

Barriers and Phases: Forward to the Past?

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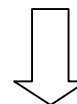
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- * We agree with the general vision and virtually all the arguments made by Chomsky over the years regarding the Minimalist Program; since this conference focuses on *tools*, i.e. technical issues, we would like to point out *technical* problems with a specific tool [phases], which in many ways is a recycled tool [barriers].
- * Furthermore, we think that Chomsky's general (conceptual) argument for phases [i.e. computational load reduction] may well be right; we hope that the following will help to cash out this intuition in a technically improved fashion.



Outline: I. phases
II. barriers
III. problems

NB: Starke (2001), Boeckx (2003), and Grohmann (2003), for example, suggest some technical modifications to the phase-based approach to the computational system of human language (C_{HL}) which we can't further discuss here.

[conventions: Chomsky (1998/2000): *MI* — Chomsky (1999/2001): *DbP* — Chomsky (2001/to appear): *BEA*]

I. Phases (From *MI* to *BEA*)

- syntactic derivations proceed in incremental chunks (= phases) with separate lexical arrays [see also Epstein et al. (1998), Uriagereka (1999b); for earlier antecedents, Bresnan (1971), Jackendoff (1972)]
- \bar{X} -complete v and C are (strong) phase heads — T, V, N aren't; unclear whether A, D, P are [see also Abels (2003), Svenonius (2004)]

(1) *Phase Impenetrability Condition* (PIC; annotated version of *BEA*, originally from *DbP*)

Once a phase has been completed and sent to the interfaces, the internal domain of a phase [i.e. the complement of the phase head] is not accessible to operations at/above the next higher phase. Only the edge of the phase [the head plus any number of specifiers] remains accessible at the next higher phase.

- escape hatch via 'indirect feature driven movement'

[“P(eripheral)-feature” in *MI*, “EPP” (feature/property) in *DbP, BEA*; henceforth, “generalized EPP”]

II. Barriers and Phases

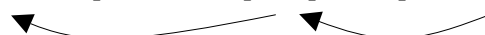
❶ *Intermediate touchdown viz. successive-cyclic movement*

- if barrier/phase between extraction site and landing site, need for intermediate touchdown

(2) a. [CP **who**_i did-C [IP John_k I [vP **t**_i [VP t_k [VP kiss **t**_i]]]]] (Chomsky 1986: 29)



b. [CP **who**_i did-C [TP John_k T [vP **t**_i [vP t_k v [VP kiss **t**_i]]]]] (à la *MI-DbP-BEA*)



(3) a. [CP **how**_i did-C [IP John_k I [vP [VP t_k [VP kiss Mary]]] **t**_i]]] (Chomsky 1986: 19)



b. [CP **how**_i did-C [TP John_k T [vP [vP t_k v [VP kiss Mary]]] **t**_i]]] (à la *MI-DbP-BEA*)



[all lower copies/traces represented as *t*; VP-internal subject indicated in *Barriers*-representations; IP = TP]

❷ *Circumventing locality violation by adjunction to the edge*

- possibility of circumventing a locality violation by adjoining to a barrier-projection (*Barriers*) — or moving to an additional specifier slot of the phase-inducing head (*MI-DbP-BEA*) / (2a-b)
 - this additional adjunction/specifier extends the syntactic life of a moving element

Justification of this additional position (Chomsky 1986: 6-7):

- (i) by redefining adjunction based on scope and *wh*/quantifier-interactions (May 1985)
- (ii) by further appealing to arguments from quantifier raising (Koopman & Sportiche 1982)

⇒ Nothing stands in the way of keeping to this line of argument and defining the “edge” of a phase-head as special — in both approaches an element can be both inside and outside a given projection (relevant for barrier or phase).

[Note incidentally that both types of arguments have been extensively criticized and rejected on empirical grounds — see e.g. Lightfoot & Weinberg (1988) and van de Koot (1989) for problematic data and discussion.]

❸ *Choice of barriers and phases*

- the relevant natural barriers/phase heads are argued to be CP/C and VP/v
 - IP is defined as a “defective” projection (Chomsky 1986: 15):
 - it is not in inherent barrier and can only become one by inheritance
 - same in phase-based approach: T is not a phase-inducing head (= defective)

In both approaches, something additional has to be said; in both cases, IP/TP is special.

⇒ Note that current strands basically reinstate barriers by inheritance: Bobaljik & Wurmbrand (2003) make the case for an additional phase beyond the inherent phase heads C and *v*: the complement of a lexical verb is an “induced phase” (virtually the equivalent of a barrier by inheritance).

[in this sense: phase = bounding node (intrinsic barrier), relativized phase = barrier (by inheritance)]

④ *Two types of locality conditions*

- regarding locality, Chomsky (1986)/the *Barriers*-framework assumed two types:
 - *barriers* (boiling down to subjacency; ideally, no crossing of bounding node or barrier)
 - *minimality* (a closer governor takes preference over a potential governor further away)

The latter condition was then relativized by Rizzi (1990), and relativized minimality (RM) has enjoyed tremendous acceptance all the way to the current minimalist approach(es).

- in fact, up to *MI*, this was the only valid or relevant condition on locality

[cf. Shortest Move of Chomsky (1993), Minimal Link Condition and Attract Closest of Chomsky (1995)]

The distinction between feature movement (FM) and category movement (CM), however, has subsequently also been explored in terms of more than one locality condition.

- e.g. Ochi (1999) develops a constraint on FM (close to Agree of *MI*) in terms of RM, but CM (traditional Move) in terms of “shortest” (quite independently of phases)

On the other hand, the first locality condition, barriers, which was absent in minimalism in the “classical period” (Chomsky 1993, 1995), was reintroduced in *MI* in terms of phases.

⇒ The two-part locality of *Barriers* was reduced quite successfully to a single condition (namely to some form of RM; see especially Boeckx 2003, Starke 2001, Boeckx & Jeong 2003) — and then it was fattened again by reintroducing barriers in terms of phases (*MI*, *DbP*, *BEA* and related work).

Question:

Can locality in grammar, whether defined through one or two conditions, be reduced to bare output/interface conditions (or other virtual-conceptual-necessity-style arguments)?

⑤ *Complete Functional Complex*

- consider the induction of the notion “Complete Functional Complex” (Chomsky 1986: 15), the part of the derivation in which “all functional roles [are] satisfied.”
 - served the purpose to distinguish CP (the highest clausal projection) and NP (the highest nominal projection) from all other projections

⇒ Again, this intuition has recently been recast in phasal terms in which a phase is a domain in which all features have been checked (Felser 2004, Svenonius 2004). This also goes hand in hand with the characterization in *MI (DbP, BEA)* that *vP* is the domain where all theta-roles are assigned.

⑥ *Enriching the inventory of barriers/phases*

- both *Barriers* and phase-based approaches potentially allow additional barriers/phases
 - having established NP as a barrier already (i.e. beyond VP and CP), Chomsky (1986: 80) tentatively opens the door for other potential barriers, such as AP

⇒ Incidentally, while painting a “simple” picture in which *v* and C are the only (strong) phase-inducing heads, Chomsky (*DbP, BEA*) alludes to the possibility that other heads may be phasal as well, such as D or P.

[NB: in both *Barriers* and phases, Chomsky restricts his attention to clausal properties]

⑦ *Vacuous Movement Hypothesis (VMH)*

- *Barriers* and phase-based approaches adopt Vacuous Movement Hypothesis (George 1980)
 - VMH is another ingredient that “plays a much more central role in the *Barriers* theory than chapter 9 of Chomsky’s monograph leads one to expect” (van de Koot 1989: 41)

This is a rather untenable hypothesis about subjects not undergoing short *wh*-movement.

- criticized by van de Koot (1989) and references cited in Lightfoot & Weinberg (1988), and more recently David Pesetsky (1999 MIT class lectures, as cited in Boeckx 2003)

Pesetsky argues against the tenability of VMH on the basis of “aggressively non-D-linked” *wh*-phrases (see Pesetsky 1987, den Dikken & Giannakidou 2001) — the fact that expressions like *what the hell* cannot remain in situ. If they must move to SpecCP for licensing relations different from regular *wh*-expressions, how could a subject like *who the hell* ever stay in situ?

- VMH has also resurfaced in recent work, by e.g. Agbayani (2000) and also Ishii (1999), who ties in apparent evidence in favour of the VMH to phases

⑧ *EPP as a wild card*

- unmotivated motivation for movement: “generalized EPP”
 - Abels (2003: 38) nicely shows that phase-EPP is same kind of stipulation as barrier-adjunction (see also Lightfoot & Weinberg 1988 on similar criticism of *Barriers*)

⑨ *The roots of the PIC*

(4) *Head Constraint* (van Riemsdijk 1978: 169)

No rule may involve X_i (X_j) and Y in the structure ... X_i ... [\square ... Y ...] ... X_j ... if Y is c-commanded by the head of \square ; \square ranges over V'' , N'' , A'' , P'' .

(5) *Phase Impenetrability Condition* (*MI*: 22, ex. (21); *DbP*: 10, ex. (7))

In phase \square with head H , the domain of H [= complement of H] is not accessible to operations outside \square [= HP], but only H and its edge [= H plus any/all of its specifiers].

(6) *Phase Impenetrability Condition* (*DbP*: 10, ex. (11); *BEA*: 5, ex. (6))

[In phase \square with head H ,] [t]he domain of H is not accessible to operations at ZP [= the next higher strong phase], but only H and its edge [*BEA*: “but only the edge of HP ”].

‣ Abels (2003: 41) explicitly compares PIC to Head Constraint (see also Müller 2003)

[for further discussion, see e.g. Uriagereka (1999a, 2000), Hiraiwa (2003), Hornstein et al. (2004: ch. 10)]

INTERIM SUMMARY

The list of parallels between barriers and phases can be continued. What is important, however, is that there were technical arguments against barriers even in GB-times (such as Sportiche 1990) — though most researchers agree with the general goal of Barriers. A phase-based approach faces the same technical (not conceptual) objections.

III. Some Problems with Phases

Phases are not the null hypothesis; in particular adopting phases begs two kinds of questions:

- (i) identity of phases (why CP but not TP, phase by inheritance, V/D/P, etc.?) and
- (ii) properties of phases (why is the edge accessible, where does the EPP come from, etc.?)

① Bouchard (2002):

• specifiers, heads, complements — and accessibility

‣ Chomsky claims that since the head of a phase must be accessible for selection and head-movement, its Spec must be as well, so edge-accessibility follows (*DbP*, *BEA*)

“If Spec is accessible because the head must be, it is presumably because Spec is a sister of a projection of head (H'). But by the same logic, the complement of H should be accessible. Furthermore, if a head is accessible for selection reasons, we could even expect that the complement would be more accessible than a specifier since a complement holds a tighter selection relation with the head than the Spec.”

(Bouchard 2002: 342-343)

Our addition:

Head accessibility could be achieved by just looking at the phase-label, not below it, since the label is a copy of the head. That would work for selection. If furthermore head-movement is not part of C_{HL} , then there is no need to look below the label, i.e. Spec should be inaccessible.

⇒ RE phases as “sharply restricting search and memory”: notice that the computational system must be able to retrieve “previously spelled-out material” to provide a complete, coherent surface string, so it can’t just forget about spelled-out elements (Bouchard 2002: 343; see also below).

② Hiraiwa (2003):

- problem with ‘acyclic’ locality evaluation: evaluation of locality at the next strong phase
 - the logic of Chomsky’s argument is clear (*DbP*, also *BEA*): a shifted object (in an extra/outer SpecvP-position) doesn’t block movement of the subject (from inner SpecvP to SpecTP) if the object further moves beyond TP — traces/unpronounced copies do not trigger intervention

⇒ Hiraiwa notes an inconsistency here:

If we say that traces are irrelevant for locality, how can we still talk about locality, since locality holds of chains, where a chain consists of a head, and a tail? Since the tail is a trace, it shouldn’t count for locality.

To solve this problem, one would like to formulate locality as the movement takes place, so as not to have to refer to the tail of the chain (cf. Epstein et al. 1998). But this clashes with the need for acyclic/next strong phase locality evaluation, which is at least ‘representational’.

⇒ Phase-based locality evaluation signifies return to GB, where operations operate freely, simultaneously, and are filtered out (see also Legate 2003).

③ Legate (2002):

- by the definition of a phase in *MI*, passive and unaccusative VPs (“Big V”) should also be phases: reconstruction at edge of phase (LF evidence), phonological isolation (PF evidence)
 - based on this, *DbP* introduces a distinction between a strong phase and a weak phase, but a weak phase has no effect on C_{HL} , it’s as if it weren’t a phase (extended in *BEA*)

④ Epstein & Seely (2002):

- argument against cyclic Spell Out:

- ‘Cyclic Spell Out’ is proposed as a way to eliminate the feature-deletion / erasure distinction in Chomsky (1995) by stripping away uninterpretable features before the interface is reached, as the derivation proceeds — uninterpretable features are in fact unvalued features, which get valued during the course of the derivation

⇒ But if so, once valued, how does Spell Out know that *previously* unvalued features must be transferred to PF and eliminated from C_{HL}? It seems like *looking-back* is needed — which poses the same computational problem as *look-ahead*, a prime concern for minimalist theorizing.

© Norbert Hornstein (p.c.):

- Spell Out and the interfaces

- LF needs to see some spelled out chunks (e.g. pronominal binding)
so spelling out might not be the most desirable consequence for LF

Does PF ever need to see some spelled out chunks?

- quite possibly: intonational patterns, such as falling intonation ending up with a declarative (statement) or rising intonation yielding an interrogative (question)

⇒ But if so, this would target spelled out chunks.

© Epstein (2004):

“Ideally, phases should have a natural characterization in terms of IC: they should be semantically and phonologically coherent and independent. At SEM, *v*P and CP (but not TP) are propositional constructions: *v*P has full argument structure, CP is the minimal construction that includes Tense and event structure, [note omitted — CB and KKG] and (at the matrix at least) force.” (BEA: 22)

- but interface (bare output) conditions in fact demand convergence, not coherence:

- “D *converges* if PHON and SEM each satisfy IC” (BEA: 3)

⇒ Architectural paradox: How can Spell Out know that a given CP *will be* relatively independent (whatever that means exactly) or propositional *at the interface* if Spell Out applies before the interface is reached, and without access to interface properties? (slightly adapted from Epstein 2004: 12; CB & KKG)

- the specification of a phase as having “*full* argument structure” (the term used by Epstein as introduced in BEA) cannot mean that all relevant theta-roles are in fact discharged

- this would have the unintended result that raising TPs, passive, and unaccusative *v*Ps are phases since all theta-roles associated with the head *are* discharged in e.g. passives

⇒ “So, full argument structure must be a *translexical* notion.” (from Epstein 2004: 12)

An unclarity remains as to whether *phases are the entities spelled out*, or whether phases instead define the point in the derivational process at which the *complement of the phase-head* is spelled out. The latter interpretation, under which phase-head complements — not phases themselves — get spelled out is suggested by the following passage.

“We understand PIC as before: the sister of the head is spelled out obligatorily; the fate of the edge — the head and its specs — is not determined until later.” (BEA: 21)

But if so, non-coherent/non-independent units, *NON-phases are transferred!*

	CP	TP	vP	VP
phase / separate LA	<i>yes</i>	<i>no</i>	<i>yes</i>	<i>no</i>
propositional (full argument, structure, coherent, etc.)	<i>yes</i>	<i>no</i>	<i>yes</i>	<i>no</i>
cyclically spelled out	<i>no</i>	<i>yes</i>	<i>no</i>	<i>yes</i>

⇒ So, vP and CP are phases — but they are not convergent objects, i.e. they contain uninterpretable features (think of e.g. long-distance *wh*-movement).

⑦ Boeckx (2003) / Brody (2002):

- suppose one finds a phrase \square which readily allows subextraction of \square

In an approach that allows blind intermediate links (spurious EPP-features), one could in principle allow for movement of \square out of \square (via the insertion of an EPP-feature), followed by movement of \square to a position \square out of which subextraction is impossible. Nothing seems to prevent further movement of \square , since \square has moved out of \square prior to \square 's fateful landing on a freezing node. An example of this scenario and a hypothetical derivation is given in (7a-c):

- (7) Target: *Who did [a picture of <who>] cause Bill to cry?
- Step 1: Movement of *who* out of [a picture of *who*] to SpecYP above vP when the *picture*-NP is in SpecvP (where subextraction is/certainly must be allowed).
[_{YP} **who** Y [_{vP} [a picture of <**who**>] v [_{VP} cause Bill to cry]]]
 - Step 2: Movement of [a picture of <*who*>] to SpecIP, a “freezing node”
[_{IP} [a picture of <**who**>] I [_{YP} who Y [_{vP} <[a picture of <**who**>]> v ...]]]
 - Step 3: Movement of *who* from SpecYP to SpecCP (= Target)
[_{CP} **who** did-C [_{IP} [a picture of <who>] I [_{YP} <**who**> Y [_{vP} ...]]]]

- nothing seems to ban the undesirable derivation sketched in (7c) at Step 2 in (7b)

- this is not so if we adopt the idea that movement is initiated upon insertion of the final landing site, as we do here: when C^0 is inserted, *picture of who* would already have landed on a freezing node, and subextraction would be doomed (ruling out (7a))

⑧ Bošković (2002):

- PF-isolability: right-node raising shows TP is isolable

(8) John believes that and Peter claims that – Mary will get a job.

(9) I know when, but I don't know where – Amanda met Steve.

⑨ Abels (2003):

- furthermore, phases shouldn't be isolable

- the edge and the complement of a phase are spelled out at different times!

⇒ Computational efficiency: search through finite objects is not very complicated. In terms of complexity theory, searching through 500 sub-constituents or 5 constituents is not different (or more complicated). Complexity grows at worst polynomially, not exponentially.

INTERMEDIATE CONCLUSION

The arguments for phases must therefore be empirical.

Argument I:

- (non-)existence of non-finite SpecTP

(10) a. There seems ___ to be a man in the garden.
b. *There seems a man to be ___ in the garden.

- no need for phases: solved if no EPP on non-finite T (e.g. Epstein et al. 1998, Castillo et al. 1999, Boeckx 2000, Grohmann et al. 2000, Bošković 2002, Epstein & Seely 2002, 2004, and others)

(11) a. There was a rumour [that a man was in the room] in the air.
b. A rumour [that there was a man in the room] was in the air.

- “Marantz-Romero facts” (incl. the Merge over Move debate; see Castillo et al. 1999): argument in favour of “T-domain” (some notion of *kernel sentence* for lexical array)

Argument II:

- no reconstruction effect in Spec of non-finite T (Abels 2003)

‣ (12d) is predicted to be good if *wh*-phrase passes through embedded SpecTP

- (12)
- *John said that Sue likes pictures of himself.
 - Which pictures of himself did John say that Sue likes?
 - *Mary seems to John to like pictures of himself.
 - *Which pictures of himself does Mary seem to John to like?

Argument for phases (Abels): *There is no successive-cyclic movement step if there is no phase, and TP is not a phase.*

Problem with Abels' argument: *Lack of reconstruction can't indicate lack of movement!*

Boeckx (2001) has argued that anti-reconstruction effects like (13) below cannot be analyzed in terms of non-movement, since some instances of A-movement (especially those involving indefinites) reconstruct (Hornstein 1999; contra Manzini & Roussou 2000). If this conclusion is correct, Abels' assumption that "if no reconstruction, no movement" cannot be right.

- (13) No one is certain to solve the problem. (≠ "it is certain that no one will solve the problem")

Another argument against that assumption comes from the fact that weak islands, those that permit a significant degree of movement, do not accommodate (full/total) reconstruction:

- (14)
- [which of his₁/*₂ pictures] did Bill₁ ask me why nobody/everybody₂ hated *t*
 - [which of his₁/*₂ pictures] doesn't Bill₁ think that everyone₂ liked *t*

In a similar vein, Bobaljik & Wurmbrand (2003) provide compelling evidence that the lack of reconstruction effect in restructuring contexts in German (among other languages) must be analyzed as an anti-reconstruction effect in the presence of movement:

- (15) ... weil er alle Fenster vergessen hat [<alle Fenster> zu schliessen].
because he all windows forgotten has to close
'... because he forgot to close all the windows.' [☞ **vergessen* >> *alle Fenster*]

⇒ So, the expletive arguments (Argument I) and the reconstruction arguments for phases (Argument II), as opposed to non-phases, disappear.

- Alternatives: (i) no EPP to get the expletive facts (references after (10))
(ii) Form Chain to get successive cyclicity (Boeckx 2003)

CONCLUSION [TO BE ADDRESSED FURTHER IN THE DISCUSSION PERIOD]

Despite its conceptual appeal, technical modifications to the phase-based approach seem indeed to be called for (as laid out in e.g. Starke 2001, Boeckx 2003, Grohmann 2003).

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