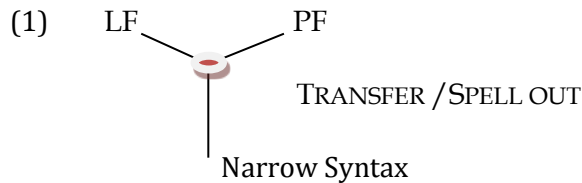# Syntactic domains at PF, PF domains in syntax

Roberta D'Alessandro, Leiden University Centre for Linguistics
r.dalessandro@hum.leidenuniv.nl

1. Introduction. The architecture of grammar

Y-model:

(1)   LF   PF

                    Transfer / Spell out

            Narrow Syntax

Virtual conceptual necessity: postulate only what is necessary.

(2)   Strong Minimalist Thesis
        "Language is an optimal solution to legibility conditions"   (Chomsky 2000:7)

- What are these "legibility conditions?"
- Taking the SMT seriously: interface conditions are determined by phonology.
  - Syntax is "instructed" by what phonology can interpret. One step further: syntax is designed like this because of the way PF is organized.
  - Not just domains for application of phonological rules, but about what phonology and prosody actually "see".

- Two consequences:
  - We can build phonological domains directly in Narrow Syntax (NS)
  - Prosody necessarily applies to the "left periphery"

1.1. Overview

2. PHONOLOGY, SYNTAX , SYNTAX-PF MAPPING

2.1. BUILDING PHONOLOGICAL DOMAINS IN NS (joint work with Tobias Scheer)

- PF instructs syntax on FI conditions for any expression that syntax will produce. Therefore, phonologically relevant chunks can and must be reflected in syntax.

Q: Are syntactic domains and PF domains isomorphic? Old question.
A: No.

Q: Can we determine prosodic domains, i.e. domains of application of phonological rules, directly from Narrow Syntax?
A: No.

2.1.1. PHRASES TO PHRASES

- PROSODIC PHONOLOGY: *non-isomorphism* (Selkirk 1981 [1978] Nespor and Vogel 1986): The output of morpho-syntax is cannot be used directly as the input to phonology and therefore needs to be "readjusted".

(3)   Abiitne   solus   pater? Solus.   [Latin]
        went-NEG   alone   father alone
        'Did father go away alone? He did'   (Nespor 1993: 201)

-ne forms a phonological word with *abiit* (ábiit becomes *abiìtne* – stess shift) but *abiitne* is not a syntactic constituent (according to Nespor)

2.1.2. PHASES TO PHRASES

- Kratzer and Selkirk (2007): "the highest phrase within the spellout domain is *spelled out as a prosodic major phrase*" (emphasis in original).

- CP and *v*P are phases: CPs and *v*Ps correspond to major phrases on the phonological side.

- Language-specific variation in prosodic phrasing is then achieved not by the syntax-phonology mapping as it was previously but purely phonologically by "prosodic markedness constraints, which operate to produce surface prosodic structures that are more nearly phonologically ideal" (Kratzer and Selkirk 2007: 126).

In other words: you get the domain for free but then you need to build a phonological phrase at PF.

(Piggot et. 2014: phases to phrases)

2.1.3.PIC DOMAINS TO PHRASES

- PIC-defined domains
- Cheng & Downing (2012, forthcoming): phonologically relevant domains that cannot be described by phase structure *as it stands.*

(4)   (bá-níké   ú-Síphó   íí-maali)   [Zulu]
        2SUBJ-give   CL1-Sipho   CL9-money
        'They gave Sipho money.'

                                                          Cheng and Downing (2012: 8)

- Vowel lengthening is the prosodic phrase boundary (for tone spreading)

      o   PIC would predict: [CP [TP subject verb [vP [VP **IO DO**]]]]
      o   But: no prosodic boundary between *v* and its complement

  D'Alessandro & Scheer (forthcoming)

- Empirical evidence of some correspondence between PIC-induced domains and domains of application of phonological (and morphological?) rules

but

- <u>Phase theory must be made more flexible</u>

2.2. CASE STUDY 1. PASSIVES AND /A/-INSERTION IN ABRUZZESE

2.2.1. ACTIVE VS PASSIVE

Active   Passive
(5)   a.   so vistə   (6)   a. so **vv**istə
             am seen   am seen
             'I have seen'   'I am seen'
       b.   so cunzideratə   b. so **cc**unzideratə
             am considered   am considered
             'I have considered'   'I am considered'

- the same lexical item
  - triggers RF in passive constructions
  - does not trigger RF in active constructions   (Biberauer & D'Alessandro 2006)

- background
  - transitive active *v* is endowed with a PIC at PF
  - Ariellese has a richer/layered *v* (D'Alessandro & Ledgeway 2010, D'Alessandro 2013)
  - *v* encodes voice (see Collins 2005 and Roberts 2010)
  - transitive active *v* (which is layered) is a phase head in Abruzzese (see D'Alessandro & Roberts (2008, 2010) on auxiliary selection and participial agreement, D'Alessandro & Ledgeway (2010) on auxiliaries in Abruzzese).

- analysis (Biberauer & D'Alessandro 2006)
  ACTIVE
  - *so* sits in T and *vistə* in V;
  - *v* is transitive active, hence a phase head (v*). It triggers spell-out of its complement;
  - *so* and *vistə* are thus separated by a PIC-endowed phase head

    PASSIVE
  - *v* is not a phase head (passive *v* is defective, see Chomsky 2005, 2008)
  - *hence so* in T and the past participle in V are NOT separated by a PIC-defined boundary
  - *so* and *vistə* are thus neither separated by a PIC-defined "boundary" neither at NS nor at PF

STRUCTURES
- at PF, angled brackets indicate spell-out domains

(7)   so vistə
        'I have seen'

        NS   PF
        [$_{TP}$ so [$_{v*P}$ **v*** [$_{VP}$ **vistə**]]] --Spellout--> [...so] [vistə]

(8)   so vvistə
        'I am seen'

        NS   PF
        [$_{TP}$ so [$_{vP}$ v [VP vistə]]] --Spellout--> **[so vistə]**
- There are cases of one-to-one, direct mapping

UNACCUSATIVES

- To the extent that unaccusatives host a *v*, this *v* is defective (Chomsky 2005), hence it is not a phase head .

- RF should occur with unaccusatives, but it does not:

(9)   so crisciutə
        am grown
        'I have grown'

- Biberauer & D'Alessandro: there is a Voice head – phasehood is linked to voice, not to transitivity (but then predicative constructions should also not show RF).

- D'Alessandro & Scheer (forthcoming): *v* is not endowed with a PIC at syntax (it is syntactically passive-like) but it DOES have a PIC at PF (it is active)

2.2.2. MODULAR PIC

- Spell-Out /Transfer are separate from the Phase Impenetrability Condition (PIC), which is an "opacity-inducing" operation (what undergoes the PIC is no longer visible for computation, either syntactic or phonological).

MODULAR PIC

- When Spell-Out occurs, every individual access point may or may not be associated with a PIC at PF, and the same optional endowment with a PIC also holds for syntax.

"As a matter of fact, Spell-Out itself does not leave any trace in phonology or syntax: it is only when it is endowed with a freezing effect that distinguishes "old" (already computed) from "new" (not yet computed) strings that an opacity effect is observed. This role is carried out by the PIC. It follows that the system is bicompositional and in principle allows for Spell-Out/Transfer to occur vacuously, i.e. without enforcing the PIC. That is, it is possible for Spell-Out/Transfer not to leave any footprint. It remains true, however, that the (phonological and syntactic) opacity effects of cyclic derivation are necessarily caused by a Spell-Out operation." (D'Alessandro & Scheer forthcoming:4)

- Spell-out domain defined in syntax does not leave any trace in phonology, i.e. is not endowed with a PIC at PF.

"PIC is guaranteed by Transfer to the interfaces of all information that would allow the interior to be modified by G. This principle must be defined with care -more care than in my own publications on the topic-to ensure that the interior, while not further modified, can nevertheless be interpreted in other positions (see Obata 201[1])." Chomsky (2012: 5)

- Transfer is not the only way to ensure a PIC: there can be a PIC associated with a phase head that does not result in the disappearance of the relevant material from the module, in our case PF.

STRUCTURE

(10)   so crisciute
       'I have grown'

       NS   PF
       [$_{TP}$ so [$_{v*P}$ v* [$_{VP}$ crisciutə]]] --Spellout--> [...so] [crisciutə]

(11)   so natə
       'I was born'

       NS   PF
       [$_{TP}$ so [$_{v*P}$ v* [$_{VP}$ natə]] –Spellout --> [so][natə]

       (weak phases in Chomsky 2001: no Spell-Out no PIC for some phase heads)

- Phase head: locus of Merge of uninterpretable features (Chomsky 2008 *ff.*)

- The phase skeleton (i.e. the set of phase heads) is invariable for a given language, and a decision is made for each phase head with regard to whether or not it is endowed with a PIC at PF (also depending on the specific phonological process).

- Whether or not a particular phase head is associated with a PIC is part of its lexical properties.

- Two languages may have the same phase skeleton, i.e. identical sets of phase heads, but differ with respect to which access point is associated with a PIC at PF.

Modular PIC: languages choose which access points are endowed with a PIC

language A: language B:

phase heads α and δ have a PIC at PF   phase heads α and γ have a PIC at PF

phase heads β and γ do not   phase heads β and δ do not

δ [γ β α [

δ γ [β α [

(D'Alessandro & Scheer forthcoming:17)

2.2.3. BACK TO ABRUZZESE

PIC at syntax only, PIC at PF, PIC at both

(12)

	PIC at syntax	* PIC at PF	RF
Transitive active *v*	+	+	-
unaccusative *v*	−	+	-
passive *v*	−	−	+

- C does not block RF in Abruzzese

(13)   lu waglionə chi   ssi vistə
         the boy   that   are seen
         'the boy that you saw'

(14)   Jè mmejə   chə   tti   sti   zittə
         is better   that SELF stay   quiet
         'It is better if you keep quiet'

- C is a phase head (C*) in syntax

6

- but it is not endowed with a PIC at PF (in Abruzzese/Arielli)

2.2.3. T0 SUM UP

- Both the complements of CP and vP are spell-out domains, i.e. C and transitive active v are phase heads.
- *v*P, but not CP, is endowed with a PIC at PF.
- PIC-defined spelled-out chunks are invisible for syntactic computation
- PIC is also active at PF
- PIC-defined spelled-out chunks may be invisible for phonological computation [PIC at PF].

2.2.4. BACK TO BANTU

RECALL: Cheng & Downing (2012): phonologically relevant domains that cannot be described by phase structure *as it stands.*

(15)   (bá-níké   ú-Síphó   íí-maali)   [Zulu]
        2SUBJ-give   CL1-Sipho   CL9-money
        'They gave Sipho money.'

                                                              Cheng and Downing (2012: 8)

Modular PIC: there is a PIC at syntax but not at PF.

The V moves to T cyclically (PIC at syntax).

2.3. PHASE-HEAD MARKING IN ABRUZZESE

2.3.1. CASE-STUDY 3. [A] INSERTION IN ARIELLESE

- Two means of marking the phase head:

- comp reduplication
- [a] insertion

(16)   Jə   so   dittə   **ca**   sə lə vo   fa **occhə** le faccə
        him   am   said   that   if it wants   do that   it does
        'I told him that if he wants to do it he may do it'

(17)   *Jə   so   dittə **occhə**   sə lə vo   fa **occhə** le faccə
        him   am   said that   if it wants do that   it does

[a] insertion: obscure distribution

(18)   Comə?
        how
        'How?'
(19)   Com**a** sti?
        how you-stay
        'How are you?'

(20)   a. vijə   b. vij**a** novə
        street   street new
        'street'   'new street'

[a] is inserted to mark the C head

(21)   a.Quandə   b. Quand**a** vi
        when   when you-come
        'When?'   'When are you coming?'

(22)   a. Chi ccosə   b. chi ccosa vu?
       which thing   which thing you-want
       'What?'   'What do you want?'

(23)   a. chə   b. ch'(**a**) si fattə?
       what   what are done
       'What?   'What have you done?'

(24)   CP   NS | PF

                       quandə   quand**a** vi

                   vi   C
                              T
                             v̶i̶
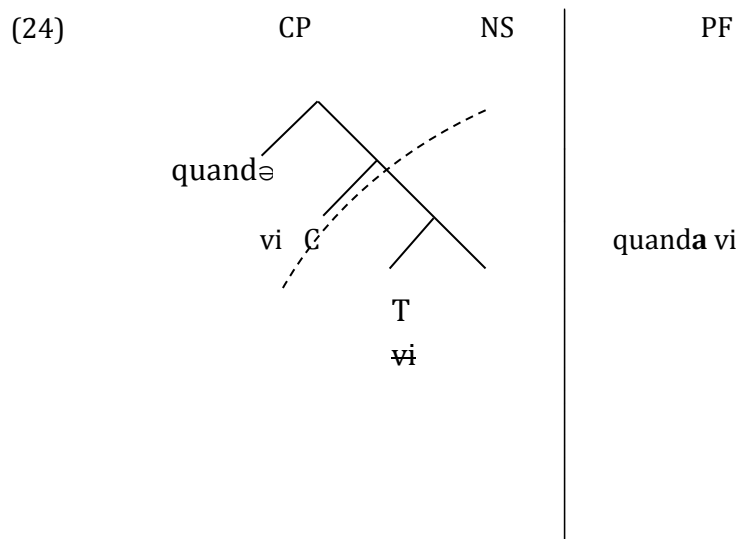
(see D'Alessandro & Van Oostendorp 2013 on [a] insertion on masculine plural nouns)

3. DOMAINS OF LEXICAL INSERTION AT PF. AGREEMENT AND ANTI-AGREEMENT IN ITALIAN VARIETIES

3.1. CASE STUDY 4. PARTICIPIAL AGREEMENT IN ITALIAN

Insertion of agreement endings (D'Alessandro & Roberts 2008)

In Standard Italian past-participle agreement is associated with:

▪ internal arguments that are promoted to subject position (passives, unaccusatives, medio-passive si) (25a, b, c);
▪ reflexive constructions (argued to also involve promotion of the "antecedent" of the reflexive [Kayne (1988)]) (25d);
▪ preposed direct-object clitics.

(25)   a.   Le   ragazze   sono   arrivate.
               the   girls-fem pl are   arrived-fem pl
               'The girls have arrived.'

       b.   Le   ragazze   sono   state   arrestate.
               the   girls-fem pl are   been-fempl   arrested-fem pl
               'The girls have been arrested.'

c.   Si   sono   viste   le ragazze.
      SI   are   seen-femplthe-fem pl girls-fem pl
      'We have seen the girls/the girls have been seen.'

d.   Le ragazze si   sono   guardate   allo   specchio
      the girls   selves   are   looked-fem pl at-the mirror
      'The girls have looked at themselves in the mirror.'

e.   Le   abbiamo salutate.
      them-fem pl   we-have greeted-fem pl
      'We have greeted them.'

f.   *Abbiamo   salutate   le   ragazze.
      have-1st pl   greeted-fem pl the-fpl girls-fem pl
      'We have greeted the girls'

CONDITION ON THE MORPHO-PHONOLOGICAL REALISATION OF AGREEMENT (D'Alessandro & Roberts 2008:482)

(26)   A. Given an Agree relation A between Probe P and Goal G, morphophonological agreement between P and G is realised iff P and G are contained in the complement of the minimal phase-head H.

        B. XP is the complement of a minimal phase head H iff there is no distinct phase head H' contained in XP whose complement YP contains P and G.

(26) means that morpho-phonological agreement is sensitive to the PIC

Q: Why does the past participle not show agreement with the postverbal object?
A: Overt morphophonological agreement in Standard Italian is constrained by the PIC.

(27)   Ho   mangiato   la   mela.
        I-have   eaten-masc sg the-fem sg   apple-fsg
        'I have eaten the apple.'

(28)   *Ho mangiata la mela.

(35)
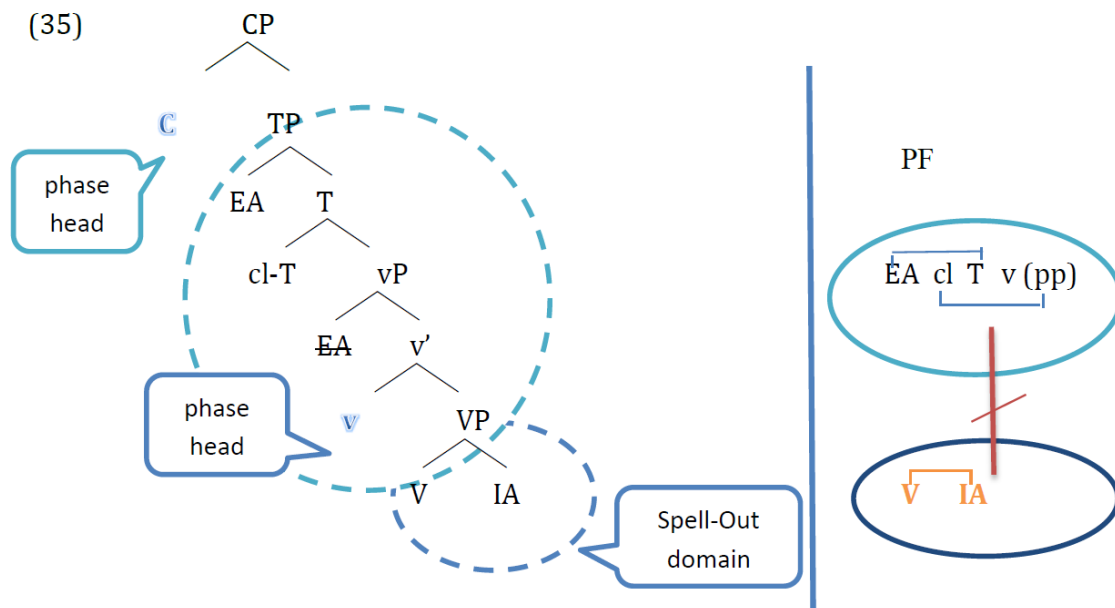
[D'Alessandro 2014, ch3:10]

UNACCUSATIVES

(29) Le   ragazze   sono   arrivate.
      the   girls-fem pl   are   arrived-fem pl
      'The girls have arrived.'

- Unaccusative *v* (if at all): no PIC.
- Morphophonological agreement between the participle and the direct object is possible.

(30)

CP
  C   TP
        T
          Aux[uN, uP]   vP
                          arrivat- [uN,uG]   VP
                                              arrivat- [uN,uG]   le ragazze[f.pl]

PF
  Aux[uN, uP]   arrivat- [uN,uG] le ragazze [f.pl]
     sono   -e
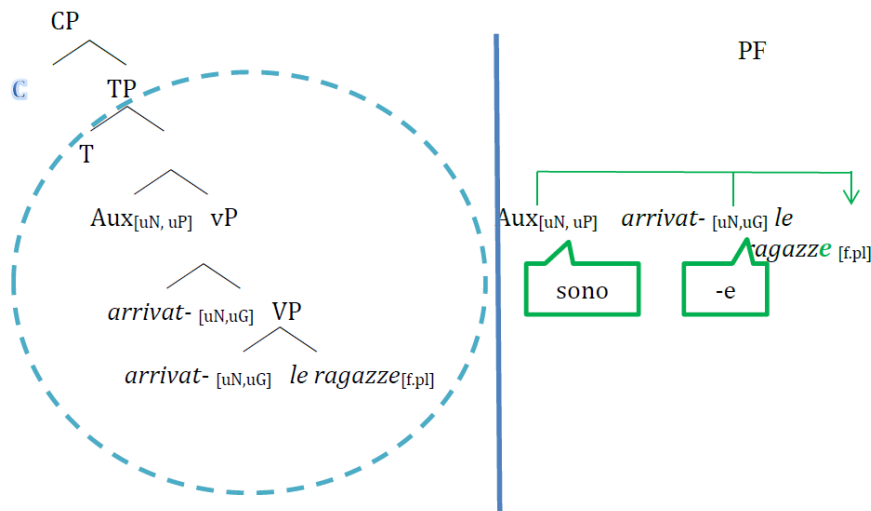
[D'Alessandro 2014, ch2:9]

PASSIVES: NO PIC

(31) Le   ragazze   sono   state   arrestate.
      the   girls-fem pl   are   been-fem pl   arrested-fem pl
      'The girls have been arrested.'

OBJECT CLITICS

(32) Le   abbiamo salutate.
      them-fem pl   we-have greeted-f pl
      'We have greeted them.'

- Past-participle agreement is triggered by clitic-movement (Kayne (1989), Belletti (2001)).
- The clitic moves to the same spell-out domain as the past participle

3.2. CASE STUDY 4. ANTI-AGREEMENT EFFECTS IN ITALIAN DIALECTS

Along the same lines:

Anti-agreement effects in Florentine and other central varieties:
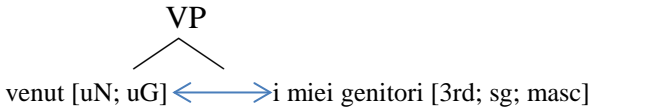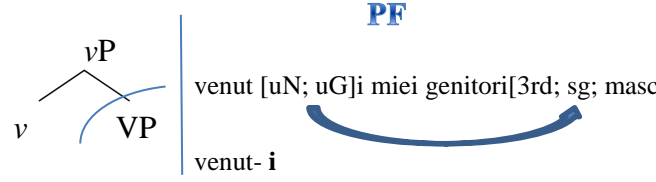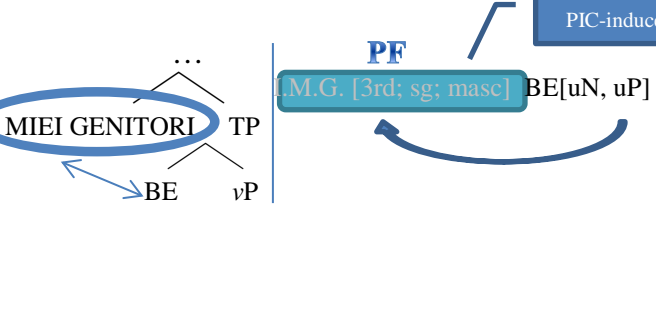
(33) a. Questo,   lo **fa**   sempre   i bambini [Marchigiano]
      b. *Questo,   i bambini   lo **fa**   sempre
      c. Questo,   **i bambini**   lo **fanno**   sempre
      this-acc   the children   it-acc does/do always   the children-nom

[Cardinaletti 1997]

(34) I MIEI GENITORI   è   venuti,   non i   tuoi   [Siena]
      the my parents-M.PL   is-3RD.SG   come-M.PL   not the-PL   yours-M.PL
      'My parents came, not yours'

1-to-1 mapping: PIC domains at syntax → lexical insertion domains at PF

(35)

a. Merge {*i miei genitori*; V (*venut-*)} b. Agree (i miei genitori); (venut-)	VP venut [uN; uG] ⟷ i miei genitori [3rd; sg; masc]
c. Merge {VP; *v*} d. Transfer VP e. AT PF: [*venut-* retrieves the 3rd pl info from *i miei genitori*] Insertion of the masc pl ending **-i**	**PF** *v*P *v* VP venut [uN; uG] i miei genitori[3rd; sg; masc] venut- **i**
e. Merge T, *v*P f. IMerge {i miei genitori; TP} → FocP g. Merge C, Foc P h. Transfer FocP g. AT PF: [BE cannot retrieve the 3rd plural info from *I MIEI GENITORI*] Insertion of the default 3rd sg ending.	PIC-induced opacity … **PF** I MIEI GENITORI TP I.M.G. [3rd; sg; masc] BE[uN, uP] BE *v*P

4. PROSODY AND THE LEFT PERIPHERY

4.1. PROSODY NECESSARILY APPLIES TO THE "LEFT PERIPHERY" (joint work with Marc van Oostendorp)

- Prosody "reads" only information structure material, i.e. it targets the higher part of the tree.
- The higher part of the syntactic tree is on another level, ABOVE the lower part of the tree, just like prosody is ABOVE segmental material.

(36)   CP

                  Top/Foc Ps   HLHL

                      TP

                          *v*P …   CVCVCCV
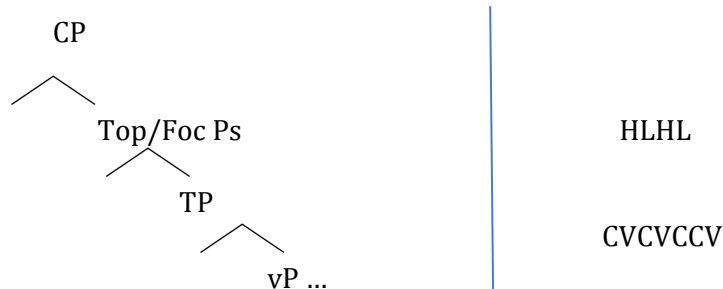
- The syntactic tree is organized like this by conceptual necessity: prosody (suprasegmental) can only be on top of phonology (segmental) material. Information structure can only be expressed on top of argument structure.

(On different dimensions in syntax, see Uriagereka's 2002 warping and Uriagereka & Pietroski 2002).

Different plane?

(37)
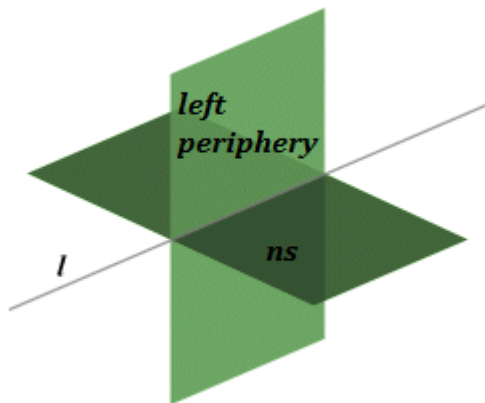
4.1.1. SYNTAX-PROSODY

- Prosody (e.g., intonation, phrasing) targets the left periphery and never anything else
- One can't express Nominative by intonation in any (non-tonal) language; one can't express Accusative by means of truncation in any language

BUT

- One can express wh- (questions) by means of pure intonation (i.e. prosody)
- One can express Topics and Foci by means of intonation
- One can express imperatives by means of intonation
- One can express vocatives by means of intonation

- prosody can only target the left periphery, not "core" argumental syntax

- Exocentric phonological behavior is a result of:
o the peripheral/external syntactic position and
o the fact that discourse-related, pragmatic-syntactic features (corresponding to Fregean Urteil- content becoming judgment; Frege 1879) are read by a different phonological cycle than φ- and Case features (corresponding to Fregean Inhalt- pure content).

- In other words: Prosody targets "edge/information-related features" (*lato sensu*) (Chomsky 2000, 2001, 2008), i.e. features that trigger movement to the left periphery for

interpretational reasons AND that are encoded on functional heads in the extended left periphery. (Generalized EPP features excluding A-mvt features) .

PROSODY READS/INTERPRETS INFORMATION STRUCTURE FEATURES
PHONOLOGY READS/INTERPRETS Φ AND STRUCTURAL CASE FEATURES

- Vocative can be realized by means of prosody; Nominative cannot.

4.2. VOCATIVES IN CENTRAL AND SOUTHERN ITALIAN

4.2.1. THE PHONOLOGY OF VOCATIVES

Vocatives in Southern Italian dialects are obtained by truncation

(38)   a. Mari' [Maria]
        b. Mariacarme' [Mariacarmela]
        c. Andreadalpo' [Andrea dal Pozzo]

Truncation, but not to a prosodic constituent.

4.2.2. THE SYNTAX OF VOCATIVES

- What we know about vocatives (from Schaden 2010)
  o Vocatives are nominal elements referring to the addressee of a sentence
  o In European grammatical tradition vocative is taken to be a case form
  o Vocative does not serve as an argument of the verb, and is set off from the rest of   the sentence by some special intonation (Zwicky 1974: 777).

- Three syntactic factors (Moro 2004):
  o The Vocative phrase does not belong to the thematic grid of the main predicate of the clause
  o The Vocative phrase may also not co-occur with an article
  o The Vocative phrase may also be preceded by an emphatic interjection (or particle)

- 1, 2, and 3 are weak facts to claim that there is a vocative Case, but they show that at least Vocative phrases behave differently from argumental NPs.

Q: Are vocatives in the "tree"? If so, where are they?

Moro: they are in the left periphery, somewhere higher than Force, on the basis of examples like:

(39)   O Pietro, Gianni baciava   Maria in giardino
        o Pietro, Gianni kissed   Maria in garden
        'Pietro, Gianni was kissing Maria in the garden'   (Moro 2004:259)

(40)   Gianni pensa, (o)Maria, che Pietro abbia letto un libro
        'Gianni thinks, (o) Maria, that Pietro has read a book'   (Moro 2004:258)

  - Word order proposed for Italian:

(41)   Voc > Force> (Top >Foc>Top) Fin   (Moro 2004)

    - Espinal (2011): two possible positions for vocatives:

- o In the tree (above Force, like Moro claims)
- o Parentheticals (i.e. in any position in the clause)
- o Vocatives are either ON the Vocative projection or they are "linked" to it

4.2.3. BACK TO PHONOLOGY

- o Two constraints (Alber & Arndt-Lappe 2009, Alber 2010):
- o ANCHOR- LEFT: makes sure that the initial segment is preserved
- o ANCHOR-STRESS: makes sure that the stressed vowel is the end
- o + some Contiguity constraint which preserves everything in between.

- ▪ Problems with this analysis:
- o A constraint aligning a stressed vowel with the edge of a phrase is somewhat suspicious for a template: neither the truncated form, nor the thing which is deleted is a prosodic constituent
- o Why would we choose truncation for vocatives (and imperatives?) and not for other morphological 'cases' / verbal moods?

Göksel & Pöchtrager (2010): vocatives are realized exclusively by prosodic means in Austrian German and Turkish.

(42)

	σ	AG	TR	σ σ	AG	TR	σ σ σ	AG	TR	σ σ σ σ	AG	TR
Nom.	Háns Cán			Márkus Aslí			Flórian Hüseyín			Alexánder Hüsamettín		
Voc.	Háns Cán			Márkus Áslı			Flórian Hüséyin			Alexánder Hüsámettin		
Surprise address	Háns Cán			Márkus Áslı			Flórian Húseyin			Alexánder Húsamettin		
Calling	Há-ans Cá-an			Márkus Áslı			Flórian Hüséyin			Alexánder Hüsaméttin		

Their conclusions:

- • Given that the patterns are (i) robust, (ii) systematic and (iii) in their definition crucially rely on linguistic notions (syllable, word edges etc.), they must be seen as part of the language system, not just as functional structures manifesting themselves in language use only.
- • The rich array of categories expressed only by prosody, e.g. the vocative, argues against a notion of morphology that relies on strict serialisation of morphological markers; rather, the phonological material representing different categories is superimposed over each other.

4.3. VOCATIVES IN SOUTHERN ITALIAN DIALECTS

Recall: vocatives in SIDs are obtained by means of truncation of anything that follows the stressed vowel:

(43) Mariagiova'

PROPOSAL: The exponent of the vocative is (at least) a pitch accent, which is specified for being at the same time a boundary tone (i.e. T*%).

Pitch accent --> makes it want to be on the stressed syllable;

Boundary tone --> makes it want to be at the edge of the constituent.

(from Vanrell & Cabré 2011)

Conflicting requirements!

The paradox is resolved by making the stressed vowel be exactly on the edge of the constituent – i.e. by truncation of everything following it.

4.4. BACK TO FEATURES AND PROSODY

- φ-features and "informational" features are derivationally distinct
- syntax has, as it were, two independent cycles: first, one in which φ-features operate, and afterwards one in which edge features are operative.
- Each of these two cycles has its own spell-out: the former to segmental phonology (and propositional semantics = Frege's Inhalt, content), the second to intonational and other types of prosodic phonology (and discourse semantics = Frege's Urteil, judgement).
- The reason why intonation etc. can only play a role in the second cycle is obvious: syntactic heads which phonologically consist of only suprasegmental material can only be realized if segmental material has already been provided on an earlier cycle.

5. CONCLUSIONS

- PF informs syntax
- If we have a domain-defining mechanism in NS we don't need to replicate it at PF
- PF domains also need to be already present at syntax
- Syntactic trees are structured as we know by NECESSITY: they reflect PF-internal architecture.

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