

Bracketing Paradoxes : A Resolution

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UiT FishFeed. Oct. 22 2019

Where we are going

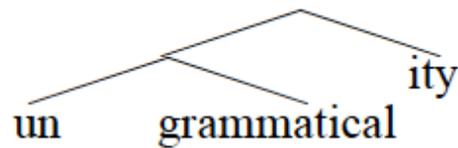
- Introduction do Bracketing Paradoxes
 - Theoretical foundations: Prosodic Phonology, Lexical Morphology and Phonology
 - All previous solutions propose 'Bracketing Paradox'-specific machinery
- A re-imagining of LPM effects in English
 - 'Level 1' as liaison
 - 'Multi-level' affixes : the predictions of LMP vs liaison
- The 'resolution' of Bracketing Paradoxes (they never emerge)
 - Bracketing Paradoxes are a red flag; theories that give impossible outputs must be incorrect
 - Hierarchical morpho-syntax + linear phonology = no red flag

Bracketing Paradoxes

Theoretical issues

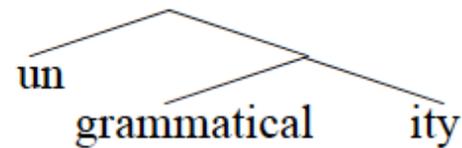
Bracketing Paradoxes

(1) a.



[[un-grammatical]-ity] MS

b.



[[un-][grammatical-ity]] PF

- A conundrum that has inspired a great number of (mostly ad hoc) morpho-syntactic and phonological solutions (see Newell 2019)

A short history of proposed solutions

- Pesetsky (1979): a universal semantic operation that allows for prefixes to be interpreted with their base regardless of morpho-syntactic structure
- Williams (1981): Lexical Relatedness
- Selkirk (1982): Level 1 *un-*
- Kiparsky (1982): Morphological reanalysis
- Strauss (1982): Level-ordering is only pertinent among groups of prefixes or suffixes
- Sproat (1984, 1985, 1988) and Marantz (1984a,b, 1989): Associativity of the linearization algorithm: $((A^B)^C)$ is equal to $(A^{(B^C)})$
- Pesetsky (1985): Quantifier Raising (of non-quantifiers)
- Nespore & Vogel (1986): Non-isomorphism of phonological and syntactic structure
- Lieber (1992), Booij & Lieber (1993): phonological and morpho-syntactic structures are “...two simultaneous structurings coexisting on different planes.” (24)
- Merchant (1995): each affix is specified with a particular phonological Alignment constraint
- Newell (2005a,b, 2008): Late Adjunction
- Newell (2018, 2019) : ...

The emergence of Bracketing Paradoxes

- Bracketing Paradoxes emerge iff phonological structure is hierarchical
- No Bracketing Paradoxes *could* exist in SPE.

(2) #un#grammatical+ity#

The Prosodic Hierarchy + Affix-Ordering

- The PH and Lexical Phonology : Capturing real patterns with unreal tools
- It quickly became clear that proposals such as the Affix Ordering Generalization (3) (Siegel (1974), Allen (1979), cf Fabb (1988), Giegerich (1999)) and Strict-Layer Hypothesis (4) (Selkirk (1982), (2011), Nespor & Vogel 1986) were misleading.

(3) prob-able_{Level 1}-ist_{Level 2}-ic_{Level 1}

(4) [[un]_{PWd}control-able]_{PWd}

The Prosodic Hierarchy + Affix-Ordering

- But people have soldiered on:
 - Halle & Vergnaud: Affix-triggered phonological cycles (1987)
 - Kaye : analytic vs non-analytic morphology/phases (1995)
 - Affix-specific phonologies (Raffelsiefen 1999, Plag 1999)
 - Stratal OT: Constraint rankings specific to stem or word (Kiparsky 2000, Bermúdez-Otero 2017)
 - Affixes are roots: DM/phases are not enough (Lowenstamm 2014,
 - Domains of interpretation may be larger than the domains defined by category-defining heads (Marantz 2013, Embick 2014, Bermúdez-Otero 2016, 2017, yesterday)

'Level 1' vs 'Level 2' affixes

(5) [[parént-al] -ly]
v-al(L1)-ly(L2)
[paréntal] [ly]

(6) [[[[góvern-∅] ment] less] ness]
v-∅(L1)-ment(L2)-less(L2)
[góvern] [ment] [less] [ness]

BUT

(7) [[subject-íve] ity]
v-ive(L1)-ity(L1)
[sùbjectíveity]

(8) [[gòvern-∅] mént] al]
v-∅(L1)-ment(L2)-al(L1)
[gòvern][méntal]

A re-imagining of LPM effects in English

'Level 1' as liaison

(This is a whole other ms. that is also under revision :

<https://ling.auf.net/lingbuzz/003898>)

Yes. The difference is phonological

- Everyone knows liaison

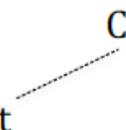
(9) a.

C	V	C	V
p	ə	t	i

C	V	C	V	C	V
g	ɑ	ʁ	ø	s	ɔ̃

b.

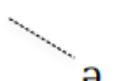
C	V	C	V	C	V	C	V
p	ə	t	i	t		ɑ	m



- Level 1 affixes are also subject to liaison

(10) $[[\text{parent}]_{\sqrt{\emptyset}}]_n \text{ al}]_a \sim [[\text{parent}]_{\sqrt{\text{al}}}]_a$

C	V	C	V	C	V	C	V	-	C	V
p	ə	ɑ	ɛ	n	ø	t			ə	l



A grammatical derivation

(11) [[[[govern]_v ∅]_v ment]_n al]_a

a. C V C V **C V C V** - C V C V C V
 | | | | | | | | | | | | | |
 g ʌ v ə **ɹ** **∅** **n** **∅** m ε n **∅** t **∅**

b. C V C V **C V C V** - C V C V C V C V
 | | | | | | | | | | | | | | | |
 g ʌ v ə **ɹ** **∅** **n** **∅** m ε n **∅** t ə l **∅**

*bold=extrametrical

What does this get us? The correct pattern.

- Remember that Giegerich (1999) showed that the vast majority of affixes are both Level 1 and Level 2 (see also Kiparsky 2005)
- This is because: Every root-attached morpheme behaves as Level 1 regardless of the initial segments status – The whole string is syllabified together (the only C-initial ‘Level 1’ affixes are root-attached : **depth**, **weight**, **‘hightη**).
- Only Level 1 affixes that are merged with non-roots will be syllabified with their bases (Level 2 affixes ‘cliticize’)
- If affixes were ‘Lexically specified’ as to their level, and if affixes are rampantly multiply-specified, then we expect to find affixes that have level 2 behavior when attached low and Level 1 behavior when attached high. We never find that. Only the liaison analysis predicts this absence.

What does this get us? Modular Grammar

- Traditional classifications of Level 1/2 affixes are non-modular
 - Morphological diacritic X triggers phonological operation Y
- Why do we care?
 - A non-modular theory massively overgenerates.
 - If a fully modular theory can account for the data, it is simpler, makes stricter predictions, and is therefore preferable.
- Traditional discussions of Level 1/2 morphology argue that a diacritic is necessary because there is no morpho-syntactic pattern underlying the difference.
 - True, but there *is* a phonological distinction.

Intermediate Conclusion

- Conclusion – A floating V analysis gets us the distinction in domains just as well as the PH, but without the PH.
- Word-internal domains are just spell-out domains that are not overridden by subsequent independently required phonological operations (see also incorporation of sub-minimal affixes, floating features, coda-onset assimilation, infixation...)
- Do we need any additional tools? Scheer (2008/2009a) says initial empty CVs. They make phonological predictions within CVCV phonology.

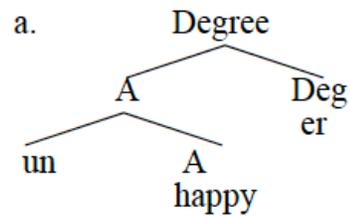
Back to Bracketing Paradoxes

If the phonology is flat, Bracketing Paradoxes do not exist

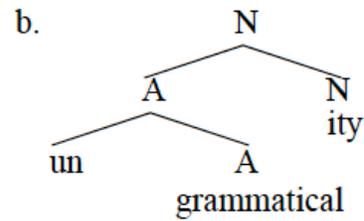
Bracketing Paradox Phenomena

(12)

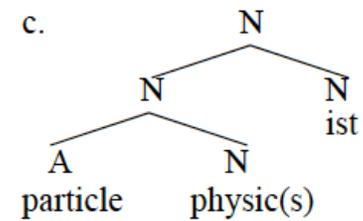
Comparative



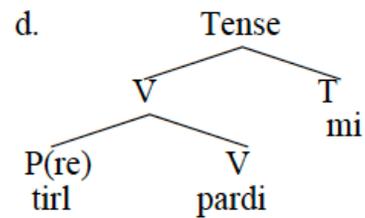
Level-Ordered



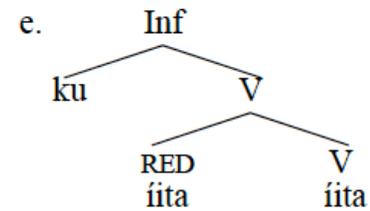
Compound/Phrasal



Prefixed Verb



Reduplication



(adapted from Newell 2019)

Level-Ordered /Compound /Phrasal/Comparative

variations on a theme

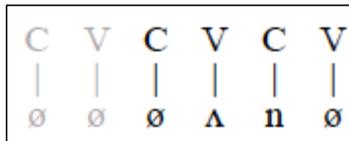
Left-branches

- In these constructions the left hand member (prefix or compound modifier) is an adjunct or specifier.
 - Complex left-branches must undergo PF interpretation before merger (Uriagereka 1999)
 - Simplex left-branches vary as to whether they undergo PF interpretation before merger (Newell 2008)
- Consider
 - (13) ungrammaticality
 - (14) modular grammarian
 - (15) unhappier

The grammaticality of *ungrammaticality*

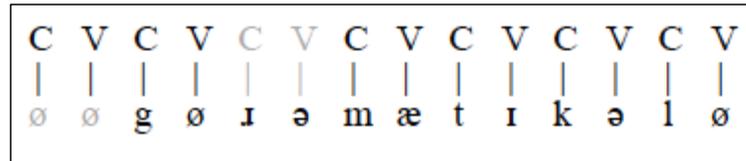
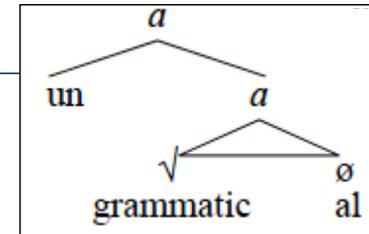
Phase 1a

- un
- →PF/LF
- Default place features assigned to /n/ in the absence of assimilation
- negative/reversative semantics



Phase 1b

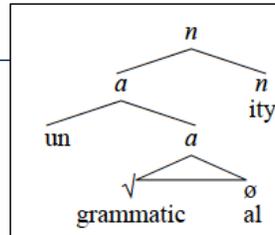
- un-grammatic-al
- →PF/LF
- *grammatical* is syllabified and linearized. Stress is assigned.
- *un* is merged but not linearized, as no new phase head has been introduced.



The grammaticality of *ungrammaticality*

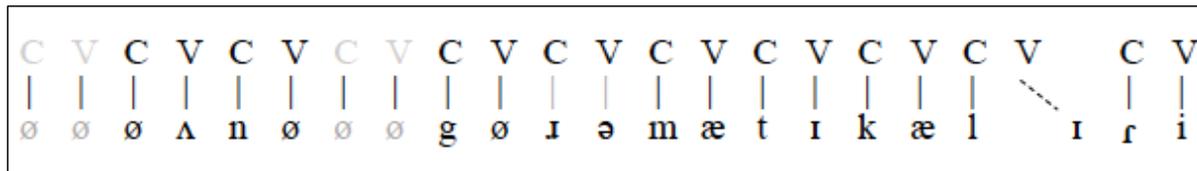
Phase 2

- -ity is merged
- -ity's initial floating vowel causes merger into the domain of *grammatical*, triggering resyllabification footing and stress assignment.
- un- is linearized but insulated from these operations via the empty CV (or just by cyclicity)



conclusions

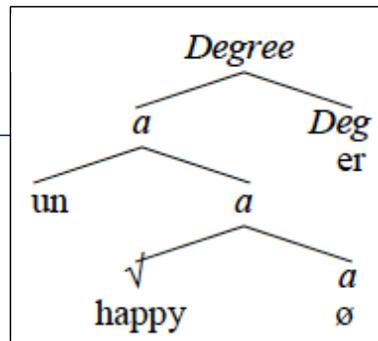
- The semantic interpretation of *ungrammaticality* can be read directly off of the syntactic structure
- There is no need for syntactic or semantic readjustment
- The phonological interpretation of *ungrammaticality* gives rise to no paradox due to its linear nature.



How to get *unhappier*

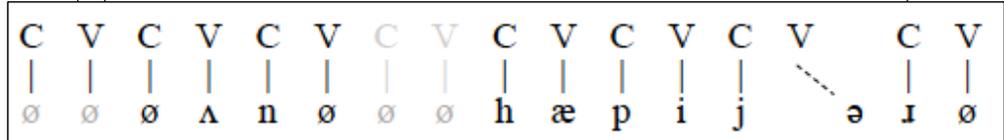
Phase 1a

- un
- →PF/LF



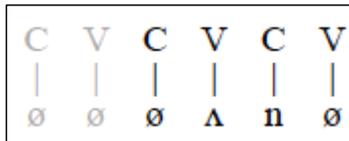
Phase 1b

un-happy-er



conclusions

- As with *ungrammaticality*, the compositional semantics of *unhappier* is read off of the syntactic structure.
- The phonological derivation leads to no paradox.



*punch-drunker/house-prouder/??slap-happier (300ish hits)

- So, if *un-* doesn't affect the allomorphy of *-er/more*, why does *house* in *house-proud*?
 - Possible boring (and seemingly wrong) answer: *house proud* is lexicalized or a root-root compound
 - These examples have normal compound stress, not monomorphemic stress
 - We do need to allow for a domain of idiomatic interpretation, and a generalized phonological interpretation in compounds.

* Reviewer question

Recap

C	V	C	V	C	V	C	V	C	V	C	V	C	V	C	V
													⋯		
∅	∅	∅	ʌ	n	∅	∅	∅	h	æ	p	i	j	∅	r	∅

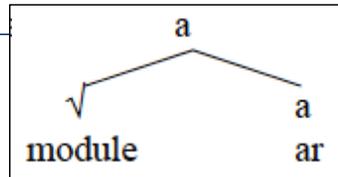
vs.

??	C	V	C	V	C	V	C	V	C	V	C	V	C	V	C	V
	∅	∅	s	∅	l	æ	p	∅	h	æ	p	i	j	∅	r	∅

How to be a *modular grammarian*

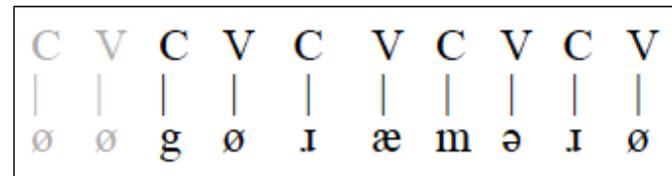
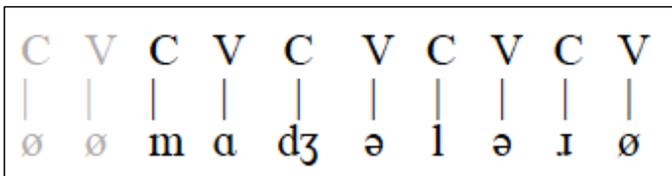
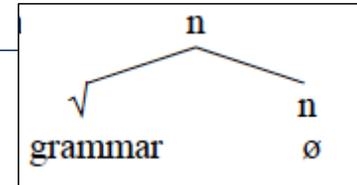
phase 1a

- module + ar
- →PF/LF
- Syllabification is assigned and stress is computed



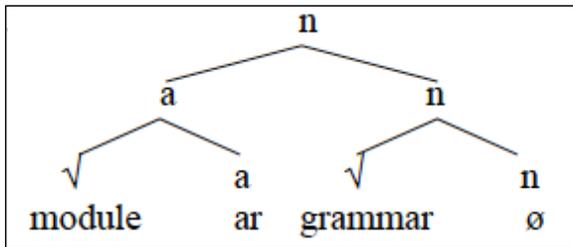
phase 1b

- grammar + n
- →PF/LF
- Syllabification is assigned and stress is computed



How to be a *modular grammarian*

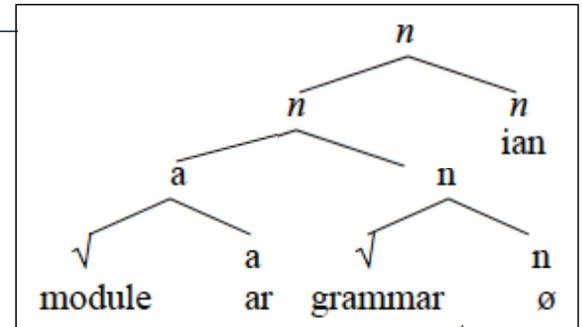
step 2



- no phase is triggered as no new phase head is introduced. Note that each constituent receives Nuclear Stress.

Phase 3

- modular grammar +ian



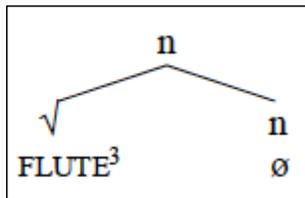
- Liaison. *-ian* merges and is syllabified in the string to its left. Only the affected part of the string is re-syllabified.

C	V	C	V	C	V	C	V	C	V	C	V	C	V	C	V	C	V	C	V	C	V				
∅	∅	m	a	d	∅	j	ə	l	ə	r	∅	∅	∅	g	∅	r	ə	m	e	r	i	j	ə	n	∅

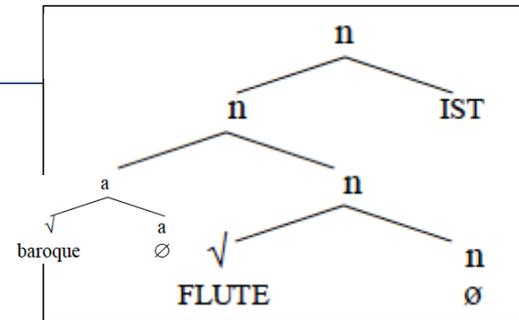
How to be a *Baroque flautist*?

allomorphy

- Phase 1



- step 2



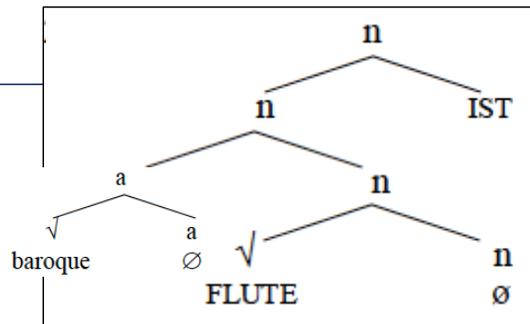
PF FLUTE \Leftrightarrow [flawt] / IST \rightarrow *Domain Suspension*
 \Leftrightarrow elsewhere (Bobaljik & Wurmbrand 2013)

No phase is triggered. Adjunction adds a segment but not a new category (Kayne 1994)

How to be a *Baroque flautist*?

Phase 2

- *-ist* triggers spell-out.



Allomorphy is conditioned. Syllabification and stress are assigned. Linearization occurs.

(Note that *baroque* could be incorporated. This would cause no problem here.)

conclusions

- The compositional semantics of the compound is read off of the syntactic structure.
- Liaison, empty CVs, and domain suspension give us the correct PF interpretation.
- There is no Bracketing Paradox.

C	V	C	V	C	V	C	V	C	V	C	V	C	V	C	V	C	V	C	V		
∅	∅	b	ə	ɪ	o	k	∅	∅	∅	f	∅	l	a	w	∅	t	ɪ	s	∅	t	∅

Nuclear Physicist/Nuclear Physician

Bermúdez-Otero (2016, 2019)

- We need to negotiate the ‘low meaning’ of *nuclear physics*, but ALSO the allosemantic meaning of *physic* in the environments of *-ian* and *-ist*

See above derivation of *Baroque flautist*

- Nuclear physic is never a spell out domain
- (1) [nucle –ar_{aP}]
- (2) [[nucle –ar_{aP}] physic –ist_{nP}]

Compound vs Phrasal Stress – An issue?

(A) has the same stress no matter what its interpretation, but (B, C, D) shift stress and interpretation together.

(A) nuclear physicist 'someone who studies nuclear physics / a central physicist'

vs

(B) particle physicist 'someone who studies particle physics' (stress on particle) / 'a particle who is a physicist' (stress on physicist)'

(C) bad grammarian 'someone who studies bad grammar' (stress on bad), 'a grammarian who is bad' (stress on grammarian).

(D) intellectualist creator 'a creator of intellectualists' (stress on intellectualist), 'an intellectualist-slash-creator' (stress on both/on creator)

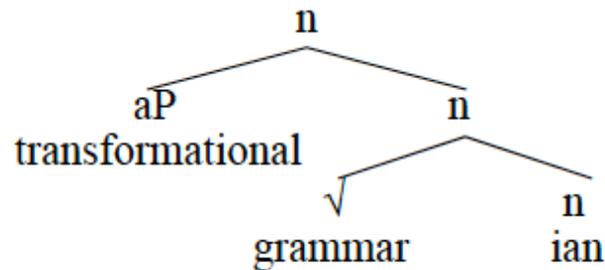
Is the syntax problematic? (Bermúdez-Otero 2019 + more examples)

- Syntactic evidence against [[transformational grammar] ian] :
- Grammarian behaves as a constituent:
 - one-substitution: He is a generative grammarian but not a transformational one.
 - ??He is a (*very) particle physicist but not a nuclear one. ??He is a (*very) quantum physicist but not a nuclear one?
 - He is a (very) bad grammarian but not a prescriptive/evil/ ??transformational one. (only high reading)
 - He is a (very) intellectualist creator but not and experimentalist one. (only high reading)
 - *That is a (*very) birdhouse but not a dog one. *He is a (*very) truck driver but not a limo one.
 - right-node raising: I know many generative but few transformational grammarians.
 - ?? I know many particle but few nuclear physicists. ?? I know many quantum but few nuclear physicists.
 - I know many bad but few prescriptive/evil/ ??transformational grammarians. (only high)
 - I know many intellectualist but few experimentalist creators. (only high)
 - *I see many bird but few doghouses. *I see many truck but few limo-drivers.

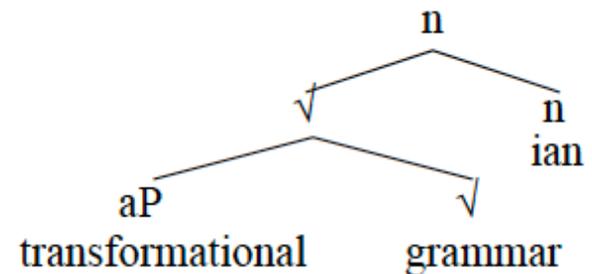
What is the necessary structure?

- Question – can we get the right-hand member behaving as a constituent any time the left-hand member is a modifier?

Do we need :



Or can we allow:



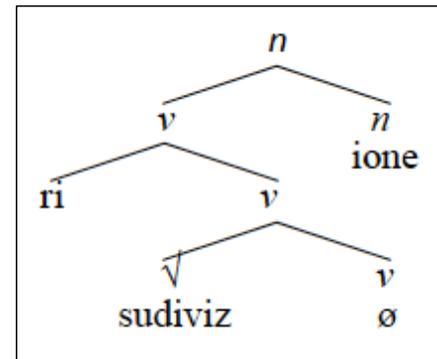
If we always need **this one** ↑ then these modificational structures are never Bracketing Paradoxes.

An Italian example

s-voicing

Italian s-voicing paradox

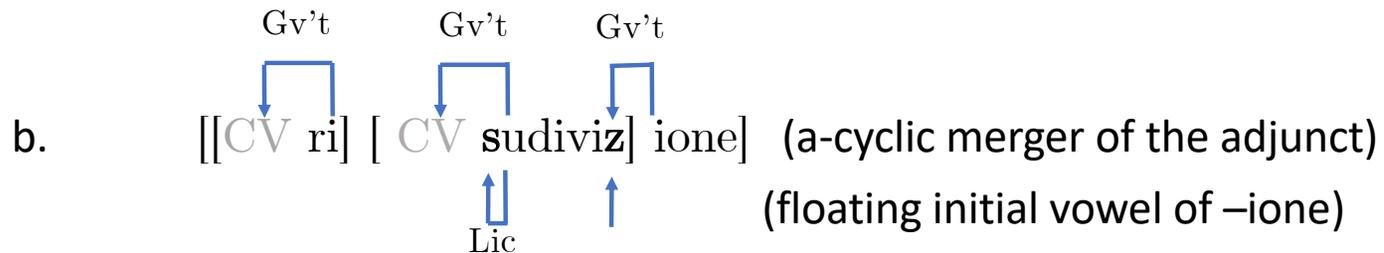
- Intervocalic s-voicing and its variability
- (19) risudivisione (N&V 1986:126)



- [[ri-sudiviz]ione] bracketing paradox?
- ri– is an adjunct (semantically and phonologically separate from its base)
- Adjuncts merge a-cyclically, and undergo spell-out before merger.

A CV analysis

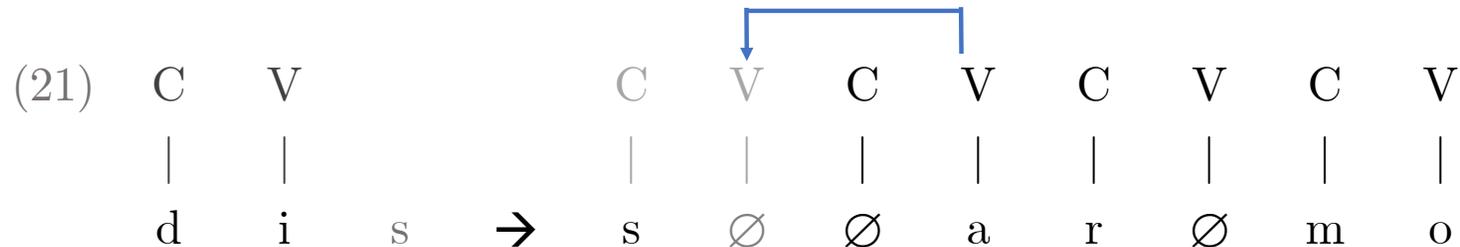
- (20) a. [CV [sudivis_v]ione_{nP}] (verbal and nominal phases)



- The root-final s is in a weak (intervocalic) position, and therefore undergoes lenition (government). The root-initial s is in a strong (onset) position (licensing).

And prefix-final *s*? *dizarmo*

- Like N&V note, Italian does not generally allow C-final words.
- In CVCV this means no final empty nuclei are permitted (a language-specific parameter)
- If no final V, then 's' in prefixes like 'dis' float. Dis is an adjunct:



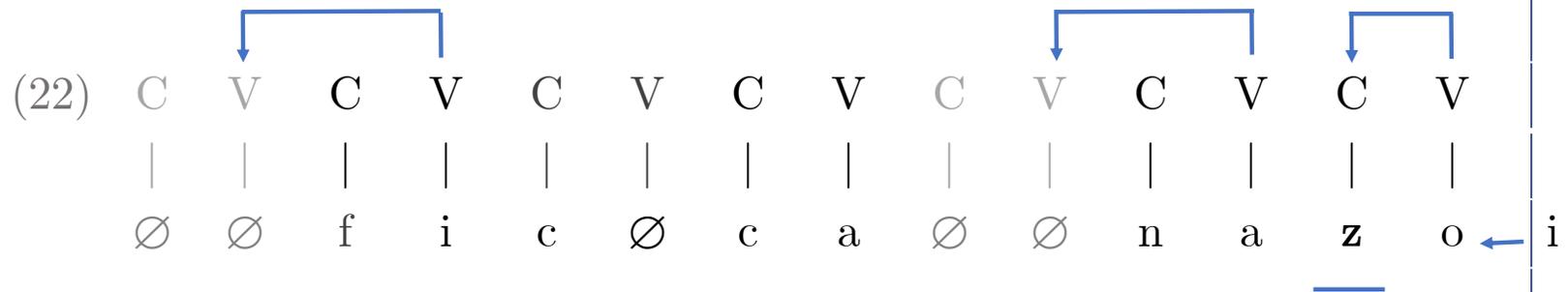
's' is a coda (weak position) due to the phase-initial CV. Lenition occurs. This is consistent also with Krämer 2001, 2005 in that the final /s/ of prefixes like *trans-* is also predicted to be weak.

cf. Dutch C-final prefixes, which never resyllabify/are followed by FENs

Suffixes in compounds

As we saw in English, suffixes may merge into the domain to their right (there is no CV boundary) : [[ficca_{nP}][naso_{nP}]i_{DP}]

(for another alternative and more on hiatus resolution and prefix-suffix asymmetries see van Oostendorp 1999)

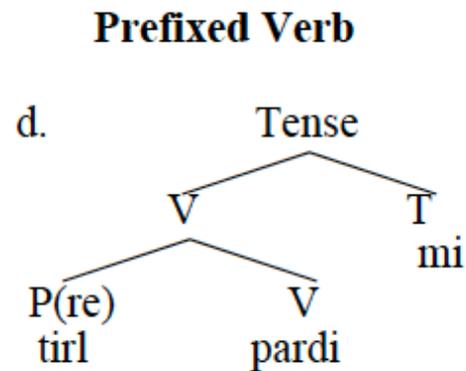


N.B. that the distinction between V-initial and C-initial affixes in Italian tracks the English data.

Particle verbs

phrases inside words

Where is the particle?



- The (not really but mostly) consensus among syntacticians is that particles head small-clause/PP complements of verbs.
- Particles raise up to AspP.
 - There is a debate in the literature over whether this is head movement or XP movement
 - We will come down on the XP-movement side.

XP movement of particles

- Svenonius 2004, supported by Caha and Ziková (2016, 2017) and others.

”If prefixes are maximal (extended) projections, then it might follow on independent grounds that they define their own phonological cycles. But if they are heads in the extended projection of V, then the special prosodic status appears to require an additional stipulation, in addition to the one that they require right adjunction by the incorporating verb.” (Svenonius 2004:7)

How to set fire/*podžög*

A reminder of the paradox

Underlying	[[[[[dIn] Ik] Ik] U
Cycle 1	---
Cycle 2	e
Cycle 3	e
Cycle 4	e
Yer-Deletion	ø
Other rules	denekek → deněček

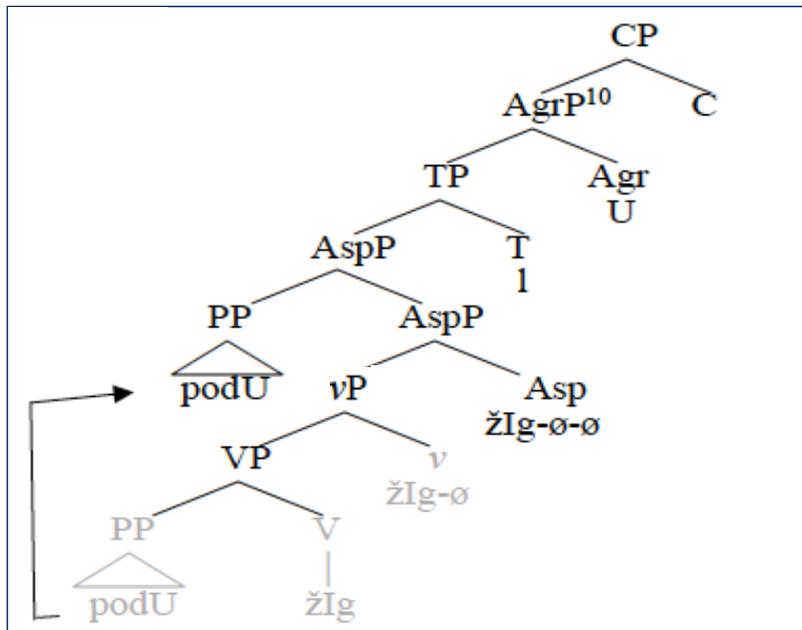
deněček 'day-diminutive-diminutive-nominative'.

Underlying	[podU[[[žIlg] l-U]]
Cycle 1	---
Cycle 2	žeg-l-U
Cycle 3	---
Yer-deletion	/podžög/
(+ other phono rules)	

podU-žlg-l-U 'under-burn-past-masc'

*podožög

How to set fire/*podžög*



phases

- PP – raises to Spec;AspP
 - Undergoes spell-out before/during movement

C	V	C	V
p	o	d	U

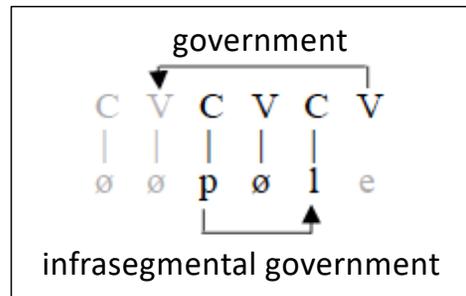
- vP – verb raises to Asp
 - vP spell-out is null
- CP – Asp⁰-Agr⁰ is spelled out

C	V	C	V	C	V
ž	e	g	ø	l	U

How to set fire/*podžëg*

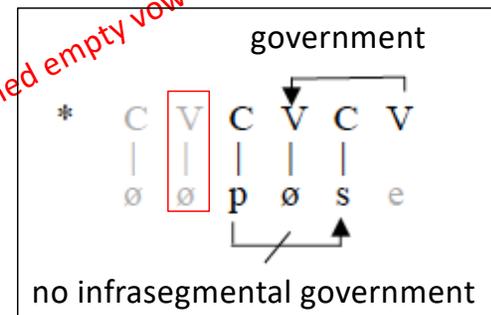
Restrictions on initial CVs

- TR-only languages



- RT languages

ungoverned empty vowel



How to set fire/*podžëg*

- Phonology:

C	V	C	V	C	V	C	V	C	V
p	o	d	U	ž	e	g	ø	l	U

- The final vowel of podU (and žlgU) is parametrically governed.
- in the CP phase, the root-Yer in žlg is lowered → žeg
- After linearization the final Yer of the particle is local to the first vowel of the root and is governed by it. (c.f. podožgla)
- stress differences in Russian vs German are explained, no word-final devoicing, no hiatus resolution, (and vowel harmony (Warlpiri, Hungarian..), separability (German...))
- There is no paradox.

Reduplication

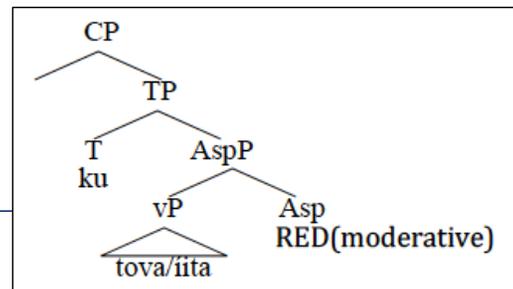
linearization and loops

How to pour a bit/*kwíitakwíita*

- Marantz (1987) presents reduplication paradoxes in Kihehe, Tagalog, and Mende.
- The paradox in Kihehe (Bantu) is the following:

(16) *ku-tova-RED* → *ku-tova-tova* ‘to beat a bit’
Inf-beat-RED

- The reduplicant scopes over the stem, the infinitival marker scopes over the reduplicant.



How to pour a bit/*kwíitakwíita*

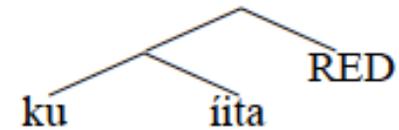
- If the INF precedes a stem that begins with a vowel, or if the 1sg prefix, which is a floating nasal feature, then the outer INF/AGR morpheme appears to scope under the RED.

(17) *ku-íita-RED* → *kwíita-kwíita* ‘to pour a bit’
 Inf-pour-RED

(18) *n-teléka-RED* → *neleka-neleka* ‘I will cook a bit’
 1sg-cook-RED

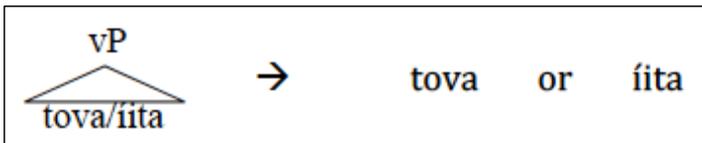
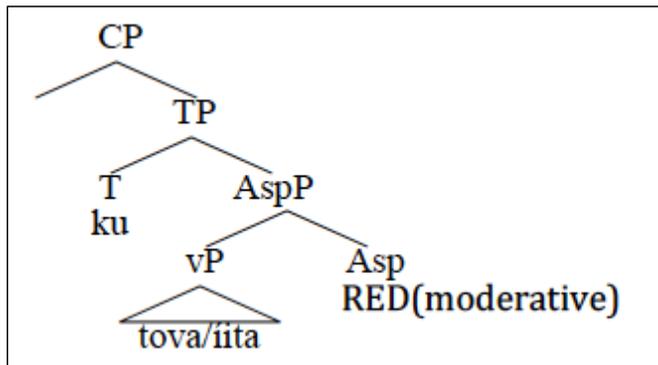
How to pour a bit/*kwíitakwíita*

- Marantz proposes that adjacency at phonological structure associative. This entails that [ku[íita RED]] is equal to [[ku íita] RED]. The requirement in Kihehe that high-round segments syllabify as onsets if possible triggers this re-bracketing in the case of vowel-initial stems, or in the case of floating nasal features



How to pour a bit/*kwíitakwíita*

Phase 1



What is RED?

- Raimy (2000)
- linearization is a phonological process, even at the melodic level.

#→t→o→v→a→% or #→i→i→t→a→%

#	→	C	→	V	→	C	→	V	→	C	→	V	→	C	→	V	→	%
								/										
		ø		ø		ø		i		t		a						

#	→	C	→	V	→	C	→	V	→	C	→	V	→	%
		ø		ø		t		o		v		a		

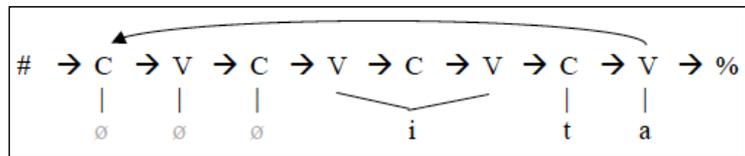
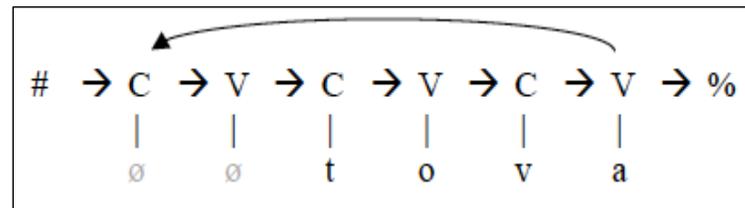
How to pour a bit/*kwíitakwíita*

What is RED?

- Linearization loop defined over a phonological domain. Full RED is a loop from the last to the first segmental position in a domain.

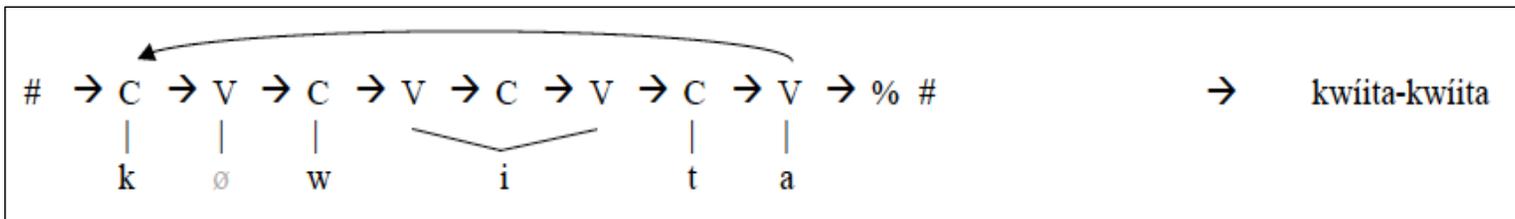
Phase 2

- CP is interpreted. RED is inserted, then the higher affix.

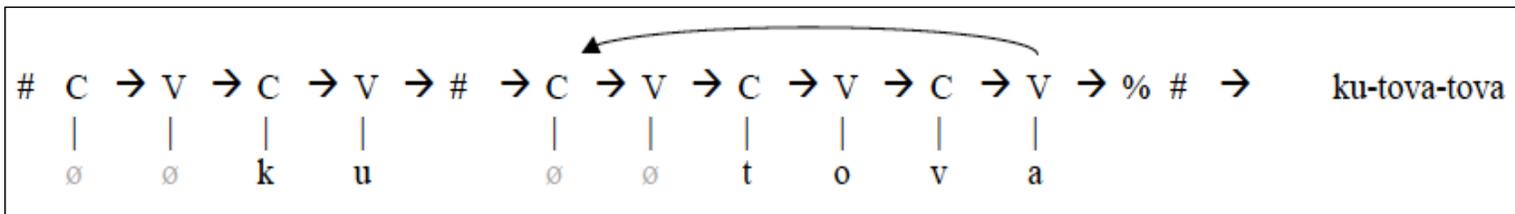


How to pour a bit/*kwíitakwíita*

- The affix syllabifies with the stem if required by the phonology



- If no independent phonological operation forces a merger of domains, the output is as predicted by the hierarchical structure.



Conclusions

There are no Bracketing Paradoxes

The elements of a theory of morpho-phonology that is paradox-free

- Domains of phonological spell-out are determined by the syntax.
 - 'Left-Branches' and phases
- Phonological domains are determined in the phonology.
 - Syllabification/floating features will blur phono-syntactic isomorphism.
- The Prosodic Hierarchy gives rise to Bracketing Paradoxes.
 - The prosodic word is not a phonological object
- Linear phonology cannot give rise to Bracketing Paradoxes.
 - And allows for a fully modular phono-syntax
- This is a fully modular theory of the phonology-syntax interface, and does not need to appeal to extra machinery to resolve bracketing paradoxes.

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Others in draft (under revision)

<https://ling.auf.net/lingbuzz/003964>

An aside on Words

Theoretical issues

We don't know what words are

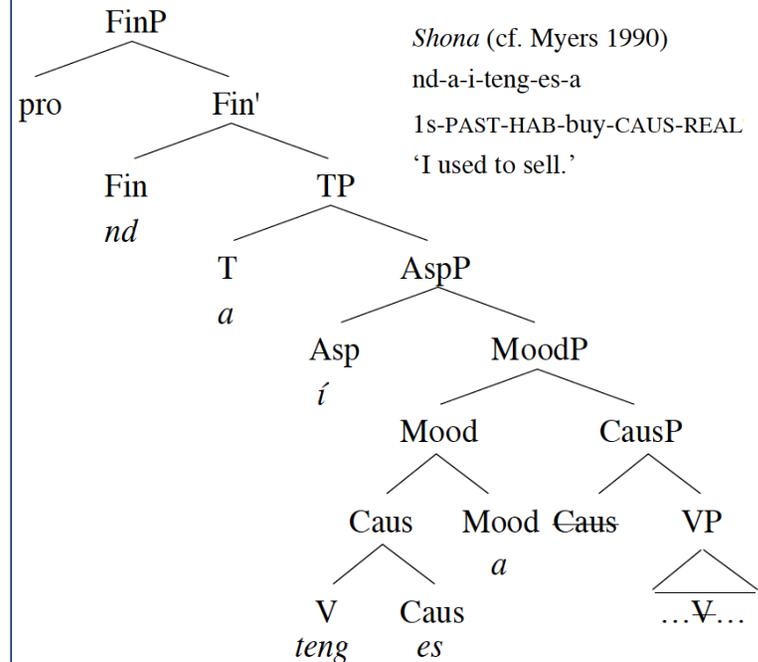
- The only proposed phono-syntactic definition
 - Words are (complex) X^0 s
 - This is a holdover from lexicalism
 - "the irreducible terminal elements of syntactic structure" Anderson (1992:17)
- The theory of non-isomorphism is based on the notion of usual isomorphism (as in Match Word; Selkirk (2011))
- It is indisputable that syntax does not have the final say in what becomes a word.

An example

- Julien (2002), Haspelmath (2011), Newell (2017); DM, Nanosyntax...

“The question of which morpheme strings are words is not really important since from the point of view of grammar, the word is merely an epiphenomenon.”

Julien (2007)



The PWd is (non)isomorphic with what?

- So, if there is no 'word' in the syntax, why are we building 'words' in the phonology?
- What does a PWd do? Scheer (2008): anything and its opposite
- We know that there is a domain, and that the phonology is sensitive to it. Let's try to get that with purely phonological objects and phases.
- The different levels of the PH have drastically different behaviours (ex. Syll vs PWd and PWd vs Intonational Phrase), so it is unclear why we want a single structural theory that encompasses all of these 'domain delimiters'.
- No PH from now on...

The end of an aside on Words