An examination of the non-phonological nature of the Prosodic Hierarchy

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Heather Newell

Université du Québec à Montréal

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Outline

- What *is* the Prosodic Hierarchy?
  - The Prosodic Hierarchy vs. other proposed phonological structures.
  - The Prosodic Hierarchy vs syntactic structure-building.
- Alternative autosegmental analyses:
  - 1 Armenian stress (Stress as syllabic, no need for PH-based strata)
  - 2 English Level 1 vs. Level 2 Phonology (English has liaison, not Levels)
  - 3 Reduced pronouns (Function words are not a thing, but underspecification is)
- Conclusions

What *is* the Prosodic Hierarchy?
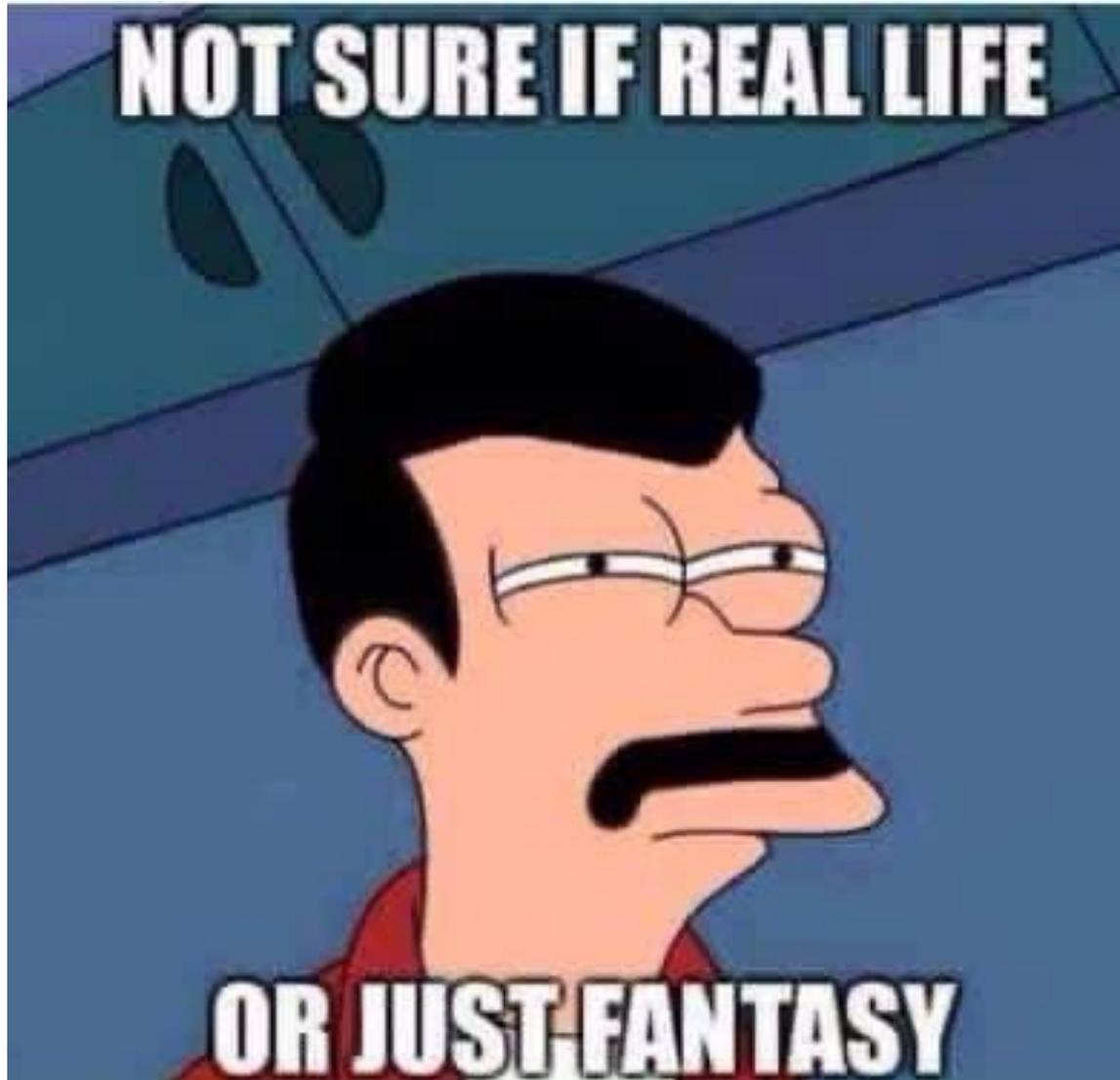
What *is* the Prosodic Hierarchy?

- A proposed cognitive object:
- Object vs. Process (I am not a philosopher)
  - Let's say that an object has stable properties.
  - Let's say a process has a stable effect.

- The PH defines:
- Constituency
- Different domains for the application of phonological processes
  - Levels of the PH are distinct objects.

Is a boundary an object?

Sure, it can be. But some boundaries are not there, even though they seem to be.

Preaching to the choir:
"the present theory is compatible with stipulating a prosodic hierarchy. But it raises the question of whether it is in fact *correct* that boundaries of different ranks are always categorically distinguished, as the prosodic hierarchy theory postulates." (Wagner 2010)

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Behaviours of phonological objects

- Sharing : ex. Assimilation
  - An object has properties that it can share with other objects
- Straddling : ex. Tone
  - An object can associate to multiple other objects
- Encroaching : ex. Closed-syllable shortening
  - An object takes up space
- Augmenting : ex. Stress
  - An object adds space into which other objects may spread
- Alternating : ex. Lenition
  - An object has distinct realizations in distinct environments
- Lexicalized : ex. morphemes
  - An object can be the lexical representation of a morpheme

Do members of the PH exhibit these behaviours?

NO • Sharing : ex. Assimilation
  • An object has properties that it can share with other objects

NO • Straddling : ex. Tone
  • An object can associate to multiple other objects

NO • Encroaching : ex. Closed-syllable shortening
  • An object takes up space

NO • Augmenting : ex. Stress
  • An object adds space into which other objects may spread

NO • Alternating : ex. Lenition
  • An object has distinct realizations in distinct environments

NO • Lexicalizing : ex. morphemes
  • An object can be the lexical representation of a morpheme

Syllables and feet don't exhibit these behaviours either. What makes them different?

- Segments *are* organized in the string.
  - N.B. That the classic, hierarchical, syllable structure is not the only (or the best) organizational system out there. (Shout out to CV-phonology!)

- Positions within a syllable have predictable behaviours (and *not* their opposites).
  - Onset = strong
  - Coda = weak
    - N.B. that the proposed strength of the 'beginning of the Prosodic Word' is predictable from syllabic behaviour.

- Unlike the PW and above, the string in which a syllable (or a foot) is determined cannot be defined outside of the phonology (ex. cyclically).

- We need the PW (for ex.) *and* the syllable *iff* we have independent evidence for them.

PH structure vs Syntactic Structure

- Syntactic structure is a function of computation (Merge).
  - A syntactic object (ex. DP) inherits the properties of (one/some of) its members.
  - Syntactic domains to not behave like they have boundaries.
    - The PIC = invisibility, not a boundary.*
    - Move occurs to a position that may happen to be at an edge. 'Edge features' are not 'edges' or 'domain delimiters'

- The Prosodic Hierarchy is not projected via Merge. (Neeleman & van de Koot (2006)
  - A Prosodic Phrase is not the projection of a 'prosodic phrase head', for example.
  - Prosodic Domains are treated as though they delimit domains, *but*
    - External sandhi is rampant and process-specific (Scheer 2011).
    - The 'Phonological PIC' does not exist (Embick 2014, Newell 2017).

*and it doesn't exist either, but were doing phonology today.

Alternative Autosegmental Analyses

Of things that the field likes to attribute to Prosodic Structure/Domains
(see Newell & Sailor (to appear) for more)

Two types of proposed Prosodic effects

- Triggering/Domain-specific phonology
  - This includes Stratal/Lexicalist proposals that different prosodic domains have their own grammars.

- Blocking
  - This also includes everything that falls under Phase Impenetrability and Faithfulness.

Do phonological operations turn on and off?
No. They don't. Phonology is always on.

- This is not a new proposition. For example, this is the take of Classic OT.
- But you don't need parallel computation to make it work.
- "If the representations are right, the rules will follow"

     (McCarthy 1998)

What about when rules stop applying?

a. Armenian Stress

b. English 'Level 2' effects

Armenian high vowel reduction : phonological illusions

*the position of the deleted vowel will be pronounced as schwa if needed to break up illicit consonant sequences.

High vowels delete (reduce*) iff they were stressed in cycle X, and then stress shifts in cycle X+1:

(1) a. Base: amusín   'husband'

      b. Der. Suffix: amusn-utjún   'marriage'
                                 *amsin-utjún
                                 *amusin-utjún

      c. C-init Infl.   amusin-nér   'husband-Pl.'
          Suffix:

      d. V-init. Infl.   amusin-óv   'husband-Instr.'
          Suffix:

      (Dolatian 2021:844, reduced dataset to W.Arm., because time)

Dolatian's Stratal OT analysis is as follows (simplified for exposition):
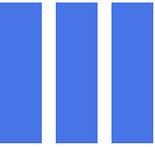
(2)   amusnutún   'marriage'

Stem Level (base) :   AlignStressRight : DestressHighV : DelDHV >> MaxV ➔ amusín
Stem Level (deriv.):   AlignStressRight : DestressHighV : DelDHV >> MaxV ➔ amusnutjún

(3)   amusinóv   'husband-Instr.' (and amusinnér)

Stem Level (base) :   AlignStressRight : DestressHighV : DelDHV >> MaxV ➔ amusín
Word-Level (Infl):   MaxV >> AlignStressRight : DestressHighV : DelDHV ➔ amusinóv
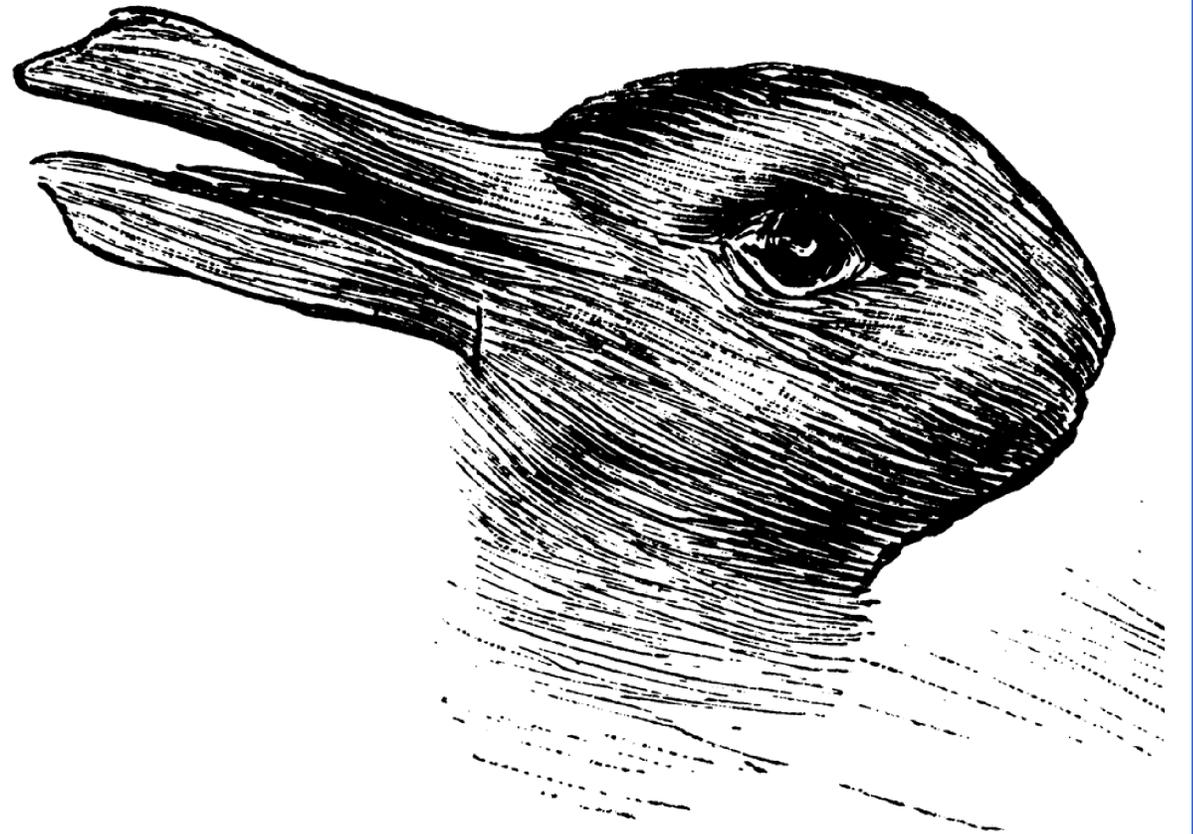
There is a plausible alternative 1-phonology analysis

But first, an aside in which we explain a phonological illusion.

The aside :
Virtual Long Vowels

In a nutshell, phonetics ≠ phonology. There are (at least) two classes of phonetic reflexes that indicate stress/length :

(1) amplitude/pitch/length (the expected reflexes, but note that these can affect Cs and Vs),

(2) non-reduction (the illusion).

Non-low vowels (/i,u,o,ɔ,e,ɛ/) reduce to schwa when unstressed, unless they share place features with an adjacent C or are word-initial. Representative examples given with /u/.

Coratino virtual length

(Bucci 2013, 2018)

(4)	a.	rútʃə	'fried'	stressed-u
	b.	rətʃətá	'fry-verb'	unstressed-reduced-u
	c.	lumínə	'lamp-dim.'	unstressed-nonreduced-u (lab.C)
	d.	uɟɟá	'oil-verb'	unstressed-nonreduced-u (#_)

The CVCV analysis:

- Stress = syllabic space (CV) (Chierchia 1986; Larsen 1998, Ségéral et Scheer 2008, etc.).

- There is extra CV-space word-initially (Lowenstamm 1999, etc.).

(5)
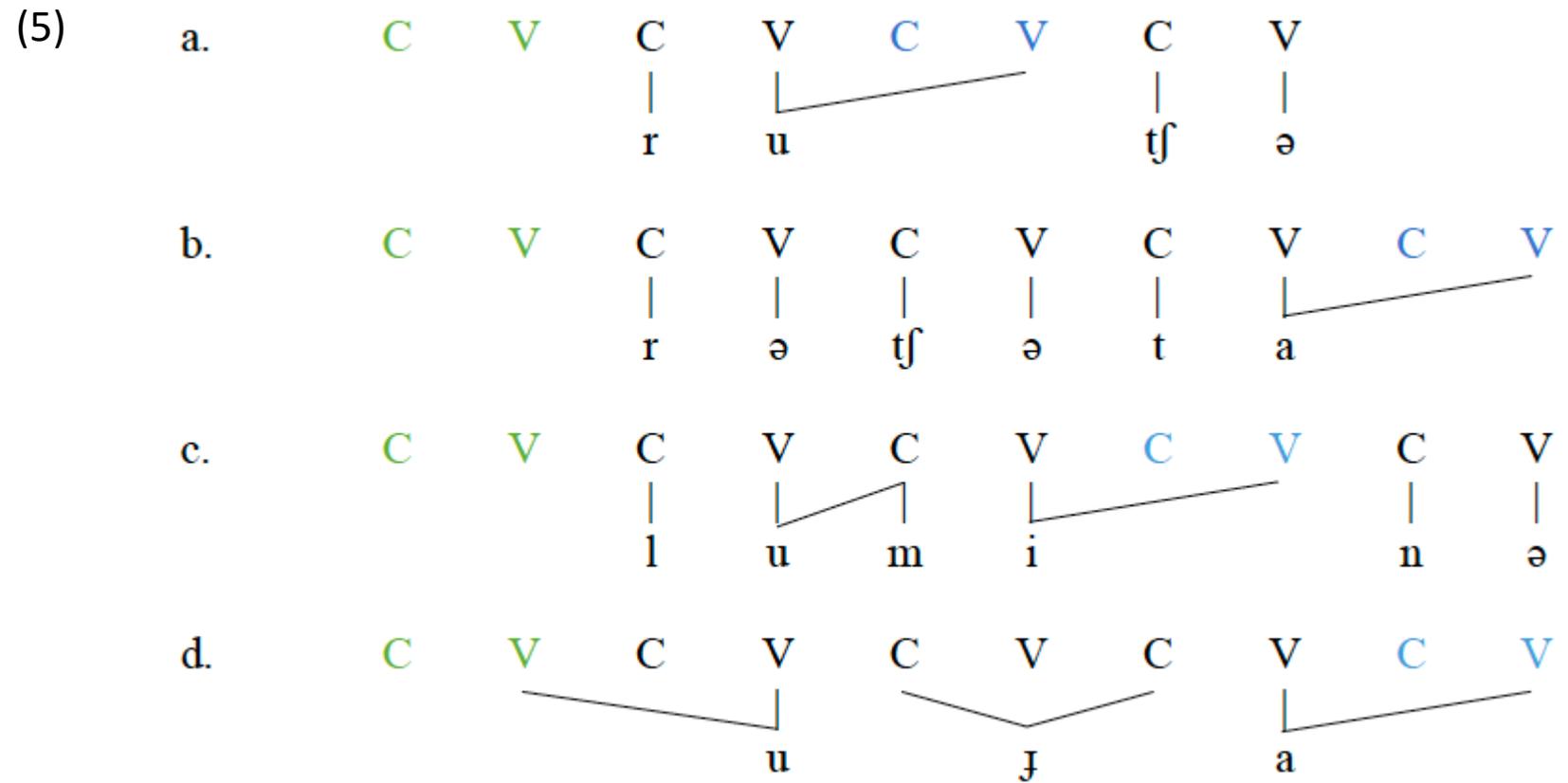
Nota Bene! In Coratino (and other southern Italian languages) length is not limited to open syllables and may be signaled by either diphthongization or non-reduction – not phonetic length. Only phonologically short vowels are reduced.

Let's go back to Armenian

A CVCV (non-reduction/deletion) re-analysis

(6)   amusnutún   'marriage'

Cycle 1 (phases, syntax… but that's not the focus here)

a.   C   V   C   V   C   V   C   V   C   V
          | | | | | |
          a   m   u   s   i   n

Cycle 2 : merger of 2 domains : deletion of CV *and* the segment attached to it.

b.   C   V   C   V   C   V   C   V   C   V   C   V   C   V
 | | | | | | | | |
      a   m   u   s   n   u   t   u   n

Deletion of the first cycle's CV entails deletion of high vowels as well, leaving an empty V position.

A CVCV (non-reduction/deletion) re-analysis continued

(7)   amusinóv   'husband-Instr.' (WA)

Cycle 1

a.   C   V   C   V   C   V   C   V   C   V
            | | | | | |
            a   m   u   s   i   n

Cycle 2 : no merger of 2 domains (just linearization) : no deletion : Primary & Secondary stressed survive.

UR of suffix:

C   V   C   V
    | |
    o   v

b. C   V   C   V   C   V   C   V   C   V | C   V   C   V   C   V
        | | | | | | |
        a   m   u   s   i   n   o   v

Levels of stress

- We know (1) that various levels of stress emerge in languages, and (2) we know that different stresses have different acoustic values, and (3) we know that stress/length prevents reduction.

- We would only need to posit that Destressed High Vowel Reduction is 'turned off' at the "word level" if the previously stressed high vowels are in fact destressed.

- I contend that they are not, and that Armenian has the same phonological grammar at all levels.

How might we get Armenian Derivation vs Inflection?
The sort of thing that would work in this framework:

Derivation – no movement – base visible at spell-out of suffix
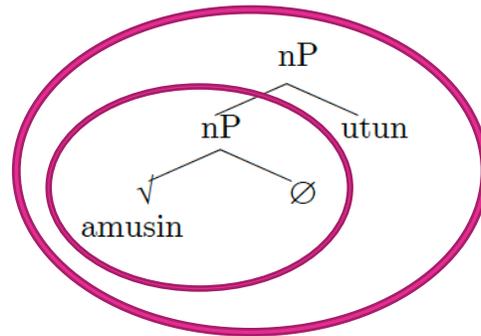
Inflection – movement – base invisible at spell-out of suffix
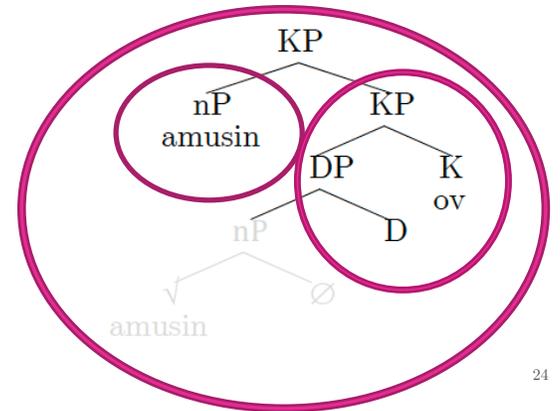
Why high vowels? Structure to the rescue again!

- High vowels are structurally simpler than mid and low vowels – they emerge as reduced forms of mid vowels in many languages.
- High vowels are weaker, and therefore they are subject to reduction. Vowels with more structure 'hang on'. See Honeybone's (2005) *Sharing makes us stronger: process inhibition and segmental structure.*
- |A| vowels behave even more differently cross-linguistically, and Pöchtrager (2018:62) translates this as structure (not elements).
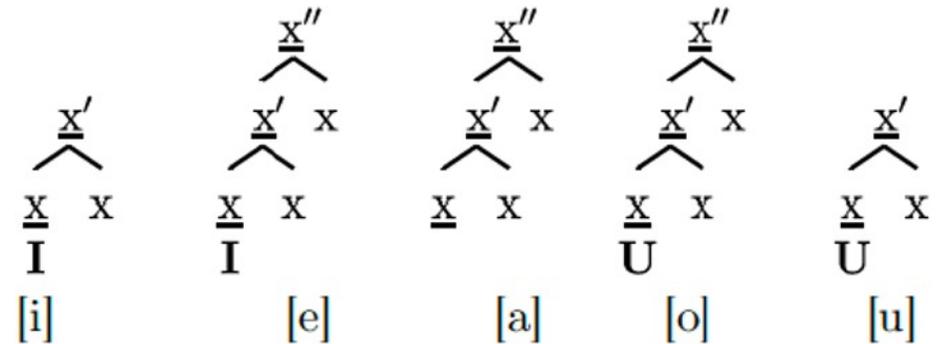
What about other languages 'level' distinctions?

The case of English being French (Newell 2021)

(8) a. párent
     b. paréntal   (presence of stress shift)

(9) a. párent
     b. párenthood   (absence of stress shift)

A li'l reminder

Classic analyses

- Lexical Phonology
  - Level 1 affixes are attached at the stem level, Level 2 affixes at the word level, and these levels have different phonologies.

- Distributed morphology
  - Level 1 affixes are attached within the phase, Level 2 affixes are attached outside the phase, and prosodic structure/the PIC blocks rule application

- Lowenstamm (2014)
  - The DM analysis won't work, because there are outer Level 1 affixes
  - ex. govern-ment-al

- NB. That the English pattern of outer affixes 'turning the phonology back on' is not specific to English.
  - Remember to ask me about Eastern Armenian ;)

The Level 1/Level 2 pattern

(i)   Affixes may have cohering, non-cohering, or variable phonological behaviour.
(ii)   All affixes behave as cohering when affixed directly to an uncategorized root.
(iii)   When an affix attaches to an already-categorized (complex) stem, it will display invariable morphophonological behaviour: it will always behave either as a cohering or as a non-cohering affix.

(10)   a. -   C   V   '-al' (parental)
                   |
               æ   l

        bi. - C   V   C   V   '-er' (teacher)
                   | |
                   ə   ɹ

        bii. - C   V   '-ly' (fully)
                   | |
                   l   i

English cohering and non-cohering affixes: 1 phonology, floating vowels

(11)

```
C  V  C  V  C  V  C  V
|  |  |  |  |     |
g  ʌ  v  ə  ɹ     n
```
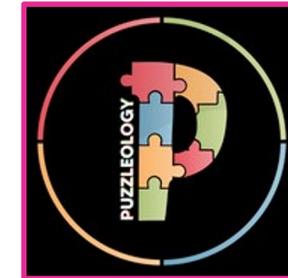
```
C  V  C  V  C  V  C  V | C  V  C  V  C  V
|  |  |  |  |     |     |  |  |        |
g  ʌ  v  ə  ɹ     n     m  ə  n        t
```

```
C  V  C  V  C  V  C  V | C  V  C  V  C  V | C  V  C  V
|  |  |  |  |     |     |  |  |     |     |  |  |
g  ʌ  v  ə  ɹ     n     m  ə  n     t     l  ə  s
```

(12)

```
C  V  C  V  C  V
|  |  |     \|
p  ʌ  z     l
```

```
C  V  C  V  C  V | C  V  C  V  C  V  C  V
|  |  |     |    |     |  |  |  |  |  |
p  ʌ  z     l    |     ɔ  l  ə  dʒ  i
```

English cohering and non-cohering affixes:
1 phonology, floating vowels

- Non-cohering affixes do not have floating vowels and remain phonologically separate from the domain to their left.
  - (like beads of water with their own surface tension).

- Resyllabification does not apply.

- Main stress may be recomputed *iff* the non-cohering affix has enough material to constitute a foot on its own.
  - Note that final syllables may be extrametrical.

English cohering and non-cohering affixes: 1 phonology, floating vowels

(13)

```
C   V   C   V   C   V   C   V
|           |   |   |       |
p           l   æ   n   ə   t
```

- Cohering affixes have floating vowels that syllabify into the domain to their left.
  - They break the tension (they are all V-initial)

```
C   V   C   V   C   V   C   V  |  C   V   C
|           |   |   |       |  |      |   |
p           l   æ   n   ə   t  |      ɔj  d
```

- Resyllabification applies, but only within the domain that the affix incorporates into.
  - Ex. *probable, probablist, probablistic*, whete the [l] is syllabic throughout.

```
C   V   C   V   C   V   C   V  |  C   V   C   V   C   V
|           |   |   |       |  |      |   |   |   |
p           l   æ   n   ə   t  |      ɔj  d   ə   l
```

- Main stress may be recomputed *iff* the cohering affix augments the preceding domain such that it can contain a foot.

On Diacritics

"The availability of such structures raises the question of whether they have any other motivation, in the form of phonological processes, say, or indeed, whether these structures are employed in other ways. If so, the use of such structures comes at no further cost to the model, since they are independently needed to capture contrasts that may be either simple or complex. The use of differing dependency relations to capture derived vs. non-derived segments in languages that need to employ this distinction is not ad hoc, as it draws on resources already available in the model."

(Kula 2008)

Why are function words weak?

Is it because they don't project Prosodic Words?

What do you think I'm going to say?

Pronoun Reduction

(Ongoing work with Tobias Scheer, Tom Leu and a great group of students (Bouvier 2023, Laurin & Newell 2022, Newell 2019, Newell & Scheer 2020a,b, 2021, in prep)

A bit of history:

- Non-isomorphism
- Look at the proposed domains in Nespor & Vogel (1986)
  - They are *all isomorphic* under current syntactic analyses.
- Except
  - Cross-clausal operations like flapping (all 'late' surface-true rules) See work done by McGill people (Wagner 2012, Kilbourn-Ceron et al. 2016, 2020)
  - Pronominal subjects

Classic PH analyses of pronoun phonology

- Allomorphy: Kaisse (1983), Ito & Mester (2019, 2021) say that the following alternations cannot be due to the phonology, as they are not predictable.

would	[wʊd / əd /d]
	vs
was	[wʌz / wəz]
them	[ðɛm/ðəm/əm/m]
	vs
the	[ðij/ðə]

- Projection of Prosodic Word: Selkirk (2014), among others: Lexical syntactic structure maps to Prosodic Structure, Functional syntactic structure does not.
  - Without focus there will be no PWd around a function word.

Problems with the status quo

- This type of analysis presumes that:
  - There is a **binary distinction** functional/lexical that is operative in the (morpho)phonology.
- This is problematic:
  - There is **no clear distinction between lexical and functional** material.
  - **Function words are multi-morphemic XPs** (ex. Cardinaletti & Starke 1994, Leu 2015), as we will clearly see for German.
    - This fatally undermines theories like MATCH and WRAP which propose that the weakness of function words derives from a sensitivity at the phono-syntactic interface to the distinction between lexical and functional X^0s.
- This analysis **misses the link between the** *loss of consonants* **and** *the lack of stress.*

A non-PH analysis: Functional items are lexically underspecified. Variation is due to computation.

- **Underspecification governs lexicalization** (Kiparsky 1982a, b; Archangeli, 1988's radical underspecification; Steriade 1995; Lahiri & Reetz 2002's Featurally Underspecified Lexicon.)

- Functional items are more likely to be underspecified than roots.

  - Distribution (Julien 2002)

  - We assume that unstable melodic segments are not linked to CV structure in their lexical representations.

- **The insertion of syllabic-space that is the exponent of grammatical information (X-slot, mora, CV unit) explains certain phonological alternations.**

N.B. That this is the simplest option available to us as phonologists and therefore must be pursued.

```
              C     V
                    |
  h     ɪ     m            /hɪm/
```

```
  C     V     C     V
  |     |     |
  h     æ     m            /hæm/
```

Origin of the extra syllabic space
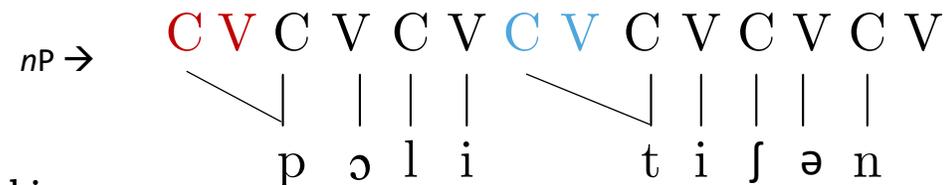
1. spell-out

2. stress

Extra syllabic space from phases and stress

Phases = cycles

At PF a CV may be inserted at the left edge of a spell-out domain

English: /p,t,k/ are aspirated word-initially and before a tonic vowel (Iverson & Salmons 1995)

/p,t,k/ are virtual geminates: they branch on extra syllabic space originating in a phase (red) and stress (blue)

*n*P →   C V C V C V C V C V C V C V

         p ɔ l i   t i ʃ ə n

- **Stress = syllabic space**
  - Chierchia (1986), Bucci (2013), Passino (2013), Ségéral & Scheer (2008), etc.
  - The left edge of a phase may be marked with an empty CV: Scheer (2012), also Lowenstamm (1999).
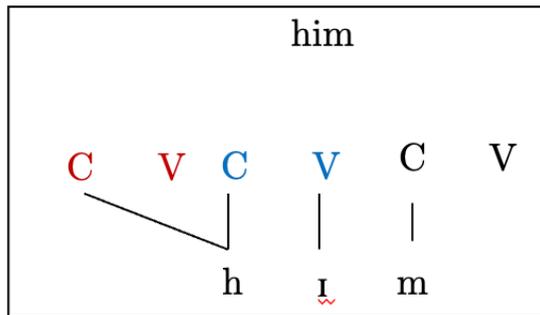
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English: Reduced vs full pronouns

- The syntactic size of pronouns affects their syntactic position.

- Only full pronouns remain in their initial-merger position.

(See Cardinaletti & Starke 1994, Uriagereka 1995, among others.)
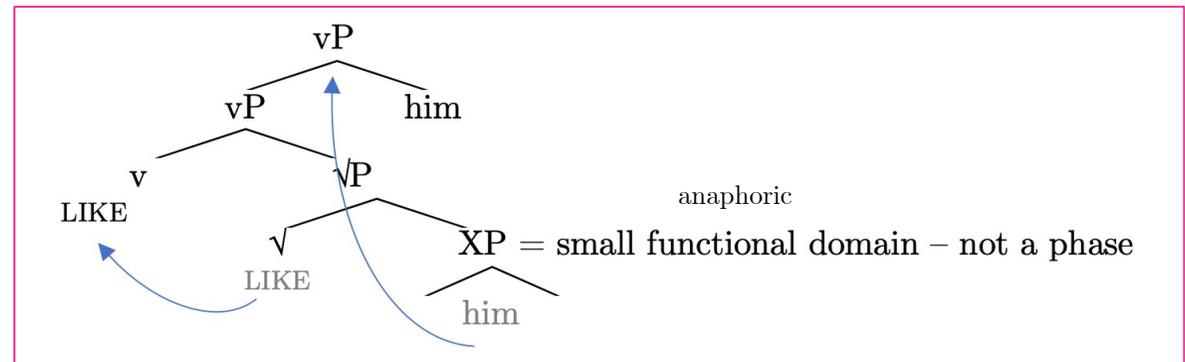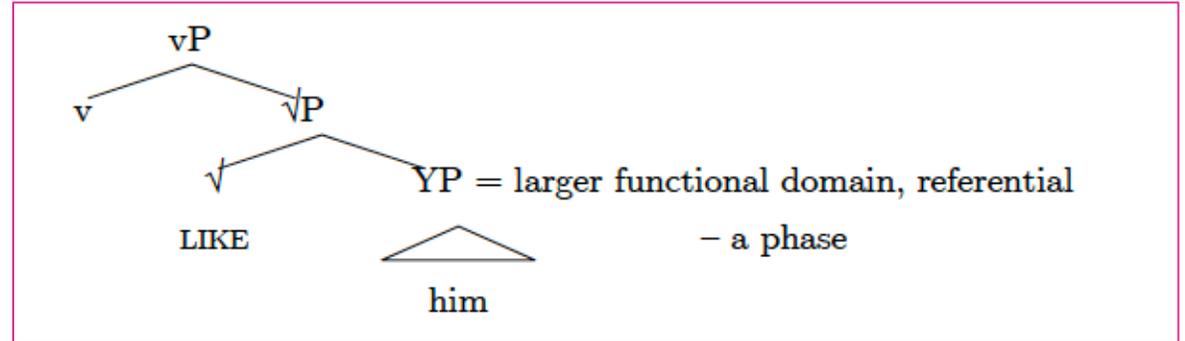
Full form:

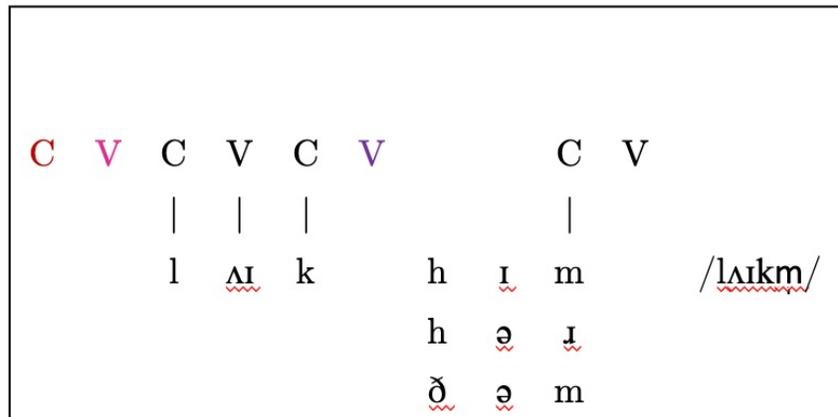|					
		him			
C	V	C	V	C	V
		h	ɪ̰	m	

YP is sent to PF: (1) Lexical insertion:

(2) Insertion of phase-initial CV.

(3) CVCV(foot-sized) phonological structures are stressed. Stress is the insertion of a CV.

(4) linking of floating melody occurs

Reduced form:

C	V	C	V	C	V		C	V
		l	ʌɪ̰	k			h ɪ̰ m	/lʌɪkm̩/
							h ə ɹ̰	
							ð̰ ə m	

The entire articulated vP is sent to PF in 2 steps:

(1) Phase 1: *like :* insertion of phase-initial CV and stress CV (with subsequent reduction of the empty VC sequence, following Gussmann & Kaye (1993)).

(2) Phase 2: *him* is neither stressed nor a phase and thus receives neither CV.

(3) The final empty V of *like* can be occupied by the vowel of the pronoun, or by the syllabic consonant.

Pronominal generalizations: The PH does not cut it.

- Cross-linguistically we get the same variation
  - Weak pronouns (and other weak 'function words') demonstrate a loss of segmental structure consistent with the loss of syllabic space (think, closed syllable shortening, liaison)
    - Hebrew, German, BCS, Korean, Greek, Moroccan Arabic, Quebec French, Galician...
  - It would be more complicated to analyze English as different.
- No prosodic account can account for the consonantal alternations (and they cannot account for all of the vocalic alternations either).
  - Being a PW or not describes domains of stress. It does not account for the segmental/syllabic nature of stress.
- Function words
  - If they're big enough to form a foot *they're strong*.
    - Ex. bi-syllabic/CVCV prepositions, under, through...
  - They *can* be final and weak. Everyone agrees that linear position within the phonological phrase is not the answer.

Conclusions

We all agree that segments are organized. — We need syllables (or their equivalent) at a minimum.

We all agree that there are domains in which phonological processes apply that are larger than the syllable. — We have two options there : representations (objects) or computation (processes).

Computation/cycles are independently motivated. — Even though some propose we don't need it in the phonology, if we have the PH.

The PH does not *do* anything. It is not a phonological object.

Non-Isomorphism is *always* derived in the phonology, due to phonological requirements that have nothing to do with the PH, but rather to do with the segment/syllable.

If we want to advance phonological analyses of the kinds of phenomena discussed here, we need to look at analyses that are predictive, simple, and independently justified.

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