# MINIMALIST INQUIRIES AND DERIVATION BY PHASE – MAIN POINTS

[This handout contains material from Winfried Lechner's handout "Economy in the Minimalist Program" David Pesetsky's handouts "Minimalist Inquiries", "Derivation by Phase"]

## Computational Operations

a. ***Select***

(I) Select [F] from the universal feature set {F}
(II) Select LEX, assembling features from [F]
(III) Select LA (lexical array) from LEX
(IV) Map LA to EXP, with no recourse to [F] for narrow syntax

b. ***Merge***: "takes two syntactic objects (a, b) and forms K(a, b) from them.

c. ***Agree*****:** "establishes a relation (agreement, Case-checking) between an LI a and a feature F in some restricted search space (its *domain*)."

d. ***Move*****:** combining Merge and Agree. [A-movement if motivated by a phi-feature; A-bar if
motivated by a P ["peripheral"]-feature]

"The operation Move establishes agreement between a and F and merges P(F) to aP, where P(F) is a phrase determined by F (perhaps but not necessarily its maximal projection) and aP is a projection headed by a. P(F) becomes the Spec of a ([Spec,a]).

## Notes on Operations:

**1)** Lexical Array: A collection of Lexical Items. Lexical Array is a Numeration if some lexical items are selected more than once (DbP: p. 11)

**Recall:** The **NUMERATION** (N) contains a subset of the lexicon (and a subscript indicating the number of occurrences of each item)
$N = \{boy_1, girl_1, the_2, see_1\}$

(1) a. The numeration N contains indexed lexical items.
b. For each lexical item, the index marks the number of times this lexical item is

used
c. Each time the derivation accesses the numeration, it selects a single lexical item.
d. Each time the derivation selects a lexical item, its index is reduced by 1.
e. The derivation stops if the numeration has been exhausted and all indices equal 0.

**2***)* "*Chains are determined by identity, with no need for indices or some similar device to distinguish chains from repetitions, also violating the Inclusiveness Condition…."* (DbP: p. 11)

**Occurrences**
-Move creates two occurences of a single a, where an "occurence of a" is the full context of a.
- "Chain" is a set of occurences. If occurences are "full contexts" we don't need to say that a chain is asequence, since there will be a containment relation between the contexts that allows us to reconstruct whatever we might needed the ordering property of a sequence for.

## Deriving Procrastinate

Move is more complex than its subcomponents.

Move is more complex than even its subcomponents *together* -- since it involves the extra step of determining **pied piping**.

Consequently:

(2) *Merge* or *Agree* "preempt" *Move*.

"This yields most of the empirical basis for Procrastinate", p. 102

## Selectional properties of functional heads:

Lexical items fall in two types, substantive and functional

**Core Functional Categories (CFC)**

a. C
b. T
c. v

*SELECTING PROPERTIES OF CFCS*

A) S-SELECTION

selected:

-C can be unselected (root).
-T and v must be selected.
-C is selected only by substantive categories.
-T is selected by either C or V. If it is selected by C it has the complete set of φ-features. If it is selected by V it is defective for φ-features (Tdef).
-v is only selected by T.

selecting:

-C selects T.
-T selects verbal elements.
-v also selects verbal elements but in addition it may select a nominal element in the specifier position, the external argument.

B) EPP-SELECTION, MOVE AND PURE MERGE

Each functional head my have an EPP-requirement, i.e. allows an extra Spec beyond its s-selection.

For v, this is the case in object shift constructions.
For T this is the EPP.
For C, in overt wh-movement.

Move is triggered to satisfy an EPP requirement of a head.

Pure Merge (with an expletive) is also possible, but only in T. Not in v and C. The ban on expletive merge in v is attributed to (3):

(3) Pure merge in theta position is required of (and restricted to) arguments

(3) also forbids arguments from merging directly with T or C instead of v.

## Phases

Two motivations for phases:

a) **Conceptual**

Complexity Considerations:
(i) Simple Operations preempt more complex ones
(ii) Search space is limited (locality)

(iii) Access to the feature set F is restricted by the procedure repeated from above:

(I) Select [F] from the universal feature set {F}
(II) Select LEX, assembling features from [F]
(III) Select LA (lexical array) from LEX
(IV) Map LA to EXP, with no recourse to [F] for narrow syntax
(iv) Computation is locally determined (no look-ahead).

b) **Empirical**

Introduced to resolve the problem of sentences with expletives like:

(4) It is fun PRO to t go to the beach
It is about time PRO to leave t
It was decided PRO to be executed t at dawn
(5) There was assumed to be a reason why a man is in the garden

where the expletive is merged after Move takes place.

Recall the cases that motivated the Merge over Move condition:

(6a) and (6b) start with the same numeration, but differ in the way the derivation proceeds.

(6) a. There seems to be someone here
b. *There seems someone to be here

(7) $N_0$ = {there$_1$, $T_2$, seems$_1$, to$_1$, be$_1$, someone$_1$, here$_1$}

In (6a), the expletive is merged into the lower SpecTP position:

(8) There$_i$ seems $t_i$ to be someone here

| | |
|---|---|
| a. $N_0$ = {there$_1$, $T_2$, seems$_1$, to$_1$, be$_1$, someone$_1$, here$_1$} | |
| b. [$_{TP}$ $T_{[EPP]}$ to be someone here] | Merge T° |
| $N_k$ = {there$_1$, $T_1$, seems$_1$, to$_0$, be$_0$, someone$_0$, here$_0$} | |
| L c. [$_{TP}$ *there* $T_{[EPP]}$ to be someone here] | Merge expletive *there* |
| $N_l$ = {there$_0$, $T_1$, seems$_1$, to$_0$, be$_0$, someone$_0$, here$_0$} | |
| d. [$_{TP}$ there $T_{[\text{EPP}]}$ to be someone here] | Check EPP |
| $N_m$ = {there$_0$, $T_1$, seems$_1$, to$_0$, be$_0$, someone$_0$, here$_0$} | |
| e. [$_{TP}$ $T_{[EPP]}$ [$_{VP}$ seems [$_{TP}$ there $T_{[\text{EPP}]}$ to be someone here]]] | Merge T° |
| $N_n$ = {there$_0$, $T_0$, seems$_0$, to$_0$, be$_0$, someone$_0$, here$_0$} | |
| f. [$_{TP}$ there$_i$ $T_{[EPP]}$ [$_{VP}$ seems [$_{TP}$ $t_i$ $T_{[\text{EPP}]}$ to be someone here]]] | Move expletive |
| g. [$_{TP}$ there$_i$ $T_{[\text{EPP}]}$ [$_{VP}$ seems [$_{TP}$ $t_i$ $T_{[\text{EPP}]}$ to be someone here]]] | Check EPP |

In (6b), the subject someone is moved to the lower SpecTP position, and the expletive merged into the higher SpecTP:

(9) *There seems someone$_i$ to be t$_i$ here

| | |
|---|---|
| a. $N_0$ = {there$_1$, $T_2$, seems$_1$, to$_1$, be$_1$, someone$_1$, here$_1$} | |
| b. [$_{TP}$ $T_{[EPP]}$ to be someone here] | Merge T° |
| $N_k$ = {there$_1$, $T_1$, seems$_1$, to$_0$, be$_0$, someone$_0$, here$_0$} | |
| c. [$_{TP}$ *someone$_i$* $T_{[EPP]}$ to be t$_i$ here] | Move *someone* |
| $N_l$ = {there$_1$, $T_1$, seems$_1$, to$_0$, be$_0$, someone$_0$, here$_0$} | |
| d. [$_{TP}$ someone$_i$ $T_{[\sout{EPP}]}$ to be$_i$ here] | Check EPP |
| $N_m$ = {there$_1$, $T_1$, seems$_1$, to$_0$, be$_0$, someone$_0$, here$_0$} | |
| e. [$_{TP}$ $T_{[EPP]}$ [$_{VP}$ seems [$_{TP}$ someone$_i$ $T_{[\sout{EPP}]}$ to be t$_i$ here]]] | Merge T° |
| $N_n$ = {there$_1$, $T_0$, seems$_0$, to$_0$, be$_0$, someone$_0$, here$_0$} | |
| f. [$_{TP}$ there$_i$ $T_{[EPP]}$ [$_{VP}$ seems [$_{TP}$ someone$_i$ $T_{[\sout{EPP}]}$ to be t$_i$ here]]] | Merge expletive *there* |
| g. [$_{TP}$ there$_i$ $T_{[\sout{EPP}]}$ [$_{VP}$ seems [$_{TP}$ someone$_i$ $T_{[\sout{EPP}]}$ to be t$_i$ here]]] | Check EPP |

Given the **Merge over Move** analysis of (6), it is not clear why raising is ever possible. In examples like (4) & (5), the expletive could merge to satisfy the EPP property of T and movement of *PRO* or *a man* should be blocked.

**Chomsky's answer:** expletives are not always available. If only a subset of LA (Lexical Array) is available to derivation, then the expletive in (4)&(5) is not in the subarray and hence not available. Thus, EPP motivates Move.

Chomsky (1998: 19) proposes that at each stage of the derivation a subset $LA_i$ is extracted, placed in active memory and submitted to the derivational procedure. Once $LA_i$ is exhausted, the computation may proceed or it may return to LA and extract $LA_j$ proceeding as before. The proposal then is that in the above sentences, the expletive is not contained in the subarray $LA_i$ and therefore it cannot be accessed.

Characterization of subarrays: they determine a *natural syntactic object* which is taken to be the closest counterpart to a proposition: either a verb phrase with all theta-roles assigned, or a full clause including tense and force.

Definition of Phases: phases of a derivation are syntactic objects which are derived by choice of a subarray $LA_i$. CPs and vPs constitute phases while TPs not. vPs constitute phases only when they are transitive, not when they are passive or unaccusative (Chomsky defines phases as being propositional rather than convergent because of complexity considerations).

Merge over Move: when the expletive is in the same phase as the element that could undergo raising.

## 1) Strong Cyclicity Condition

Chomsky proposes that phases must satisfy the strong cyclicity condition in (10):

(10) The head of a phase is "inert" after the phase is completed triggering no further operations.

According to (10), a phase head cannot trigger Merge or Attract is a latter phase. This means that derivations proceed phase by phase.

This derives the effects of 'strength' in Minimalism-Stage 1 and of the Strict Cycle Condition (in earlier frameworks).

## 2) Phase Impenetrability Condition (PIC) strong version

*Strict version (Minimalist Inquiries*; see below for a weaker definition*)*

(11) In phase α with head H, the domain of H is not accessible to operations outside α, but only H and its edge

This forces Move of a phrase inside the phase to Spec,H in order for this phrase to be accessible to operations outside α, i.e. a strong form of Subjacency.

Consequences

-wh-movement must proceed through the edge of C, i.e. successive cyclic movement through Spec,CP.

-an object that undergoes wh-movement undergoes first (covert) object shift—in order to be accessible for wh-movement. (recall the adjunction to VP-extraction strategy in barriers)

-To implement this without having "look ahead" problems, Chomsky (2000) proposes that that an EPP or P (force-topic-focus etc.) feature may be optionally assigned to the head of a phase [unlike the EPP-feature of T which might be Universal, EPP or P features on v or C are properties of phases rather than head). A long discussion on the assignment of EPP-features on v in connection with the [±Object Shift] parameter is included in Chomsky (2001).

## 3) Cyclic Spell-Out

In Chomsky (1995, footnote 50) it is noted that there are -interpretable features that may have a PF reflex, for example φ-features on T, v or Case on DPs. This is problematic if

the checking relation is overt: the -Interpretable feature is checked and erased before Spell-Out but its phonetic matrix remains.

To resolve the problem, Chomsky (2000) proposes that instead of single Spell-Out there is cyclic Spell-Out: deleted features are erased but only after they are sent to the phonological component—possibly at the phase level. Spell-out applies cyclically in the course of a derivation. Cyclic Spell-Out is contingent on feature checking operations. In the previous model, there where two cycles, the cycle of overt and the cycle of covert derivations. With cyclic Spell-Out, there is only one cycle and all operations are cyclic.

**The issue is stated more clearly in DbP (p. 5):**

*"The operation Spell-Out removes LF-uninterpretable material from the syntactic object K and transfers K to the phonological component. It must therefore be able to determine which syntactic features are uninterpretable, hence to be removed. Prior to application of Agree, these are distinguished from interpretable features by lack of specification of a value* [see below for details on Agree]. *After application of Agree the distinction is lost. To operate without reconstructing the derivation, Spell-Out must therefore apply shortly after the uninterpretable features have been assigned values […]. Spell-Out must be strongly cyclic (as assumed in MI) […]. In contrast to Extended Standard Theory-based systems, this system has no overt-covert distinction with two independent cycles; rather it has a single narrow-syntactic cycle. Furthermore, the phonological cycle is not a third independent cycle, but proceeds essentially in parallel".*

**4) Phase Impenetrability Condition (PIC): weaker version**

In DpP he modifies the PIC in order to capture the fact that the edge of a lower phase is Spelled-Out in the next higher phase.

**General Guiding Principle:**

(12) Ph1 is interpreted/ evaluated at the next relevant phase Ph2

**PIC (modified version)**

given a configuration [ZP Z….[HP a [H YP]]]

(13) The domain of H is not accessible to operations at ZP, only H and its edge are accessible to such operations

A consequence: under the modified version, T can access the domain of v. Under the strict version it cannot. He writes (p.14): *"But T in the domain of Z can agree with an element within its complement, for example, with the in-situ quirky nominative object of its v*P complement…"*

**Comment:** ….but the issue probably does not arise since nominative objects occur with an unaccusative v (a weak phase), unless the PIC also holds for weak phases….

## Agree, Probes, Goals, Incomplete Agreement, Activity, Freezing, Defective Intervention

A functional head T or v has uninterpretable φ-features. The φ-feature set is a probe that seeks a goal, namely "matching" features that establish agreement. The relation of the probe of T to its goal is the T-associate relation. Locating the goal (the φ-features of a DP with structural Case), the probe erases under matching. Taking structural Case to be an uninterpretable feature, it too erases under matching with the probe. The erasure of uninterpretable features of probe and goal is the operation Agree.

(14) T be elected an unpopular candidate

- T has φ and EPP features.
- **Probe:** φ-features of T
- **Goal:** *an unpopular candidate*, which has matching features.
- **P(G):** "pied piping" of a phrase determined by the goal of T's probe

**"...taking structural Case to be a reflex of an uninterpretable φ-set, it too erases under matching with the probe."**

**Movement =**

- selection of P(G)
- move of P(G)
- feature-deletion under match (Agree)

Matching is a relation that holds of a probe P and a goal G. Not every matching pair induces Agree. To do so, G must be in the domain D(P) of P and satisfy locality conditions. General conditions on Agree:

(15) (I) Matching is feature Identity
(II) D(P) is the sister of P
(III) locality reduces to "closest c-command"

Feature Identity: identity in the choice of feature and not the value.

**Deletion:** Deletion is taken to be a "one fell swoop" operation, dealing with the φ-set as a unit. Its features cannot selectively delete: either all or none.

Chomsky claims that the φ-features of T do not agree with different NPs. He further assumes that only a probe with a full set of φ-features is capable of deleting the feature that activates the matched goal.

**Incomplete Agreement**

For example, a deficient T is assumed to be one lacking the complete set of φ-features. Thus it cannot check the Case of a DP (in successive cyclic raising) which is the feature activating the goal.

Similarly, participle agreement does not yield Case checking because it is incomplete (no person agreement)

**Activity condition**

(16) A goal must bear some uninterpretable feature [otherwise it is frozen in place].

Under the assumption that uninterpretable features serve to implement operations, it is structural Case that enables the closest goal G to select P(G) to satisfy EPP by Merge.

-This is why structural case exists!
-The "character" of the Case (nominative, accusative)merely registers the identity of the probe, so that "structural Case itself" is a single, undifferentiated feature. This is why differently-cased DPs can interfere with each other.

For there-type expletives, the assumption is that they are active due to an uninterpretable person feature they have. This permits T to enter a Case checking relation with the Associate.

For Quirky subjects, the assumption is that in addition to the inherent case feature, they also have a Structural Case feature that makes them active: *«....Suppose quirky Case is (theta-related) inherent Case with a structural Case feature, as is often suggested in one or another form. Then it too is immobile once it reaches a Case-checking position. If the φ-features of T that check the structural Case of raised quirky subject themselves delete, we have default T; if they remain, we have remote agreement with some lower accessible nominative..."* (Chomsky 1998: 43)

[Note that there is a problem here. The whole thing is presented as if there is a choice. There isn't one though--or there shouldn't be one--since any T that is non-defective should erase its features immediately if possible. It seems that with respect to "freezing" quirky DPs behave as if they have structural Case--but with respect to "deletion of features of the goal" they do not. Note also the continuation: *"In his detailed review of Icelandic agreement, Sigurðsson (1996) concludes that remote NOM allows number agreement but not first/second person agreement. That would follow if the [person] feature o T reduces to [3person] (the default choice) when it attracts quirky Case or EXPL in SPEC,T.."* But note that these facts suggest that deletion is not a "one fell swoop" operation for quirky subjects and maybe expletives)

- Expletive *there* must have properties quite similar to Tdefective .
- Since it moves around like a normal DP, it has some attractable feature, e.g. [person] -- call it *G*. [But since it is not phi-complete it does not delete features on T.]

- But it does not delete the probe features, as witnessed by LD agreement.

(17) there were declared guilty three men

- When *there* raises to normal T the story is:

-The full set of f-features on T deletes the uninterpretable feature G of *there*.
-G on *there* is deleted by the f-features on T, so it stops raising.
-[T Agrees with its associate...]

Note that LD agreement is not specifically a property of expletive constructions, but of constructions where the specifier of TP does not have a full set of f-features. Thus dative subject constructions also show LD agreement.

**Conclusions so far:**

(i) Long-distance agreement is a T-associate (probe-goal) relation.
(ii) EPP can be satisfied by:
(a) Merge of expletive [T-associate agr.]
(b) Merge of associate [your basic boring sentence]
(c) Merge of a closer to T than the associate
[dative subjects etc.]

**Freezing and defective intervention effects**

If structural Case has been already been checked (deleted), the phrase P(G) is «frozen in place», unable to move further to satisfy EPP in a higher position. Uninterpretable features render a goal active, able to implement an operation: to select a phrase for Merge or to delete a probe.

Merge and Agree require a goal that is both local and active. This means that an element that is inactive but still local may cause intervention effects.

- **Some further refinements on Agree and Merge in Chomsky (2001)**

TYPOLOGY OF ININTERPRETABLE FEATURES

Uninterpretable features serve to implement Agree and Move. They are of three kinds:

(i) Features that select a target α φ-features on v, T (optionally C)

| | |
|---|---|
| (ii) Features that determine whether α offers a position for movement and if so what kind of category can move to that position | EPP-features |
| (iii) Features that select the category β that is moved | Case |

Presence of uninterpretable features renders them active, so that matching leads to agreement.

(33) a. Probe and goal must be both active for Agree to apply
b. α must have a complete set of φ-features to delete uninterpretable features of the paired matching element β

Locality conditions yield an intervention effect if probe α matches inactive β which is closer to α than matching Γ, barring Agree(α,Γ).

UNINTERPRETABLE FEATURES ARE UNVALUED. AGREE VALUES THEM.

Chomsky (2001) takes uninterpretable features to be unvalued. They receive their values under Agree. Match is not identity but nondistinctness: same feature, independently of value. When an element is defective it is unable to inactivate a matched element by deleting its unvalued features.

Illustration

-Raising and ECM

(34) a. there are likely to be awarded several prizes
b. several prizes are likely to be awarded

(35) a. we expect there to be awarded several prizes
b. we expect several prizes to be awarded

Spec,Tdef of α is filled either by Merge or Move. Tdef matches SUBJ in some of its features (to implement raising) but not all (to preclude inactivation). This feature is taken to be [person]. Expletives must also have the feature [person] since they raise. And pure expletives of the there-type have no other formal features. In a framework that dispenses with categorial features [person] plays the role formerly assigned to [D] or [N] features.

When φ-complete, T values and deletes structural Case for N. The φ-set of N (which is always φ-complete) both values and deletes the φ-features of T (with and without movement). With defective probe, agreement is not manifested and Case of the matched goal is not assigned a value: raising T exhibits no agreement, and participles lack person; neither determines the Case of the matched N, which depends on a higher non-defective probe, T (in raising) and v (in ECM).