1. Background

Recall: If two operations (more generally, building blocks) are assigned to different strata, or levels, which are in a fixed order, then the two operations will also have to apply in a fixed order. We have seen this for phonology and morphology (see Pesetsky (1979), Kiparsky (1982a,b), Bermúdez-Otero (2008; 2011)). The same goes for syntax.

(1) Interaction:
   a. Operations at level \( L_i \) feed and bleed operations at level \( L_{i+1} \).
   b. Operations at level \( L_{i+1} \) counter-feed and counter-bleed operations at level \( L_i \).

A version of this proposal:
Some rules apply in core areas of a grammatical component; other rules apply at interfaces (before or after the core component). Pullum (1979): Post-cyclic (post-syntactic, phonology-oriented) operations will always be fed and bled by cyclic (genuinely syntactic) operations. Pre-cyclic (pre-syntactic, lexicon-oriented) operations will never be fed or bled by syntactic operations.

Question: How are levels of representation justified?

(2) Possible justifications of levels of representation in syntax:
   a. Standard approach:
      A level \( L_i \) is justified by the building blocks that characterize it— the operations that apply at \( L_i \), or the constraints that hold of \( L_i \).
   b. Branching approach:
      A level \( L_i \) is justified if it branches (Sternfeld (1991))— e.g., S-structure is only justified if it branches to PF and LF.
   c. Interface approach:
      A level \( L_i \) is only justified if it qualifies as an interface of syntax to some other domain (PF, LF are justified as levels. S-structure is not: Chomsky (1995)).

2. D-Structure and S-Structure

Assumption (Chomsky (1981)):
D-Structure and S-structure are justified as levels of representation in the Y-model (or T-model) since there are building blocks that exclusively characterize them.

(3) Y-Model

Note:
(i) D-Structure is a level of representation where (in current terminology) all external Merge operations have applied, but no internal Merge operation has applied (i.e., there is no movement whatsoever yet).
(ii) S-Structure is a level of representation where all movement operations have applied on the basis of a D-structure input; in addition, other operations (like deletion) may also have taken place.

2.1. Justification of D-Structure

Note:
The arguments center around the \( \theta \)-Criterion.

(4) \( \theta \)-Criterion (Chomsky (1981), informal version): Each argument is assigned exactly one \( \theta \)-role, and each \( \theta \)-role is assigned to exactly one argument.

2.1.1. Non-Existence of SEEM

Note:
Assuming the \( \theta \)-Criterion to apply at D-structure derives the non-existence of SEEM.

(5) There is no verb \( V \) that triggers S-bar deletion (i.e., selects TP at S-structure), \( \theta \)-marks its subject, but does not assign case to the embedded subject governed by \( V \).

(6) a. D-Structure:
   \[ \text{NP } e \] SEEMS \[ CP \text{ Jove to rain } \]
   b. S-Structure:
   \[ \text{NP Jove1} \] SEEMS \[ TP \text{ t1 to rain } \]

Observation:

1. At S-structure, Jove has picked up a \( \theta \)-role (by movement to the matrix clause), so the \( \theta \)-Criterion is not violated here.
2. At D-structure, Jove does not have a \( \theta \)-role; and the \( \theta \)-role provided by SEEM is not assigned to any argument.
3. Therefore, by assuming that the \( \theta \)-Criterion applies at D-structure, the non-existence of SEEM can be derived.
4. In return, this supports the hypothesis that D-structure exists.
However, SKEM is incompatible with Burzio’s Generalization, so the reasoning here may not be needed.

**Outlook:**
(i) There is no room for the θ-Criterion in current minimalist approaches anymore: “If the empirical consequences can be explained in some other way and D-structure eliminated, then the [...] θ-Criterion can be dispensed with.” (Chomsky, 1995, 188).
(ii) Most of the work done by the θ-Criterion is automatically, and independently, done by principles of semantic interpretation at LF already: “This picture requires conditions to ensure that D-structure has basic properties of LF. At LF the conditions are trivial. If they are not met, the expression receives some deviant interpretation at the interface; there is nothing more to say.” (Chomsky, 1995, 187)

2.1.2 **Tough-Movement**

(7) **Tough-movement**

John is easy to please

(8) **Analysis in Chomsky (1981):**

   a. **D-structure:**
   
   e is easy [s PRO to please PRO ||]
   
   b. **Movement:**
   
   e is easy [s PRO [s PRO to please t1 ]]
   
   c. **Reanalysis:**
   
   e is easy [AP [A easy to please ] t1 ]
   
   d. **S-structure with lexical insertion:**
   
   John1 is [AP [A easy to please ] t1 ]

**Argument for D-structure:**

In [8-d], John does not occupy a θ-position; however (so Chomsky argues), it can also not be assigned a θ-role in the embedded clause and move directly to the matrix clause because there is evidence for an S’ (CP) level here that would give rise to improper movement. The facts fall into place if the θ-Criterion holds at D-structure, and John enters the derivation later (at S-structure, via lexical insertion).

(9) **An impossible derivation:**

John1 is easy [CP t1 to please t1 ]

(10) **Improper movement:**

   a. Mary1 seems [CP t1 to like John ]
   
   b. *Mary1 seems [CP t1 that t1 likes John ]

(11) **An argument for CP-embedding in tough-constructions: longer movement dependencies in the embedded clause:**

   a. The violins are easy [to play the sonatas on ]
   
   b. This book is difficult [to convince people [CP that they ought to read ||]

**Outlook:**

“We need not tarry on that matter [whether tough-movement provides an argument for D-structure on this analysis], however, because the technical device [reanalysis plus lexical insertion] does not help. As noted by Howard Lasnik, the LGB solution fails, because an NP of arbitrary complexity may occur in place of John.” (Chomsky, 1995, 188)

2.2 **Justification of S-structure**

2.2.1 **The Projection Principle**

(12) **Projection Principle (Chomsky [1981]):**

   a. If A selects B as a lexical property, then A selects B in C at level L1.
   
   b. If A selects B in C at level L1, then A selects B in C at level L1.

(13) **A consequence of the Projection Principle: the existence of traces:**

   a. What1 did John [VP see what1 ]?
   
   b. *What1 did John [VP see ]?

**Note:**

To find out whether the Projection Principle is violated, it does not suffice to simply look at a level of representation, or at a step in the derivation – to show that (13-b) is an impossible S-structure representation, we have to know that there is an object DP within VP at an earlier derivational stage.

**Outlook:**

(a) There is no room for the Projection Principle in current minimalist analyses anymore: “If the empirical consequences can be explained in some other way and D-structure eliminated, then the Projection Principle [...] can be dispensed with.” (Chomsky, 1995, 188).

(b) The Projection Principle has always been a conceptually unattractive constraint since it qualifies as global in Lakoff’s (1971) sense. (A global constraint applies to a whole derivation; it correlates non-adjacent steps in the derivation.)

2.2.2 **Parametrization**

**Assumption:**

Some movement operation may take place overtly, at S-structure, in some languages, and covertly, at LF, in others.

(14) **Wh-movement in English vs Korean:**

   a. I wonder [CP what1 John did t1 ]
   
   b. [CP 노- naam [CP Ch’ŏlsu- ka wae1 o-ass-ta-ko ] saenggakka-ni ]?
      you-top Ch’ŏlsu-nom why come-IMP-DECL-C believe-Q

‘Why1 do you think Ch’ŏlsu came t1?’

**Outlook:**

The difference can be captured without reference to S-structure (e.g., by postulating different – “strong” – features on the relevant C heads).

2.2.3 **Binding Theory: Principle C**

An argument for Principle C at S-structure (not at LF):

Wh-movement at LF would bleed disjoint reference if the latter were determined at LF. However, it doesn’t. Therefore, we can conclude that disjoint reference is determined earlier, at S-structure: counter-bleeding.
(15) **Wh-movement at LF and disjoint reference:**
   a. *You said he1 liked [dp the pictures that John1 took]*
   b. [dp How many pictures [cp that John1 took] did you say he liked t1?]
   c. *Who2 t2 said he1 liked [dp how many pictures [cp that John1 took]]?*

**Outlook:**
This argument goes through only if the LF representation of (15-c) is (16-a), not if it is (16-b). Assuming (16-b), disjoint reference still follows if Principle C applies at LF (rather than at S-structure).

(16) **Two competing LF representations**
   a. **Bleeding:**
      [dp2 How many pictures [cp that John1 took] who2 t2 said he1 liked t3?]
   b. **No interaction:**
      how many4 who2 t2 said he1 liked [dp4 t4 pictures [cp that John1 took]]?

3. **NP-Structure**

**Ref:**
Riemsdijk & Williams (1981)

(17) **L-Model (‘Linear model’)**

```
PF
  S-Structure
  NP-Structure
  D-Structure
    Lexicon
```

**Proposal:**
(i) NP-structure is derived from D-structure by NP-movement (→ A-movement) operations.
(ii) S-structure is derived from NP-structure by wh-movement (and other A-bar movement) operations.
(iii) NP-structure is justified by arguing that certain building blocks can only apply at this level, not before or after.

(18) **Building blocks applying at NP-structure:**

- Binding theory, case assignment, contraction, double-ing filter

3.1. **Principle C**

(19) **Movement and Principle C: reconstruction:**

*dp2 Whose1 mother | do you think he1 likes t2?*

**Observation:**

If Principle C applies at S-structure or LF, (19) can only be excluded by unattractive additions to the theory, such as (a) genuine reconstruction (downward LF movement), (b) copy theory (at the time referred to as ‘layered traces’), or (c) massively enriched representations (cf. the concept of chain-binding developed in Bars (1984; 1986)). However, if Principle C applies at NP-structure, the effect follows at once: disjoint reference is counter-bleded.

(20) **NP-structure representation**

*do you think he1 likes [pp whose1 mother] t2?*

**Note:**
(21) shows that NP-structure is relevant for Principle C, not D-structure.

(21) **NP-structure vs D-structure:**

*He1 seems [pp to John1] [TP t1 to be a fool]*

**Conclusion:**

3.2. **Principle B**

(22) **Movement and Principle B: reconstruction**

*dp2 To him1 | we thought that John1 talked t2

(23) **NP-structure representation**

we thought that John1 talked [pp2 to him1]

(24) **NP-structure vs D-structure:**

*John1 seems [pp to him1] [TP t1 to be a fool]*

**Conclusion:**

3.3. **Principle A**

(25) **Movement and Principle A: reconstruction:**

*dp2 Which picture of himself1 | does John1 like t2?*

(26) **NP-structure representation**

does John1 like [dp2 which picture of himself1]?

(27) **NP-structure vs D-structure:**

a. They1 seem to each other1 [TP t1 to be smart]
   b. John1 seems to himself1 [TP t1 to be a fool]

(28) **NP-structure vs LF:**

a. **NP-structure representation:**

* [cp C TP Each other1 [TP t1 like [dp1 all students]]]]
   b. **Logical Form representation:**

* [cp C TP [dp1/a all students] |TP each other1/a [TP t1/a like t1/b]]]]
Conclusion:

3.4 Principle A: A Possible Problem with Psych-Verbs?

Note:
Belletti & Rizzi (1986) observe the same kind of phenomenon in psych verb constructions. A basic assumption (for which they provide independent motivation) is that the arguments that act as subjects in these constructions are not the external argument of the psych verb; rather, they are ‘derived’ subjects in the sense that they must move across a higher argument into the subject position, as in (29).

(29) Structure of psych verb constructions:
[TP [DP, This picture] | VP [V' bothers t1] | [DP2, John]]

(30) Movement to SpecT of a DP containing an anaphor. English:
a. *TP [DP1, Each other’s2 parents] | [VP t1 promised [DP2, the girls] to buy cars]]
b. TP [DP1, This picture of himself2] | [VP [V' bothers t1] | [DP2, John]]

(31) Movement to SpecT of a DP containing an anaphor. Italian:
a. TP [DP1, Questi pettegolezzi su di sé2] | [VP V' preoccupano t1] | Gianni2 these gossips about himself worry Gianni
   più di ogni altra cosa
   more than anything else
b. *TP [DP1, Questi pettegolezzi su di sé] | [VP t1 V' descrivono Gianni] these gossips about himself describe Gianni
   meglio di ogni biografia ufficiale
   better than any official biography

Conclusion:
A-movement to the subject position in psych-verb constructions counter-bleeds reflexivization.

Question:
Is this compatible with an approach where (a) A-movement to subject position takes place on the way to NP-structure (i.e., strictly speaking precedes reflexivization (Principle A)), and (b) Principle A applies at NP-structure?

3.5 Principle A: A Serious Problem

Riemsdijk & Williams’s (1981) NP-structure approach is fundamentally incompatible with English data showing that A-bar movement can feed reflexivization after all.

(32) Wh-movement to SpecC makes A-binding possible, first example:
John1 wondered which picture of himself1,2 Bill2 saw
a. D-structure representation:
[CP C[−wh] [TP [VP [DP1, John] wondered [CP C[−wh] [TP [VP [DP2, Bill | saw [DP, which picture of himself1,2]]]]]]]]
b. S-structure representation:
[CP C[−wh] [TP [DP1, John] T [VP t1 wondered [CP [DP2, which picture of himself1,2]]]]]

C[−wh] [] TP [DP2, Bill | T [VP t2 saw t3]]

(33) Long-distance binding is impossible without movement:
[CP C[−wh] [TP [DP1, John] | [VP t1 wondered [CP [CP [CP [CP [CP [TP [VP [DP2, Bill | T [VP t2 saw [DP, a picture of himself1,2]]]]]]]]]]]]

(34) Wh-movement to SpecC makes A-binding possible, second example:
Which picture of himself1,2 does John1 think that Bill2 liked?
a. D-structure representation:
[CP C[−wh] [TP does [VP [DP1, John] | [VP t1 thinks [CP [CP [CP [CP [CP [TP [VP [DP2, Bill | T [VP t2 liked [DP, which picture of himself1,2]]]]]]]]]]]]]

b. S-structure representation:
[CP [DP1, Which picture of himself1,2 [C[−wh] does [TP [DP2, John] | [VP t1 thinks [CP [CP [CP [CP [CP [TP [VP [DP2, Bill | T [VP t2 liked [DP, which picture of himself1,2]]]]]]]]]]]]]]]

(35) Long-distance binding is impossible without movement:
[CP C[−wh] [TP [DP1, John] | [VP t1 thinks [CP [CP [CP [CP [CP [TP [VP [DP2, Bill | T [VP t2 liked [DP, which picture of himself1,2]]]]]]]]]]]]

3.6 Case Assignment

Observation:
Case-assignment is highly local, and requires c-command (taken together: ‘government’). A-bar movement does not interfere with case-assignment (counter-bleeding); and NP-movement makes new case assignment possible (feeding).

(36) Case assignment:
a. John1 seems [TP t1 to be a fool ]
b. Whom did you see t1 ?
c. [DP Diev Vorfalls ] denke ich [CP wird sich Maria t2 noch lange this in deu ich denk ich [CP wird sich Maria t2 noch lange [CP von [CP [CP [CP [CP [TP [VP [DP2, Bill | T [VP t2 [CP [CP [CP [CP [CP [TP [VP [DP2, Bill | T [VP t2 liked [DP, which picture of himself1,2]]]]]]]]]]]]]]]]]

3.7 Wanna-Contraction

(37) Control vs. Exceptional Case Marking (ECM)
a. Who do you want to meet ?
b. Who do you wanna meet ?
c. Who do you want to meet Mary ?
d. *Who do you wanna meet Mary ?

Analysis:
At NP-structure, who in (37-d) still intervenes between want and to. If wanna-contraction applies at NP-structure, counter-feeding by wh-movement (which applies at S-structure) is correctly predicted.

(38) NP-structure representation of (37-d):
*do you want who to meet Mary ?

(39) NP-movement feeds wanna-contraction
a. These papers want $t_1'$ to be finished $t_1$ by tomorrow
b. These papers wanna be finished $t_1$ by tomorrow
(40) *D-structure representation (would presumably also work):
e want e to be finished these papers

3.8. Filters
3.8.1. The Double-ing Filter in English
Ref: Ross (1972)
(41) The Double-ing Filter:
*V-ing V-ing
(42) Double-ing:
a. The police began searching the car.
b. *The police are beginning searching the car.
c. my car, searching which the police have already begun
d. *my car, searching which the police are beginning today
(43) NP-structure representation of (42-d):
my car e the police are beginning searching which today

Conclusion:
Separation of the two verb forms by movement should feed double-ing-realization but does not: counter-feeding.

3.8.2. The Adjacent Infinitive Filter in Italian
Ref: Longobardi (1979)
(44) The Double-inf Filter:
*Vinf Vinf
(45) Double-inf
a. Giorgio comincia ad amare studiare
b. *Quale materia? potresti desiderare [CP $t_1'$ studiare $t_1$ ]?
which subject could you wish to study
c. Ecco l’uomo che puoi vedere [CP $t_1'$ portare ogni giorno dei fiori a
here is the man that you can see bring every day flowers to
Mario]
Mario
(46) NP-structure representation of (45-bc):
a. *potresti desiderare [CP studiare quale materia; ]?
could you wish to study which subject
b. ecco l’uomo e puoi vedere [CP che1 portare ogni giorno dei fiori a
here is the man you can see that bring every day flowers to
Mario]
Mario

Conclusion:
In contrast to the English double-ing above, now we have a case of counter-bleeding: Movement of the relative pronoun in (46-b) should bleed double realization of the infinitive but doesn’t since it comes too late.

3.9. Interpretation
Observation:
Cases of obligatory pied piping need to be reconstructed for semantic interpretation.
(47) *Pied piping:
[DP, Whose mother did you see $t_1$? ]
a. LF1: whose2 did you see [DP, t2 mother ]
b. LF2: *[DP, whose mother did you see $t_1$]

Claim:
Semantic interpretation (involving variable binding) takes place at NP-structure, not at S-structure.

4. More Recent Developments
4.1. Principle A of the Binding Theory
Note:
Since levels like D-structure, NP-structure and S-structure have been abandoned in the minimalist program, and since there are some problems with Principle A as regards the level(s) to which it is assigned anyway (see above: A-bar movement feeds reflexivization. A-movement in psych verb constructions counter-bleeds reflexivization), the question arises as to how this constraint is to be understood.

(48) Principle A as an Anywhere Principle:
a. [TP [DP, Questi pettegolezzi su di sé] ]
   T [VP [v proccupano t1 ] Gianni]
   these gossip about himself worry
   Gianni
   più di ogni altra cosa]
   more than anything else
b. [CP dass [TP sich] gestern wieder die Kinderi t1 geschlagen haben ]
   that each other yesterday again the children hit have
   [TP John [t1 T [VP [v sehnen [CP to himselfi ]] [TP t1 to be [AP t1 clever ]]]]]
c. [CP [TP John [t1 T [VP [v seems [CP to himselfi ]] [TP t1 to be [AP t1 clever ]]]]]
d. [DP, Which portrait of himselfi/2 does John2 believe that Bill1 criticized t3 ?

(49) Principle A:
An anaphor is bound in its binding domain at some stage of the derivation.
However:
On this view, principle A is not a local constraint anymore: To find out whether (49) is violated or not, the whole derivation must be scanned, and if principle A is to be respected, there must be at least one step of the derivation where the anaphor is bound within its binding domain.
Hence, (40) does in fact qualify as a global constraint, just like the Projection Principle (see above).

4.2. Interface Levels: PF and LF

4.2.1. Dependent Verbs: PF

Ref: Embick (2000) on Latin deponents

(50) Regular and deponent verbs

<table>
<thead>
<tr>
<th></th>
<th>regem (‘rule’)</th>
<th>hortāri (‘urge’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PASS</td>
<td>regi</td>
<td>hortātur</td>
</tr>
<tr>
<td></td>
<td>regis</td>
<td>hortāri</td>
</tr>
<tr>
<td></td>
<td>regitum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rēxit</td>
<td>hortātus est</td>
</tr>
</tbody>
</table>

Two approaches, each with two possible sources of [pass]:

1. [pass] may be present in syntax, triggering passive morphology and interpretation, or may be inserted after syntax, where it still triggers passive morphology (by late insertion of morphological exponents) but comes too late to trigger passive syntax (or interpretation → counter-feeding). (Problem: deponency realization feeds head movement, but there is no post-syntactic movement. Solution)

2. [pass] may show up in two different positions: With regular passivization, it is part of a functional head (triggering passive syntax and interpretation). With deponents, it shows up on a root, where subcategorization information and interpretation are not affected. Morphological realization of [pass] proceeds uniformly.

4.2.2. Scrambling without Scope Inversion


4.3. Phase Theory

Outlook: phase theory. However, since phase generation takes place incrementally (bottom-up), the order of operations in different phases always follows from the Cyclic Principle. Still: On the phase level, all operations are assumed by Chomsky more recently to apply simultaneously (see Chomsky (2008; 2013)); this would look similar to the situation with traditional levels after all.

5. Conclusion

• In pre-minimalist versions of Principles and Parameters theory, a level of representation Li is typically justified by the building blocks (operations, constraints) that apply at Li,

• The major motivation for assigning a building block to some level is its (lack of) interaction with other building blocks: feeding, bleeding, counter-feeding, and counter-bleeding.

References