraint-based computation' includes OT (Prince & Smolensky 1993), Harmonic Grammar (Pater 2009), and MaxEnt (Hayes & Wilson 2008), but excludes Harmonic Serialism (McCarthy 2010) and Candidate Chain Theory (McCarthy 2007): see Bermúdez-Otero (2018b: 101-102) on the demarcation of 'constraint-based Stratal Phonology'. On, for example, Stratal MaxEnt, see Nazarov & Pater (2017).

§2 Therefore, any challenge to constraint-based Stratal Phonology is a challenge to the foundations of the theory of alternations developed in this course.

This session reviews three such challenges:

	phenomenon		*challenge to*
(i)	stratum-internal capacity	⇨	parallel constraint-based computation
(ii)	paradigmatic dependency without containment	⇨	strict inside-out cyclicity
(iii)	bracketing paradoxes	⇨	strict coextensiveness of cyclic domains with morphosyntactic constituents.

§3 I argue that all three challenges yield to independently motivated solutions that leave the stratal-cyclic architecture unaffected:

	phenomenon		*independently motivated solution(s)*
(i)	stratum-internal opacity	⇨	distantial faithfulness, etc
(ii)	paradigmatic dependency without containment	⇨	UR acquisition, listed allomorphy
(iii)	bracketing paradoxes	⇨	prosody, semantics

Stratum-internal opacity

Outline of the argument

§4 The challenge (e.g. McCarthy 1999, 2007, Vaux 2008, *inter multos alios*):

Opacity within a single phonological cycle cannot be handled by parallel constraint-based computation and requires a more powerful theory of derivations:

e.g.
- ordered rules (e.g. Chomsky & Halle 1968, Calabrese 2005, Vaux 2008)
- Harmonic Serialism (e.g. McCarthy 2010)

or
- candidate chains (e.g. McCarthy 2007)

§5 The response:

(i) Many opaque interactions fall out of the stratal affiliation of the relevant processes without further stipulation.

In such cases, adopting a stratal solution results in learnability advantages (Bermúdez-Otero 2003, ►❸).

Example below: Catalan /ʒ/-affrication and voicing assimilation.

(ii) Other opaque interactions submit to independently motivated constraint-based solutions:

such as distantial faithfulness (Kirchner 1996, Gnanadesikan 1997, Zuraw 2013) motivated by chains shifts (Kirchner 1996) and saltation (Hayes & White 2015).

Example below: Catalan spirantization and voicing assimilation.

Catalan laryngeal neutralization (Bermúdez-Otero 2006b, 2007)

§6 Standard (Central) Catalan possesses the following obstruent phonemes :

p		t̪		k
b		d̪		g
	f	s	ʃ	
		z	ʒ	

See Wheeler (1979: xxii, 222, 234, chs V and VI), Recasens (1991: 173), Hualde (1992: §3.1.1).

§7 Voice contrasts are neutralized in the coda:

(i) Voiceless realizations in surface codas before a voiceless segment or pause:

/p/→[p]	/t̪/→[t̪]		/k/→[k]
/b/→[p]	/d̪/→[t̪]		/g/→[k]
/f/→[f]	/s/→[s]	/ʃ/→[ʃ]	
	/z/→[s]	/ʒ/→[tʃ]†	

e.g.	/p/	*escu*[p]	‘(s)he spits’	cf. *esco*[p]*ir* ‘to spit’
		escu[p] *tot*	‘(s)he spits everything’	
	/b/	*llo*[p]	‘he-wolf’	cf. *llo*[β]*a* ‘she-wolf’
		llo[p] *trist*	‘sad he-wolf’	
	/f/	*bu*[f]	‘puff’	cf. *bu*[f]*ar* ‘to puff’
		bu[f] *calent*	‘warm puff’	

† /ʒ/ undergoes affrication in the coda (§12–§14 below).

(ii) Voiced realizations in surface codas before voiced segments (including sonorants):

/p/→[b]	/t̪/→[d̪]		/k/→[g]
/b/→[b]	/d̪/→[d̪]		/g/→[g]
/f/→[v]	/s/→[z]	/ʃ/→[ʒ]	
	/z/→[z]	/ʒ/→[dʒ]	

e.g.	/p/	*escu*[b] *molt*	‘(s)he spits a lot’
	/b/	*llo*[b] *lliure*	‘free he-wolf’
	/f/	*bu*[v] *brusc*	‘abrupt puff’

§8 Voice neutralization overapplies to prefix- and word-final obstruents resyllabified into the onset:

(i) Prefix- and word-final stops resyllabified into the onset surface as voiceless:

e.g.	/p/	*escup això*	[əs.ku.**p**ə.ʃɔ]	‘spit this’
	/b/	*llop amic*	[ʎo.**p**ə.mik]	‘friendly he-wolf’
	/p~b/	*subalpí*	[su.**p**əl.pi]	‘subalpine’

NB ‘Pronominal enclitics’ are agreement suffixes and so part of the grammatical word (Bermúdez-Otero & Payne 2011: 68–71; cf. Harris 1993), just as in European Portuguese (Bermúdez-Otero & Luís 2009):

e.g.	/p/	*escup=ho*	[əs.ku.**p**u]	‘spit it’		
	/b/	*rep=ho*	[rɛ.**β**u]	‘receive it’	cf. *re*[β]*re*	‘to receive’

(ii) Prefix- and word-final fricatives resyllabified into the onset surface as voiced:

e.g.	/f/	*buf enorme*	[bu.**v**ə.nor.mə]	‘enormous puff’	
	/s/	*gos alat*	[go.**z**ə.lat]	‘winged dog’	cf. *go*[s]*a* ‘bitch’
	/z/	*vas enorme*	[va.**z**ə.nor.mə]	‘enormous glass’	cf. *va*[z]*os* PL
	/s~z/	*bes-avi*	[bə.**z**a.βi]	‘great-grandfather’	

§9 The stratal ascription of voicing neutralization:

(i) Voicing neutralization must apply at the word level, since it affects word-final prevocalic obstruents, which are in the coda at the word level but undergo resyllabification into the onset at the phrase level.

For prefixes, assume a prosodic word boundary at the prefix-stem juncture, crossed by onset-satisfying resyllabification only at the phrase level (◀❶§15iv).

(ii) On the other hand, the surface voicing of neutralized obstruents is partly determined by assimilation, which must be phrase-level since it applies across word boundaries.

§10 A two-step solution:

(i) Coda obstruents lose their laryngeal node at the word level.

(ii) At the phrase level, delaryngealized obstruents are supplied with voicing specifications contextually:

- before obstruents, they assimilate in [±voice];
- before sonorant consonants, they get [+voice] voiced by default;
- before vowels, fricatives and affricates get [+voice] by default;
- the rest get [-voice] by default.

See the classic rule-based autosegmental account of Mascaró (1987). On voicing neutralization as delaryngealization, see Steriade (1999b). For the same analysis applied to Quito Spanish (◀❶§2ii), see Bermúdez-Otero (2011: §6).

§11 Examples:

	llo/b/ *trist*	*llo*/b/ *lliure*	*llo*/b/ *amig*
ℌℒ	.ʎob.	.ʎob.	.ʎob.
ℳℒ	.ʎo**P**.	.ʎo**P**.	.ʎo**P**.
ℙℒ	.ʎo**p**.trist.	.ʎo**b**.ʎiw.ɾə.	.ʎo.**p**ə.mi**k**.
	‘sad he-wolf’	‘free he-wolf’	‘friendly he-wolf’

	go/s/*a*	*go*/s/	*go*/s/ *enorme*
ℌℒ	.go.sə.	.gos.	.gos.
ℳℒ	.go.sə.	.goS.	.goS.
ℙℒ	.go.sə.	.go**s**.	.go.**z**ə.nor.mə.
	‘bitch’	‘dog’	‘enormous dog’

Catalan /ʒ/-affrication

§12 Data (see Wheeler 1979: 309–310; Mascaró 1984: §4, 1986: 165–166)

/bɔʒ/ ‘mad’	*boja*	[bɔ.ʒə]	‘madwoman’
	bogeria	[bu.ʒə.ɾi.ə]	‘madness’

but	*boig*	[bɔ**tʃ**]	‘madman’
	boig petit	[bɔ**tʃ**.pətit]	‘small madman’
	boig gran	[bɔ**dʒ**.ɣran]	‘big madman’
	boig estrany	[bɔ.**dʒ**əs.trəɲ]	‘strange madman’

§13 /ʃ/ does not affricate:

/məte**ʃ**/ ‘same’	*mateix*	[mə.te**ʃ**]	‘same.M’
	mateixa	[mə.te.**ʃ**ə]	‘same.F’
	mateix corb	[mə.te**ʃ**.kɔrp]	‘same raven’
	mateix gos	[mə.te**ʒ**.ɣos], *[-**dʒ**-]	‘same dog’
	mateix home	[mə.te.**ʒ**ɔ.mə], *[-**dʒ**-]	‘same man’

§14 My analysis: /ʒ/ affricates to [dʒ] in the coda at the stem level (Bermúdez-Otero 2001: 12).

		bo/ʒ/-*a*	*bo*/ʒ/	*bo*/ʒ/ *estrany*	
$\mathfrak{S}\mathfrak{L}$	/ʒ/-affrication	.bɔ.**ʒ**ə.	.bɔ**dʒ**.	.bɔ**dʒ**.	} counterbleeding
$\mathfrak{W}\mathfrak{L}$	delaryngealization	.bɔ.**ʒ**ə.	.bɔ**ΤΣ**.	.bɔ**ΤΣ**.	
$\mathfrak{P}\mathfrak{L}$	assimilation/default	.bɔ.**ʒ**ə.	.bɔ**tʃ**.	.bɔ.**dʒ**əs.trəɲ.	
		‘madwoman’	‘madman’	‘strange madman’	

§15 What comes for free from the relative sizes of cyclic domains:

(i) /ʒ/-affrication must be lexical because it overapplies in word-final prevocalic position:

e.g. *bo*/ʒ/ *estrany* [bɔ.**dʒ**əs.trəɲ] ‘strange madman’ affrication in surface onset!

(ii) Hence, /ʒ/-affrication must precede phrase-level assimilation:

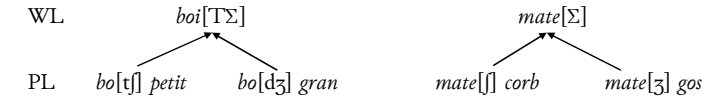
UR	/bɔʒ pətit/	/məteʃ ɣos/
/ʒ/-affrication	bɔdʒ pətit	n.a.
assimilation	bɔtʃ pətit	məteʒ ɣos
	Counterbleeding	*Counterfeeding*

§16 This helps in acquisition:

Q. How does the child learn that /ʒ/ undergoes affrication in codas, given surface counterevidence like [mə.te**ʒ**.ɣos]?

A. The child acquires the grammar bottom-up, from lower to higher levels, undoing each alternation at the relevant stratum (Bermúdez-Otero 2003).

(i) Undoing phrase-level alternations:



(ii) Learning word-level phonotactics over phrase-level input:

⇨ No laryngeally specified obstruents, and so no [ʒ], in word-level codas.

⇨ The learner can already promote *[ʒ̩] to undominated status!

[On how the learner generalizes from alternating to non-alternating codas, ►❸.]

Catalan spirantization

§17 The nonsibilant voiced obstruent phonemes /b, d̪, g/ have noncontinuant and continuant allophones:

(i) In voicing neutralization environments, /b, d̪, g/ have noncontinuant allophones:

- /b, d̪, g/ →[p, t̪, k]

in the coda before pause	*llo*[p]	‘he-wolf’
in the coda before a voiceless segment	*llo*[p] *trist*	‘sad he-wolf’
in prefix-final or word-final onset position	*llo*[p] *amic*	‘friendly he-wolf’

- /b, d̪, g/ →[b, d̪, g]

in the coda before a voiced segment	*llo*[b] *lliure*	‘free he-wolf’

(ii) Outside voicing neutralization environments, the continuancy of /b, d̪, g/ is determined allophonically by a process of spirantization:

- /b, d̪, g/ →[b, d̪, g] in a non-prefix/word-final onset…

after pause	[**b**]*asta!*	‘Enough!’		
after an oral stop	*ami*[g **b**]*o*	‘good friend’		
after a nasal stop	*a*[ɲ **b**]*inen*	‘next year’		
/d̪/→[d̪] after laterals	*e*[ʎ **d̪**]*iu*	‘he says’	cf. *e*[ʎ β]*a*	‘he goes’
/b/→[b] after /f/	*bu*[v **b**]*rusc*	‘abrupt puff’	cf. *a*[vɣ]*à*	‘Afghan’
in gemination	[pɔ**b.b**lə]	‘people’		

- /b, d̪, g/ →[β, ð̞, ɰ] in other non-prefix/word-final onset positions:

e.g.	*l*[ə **β**]*aca*	‘the cow’
	é[z **β**]*lau*	‘is blue’
	e[ʎ **β**]*a*	‘he goes’
	ma[r **β**]*onic*	‘pretty sea’

§18 Properties of spirantization:

(i) Domain: sees across word boundaries, e.g. *a*[ɲ b]*inen* ‘next year’,
ma[r β]*onic* ‘pretty sea’;
therefore phrase-level.

(ii) Input:
- applies to nonneutralized [b, d̪, g] in the input to the phrase level;
- does not apply to delaryngealized [P, T, K] in the input to the phrase level.

I.e.		*llo*/b/*a*	*llo*/b/ *lliure*
☊		.ʎo.ba.	.ʎob.
☋	delaryngealization	.ʎo.**b**a.	.ʎo**P**.
☊	spirantization, assimilation	.ʎo.**β**a.	.ʎo**b**.ʎiw.ɾə.

§19 Stratum-internal opacity: both spirantization and assimilation are phrase-level!

phrase-level input	.ʎo**P**.#.ʎiw.ɾə.
spirantization	n.a.
assimilation	.ʎo**b**.ʎiw.ɾə.

Counterfeeding

§20 A distantial-faithfulness effect: no fell swoop from P to β

assimilation	(✓)	P ⟶ b	violates IDENT-[voice]
spirantization	(✓)	b ⟶ β	violates IDENT-[cont]
fell swoop	(✗)	P ⟶ β	violates IDENT-[voice]&$_{seg}$IDENT-[cont]

§21 Similar distantial-faithfulness effects found in chain shifts:

e.g. Grimm’s Law in Proto-Germanic

✓ p > ɸ
✓ b > p but ✗ b > ɸ
✓ b^{ɦ} > b but ✗ b^{ɦ} > p

§22 Different implementations of distantial faithfulness:

- constraint conjunction (Kirchner 1996)
- MAP-constraints (Zuraw 2013)
- containment (Popp 2018)

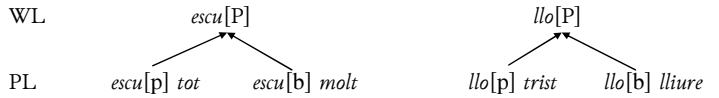
§23 Implementation with constraint conjunction:

Phrase-level input	*Phrase-level output*	IDENT-[voice]&$_{seg}$IDENT-[cont]	CODACOND-[voice]	VOICEDSTOPPROHIBITION	IDENT-[voice]	IDENT-[cont]	*Effect*
lə bakə	lə bakə			*!			spirantization
	lə βakə ☜					*	
məteʃ ɣos	məteʃ ɣos		*!				assimilation
	məteʒ ɣos ☜				*		
əskup molt	əskup molt		*!				assimilation
	əskub molt ☜			*	*		counterfeeds
	əskuβ molt	*!			*	*	spirantization

§24 But, even in this case, stratification aids in the acquisition of opacity effects:

Q. How does the child learn that opaquely nonspirantized [b, d̪, g] derives from delaryngealized [P, T, K]?

A. Simply by undoing phrase-level alternations:



[Again, on how the learner generalizes from alternating to non-alternating segments, ►❸:

e.g. non-alternating		*enigma*
	☋	.ə.niK.mə.
	☊	.ə.nig.mə.
		‘enigma’]

Extrinsic rule ordering subverts stratification: Spanish diphthongization again

§25 Back to the Spanish diphthongal alternation (◄❶§19):

Basic generalization:
- diphthongs in tonic syllables: e.g. [bj**é**x-o] ‘old man / old’
- monophthongs elsewhere: e.g. [b**e**x-éθ-∅] ‘old age’

§26 The alternation misapplies in the presence of certain affixes (in semantically compositional uses):

notably,
- diminutive *-(ec)it-o*
- augmentative *-az-o*
- augmentative *-ón-∅* in denominal and deadjectival uses only
- superlative *-ísim-o*
- causative *a-…-á-r* in deadjectival change-of-state verbs only

(i) *normal application*	[bj**é**x-o]	'old man / old'	[bw**é**n-o]	'good'
	[b**e**x-éθ-∅]	'old age'	[b**o**n-dá^{ð}-∅]	'goodness'
(ii) *misapplication*	[bj**e**x-ón-∅]	'old_man.AUG'	[bw**e**n-ón-∅]	'good.AUG'
	[bj**e**x-áθ-o]	'old_man.AUG'	[bw**e**n-áθ-o]	'good.AUG'
	[bj**e**x-eθít-o]	'old(_man).DIM'	[bw**e**n-eθít-o]	'good.DIM'
	[bj**e**x-ísim-o]	'old.SUPL'	[bw**e**n-ísim-o]	'good.SUPL'
	[a-β**je**x-á-ɾ]	'make_old.INF'		

§27 Analysis:
- the suffixes in §26ii are word-level;
- allomorph selection in the diphthongal alternation must take place in a stem-level cycle.

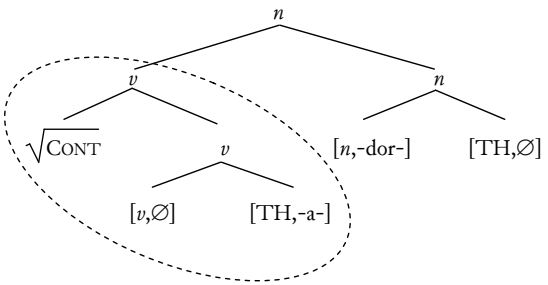
	viejísimo
	⟦WL ⟦SL {bex-o / bjex-o}⟧ ísim-o ⟧
𝔖𝔏	bjéxo
𝔚𝔏	bjexísimo

All stratal approaches draw this conclusion: e.g. Halle et al. (1991: 146)
Bermúdez-Otero (2006a: 286, 2013: 61)

[§28 Two generalizations about the word-level constructions in §26ii:
- they are all very highly productive (Carlson and Gerfen 2011b, b);
- they are all denominal or deadjectival, not deverbal (Rainer 1993: 175-176).

For a diachronic explanation, ►❻.]

§29 But stem-level cyclicity causes a problem: e.g. *cont-a-dor-∅* 'counter'



§30 If (i) there is a cycle of the stem-level phonology over the inner stem highlighted in §29, and (ii) selection, operating over root allomorphs, takes place in this cycle,
then the wrong results follow:

	[SL [SL {koNt / kweNt} -a] dor- {∅ / e}]
first cycle	kwén.ta
second cycle	*kwen.ta.dór

Yet, *pace* Myler (2015), premise (i) is not in doubt: see Bermúdez-Otero (2016: 408-413)
◄❶§19ii

§31 This is a classic puzzle:

> If verb and noun stems are stress domains, then Diphthongization is not cyclic [i.e. not stem-level].
>
> (Harris 1989: 345)

§32 *The extrinsic-ordering gambit* (Halle et al. 1991)
Stress shift counterbleeds diphthongization within a word-level cycle:

		buen	*buen-ísim-o*
		⟦WL ⟦SL bOn⟧⟧	⟦WL ⟦SL bOn⟧ isim-o⟧
𝔖𝔏	stress assignment	bÓn	bÓn
𝔚𝔏	diphthongization	bwén	**bwénisimo**
	stress assignment	—	**bwenísimo**

§33 ☠ A particularly nasty type of extrinsic ordering:
- Independently argued never to be necessary even in rule-based models: e.g. Kaisse (1999).
- Destroys the empirical content of the concept of cyclic domain:
  Extrinsically ordering diphthongization before stress assignment at the word level enables Halle et al. (1991) to state something quite contradictory: namely, that diphthongization applies in word-level domains but cannot see word-level affixes.
- Incompatible with learning models such as Bermúdez-Otero (2003);
  cf §16 and §24 above.

§34 For a better solution, ►❺.

PARADIGMATIC DEPENDENCIES WITHOUT CONTAINMENT

The issue

§35 Question (Steriade 1999a, 2008, 2013; Steriade & Yanovich 2015)

- Languages often exhibit morphophonological paradigmatic dependencies between expressions that do not stand in a relationship of containment with each other.
- Can this observation be reconciled with a strictly cyclic approach to the morphosyntax-phonology interface?

§36 My answer (Bermúdez-Otero 2018a, 2018b)

- Yes. Paradigmatic dependencies without containment are established indirectly through the acquisition of underlying representations (URs):
- In such cases, a surface form determines the phonological behaviour of a morphologically related item by providing the learner with cues to the UR of a constituent present in both expressions.

The empirical argument: paradigm extension and suppletion

§37 I argue that interesting and correct predictions about paradigm extension follow from the hypothesis that paradigmatic dependencies without cyclic containment take effect during the acquisition of URs:

> notably, paradigmatic dependencies are correctly predicted never to be systematically extended to new items in cases of suppletion.

§38 Empirical case study: Latin rhotacism (Bermúdez-Otero 2018a: §3; cf. Albright 2002)

☞ Weakly suppletive dependencies like *operis* N.GEN.SG ⇒ *opus* N.NOM.SG 'work', though highly reliable in neuter polysyllables, fail to be extended to items like *acer~aceris* N 'maple'; cf. **acus*

Two types of paradigmatic dependence in cyclic frameworks

§39 Paradigmatic dependence in morphophonology:

The form of a linguistic expression *a* is predictable from the surface representation of one or more morphosyntactically related expressions {*b*, *c*, ...}.

§40 Paradigmatic dependencies with and without containment:

(i) Present-day English: pretonic secondary stress (◂❶§10,§17)

initial dactyl	ˈσσσσσ	*spècif-icátion*	predictable from *spécify*	(containment)
no initial dactyl	σσσσσ	*imàgin-átion*	predictable from *imágine*	(containment)

(ii) Early West Saxon: NOM.PL inflection in neuter *a*-stem nouns

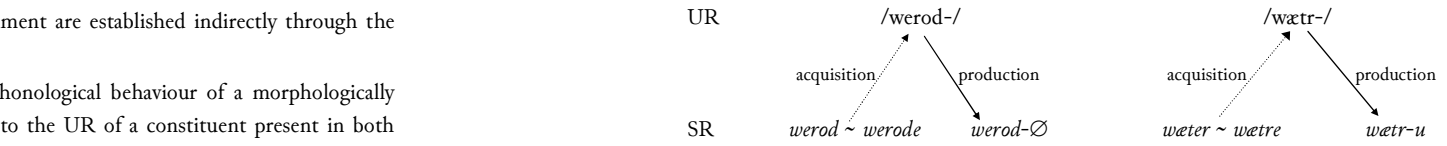
[-∅] in *werod* 'troop'	*werod-∅*	predictable from oblique *werod-e*	(no containment)
[-u] in *wæter* 'water'	*wætr-u*	predictable from oblique *wætr-e*	(no containment)

(Bermúdez-Otero & Hogg 2003: §3)

§41 Dependency with containment through cyclicity (§40.i):

	[[*imagine*] *ation*]	[[*classify*] *ication*]
1st cycle	*ímágine*	*clássify*
2nd cycle	*ìmàgináti͡on*	*clàssificátion*

§42 Dependency without containment through lexical acquisition (§40.ii):



Derivations:

	'troop.NOM.SG'	'troop.NOM.PL'	'water.NOM.SG'	'water.NOM.PL'
	/werod/	/werod-u/	/wætr/	/wætr-u/
u-apocope	—	werod	—	n.a. after obs+son
epenthesis	—	—	wæter	—
	werod	*werod-∅*	*wæter*	*wætru*

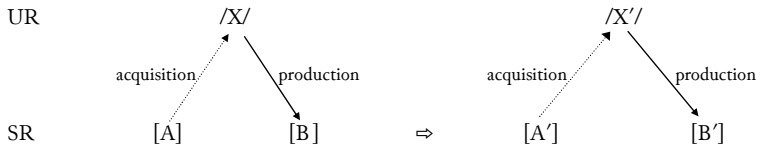
§43 Generalization: ☞ Paradigmatic dependencies without containment are established indirectly through the acquisition of URs.

§44 Schema for paradigmatic dependencies without containment in cyclic frameworks:

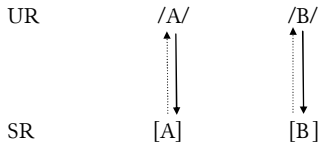
[B] predictable from [A] ⇨ The learner sets up a shared underlier /X/ from which [A]~[B] is derived by regular phonology.

§45 Extension of paradigmatic dependencies:

Given [A′], the learner sets up the underlier /X′/ and derives [A′]~[B′] from /X′/ by means of the same regular phonology that derives [A]~[B] from /X/.



§46 Cf. suppletive allomorphy:



In the case of suppletion, the [A]~[B] alternation cannot be systematically extended to [A′], [A″], as there is no phonological process able to derive [A]~[B], [A′]~[B′], [A″]~[B″], etc from single URs.

The levelling of rhotacism alternations in Latin 3rd-declension nouns

§47

	Preclassical		*Classical*		
	NOM.SG	GEN.SG	NOM.SG	GEN.SG	
• Nonneuter polysyllables	hono:s	hono:ris	honor	hono:ris	‘honour’
• Neuter polysyllables	opus	operis	no change		‘work’
	korpus	korporis	no change		‘body’

See e.g. Weiss (2009: 152)

§48 Question: why was there systematic levelling in the nonneuters, but no levelling in the neuters?

§49 Albright’s (2002) answer

- Latin learners chose the surface form of the GEN.SG as the **base** of the paradigm because it was more informative than the NOM.SG, which was subject to several neutralizations.
- Latin learners set up rules projecting NOM.SG surface forms from GEN.SG forms.
  A rule was adopted if it had a higher **confidence score** than the alternatives
  (where a rule’s confidence score is a function of its reliability and scope).

§50

		confidence score	*Preclassical examples*	
☞	$[o{:}ris]_{GEN.SG} \rightarrow [or]_{NOM.SG}$ / $[X]_{polysyl,-neut}$____#	0.723	soror~soro:ris	‘sister’
	$[o{:}ris]_{GEN.SG} \rightarrow [o{:}s]_{NOM.SG}$ / $[X]_{polysyl,-neut}$____#	0.611	hono:s~hono:ris	‘honour’
☞	$[eris]_{GEN.SG} \rightarrow [us]_{NOM.SG}$ / $[X]_{polysyl,+neut}$____#	0.643	opus~operis	‘work’
	$[eris]_{GEN.SG} \rightarrow [er]_{NOM.SG}$ / $[X]_{polysyl}$____#	0.374	aker~akeris	‘maple’
☞	$[oris]_{GEN.SG} \rightarrow [us]_{NOM.SG}$ / $[X]_{polysyl,+neut}$____#	0.545	korpus~korporis	‘body’
	$[Vris]_{GEN.SG} \rightarrow [Vr]_{NOM.SG}$ / $[X]_{+neut}$____#	0.198	marmor~marmoris	‘marble’

- The pattern of *honōs~honōris* exhibits a relatively low confidence score, and so it is replaced by the pattern of *soror~sorōris*.
- The pattern of *opus~opĕris* and *corpus~corpŏris* exhibits a relatively high confidence score, and so it resists paradigm extension from *acer~acĕris* and *marmor~marmŏris*.

§51 The **acus* problem

- The rules with the highest confidence score for neuter polysyllables are

  $[eris]_{GEN.SG} \rightarrow [us]_{NOM.SG}$ / $[X]_{polysyl,+neut}$____#
  $[oris]_{GEN.SG} \rightarrow [us]_{NOM.SG}$ / $[X]_{polysyl,+neut}$____#

- By parity of reasoning, the alternations generated by these rules should be extended to their targets as well:
  the allomorphy of *opus~operis* should be extended to neuters with GEN.SG forms in *-ĕris*,
  the allomorphy of *corpus~corporis* should be extended to neuters with GEN.SG forms in *-ŏris*,

Thus, §49+§50 predict aker~akeris > akus~akeris N ‘maple’
marmor~marmoris > marmus~marmoris N ‘marble’

⚠ The prediction is incorrect: innovative N.NOM.SG forms like **acus* and **marmus* do not occur.

§52 Cyclic frameworks avoid the **acus* problem:

Levelling as input-restructuring (►❺)
It is trivially easy to describe the change that *did* happen as UR-restructuring:

	Preclassical		*Classical*
UR	/hono:s-/	>	/hono:r-/
SR	hono:s~hono:ris		honor~hono:ris

§53 But the paradigm extensions incorrectly predicted by Albright (§51) could not come about through UR-restructuring…

…because alternations like [opus]~[oper-] and [korpus]~[korpor-] were synchronically suppletive.

§54 There were no synchronically valid phonological rules capable of deriving the [u]~[e] alternation from a single underlying /V/:

Prehistorically, all short unstressed vowels had neutralized to [e] before [r],

but this had ceased to be true when nouns like †[temp**u**s~temp**e**ris] 'time' became [temp**u**s-temp**o**ris]; cf. [temperi:] 'in a timely manner' (Weiss 2009: 118, 239, 307).

§55 The same is true of the [s]~[r] alternation: by the Classical period, rhotacism survives as a process of phonologically driven allomorph selection, but is no longer an automatic alternation.

Synchronic exceptions include

- /s/ from historical †/s:/ — *cau**s**a* 'cause'
- irregular dissimilatory blocking — *mi**s**er* 'wretched', but cf. †*swesōr* > *so**r**or*
- loanwords — *ba**s**is* 'pedestal' (from Greek)

etc. (Roberts 2012)

§56 Prediction §37 is confirmed!

BRACKETING PARADOXES

The issue

§57 The term 'bracketing paradox' covers a large and heterogeneous set of phenomena (Spencer 1988: 680–681; Stump 1991: note 38).

The problems they raise have received a wide range of solutions (Newell 2019).

The relevant cases for us are those in which

appear to mismatch ⨯ cyclic phonological domains / the morphosyntactic constituents suggested by semantic scope;

cf. ◀❶§7–§11.

§58 Classic examples: English *ungrammaticality* (Bermúdez-Otero 2018b: 122–123)
English *transformational grammarian* (Bermúdez-Otero 2016: 422–423)

Case study: *transformational grammarian*

§59 Paradoxical reading: 'practitioner of transformational grammar'

Bracketing suggested by semantic scope: [[*transformational grammar*] *ian*]
Bracketing needed for phonology: [[*transformational*][*grammarian*]]

§60 Syntactic evidence against [[*transformational grammar*] *ian*]:

Grammarian behaves as a constituent:

- *one*-substitution: *He is a generative grammarian but not a transformational one.*
- right-node raising: *I know many generative but few transformational grammarians.*

§61 Morphological evidence against [[*transformational grammar*] *ian*]:

The noun is a domain for allomorph selection:

- BAROQUE LUTE-IST 'player of the Baroque lute' ↔ *Baroque **luten**-ist*
- BAROQUE LUTE-ER 'maker of Baroque lutes' ↔ *Baroque luth-**ier***

§62 Semantic evidence against [[*transformational grammar*] *ian*]:

The noun is a domain for allosemic selection (in the sense of Marantz 2013):

- *Modern hispanist* denotes a type of hispanist.
  Idiosyncratically, *hispanist* does not denote someone who studies all Hispanic things but only someone who studies Hispanic culture and society.
  Hence, a modern hispanist is someone who studies modern Hispanic culture and society, and not someone who studies, say, genetic variation in modern Hispanic populations.
- *Nuclear physicist* denotes a type of physicist (one who practises nuclear physics);
  nuclear physician denotes a type of physician (one who practises nuclear medicine).
  The relevant allosemes of the base *physic-* are only selected in the presence of the appropriate suffixes:

	physic-∅	'drug' (obsolete)
	physic-ian	'practitioner of medicine'
but	*physic-al*	'material'
	physic-s	'science of matter and energy'
	physic-ist	'practitioner of physics'

§63 Alternative solution:

- The correct, and only, bracketing is [[*transformational*][*grammarian*]].
- The paradoxical readings are generated in the semantics by the same mechanisms that yield non-intersective interpretations in cases like *former president*, *wannabe actor*, *alleged murderer*, *habitual thief*, and *beautiful chef* (e.g. Larson 1998).

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