

Phonological traces of syntactic phases: PIC à la carte?

- (1) outline
 - a. there are no look-back effects = PIC-effects in phonology
 - b. but "spell out and forget" (or "spell out and trash") is not an option in phonology: too strong.
==> if the PIC is to be saved in phonology AND if its radical version is correct in syntax, we need a weaker formulation for phonology.
==> PIC à la carte, i.e. process-specific PIC, is an option.
 - c. consequence: different definitions of the PIC in syntax and phonology.
==> is this a viable scenario?
 - d. **the word-spell-out-mystery**
there are phonological effects of the cyclic spell-out of morphemes, but not of words (this is what the literature says, although only implicitly)
==> this is incompatible even with the most conservative assumptions on phasehood (Chomsky's CP, vP plus eventually DP): phases above the word level should leave phonological footprints in terms of PIC-effects.
==> divorce between the existence of a Phase and a phonological consequence thereof.
 - e. **phasehood**
does syntactic and phonological evidence for phasehood coincide? Obviously not: no evidence for any phases between the word and the CP (note that there is PIC-unrelated evidence for Phases).
==> could a syntactic phase head provoke a syntactic, but not a phonological Phase?
 - f. obviously not: this is a contradiction in terms:
there is only one Phase that mediates between syntax and PF.
==> PIC à la carte is an option: there is a Phase, but phonology does not react (no PIC-effect).
 - g. PIC à la carte is a very un-minimalistic thing
PIC is economy-driven (economy of active memory), and economy conditions are always obeyed.
==> well, phonology has PIC à la carte, not syntax. In syntax "spell-out and forget" may be in place. And according to the biolinguistic perspective PF is not really grammar: animals are supposed to be able to have it as well (Samuels 2009).

this talk is based on Scheer (forth),
pieces of which are Scheer (2008, 2009a,b, 2010)

1. Intermodular argumentation

- (2) 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 Impenetrability (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.
- (3) convergence
 - a. I would like to draw attention to the fact that the mechanisms which have been proposed on the morpho-syntactic side in order to manage the procedural communication with phonology, and their phonological equivalents are actually converging to a large extent – but this is not really perceived because they run under different labels.
 - b. there is no alternative anyway if there is any cyclic communication between morpho-syntactic structure and phonological interpretation at all:
==> the spell-out mechanism must be the same on both sides: the pieces that travel are the same.
 - c. convergence is a criterion for selecting among competing solutions in phonology.

2. "Spell-out and forget" is too strong for phonology

- (4) external sandhi (cross-word phonology)
 - a. the word level is a typical no look-back boundary (= Phase boundary) for phonological phenomena.
["word" indicates the size of the chunk concerned, it does not imply any take on what a word is]
 - b. but external sandhi phenomena regularly
 - 1. modify word-internal properties
 - 2. take into account conditioning items in other wordseven when there is evidence that the word boundary in this particular language and for this particular phenomenon is a no look-back barrier.

- (5) pattern 1
PIC violation concerning a property that did not serve to establish the phase boundary
English: stress assignment is strictly limited to the word, but there is a lot of (external) sandhi.
- a. word stress assignment
párent - parént-al, but in [paréntal tasks] stress is not reassigned: *parentál tasks
 - b. t-flapping
[Kahn (1976) etc.]
According to Nespor & Vogel (1986), flapping applies in whatever syntactic environment provided the /t/ is word-final and intervocalic.
 - 1. word-internal /t/
[r] city, atom
 - 2. word-final /t/ across word boundaries
[r] at issue
a white owl
invite Olivia
at eleven
just the other night a racoon was spotted in our neighbourhood
- (6) pattern 2
PIC violation concerning the property that served to establish the phase boundary.
English: word stress vs. stress clash
- a. stress clash (or Rhythm Rule, Liberman & Prince 1977)
thirtéen vs. thírteen mén
 - b. hence word stress assignment is modified by post-word computation. But we know that word stress is bound by the word.
- (7) pattern 3
no PIC violation, but material from previous phases is taken into account
English: t-flapping occurs only if the following word is V-initial. We know from word stress, however, that the (following) word is a phase by its own.

3. Solutions

- (8) solution I
weaken the PIC: **don't undo!**
- a. previously interpreted strings are not frozen or forgotten altogether; only phonological properties that are due to previous phonological computation are frozen, i.e. cannot be undone.
 - b. pattern 1+3 ok
further stress shift after the word level is blocked because stress was assigned by previous computation. Flapping across word boundaries can go into effect because the /-t/ was not modified by previous computation.
 - c. pattern 2: trouble
word stress was acquired by previous computation, but is further modified by external sandhi.

- d. along these lines are
 - 1. Structure Preservation (concerning syllable structure)
"old" syllable structure that was built on a previous cycle cannot be erased or modified by computation on later cycles.
Steriade (1982:84ff, 1984, 1988:205, Greek and Latin), Oostendorp (1994, Dutch) and Harris (1993, Spanish).
 - 2. distinction between structure-building and structure-changing processes that was introduced in the 80s in order to rescue The Strict Cycle Condition (SCC, rules apply only to derived environments), cf. Kiparsky (1982a:46ff, 1982b:160ff).
 - 3. Free Element Condition (FEC) (concerning stress)
a foot that was acquired on a word-internal cycle cannot be erased (or refooted) when the word is computed together with an enclitic. But new foot structure can be erected across words (and enclitics) on unfooted ("fresh") lexical material.
Prince (1985), Steriade (1988:286)
 - 4. Kaye (1992, 1995)
"don't undo!" is a general property of phases.
- (9) solution II
process-specific PIC
 - a. the word level seems to be an insuperable barrier for some processes, but not for others.
It is specified for each process whether its application is subject to the PIC or not.
==> Stress assignment is, flapping is not.
 - b. pattern 1+3 ok
pattern 2 ok: word stress assignment is not the same process (rule) as stress clash.
 - c. tacitly practised in the 80s:
 - structure Preservation concerns only syllable structure
 - the Free Element Condition only concerns stress
 - d. Poser (1986, 1989) on stress, but no ambition to generalize.
 - e. process-specific PIC has also been proposed in syntax (Bošković 2007), and is implied by Marvin's (2002) analysis of English stress (Distributed Morphology).
 - f. consequences
 - 1. determining the phase structure of a language is necessary, but does not tell you much about the phonological consequences of phases since
 - 2. Phase Impenetrability (in phonology) is not an automatic consequence of a phase.
- (10) solution III
the PIC is phase-specific
 - a. Mohanan & Mohanan (1984) and Halle & Mohanan (1985:95ff) argue for the stratum-specificity of the SCC: in English, stratum 1 is, but stratum 2 is not cyclic (= does/does not respect the SCC).
 - b. supposes a specific architecture (a version of Lexical Phonology) and a particular distribution of processes over strata (= Phases).
- (11) summary thus far
"Don't undo" appears to be in trouble with pattern 2.
Process-specific PIC fares well empirically speaking.

4. Lexical Phonology can do it, but does it without the PIC

- (12) process-specificity is in-built
- a. Lexical Phonology is based on the existence of a number of distinct computational systems:
 1. in the Lexicon (i.e. where words are constructed):
 - level (stratum) 1
 - level (stratum) 2these computational systems are **morpheme-specific**: in English, class 1 affixes are computed by level 1 phonology, class 2 affixes by level 2 phonology.
 2. postlexical (after syntax, i.e. when the sentence is fully concatenated):
this computational system is **chunk-specific**: chunk sizes at and below the word size are computed by lexical, above word size by postlexical phonology.
 - b. rules (processes) are then simply assigned to a specific computational system:
 - t-flapping is present in the Lexicon and in post-lexical phonology
 - stress clash is present in post-lexical phonology, but not in the Lexicon
 - word stress assignment is present in the Lexicon, but not postlexically
 - c. as we will see below, at no point is there any PIC-effect in the analysis of Lexical Phonology.
==> this will be the basis for an intermodular argument.

5. Why Lexical Phonology must be wrong in a Phase-based architecture: morpheme-specific mini-grammars are out of business

- (13) inside-out interpretation
- a. introduced by Chomsky et al. (1956:75).
Known as the Transformational Cycle, the Phonological Cycle, cyclic spell-out, cyclic interpretation.
 - b. is shared by all generative theories of phonological interpretation.
[except a body of anti-cyclicity literature in OT, e.g. Kager 1999:277]
- (14) spell-out in SPE
- a. all morphemes are cycles
[except for two successive items of the same major category (A,N,V):
theatricality is [[[theatr]_N ic + al]_A i + ty]_N (Chomsky & Halle 1968:88f)]
 - b. all cycles are interpreted (by so-called cyclic rules)
 - c. [[[A] B] C]
cycle 1: interpretation of A
cycle 2: interpretation of AB
cycle 3: interpretation of ABC

Lexical Phonology

- (15) all cycles are interpreted – but not by the same computational system
- a. English affix classes
e.g. Kaisse & Shaw (1985), Giegerich (1999), McMahon (2000)
 - b. example: stress assignment
párent, parént-al vs. párent-hood

(16) *párent* - *parént-al* vs. *párent-hood* in Lexical Phonology

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

(17) stratal architecture

- a. the lexicon contains underived roots
- b. class 1 affixes are concatenated at stratum 1 (level 1)
- c. class 2 affixes join in at stratum 2 (level 2)
- d. after the concatenation is complete at each stratum, a stratum-specific phonology applies to the string as it stands.
- e. rules are assigned to specific strata: in our example, the stress-assigning rule is a level 1 rule, which means that it is active at level 1, but absent from level 2.
- f. the derivation is strictly serial: given the order lexicon → level 1 → level 2, strings that are present at some level must run through all subsequent levels on their way to the surface. This means that they experience the computation that these levels.
- g. there are two distinct and morpheme-specific computational systems:
 - level 1 phonology
 - level 2 phonology
 ==> underapplication (here at level 2) is achieved by the contrast of these two systems.

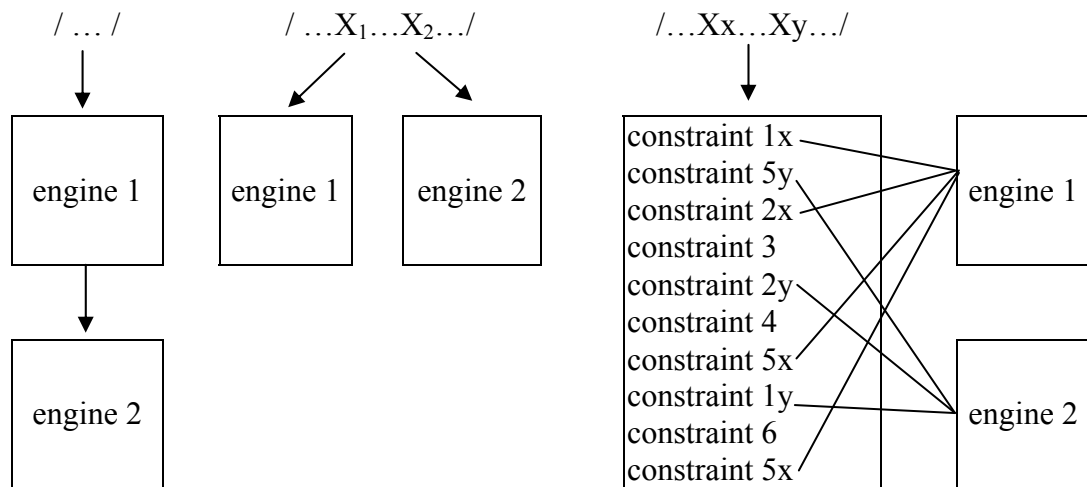
Modern versions of morpheme-specific multiple mini-phonologies

(18) OT-based implementations

- a. serial versions: continuation of the stratal architecture
 - Stratal OT (Kiparsky 2000, Bermúdez-Otero forth)
 - DOT (Rubach 1997 et passim)
- b. parallel versions:
 - co-phonologies (e.g. Itô & Mester 1995, Inkelas 1998, Anttila 2002)
 - indexed constraints. Prince & Smolensky (1993), Itô & Mester (1999), Pater (2000, forth).
- c. all cycles are interpreted by some phonological computational system.
 - ==> no selective spell-out

(19) morpheme-specific phonologies: different implementations in OT

- a. serial DOT, Stratal OT b. parallel co-phonologies indexed constraints



Halle & Vergnaud (1987)

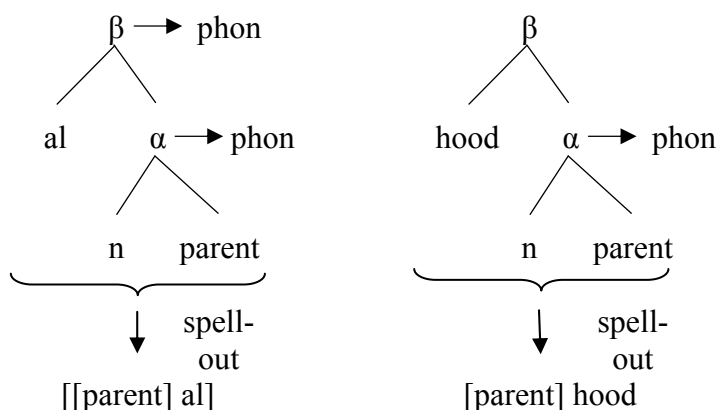
(20) Selective Spell-out

- there is only one computational system.
- only some nodes of the morpho-syntactic tree trigger spell-out
- whether or not a node dominates an interpretational unit is decided by its head: affixes are lexically specified as interpretation-triggering (cyclic affixes in Halle & Vergnaud's terms) or interpretation-neutral (non-cyclic). This property is then inherited by the node that they project, and the spell-out mechanism does or does not send off nodes to PF/LF according to this property.

(21) Halle & Vergnaud (1987): analysis of affix class-based stress

- class 1 (-al): interpretation-triggering
class 2 (-hood): interpretation-neutral

- a. parent-al b. parent-hood



- (22) analysis of level 1 rules (rule-blocking pattern)
- all roots are interpretational units by themselves
 - class 1 (-al), rather than class 2 (-hood) affixes, are interpretation-triggering
 - input to phonology:
 [[parent] al] - the stress rule reapplies to the whole word: regular penultimate stress
 [parent] hood - the stress rule applies only to the root
 - underapplication is achieved by selective spell-out: class 2 affixes do not trigger interpretation, which prevents the stress rule from reapplying.

Kaye (1995)

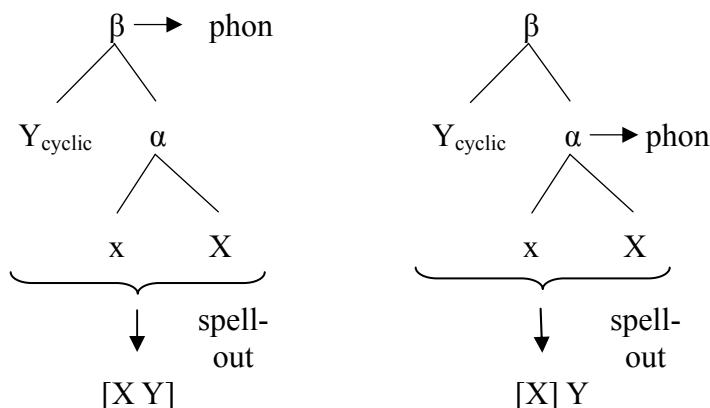
- (23) Selective Spell-out, but with different secondary choices
- Kaye (1992,1995) adopts selective spell-out
 - like Halle & Vergnaud, Kaye rejects morpheme-specific phonologies

- (24) differences between Halle & Vergnaud (1987) and Kaye (1995)

	Halle & Vergnaud	Kaye
a. the root is an interpretational unit	yes	no
b. the word is an interpretational unit	no	yes
c. interpretation-triggering affixes trigger the spell-out of	their own node	their sister
d. type of English affix-classes that triggers interpretation	class 1	class 2
e. underapplication is achieved by	cycles	cycles and no look-back

- (25) interpretation-triggering affixes: what exactly is spelled out

- a. Halle & Vergnaud (1987): cyclic affixes trigger the spell-out of their own constituent β
- b. Kaye (1995): cyclic affixes trigger the spell-out of their sister α



- (26) given that

X = interpretation-neutral affix Y = interpretation-triggering affix

	Halle & Vergnaud	Kaye	
a. root-X	[root] X	[root X]	different
b. root-Y	[[root] Y]	[[root] Y]	identical

- (27) analysis of level 1 rules (rule-blocking pattern)
- line of attack: the observation that morpho-syntactic boundaries may or may not be visible for phonological processes.
 - [parent al] boundary invisible
[[parent] hood] boundary visible
 - [parent al]
penultimate stress assigned on the only cycle
 - [[parent] hood]
inner cycle: penultimate stress assigned
outer cycle: no reapplication of the stress rule because of "freezing" no look-back.
 - "freezing" no look-back
strings which have already been subject to interpretation cannot be modified by further computation on later cycles.
 - ==> underapplication is achieved by freezing no look-back.

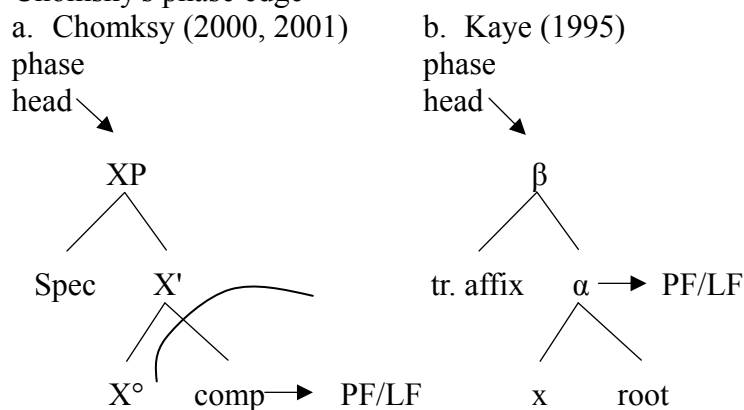
Summary

- (28) morpheme-specific mini-phonologies vs. selective spell-out
- empirical coverage: to be looked at.
 - intermodular argumentation I
derivation by Phase is based on selective spell-out
[Uriagereka 1999, Chomsky 2000, 2001 etc.]
==> if derivation by phase, i.e. minimalist syntax, is on the right track, selective spell-out must be correct (and morpheme-specific mini-grammars wrong).
[on spell-out-as-you-merge (Epstein et al. 1998) see below]
 - two different candidates that practise selective spell-out:
 - Halle & Vergnaud (1987)
 - Kaye (1995)

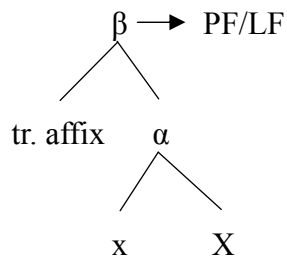
The phase edge: spell out your sister!

- (29) the phase edge in syntax
current phase theory holds that in case XP is a phase head, the spell-out of 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).

- (30) Kaye's version of interpretation-triggering affixes and Chomsky's phase edge



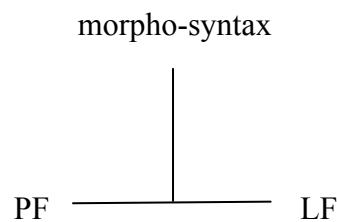
- (31) compare with Halle & Vergnaud:
spell-out the node that you project



- (32) intermodular argumentation II
- both Halle & Vergnaud and Kaye practise selective spell-out, but only the latter spells out like syntactic spell-out: the sister of the phase head.
 - of course we are talking about the same spell-out: it cannot be like this on the syntactic, but like that on the phonological side.
==> only Kaye passes both syntactic filters.

6. Interlude: interactionism

- (33) the generative architecture of grammar:
the inverted T model



- (34) the inverted T
- introduced by Chomsky (1965:15ff)
 - modular
 - syntactico-centric:
 - one concatenative unit (where pieces are glued together): morpho-syntax
 - two interpretative modules (where ready-glued strings are interpreted)

- (35) SPE: phonology interprets a bracketed string
- a. a proviso assorted to the inverted T in SPE
all concatenation before all interpretation
 - b. consequence: inside-out interpretation does not take place "online", but in two steps:
 1. the spell-out mechanism transforms morpho-syntactic structure into a linear string all the way down (or up) the tree: the entire sentence is transformed before anything is shipped to phonology.
 2. phonology receives a full sentence in form of a bracketed string:
theatricality is [[[theatr]_N ic + al]_A i + ty]_N
Brackets have two functions:
 1. they are the buffer for cyclic structure: inside-out information is restored
 2. they are labelled and hence give direct access to morpho-synt. information
 - c. brackets violate modularity, in both of their functions:
 - phonology cannot parse diacritic indicators of the derivational history
 - phonology does not know what a noun etc. is.
 - d. but nobody cared until Lexical Phonology came up with a solution to this problem – which provoked a reaction in defence of the modularity-violating "all concatenation before all interpretation".
- (36) Lexical Phonology
[Pesetsky 1979, Kiparsky 1982 etc.]
- a. accepts the inverted T
 - b. but dispenses with the proviso
"all concatenation before all interpretation"
 - c. proposes an **interactionist** architecture where concatenation and interpretation are interspersed:
 1. take a root: A
 2. interpret the root: $\varphi(A)$
 3. concatenate an affix: A+B
 4. interpret the result: $\varphi(AB)$
 5. concatenate another affix: AB+C
 6. interpret the result: $\varphi(ABC)$and so on
- (37) Halle & Vergnaud (1987)
- a. are anti-interactionist: the reaction of generative orthodoxy on Lexical Phonology
 - b. propose a non-interactionist version of Lexical Phonology
 - c. in order to restore the proviso
"all concatenation before all interpretation"
- (38) interactionism reconciles inside-out interpretation and modularity
- a. interactionism does away with brackets
 - b. it is the only way to make inside-out interpretation compatible with modularity
 - c. surprisingly enough, this has played no role at all in the late-80s discussion around (anti-)interactionism. Modularity was never used as an argument by the defenders of interactionism.

- (39) when generative linguistics became interactionist
- a. Uriagareka (1999) paved the way
 - b. the spine of Chomsky's (2000 et passim) derivation by phase is interactionism.
 - c. but the syntactic literature does not mention the phonological model.
 - d. modular argumentation III
all in all, that's good news:
 1. views on how procedural communication between morpho-syntax and phonology works converge. Grammar is interactionist.
 2. inside-out interpretation is made compatible with modularity.

7. The word-spell-out-mystery

- (40) there are no phonological traces of the cyclic spell-out of words
- a. this is the picture that the literature draws, but only implicitly: the generalisation as such is never made explicit as far as I can see.
 - b. diagnostic I
all external sandhi (i.e. phonology that applies across word boundaries) is exclusively handled by representational means: the Prosodic Hierarchy.

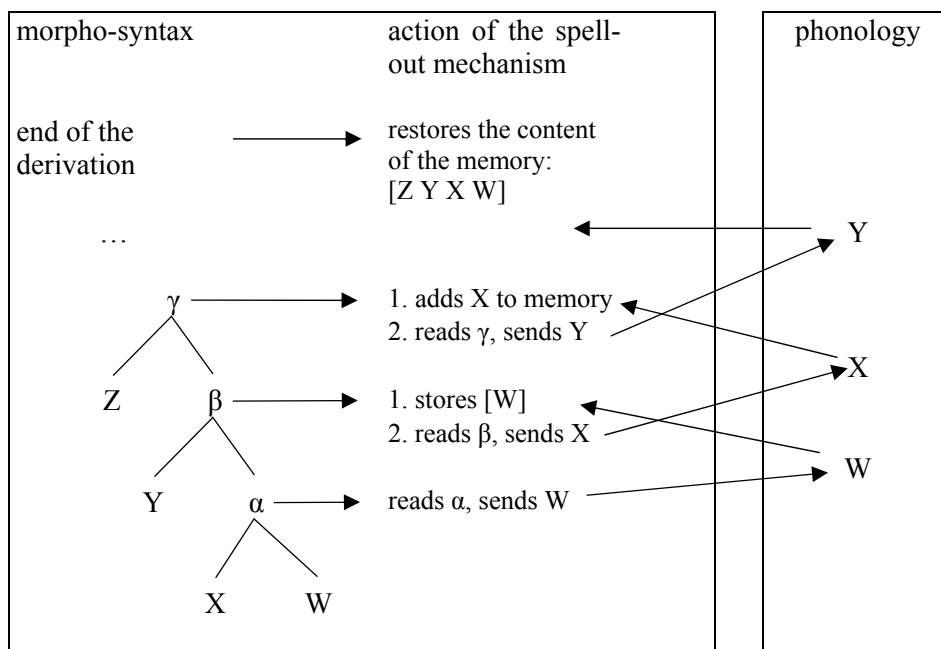
The exclusive ambition of representational management at and above the word level is rarely made explicit, though. The only cases that I am aware of are Selkirk (1984) and Inkelas (1990). These authors observe that while prosodic constituency can cover the full spectrum of units (morphemes and words alike), Lexical Phonology is confined to the Lexicon, i.e. to morphemes. Since there is no place for two devices (procedural and representational) that do the same job below the word level, Inkelas (1990) argues, prosodic constituency should be extended to the Lexicon. Lexical Phonology, then, is an empty shell at best.

- c. diagnostic II
the absence of cyclicity-induced external sandhi is in-built in the architecture of Lexical Phonology:
 - lexical phonology is cyclic
 - post-lexical phonology (i.e. after syntax has applied) is non-cyclic \Rightarrow Praguian segregation: two distinct computational system for the interpretation of morpheme- and word-sequences.
- (41) if the word-spell-out-mystery is real...
- a. it is a mystery indeed:
 1. phonology is exposed to piecemeal fire of morphemes as much as of words
 2. but it reacts only on the chunkwise submission of morphemes
 3. we expect that piecemeal fire always leaves some traces in the receiving module
 - b. the obvious solution is to
 1. make morphology and syntax distinct systems
 2. make the spell-out of morphemes, but not of words, interactionist \Rightarrow this is Lexical Phonology: cyclic lexical vs. non-cyclic post-lexical phonology
 - c. if derivation by phase is on the right track, b2) must be wrong: the spell-out of words *is* interactionist.

(42) alternative implementation:

- a. what is the PIC a property of?
- b. of the interpretational computational system? I.e. of phonology?
Rather implausible: modular computation cannot make the difference between "old" and "new" pieces.
- c. alternative: of the spell-out mechanism
the spell-out mechanism "decides" whether an interpretational computation is subjected to no look-back or not.
- d. result:
 - just one phonological computational system
 - just one spell-out mechanism
 - a "decision" to impose the PIC for a given chunk-size, but not for another.
- e. the PIC supposes the existence of a "memory keeper" anyway – phonology is out of business for this task.

(43) no look-back managed by the spell-out mechanism



8. Phonological footprints of syntactic phases: no good match

(44) chunks that are relevant phonological domains

phonological domain = phase

the classical units of the Prosodic hierarchy

- a. below the word: variable (morpheme classes, cf. above)
- b. Prosodic Word: about word size
- c. Prosodic Phrase: about an X" (DP, VP, AP)
- d. Intonational Phrase: no specific syntactic correlate, often a CP
- e. Utterance

(45) evidence for the utterance

Belarusian: i-prothesis before CVC roots that occur in zero grade

	context	example	gloss
a.	## __CVC	lev	lion NOMsg
	## __CøC-V	i-lva	lion GENsg
b.	...C # __CøC-V	brat i-lv-a	the brother of the lion
c.	...V # __CøC-V	śastra lv-a	the sister of the lion
d.	...C # __CVC	tam jośc lev	there is a lion
e.	...V # __CVC	malady lev	young lion

(46) i-prothesis occurs

- after C-final words no matter what the syntactic boundary
- utterance-initially
- when the word is quoted in isolation

(47) how do phonological footprints of phases correlate with morpho-syntactic phase structure?

- Chomsky's (2000) original take on phasehood identifies CP and vP, maybe DP (Chomsky 2005:17f), as phase heads.
- Since then there is a constant trend to grant phasehood to smaller and smaller chunks (den Dikken 2007:33 provides an overview): the DP track is followed, and also DP-internal phases are argued for (Matushansky 2005). TP is also under debate: while Chomsky (e.g. 2000:106, 2004:124) is explicit on the fact that TP does not qualify as a phase head (because it is not propositional), den Dikken (2007) points out that according to Chomsky's own criteria, this conclusion is far from being obvious. TP is indeed assumed to act as a phase head in a growing body of literature, and nodes below TP such as Voice⁰ (Baltin 2007, Aelbrecht 2008) and AspP (Hinterhölzl 2006) are also granted phasehood.

- spell-out-as-you-merge: every node is a phase head

==> **return to Lexical Phonology, against selective spell-out**

The vanishing point of the atomization of phasehood is a situation where all nodes trigger interpretation; or, in other words, where interpretation occurs upon every application of Merge. This radical position – Spell-out-as-you-Merge – is defended by Samuel Epstein and colleagues: Epstein et al. (1998), Epstein & Seely (2002, 2006).

- argument against spell-out-as-you-merge

[i.e. in favour of selective spell-out]

If all XPs are subject to Phase Impenetrability, "no extraction would be possible, as the complement of any phase would have to move to the edge of that phrase/phase, a movement step that would count as too local under any version of 'anti-locality'" (Boeckx & Grohmann 2007:212).

That is, anti-locality (Grohmann 2003) marshals the atomisation of phasehood. In the evolution that makes smaller and smaller chunks of the tree phase heads, there is a level where the phase edge will not be able to act as an escape-hatch anymore for material that is trapped in the complement: anti-locality will prevent it from escaping.

- The field is in steady movement, but even on the most conservative count, i.e. Chomsky's initial vP and CP, there is a "syntactic" phase between the word and the utterance: vP. Less conservative perspectives place many more phase boundaries in this area, **none of which seems to leave phonological traces.**

- f. It is hard to believe that this is due to insufficient analysis, or to the lack of cross-linguistic study of phonological traces of phase boundaries. That is, it is hard to imagine a language where word-initial consonants are strong, and first vowels of the word stable, but only in words that happen to be vP-initial (or TP-initial etc.). Also, we have seen a language, Belarusian, where there is definitely no phonological trace of the spell-out of chunk sizes that range between the word and the utterance: (at least) vP will be a phase in Belarusian as well, but its spell-out does not leave any phonological trace.

(48) bumpy match between syntactic and phonological evidence for phases

phases (syntactic evidence)	phases (phonological evidence)	
CP	utterance	good match
vP	–	no phonological trace
TP	–	no phonological trace
DP	–	no phonological trace
...	–	no phonological trace
–	word	no syntactic trace

9. Conclusion

- (49) PIC à la carte x2
- (morpho-)syntax defines the phase skeleton
 - a phase may or may not be armed to leave a phonological trace:
certain phases never leave a phonological trace (anything between the word and CP)
 - if a phase is "allowed" to leave a phonological trace, every process decides whether it is sensitive to this phase, i.e. whether a PIC-effect is produced.
 - who decides whether a phase is phonologically armed for a given process?
- certainly not morpho-syntax
- certainly not phonology
==> the spell-out mechanism
==> hard-wired settings (parameters)

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