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www.unice.fr/dsl/tobias.htm

# INTERMODULAR ARGUMENTATION
Piece-driven phase and one single phonology
[post-conference version]

(1)    phase theory should bother phonologists, but it doesn't
   a.   the minimalist focus on the interface has changed the landscape radically: the revival of cyclic spell-out and Phase Impenetrabililty (i.e. phase theory) establishes a pipe between syntax and phonology that did not exist in GB.
   b.   People on both ends of the pipe are not free anymore to do what they want: their theories and analyses may make predictions on the other end.
   c.   The intermodular potential of phase theory has not received much attention thus far. Syntacticians use Phase Impenetrability for syntax-internal purposes, and phase theory evolves at high speed without taking into account what happens when the parcel is dumped to phonology.
   d.   Phonologists have barely acknowledged the existence of phase theory, let alone taken into account the predictions that it makes on the phonological side.
   e.   Certainly an important factor here is the misty relationship (if any) that OT has with modularity, which is constantly violated (mapping done in the phonology, interface constraints, constraints that combine phonological and morphological instructions etc.). Phase theory (and indeed the generative architecture of grammar), however, make no sense in absence of sharp modular contours.

(2)    purpose
   use the pipe in order to make intermodular arguments
   [Scheer forth]
   a.   syntax → phonology
      1.  multiple mini-phonologies dominate phonology since the advent of Lexical Phonology in the early 80s up to the present day. They are incompatible with phase theory and have to go
      2.  anybody who believes that current syntactic thinking is on the right track must reject muliple computational systems in phonology (that is, 80% of current phonological theories).
   b.   phonology → syntax
      1.  phase theory is rapidly evolving in syntax: all kinds of options are considered – but not the one that the phonological version of phase theory practises, piece-driven phase.
      2.  that is, rather than of a particular node, phasehood is a property of lexical items, which percolates to the arboreal structure. A node is not a phase head per se, but only because it dominates an item that is lexically specified for phasehood.

## 1. Multiple mini-phonologies have to go

(3)    empirical basis for cyclic spell-out/multiple mini-phonologies:
       affix classes
       a.    known since SPE (Chomsky & Halle 1968:84) for English
       b.    in other languages:
             Malayalam (Dravidian), Basque, Dakota (native American), Dutch, German.
             Overview: Booij (2000:297)

(4)    well-known affix class-based phenomena in English
       a.    underapplication to class 2 strings
             (= level 1 rules, rule-blocking boundaries)

| morpheme-internal | root in isolation | class 1 affix | class 2 affix | effect |
|---|---|---|---|---|
| – | párent | parént-al | párent-hood | penultimate vs. other stress |
| – | s[ej]ne | s[æ]n-ity | | (trisyll) |
| | m[ej]den | | m[ej]den-hood | shortening |
| si[ŋ]k | – | im-possible | un-predictable | nasal assimilation |

       b.    underapplication to class 1 strings
             (= level 2 rules, rule-triggering boundaries)

| morpheme-internal | root in isolation | class 1 affix | class 2 affix | effect |
|---|---|---|---|---|
| i[gn]orance | sig[n] | si[gn]-ature | sig[n]-ing | gn-n |
| a[mn]esia | dam[n] | da[mn]-ation | dam[n]-ing | mn-m |
| fi[ŋg]er | si[ŋ]g | you[ŋg]-er | si[ŋ]g-er | ŋg-ŋ |
| | lo[ŋ]g | lon[ŋg]-er | lo[ŋ]g-er | |

## 1.1. Analysis with multiple mini-grammars (Lexical Phonology)

(5)    classical analysis in stratal Lexical Phonology
       (Pesetsky 1979, Kiparsky 1982a,b, Mohanan 1986 and so forth)
       a.    derivation of parént-al vs. párent-hood

| | | parent | parént-al | párent-hood |
|---|---|---|---|---|
| lexicon | | parent | parent | parent |
| level 1 | concatenation | — | parent-al | — |
| | stress assignment | párent | parént-al | — |
| level 2 | concatenation | — | — | párent-hood |
| | rule application | — | — | — |

    b.   multiple mini-phonologies are a critical property of Lexical Phonology
        1.  the stress-assigning rule must be absent from level 2 (otherwise we get parént-hood).
        2.  hence there are two distinct computational systems in phonology:
            - level 1 phonology
            - level 2 phonology
            the pool of rules that they are made of is not the same (in modern constraint-based environments: the ranking of the constraints is not the same).
        3.  every rule must "know" at which level(s) it applies:
            domain assignment
    c.   take-home message
        1.  multiple mini-grammars are critical for Lexical Phonology
        2.  they are responsible for underapplication
            ==> the stress rule underapplies (does not apply) to párent-hood because it is absent from level 2.
        3.  multiple mini-phonologies are **THE** innovation of Lexical Phonology. SPE had only one single phonology.

(6)   modern incarnations of multiple mini-phonologies
    a.   stratal vs. parallel versions
       Lexical Phonology

          ↓                       new parallel implementation:
       Stratal OT                     co-phonologies
       DOT                         indexed constraints

    b.   stratal representatives
        1.  DOT
            Rubach (1997 et passim), Booij (1997)
        2.  Stratal OT
            Kiparsky (2000), Bermúdez-Otero (forth)
    c.   parallel representatives
        a.  co-phonologies
            mini-phonologies incarnate as independent constraint hierarchies
            among others, Itô & Mester (1995), Orgun (1996), Inkelas (1996,1998,1999), Orgun & Inkelas (2002), Anttila (2002)
        b.  indexed constraints
            mini-phonologies incarnate into the same constraint hierarchy (A-versions of constraints are interspersed with B-versions of the same constraints)
            among others, Prince & Smolensky (1993), Itô & Mester (1999b,2001) and Pater (2000)

(7)     comparison between the stratal and the parallel option
        a. parallel                                b. stratal
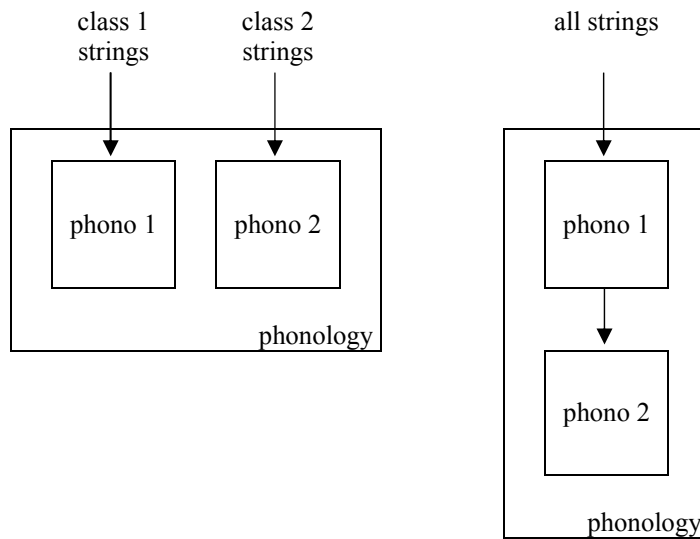


## 1.2. The one-phonology approach (analysis with Phase Impenetrability)

(8)     the one-phonology approach
        a.   roots in SPE
             1.  there was only one phonology in SPE
             2.  SPE had cyclic spell-out (actually present since Chomsky (1956:75)
             3.  but there was no Phase Impenetrability
        b.   career of no look-back devices (today called Phase Impenetrability)
             1.  introduced by Chomsky (1973)
             2.  applied to phonology
                 -   under the name of the Strict Cycle Condition (SCC) by Kean,  Mascaró
                     (1976)
                 -   under the name of Bracket Erasure in (stratal) Lexical Phonology (Mohanan
                     1986)
                 -   in Government Phonology by Kaye (1992,1995)
             3.  forgotten in GB syntax
             4.  revived by the minimalist programme as Phase Impenetrability
             5.  today applied to phonology only by
                 - Government Phonology
                 - Distributed Morphology

(9)     first incarnation of the one-phonology approach:
        Halle & Vergnaud (1987:77ss)
        (which Halle & Vergnaud misleadingly advertised as a version of Lexical Phonology)
        also Halle & Vergnaud (1987), Szpyra (1987), Halle et al. (1991), Halle & Kenstowicz
        and Odden (1993).
        More recently Halle & Matushansky (2006), Halle & Nevins (forth)
        a.   nodes (=affixes) are either cyclic or non-cyclic:
             cyclic: their content is spelt out
             non-cyclic: no spell-out occurs (phonology "jumps" over this node)

b.   analysis of parént-al vs. párent-hood
   1.  class 1 affixes are cyclic, i.e. trigger spell-out
   2.  class 2 affixes are non-cyclic, i.e. are treated by the phonology as if they did not exist
   3.  special proviso: the root is treated as a cyclic affix
   4.  hence the following structure, where brackets mean "spell-out"
   [[parent] al]
   [parent] hood
   5.  derivation: the phonology assigns penultimate stress
   - parént-al: [párent], but then stress is shifted by the cyclic -al: parént-al
   - párent-hood: [párent], but no spell-out at -hood, so párent-hood.

c.   argument against the stratal architecture: affix ordering turns out to be wrong. That is, cases where class 2 affixes precede class 1 affixes are on record: govern-ment$_2$-al$_1$. The stratal architecture, however, predicts that affixes may not appear in this order.

   a. √-1-2: univérs-al$_1$-ness$_2$        b. √-2-1: govern-mént$_2$-al$_1$
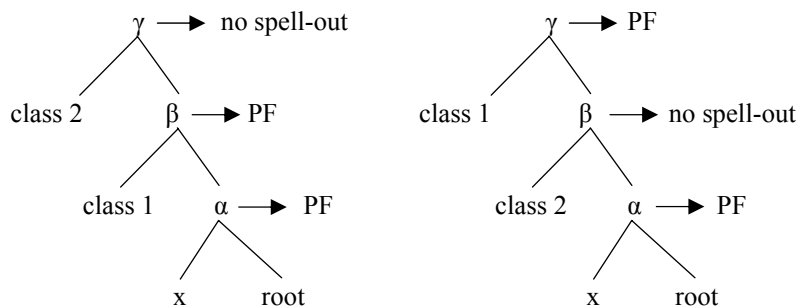


d.   no Phase Impenetrability needed
e.   Halle & Vergnaud's system cannot do level 2 rules (rule-triggering boundaries).
f.   there is a second phonological computational system, called non-cyclic phonology, which applies after all cyclcic operations, i.e. after the last node has been processed.
   ==> this is SPE's word-level phonology.
g.   there may be debate whether the existence of a specific word-level phonology is equivalent to the multiple mini-phonologies of stratal Lexical Phonology. My take is that it does not make Halle & Vergnaud's system a version of multiple mini-phonologies: the word-level phonology does not participate in affix class management.
   Rather, the word-level phonology is a version of post-lexical phonology, or of Rubach & Booij's (1984,1987) post-cyclic but lexical rules.
h.   ==> Halle & Vergnaud (1987) are representatives of the one-phonology appraoch, but they do not use Phase Impenetrability.

(10) Kaye (1995)
first application of Phase Impenetrability in the environment of a single computational system
a.   analysis of parént-al vs. párent-hood
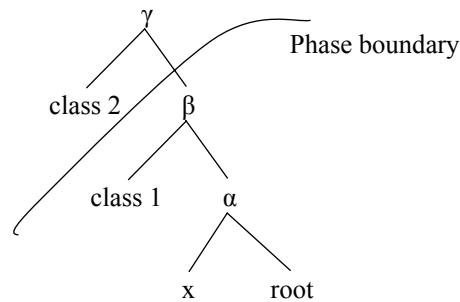


b.   class 1 and class 2 affixes merge at different heights in the tree.
c.   they are separated by a phase boundary (but crucially, the root and class 1 affixes are not):
- $\beta$ is a phase head
- $\gamma$ (or some higher node) is a phase head
- $\alpha$ is not a phase head
d.   experience spell-out at $\beta$:
1. roots in isolation: párent
2. class 1 strings ([root + class 1 affix]): parént-al
e.   do not experience spell-out at $\beta$:
class 2 strings ([root + class 2 affix]): párent-hood
f.   derivation of párent-hood:
1. párent is interpreted at $\beta$ in isolation → result: [párent]
2. -hood is added, but upon the next higher phase, [párent] is frozen by Phase Impenetrability, hence stress does not shift to the right.

(11)  appendix
comparison between Halle & Vergnaud (1987) and Kaye (1995):
exactly opposite takes on the spell-out properties of affix classes
a.   spell-out is triggered by
- class 1 nodes (H&V) vs.
- class 2 nodes (Kaye)
b.   no spell-out is triggered by
- class 2 nodes (H&V) vs.
- class 1 nodes (Kaye)
c.   examples
1. parent-al
H&V:  [[parent] al]
Kaye:  [parent al]
2. parent-hood
H&V:  [parent] hood
Kaye:  [[parent] hood]
d.   Kaye (1995) cannot do $\sqrt{}$-2-1 strings (govern-ment$_2$-al$_1$): this would be a violation of Phase Impenetrability.
Same picture in Distributed Morphology: Marvin (2002) concludes that Phase Impenetrability does not apply to English primary stress.

(12) take-home message
    a.   underapplication is achieved by Phase Impenetrability:
         parént-hood is avoided by the prohibition to touch previously interpreted párent.
    b.

> multiple mini-phonologies and Phase Impenetrability do the same job: their raison d'être is the organization of underapplication

    c.   the two devices are thus mutually incompatible
        1.  their simultaneous presence would be redundant.
        2.  hence no theory can afford to accommodate both.
        3.  present-day theories strictly respect this complementary distribution:
           -  Phase Impenetrability is unheard of in OT-based theories of the interface because all of them implement multiple mini-grammars.
           -  modern heir of Kaye (1995): Distributed Morphology (Marvin (2002) only one phonology and active Phase Impenetrability

(13) syntax referees
    a.   Phase Impenetrability is critical for current syntactic thinking.
    b.   there is no way current syntax could work in absence of Phase Impenetrability on the other end of the pipe. Phase Impenetrability is a property of the interface/of grammar, not of either syntax or phonology alone.
    c.   even if in a monster-grammar Phase Impenetrability were present in syntax, but absent in phonology, phonology would not know which mini-phonology should interpret the strings that come in.
    d.   anybody who believes that current syntax is on the right track must reject phonological theories that accommodate multiple mini-phonologies.
        Anybody who works with multiple mini-phonologies must reject Chomsky's phase theory and minimalist syntax.

(14) appendix: spell-out without the edge?
    a.   current phase theory holds that in case XP is a phase head, spell-out upon XP only triggers the interpretation of the complement – the head and Spec,XP ("the edge of the phase") are spelt out only at the next higher phase (Chomsky 2000:108)
        That is, only material in the complement of XP is frozen by Phase Impenetrability; the edge is still accessible for extraction even after the spell-out of XP.
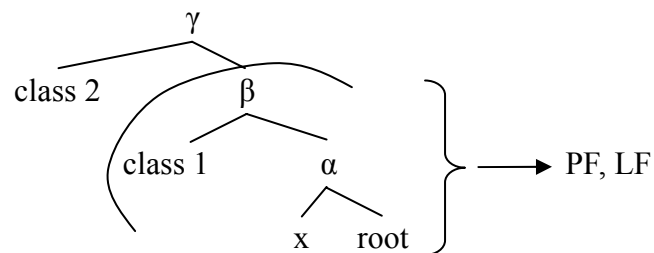
spell-out of XP        XP

       Spec       X'

           X°   Comp  ⟶  PF, LF
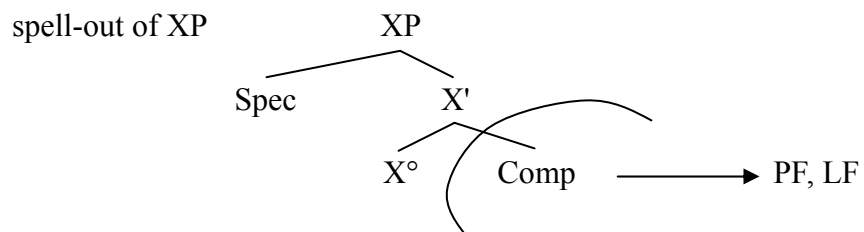
b. does the non-spell-out of the edge have a parallel in phonology?
Maybe:
1. affix class membership is a lexical property of affixes.
2. in the one-phonology perspective and in parallel LP (but not in stratal LP), affix class information is injected into the syntactic derivation and percolates to the node that dominates the affix.
3. in the one-phonology approach (but not in stratal or parallel LP),
- nodes that dominate class 1 affixes are phase heads
- nodes that dominate class 2 affixes may or may not be phase heads (irrelevant)
==> phasehood is a property of **class 1** affixes.
4. alternative analysis:
- phasehood is a property of **class 2** affixes.
- the merger of a class 2 affix triggers spell-out not of its own node ($\gamma$), but only of its complement ($\beta$)
- that is, spell-out at $\gamma$ interprets only the complement – the head is only interpreted at the next higher phase.
- problem: this does not look like X-bar. There is no phonological evidence for Spec, so the edge is only made of the head.
But maybe there are no Specs anyway…

spell-out of $\gamma$          $\gamma$

class 2          $\beta$

class 1          $\alpha$          $\longrightarrow$ PF, LF

x     root

c. a minimalist argument in favour of the latter option where phasehood is a property of class 2 affixes, but which triggers only the spell-out of the complement
1. the existence of a phase below $\gamma$ is always critical, including cases where there is no class 1 affix (e.g. párent-hood): [párent] must experience LF interpretation before -hood is merged in order to get PIC-guaranteed stress. If phasehood is a property of $\beta$, this means that
- $\beta$ must be constructed even when it is empty - very unlike minimalist economy
- one wonders where phasehood comes from: $\beta$ being empty, nothing can percolate from any class 1 piece. This is incompatible with the basic ides of piece-driven phase and the fact that phasehood is a lexical property of affixes: phasehood would end up being a property of the *node* $\beta$, rather than of its head.

2. beyond (English) affix classes, the idea that affixes fall into a class that triggers spell-out of their complement upon merger (cyclic affixes), and those that do not (non-cyclic affixes), is expressed in Ziková & Scheer (2007) and Ziková (2008a,b).
3. note that this follows the same logic as Halle & Vergnaud's (1987), but in the exact opposite way:
   - Halle & Vergnaud (1987):
     cyclic affixes trigger the spell-out of the node that they head, i.e. including themselves. If α is cyclic, its merger to a root triggers the spell-out of the whole complex [√ + α].
   - Ziková (2008a,b):
     upon merger, cyclic affixes trigger only the spell-out of their complement, excluding themselves. If α is cyclic, its merger to a root triggers only the spell-out of the root.
   - this is the expression in modern vocabulary of the contrast between Halle & Vergnaud (1987) and Kaye (1995) that is discussed under (11).


## 2. Piece-driven phase

(15)  phase theory and its evolution
   a.  since Chomsky (2000,2001), phase theory evolves at high speed.
   b.  many directions are explored, and the literature is growing rapidly – difficult to follow (especially for a phonologist).
       Certainly phase theory is in an embryotic state and poorly understood (Boeckx & Grohmann 2007).
   c.  the overall picture may be quite confusing at times: everybody seems to have his/her private way of doing phases, many of which are incompatible. The common denominator reduces constantly, probably to not much these days, except that
       - things are sent off to LF/PF and
       - come back frozen (to various extents).

(16)  some directions
      overview literature: Frascarelli (2006), Boeckx & Grohmann (2007), den Dikken (2007)
   a.  atomisation
      1.  phases are cut into smaller and smaller pieces: Chomsky's original take was CP and vP, maybe DP.
      2.  DP, also DP-internal phases
          TP
          Matushansky (2005), den Dikken (2007).
          Limitations of atomisation: Boeckx & Grohmann (2007): if we atomise too much, nothing will be able to escape phases anymore.
      3.  radical atomisation:
          Marvin (2002) for the area below the word (and based on phonological motivation).
          ==> all xPs are phase heads.

    b.   independent (extra-syntactic) control of phasehood

        1.  Chomsky attempts at a non-syntactic correlate: a phase is a "syntactic object" (SO) something that has a certain degree of independence (phonetic and semantic, i.e. propositionality) and is "isolable" at the interfaces. Also, it is $\theta$-complete.

        2.  this is weakened as atomisation of phasehood progresses. Also, Chomsky's syntaxtic and extra-syntactic criteria are found to be non-operational.
            See Legate (2003), Boeckx & Grohmann (2007).
            One argument: extra-syntactic independence should concern whatever is actually spelt out. Since only the complement of vP and CP, rather than vP and CP themselves, are spelt out, it should be the complement that enjoys interface independence.

    c.   independent LF and PF Phases (asymmetric spell-out)
       Marušič (2005), Marušič & Žaucer (2006), Felser (2004), Matushansky (2005), den Dikken (2007), Megerdoomian (2003) and Caha & Scheer (2007).

    d.   Phase Extension (den Dikken 2007)
       - phasehood is not given; it is defined by syntactic computation.
       - phasehood is dynamic, rather than rigidly defined at fixed points of the derivation.
       - the phasehood of heads moves together with the head: if a phase head moves, it will also be a phase head in its new position.
       **==> akin to piece-driven phase, see below.**

    e.   cross-linguistic parameterisation of phasehood: Gallego (2005).

    f.   PIC à la carte
       PIC applies to some phenomena, but not to others.
       Example: Marvin (2002) concludes that English primary stress is not liable to the PIC. Reason: class 1 affixes that attach outside of class 2 affixes (e.g. govern-ment$_2$-al$_1$, in violation of affix ordering) still shift stress. Stress, however, should be fixed by the PIC since the class 2-phase.
       Also Bošković (2007): Move, but not Agree, is subject to the PIC.
       ==> further study must show whether the pool of phenomena that are and the pool of phenomena that are not impacted by the PIC share any consistent property.
       Candidate generalisation: suprasegmental phenomena (stress, tone) may be (are?) PIC-violating.

    g.   Fox & Pesetsky (2005)
       - unification of phase theory and locality
       - try to derive cyclic movement from PF linearization.

    h.   doubts that phase theory is a good thing to have at all (too many problems, too much confusion, too many internal inconsistencies, too little conceptual motivation):
       Matushansky (2005), Boeckx & Grohmann (2007).

(17)  piece-driven phase
    is what is practised by the one-phonology approach (Kaye 1995 & Distributed Morphology)

    a.   rather than being a property of a given node, phasehood is a lexical property of pieces (morphemes).

    b.   a node is a phase head not per se, but only because the "phasehood feature" of the item that it dominates has been projected.

(18) I don't want to add to the ambient confusion, but
    a. given the blooming diversity of current approaches to phase, not many properties of Chomsky's initial proposal stand unchallenged.
       One of them is node-drive phase, i.e. the unspoken principle that phasehood is defined by the label of nodes.
    b. phonology-style piece-driven phase is at least a logical possibility, which may be worth considering also in syntax.
    c. of course I see the trouble: phasehood is supposed to make a statement about (the importance and autonomy of) syntactic structure, not about the lexical identity of pieces. Especially in a system where category is not a lexical property of roots.
    d. still, a system could be imagined where designated lexical items (e.g. little v/n/a) "inject" phasehood, which then is manipulated by syntactic computation and ends up under some node, which is crowned as a phase head.
    e. den Dikken's (2007) Phase Extension is akin to piece-driven phase:
        1. it proposes dynamic phasehood definition, i.e. where phasehood may be the result of syntactic computation (movement).
        2. phasehood is made a property of a piece (the head), which moves with this piece wherever the piece goes.
        3. phasehood of a node may be the result of the percolation of a property of the piece (the displaced head) that it dominates.

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