

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 will see 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 of 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:

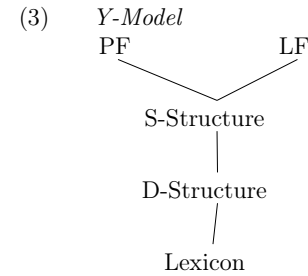
How are levels of representation justified?

- (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* (Sternefeld (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.



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 θ -Criterion.

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

2.1.1 Non-Existence of SEEM

Note:

Assuming the θ -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), θ -marks its subject, but does not assign case to the embedded subject governed by V .
- (6)
 - a. *D-Structure:*
[_{NP} e] SEEMS [_{CP} Jove to rain]
 - b. *S-Structure:*
[_{NP} Jove₁] SEEMS [_{TP} t₁ to rain]

Observation:

1. At S-structure, *Jove* has picked up a θ -role (by movement to the matrix clause), so the θ -Criterion is not violated here.
2. At D-structure, *Jove* does not have a θ -role; and the θ -role provided by SEEM is not assigned to any argument.
3. Therefore, by assuming that the θ -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:

SEEM 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 anyway: "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'} [_S PRO to please PRO]]

b. *Movement:*

e is easy [_{S'} PRO₁ [_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} t'₁ to please t₁]

(10) *Improper movement:*

a. Mary₁ seems [_{TP} t₁ to like John]

b. *Mary₁ seems [_{CP} t'₁ 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 in-

sertion] 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 L_i.

b. If A selects B in C at level L_i, then A selects B in C at level L_j.

(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} Nŏ-nŭn [_{CP} Ch'ŏlsu-ka wae₁ o-ass-ta-ko] saengkakha-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:*
- *You said he₁ liked [DP the pictures that John₁ took]
 - [DP How many pictures [CP that John₁ took] did you say he liked t₁ ?
 - *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).

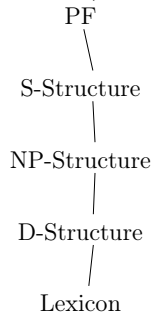
- (16) *Two competing LF representations:*
- Bleeding:*
[DP₃ how many pictures [CP that John₁ took]] who₂ t₂ said he₁ liked t₃ ?
 - No interaction:*
how many₄ who₂ t₂ said he₁ liked [DP₃ t₄ pictures [CP that John₁ took]] ?

3. NP-Structure

Ref.:

Riemsdijk & Williams (1981)

- (17) *L-Model* ('linear model')



Proposal:

- NP-structure is derived from D-structure by NP-movement (= A-movement) operations.
- S-structure is derived from NP-structure by wh-movement (and other A-bar movement) operations.
- 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 Barss (1984; 1986)). However, if Principle C applies at NP-structure, the effect follows at once: disjoint reference is counter-bleed.

- (20) *NP-structure representation:*
do you think he₁ likes [DP whose₁ mother]₂ ?

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:

A-movement feeds disjoint reference (Principle C), A-bar movement counter-bleeds disjoint reference.

3.2. Principle B

- (22) *Movement and Principle B: reconstruction:*
*[PP₂ 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:

A-movement feeds disjoint reference (Principle B), A-bar movement counter-bleeds disjoint reference.

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:*
- They₁ seem to each other₁ [TP t₁ to be smart]
 - John₁ seems to himself₁ [TP t₁ to be a fool]

- (28) *NP-structure vs. LF:*
- NP-structure representation:*
*[CP C [TP Each other₁ [T' T [VP t₁ like [DP₁ all students]]]]]
 - Logical Form representation:*
*[CP C [TP [DP_{1/b} all students] [TP each other_{1/a} [T' T [VP t_{1/a} like t_{1/b}]]]]]

Conclusion:

A-movement feeds reflexivization (Principle A), A-bar movement counter-bleeds reflexivization.

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 [DP₁ This picture] T [VP [V' bothers t₁] [DP₂ John]]]

(30) *Movement to SpecT of a DP containing an anaphor, English:*

- a. *[TP [DP₁ Each other's₂ parents] T [VP t₁ promised [DP₂ the girls] to buy cars]]
 b. [TP [DP₁ This picture of himself₂] T [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] T [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] T [VP t₁ [V' descrivono Gianni₁
 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 himself_{1,2} Bill₂ saw

a. *D-structure representation:*

[CP C_[-wh] [TP T [VP [DP₁ John] wondered [CP C_[+wh] [TP T [VP [DP₂ Bill] saw [DP₃ which picture of himself_{1,2}]]]]]]]

b. *S-structure representation:*

[CP C_[-wh] [TP [DP₁ John] T [VP t₁ wondered [CP [DP₃ which picture of himself_{1,2}]]]]]

C_[-wh] [TP [DP₂ Bill] T [VP t₂ saw t₃]]]]]]

(33) *Long-distance binding is impossible without movement:*

[CP C_[-wh] [TP [DP₁ John] T [VP t₁ wondered [CP whether [TP [DP₂ Bill] T [VP t₂ saw [DP₃ a picture of himself_{*1,2}]]]]]]]]]

(34) *Wh-movement to SpecC makes A-binding possible, second example:*

Which picture of himself_{1,2} does John₁ think that Bill₂ liked?

a. *D-structure representation:*

[CP C_[-wh] [TP does [VP [DP₁ John] think [CP [C_[-wh] that] [TP T [VP [DP₂ Bill] liked [DP₃ which picture of himself_{1,2}]]]]]]]]]

b. *S-structure representation:*

[CP [DP₃ Which picture of himself_{1,2}] [C_[-wh] does] [TP [DP₁ John] T [VP t₁ think [CP t'₃ [C_[-wh] that] [TP [DP₂ Bill] T [VP t₂ liked t₃]]]]] ?

(35) *Long-distance binding is impossible without movement:*

[CP C_[-wh] [TP [DP₁ John] T [VP t₁ thinks [CP [C_[-wh] that] [TP [DP₂ Bill] T [VP t₂ liked [DP₃ this picture of himself_{*1,2}]]]]]]]]]

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. Whom₁ did you see t₁ ?
 c. [DP₂ Dieses Vorfalls] denke ich [CP wird sich Maria t₂ noch lange
 this incident_{gen} think I will REFL Maria_{nom} yet long
 erinnern]
 remember

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 papers₁ want t'₁ to be finished t₁ by tomorrow
 b. These papers₁ wanna be finished t₁ 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:*
 *V_{inf} V_{inf}
- (45) *Double-inf:*
 a. *Giorgio comincia ad amare studiare
 Giorgio begins to like to study
 b. *Quale materia₁ potresti desiderare [CP t'₁ studiare t₁] ?
 which subject could you wish to study
 c. Ecco l'uomo che₁ puoi vedere [CP t'₁ t₁ 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 materia₁] ?
 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:*
 [DP₁ Whose mother] did you see t₁ ?
 a. LF₁: whose₂ did you see [DP₁ t₂ mother]
 b. LF₂: *[DP₁ whose mother] did you see t₁

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.

A standard assumption (Belletti & Rizzi (1988), Epstein et al. (1998), Sabel (2011)): Principle A is an "Anywhere Principle".

- (48) *Principle A as an Anywhere Principle:*
 a. [TP [DP₁ Questi pettegolezzi su di sé₂] T [VP [V_r preoccupano t₁] Gianni₂
 these gossips about himself worry Gianni
 più di ogni altra cosa]
 more than anything else
 b. [CP dass [TP sich₁ gestern wieder die Kinder₁ t₁ geschlagen haben]
 that each other yesterday again the children hit have
 c. [CP [TP John₁ [T_r T [VP [V_r seems [PP to himself₁]] [TP t'₁ to be [AP t₁ clever]]]]]]
 d. [DP₃ Which portrait of himself_{1/2}] 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, (49) does in fact qualify as a global constraint, just like the Projection Principle (see above).

Note:

In more recent work (Reuland (2001; 2011) and many others), it has been suggested that the Anywhere effect with Principle A can be implemented by assuming that reflexives have an unvalued feature that must participate in an Agree operation (with a suitable antecedent); once it has done so, there will be no problem whatsoever anymore with respect to its licensing. However, given that Agree obeys Earliness (it applies as soon as possible), it is unclear how cases where it can be delayed (as in (49-d)) can be derived.

4.2. Interface Levels: PF and LF

4.2.1 Deponent Verbs: PF

Ref.: Embick (2000) on Latin deponents

(50) Regular and deponent verbs

	regere ('rule')		hortāri ('urge')	
	ACT	PASS	ACT	PASS
PRES IND	regit	regitur	hortātur	—
PRES INF	regere	regi	hortāri	—
PRF IND	rēxit	rēctus est	hortātus est	—
PTCP PERF	—	rēctus	hortātus	—
SUPINE	rēctum	—	hortātum	—
PART PRES	regēns	—	hortāns	—

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

- [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:)
- [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

Ref.: Sauerland & Elbourne (2002) Assigning certain kinds of movement to PF only derives effects like blocked scope inversion with scrambling in Japanese and German.

4.3. Phase Theory

Outlook:

Phase theory. However, since phase generation takes place incrementally (bottom-up), the order of operations in different phases already 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 L_i is typically justified by the building blocks (operations, constraints) that apply at L_i .
- 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.

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