A penetrating look at locality in phonology

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Outline

There is no *impenetrability* in the phonology

- There are no 'no-look-back' devices (no PIC)
  - *It's all bleeding*
- Cyclic locality effects are structural
  - *Relativized cyclic phonology*
- How structural cyclic locality simplifies the phonology
  - Phonological operations can be structure-changing or structure-building.
  - *No strata/No co-phonologies*.
- How command chains impact locality in phonology
  - *some thoughts, few conclusions*
- Conclusions

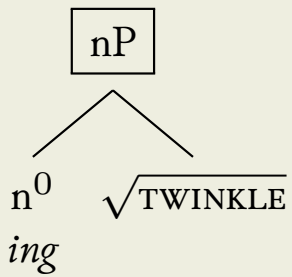
A simple example of why people think there could be an active 'PIC' in the phonology

(English syllabification: only do it if you have to)

English syllabification is sensitive to cyclicity

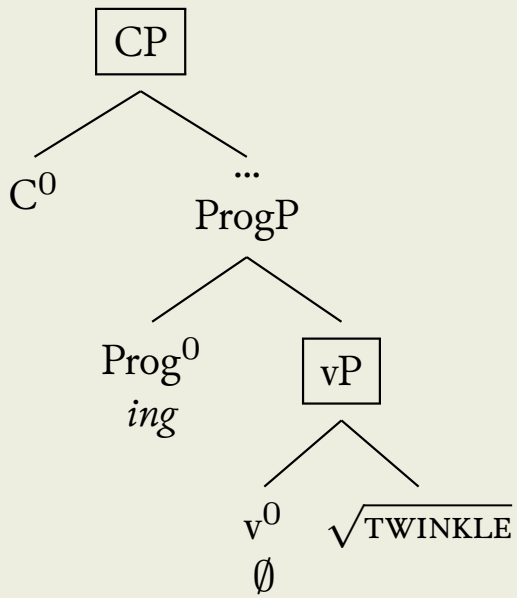
Monocyclic vs multicyclic derivations

[twɪŋ.klɪŋ]



'a short moment'

[twɪŋ.kl.ɪŋ]

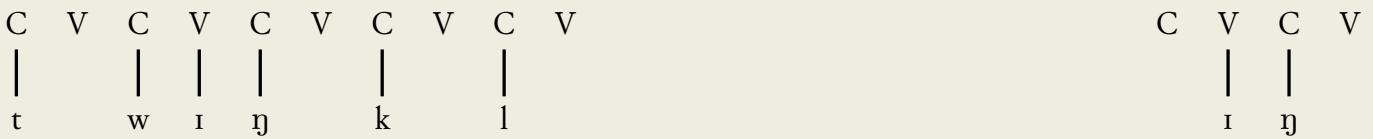


'the act of twinkling'

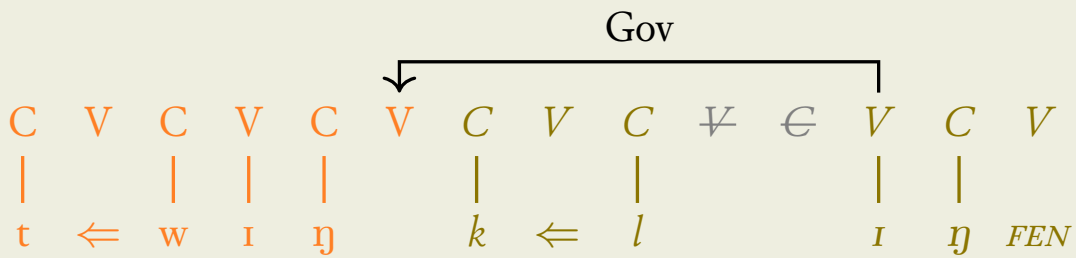
(Marvin 2002, 2013)

Single-cycle derivations have no boundaries

Underlying representations



ɪ cycle (nP): /l/ 'sees' /ɪ/



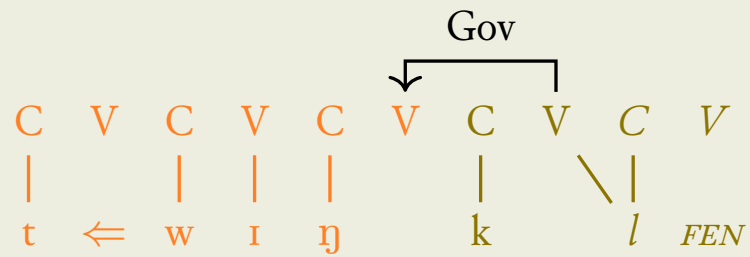
In CVCV Phonology (Lowenstamm 1996; Scheer 2012), The ⇐ indicates a complex onset. Syllable structure is in the UR. 'Free' empty Vs must be governed by a local V. Empty VC-sequences are deleted in a cycle (Gussmann and Kaye 1993). Colour-coding = 'classic syllables'.

- Linearization inside a cycle leads to a string indistinguishable from a monomorpheme (no exceptions (see Newell (2021)) for detailed discussion)
  - Phonological operations triggered include licensing, government, *extrametricality* (see Faust and Ulfsbjorninn (2018)), and stress.
  - /l/ syllabifies as an onset when followed by a linked vocalic segment.

Multi-cyclic derivations have no boundaries either

(no PIC, but no motivation for resyllabification either)

2 cycles : syllabified separately : cycle 1 (vP): /l/ is syllabic



- /l/ becomes syllabic when not followed by a linked vocalic segment

2 cycles : syllabified separately : cycle 2 (CP): no resyllabification

- /-ɪŋ/ undergoes VI, then phonology.
- Syllabic /l/ does not (re)syllabify as an onset. The FEN-V sequence is not deleted.

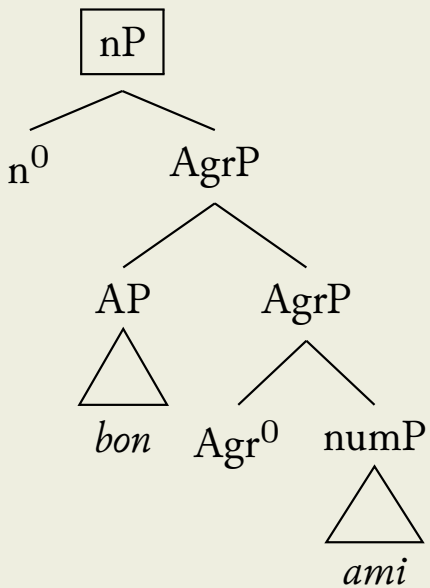
A simple example of cross-domain phonological interaction

(French liaison: do it when you can)

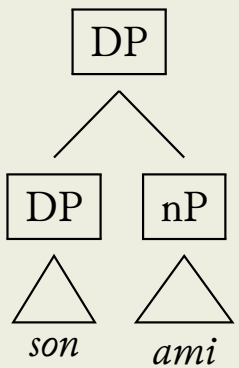
When floating consonants attach

Monocyclic vs multicyclic derivations: note the nasalization

bon ami [bɔ.na.mi] 'good friend.M'



son ami [sɔ̃.na.mi] '3S's friend.M'



(Tranel 1993; Lelièvre 2018; Lamarche 1991; Stark et al. 2009)

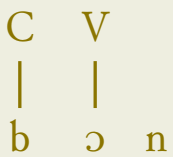
When floating consonants attach

(Liaison segments are not syllabified underlyingly)

bon ami

Cycle 1 (Spell-out at nP. N.B. the semantics)

c.f. The UR of *bon*

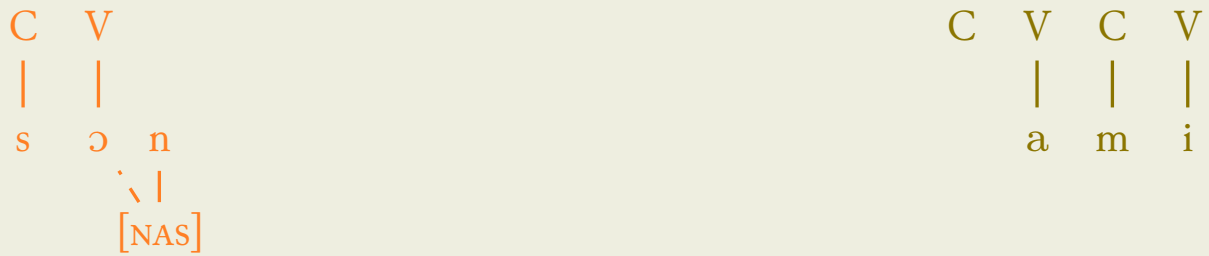


- Phonology inside a cycle = indistinguishable from a monomorpheme.
- Nasal segments:
  - link to C (syllable structure) when followed by a vocalic segment.
  - nasalize a preceding vocalic segment if not followed by a vocalic segment.

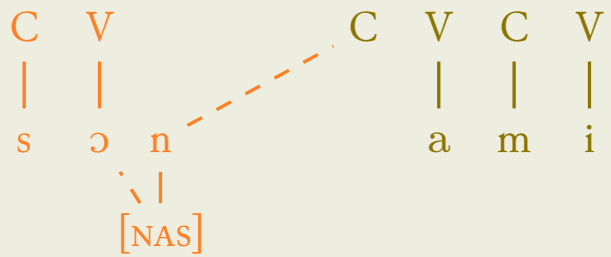
When floating consonants attach

(The next cycle over may be local)

son ami: Cycle 1 (2 separate spell-outs at nP and DP_{son})



Cycle 2 (Spell-out at DP_{sonami})



- Previous cycles can be 'seen'.
- The timing of spell-out impacts the structure of the output.
- Addition of structure (links) does not imply destruction of what has been built before.

Interim summary

(That French pattern is not in any way isolated: sandhi phenomena)

No phonologists can actually assume the PIC

Strict Cyclicity

"Structure-changing cyclic rules apply in derived environments only (where a 'derived environment' is an environment created by either a morphological rule or a phonological rule on the same cycle)"

(Giegerich 1999:100; (Chomsky 1973; Kean 1974; Mascaró 1976))

Any Multi-cyclic OT

FAITHFULNESS vs MARKEDNESS constraint rerankings at any cycle.

(Prince and Smolensky (1993/2008)(mono-cyclic))

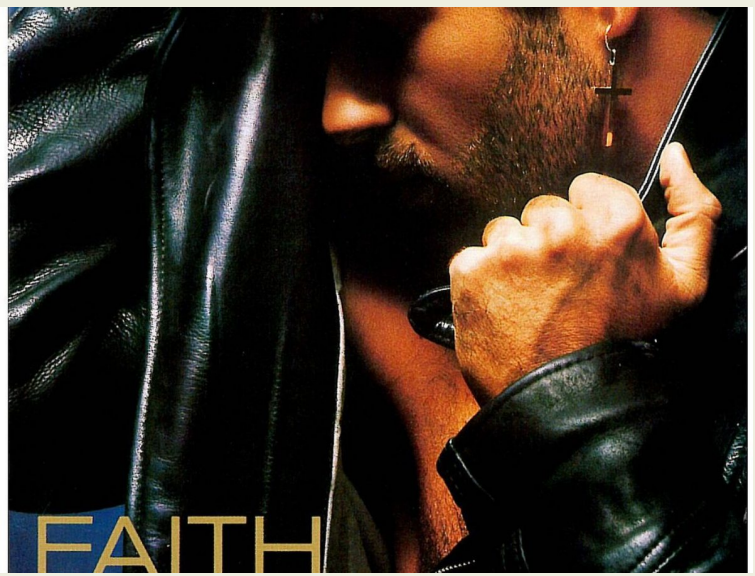
Modular PIC

"A point that needs to be made in this context can only be briefly mentioned in this footnote: in addition to being module- and phase-head-specific, the PIC is process-specific. This is a well-known (but often unmentioned) fact about sandhi phonology...a given morphosyntactic division blocks some phonological processes ... while being permeable to others .... Hence, phonological processes need to "know" whether or not they can apply across any given morphosyntactic division." (D'Alessandro and Scheer 2015)

Phase Impenetrability Condition

In a phase with head H, the domain of H is not accessible to operations outside; only H and its edge are accessible to such operations. (Chomsky 2000:108)

Do we gotta have [FAITH]?
(no)



Phonology is sensitive to structure and does not run blindly

(The Elsewhere Condition in Phonology = do nothing. There is no GEN)

- An affix may 'lean' on its host without resyllabifying with it.
  - This is the default for cyclic derivation. Merger of strings must be triggered.
- Phonological operations are **triggered**. [TRIGGER WARNING]
  - The phonology does not just 'run'.
    - e.g., Vowel-Harmony is triggered by underspecified segments/ the initiation of a search
    - e.g., Agree is triggered by unvalued features/ the initiation of a search
- In *twin.kl.ing*, resyllabification is not triggered in the second cycle.
  - The underlying structure of *-ing* is underlyingly syllabified, and therefore does not syllabify with the string to its left.
  - The syllabic structure in the URs of *bon* and *son* is underlyingly underspecified. This triggers a search into adjacent strings.

Cyclic locality effects are structural

(Relativized cyclic phonology)

As pointed out in d'Alessandro & Scheer (2015), we can have variable opacity in a single multi-cyclic phonological structure:

English regular verbs are computed in more than one cycle

- Phonology:
  - English repairs superheavy syllables (e.g., closed syllable shortening: *repair* [ɹiːpɛɹ]-*reparable* [ɹɛːprəbl]), but regular verbs are not repaired:
    - *seethed, bathed, zoomed, poked*...
  - English NC sequences are homorganic, but not in regular verbs:
    - *hummed, clanged*...
  - So, the final CCs in *zoomed* or *poked* are not syllabified together (Kaye 1995), but they do interact on a segment-internal level for voicing.
- Syntax:
  - Verbs in English stay low in the vP.
    - See (Newell to appear) for discussion of how this all works in more detail.

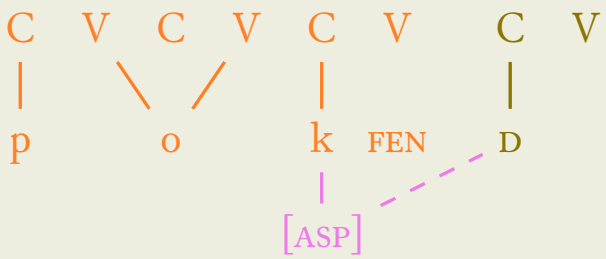
Now you see in, and you also don't

(Variable opacity on different phonological tiers)

Cycle 1:(vP)

- The UR of *poke* is identical to the one here, save the assignation the status of the [FEN].

Cycle 2:(CP)



- The *-ed* is underlyingly syllabified, and spelled out in a separate cycle from the verb root.
  - No super-heavy syllable is derived.
- But, the /D/ in *-ed* is underspecified for voicing.
  - Aspiration (voicelessness) spreads from /k/. This subsegmental link is (i) local, (ii) cross-cyclic, and (iii) does not implicate cross-cyclic interactions at other levels of structure.

Over-riding default cyclic (non)syllabification

(Different phonologies in different strata?)

Armenian Destressed High Vowel Reduction

(Dolatian 2021 : Hi Stony Brook!)

High vowels delete(reduce) iff they were stressed in cycle X, and then stress shifts in cycle X+1, under certain circumstances: 3 cycles, 4 patterns

	Stem 1	Stem 2	Word		
Base:	amus**í**n			‘husband’	W. & E.
Der. Suffix:	amus□n	-utj**ú**n		‘marriage’	W. & E.
C-init Infl. Suffix:	amusin		-n**é**r	‘husband-Pl.’	W. & E.
V-init. Infl. Suffix:	amusin		-**ó**v	‘husband-Instr.’	W. Arm.
	amus□n		-**ó**v		E. Arm.

N. B. the position of the deleted vowel will be pronounced as schwa if needed to break up illicit consonant sequences : loss of a vowel $\neq$ loss of syllable structure.

Dolatian's analysis

Stem-level derivation : 2nd cycle

[amusín] + /-utjun/			* i̯/ŭ	Id[f]	Max-V
a.		amusi̯n-utjún	*!		
b.	☞	amusn-utjún			*
c.		amusən-utjún		*!	

Word-level derivation : 2nd cycle

[amusín] + /-ov/			Id[f]	Max-V	* i̯/ŭ
a.	☞	amusi̯n-óv			*
b.		amusn-óv		*!	
c.		amusən-óv	*!		

- *i̯,ŭ = *i,u[-STRESS]: there are no unstressed [destressed] high vowels
- ID[F]: a vowel does not lose its features F and become a schwa
- MAX-V: a vowel is not deleted
- ALIGN(STR,R): stress is on the rightmost syllable

A diacritic: a disturbance in the tableau

Eastern vs. Western Armenian V-initial Word-level suffixes

Stratal and prosodic derivation of amusn-ov (EArm), amusin-ov (WArm), *and* amusin-ner (both)

				EArm	WArm	EArm &WArm
Input				/amusin -$Ø_S$ -ov$_W$/	/amusin -$Ø_S$ -ov$_W$/	/amusin -$Ø_S$ -ner$_W$/
Cycle 1				(a.mu.sín)$_s$	(a.mu.sín)$_s$	(a.mu.sín)$_s$
Cycle 2	MORPH		Spell-out	(a.mu.sín)$_s$ - /-ov$_W$/	(a.mu.sín)$_s$ - /-ov$_W$/	(a.mu.sín)$_s$ - /-ner$_W$/
	PROSODY		Syllabify	(a.mu.sí.n)$_s$-ov	(a.mu.sí.n)$_s$-ov	(a.mu.sín)$_s$-ner
			Readjust PStem	(a.mu.sí.n-ov)$_s$	(a.mu.sí.n-ov)$_s$	
	PHONO	*PStem-level*	Stress	(a.mu.sǐ.n-óv)$_s$	(a.mu.sǐ.n-óv)$_s$	
			DHR (EArm)	(a.mus.n-óv)$_s$		
	PHONO	*WLevel*	Stress	(a.mu.sn-óv)$_s$	((a.mu.sin-óv)$_s$	(a.mu.sin)$_s$-nér)
Output				amusn-óv	amusin-óv	amusin-nér

- Stress-shift and reduction occur in both dialects: The previously-computed domain is penetrable.
- Only in E.Arm. does this shift trigger a prosodically-driven co-phonology derives Destressed High-Vowel Reduction.
  - This is specific to V-initial lexical items and must be diacritically-marked.
  - This is due to neither resyllabification, destressing, nor stress shift: All of these occur in W. Arm.

An alternative, One-Phonology analysis

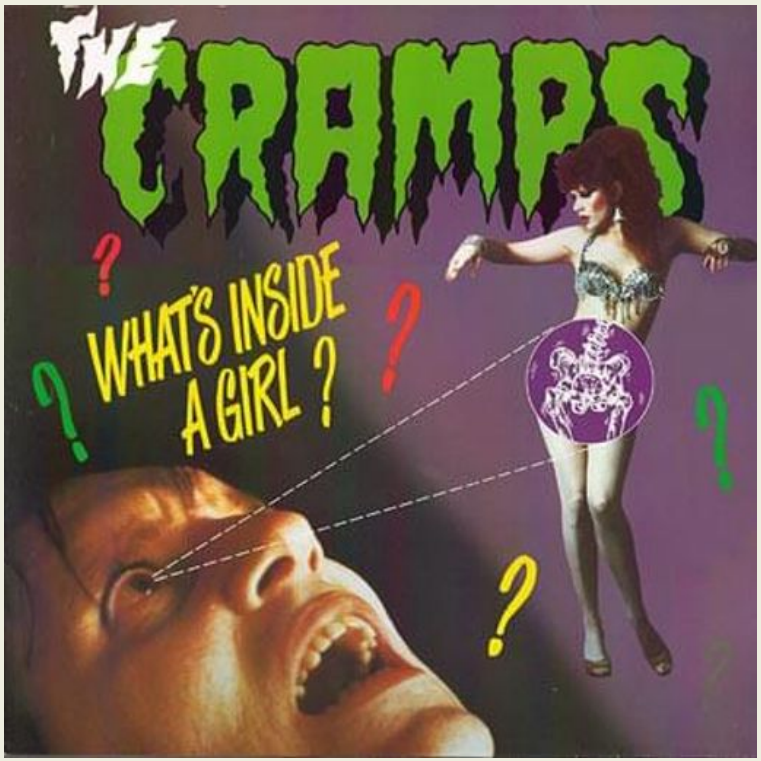
(with no diacritics, but with more phonology)

Let's ponder the logic of positing a prosodically-driven co-phonology, rather than delving into the potential effects of phonological structure.

- Vowel-initial suffixes in Eastern Armenian have liaison/floating vowels.
  - Liaison is not just for French.
  - See also Newell (2021) for a similar analysis of phonological levels in English.
- Armenian is an example of a language with virtual length (ex. Ségéral and Scheer 2001; Bucci 2013; Ulfsbjorninn 2021; Chabot 2022).
  - Virtual geminates are phonologically long segments that are phonetically short : gemination does not have to be realized phonetically as length
- High vowels are small vowels.
  - Segments differ as to the size of their internal structure/geometry.
- A single domain has a single stress. Adjacent domains may have two.

What's inside a vowel?

(some vowels are bigger than others)



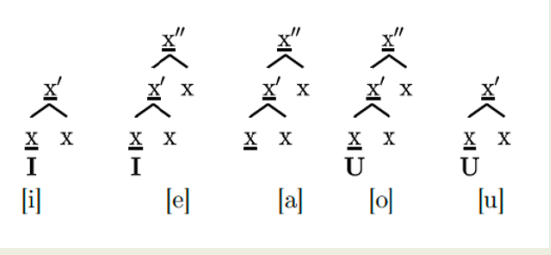
What *is* vowel reduction?

(Weak (small) vs. Strong (big) vowels)

Government Phonology 2.0 (Pöchtrager and Kaye 2013)

(insert your favourite segment-internal structure here)

- But be careful to account for the link between being big internally (full) and big externally (long).
  (Pöchtrager 2006, 2018)



Stress *is* syllable structure (Szigetvári and Scheer (2005), and refs. therein)

- It can offer space for segmental expression
  - Lengthening under stress (Italian (Larsen 1998; Faust and Ulfsbjorninn 2024) , Kanien'kéha (Piggott 1995)...)
  - Stressed vowels allow more contrasts than unstressed vowels (Portuguese (Pöchtrager 2024), Bulgarian (Pettersson and Wood 1988)...)
  - Consonant gemination under stress (English (Ségéral and Scheer 2001), Amharic (Newell and Ulfsbjorninn 2023)...)

Stress Loss and its side effects

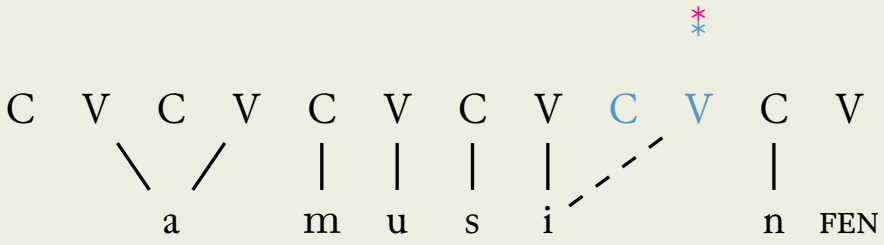
Sometimes it'll take structure with it

- High vowels are often simpler than mid and low vowels structurally – they emerge as reduced forms of mid vowels in many languages.
- Singleton segments are weaker, and therefore they are subject to reduction. Geminates have integrity (Honeybone 2005).
- The lack of high vowel reduction in certain environments in Armenian is not due to a constraint-reranking. It has a structural motivation.
  - High vowels are underlyingly short, and lengthen into the stress CV. When it goes, vowels that are attached to it go too.
  - Non-high vowels are already long. They are stressed via inheritance of metrical information (following Ulfsbjorninn (2014) and more recent work, including Faust and Ulfsbjorninn (2018)).

High vowels form a constituent with a stress-CV

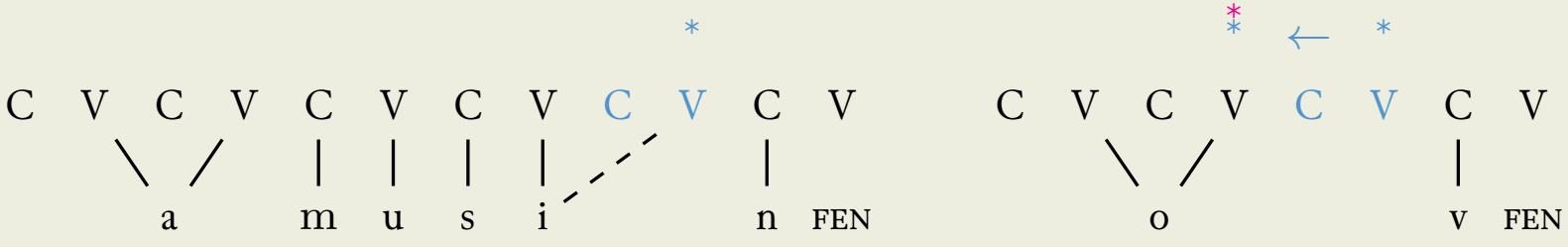
(non-high vowels do not)

Cycle 1



- Stress is inserted, virtual vowel lengthening occurs.
- * = stress
- * = main stress

Cycle 2: Western Armenian



-ov is inserted in the second cycle. No resyllabification occurs. Stress is assigned to the second domain. Main stress is phonetically realized prominence, secondary stress remains. Long vowels do not reduce.

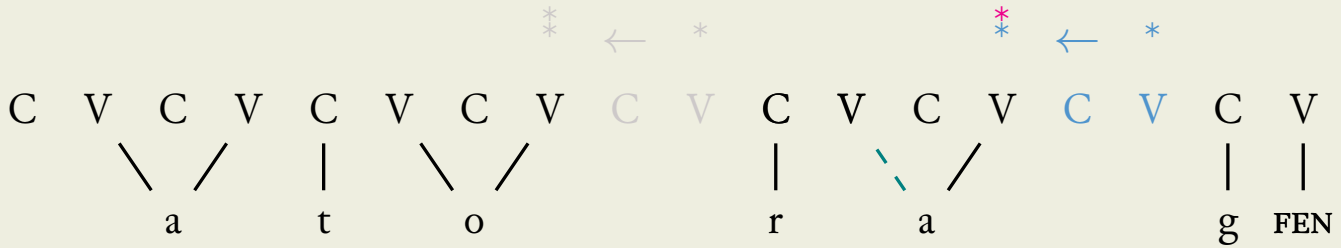
Restressing: short vs long vowels

Cycle 2: Eastern Armenian

V-initial suffixes have floating initial vowels and undergo liaison. This retriggers the stress algorithm (stress is computed in every domain). The stress on [*i*] is deleted, and the vowel linked to it is also deleted.

Cycle 2: When the Cycle 1 stressed vowel is a virtual geminate

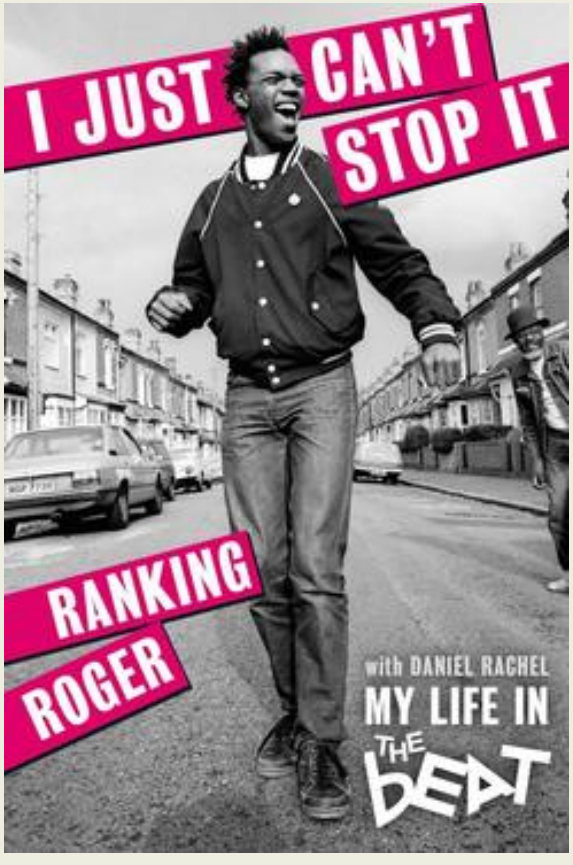
(*ator-ag* 'stool'.../a/ in *-ag* is probably not a floating vowel as it's derivational, but it serves to illustrate)



When stress shifts, no reduction occurs for big, non-high, vowels, as they are not linked to a stress-CV. Support: certain monosyllabic roots do not reduce under stress shift (e.g., lí 'copious' lij-anál 'to fill'). In this account these vowels have lengthened to meet word-minimality requirements.

Positing co-phonologies? Re-ranking?

(stop)



No-cophonologies

(no reranking)

Structural changes do not need to be computationally duplicated

- Each language/dialect lexicalizes its Vocabulary Items with the appropriate structure. Surface alternations trigger underspecified lexicalizations.
  - Lexicalization is not diacritic (Scheer 2008).
  - A diacritic is a marker that is not in the normal vocabulary of a module.
  - Even if you were to assume lexicalization to be diacritic, underlying structures are independently necessary.
- Constraints that refer only to the surface forms of segments are not fine-grained enough.
  - Phonetics $\neq$ Phonology (Substance Free Phonology (Reiss 2017; Chabot 2022))
- Positing one, single, computational phonology for a grammar is possible if one takes the effects of structural change into account.

What does this have to do with *Locality*?

- Structure gives us the means to explain a lot of what are claimed to be phonological locality effects.
  - Structural changes modify targets and make processes appear to be non-local/blocked.
  - But this is really just *bleeding* and/or the Elsewhere Principle.

Command chains and phonology

Isomorphism vs non-isomorphism

- French liaison : Obligatory vs None (generally)
  - Ils aiment [ɪlzɛm] 'They.MASC.PL like'
    L'enfant à réussi [lɑ̃fɑ̃ a ʁeysi] 'The child has succeeded'

    (Cŏté 2011)
- Ojibwe hiatus resolution : Obligatory vs None
  - ni-a:gamose: [nida:gamose:] 'I *walk in* snowshoes'
    bi-a:gamose: [bia:gamose:] '*he walks* here-*in* snowshoes'

    (Newell and Piggott 2014)
- Western Armenian DHR : Obligatory vs None

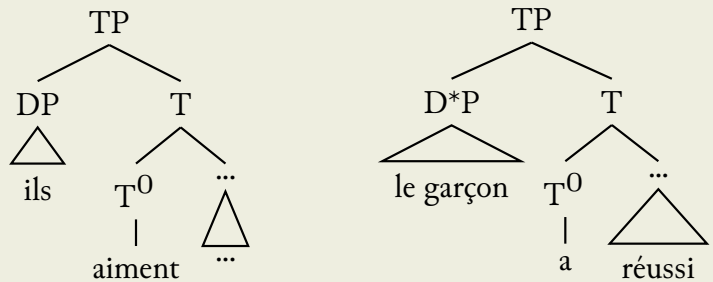
  amusín-utjun [amusnutjún] 'marriage'
  amusín-óv [amusĭnóv] 'husband-INSTR

  (Dolatian 2021)

Phase vs non-Phase? C-command vs none?(*=Phase)

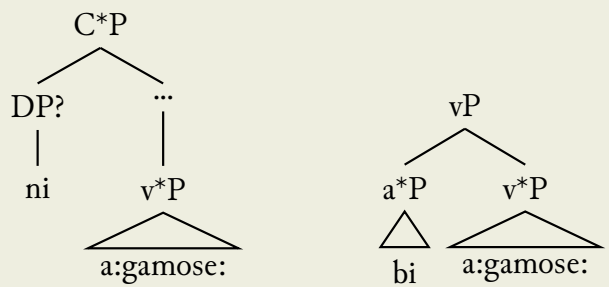
French

(see Newell and Scheer (inprep), coming soon!)



- But, remember that 'son' in 'son ami' also had to be a D*P.

Ojibwe



- But Ojibwe also has hiatus resolution by deletion for *ni-* and its ilk.

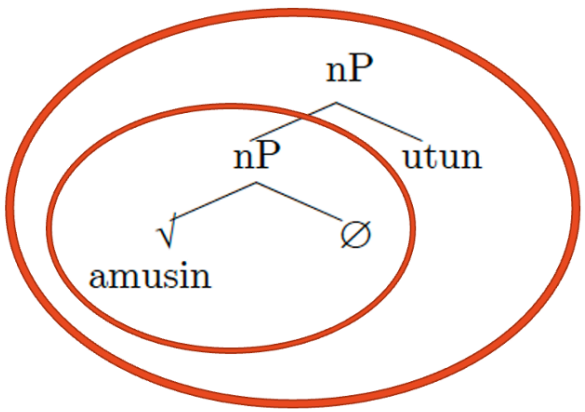
(Newell and Piggott 2014; Newell and Scheer 2017)

How might we explain the domain-effects of Armenian Stress?

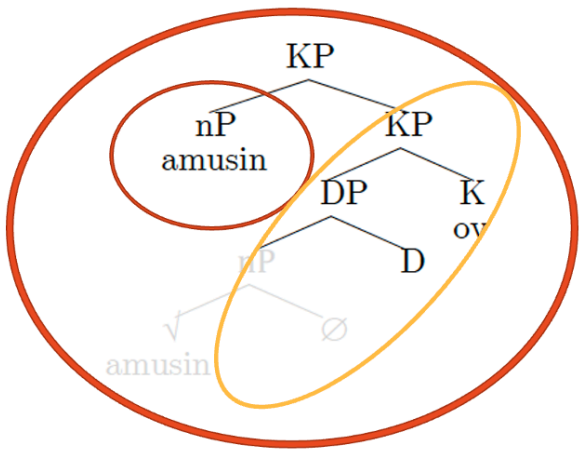
(Derivation vs Inflection)

C-commanded by the head vs a Phase in a specifier?

Derivation – no movement – base visible at spell-out of suffix



Inflection – movement – base invisible at spell-out of suffix



Phonology and syntax

We are not the same, but the logic of operations is not different

Whether a phonological object is a target is relative.

- Structures can be targets, or not.
  - What makes a phonological object a potential target?
    - Sometimes it's unvalued, and it need valuing. (underspecification/feature-filling)
    - Sometimes it is (un)wanted. (feature-changing).
    - If there is no motivation for the interaction of two parts of the structure, then they do not interact.
  - Locality is *relative* and *structurally-defined*
    - It is not global (Embick 2010, 2014)
    - And it's not always linear (Bešlin 2025)

There are no 'no-look-back' devices

(no PIC)

The PIC is not a tool in our toolbox. It is is not, and has never been, a positive computational object

- It is not a syntactic operation. (merge, internal merge, agree...)
- It is not a phonological operation. (license, spread, lenite...)
- Is it a cognitive restriction?
  - No. It is not. Previously-computed linguistic objects remain accessible to the computation.
  - The PIC is a place-holder for a true explanation of the variable nature of the effects of cyclic computation. (see Bjorkman (2011); Bešlin (2025), and I'm sure, the preceding talks at this workshop)

Computational Memory

"At each point of interpretation (spell-out) in a derivation, the entire constituent under consideration is visible and accessible to syntactic, morphological, and phonological operations." (Newell 2017:36)

Conclusions

If you want to see into a domain, you just need to be looking properly

- Items in two separate PF domains can be *local*.
- Many phonological tools in the present toolboxes are redundant, and we can tell which ones...
  - Everyone needs structure in their phonological representations
    - Proper attention to structural changes a each PF cycle can replace FAITH, fixed constraint hierarchies, the PIC.
    - And also be careful to be modular (no morpheme-specific co-phonologies) (Newell and Sailor in press)
- Some domains are less (and less?) penetrable.
  - The more deeply two items are embedded in separate command chains, the less likely they are to be local for certain operations.
  - Phonological structure has some of the answers to locality, but not all.
- If you are a phonologist, be very careful of positing isomorphism or non-isomorphism. The Phase literature is still deep and murky.

(Newell to appear.a)

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