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Constraints in the Principles-and-Parameters Approach

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Government and Binding

Note:

The Principles-and-Parameters (aka **Government and Binding**) approach was first developed in Chomsky (1980; 1981); it was then refined throughout the eighties. A guiding idea was that the constraints (or “principles”) should be as general as possible, and that they may contain open parameters which are fixed differently in different languages. Many of the constraints rely on the notions of government and binding.

A different approach to phrase structure:

The approach to phrase structure and derivations adopted in the Principles-and-Parameters approach is slightly different from the one presupposed so far:

- (1) **Three levels of the syntactic component of a grammar in the Principles-and-Parameters approach:**
 - a. **D-structure:**
All pure Merge operations have applied; no Move operation has applied.
 - b. **S-structure:**
All overt Move operations have applied.
 - c. **Logical Form:**
All covert Move operations have applied.

Levels

Of these three **levels of representation**, S-structure is motivated independently – it represents the accessible output form of a sentence. D-structure and Logical Form (LF) are theoretical constructs that are mainly motivated by the fact that constraints can refer to them (potentially exclusively so).

Note on (1-a):

D-structure is not to be confused with the lexical array: The latter contains to hierarchically organized structures, the former does.

Note on (1-b):

S-structure is the level of representation at which we have so far assumed representational constraints to hold. S-structure movement is phonologically visible.

(There are exceptions: Move may apply to certain empty categories – not to traces, but to an empty pronominal subject PRO in **control** infinitives (cf. **John tries PRO₁ to be elected t₁**, or to so-called **null operators** OP in, e.g., certain relative clauses (cf. **the man OP₁ I was talking to t₁**).

Note on (1-c):

Logical Form is an abstract level of representation that is supposed to act as the interface to the semantic representation. (Sometimes, it is in fact regarded as the semantic representation itself; see Heim & Kratzer (1998). In that case, LF has sometimes been referred to as **Transparent Logical Form**.) Movement of items in the LF-component is necessarily phonologically invisible.

Constraints in the Principles-and-Parameters Approach

- (2) **Levels of grammar in the Principles-and-Parameters approach:**
Lexicon (plus Morphology) → D-structure → S-structure → Phonological Form, Logical Form
- (3) **Constraints in the Principles-and-Parameters approach:**
- Local derivational** constraints
(Some constraints are of this type.)
 - Local representational** constraints
(Most constraints are of this type.)
 - Global** constraints
(A few constraints are of this type.)
 - Transderivational/translocal** constraints
(The role of these constraints is minimal, but they exist nevertheless.)

Successive-Cyclic Movement

A question:

Movement operations like wh-movement appear to be unbounded in principle (as long as no constraints on Move are violated). Does such **long-distance movement** operate in one step, or does it result from the combination of smaller steps, i.e., operate **successive-cyclically**?

Successive-Cyclic Movement

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Assumption:

Long-distance movement applies successive-cyclically. Each intermediate SpecC position of a $C_{[-wh]}$ is targeted by Move on the way to the ultimate SpecC position of the $C_{[+wh]}$ node. Movement from a position created by Move (rather than by pure Merge) leaves an **intermediate** trace (t'_1 , t''_2 , etc.)

Successive-Cyclic Movement 2

(4) Successive-cyclic movement:

- a. How₁ do you think [_{CP} t'₁ [_C (that)] Mary solved the problem t₁] ?
- b. [_{DP₁} Which book] do you think [_{CP} t'₁ [_C (that)] John read t₁] ?
- c. [_{DP₁} What] does John think [_{CP} t''₁ [_C (that)] Mary said [_{CP} t'₁ [_C (that)] Bill likes t₁]] ?

Problem:

If Move is a special case of Merge, and (except for modification operations) Merge is possible only if it deletes a structure-building [**•F•**] feature (a [**•wh•**] feature in the case at hand), then how does movement to intermediate SpecC positions in (4) come about?

Movement to Intermediate Positions 1

Three solutions:

① Feature-based approach:

There is in fact a structure-building feature on the intermediate C nodes.

② Violability:

The Economy Constraint on Merge (Move) is violable in favour of certain other constraints that force (certain) Move operations to be successive-cyclic.

③ Form Chain:

There is no structure-building feature on the intermediate C nodes. Move operates in one step after all, targetting $C_{[+wh],[\bullet wh \bullet]}$ directly. But Move is a more complex operation (called 'Form Chain'): It inserts traces in all intermediate SpecC positions after re-merging an XP in its target position.

Movement to Intermediate Positions 2

Note:

The Form Chain approach is problematic for conceptual reasons (it violates the Strict Cycle Condition that will be discussed below). The approach in terms of violability has a number of non-trivial further consequences since it presupposes that constraints can be violable in principle (which we have not assumed so far). Hence, for the time being, the feature-based approach will be adopted. This approach is also arguably the predominant one in recent work based on minimalist assumptions.

Assumption (Chomsky (2000; 2001)):

C can be assigned a [\bullet F \bullet] ([\bullet wh \bullet], [\bullet top \bullet], [\bullet rel \bullet]) feature during the derivation (that triggers movement to SpecC) only if this has an effect on output.

Movement to Intermediate Positions 3

Note:

This raises a question with respect to the Inclusiveness Condition. Furthermore, the problem arises of how one can determine at a given stage in the derivation whether assigning a feature like $[\bullet wh \bullet]$ will eventually be justified; this seems to require what is known as **look-ahead**. Alternatively, one might assume that in order to decide at a given stage of the derivation whether $[\bullet wh \bullet]$ is to be assigned to a given C, one can look into the lexical array: Simplifying a bit, $[\bullet wh \bullet]$ should better be assigned to $C_{[-wh]}$ if there is a $C_{[+wh],[\bullet wh \bullet]}$ left in the lexical array that needs a wh-phrase to delete its structure-building $[\bullet wh \bullet]$ feature (and no other wh-item is left in the lexical array).

Alternative

An alternative:

Suppose that $C_{[-wh]}$ can optionally bear a feature like $[\bullet wh \bullet]$ in the lexical array, without qualification. Then, the problem might arise to exclude ill-formed sentences like (5-b), depending on the features of the root C (sentences of this type are possible as long-distance questions in certain languages, though, like Iraqi Arabic and Ancash Quechua). Depending on whether root C is $[+wh]$, $[\bullet wh \bullet]$ or $[-wh]$, (5-b) can be straightforwardly excluded ($[\bullet wh \bullet]$ on C must be deleted under identity with a $[Q]$ feature on a wh-phrase, which it is not in (5-b)), or requires additional assumptions (a $[-wh]$ C does not require a $[\bullet wh \bullet]$ feature; hence, the illformedness of (5-b) must be accounted for by invoking additional assumptions).

Conclusion

- (5) A potential problem with [**F**] features on [-wh] C nodes:
- a. Partial LA:
 - (ia) \emptyset : { [C], [root], [+wh], [+fin], [**T**, **+fin**] > [**Q**] }
 - (ib) \emptyset : { [C], [root], [-wh], [+fin], [**T**, **+fin**] }
 - (ii) \emptyset : { [C], [-wh], [+fin], [**T**, **+fin**] > [**Q**] }
 - (iii) which: { [D], [3pers,-pl,-fem,-masc], [acc], [Q], [**N**] }
 - (iv) book: { [N], [3pers,-pl,-fem,-masc], [acc] }
 - b. $*[_{CP} [_{C} \emptyset] \text{ Mary thinks } [_{CP} [_{DP_1} \text{ which book }] [_{C} \emptyset] \text{ John read } t_1]]$

Conclusion:

For present purposes, we simply assume that Move can operate successive-cyclically, via intermediate SpecC positions, and that such movement can be reconciled with the idea that Move takes place only if it deletes a structure-building feature.

Reflexes of Successive Cyclicity

Note:

Whereas it is difficult to find evidence for structure-building features on intermediate C nodes, there is evidence for successive-cyclic movement via SpecC as such.

- ① Some languages show morphological reflexes of successive-cyclicity in SpecC on either the C node (e.g., Modern Irish) or the adjacent SpecT position (e.g., Ewe).
- ② Some languages exhibit verb-second phenomena (V/T-to-C movement) in a CP exactly in those circumstances where (a certain type of wh-) movement has taken place from that CP (e.g., Spanish).
- ③ Some languages have obligatory CP extraposition (which is otherwise optional) when movement takes place from that CP (German).
- ④ Some languages (like Iraqi Arabic, Hungarian, Ancash Quechua, and German) even permit a stranding of the wh-phrase in an intermediate SpecC position (**partial wh-movement**).

Partial Wh-Movement

(6) Partial wh-movement in German:

- a. ?Wen₁ denkt Maria [_{CP} t'₁ [_C dass] Fritz t₁ mag] ?
- b. Was denkt Maria [_{CP} wen₁ [_C Ø Fritz t₁ mag] ?

Note:

Thus far, the only goal was to derive that successive-cyclic movement via SpecC is possible. It remains to be shown that such movement is also necessary in long-distance movement constructions.

The Constraint

(7) **Subjacency Condition**^d (Chomsky (1977)):

- a. In a structure $\alpha \dots [\beta \dots [\gamma \dots \delta \dots] \dots] \dots$, movement of δ to α cannot apply if β and γ are bounding nodes.
- b. DP and TP are **bounding nodes**.

Note:

The Subjacency Condition is much more general than most of the constraints discussed so far. True, it does mention categorial features ([D] and [T]), but it turns out to account for many effects that separate constraints were so far needed for.

A first consequence of the Subjacency Condition

It now follows that successive-cyclic movement is the only way to leave a CP: Otherwise, two TPs will be crossed in the course of a single Move operation. Thus, the SpecC position acts as an **escape hatch**. In the final output representation, the wh-phrase is separated from its initial trace by two bounding nodes, but given the derivational formulation of the Subjacency Condition and the availability of successive-cyclic movement, this is unproblematic.

(8) **The Subjacency Condition and successive-cyclic movement:**

$[_{DP_1}$ Which book] do $[_{TP_2}$ you think $[_{CP}$ t'_1 $[_C$ (that)] $[_{TP_4}$ John read t_1]]] ?

Further consequences of the Subjacency Condition

The Subjacency Condition accounts for
Complex NP Constraint effects,
Wh-Island Condition effects,
Left Branch Condition effects, some
Coordinate Structure Constraint effects, and
Sentential Subject Constraint/Subject Condition effects
(under certain assumptions).

Complex NP Constraint Effects

- (9) A consequence of the Complex NP Constraint, argument clauses:
- a.??[_{DP₁} Which book] did [_{TP₃} John hear [_{DP₂} a rumour [_{CP} t'₁ that you had read t₁]]] ?
 - b. *[[_{PP₁} How] did [_{TP₃} John hear [_{DP₂} a rumour [_{CP} t'₁ that you had fixed the car t₁]]] ?
 - c.?*The hat [_{DP₁} which] [_{TP₃} I believed [_{DP₂} the claim [_{CP} t'₁ that Otto was wearing t₁]]] is red

Note:

Movement in (9-abc) crosses TP₃ and DP₂ in the second step; TP₃ and DP₂ are bounding nodes. Hence, illformedness results. In contrast, the first movement step crosses only one bound node – the embedded TP –, and therefore respects the Subjacency Condition.

Complex NP Constraint, pt. 2

(10) A consequence of the Complex NP Constraint, relative clauses:

- a. * $[_{DP_1}$ Which book] did $[_{TP_3}$ John meet $[_{DP_2}$ a child $[_{CP}$ who $[_{TP_4}$ read t_1]]]] ?
- b. * $[_{DP_1}$ Who] does $[_{TP_3}$ Mary know $[_{DP_2}$ a girl $[_{CP}$ who $[_{TP_4}$ is jealous of t_1]]]] ?

Note:

Movement in (10-ab) crosses the two bounding nodes TP_3 and DP_2 . In addition, this time the embedded bounding node TP_4 is also crossed. The reason is this: First, there is some other category in the SpecC position of the relative clause already, viz., the relative pronoun. Second, it seems to be a fact about many languages (English and German among them) that C can have only one structure-building feature that triggers a Move operation targetting SpecC. In other words: C can only have one specifier. Under these assumptions, it follows that a relative pronoun in SpecC blocks the use of SpecC as an escape hatch for successive-cyclic movement from CP.

Complex NP Constraint, pt. 3

A side effect:

Movement from DP-internal relative clauses crosses one more bounding node than movement from DP-internal argument clauses. This is often taken to account for the fact that Complex NP Constraint violations are typically more severe with relative clauses than with argument clauses.

Wh-Island Condition Effects

(11) A consequence of the Wh-Island Condition:

- a. *How₁ does [_{TP₃} she know [_{CP} [_{DP₂} which car] [_{TP₄} Mary fixed t₂ t₁]]] ?
- b.?*[_{DP₁} Which book] do [_{TP₃} you wonder [_{CP} [_{PP₂} to whom] [_{TP₄} John gave t₁ t₂]]] ?
- c.??Who₁ do [_{TP₃} you wonder [_{CP} why C [_{TP₄} Mary loves t₁]]] ?

Note:

wh-movement in (11-ab) crosses two bounding nodes (TP₃ and TP₄), in violation of the Subjacency Condition. As with the relative clause case of the Complex NP Constraint, the problem is that the escape hatch SpecC is blocked by something else.

C Elements and Wh-Islands 1

A problem:

Why does wh-movement in (12) violate the Subjacency Condition? (Recall that it violates the Wh-Island Condition only because of the stipulation that wh-elements in SpecC or C block movement from a CP.)

(12) Wh-Islands created by C elements:

*How₁ do you wonder [_{CP} whether Mary solved the problem t₁] ?

C Elements and Wh-Islands 2

A solution:

It is clear that LIs like *whether* and *if* do not need to have [\bullet wh \bullet] features, unlike an empty (non-root) $C_{[+wh]}$, which must have a [\bullet wh \bullet] feature in English-type languages with wh-movement in questions. Suppose that this assumption is strengthened: *whether* and *if*, as a lexical property, cannot have a [\bullet wh \bullet] feature, in contrast to [-wh] complementizers (*that* and \emptyset) which can have [\bullet wh \bullet] features. Then, wh-movement in (12) will have to proceed in one step, without an intermediate landing site in the embedded SpecC position, and a violation of the Subjacency Condition is ensured.

Left Branch Condition Effects

(13) A consequence of the Left Branch Condition:

- a. * $[_{DP_1}$ Whose] did $[_{TP_3}$ you meet $[_{DP_2}$ t₁ sister]] ?
- b. * $[_{AP_1}$ Neue] hat $[_{TP_3}$ Hans $[_{DP_2}$ D $[_{NP}$ t₁ Bücher]] gekauft]
- new has Hans books bought

Note:

Movement crosses TP_3 and DP_2 in (13-ab). Hence, a violation of the Subjacency Condition results.

Coordinate Structure Constraint Effects

(14) **Consequences of the Coordinate Structure Constraint:**

- a. * $[_{DP_1}$ Who] does John like $[_{DP_3}$ t_1 and $[_{DP_2}$ Bill]] ?
- b. * $[_{DP_1}$ Who] is John $[_{AP}$ proud of t_1] and $[_{AP}$ tired of $[_{DP_2}$ his mother]] ?

Note:

(14-b) does not follow from the Subjacency Condition. (14-a) does so only if we assume (instead of postulating a “coordination phrase”) that the two DP conjuncts are dominated by a DP again.

Sentential Subject Constraint/Subject Condition Effects

(15) A consequence of the Subject Condition:

- a. * $[_{DP_2}$ Who(m)] has $[_{TP_3}$ $[_{DP_1}$ a comment about t_2] annoyed you] ?
- b. * $[_{PP_3}$ About whom] has $[_{TP_3}$ $[_{DP_1}$ a comment t_3] annoyed you] ?

Note:

Movement crosses two bounding nodes, TP_3 and DP_1 . Hence, a Subjacency Condition violation arises in both (15-a) and (15-b).

Sentential Subject Constraint/Subject Condition Effects 2

Problem:

Like the A-over-A Principle, the Subjacency Condition fails to distinguish between argument DPs that are external arguments merged in specifier positions (subjects) and argument DPs that are merged in complement positions (objects). This may be a desirable result for left branches of DPs, but it is less desirable for material that is merged to the right of N. Hence, it seems that the constraint is too strong; it rules out examples like (16-ab). However, it also rules out (16-cd), which is a welcome result – (16-c) has another type of embedding predicate, (16-d) has replaced the indefinite determiner of (16-abc) with a more specific, definite determiner (a so-called **Specificity** effect).

(16) A problem for the Subjacency Condition:

- a. [DP₁ Which author] did [TP₃ you read [DP₂ a book about t₁]] ?
- b. [DP₁ Who₁] did [TP₃ you see [DP₂ a picture of t₁]] ?
- c. *[DP₁ Which author] did [TP₃ you destroy [DP₂ a book about t₁]] ?
- d.?*[DP₁ Which author] did [TP₃ you read [DP₂ the book about t₁]] ?

Reanalysis

Sketch of a possible solution:

Suppose that certain types of verbs have a **reanalysis** property that in effect can break up the DP structure of its internal argument. Technically, we can assume that, e.g., **read** can have an additional [**•P•**] feature that does not correspond to a slot in the argument structure, and that can only be deleted by (string-vacuous) rightward movement of PP_1 (**about which author**) in (16-a) to a right-peripheral specifier in VP. Such PP movement from DP_2 crosses only one bounding node since the landing site is still below TP. In the next step, DP_1 would move from the extraposed PP_1 to SpecC, again crossing only one bounding node. Needless to say, such an analysis raises many further problems (e.g., moved items typically block further extraction, see below).

Sentential Subject Constraint 1

Note:

The Subjacency Condition may also account for Sentential Subject Constraint effects if we make some further assumptions. A first assumption might be that subject clauses are always embedded by DPs with empty D heads, as in (17-a). Then, it follows that movement from the subject CP_4 will have to cross two bounding nodes (TP_2 and DP_3), even if it proceeds successive-cyclically, via the intermediate SpecC position of CP_4 . Alternatively, one might assume that whereas there is no empty determiner embedding subject clauses, a LI C that is merged in a specifier position cannot bear the $[\bullet wh \bullet]$ that is otherwise optional (and needed to trigger successive-cyclic movement, by assumption). If so, Sentential Subject Constraint effects will essentially be derivable in the same way as Wh-Island Condition effects: In (17-b), wh-movement will have to cross two bounding nodes (TP_2 and TP_5) in one step.

Sentential Subject Constraint 2

(17) A consequence of the Sentential Subject Constraint:

- a. * $[_{DP_1}$ Who] did $[_{TP_2}$ $[_{DP_3}$ $[_D$ \emptyset] $[_{CP_4}$ t'_1 that $[_{TP_5}$ Mary was going out with t_1]]] bother you] ?
- b. * $[_{DP_1}$ Who] did $[_{TP_2}$ $[_{CP_4}$ that $[_{TP_5}$ Mary was going out with t_1]]] bother you] ?

Parametrization 1

Note:

The Subjacency Condition is the classic example of a parametrized constraint. The idea is that languages may differ with respect to what counts as a bounding node, and what does not. Here is Rizzi's (1982) famous proposal for Italian:

(18) **Parametrization of bounding nodes:**

- a. English: DP, TP
- b. Italian: DP, CP

Parametrization 2

Evidence:

Italian seems to freely violate the Wh-Island Condition (see (19-a)), but it respects the Complex NP Constraint (see (19-b)). Wh-Island Condition effects can be derived from the Subjacency Condition in English because they involve a crossing of two TP bounding nodes in one movement step; if CP replaces TP as a bounding node in Italian, Wh-Island Condition violations are expected to disappear. Complex NP Constraint effects can be derived from the Subjacency Condition in English because they involve a crossing of a DP and a TP bounding node; and if CP replaces TP as the second bounding node in Italian, these kinds of effects are still predicted. Furthermore, movement steps that cross **two** wh-islands are again correctly predicted to be impossible, even in Italian; see (19-c).

Parametrization: Basic Italian Data

(19) The Wh-Island Condition and the Complex NP Constraint in Italian:

- a. Tuo fratello [CP₃ [PP₁ a cui] mi domando [CP₄ [DP₂ che storie]
 your brother to whom myself I ask which stories
 abbiano raccontato t₂ t₁] era molto preoccupato
 they have told was very worried
- b. *Tuo fratello [CP₃ [PP₁ a cui] temo [DP₄ la possibilità [CP₅ t'₁ che
 your brother to whom I fear the possibility that
 abbiano raccontato tutto t₁]]] ...
 they have told everything
- c. *Francesca [CP₃ [DP₁ che] non immagino [CP₄ [DP₂ quanta gente] t₂ sappia
 Francesca who not I imagine how many people know
 [CP₅ [PP₆ dove] hanno mandato t₁ t₆]]] ...
 where they have sent

Parametrization: Problems

A cautionary note:

It is not really clear whether a parametrization of bounding nodes is the correct approach. First, the Italian examples above involve relativization; however, Italian wh-movement constructions that closely resemble constructions that are typically chosen to illustrate Wh-Island Condition effects in English are also fairly ill formed; the pertinent examples can already be found in Rizzi's (1982) original work. Second, some of the English examples that involve a Wh-Island Condition violation are often not judged to be that ill formed after all; see Grimshaw (1986), Chomsky (1986).

Parametrization: Other Data

(20) *Wh-movement respects the Wh-Island Condition in Italian:*

- a. * $[_{DP_1} \text{ Chi}] \text{ ti} \quad \text{domandi} \quad [_{CP_3} [_{DP_2} \text{ chi}] \text{ t}_2 \text{ ha incontrato t}_1]$?
 who yourself you ask who has met
- b?? $[_{DP_1} \text{ Chi}] \text{ non sai} \quad [_{CP_3} [_{DP_2} \text{ che cosa}] \text{ t}_1 \text{ ha fatto t}_2]$?
 who not you know what has done

(21) *Wh-movement may violate the Wh-Island Condition in English:*

- a. $[_{DP_1} \text{ Which book}] \text{ did the students forget} \quad [_{CP_3} \text{ who}_2 \text{ t}_2 \text{ wrote t}_1]$?
- b. $[_{DP_1} \text{ Which car}] \text{ did John tell you} \quad [_{CP_3} \text{ how}_2 \text{ to fix t}_1 \text{ t}_2]$?

Parametrization: Conclusion

Conclusion:

The concept of parametrization of bounding nodes is often considered dubious nowadays. More generally:

(22) Assumptions about parametrization:

Languages differ (a) the feature structures of their LIs (including functional categories), and (b) their linear precedence statements, but not in (c) the make-up of the fundamental operations Merge and Move, or (d) the constraints.

A Gap in the Argument So Far?

Note:

The discussion so far presupposes a certain derivational order in Wh-Island Condition constructions: First, a wh-phrases XP_2 moves to the embedded $\text{Spec}C_{[+wh]}$, then, another wh-phrase XP_1 moves across it to the higher $\text{Spec}C_{[+wh]}$. But what about the reverse application of movement operations?

An Alternative Derivation

(23) An alternative derivation for Wh-Island Condition constructions:

- a. ...
- b. $[CP_4 C_{[+wh]} [TP \text{ John gave } [DP_1 \text{ which book }] [PP_2 \text{ to whom }]]]]$
- c. $[CP_4 [DP_1 \text{ which book }] C_{[+wh]} [TP \text{ John gave } t_1 [PP_2 \text{ to whom }]]]]$
- d. ...
- e. $[CP_5 C_{[+wh]} [TP \text{ you wonder } [CP_4 [DP_1 \text{ which book }] C_{[+wh]} [TP \text{ John gave } t_1 [PP_2 \text{ to whom }]]]]]]$
- f. $[CP_5 [DP_1 \text{ which book }] C_{[+wh]} [TP \text{ you wonder } [CP_4 t'_1 C_{[+wh]} [TP \text{ John gave } t_1 [PP_2 \text{ to whom }]]]]]]$
- g. $[CP_5 [DP_1 \text{ which book }] C_{[+wh]} [TP \text{ you wonder } [CP_4 [PP_2 \text{ to whom }] C_{[+wh]} [TP \text{ John gave } t_1 t_2]]]]]]$

First Solution: Strict Cycle Condition

A first solution:

The standard solution to this problem is that the last movement operation in (23) is **counter-cyclic**: It violates the **Strict Cycle Condition**:

(24) **Strict Cycle Condition**^d (Chomsky (1973)):

No operation can apply to a domain dominated by a cyclic node α in such a way as to affect solely a proper subdomain of α dominated by a node β which is also a cyclic node.

Note:

There is disagreement as to what counts as a cyclic node. The strongest hypothesis is that every XP is a cyclic node.

(25) **Cyclic node**:

Every XP is a cyclic node.

Conclusion:

The last operation in the derivation in (23) violates the Strict Cycle Condition: Here, wh-movement of PP₂ affects only the embedded CP₄, which is dominated by several other cyclic nodes (matrix VP, matrix TP, matrix CP₅).

Second Solution: Subjacency is Representational

A second solution:

Suppose that the Subjacency Condition is reformulated as a representational constraint:

(26) **Subjacency Condition**^r (Freidin (1978; 1992)):

- a. *... α_1 ... [β ... [γ ... t_1 ...] ...] ..., where β and γ are bounding nodes.
- b. DP and TP are bounding nodes.

Conclusion:

It is now immaterial how Wh-Island Condition constructions are derived: The Subjacency Condition successfully rules out the final output representation. All the remaining evidence in favour of the Subjacency Condition that was discussed so far can still be accounted for under the representational reformulation.

Third Solution

A third solution:

Suppose that we maintain the derivational formulation of the Subjacency Condition. Counter-cyclic derivations of Wh-Island Condition constructions may then still be excluded without invoking the Strict Cycle Condition, given the assumptions about movement adopted above. Here is why:

- (i) Because of the Economy Constraint on Merge and the definition of Move in terms of Merge, there can be no movement without deletion of a structure-building feature.
- (ii) C can only have one structure-building [\bullet wh \bullet] feature in English-type languages (otherwise, multiple wh-movement would be predicted to occur, as in Bulgarian).
- (iii) Once DP₁ has moved to SpecC of CP₄ in (23), no other XP (including PP₂) will be able to move to that position in the remainder of the derivation, because of the Economy Constraint on Merge.

Conclusion: Strict Cyclicity

Note:

Even though it may not be needed for an account of Wh-Island phenomena, the Strict Cycle Condition is a fundamental constraint in derivational approaches to syntax. It is needed in many other domains.

Is the Subjacency Condition a Derivational or a Representational Constraint?

Chomsky (1981) presents a theory-internal argument in favour of a derivational formulation of the Subjacency Condition. It is based on wh-movement from **exceptional Case-marking** (ECM) constructions. Assumptions:

- ① In ECM constructions, the structure-building [\bullet acc \bullet] Case feature of a matrix V can exceptionally be deleted under identity with an [acc] Case feature on a DP that V is not merged with; rather, the DP providing the matching [acc] feature is the specifier of an infinitival TP complement of V.
- ② The Case feature of DP in SpecT of an infinitive cannot be deleted under identity with a structure-building Case feature within the infinitive.
- ③ DP must move to the embedded SpecT position even though infinitival T cannot possibly have a [\bullet nom \bullet] feature. (This might argue for [\bullet D \bullet] as the feature triggering movement to SpecT after all.)

Exceptional Case Marking

(27) ECM constructions:

I believe [_{TP} [_{DP₁} him] to be t₁ in love with Mary]

Problem:

If bare TP embedding is the correct analysis for (27), (28) is wrongly predicted to incur a violation of the Subjacency Condition: A SpecC escape hatch is missing.

(28) A violation of the Subjacency Condition:

Who₂ do [_{TP} you believe [_{TP} him₁ to be in love with t₂]] ?

Chomsky's solution

ECM constructions initially involve Merge of V and an infinitival CP. As a lexical property, ECM predicates can then delete the CP shell later in the derivation; and they must do so in order to ensure [**acc**]/[acc] feature deletion on V and DP₁. However, wh-movement must take place prior to CP deletion, in order to satisfy the Subjacency Condition. This, in turn, implies that the Subjacency Condition must be a derivational constraint; a representational Subjacency Condition can only check the ultimate output representation, in which CP has been deleted, and the wh-phrase is separated from its trace t₂ by two TP bounding nodes.

(29) A relevant part of the derivation:

- a. [_{CP} C [_{TP} him to be in love with who₁]]]
- b. [_{CP} who₁ C [_{TP} him to be in love with t₁]]] ...
- c. who₁ do [_{TP} you believe [_{CP} t'₁ C [_{TP} him to be in love with t₁]]]]
- d. who₁ do [_{TP} you believe [_{TP} him to be in love with t₁]]] ?

A Note on LF Movement and the Subjacency Condition

Note:

Recall that the Principles-and-Parameters approach envisages an abstract level of Logical Form that is created on the basis of S-structure via so-called LF movement. LF movement has been suggested for the following types of categories, among others:

- (30) **Items that undergo LF movement in the Principles-and-Parameters approach:**
- wh-phrases in multiple questions that are **in situ** at S-structure undergo movement to a specifier position of $C_{[+wh]}$ in the LF component.
 - Quantified XPs undergo so-called **quantifier raising** (QR) to a TP- or VP-specifier in the LF component.

LF Movement and Subjacency

The basic motivation behind postulating these abstract movement operations is semantic. We will not be concerned with the question of what triggers the movement operation (structure-building [\bullet F \bullet] features that are somehow inert at S-structure being an obvious candidate), and what the exact landing site is. Furthermore, we can leave open whether there is or is not good reason to assume a level of Logical Form that is derived by syntactic movement in the first place. However, it seems clear that if LF exists, the Subjacency Condition can not be assumed to hold at this level (if it is formulated representationally), or to hold for movement operations that connect S-structure to LF (if it is formulated derivationally). Here is why:

(31) **Wh-in situ does not obey the Subjacency Condition:**

- a. Who₁ t₁ remembers [_{CP} why₂ we bought what₃ t₂] ?
- b. Who₁ t₁ likes [_{DP} D books [_{CP} that criticize who₂]] ?
- c. Who₁ t₁ thinks [_{CP} that [_{DP} pictures of who₂] are on sale] ?

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- b. Who₁ t₁ likes [DP D books [CP that criticize who₂]] ?
- c. Who₁ t₁ thinks [CP that [DP pictures of who₂] are on sale] ?

Observation:

The same goes for other island phenomena.

(32) **Wh-in situ does not obey the Coordinate Structure Constraint:**

Who₁ t₁ saw John and who₂ ?

LF Movement and Subjacency 2

Observation:

The same goes for wh-in situ in a language like Chinese, which does not have [●wh●] features on C nodes marked [+wh] (see Huang (1982)).

(33) Wh-in situ does not obey the Subjacency Condition:

- a. ni zui xihuan [DP shei mai de shu] ?
 you most like who buy Comp book
 ‘*Who₁ do you like the books that t₁ bought?’
- b. [CP wo mai shenme] zui hao ?
 I buy what most good
 ‘*What₁ is that I buy t₁ best?’

Conclusion:

The argument for a syntactic derivation of a level of Logical Form is strengthened if it can be shown that LF-construction obeys constraints that are otherwise well motivated in syntax; it is weakened if it does not obey any of the well-established syntactic constraints. There is no general agreement with respect to this question so far.

Empirical Problems with Subadjacency Ia

Prediction: Extraction from an argument CP in a CNPC configuration should be ok (with TP, DP as bounding nodes) if the landing site is below TP.

Background: German has scrambling to the VP domain.

Observation: Movement is still ungrammatical in this context.

Conclusion:

This shows that the problem with extraction from CP in a CNPC configuration is not due to the combined TP-DP structure; rather, it suggests that the CP itself is an island in this context.

(34) **Scrambling from CNPC in German:**

- a. dass [TP ihm [vP keiner [DP das Gerücht [CP dass die Maria den Karl₁ mag]] mitgeteilt hatte
- b. *dass [TP ihm [vP den Karl₁ keiner [DP das Gerücht [CP dass die Maria t₁ mag]] mitgeteilt hatte
- c. *dass [TP ihm [vP den Karl keiner [DP das Gerücht] mitgeteilt hatte [CP dass die Maria t₁ mag]
- d. dass ihm den Karl₁ keiner t₁ vorgestellt hatte

Empirical Problems with Subjacency Ib

Note: (34-bc) could still be excluded under the Italian parameterization (CP, DP as bounding nodes). However, this solution is not available because German strictly obeys the Wh-Island Constraint (and reducing this to Subjacency requires having TP and DP as bounding nodes).

(35) *Wen₁ weißt du nicht [_{CP} wie₂ man t₂ t₁ anzusprechen hat] ?

Empirical Problems with Subjacency IIa

Prediction: If a language has a movement operation targetting a DP-internal position, there should be no Subjacency violation in complex NP configurations under either setting of the bound node parameter.

Background: German has such a (slightly marked, and substandard) movement operation.

(36) [DP₂ [PP₁ Von Peter] [D' das Gerücht t₁]] habe ich t₂ gehört
 by/of Peter the rumour have I heard

Empirical Problems with Subadjacency IIb

Observation: Movement is still ungrammatical in this context.

Conclusion:

This again shows that the problem with extraction from CP in a CNPC configuration is not due to the combined TP-DP (or CP-DP) structure; rather, it suggests that the CP itself is an island in this context.

- (37) a. Fritz hat [DP das Gerücht [CP dass Maria [PP₁ von Peter] gestern ein Buch
Fritz has the rumour that Maria by Peter yesterday a book
gekriegt hat] gehört
given was heard
- b. *[PP₁ Von Peter] hat Fritz [DP das Gerücht [CP dass Maria t₁ gestern ein Buch
by Peter has Fritz the rumour that Maria yesterday a book
gekriegt hat] gehört
given was heard
- c. *Fritz hat [DP [PP₁ von Peter] [D' das Gerücht [CP dass Maria t₁ gestern ein
Fritz has by Peter the rumour that Maria yesterday a
Buch gekriegt hat]] gehört
book given was heard

The Role of the Subjacency Condition in Linguistic Theory

... can hardly be overestimated. From one perspective, it is a major accomplishment; from another one, it is an obvious target. The Subjacency Condition qualifies as a prime example of **metonymic transfiguration**.

“What kind of genetic theory of language acquisition is generative linguistics then? You are not seriously looking for subjacency mutants, after all.” (Huybregts & Riemsdijk (1982, 24))

“It should also be emphasized ... that, in the current view, the principles and structures whose existence it is difficult to explain without universal grammar (such Chomskian things as the **subjacency constraint**, the empty category principle, and the binding principles) are theory-internal affairs and simply do not exist in usage-based theories of language – full stop.” (Tomasello (2003, 7))

Subjacency and Evolution

“[Pinker and Bloom (1990)] note that it has been proposed that such constraints might aid in the parsing, or processing, of sentences by listeners. So how did Subjacency come about? Pinker and Bloom conclude [...]: “But by settling in on a particular subset of the range of possible compromises between the demands of expressiveness and parsability, the evolutionary process may have converged on a satisfactory set of solutions to one problem in language processing.” Pinker and Bloom conclude that the “evolutionary process may have converged on” a solution to parsing problems involving the Subjacency constraint. This falls short of what they actually hoped to show; viz., that Subjacency was an adaptation and resulted from natural selection. For evolution is not the same as natural selection. It involves a host of other physical factors. Why did evolution “compromise” on Subjacency, as opposed to other conceivable constraints? The answer must be discovered by a consideration of the various genetic, developmental and physical factors that played a role in the “evolutionary process”. These kinds of factors must account in large part, perhaps fully, for the properties of Subjacency, just as they play a central role in accounting for the spirals in sunflowers or the DNA double helix. But whether or not natural selection played any significant role in this particular case remains an open question and was left unanswered by Pinker and Bloom.” (Jenkins (2000, 194))

More on Subjacency and Evolution

“Voltaire’s Dr Pangloss held that “Things cannot be other than they are ... Everything is for the best purpose. Our noses were made to carry spectacles. [...] Modern Panglossians show that the Subjacency Condition, the Binding Theory, etc. constrain speakers to produce forms which can be understood (“parsed”) in accordance with our apparent parsing capacity. [...] But this is not enough. If the emergence of the Subjacency Condition limited traces of movement operations to those that are local enough to be parsed [...], one wants to know why **this** solution was adopted. [...] Why was the relevant limitation not made by using a resumptive pronoun in place of a trace [...]?”

In order to approach the question of **why** the Subjacency Condition evolved, one needs to have a notion of **how** it evolved. Assuming that the Subjacency Condition is a condition on the distribution of traces of movement operations, one might show that organisms with traces constrained by Subjacency “have an edge over” similar organisms which lacked Subjacency, other things remaining constant. [...] To say that an organism with some property “has an edge over” a similar organism without that property entails claiming that it had a better chance of having descendants, if one intends to offer an argument that the property is due to natural selection. [...] The Subjacency Condition has many virtues, but I am not sure that it could have increased the chances of having fruitful sex.” (Lightfoot (1999, 235-236))

An Even More Radical Approach

Hypothesis (Kluender & Kutas (1993)):

The Subjacency Condition does not exist as a principle of grammar. Its effects can be derived from **parsing difficulties**; i.e., Subjacency effects illustrate performance problems, not competence problems.

Argument (from behavioural and ERP studies):

- ① Clause-initial (closed-class) material gives rise to parsing difficulty, in the order **what/who** \gg **if** \gg **that**.
- ② Movement (filler-gap) dependencies give rise to parsing difficulties.
- ③ When the two tasks are combined, the difficulties may become insurmountable, leading to strong deviance: wh-islands.
- ④ This result may perhaps be generalized to (some) other Subjacency effects.
- ⑤ Thus, Subjacency effects pose the same kind of performance-related problem as instances of multiple center-embedding.

Adjunct Condition

Observation:

Items which do not enter the derivation via structure-building Merge (modifiers, so-called **adjuncts**) are always islands. This can be formulated in a preliminary way as the Adjunct Condition:

(38) **Adjunct Condition^d**:

Movement must not take place from an XP that has been merged without a deletion of structure-building features.

The Adjunct Condition straightforwardly excludes Complex NP Constraint constructions in which a relative clause is crossed by movement. Furthermore:

Consequence

(39) A consequence of the Adjunct Condition:

- a. * $[_{DP_1}$ Who] did you get jealous $[_{CP}$ because I talked to t_1] ?
- b. * $[_{PP_1}$ To whom] did they leave $[_{CP}$ before speaking t_1] ?
- c. * $[_{DP_1}$ Who] did they leave $[_{CP}$ before speaking to t_1] ?

Question:

Can (39-abc) also be excluded by the Subjacency Condition? The answer is yes if we can ensure that the adjunct CPs do not have a SpecC position that is available for successive-cyclic movement; otherwise (i.e., if the adjunct CPs have an available SpecC position) it is no.

The Condition on Extraction Domain

Observation:

The Subject Condition and the Adjunct Condition can be unified as the Condition on Extraction Domain (CED). The basic insight was arguably first formulated by Cattell (1976). The notion CED is due to Huang (1982). Kayne (1984) employs a similar concept. Chomsky (1986) is the most comprehensive and careful study in this area; it centers around the notion of **barrier**. Cinque (1990) has useful simplifications. The following definition freely draws on all the concepts developed in these approaches.

(40) Condition on Extraction Domain (CED):

- a. Movement must not cross a barrier.
- b. An XP is a **barrier** iff it is not a complement.

Freezing and The Condition on Extraction Domain 1

Note:

Conceptually, this is a step in the right direction because we move from an intrinsic definition to a contextual definition of locality domains: Whether some XP is a bounding node or not is simply listed; whether some XP is a barrier or not can be determined by looking at the syntactic context in which it occurs.

Consequence:

A barriers-based approach to locality in terms of the Condition on Extraction Domain can account for Subject Condition and Adjunct Condition effects. It also derives the relative clause case of the Complex NP Constraint. If argument clauses selected by N are in fact not merged in complement position (as suggested by Stowell (1981), Kiss (1986), among others), Complex NP Constraint phenomena can be explained in toto. A further constraint that can be dispensed with in favour of the Condition on Extraction Domain is the Freezing Principle. The reason is that movement can never end in a complement position.

Freezing and The Condition on Extraction Domain 2

- (41) **Freezing Principle**^d (based on Ross (1967), Wexler & Culicover (1980)):
Movement cannot take place from a moved XP.

Note:

Given that subject DPs are DPs that have been moved to SpecT, their opacity follows from both the Subject Condition and the Freezing Principle.

- (42) **Consequences of the Freezing Principle:**

- a. *Who₁ do you think [CP t'₁ that [DP₂ pictures of t₁] were painted t₂] ?
- b. *Who₁ do you think [CP t'₁ that [DP₂ pictures of t₁] John would like t₂] ?
- c. *Who₁ do you think [CP [PP₂ to t₁] he will talk t₂] ?
- d. *Who₁ don't you know [CP [DP₂ which picture of t₁] Mary bought t₂] ?
- e. *[PP₁ Über Fritz]₁ glaube ich [CP [DP₂ ein Buch t₁] hat Maria t₂ geschrieben]
about Fritz believe I a book has Maria written

Rigid vs. Relativized Locality

An important distinction:

From a more general point of view, we can distinguish between two types of (local derivational or local representational) locality constraints – rigid locality constraints and relativized locality constraints (island constraints all belong to the first group).

Two types of locality constraints

(43) a. **Rigid Locality:**

- (i) Complex NP Constraint
- (ii) Sentential Subject Constraint
- (iii) Subject Condition
- (iv) Coordinate Structure Constraint
- (v) Upward Boundedness Constraint
- (vi) Left Branch Condition
- (vii) Wh-Island Condition
- (viii) Clause Non-final Incomplete Constituent Constraint
- (ix) Post-Sentential Subject Extraction Constraint
- (x) Subjacency Condition
- (xi) Adjunct Condition
- (xii) Condition on Extraction Domain

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- (ix) Post-Sentential Subject Extraction Constraint
- (x) Subjacency Condition
- (xi) Adjunct Condition
- (xii) Condition on Extraction Domain

b. **Relativized Locality:**

- (i) A-over-A Principle
- (ii) F-over-F Principle
- (iii) Superiority Condition
- (iv) Minimal Link Condition (= F-over-F Principle & Superiority Condition)
- (v) Relativized Minimality (Rizzi (1990), not yet discussed)

Conclusion

Generalization:

Both types of constraints are needed, but it is far from clear which phenomena should be accounted for by which constraint type. Currently, there are two fundamental constraints that are widely adopted: The Condition on the Extraction Domain on the one hand, and the Minimal Link Condition (i.e., the combined F-over-F Principle/Superiority Condition) on the other.

Note:

There is an interesting correlation: The XPs that best tolerate movement out of them are also the ones that can be moved most easily themselves (from certain types of islands), viz.: complements. Ideally, this should be reflected in the theory.

The Empty Category Principle

Assumption:

The Empty Category Principle is a representational constraint that holds at LF.

(44) **Empty Category Principle (ECP)**^r:

Every trace must be marked $[+\gamma]$.

(45) **γ -Marking** (derivational):

A trace is marked $[+\gamma]$ iff it is properly governed.

(46) **Proper Government** (simplified):

A trace is properly governed if it is antecedent-governed or lexically governed.

Lexical Government and Antecedent-Government

(47) **Lexical Government** (simplified):

α lexically governs β iff

- a. α is a LI belonging to a lexical category.
- b. α and β are dominated by the same XPs.

(48) **Antecedent-Government** (simplified):

α antecedent-governs β iff

- a. α and β are co-indexed.
- b. α c-commands β .
- c. There is no barrier between α and β .
- d. There is no wh-phrase or complementizer in the C domain that intervenes between α and β .

Note:

(i) An item in SpecC cannot antecedent-govern a subject trace in SpecT across a lexical complementizer.

(ii) An item in an outer SpecC position cannot antecedent-govern a subject trace in SpecT across an item in an inner SpecC position.

Complementizer-Trace Effects and the ECP

(49) **The ECP accounts for that-trace effects:**

- a. *Who₁ do you think [_{CP} t'₁([+γ]) that [_{TP} t₁([-γ]) left]] ?
- b. Who₁ do you think [_{CP} t'₁([+γ]) ∅ [_{TP} t₁([+γ]) left]] ?

Analysis:

The trace t_1 in (49-b) is antecedent-governed from SpecC; the trace t_1 in (49-a) is not. Since it is not lexically governed either, it cannot be assigned [+γ], and the ECP will be violated at LF.

General assumption (Lasnik & Saito (1984; 1992), Chomsky (1986)):

Intermediate traces of arguments can be deleted on the way to LF (intermediate traces of adjuncts cannot be deleted on the way to LF).

An Anti-complementizer-trace effect

(50) **An Anti-that-trace effect:**

Who₁ do you think [_{CP} t'₁'([+γ]) that Mary said [_{CP} t'₁'([-γ]) ∅ [_{TP} t₁([+γ]) left]]] ?

Note:

There is no ECP violation in (50) because the intermediate argument trace t'₁'([-γ]) can be deleted on the way to LF; but there is an ECP violation in (49-a) because the initial t₁([-γ]) cannot be deleted on the way to LF. This presupposes that the ECP is a representational constraint applying to LF representations, not to S-structure representations or derivations. If the ECP held at S-structure or in the derivation, we would expect the [-γ]-marked intermediate trace t'₁' in (50) to induce a fatal ECP effect that would render the sentence ungrammatical.

ECP and Superiority 1

Note:

Another application of the ECP concerns data that have so far been accounted for by the Superiority Condition:

(51) Superiority Condition effects:

- a. Who₁ t₁ saw what₂ ?
- b. *What₂ did who₁ see t₂ ?
- c. I wonder [CP who₁ t₁ bought what₂]
- d. *I wonder [CP what₂ who₁ bought t₂]

Analysis:

If all wh-in situ XPs must move to a SpecC_[+wh] position in the LF component, and if they must occupy an **outer** specifier of C if some other wh-phrase has already moved to a specifier of C in the syntax, a subject trace created by LF wh-movement will not be marked [+γ]. Not being deletable, it will therefore incur a violation of the ECP.

ECP and Superiority 2

Problem (Hendrick & Rochemont (1982), Pesetsky (1982)):
An ECP approach does not cover all Superiority Condition effects.

(52) **Superiority Condition effects that are not reducible to the ECP:**

- a. Whom₁ did John persuade t₁ [CP to visit whom₂] ?
- b. *Whom₂ did John persuade whom₁ [CP to visit t₂] ?

The Projection Principle

Note:

The Projection Principle (Chomsky (1981)) applies to pairs of levels of representation; hence, it qualifies as a global constraint.

(53) Projection Principle^g:

- 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 .

(54) A consequence of the Projection Principle:

- a. What₁ did John [_{VP} see t₁]?
- b. *What₁ did John [_{VP} see]?

The Projection Principle 2

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 (54-b) is an impossible S-structure representation, we have to know that there is an object DP within VP at D-structure.

Avoid Pronoun

Note:

Chomsky (1981) proposes a non-local, non-global Avoid Pronoun principle as a genuinely grammatical (i.e., non-pragmatic) constraint. The empirical evidence comes from English gerunds. A background assumption is that all entries in the argument structure (Θ -grid) of a predicate must be represented as arguments in the syntax. In those cases where no external argument DP is visible, there is a non-overt argument PRO.

(55) PRO in English gerunds:

- a. John₁ would much prefer [PRO₁ going to the movie]
- b. *John₁ would much prefer [PRO_{2/arb} going to the movie]

Avoid Pronoun and a Constraint on Control

(56) **Constraint on Control**^r (Manzini (1983)):

If PRO is minimally dominated by a declarative clausal complement α , then it must be controlled by an antecedent within the minimal CP that dominates α .

(57) **Pronouns in English gerunds:**

- a. *John₁ would much prefer [his₁ going to the movie]
- b. John₁ would much prefer [his₂ going to the movie]
- c. John₁ would much prefer [his₁ book]

Observation:

It is unclear why (57-a) is ungrammatical. (Constraints of the Binding theory cannot be involved, see (57-c) and below). Proposal:

(58) **Avoid Pronoun**^{td/tl} (Chomsky (1981)):

Lexical pronouns are blocked by empty pronouns if possible.

Avoid Pronoun: A Better Formulation

Note:

To make the Avoid Pronoun account work, we cannot adopt the null hypothesis according to which derivations (or output representations) compete with each other (i.e., are in the same **reference set**) if they go back to the same LA; see (60). Otherwise, (55-a) could not block (57-a). Thus, an independent way must be found to determine the reference set, i.e., the set of competing derivations (or output representations). Furthermore, we must assume that a derivation that violates some local constraint (like the Constraint on Control) cannot block another derivation; see (61). A more precise definition of the Avoid Pronoun constraint might look as follows.

(59) **Avoid Pronoun**^{td/tl} (different formulation):

If two derivations D_1 and D_2 are in the same reference set and D_1 uses a lexical pronoun where D_2 uses an empty pronoun, then D_1 is to be preferred over D_2 .

Reference Sets

(60) **Reference Set:**

Two derivations D_1 and D_2 are in the same reference set iff:

- a. D_1 and D_2 start with the same LA.
- b. D_1 and D_2 do not violate local or global constraints.

(61) **Reference Set:**

Two derivations D_1 and D_2 are in the same reference set iff:

- a. D_1 and D_2 have identical lexical categories in the LA.
- b. D_1 and D_2 have the same semantic interpretation.
- c. D_1 and D_2 do not violate local or global constraints.