

PHASE IMPENETRABILITY VS. MULTIPLE COMPUTATIONAL SYSTEMS

- (1) purpose
 - a. there are two ways for morpho-syntax to talk to phonology
 - 1. procedurally; SPE: the cycle, later on Strict Cyclicity
 - 2. representationally; SPE: boundaries #, later on the Prosodic Hierarchytoday is only about the former.
[the talk presents a piece of Scheer (forth)]
 - b. show that Phase Impenetrability (PI) and Selective Rule Application (SRA) do the same job: they are competitors, hence no theory can have both.
 - c. argue that this is the most important line of division in phonological interface theories, but which is usually not made explicit.
 - d. elaborate a map of the theoretical landscape according to this fraction line.
 - e. provide arguments in disfavour of SRA
 - 1. if PI is needed elsewhere, there is no point in having an extra mechanism doing its job in the phonology.
 - 2. it is a misunderstanding to believe that anti-derivationalism in phonology entails anti-cyclicity.
 - f. ask some unpleasant questions regarding the embryotic state of PI and the non-coincidence of syntactic and phonological motivations.

1. Phase Impenetrability

- (2) the cycle
 - a. cyclic derivation
 - is the idea that linguistic structure is spelled out in morpho-syntactically defined chunks, starting from the lowest area (the innermost) and moving up (outwards).
 - Every chunk is sent off to (phonological and semantic) interpretation.
 - b. origin
 - Transformational Cycle: Chomsky et al. (1956:75), continued in SPE
 - Phonological cycle: Mascaró (1976)
 - Phase theory: Chomsky (2001 et passim)

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(3) Phase Impenetrability

- a. [trying to find a neutral formulation]
"no double computation"
a chunk that has already been interpreted (spelt out) comes back "frozen", grammar "forgets" about it, and will ignore it should it be sent off to interpretation again.
- b. this "don't touch" mechanism comes in various varieties, cf. the conclusion.
- c. origin
Strict Cycle Condition (SCC)
Chomsky's (1973) Strict Cyclicity, applied to phonology by Kean (1974) and Mascaró (1976).
Movement of the 70s trying to fight back overgeneration both in syntax and phonology (see Lexical Phonology below).
- d. motivation:
 - overgeneration in the 70
 - economy (working memory) in the 00s

2. Selective Rule Application

(4) classical representative: Lexical Phonology

- a. a different set of rules applies at different strata (levels).
- b. domain assignment: rules bear a diacritic that indicates at which level they apply: there are level 1 rules, level 2 rules.
- c. example
English stress assignment
-al = level 1 affix
-hood = level 2 affix
stress assignment: penultimate = level 1 rule
- d. derivation

		parent	parent-al	parent-hood
level 1	concatenation	parent	parent-al	parent
	stress assignment	párent	parént-al	párent
level 2	concatenation	—	—	párent-hood
- e. crucially, stress assignment must not apply at level 2.
- f. there are two different phonological engines: one that applies at level 1 and contains the stress rule, another one that applies at level 2 and lacks it.

(5) PI and SRA do the same job

- a. did stress assignment apply at level 2 as well, PI would be needed in order to prevent párent-hood from becoming parént-hood.
- b. hence SRA are concurrent mechanisms which make sure that phonological effects achieved on an earlier cycle are not undone later on.
- c. having both in the grammar would be redundant.
Hence one or the other must be wrong.

3. SRA and PI are in complementary distribution among theories

- (6) a tacit line of division that usually goes unmentioned
- | one phonological engine | two phonological engines |
|---------------------------|-----------------------------|
| 1. SPE | 1. Lexical Phonology |
| 2. Government Phonology | 2. Halle & Vergnaud (1987) |
| 3. Distributed Morphology | 3. (Prosodic Phonology) |
| | 4. Stratal OT, DOT |
| | 5. co-phonologies (OT) |
| | 6. indexed constraints (OT) |
- (7) SPE
- only one phonology, but no PI - who does the job, then?
 - a representational, instead of a procedural device:
 - level 2 affixes come with a #
 - the stress rule is blocked by #.
- (8) Government Phonology (Kaye 1995)
- spell-out is cyclic
 - there is only one phonology: the ϕ -function
 - plus PI (which Kaye calls robustness)
 - the content of the ϕ -function is non-serial
- (9) Halle & Vergnaud (1987)
- non-interactionist "version of Lexical Phonology".
 - Forerunner of Distributed Morphology: defender of the inverted T model, anti-interactionist.
 - non- and pre-OT incarnation of co-phonologies.
 - interactionism is the heart of Lexical Phonology
"first you do a little concatenation, then a little interpretation (phonology), then a little more concatenation, a little more interpretation etc."
 - this violates the basic architecture of generative grammar:
"all concatenation before all interpretation" = the inverted T model.
 - this is why Distributed Morphology has an issue with Lexical Phonology (Marantz 1997):
there is only
 - one place for concatenation of lexical pieces (LP: two, syntax and the Lexicon)
 - one place for the computation of meaning (LP: two, LF and the Lexicon)
 - one computational device (LP: two, one syntactic, the other morphological)
 - Halle & Vergnaud (1987) is the answer of generative orthodoxy to Lexical Phonology: look, we can do all that Lexical Phonology was made for, but with sticking to the inverted T model.
 - how it works:
 - there are affix classes ("cyclic" vs. "non-cyclic")
 - there are several pools of rules ("cyclic" vs. "non-cyclic")
 - cyclic affixes trigger the cyclic pool, non-cyclic affixes the non-cyclic pool
 - "triggers" means that the pool in question applies to the string at hand when spell-out comes across an affix.
 - hence there are still two different phonologies; the only difference is the way they are selected: through a diacritic on rules in LP, through a diacritic on affixes here.

(10) Prosodic Phonology

- a. is not really in business because it has got nothing to do with the procedural communication with phonology.
- b. its action is restricted to the representational communication with phonology.
- c. however, PP argues for a "peaceful coexistence" with Lexical Phonology. Allegedly, the phenomena treated by both interface theories are complementary: everybody treats his own phenomena.
But this is not true: they are in direct concurrence below the word level (the only area where LP is competent), see Selkirk (1984:412ss), Inkelas (1990).

4. OT is forced into SRA because of its anti-derivationalism

(11) regarding the interface (and otherwise), OT falls into two groups

- a. those versions which hold up the backbone of OT, i.e. strict parallelism, anti-derivationalism.
- b. those versions which admit serial derivations.
These are (more or less) direct descendants of Lexical Phonology.

(12) derivational OT: OTed versions of Lexical Phonology

- a. DOT
Derivational Optimality Theory, Rubach (1997,2000), Booij (1997)
- b. Stratal OT
Kiparsky (2000), Bermúdez-Otero & McMahon (2006), Bermúdez-Otero (forth)
- c. OTed versions of Lexical Phonology - how they work
 - like in LP, there are several strata (levels), each of which has its own grammar, i.e. constraint ranking in terms of OT.
 - like in LP, strata are serially ordered:
underlying forms run first through stratum 1: the output is then assessed again by stratum 2 and so forth.
 - following the basic OT architecture, there is only one universal constraint set, but there are several constraint rankings (= grammars) in one single language: between stratum 1 and 2, constraints are re-ranked.
- d. hence serial versions of OT are serial precisely because they implement several distinct phonological engines.
- e. benefits
 - no problem with opacity (just like with SPE-type ordered rules)
 - no problem with cyclicity (cf. anti-cyclicity below).

(13) anti-cyclicity

- a. cyclic derivation is regarded as a form of serialism that is incompatible with the parallel backbone of OT. Lexical strata must be done away with. E.g. Cole (1995).
- b. there is undesirable opacity, hence opacity-killers
there is undesirable cyclicity, hence cyclicity-killers
- c. it is not clear to me why cyclic derivation is regarded as a serial enemy *in the phonology*. Cyclicity is about chunk-submission to phonological interpretation, not about phonology itself.

Hence there is no problem having a non-serial phonology, but a serial interface (= cyclic derivation), plus PI. This is precisely the position of Government Phonology.

- d. except if serialism is regarded as undesirable not just in phonology, but in grammar as such.

There is indeed a natural (but tacit) tropism in OT to go down this road, cf. below. But this rapidly leads to outlandish scenarios which do not stand on common modular and generative grounds anymore (cf. below).

(14) co-phonologies

= waterproof mini-grammars

- a. work in the same way as DOT and Stratal OT, except that the two distinct phonological engines do not entertain a serial relationship: the output of one is not the input into the other.
- b. whether one or the other co-phonology computes a chunk depends on the lexical specification of affixes, which bear a diacritic.
==> affix-triggered selection of distinct phonological engines = Halle & Vergnaud
- c. co-phonologies do not "see" each other - they exist in waterproof parallel worlds. Phonology is a set of mutually incompatible subregularities, each of which forms a natural and consistent system.
- d. literature
Orgun (1996), Inkelas (1996,1998), Orgun & Inkelas (2002), Anttila (2002).

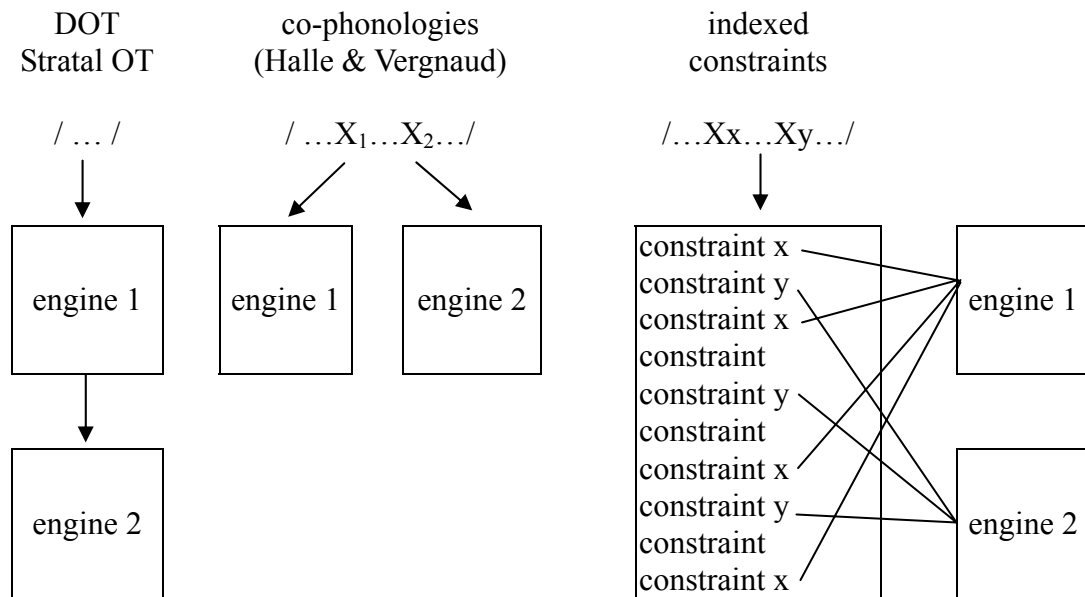
(15) indexed constraints

= mini-grammars, but in the same constraint hierarchy

- a. several mini-grammars, but in a single constraint hierarchy.
- b. constraints are duplicated, e.g. FAITH₁, FAITH₂, FAITH₃, and specific morphemes/ words are specified for being assessed only by index-1, index-2 etc. constraints.
- c. hence double diacritic marking:
 - 1. of morphemes/ words
 - 2. of constraints, cf. domain assignment in LP
- d. indexed constraints are interspersed with regular, non-indexed constraints.
- e. example: loanword adaptation with various degrees of nativization (native words, established loans, assimilated foreign words and unassimilated foreign words): as many indexes as degrees of nativization.
Itô & Mester (1995,1999).

5. The landscape

(16) variation of 2-engine approaches within OT



(17) where exactly is serialism in the interface?

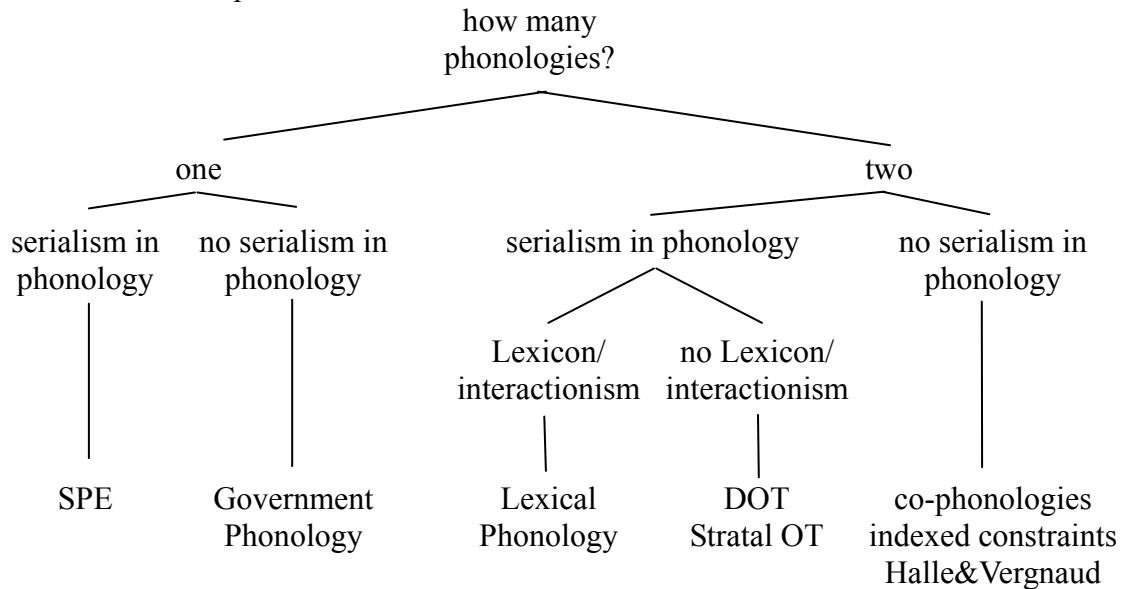
- a. in the morpho-syntax, not in the phonology
 1. Government Phonology: Kaye (1995)
 2. Halle & Vergnaud (1987)
 3. Distributed Morphology ?

In the morpho-syntax for sure, no explicit statement regarding phonology.

No ordered anything (rules, constraints etc.) in the phonology. Phonology is a unique function (the ϕ -function) that applies to whatever is submitted to her: cyclic derivation submits chunks of increasing size, with a memory for PI.

- b. both in the morpho-syntax and in the phonology
SPE: cyclic derivation and ordered rules.
- c. Lexical Phonology
 - in the Lexicon = the morphology
 - in the phonology
 - no statement regarding syntax (agnostic)
- d. DOT, Stratal Phonology
 - no stand regarding the Lexicon anymore
 - (probably) in the morpho-syntax
 - in the phonology, but not within either of the mini-grammars
- e. OT co-phonologies
OT indexed constraints
 - not in the phonology
 - against cyclic spell-out, hence probably not in morpho-syntax either, but no explicit statement regarding this.

(18) theoretical landscape



Distributed Morphology ?

6. Approaches that (are about to) leave generative/modular grounds

(19) tropism in OT: blurred modular contours

- a. the parallel stance of OT induces a natural drive towards scrambling of all sorts of linguistic information.
- b. by any standards, morphology (morpho-syntax) and phonology are different modules:
 - they do not share the same language (domain specificity): palatal vs. person, number etc.
 - the ontological distance between phonology and morphology/syntax/semantics no doubt is the largest among linguistic modules (except with pragmatics).
- c. phonological and morphological instructions are freely interleaved. It is not easy, sometimes impossible, to determine whether a given constraint is "phonological" or "morphological".
- d. a constraint hierarchy must be part of the same module. Hence the cohabitation of morphological and phonological constraints in the same hierarchy is a violation of modularity: if the module in question is supposed to be phonology, the morphological instructions will be uninterpretable, and vice-versa.
- e. the consistent violation of modularity is not a common topic of discourse in OT, and the consequences of abandoning modularity for the generative status of the theory are not usually reflected.

Yip (1998) and Kager (2000) for example make the blurred contours between phonology and morphology explicit, but do not consider the consequences for modularity. Kager (2000) actually argues that the violation of modularity is an achievement.

- f. "These results make it hard to identify a clear dividing line between morphology and phonology. What is more, they go much further to blur the distinction than does the interleaving of phonology and morphology found in lexical phonology. In lexical phonology, each component has its own character: the entities are different, and the rules are different. In Optimality Theory, this is not necessarily the case. Alignment is the most striking example. Alignment appears to play a role in pure morphology, in pure phonology, and at the interface." Yip (1998:219)

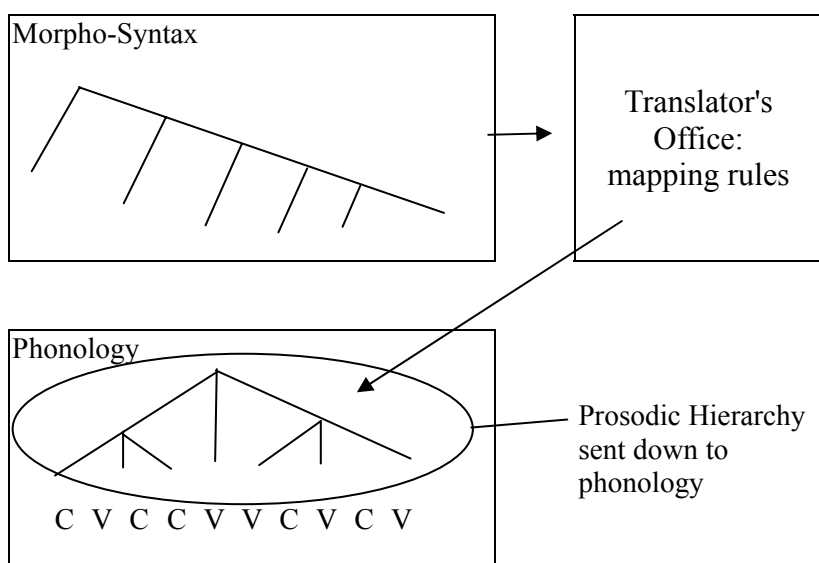
"Phonological and morphological constraints are ranked together in a single hierarchy. One might argue that parallelism is the counterpart of the 'interleaving' of morphological and phonological rules in the derivational model of Lexical Phonology. However, parallel Correspondence Theory predicts a broader kind of sensitivity of morphology to phonology than is possible under interleaving Lexical Phonology. While interleaving restricts phonological sensitivity of affixation to properties that are present in the stem 'before' the affixation, the parallel model allows for sensitivity to the full range of output properties of the base-plus-affix combination." Kager (2000:123)

- g. an extreme case is Russell (1999):
linguistics is made of one single constraint chamber, and modules do not exist.

"An OT grammar evaluates all sub-representations (e.g., phonology, syntax, semantics) in parallel. There is no serial derivation between modules such that, for example, syntax is the "input" to morphology or phonology." Russell (1999:5)

"Most work in OT seems to have implicitly adopted this assembly-line view of the overall architecture of language. While individual modules (specifically phonology and syntax) are argued to function non-derivationally, the relationship between modules is usually assumed to be linear and directional. Each module has an input and an optimal output - the inputs come from somewhere, and the outputs go somewhere for further processing. MOT rejects the assembly-line view of how sub-representations are related to each other. It takes seriously the claim that the job of a grammar is not to construct a representation to order (or even to choose a representation based on some input), but simply to look at a complete linguistic representation and judge whether it is a legal or illegal representation of the language." Russell (1999:6)

- (20) general architecture SPE-Prosodic Phonology
Nespor & Vogel (1986)



(21) Interface Constraints

- a. make direct reference to designated morphological categories, e.g. roots vs. affixes, nouns vs. verbs, heads vs. dependents etc.
- b. example from Anttila (2002:2)
description of a "language where accents shift to an unmarked position dictated by the markedness constraint M (accent-location), except in nouns where the accent remains faithful to its underlying position due to Fnoun(accent-location).
Fnoun(accent-location) >> M(accent-location) >> F(accent-location)
- c. e.g. Anttila (2002), Hammond (1995), McCarthy & Prince (1995), Urbanczyk (1996), Beckman (1998), Alderete (1999).
- d. this goes without even mentioning
 - the harsh violation of modularity
 - Indirect Reference, the major achievement of 80s interface theory and the backbone of Prosodic Phonology, which otherwise is endorsed.
 - the debate of the early 80s regarding precisely the direct reference to morpho-syntactic categories: Direct Syntax Approaches
e.g. Kaisse (1985), Odden (1987), The thematic issue of Phonology Yearbook 4 (1987) on Syntactic Conditions on phonological rules, edited by E. Kaisse and A. Zwicky.

(22) mapping in the phonology:

a generalized architectural misconception in OT

- a. all versions of OT (as far as I can see) endorse and implement the Prosodic Hierarchy.
- b. but mapping is OTed as well, i.e. it is done IN the phonology.
- c. mapping is done by two constraint families, Align and Wrap.
- d. these are interleaved with regular phonological constraints in the phonological module. They contract regular (and crucial) ranking relations with them.
- e. the whole point of mapping, however, is the fact that it has access to morpho-syntactic information. In Prosodic Phonology, it is therefore located outside the phonological module. Otherwise we are back to Direct Reference (cf. Interface Constraints).
- f. hence doing mapping in the phonology is violating Indirect Reference and modularity.
example: Align (PrWd, edge of morpheme)

7. Multiple phonologies are unwarranted

(23) argument 1

unpredicted poor distance of mini-grammars

Golston (1996)

different engines in principle allow for a single language to be co-defined by very distant and completely different phonologies: say, one stratum applying Turkish vowel harmony, while another showing an Arabic-like three vowel system. This, Golston argues, is not a situation that is ever found in natural language: the phonologies of different strata of a given language are always intimately akin; the range of variation found here is not even remotely comparable to what the cross-linguistic picture offers.

(24) argument 2

a misunderstanding in OT: anti-cyclicity does not follow from anti-derivationalism

- a. there is no problem of having both a non-derivational phonology and cyclic spell-out.
- b. unless anti-derivationalism concerns the entire grammar, rather than just phonology.
- c. in this case, however, we have left the grounds of generative grammar and modularity.
Rather, this looks like connexionism: all is in everything, no functional specialization.

(25) argument 3

distinct engines are suspect on modular grounds

- a. a module is a computational system: fast, automatic, mandatory etc.
- b. can there be two distinct computational systems that operate over the same domain (vocabulary)?
- c. what does it mean for a module to have various sub-modules?
- d. modules usually talk to each other through an interface.
The more so if they are ontologically close.
Distinct phonological computations are as close as modules can be: they operate over the same domain (vocabulary) in the course of the same derivation. But they are supposed to be water-proof, i.e. not to communicate at all.

(26) argument 4

diacritics are non-linguistic aliens

- a. all versions of SRA use diacritics.
- b. diacritics are to be eliminated from grammar: # etc.
- c. the alternative, Phase Theory and PI, does not need any diacritics.

(27) argument 5

if Phase Theory and PI are needed elsewhere, SRA has to go

- a. PI and SRA do the same job and no grammar can afford having both.
- b. PI and cyclic derivation is well supported outside of the phonology: they are a core piece of minimalism.
- c. there is very good evidence for PI outside the phonology: when semantic and phonological effects coincide
cómparable "roughly the same" = semantically and phonologically opaque
compáritable "able to be compared" = semantically and phonologically transparent

8. Conclusion

(28) Conclusion

- a. Phase Theory and Phase Impenetrability are needed independently of the phonology.
 1. Hence Selective Rule Application has to go.
 2. This operates a severe selection among current phonological theories.
 3. An example how general architectural considerations can bear on the domestic organization of a particular module.
- b. the drift of OT away from modular grounds should be a topic of discourse, rather than a tacit move. There is no way of being generative and non-modular.

(29) Outlook

Phase Impenetrability is still in an embryotic state

- a. as usual, syntacticians don't look at phonological evidence, and phonologists not at syntactic evidence, when building their versions of PI.
- b. the kind of motivation in both areas is rather different:
 - economy/ memory
 - actual phonological evidence: stratal phenomena
- c. the phase boundaries that are needed in the syntactic and the phonological perspective hardly ever coincide. This must be wrong: Phase Theory doesn't make sense if syntactic and phonological phases do not coincide.
- d. different versions of PI circulate: strong ("invisible"), weak ("you can't undo something that has been done on a previous cycle, but you can touch things that have not been modified before").
- e. asymmetric spell-out: heads remain uninterpreted (syntax)
Not really in phonology.
- f. predictability of Phases
 1. node-driven Phase definition: Chomsky (CP, vP), Marvin (2002) (plus vP, nP, aP).
 2. falls foul of the most trivial phonological derivations:
órigín - orígín-al - origin-ál-ity
no PI although aPs and nPs are crossed
 3. PI à la carte comes down to the abandon of the entire mechanism.
Marvin (2002:56ss) argues that English main stress is not subjected to PI. Hence PI applies only when it suits the analyst.
 4. morpheme (-class)-driven Phase definition:
Halle & Vergnaud's (1987) proposal.
Seems to be the only way to do stratal phenomena, which by definition are morpheme (-class) specific.

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