ON DERIVING
LOCALITY CONSTRAINTS ON MOVEMENT
IN A PHASE-BASED APPROACH TO SYNTAX

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Lecture 1

Background

1. Locality Constraints

1.1. General Remarks

(1) Constraint types:
   a. A local derivational constraint applies to syntactic (Merge or Move) operations.
   b. A local representational constraint (“filter”) applies to an output representation.
   c. A global constraint applies to a whole derivation; it correlates non-adjacent steps in the derivation.
   d. A translocal constraint applies to sets of output representations; it picks out an optimal output representation among competing output representations.
   e. A transderivational constraint applies to sets of derivations; it picks out an optimal derivation among competing derivations.

(2) Complexity of constraint types:
   derivational constraints, representational constraints < global constraints < translocal constraints < transderivational constraints

Strategy:
   If constraint C1 and constraint C2 can account for a given phenomenon in the same way and C1 is less complex than C2 then, other things being equal, choose C1.

Note:
   This strategy does not imply that transderivational, translocal, or global constraints should be abandoned.

A meta-constraint on constraints:
   Constraints should be as general as possible.

1.2. The A-over-A Principle

(3) A-over-A Principle (Chomsky (1964)):
   In a structure ... [A ... [A ... ...] ...] ..., an operation can only affect the higher, more inclusive category A.

Note:
   The A-over-A Principle is a local derivational constraint. To find out whether a given derivation respects it or not, each (Move) operation must be checked, by taking into account the phrase marker constructed so far.

(4) A first consequence of the A-over-A Principle:
   a. [PP1, My letter to [PP2, a friend in Italy] ] got lost
   b. *[PP2, Who] did [PP1, my letter to t2] get lost ?
   c. *[PP1, Which letter to [PP2, a friend in Italy] ] got lost?
   d. *[John is the friend [PP2, who] C [PP1, my letter to t2] ] got lost
   e. This is the letter [PP1, which ] t1 got lost

(5) Another consequence of the A-over-A Principle:
   a. John heard [PP1, a rumour that you had read [PP2 this book]]
   b. *[PP2, What] did John hear [PP1, a rumour that you had read t2]]
   c. *[PP1, Which rumour that you had read [PP2 this book]] did John hear ?
   d. *[This is a book [PP2, which ] John heard [PP1, a rumour that you had read t2] ]
   e. This a rumour [PP1, which ] John heard t1

Note:
   The A-over-A Principle can be reformulated as a representational constraint on outputs.

(6) A-over-A Principle (representational version):
   "... A2 ... [A1 ... t2 ... ] ... ] ..."

Note:
   Crucially, this formulation relies on the existence of traces, and this is in fact one of the two main reasons why one would want to postulate traces in the first place (the other main reason being that traces are relevant for semantic interpretation).

Motivating traces
   Traces are needed by representational constraints.

Problem:
   The A-over-A Principle is too strong and too weak. The first problem is potentially severe; the second problem makes the A-over-A Principle look less plausible.

(7) Well-formed DP-over-DP examples ruled out by the A-over-A Principle:
   a. [PP2, Who would you approve of [PP1, my seeing t2] ] ?
   b. [PP2, Which author] did you read [PP1, a book about t2 ] ?

(8) Well-formed CP-over-CP examples ruled out by the A-over-A Principle:
   a. John wouldn’t say [CP1, that Mary thinks [CP2, that Bill is nice ]]
   b. [CP2, That Bill is nice ] John wouldn’t say [CP1, that Mary thinks t2 ]
   c. Fritz hat behauptet [CP1, Maria würde denken [CP2, dass er nett ist ]] Fritz non, has claimed Maria would think that he nice is
   d. [CP2, Dass er nett ist ] hat Fritz behauptet [CP1, würde Maria denken t2 ]
1. Locality Constraints

(9) Well-formed VP-over-VP (-over VP) examples ruled out by the A-over-A Principle:

a. Fritz hat [vp₁, [vp₂ zu arbeiten] versucht]
Fritznom has to work tried
b. [vp₂ Zu arbeiten] hat Fritz [vp₁ t₂ versucht]
to work has Fritznom tried
c. [vp₁ [vp₂ Zu arbeiten] versucht] hat Fritz t₁
to work tried has Fritznom tried
d. Ich [v₁ denke] nicht [vp₀ t₃ [cp dass er [vp₁ [vp₂ zu arbeiten] versucht]]
I think not that he to work tried
hat]
has
e. ?[vp₁ [vp₂ Zu arbeiten] versucht] [vp₀ t₄ [cp dass er t₁ to work tried think I not that he
hat]]
has
f. ?[vp₂ Zu arbeiten] denke ich nicht [vp₀ t₄ [cp dass er [vp₁ t₂ versucht]]
to work think I now that he tried
hat]]
has

(10) An ill-formed example not ruled out by the A-over-A Principle – AP movement from DP:

a. You have [dp₁ a [ap₂ very intelligent] [sister]]
b. [dp₁ [ap₂ How intelligent] a t₂ sister] do you have ?
c. *[ap₂ How intelligent] do you have [dp a t₂ sister] ?

(11) Another ill-formed example not ruled out by the A-over-A Principle – DP movement from PP (preposition stranding):

a. Sie spielt [pp₁ mit [pp₂ dem grünen Auto]]
she plays with the green car
b. [pp₁ Mit [pp₂ welchem Auto]] spielt sie t₁ with which car plays she
c. *[dp₂ Welchem Auto] spielt sie [pp₁ mit t₂] with which car plays she with
d. [pp₁ Mit [pp₂ dem grünen Auto]] spielt sie t₁ with the green car plays she

e. *[dp₂ Diesem Auto] spielt sie [pp₁ mit t₂] this car plays she with

Outlook: the future.
The A-over-A Principle is formulated in terms of categorial features. Assumption (see below): Certain designated features are responsible for triggering various movement operations (\([wh\] for wh-movement, \([stop\] for topicalization, etc.). These features are not (necessarily) categorial. (Possible exception: \([stop\], the EPP feature of T.) What would happen if the A-over-A Principle were revised as an F-over-F Principle?

(12) F-over-F Principle:

In a structure \([\alpha_{[\beta]} … [\gamma_{[\eta]} … [\iota] …] …]\) movement to \([F{\beta}]\) can only affect the category bearing the \([\beta]\) feature that is closer to \([F{\alpha}]\).

Note:
This is in fact (a subcase of) a constraint that is widely adopted in most recent versions of the minimalist program – the generalized Minimal Link Condition (see below).

Back to the sixties:
In reaction to Chomsky’s A-over-A Principle, Ross (1967) developed a theory of islands, i.e., categories that are opaque for movement.

1.3. The Complex NP Constraint

(13) Complex NP Constraint (CNPC, Ross (1967)):

No element contained in a CP dominated by a DP may be moved out of that DP.

Note on terminology
It was a standard assumption until the late eighties that NP dominates DP, not DP NP, as assumed here (and in most current work). Hence, the original Complex NP Constraint is a constraint on movement from NP to not from DP. The constraint is still known under its original name, which is therefore also adopted here, even though “Complex DP Constraint” might be more appropriate. The Complex NP Constraint accounts for some of the data that motivated the A-over-A Principle.

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

a. *[dp₁ Which book did John meet] [dp₂ child] [cp who read t₁]]
b. *[dp₁ Who does Mary know] [dp₂ a girl] [cp who is jealous of t₁]]

(15) A consequence of the Complex NP Constraint, argument clauses (see (5-b)):

a. ??[dp₁ Which book did John hear] [dp₂ a rumour] [cp that you had read t₁]]
b. *[dp₁ How] did John hear [dp₂ a rumour] [cp that you had fixed the car t₁]]
c. ??The hat [dp₁ which] [I believed] [dp₂ the claim] [cp that Otto was wearing t₁]] is red

Note:
Movement from argument clauses (selected categories) in complex DPs typically yields much better results than movement from relative clauses (non-selected, modifier categories). However, this does not hold for movement of modifiers themselves, which is completely impossible throughout (see (15-a) vs. (15-b)).

(16) Complex NP Constraint (representational version):

* … \([\alpha₁ … [dp … [cp … t₁ …]] …]\) …

Problem:
The specific formulation of the CNPC predicts that extraction from CP to a position below DP should be fine, which it is not. This can be seen in constructions involving PP
movement to specifiers of DP in German (see Lindauer (1995) for extensive discussion - the construction typically requires certain intonation patterns, and it distribution is also restricted in a number of further ways); the illformedness of (17-d) is therefore a priori unexpected.

(17) **CNPC effects not covered by the CNPC in German:**

a. \[D_p, D_p, Von Peter | D_p, das Gericht t_1 | \] habe ich t_2 gehört by Peter the rumour have I heard

b. Fritz hat \[D_p, das Gericht \] [cp dass Maria \[D_p, von Peter \] ein Buch Fritz has the rumour that Maria by Peter a book gekriegt hat | gehört given was heard
c. \[D_p, Von Peter \] hat Fritz \[D_p, das Gericht \] [cp dass Maria t_1 ein Buch by Peter has Fritz the rumour that Maria a book gekriegt hat | gehört given was heard
d. Fritz hat \[D_p, D_p, von Peter \] | D_p, das Gericht \[D_p, cp dass Maria t_1 ein Buch by Peter the rumour that Maria a book gekriegt hat | gehört given was heard

**Generalization:**

Extraction from CPs in DPs seems to be blocked in general, even if movement does not go beyond DP. (Note: Recurrences also for the Subjacency Condition (Chomsky (1977)), which I ignore throughout.)

1.4. The Sentential Subject Constraint

(18) **Sentential Subject Constraint** (Ross (1967)):

No element dominated by a CP may be moved out of that CP if that CP is a subject.

(19) **A consequence of the Sentential Subject Constraint:**

a. \[D_p, Who \] did the reporters expect \[D_p, \] that the principal would fire t_1 \?

b. \[D_p, Who \] was \[D_p, \] that the principal would fire t_1 \ expected by the reporters ?

c. \[D_p, Who \] did \[D_p, \] that Mary was going out with t_1 \ bother you ?

(20) **Sentential Subject Constraint** (representational version):

\[* ... α_1 ... D_p ... t_1 ... \] ... if CP is a subject.

1.5. Subject Condition

**Note:**
The Sentential Subject Constraint can be generalized: DP subjects are also islands, even if they do not qualify as complex in the sense of the Complex NP Constraint.

(21) **Subject Condition** (Chomsky (1973), Huang (1982), Chomsky (1986), Freidin (1992)):

No element may be moved out of a subject.

(22) **Subject Condition** (see (4)):

a. \[D_p, Who(m) \] has \[D_p, a \] comment about t_2 \ annoyed you ?

b. \[D_p, About whom \] has \[D_p, a \] comment t_3 \ annoyed you ?

(23) **Subject Condition** (representational version):

\[* ... α_1 ... [c_p β_2 ... t_1 ... \] ... if β is a subject.

1.6. The Wh-Island Condition

(24) **Wh-Island Condition** (Chomsky (1973)):

Movement must not cross a CP with a \(wh\)-element in SpecC or C.

(25) **Wh-Island Condition** (representational version):

\[* ... α_1 ... [c_p β_2 ... t_1 ... \] ... where \(β\) is a \(wh\)-element in SpecC or C.

(26) **A consequence of the Wh-Island Condition:**

a. How \_ do you think \[D_p, \] that Mary solved the problem t_1 ?

b. How \_ do you wonder \[D_p, \] whether Mary solved the problem t_1 ?

c. \[D_p, Which book \] do you think \[D_p, \] that John read t_1 ?

d. ?\[D_p, Which book \] do you wonder \[D_p, \] to whom \[D_p, \] John gave t_1 t_2 ?

**Note:**

Wh-Island effects are typically not that strong if the \(wh\)-clause is an infinitive and the moved item is a complement DP.

(27) **Weak Wh-Island Condition effects**

\?[D_p, Which book \] don’t you know \[D_p, \] whether to read t_1 ?

**Note:**

A similar effect arises with topicalization to SpecC. Accordingly, a **Topic Island Condition** has been suggested, and further generalization seems possible.

(28) **Topic Island effects:**

a. \[D_p, This book \] Mary thinks that Bill gave t_1 \[D_p, \] to John \[D_p, \]

b. \[D_p, This book \] Mary thinks that \[D_p, \] to John \[D_p, \] Bill gave t_1 t_2 \c?\[D_p, ? \]\[D_p, ? \]

d. \[D_p, ? \]\[D_p, ? \]\[D_p, ? \]\[D_p, ? \]

1.7. The Superiority Condition

(29) **Superiority Condition** (Chomsky (1973)):

In a structure \(α_1,f_2,... \[D_p, \] ... β_3,... \[D_p, \] ... γ_4,... \[D_p, \] ... \), movement to \[D_p, \] can only affect the category bearing the \(F\) feature that is closer to \[D_p, \].
1. Locality Constraints

Note:
The only difference to the (revised) A-over-A Principle (i.e., the F-over-F Principle) is that $\beta$ c-commands $\gamma$ in the Superiority Condition, whereas $\beta$ dominates $\gamma$ in the F-over-F Principle.

(30) **Superiority Condition** (representational version):
*... $\gamma[\ldots [\ldots \beta[\ldots [\ldots t_1 \ldots ] \ldots ] \ldots ] \ldots$ if the head of which $\gamma$ is the specifier bears a [\*F] feature in the LA.

(31) A consequence of the Superiority Condition:
  a. Who$_1$ t$_1$ saw what$_2$?
  b. *Who$_1$ saw what$_2$ who$_2$?
  c. I wonder [\*CP who$_1$ t$_1$ bought what$_2$]
  d. *I wonder [\*CP what$_2$ who$_1$ bought t$_2$]

Note:
The formulation of the Superiority Condition in (29) is of course not Chomsky's original one. The original definition is given in (32). The crucial thing to note is that (32) is also formulated in a very general way; and, in more current terminology, a rule "applies ambiguously to $Z$ and $Y$" if both $Z$ and $Y$ could satisfy the movement-inducing feature associated with the target head $X$. Therefore, (29) represents a faithful updating of (32).

(32) **Superiority Condition** (from Chomsky (1973, 246)):
No rule can involve X, Y in the structure...
... X ... [a ... Z ... -WYZ ... ] ...
where the rule applies ambiguously to $Z$ and $Y$ and $Z$ is superior to $Y$.

Note:

1.8. The Clause Non-final Incomplete Constituent Constraint

(33) **Clause Non-final Incomplete Constituent Constraint** (Kuno (1973)):
It is not possible to move any element of a category $\alpha$ ($\alpha = \text{DP}$ or CP) in a clause non-final position out of $\alpha$ if what is left over in $\alpha$ constitutes an incomplete $\alpha$.

(34) **Incompleteness**
A DP/CP $\alpha$ is incomplete if an obligatory element is missing.
(An obligatory element may, as a first approximation, be an element that is obligatorily selected.)

**Origin:**
Kuno suggests the Clause Non-final Incomplete Constituent Constraint as a more general version of the Sentential Subject Constraint, which it is therefore supposed to replace.

(35) A consequence of the Clause Non-final Incomplete Constituent Constraint, object DPs:

a. [\*DP, Which man did you buy in $\text{a picture of} t_1$]?
(b) [\*DP, Of which man did John give in $\text{a picture of} t_2$ to Bill?]
(c) [*DP, Which man did John give in $\text{a picture of} t_1$ to Bill?]

Note:
In (35-a), the DP is clause-final; in (35-b), the DP counts as complete (recall that arguments of $N$ are optional). Only in (35-c) are both requirements violated: The DP from which movement takes place is in a non-final position, and if movement occurs, it counts as incomplete (of has an obligatory [\*D] feature).

(36) A consequence of the Clause Non-final Incomplete Constituent Constraint, subject DPs:

a. [\*DP, Which cars did the explosion damage in $\text{the hoods of} t_1$]?
(b) [\*CP, Of which cars were in $\text{the hoods of} t_2$ damaged by the explosion?]
(c) [*DP, Which cars were in $\text{the hoods of} t_1$ damaged by the explosion?

Note:
(36-b) is expected to be ungrammatical under the Subject Condition. However, it has been suggested that these kinds of PP's may in fact be merged outside the subject DP (see Cinque [1990]), in which case the Subject Condition would be compatible with (36-b) (and the Clause Non-final Incomplete Constituent Constraint would be vacuously fulfilled here).

(37) A consequence of the Clause Non-final Incomplete Constituent Constraint, CPs (see (19)):

a. [\*DP, Who did the reporters expect in $\text{the principal would fire} t_1$]?
(b) [\*CP, Who was it expected by the reporters in $\text{the principal would fire} t_1$]?
(c) [*CP, Who was in $\text{the principal would fire} t_1$ expected by the reporters?]

Note:
The Clause Non-final Incomplete Constituent Constraint can be reformulated as a representational constraint on outputs.

(38) **Clause Non-final Incomplete Constituent Constraint** (representational version):
*... $\alpha_1 \ldots [\beta \ldots t_1 \ldots ] \ldots$ if (a)-(c) hold:
  a. $\beta = \text{DP or CP}$.
  b. $\beta$ is in a clause non-final position.
  c. $\beta$ is incomplete.

(39) An apparent problem:
[DP, Who does John think CP$_2$ Mary has persuaded in $\text{the principal is a spy}]]$?

Note:
(39) does not violate the Clause Non-final Incomplete Constituent Constraint because the only CP from which movement takes place is CP$_2$; and CP$_2$ is incomplete after the
movement operation, but it is in a clause-final position.

(40)  A real problem?
   a. [Dp, Which man] did you buy [Dp a picture of t1] from Mary?
   b. [Dp, Which tree] did you see [Dp the leaves of t1] in the yard?

Note:
Kuno assumes that (40-ab) are well-formed, and he takes this to follow from the Clause Non-final Incomplete Constituent Constraint. The idea is that what is problematic about the starred data is “the fact that the incomplete ... phrases are followed by nonoptional elements [...]. In (40-ab), ... incomplete ... phrases appear either clause-finally or, if not, are followed only by optional elements in the sentences.” But does this follow from the constraint?

1.9. The Post-Sentential Subject Extraction Constraint

(41) Post-Sentential Subject Extraction Constraint (Zaenen & Pinkham (1976)):
   It is impossible to move a DP across a sentential subject.

Note:
Unlike the Clause Non-final Incomplete Constituent Constraint, this constraint is sup- 
posed to complement (rather than replace) the Sentential Subject Constraint.

(42) A consequence for wh-moving:
   a. [Dp, Who] do you think [Dp, that [Dp2 Bill’s resignation] would surprise t1]?
   b. *[Dp, Who] do you think [Dp, that [Dp2 for Bill to resign] would surprise t1]?

(43) A consequence for topicalization:
   a. [Dp, John] [Dp2 Bill’s resignation] would not surprise t1
   b. *[Dp, John] [Dp2 for Bill to resign] would not surprise t1

(44) Post-Sentential Subject Extraction Constraint(representational version):
   *[α1 ... [ ... β ... [ ... t1 ... [ ...] if β is a sentential subject.

A generalization?
(i) Sentential Subject Constraint:
   All sentential subjects are islands.
(ii) Post-Sentential Subject Extraction Constraint:
   The domain to the right of a sentential subject is an island.
→
(iii) Most general constraint:
   All sentences with sentential subjects are islands.

Problem:
Sentential subjects themselves can be moved.

(45) Movement of sentential subjects:
   That John would be late, Mary didn’t think was very likely.

1.10. The Condition on Extraction Domain

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

(46) Adjunct Condition:
   Movement must not take place from an XP that has been merged without a 
deletion of selectional features.

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

(47) A consequence of the Adjunct Condition:
   a. [Dp, Who] did you get jealous [Dp because I talked to t1]?
   b. [Dp, To whom] did they leave [Dp before speaking t1]?
   c. [Dp, Who] did they leave [Dp before speaking to t1]?

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).

(48) Condition on Extraction Domain (CED, Huang’s original version):
   A phrase A may be extracted out of a domain B only if B is properly governed.

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) and 
Manzini (1992) have useful simplifications and modifications. The following definition 
freely draws on all the concepts developed in these approaches.

(49) Condition on Extraction Domain (CED):
   a. Movement must not cross a barrier.
   b. An XP is a barrier iff it is not a complement.

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 (in the sense of the Subjacency Condition) 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
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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 (hopefully, see below) be dispensed with if the Condition on Extraction Domain is adopted is the Freezing Principle. The reason is that movement can never end in a complement position.

(50) **Freezing Principle** (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.

(51) Consequences of the Freezing Principle:

a. *Who1 do you think [CP t2 that [NP2 pictures of t1] were painted t2]?
b. *Who1 do you think [CP t1 that [NP2 pictures of t1] John would like t2]?
c. *Who1 do you think [CP [NP2 to t1] he will talk t2]?
d. *Who1 don’t you know [CP [NP2 which picture of t1] Mary bought t2]?
e. *[NP1 Über Fritz I glaube ich [CP [NP2 ein Buch t1] hat Maria t2 about Fritz I believe I a book has Maria geschrieben] written

1.11. Relativized Minimality

(52) **Relativized Minimality** (original version, Rizzi (1990)):

a. (Certain) chain links require antecedent-government.
b. X antecedent-governs Y only if there is no Z such that (i) and (ii) hold.
   (i) Z is a typical potential antecedent-governor for Y.
   (ii) Z c-commands Y and does not c-command X.

(53) **Typical Potential Antecedent Governor:**

a. Z is a typical potential antecedent governor for Y, Y in an A-chain = Z is an A specifier c-commanding Y.
b. Z is a typical potential antecedent governor for Y, Y in an A′-chain = Z is an A′ specifier c-commanding Y.
c. Z is a typical potential antecedent governor for Y, Y in an X′0-chain = Z is a head c-commanding Y.

(54) **Relativized Minimality** (updated version, Rizzi (2001)):

a. Chain links require a Minimal Configuration (MC).
b. Y is in a Minimal Configuration (MC) with X iff there is no Z such that (i) and (ii) hold.
   (i) Z is of the same structural type as X.
   (ii) Z intervenes between X and Y.

(55) **Consequences of Relativized Minimality for A-movement:**

*John1 seems that it is likely [TP t1 to win]

(56) **Consequences of Relativized Minimality for A′-movement:**

a. *Combiens a-t-il beaucoup consulté [t1 de livres] ?
how many did he a lot consult of books
b. *How1 do you wonder [CP who2 could solve this problem t1] ?

(57) **Consequences of Relativized Minimality for head movement:**

a. Could1 they t1 have left ?
b. *Have2 they could t2 left ?

Note:
Relativized Minimality thus derives effects of the Head Movement Constraint (Travis (1984)).

1.12. Conclusion

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).

(58) **Two types of locality constraints:**

a. **Rigid Locality:**
   (i) Complex NP Constraint
   (ii) Sentential Subject Constraint
   (iii) Subject Condition
   (iv) Wh-Island Condition
   (v) Clause Non-final Incomplete Constituent Constraint
   (vi) Post-Sentential Subject Extraction Constraint
   (vii) Adjunct Condition
   (viii) Condition on Extraction Domain
b. **Relativized Locality:**
   (i) A-over-A Principle
   (ii) F-over-F Principle
   (iii) Superiority Condition
   (iv) Relativized Minimality

Generalization:
At first sight at least, it looks like both types of constraints are needed, but it is far from clear which phenomena should be accounted for by which constraint type.
1.13. State of the Art

(59) General assumptions:

a. Constraints are general. This excludes construction-specific constraints like the Complex NP Constraint, the Sentential Subject Constraint, the Subject Condition, the Wh-Island Condition, the Post-Sentential Subject Extraction Constraint, and the Adjunct Condition.


c. Constraints are compatible with the minimalist requirements in (60).

(60) Minimalist requirements (Chomsky (2005b)):

a. Constraints are of type (i) or (ii).

(i) principles of efficient computation (local economy constraints)

(ii) interface conditions (constraints imposed by phonological and semantic interfaces)

b. Constraints do not rely on concepts that lack independent motivation (like, e.g., L-marking, (proper) government, barrier, and so forth).

The situation now:

Currently there are two local constraints that are widely accepted: the Condition on the Extraction Domain on the one hand, and the (Generalized) Minimal Link Condition (i.e., the combined F-over-F Principle/Superiority Condition) on the other. However, whereas the latter constraint may perhaps be viewed as a principle of efficient computation, the former cannot straightforwardly be construed in such a way. Therefore, attempts have been made to derive it in some way.

2. The Minimal Link Condition: State of the Art

The problem with most of the constraints discussed so far is the lack of generality; these constraints often look construction-specific. Should syntactic constraints be permitted to mention specific categorical features, or specific selectional features? Ideally, the answer is no. Still, some of the constraints are not subject to this critique. Most notably, this holds for the the A-over-A principle (in particular, its F-over-F version) and for the Superiority Condition (Minimal Link Condition). It therefore does not come as a surprise that the combination of these two conditions is widely considered valid nowadays. The combined constraint can be referred to as the Generalized Minimal Link Condition.

61) F-over-F Principle:

In a structure \( \alpha_{[\mathfrak{F}][\cdots \beta_{[\mathfrak{F}][\cdots \gamma_{[\mathfrak{F}][\cdots \ldots]}}} \ldots] \ldots \ldots \), movement to \( [\mathfrak{F}] \) can only affect the category bearing the \( [\mathfrak{F}] \) feature that is closer to \( [\mathfrak{F}] \).

Empirical evidence for the F-over-F Principle:

This constraint blocks certain illicit instances of remnant movement in languages like German and Japanese (Takano (1994), Koizumi (1995), Kitahara (1997), Müller (1998)).

62) a. [\( \alpha_{[t_1} \text{ zu lesen }]_{2} \] hat [\( \alpha_{[\mathfrak{p} d\text{ das Buch }]_{3} \] keiner t3 vsucht to read has the book no-one tried

b. [\( \alpha_{[t_2} \text{ zu reparieren }]_{2} \] hat der Frank dem Matthias_1 den Drucker_3 t3 to fix has ART Frank ART Matthias_did the printer_acc vsprochen promised

63) a. *dass [\( \alpha_{[t_1} \text{ zu lesen }]_{2} \] \( \alpha_{[\mathfrak{p} d\text{ das Buch }]_{3} \] keiner t3 vsucht hat that to read the book_acc no-one tried has

b. *dass der Frank [\( \alpha_{[t_2} \text{ zu reparieren }]_{2} \] dem Matthias_1 den Drucker_3 t3 that ART Frank to fix ART Matthias_did the printer_acc vsprochen has

64) a. [\( \text{CP Mary-ga } [\mathfrak{N} \text{ sono hon-o }]_{2} \text{ yonda-to }]_{2} \text{ Bill-ga } [\text{CP John-ga t2 Mary}

\text{nom } \text{ that book_acc read-COMP Bill}
\text{nom } \text{ John}
\text{nom itta-to }]_{2} \text{ omote-iru (koto)

\text{said-COMP think fact]

b. *[\( \text{CP Mary-ga t1 yonda-to }]_{2} \text{ [\mathfrak{p} \text{ sono hon-o }]_{2} \text{ John-ga t2 itta (koto)

\text{Mary}
\text{nom } \text{ read-COMP that book_acc John}
\text{nom said fact

65) a. *[\( \mathfrak{p} \text{ Which book about t1 }]_{2} \text{ don’t you know [\text{CP who1 to read t2 }] ?

b. *[\( \mathfrak{p} \text{ Which picture of t1 }]_{2} \text{ do you wonder [\text{CP who1 she likes t2 }] ?

In (63), (64), and (65), there is a stage of the derivation where a movement-inducing feature (like \( [\mathfrak{S}][\chi] \) for scrambling, and \( [\mathfrak{a}][\mathfrak{a}] \) for ad-movement) on a target head could in principle attract either the more inclusive category or another category dominated by the latter (both bearing, by assumption, a matching feature \( [\mathfrak{S}] \) or \( [\mathfrak{a}] \)). The F-over-F Principle then excludes movement of the higher category first, and subsequent will invariably be excluded by whatever derives the c-command constraint on movement (because it involves lowering), plus the CED.

66) Superiority Condition/Minimal Link Condition:

In a structure \( \alpha_{[\mathfrak{F}][\cdots \beta_{[\mathfrak{F}][\cdots \gamma_{[\mathfrak{F}][\cdots \ldots]}}} \ldots] \ldots \ldots \), movement to \( [\mathfrak{F}] \) can only affect the category bearing the \( [\mathfrak{F}] \) feature that is closer to \( [\mathfrak{F}] \).


In a structure \( \alpha_{[\mathfrak{F}][\cdots \beta_{[\mathfrak{F}][\cdots \gamma_{[\mathfrak{F}][\cdots \ldots]}}} \ldots] \ldots \ldots \), movement to \( [\mathfrak{F}] \) can only affect
3. The Condition on Extraction Domain: State of the Art

3.1. Problems with the CED

(70) **Condition on Extraction Domain (CED):**

a. Movement must not cross a barrier.

b. An XP is a barrier if it is not a complement.

**Properties of the CED:**

- The CED is a general constraint.
- The CED is a local constraint.
- The CED does not seem to qualify as a principle of efficient computation.
- The CED does not seem to be an interface condition.
- The CED relies on concepts that lack independent motivation (barrier).

**Consequence:**

Attempts have been made to derive the CED (or CED effects) in a way that respects all meta-requirements for constraints.

**Three kinds of analyses**

- CED effects are derived by invoking assumptions about elementary operations like Merge and Agree.

- CED effects are derived by invoking assumptions about cyclic spell-out.

- CED effects are derived as freezing effects.

**Observations**

1. The first kind of analysis relies on special assumptions that mimic assumptions in Chomsky’s (1986a) theory of barriers.

2. The second kind of analysis is incompatible with the assumption that only the complement of a phase head is affected by spell-out (whereas the specifier domain and the head itself remain available for further operations on subsequent cycles).

3. The third kind of analysis is incompatible with the existence of CED effects where an XP is a barrier in its in situ position.

3.2. Elementary Operations

3.2.1. Merge in Sabel (2002)

In Sabel’s (2002) approach, extraction from subjects and adjuncts is argued to be impossible because these examples are not merged with a lexical head, and a required S-projection cannot be formed. Sabel starts out with (71), which is assumed to follow as theorem: “I will argue […] that [(71)] is motivated by θ-theoretic considerations” (Sabel 2002, 202).

(71) **Barrier:**

A category A may not be extracted from a subtree T2 (X^{max}) of T1 if T2 was merged at some stage of the derivation with a complex category (i.e., with a non-head).

“I assume that transparency and barrierhood in the case of CED-islands is a consequence of θ- (or [...] ‘selection’-) theory.” (p. 295).

(72) **Assumptions about Merge:**

a. Head/complement Merge results in co-indexing; it establishes a selectional (superscript) index on a head and its complement (head/specifier Merge does not, and adjunction does not create co-indexing either).

b. Selectional indices are projected from a head to its XP.

(73) **Selection-Projection:**

X heads the smallest projection containing αn. Then Y is an S-projection of X if

a. Y is a projection of X, or

b. Y is a projection of Z, where Z bears the same index as X.

(74) **Uniform Domain (UD):**

Given a nontrivial chain CH = <α_{i},...,α_{n}> with n>1, there must be an X such that every α is included in an S(election)-projection of X.
Consequence:
(i) As soon as the path from a base position to a (final) landing site of movement includes a specifier or adjunct, propagation of the original selectional index stops.
(ii) If selectional index transmission stops, the S-projection ends, because of clause (b) of (73).
(iii) Therefore, in such a case, there cannot be some node X anymore such that every member of the movement chain is included in an S-projection of X. Members of the movement chain will invariably belong to the dominance domains of more than one S-projection.

Comments:
(i) Uniform Domain is a constraint that does not seem to qualify as either an economy constraint or an interface condition (perhaps the latter?).
(ii) The analysis is incompatible with the concept of a phase (Chomsky 2000, 2001, 2005a]) because checking whether UD is violated or not requires scanning the large portions of syntactic structure.
(iii) The analysis requires special concepts that do not seem to be needed otherwise (S-projection, selectional indices).
(iv) The crucial assumption is (72a), which introduces a difference between head/complement and head/specifier (or head/adjunct) relations and thereby mimics the concept of L-marking in Chomsky (1986a) (or clause (b) of (70)).

3.2.2. Agree in Rzchowski & Richards (2005)
In contrast to Saberi (2002), Rzchowski & Richards (2005) derive (a version of) the CED by invoking special assumptions about Agree.

(75) Assumptions about movement:

a. A probe must Agree with the closest goal that can move.
b. A goal α can move if it is a phase (CP, vP, DP).
c. A goal α is the closest one to a probe if there is no distinct goal β such that for some X (X a head or a maximal projection – note that X’ categories must not count), X α-commands α but not β.
d. Once a probe P is related by Agree with a goal G, P can ignore G for the rest of the derivation.
e. v has a Case feature that is checked via Agree. It can also bear EPP-features that move active phrases to its edge.
f. [+-wh] C has a [+wh] feature that is checked via Agree (and sometimes Move).

(76) Condition on Extraction Domain (Rzchowski & Richards’s (2005) version):
Only those CPs and DPs that Agree with a phase head on independent grounds (e.g., direct objects and complement clauses) are transparent for wh-extraction.

(77) [cp Who do you [cp that we should [cp hire -]]]?

Remarks on (78):
(i) We will sketch the derivation as though movement begins once the tree has been completed” (p. 283).
(ii) The ‘Forget’ operations in (78) are not in the original paper.

(78) Extraction from object CP:

a. [C[+wh] v [C v who]] (Agree v-CP)
b. [C[+wh] v [C v who]] (Agree v-CP)
c. [C[+wh] v [C v who]] (Agree v-CP)
d. [C[+wh] v [C v who]] (Agree v-CP)
e. [C[+wh] v [C v who]] (Agree matrix v-Cp)
f. [C[+wh] v [C v who]] (Agree v-CP)
g. [C[+wh] v [C v who]] (Agree matrix v-CP)
h. [C[+wh] v [C v who]] (Agree v-CP)
i. [C[+wh] v [C v who]] (Agree v-CP)
j. New Agree of matrix C is possible with matrix vP, or with who (by stipulation - see (75c) – since v does not count, and vP thus does not intervene).

k. [C[+wh] v [who]] (Agree C-CP)
l. [who v [C v who]] (Agree C-CP)
m. [who v [C v who]] (Agree C-CP)

Note:
(i) v must independently Agree with C (clauses, by assumption, need case).
(ii) The analysis predicts that there can be no intermediate traces in SpecC positions.

How CED effects are derived:
(i) Subjects, like adjuncts, never enter into an Agree relation with v (v cannot probe into its own specifier, given the c-command requirement on Agree).
(ii) If they do in some languages after all because Agree is possible under m-command (as assumed for Japanese), subjects become transparent.

An empirical problem:
The analysis does not permit successive-cyclic movement to take place via embedded SpecC positions. The counter-evidence from partial wh-movement in languages like German may be explained away by assuming an indirect dependency approach (Dayal (1994)). Such a way out is not available for the closely related wh-copy construction.

(79) Partial wh-movement and copy movement in German:

a. Was meinen du [cp wen1 wir t1 einladen sollen] ?
   what think you whom we invite should
b. Wen1 meinen du [cp wen1 wir t1 einladen sollen] ?
   whom think you whom we invite should

Comments
(i) The crucial assumption is that extraction from XP requires an Agree operation involving v and XP. Since v can Agree with (something in) its complement but not with its specifier or an adjunct, the latter two categories are derived as barriers.
(ii) Arguably, the ‘c-command by v’ requirement mimicks the L-marking requirement of Chomsky (1986a). Plus, the restriction to v (vs. T, C) is also very similar to the restriction to lexical categories that is part of the definition of L-marking.

(iii) There is a curious asymmetry: For the purposes of minimalism, the vP-v’ distinction must be ignored; for the purposes of deriving the CED, this distinction must be maintained.

(iv) Agree relations between C or T and (e.g.) CP would undermine the account of CED effects (this is why intermediate movement steps to SpecC cannot be permitted in this system); but they can only be excluded by additional stipulations. (Suppose that C (or T) first carries out Agree with a subject (CP or DP), and then with an item in the left edge of the subject (CP or DP). Then, extraction from a subject would be possible after all.)

This restriction is all the more peculiar since T does regularly undergo Agree with subjects.

3.3. Spell-Out


Here, the attempt is made to derive (some version of) the CED, by invoking specific (though independently motivated) assumptions about cyclic spell-out. I focus on Uriagereka (1999).

Main goal

The goal is to derive (a version of) the LCA from minimalist assumptions.

Claim:

This is possible if we assume cyclic (multiple) spell-out.

The original LCA:

80) Linear ordering of terminal symbols (L):
   a. transitive: \( \forall x, y, z: <x, y> \in L \land <y, z> \in L \rightarrow <x, z> \in L \)
   b. total: \( \forall x, y: <x, y> \in L \lor <y, x> \in L \)
   c. antisymmetric: \( \forall x, y: <x, y> \in L \land <y, x> \in L \rightarrow x = y \)

81) a. \( d(X) \) = dominance relation between non-terminal symbols
   b. \( d \) = dominance relation between non-terminal and terminal symbols
   c. \( d(S) = \{ a \} \) is dominance on terminal symbols that are dominated by a non-terminal \( X \) (under the 'image' of \( S \) under \( d \))

82) a. \( A = \{ <x_i, y_i> \} \), such that for each \( i: X_j \) c-commands \( Y_j \) asymmetrically
   b. \( T = \) set of terminal symbols of a phrase structure tree \( P \)

83) Linear Correspondence Axiom (LCA; Kayne (1994)):
   \( d(A) \) is a linear ordering of \( T \).

84) Consequences:
   a. A head precedes its complement (\( \beta \)).
   b. A specifier (\( \alpha \)) must formally qualify as an adjunct. It is unique and precedes its head.

85) The shape of phrases under Kayne’s LCA:

\[ \alpha \rightarrow \beta \]

\[ X \]

Difference between Kayne (1994) and Chomsky (1995):

- Kayne’s original LCA restricts possible phrase markers.
- Chomsky’s version of the LCA restricts possible linearizations of a priori unordered phrase markers at PF.

Deducing the Base Step of the LCA Assumption (Chomsky (1995)):

The LCA ensures linearization of a priori unordered phrase structures (in a bare phrase structure model).

86) A Chomskyan version of the LCA:
   a. Base step: If \( \alpha \) c-commands \( \beta \), then \( \alpha \) precedes \( \beta \).
   b. Induction step: If \( \gamma \) precedes \( \beta \) and \( \gamma \) dominates \( \alpha \), then \( \alpha \) precedes \( \beta \).

Note:

86-b is essentially the Nontangling Condition (Partee et al. (1993, 437)):

87) Nontangling Condition:

\[ \forall x, y: x \rightarrow y \]

In any well-formed constituent structure tree, for any nodes \( x \) and \( y \), if \( x \) precedes \( y \), then all nodes dominated by \( x \) precede all nodes dominated by \( y \).

88) Command Unit (CU):

A command unit emerges in a derivation through the continuous application of Merge to the same object.

Note: Labels are underlined in (80) and (90).

89) Continuous application – command unit:
   a. \( \alpha \rightarrow \{ \beta \} \rightarrow \{ \alpha, \{ \beta \} \} \)
   b. \( \gamma \rightarrow \{ \gamma, \{ \alpha, \{ \beta \} \} \} \)

90) Discontinuous application – not a command unit:
   a1. \( \alpha \rightarrow \{ \beta \} \rightarrow \{ \alpha, \{ \beta \} \} \)
   a2. \( \gamma \rightarrow \{ \gamma, \{ \alpha, \{ \beta \} \} \} \)
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a. \( \{ \alpha, \{ \beta, \ldots \} \} + \{ \gamma, \{ \delta, \ldots \} \} \rightarrow \{ \alpha, \{ \gamma, \{ \delta, \ldots \} \} \} \)

Question: There are \( n! \) ways to “lay the mobile on the ground” — why is the Spec-Head-Comp order chosen (assuming the validity of the LCA)?

(91) Possible orders
   a. Comp Head Spec
   b. Head Comp Spec
   c. Spec Comp Head
   d. Spec Head Comp
   e. Comp Spec Head
   f. Head Spec Comp
      (violates Nontangling)
   (violates Nontangling)

Assumption:
(i) There is an order of Merge operations (a “Merge-wave of terminals”).
(ii) The most economical way to map phrase structure onto linear order is to “harmonize (in the same local direction) the various wave states, thus essentially mapping the merge order into the PF linear order in a homomorphic way.” (But: This is “hand-waving until one establishes what such a Merge-wave is.”)

Problem:
Why does the command relation collapse into precedence, and not the opposite ((91-d) vs. (91-a))? 

Solution:
This is not a problem because we only need an optimal solution; there may not be the optimal solution.

Deducing the Induction Step of the LCA Goal: The goal now is to derive the Nontangling Condition.

Ider: Multiple spell-out.

Question:
Assuming that the induction step of the LCA in (86) does not hold, how does linearization work in derivations with more than one CU?

(92) Induction step: If \( \gamma \) precedes \( \beta \) and \( \gamma \) dominates \( \alpha \), then \( \alpha \) precedes \( \beta \).

Answer:
There are various steps of linearization, each of which involves only CUs.

Two implementations:

1. Conservative approach:
   A collapsed Merge structure is no longer phrasal after spell-out; it’s more like a giant lexical compound, or a word.

2. Radical approach:
   A spelled-out CU does not merge with the rest of the structure; interphrasal association is accomplished in the performatives components.

Note:
In the remainder of the paper, the analysis simultaneously proceeds in two different directions, Uriagereka systematically giving two competing accounts of the relevant observations. To simplify matters, I focus on the **conservative account** throughout.

(93) How spell-out works:
   a. \( \{ \alpha, \{ L, K \} \} \Rightarrow \{ \alpha, < L, K \} \}
   b. \( \{ \alpha, < L, K \} \} = \{ \alpha, \{ L \}, \{ L, K \} \}
   c. \( \{ \alpha, \{ L \}, \{ L, K \} \} \} \) is not a syntactic object.

(94) Syntactic object (Chomsky (1995)):
   a. Base step: A word is a syntactic object.
   b. Induction step: \( \{ \alpha, \{ L, K \} \} \} \) is a syntactic object, for \( L \) and \( K \) syntactic objects and \( \alpha \) a label.

“[(94-b)] is obtained through Merge and involves a labeling function that Chomsky argues is necessarily *projection.*”

(95) Within a syntactic object, a label \( \alpha \) is not a term.

(96) \( K \) is a term iff (a) or (b):
   a. Base step: \( K \) is a phrase marker.
   b. Induction step: \( K \) is a member of a member of a term.

Consequence:
\( \{ L, K \} \} \) in (93)-(c) is a term, but not a syntactic object. Therefore, it is not accessible to syntactic operations.

CED Effects

(97) Condition on Extraction Domain:
   a. Movement must not cross a barrier.
   b. An XP is a barrier iff it is not a complement.

(98) CED Effects:
   a. \( \text{Who}_1 \) did you see \( \{ \text{pp a critic of t}_1 \} \)?
   b. \( \ast \text{Who}_1 \) did \( \{ \text{pp a critic of t}_1 \} \) see you?

Analysis in terms of multiple spell-out:
*If a non-complement is spelled out independently from its head, any extraction from
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a non-complement will involve material from something that is not even a syntactic object; thus, it should be as hard as extracting part of a compound."

Problem (?): Why are sentences with left-branch extractions like (99) possible?

(99) Which professor did you say [ t₁ left ] ?

Note:
A similar problem arises in Gazdar's (1981) analysis in terms of the Generalized Left Branch Condition.

(100) Generalized Left Branch Condition (Ross (1967), Gazdar (1981)): The leftmost item of an XP cannot be moved out of that XP.

Solutions:
(i) Gazdar's solution (not Uriagereka's solution!): There is no subject trace present in these cases.
(ii) "The answer to this puzzle relates to the pending question of wh-feature accessibility in spelled-out phrases."

Side remark:
The analysis of CED effects in Nunes & Uriagereka (2000) is basically identical (but the analysis is extended to parasitic gaps and their ability to circumvent CED violations, by adopting a sideward movement approach).

3.3.2. Late Adjunct Insertion: Stepanov (2007)

Note:
Stepanov (2007) argues for a heterogeneous approach to CED effects that distinguishes between the Subject Condition and the Adjunct Condition. For the former, he adopts a version of the freezing approach (see below). For the latter, he suggests that late insertion of adjuncts provides the ultimate explanation: At the point where extraction takes place, the adjunct is not yet part of the structure. The effect is similar to the one occurring with subjects in Uriagereka's approach: XPs are islands because they are not present as syntactic objects at the relevant stage of the derivation where movement takes place – either not anymore (Uriagereka and Nunes), or not yet (Stepanov).

3.3.3. Conclusion

Comments:
Uriagereka & Nunes' analysis is fundamentally incompatible with the notion of a phase as the relevant domain for cyclic spell-out (Chomsky (2000, 2001, 2005a)). Uriagereka's spell-out domains are variable in size.
(i) They can be larger than the spell-out domain of a phase – in fact, extremely large (possibly, the whole sentence): As long as no complex specifier is merged (either no specifier, or specifiers consisting only of lexical items), a new spell-out domain will not be created.

(ii) They can be smaller than the spell-out domain of a phase: E.g., a complex specifier (belonging to any category) is always a spell-out domain.

3.4. Freezing

Refs:

Note:
All these analyses presuppose that (relevant subcases of) CED effects can be traced back to freezing effects; i.e., an item becomes a barrier after movement has taken place. They differ in what is taken to be responsible for the occurrence of freezing.

3.4.1. Freezing and Head Movement: Kitahara (1994)
The first freezing approach to be discussed here is actually not typical: The freezing effect does not arise from movement of the XP from which extraction is to take place, but rather from movement of a head to the domain in which XP is located. (This is in fact a bit more in the spirit of the proposal of Wexler & Culicover (1980).)

Goal:
A minimalist reformulation of the CED that makes the following predictions:
(i) A complement is never a barrier.
(ii) An adjunct is always a barrier.
(iii) A specifier is a barrier only if its head has been the target of head movement.

(101) Inner Minimal Domain Requirement (IMDR):
Extraction out of a category K is possible only if for every X₀-chain H such that K ∈ the minimal domain of H, K ∈ the inner minimal domain of H.

(102) Domain, minimal domain (basically as in Chomsky (1993)):
For any X₀-chain CH <α₁,...,αₙ>:
- a. the domain of CH = the set of nodes (i.e., categories) contained in the least full-category maximal projection dominating α₁ that are distinct from and do not contain any αᵢ.
- b. the minimal domain of CH = the smallest subset K of the domain of CH such that for any Γ ∈ the domain of CH, some β ∈ K reflexively dominates Γ.

(103) Inner minimal domain:
For any X₀-chain CH <α₁,...,αₙ>:
the inner minimal domain of CH = the (maximal) subset S of the minimal domain of CH such that each member of S is dominated by every maximal projection dominating αᵢ.

(104) Configurations
- [XP [XP Spec [X' X Comp ] Adj]]
  Adj barrier, Spec & Comp transparent
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b. $[\text{HP Spec}_1 [H \cdot [H X_i \cdot [XP \text{ Spec}_2 [X^c \cdot t_1 , \text{Comp}]]]]$ $\text{Spec}_1$ barrier, Spec$_2$ & Comp transparent

Note:
This is not necessarily incompatible with the view that head movement does in fact remove barriers (rather than create them). The evidence that head movement opens up barriers is originally only concerned with complements (see Baker (1988)); also see Bobaljik & Wurmbrand (2003), Gallego & Uriagereka (2006), and den Dikken (2007, 2008) for recent discussion, and below.

(105) Empirical evidence: English vs. Icelandic subjects:

a. *Who$_1$ do you think [$_{DP}$ that [$_{DP}$ pictures of t$_1$ ] are on sale ] ?
b. *Hverjum$_1$ heklur þú [$_{CP}$ að [$_{CP}$ myndir af t$_1$ ] sú til síðu ] ?

who think you that pictures of are on sale

Account of (105):
(i) In both cases, the subject DP moves to SpecAgr/S, which dominates TP. (Note: this movement step, by itself, does not create a barrier, under Kitahara's assumptions.

(ii) In English, subject raising must follow T-to-Agr/S movement (for reasons having to do with case-checking).

(iii) In Icelandic, subject raising can precede T-to-Agr/S movement, and there is thus a legitimate order that respects the IMDR: (a) subject raising to SpecAgr/S; (b) extraction from subject; (c) T-to-Agr/S head movement that turns the subject into a barrier (but too late to block extraction) by removing it from the inner minimal domain of the T-chain.

Comment:
Independently of various potential empirical problems, it can be noted that this analysis does not seem to meet minimalist requirements: The IMDR neither contributes to efficient computation in an obvious sense, nor is it an interface requirement. In addition, it employs concepts that do not seem independently motivated (dominance vs. containment, minimal domain, inner minimal domain, etc.)


Note:
The exposition here follows Takahashi (1994); Stepanov (2007) adopts a version of Takahashi's approach, but only for the Subject Condition part of the CED (as noted above, the Adjunct Condition part is treated differently).

(106) Chain Uniformity.

Chains must be uniform.

(107) Uniformity Corollary on Adjunction (UCA):

Adjunction to a part of a non-trivial chain or coordination is not allowed.

Assumptions:

Chain members are full copies. Therefore, after movement of some XP, no adjunction to either XP copy created by movement is permitted.

(108) Shortest Move (a transferivalational constraint; see (68)): Make the shortest move.

Assumption:

Every possible intermediate landing site (for a given movement type: A, A-bar, head) must be used in the course of movement, by adjunction to XP.

Observation:

Extraction from a subject that has undergone movement from Specv to SpecT will lead to a dilemma: It is impossible to satisfy both the UCA and Shortest Move simultaneously in this context. Either one of the two copies must be targeted by adjunction (as in (109-a)), or a non-local movement step must be carried out (skipping the DP adjunction site and moving to TP-Adj directly, as in (109-b)).

(109) A dilemma for extraction from moved subjects, part 1: *UCA:

*Who$_1$ has [$_{TP}$ [$_{DP}_2$ who$_1$ [$_{TP}$ a comment about who$_1$ ]] T [$_{TP}$ [$_{DP}_2$ a comment about who$_1$ ]] [$_{V}$ v-annoyed [$_{VP}$ TV you]]]

(110) A dilemma for extraction from moved subjects, part 2: *Shortest Move:

*Who$_1$ has [$_{TP}$ who$_1$ [$_{TP}$ a comment about who$_1$ ]] T [$_{TP}$ [$_{DP}_2$ a comment about who$_1$ ]] [$_{V}$ v-annoyed [$_{VP}$ TV you]]

Prediction:
CED effects with subjects only show up if the subject is moved from its base position. External arguments in situ (in Specv) and derived subjects (as in passive clauses) are transparent as long as they can stay in situ (which they can in various languages).

Towards deriving the Adjunct Condition part of the CED:
By assumption, clauses with adjuncts are coordination-like structures; hence, adjunction to adjuncts is blocked.

(This part of the analysis raises various questions, see Stepanov (2007).)

Comment:

(i) The Chain Uniformity requirement makes it necessary to scan large domains of syntactic structure; as it stands, it does not seem compatible with a phase-based approach, where the active part of the derivation is very small at any given stage.

(ii) The analysis crucially relies on the copy theory of movement.

(iii) The analysis involves a transferivalational constraint (but see lecture 2 for an alternative that does not but produces essentially the same results.)

3.4.3. $\Phi$-Completeness: Boeckx (2003)

Assumption (Boeckx (2003))

The Adjunct Condition and the Subject Condition are to be treated differently.
Adjunct Condition: \( \Phi \)-Inertness
Probes cannot undergo Agree with anything inside an adjunct. Therefore, if Move involves Agree, the barrier status of adjuncts is predicted.

Subject Condition: Freezing
The approach is designed to be a minimal variation of Takahashi's approach that captures his basic insight that “the ban on extraction out of displaced constituents results from what one might call a ‘chain conflict’” (Boeckx (2003, 104)).

Takahashi’s combination of UCA and Shortest Move is replaced with the constraint in (111): a version of the Freezing Principle that I call Constraint on \( \Phi \)-complete Domains (Boeckx does not give it a name). (Note: There is a potential tension here when we recall Rackowski & Richards's (2005) hypothesis that Agree relations create transparency. Still, there is a relevant difference with respect to the locus in which the Agree relation is morphologically realized.)

(111) **Constraint on \( \Phi \)-complete Domains:**
Agree cannot penetrate a domain that is already \( \Phi \)-complete.

**Analysis:**
(i) When an XP has undergone movement and reached its final landing site, it freezes - it is \( \Phi \)-complete.
(ii) Movement out of XP requires an Agree relation into XP.
(iii) Therefore, moved (\( \Phi \)-complete) XPs are barriers.

**Note:**
The approach is supposed to cover all kinds of freezing effects.

**Comments:**
(i) Given the Phase Impenetrability Condition (Chomsky (2000, 2001, 2005a), (111) is a second constraint that imposes a locality requirement on syntactic operations. Neither constraint is reducible to the other one (not all phases are \( \Phi \)-complete, not all \( \Phi \)-complete items are phases, and phases provide a domain that is accessible from outside, which (111) must not do), but many redundancies arise.
(ii) There are freezing effects with categories where it does not seem to make sense to attribute them the property is/is not \( \Phi \)-complete: cf. the VP and PP examples in (112).
(iii) There is an interesting potential tension between Boeckx’s (2003) approach on the one hand, and Rackowski & Richards’s (2005) on the other: In the latter approach, Agree with XP makes XP transparent for extraction out of it, in the former, Agree with XP (producing \( \Phi \)-completeness) renders XP opaque.

(112) a. Ich denke \[ \text{vp das Buch gelesen I have read } \]
   \[ \text{ I think the book read has no one} \]
b. \[ \text{dp Was I have read}\] \[ \text{vp t2 hat keiner } \]
   \[ \text{what think you has no one read} \]
c. \[ \text{dp Was I have read}\] \[ \text{vp t1 gelesen I have read}\] \[ \text{what think you gelesen has no one} \]

(113) a. \[ \text{Who1 do you think that he will talk [vp, to t1]} \]
b. \[ \text{*Who1 do you think that [vp, to t1] he will talk t2} \]

The approach developed in Rizzi (2006, 2007) and related work is not primarily concerned with CED effects, but it is based on a principle that is very similar to a number of freezing constraints that yield CED effects as a consequence.

(114) **Criterial Freezing:**
In a criterial configuration, the criterial goal is frozen in place.

**However:**
To account for the contrast between (115-a) and (115-b) in French, Rizzi (2007) actually assumes that the a criterially frozen subject is *not* a barrier. On his view, the construction is legitimate because the subject DP is endowed with “nominal and \( \Phi \)-features”, and these are maintained in the criterial subject position if only *combin* is extracted (in contrast to (115-a), where Criterial Freezing is violated). (The slight deviance of (115-b) is attributed to a Left Branch Condition violation.)

(115) a. \[ \text{dp2 Combin1 de personnes [vais] tu veux tu [vp, que [tp, t2 viennent a your birthday}]
   \[ \text{how many of people do you want that come to ton anniversaire]} \]
   \[ \text{your birthday} \]

b. \[ \text{Combin1 veux tu [vp, que [tp, dp2 t2 de personnes viennent a your birthday}]
   \[ \text{how many of people do you want that come to ton anniversaire]} \]
   \[ \text{your birthday} \]

3.4.5. **Phase Sliding: Gallego & Uriagereka (2006)**
The basic assumption here is that there is a specific freezing constraint; the constraint is similar to Boeckx's Constraint on \( \Phi \)-complete Domains and Rizzi’s Criterial Freezing; but it also incorporates Uriagereka’s idea of ‘flattening’ complex (non-complement) constituents.

(116) **Edge Condition:**
Syntactic objects in phase edges become internally frozen.

**Note:**
(116) does not impose a ban on extraction from moved items per se; it only blocks extraction from items that have undergone movement to phase edges. (Of course, the two options may be identical, if all movement is movement to phase edge positions.)

**The idea:**
(116) is not radically different from what can be found in other approaches. Gallego & Uriagereka’s (2006) main new contribution is that they assume that v-to-T movement may result in TP (rather than Vp) becoming the relevant phase; i.e., movement of v carries the phase property along. This accounts for a curious asymmetry with extraction

3. The Condition on Extraction Domain: State of the Art
from subjects in Spanish: Preverbal subjects are barriers, postverbal subjects are not.

(117) Extraction from preverbal and postverbal subjects in Spanish

a. De qué conferenciantes te parece que me van a impresionar
   of what speakers to you seem-3SG that to me go-3SG to impress
   [pp las propuestas t1 ]
   the proposals

b. *De qué conferenciantes te parece que [pp las propuestas t1 ]
   of what speakers to you seem-3SG that the proposals
   me van a impresionar
   to me go-3SG to impress
   ‘Which speakers does it seem to you that the proposals by will impress me?’

Observation:
Given that TP (not vP) is the phase in Spanish, the subject DP is in the edge domain of a phrase in (117-b) but not in (117-a).

Comments:
(i) The proposal has a number of far-reaching empirical consequences (e.g., shouldn’t we expect that postverbal subjects in verb-second clauses are always transparent for extraction?).
(ii) It is unclear whether the analysis is compatible with the idea that phases are first and foremost motivated by complexity considerations.
(iii) One might think at first sight that this approach predicts the opposite of Kitahara’s (1994) approach discussed above: In one approach, head movement creates transparency of a specifier (Gallego & Uriagereka); in the other approach, head movement creates opacity of a specifier (Kitahara). However, this is not the case. In both approaches, head movement turns a specifier of the landing site into a barrier; and in both approaches, a specifier associated with the head in situ is predicted to be transparent for extraction.

3.4.6. Conclusion

Two problems with freezing analyses

(i) All freezing analyses rely on additional constraints. It is far from clear whether these constraints can be taken to comply with basic minimalist tenets, as formulated above.
(ii) Freezing analyses have nothing to say about CED effects that arise in contexts where the barrier has not undergone movement. An example: Assuming that particles like denn, wohl, ja demarcate the vP edge in German, it seems clear that the subject DP (DP3) is in situ in the German examples in (118). Nevertheless, a CED occurs with extraction out of the subject.

(118) CED effects with subject DPs in situ in German:

a. *Was1 haben denn [pp2, t1 für Bücher | [DP2 den Fritz ]
   about whom has prt a booknom the Fritzacc
   beeindruckt ?
   impressed

3.5. General Remarks

Conclusions so far (repeated in modified form from above):

1. Analyses that are centered around the working of elementary operations like Move or Agree rely on special assumptions that mimic assumptions in Chomsky’s (1986a) theory of barriers.
2. Analyses that are based on specific concepts of cyclic spell-out are incompatible with the assumption that only the complement of a phase head is affected by spell-out (whereas the specifier domain and the head itself remain available for further operations on subsequent cycles), and with the notion of phase in general.
3. Analyses that rely on freezing are incompatible with the existence of CED effects where an XP is a barrier in its in situ position.
4. Furthermore, most of the approaches discussed so far make it necessary to stipulate separate constraints and/or concepts that are not independently motivated, and that may not always fall under either economy or interface constraints.

Finally

All these analyses have nothing to say about melting effects, a class of data that I will discuss in detail in lecture 3. Here, it looks as though an XP may qualify as a barrier in one case and as transparent in another even though it has exactly the same structural relationship with the surrounding lexical items.

(119) A melting effect with local scrambling in German:

a. *Was1 haben [DP3, t1 für Bücher | [DP2 den Fritz ]
   about whom have booknom the Fritzacc
   beeindruckt ?
   impressed

b. Was1 haben [DP2 den Fritz | [DP3, t1 für Bücher | t2 beeindruckt
   about whom have the Fritzacc for booknom impressed

(120) A melting effect with local scrambling in Czech:

a. *[NP1 Holka ] neudělila [DP3, žádná t1 | Petra2
   ‘No girl hit Petr.’

girlnom hit
   noacc
   Petraacc

girlnom hit
   noacc
   Petraacc

b. *[NP1 Holka | neudělila Petra2 [DP3, žádná t1 | t2
   ‘No girl hit Petr.’

girlnom hit
   Petraacc
   noacc

4. Goals

In the following lectures (2 & 3), I will argue that both MLC and CED effects follow from the Phase Impenetrability Condition (PIC), in interaction with independently motivated
4. Goals

assumptions about movement and structure-building in general. In lecture 4, I address the fate of the Head Movement Constraint; and I argue that it can be derived without invoking a separate constraint, too – it follows from the properties of a certain type of categorial probe features (*Münchhausen* features).

(121) **Claims:**

a. Edge features that trigger intermediate movement steps to phase edges can only be inserted when they have an “effect on outcome”, in Chomsky’s (2001) terms. A simple way of making precise what this means implies that MLC effects follow from the PIC.

b. Edge features that trigger intermediate movement steps to phase edges can only be inserted “after the phase is otherwise complete”, in Chomsky’s (2001) terms. There is good theory-internal evidence for replacing “after” with “before”; this move implies that CED effects follow from the PIC.

c. Head movement by adjunction is known to be a problematic concept (Strict Cycle Condition, c-command requirement for traces, etc.). If head movement must involve reprojecion, these problems are solved. In addition, HMC effects follow without further ado.
Lecture 2

On Deriving MLC Effects from the PIC

1. Introduction

Claim:
There is something wrong with the (Generalized) Minimal Link Condition (MLC): A derivational approach to syntax should minimize search space, its representational residue (Brody (2001, 2002)). Constraints that minimize search space should therefore be strengthened (Chomsky; Chomsky’s (2000; 2001) PIC); constraints that presuppose search space should be abandoned (MLC).

Empirical domain:
MLC effects (superiority and superiority-like effects in German and English) can be derived from a strengthened version of the PIC (Chomsky (2000, 2001)) that holds for phrases rather than phases.

2. Phase Impenetrability

2.1. The Standard Approach

Note:
In Chomsky’s (2000; 2001) system, the SCC and the PIC impose strong restrictions on active parts of derivations. The SCC restricts possible positions for the probe, and the PIC restricts the probe’s search space, i.e., possible positions for the goal.

(For more recent versions of the SCC, see Chomsky (1995, 2001), Collins (1997), Kita- hara (1997), Bošković & Lasnik (1999), and Freidin (1999).)

Within the current XP α, a syntactic operation may not target a position that is included within another XP β that is dominated by α.

The domain of a head X of a phase XP is not accessible to operations outside XP;
only X and its edge are accessible to such operations.

3. Edge (Chomsky (2001, 13)):
The edge of a head X is the residue outside of X; it comprises specifiers of X (and adjuncts to XP).

4. Phase:
The propositional categories CP and vP are phases; other XPs (except perhaps for DP) are not.

Consequence:
Suppose that ZP, XP, and UP are phases in (5). Then, in (5-a), operations can have a probe only in YP (SCC), and look for a goal only in YP or in the residue or head of XP (PIC1). In the subsequent step (5-b), the probe must be in ZP, and the search space for a goal grows as indicated.

5. Search space under PIC1:

\[
\begin{align*}
\text{SCC} & \quad \text{PIC1} \\
\text{a. } & \left( [\text{YP} \ldots \text{Y} \mid \text{XP} \ldots \text{X}] \quad \left[ \text{wp} \ldots \text{W} \ [\text{UP} \ldots \text{U}] \right]\right) \\
\text{b. } & \left( [\text{YP} \ldots \text{Z} \mid \text{XP} \ldots \text{X}] \quad \left[ \text{wp} \ldots \text{W} \ [\text{UP} \ldots \text{U}] \right]\right)
\end{align*}
\]

Problem:
The PIC1 does not allow an operation involving Y and an element of WP. Suppose that YP = TP, XP = vP, and WP = VP. The PIC1 then precludes an operation involving T and DP in VP, which is arguably necessary for cases of long-distance agreement with nominative objects. Solution: The PIC1 is weakened: A phase is evaluated with respect to the PIC2 only at the next phase level.

6. Phase Impenetrability Condition2 (PIC2) (Chomsky (2001, 14)):
The domain of a head X of a phase XP is not accessible to operations at ZP (the next phase); only X and its edge are accessible to such operations.

Consequence:
The search space is enlarged: Operations in YP can now look for a goal in YP, in XP, in WP, or in the residue or head of UP.

7. Search space under PIC2:

\[
\begin{align*}
\text{SCC} & \quad \text{PIC2} \\
\text{a. } & \left( [\text{YP} \ldots \text{Y} \mid \text{XP} \ldots \text{X}] \quad \left[ \text{wp} \ldots \text{W} \ [\text{UP} \ldots \text{U}] \right]\right) \\
\text{b. } & \left( [\text{YP} \ldots \text{Z} \mid \text{XP} \ldots \text{X}] \quad \left[ \text{wp} \ldots \text{W} \ [\text{UP} \ldots \text{U}] \right]\right)
\end{align*}
\]

This lecture is mainly based on Müller (2004a), with various subtle changes in the theory (e.g., concerning the Edge Feature Condition and the role of a constraint Phase Balance) carried out to enhance overall coherence.
2. Phase Impenetrability

Movement: Movement is an agreement relation that is accompanied by an EPP feature on the probe. Checking is deletion under matching. Both PIC₁ and PIC₂ require successive-cyclic wh-movement to proceed via Specv and SpecC. What triggers intermediate movement steps?

(8) Edge Feature Condition (EFC) (Chomsky (2000, 109), Chomsky (2001, 34), Chomsky (2006a, 14)):
   The head X of phase XP may be assigned an edge feature after the phase XP is otherwise complete, but only if that has an effect on outcome.

(9) Derivation of wh-questions (I wonder) what John read
   a. \[ vP \text{ read}\_3 \text{ what}_1 \]
   b. \[ \text{TP} \text{ John}_2 \text{ read}_3 [\text{VP} \text{ t}_3 \text{ t}_1 ] \]
      (EPP on v)
   c. \[ \text{TP} \text{ John}_2 \text{ T} [\text{TP} \text{ what}_1 \text{ t}_2 \text{ read}_3 [\text{VP} \text{ t}_3 \text{ t}_1 ]]] \]
      (EPP on T)
   d. \[ \text{CP} \text{ what}_1 \text{ C} [\text{TP} \text{ John}_2 \text{ T} [\text{TP} \text{ t'}_1 \text{ t}_2 \text{ read} [\text{VP} \text{ t}_3 \text{ t}_1 ]]] \]
      (EPP on C)

(10) Minimal Link Condition (Chomsky (2000; 123, 2001, 27)):
   If \( \beta \) and \( \gamma \) both match a probe \( \alpha \) and \( \beta \) asymmetrically \( \alpha \)-commands \( \gamma \), a syntactic operation cannot involve \( \alpha \) and \( \gamma \).

Problem: Subject raising to SpecT should be blocked by the MLC if object movement to Specv has occurred: \( \text{what}_1 \) is closer to T in (9-c) than t₂.

Solution:
Since an equidistance solution (Chomsky (1995)) is to be avoided, the MLC in its strict form must be fulfilled in (9) after all. Idea: After wh-movement, the subject DP is the closest goal for T. Execution of this idea seems to imply giving up the SCC (movement in TP would have to follow movement in CP). Chomsky’s solution: The MLC is not evaluated at each step of the derivation; it is only evaluated at the phrase level. In (9-d), no overt DP separates the subject trace and T, and the MLC is respected.

2.2. Conceptual Considerations

Background assumption: An attractive feature of incremental derivational approaches to syntax is that complexity can be reduced, compared to representational approaches.
   (i) Lack of look-ahead: At each step of the derivation, subsequent operations and their effects need not (and cannot) be considered.
   (ii) Cyclicity: The SCC prohibits going back to earlier parts of the derivation.
   (iii) Phase Impenetrability: The PIC₁₂ significantly reduces the search space. In effect, all syntactic material in the domain that the PIC₁₂ renders opaque can (and must) be forgotten for the remainder of the derivation ("spell-out").

Observation:
(i) PIC₁ and, in particular, PIC₂ could reduce search space even more radically.
(ii) MLC presupposes search space.

Three problems with PIC₁₂ and MLC:

(i) Weak/Strong Representationality (Brody (2001, 2002)):
   A representational approach can be strictly non-derivative. However, a derivational theory must always be representational to some extent. It is weakly representational if “derivational stages are transparent (i.e., representations), in the sense that material already assembled can be accessed.” It is strongly representational if it “is weakly representational and there are constraints on the representations.” On this view, Chomsky’s (2000; 2001) approach is strongly derivational (see phase evaluation of PIC₂ and MLC). Ideally, though, a strictly derivational theory should not even be weakly representational.

(ii) PIC/MLC Redundancy:
   Chomsky (2001, 47, fn. 52) notes: “The effect on the MLC is limited under the PIC, which bans ‘deep search’ by the probe.” The MLC can only become relevant in the relatively small portions of structure permitted by PIC₁ and PIC₂; it thus loses much of its original empirical coverage. In line with problem (i), this could be taken to suggest that strictly derivational approaches should dispense with the MLC in toto since this constraint presupposes an articulated representation (the search space for the probe). Arguably, in a derivational approach, minimality effects should not be covered by a constraint that accesses a significant amount of syntactic structure, i.e., a representation (MLC); rather, they should emerge as epiphenomena of constraints that reduce the search space (PIC).

(iii) SCC/PIC₁₂ Asymmetry
   The SCC and the PIC₁₂ have complementary tasks and look like two sides of the same coin. Therefore, it is possibly suspicious that the two constraints talk about domains of such a different size: From the point of view of symmetry, the local domain of the SCC should be the phase (not the phrase); or the local domain of the PIC should be the phrase (not the phase).

Goal
A derivational approach that evades problems (i), (ii) and (iii) by having the following properties:
(i) The material that can be accessed at any given step of the derivation is a small bundle of categories that can hardly be called a representation anymore. Hence, the approach is not even weakly representational.
(ii) The MLC is dispensed with in favour of a strengthened version of the PIC.
(iii) The new version of the PIC has the same kind of local domain as the SCC: Phrases are phases.
3. Assumptions

3.1. All Syntactic Operations are Feature-Driven

**Standard assumption:**
Agree and internal Merge (i.e., Move) are feature-driven (but see Chomsky (2005a, 2007)).

**Proposal:**

(11) **Two types of features that drive operations** (Heck & Müller (2006); based on Adger (2003), Roberts & Roussou (2002), Sternefeld (2006)):  
   a. Structure-building features (edge features, subcategorization features) trigger (external or internal) Merge: $[\mathbf{F}_\mathbf{f}]$
   b. Probe features trigger Agree: $[\mathbf{F}_\mathbf{f}]$.

(12) **Last Resort (LR):**
Every syntactic operation must discharge either $[\mathbf{F}_\mathbf{f}]$ or $[\mathbf{F}_\mathbf{f}]$.

**Convention:**
$[\mathbf{F}_\mathbf{f}]$ or $[\mathbf{F}_\mathbf{f}]$ must be eliminated by the respective operations they trigger.

Movement-inducing features are category-specific:

1. $[\mathbf{wh}_\mathbf{f}]$ on C: wh-movement
2. $[\mathbf{top}_\mathbf{f}]$ on C: topicalization
3. $[\mathbf{bl}_\mathbf{f}]$ on V or v: scrambling to Specv (Grewendorf & Sabel (1990), Sauerland (1999))
4. $[\mathbf{c}_\mathbf{f}]$ on T: EPP movement to SpecT
5. [..]...

3.2. All Phrases are Phases

**Standard assumptions about phases:**
- vP and CP are phases (Chomsky (2000, 2001, 2005a))
- DP may be a phrase (Svenonius (2004), Heck & Zimmermann (2004), Matushansky (2005), Kramer (2007), Heck et al. (2007))
- TP may be a phrase (possibly as a parametrized option: Richards (2004, 2007), Gallego & Uriagereka (2006), Gallego (2007)).

**Conflicting assumptions about locality:**
- All XPs are locality domains for movement (Köster (1978, 2000), van Riemsdijk (1978)).
- Also compare Slash feature percolation in Gazdar (1981); Gazdar et al. (1985), and the related concepts of “gap phrase” and “operator feature percolation” in Köster (2000) and Neeleman & van de Koot (2007).

**Proposal:**
(B3) **Phase:** All phrases are phases.

**Observation:**
Such an approach makes it necessary to reconsider a substantial part of the evidence that has been brought forward in support of a less general, category-selective concept of phases.

3.2.1. Cyclic Spell-Out Domains

First, phases have been correlated with cyclic spell-out domains. However:
- The correlation is not perfect in the first place (it is the complement domain of the phase head that is spelled out, rather than the phase as edge and head material must be available for operations on the next phase level).
- Domains for cyclic spell-out have also been argued to be potentially smaller than the classical phase (cf. Uriagereka (1999)), perhaps radically so (see Epstein & Seely (2002)).

3.2.2. Reflexes of Successive Cyclicity

Second, closer inspection of the literature on morphological and other reflexes of successive cyclicity reveals that they are not always confined to the DP or vP domains (as is the case with, e.g., complementizer selection in Modern Irish discussed in McCloskey (1979, 2002), or possibly the instances of wh-agreement in Chamorro discussed in Cling (1994)).

- For instance, focus movement in Ewe looks like a clear counter-example because the morphological reflex shows up in the TP domain (rather than the vP or CP domain): Optionally, a different form of subject pronoun in SpecT can be chosen if movement to SpecC takes place (see Collins (1993, 1994)).
- Similarly, tonal downstream in Kikuyu is a reflex of successive-cyclic movement that does not exclusively identify CP or vP edges (see Clements et al. (1983)).

3.2.3. Reconstruction

Third, the assumption is compatible with evidence from reconstruction (Fox (2000), Nissenbaum (2000)).
3. Assumptions

3.2.4. Reflexivization

Fourth and finally, Abels’ (2003) argument for designated intermediate landing sites (for “punctuated paths,” in his terminology) can be shown to be inconclusive.

(14) Put-stop reflexives seem to distinguish between SpecC and SpecT:
  a. Which pictures of himself does John think [cp □ (that)] she likes t?
  b. *Which pictures of himself did Mary see to John, [tp □ t2 to like t]?

Two problems:

• When which picture of himself in (14-b) moves to SpecT (assuming that it does because every phrase is a phase), the intervening subject Mary is still present in the same domain, and it continues to be present when John is merged. Therefore, Mary will intervene, and block binding of the reflexive by John (as a closer potential antecedent) even if which picture of himself moves to SpecT, assuming that two specifiers of the same head are in the same minimal domain and may create intervention effects for each other.

• A second problem with Abels’s (2003) argument for designated phases: Boeckx (2008), Abels & Bentzen (2008): Sentences like (15) also lack the enrichment of binding options by movement to intermediate positions although the most deeply embedded clause is a CP, and movement to the □ position of this CP domain should suffice for creating the new binding option. Conclusion: An intervening experiencer blocks the enrichment of binding options, quite independently of the nature of the landing site involved.

(15) Experiencers block enrichment of reflexivization options
  *Which pictures of himself did Mary see to John, [cp □ that she likes t]?

3.2.5. Conclusion

Consequence:

Wh-movement must proceed via every XP edge domain on its way to its ultimate target position (the C(subject) node that attracts it), given the PIC.

The SCC is as before, but PIC3 now is restricted to phrases. This denies a special role of CP and vP for the purposes of movement theory, contra Chomsky (2000, 2001), Fox (2000), Nassenbaum (2001), Bruning (2001), Barbiers (2002), and others. (But it is of course compatible with all the evidence suggesting that SpecC and Specv are used by successive-cyclic movement.)

(16) Strict Cycle Condition (SCC):
  Within the current XP α, a syntactic operation may not target a position that is included within another XP β that is dominated by α.

(17) Phrase Impenetrability Condition3 (PIC3):
  The domain of a head X of a phrase (= phrase) XP is not accessible to operations outside XP; only X and its edge are accessible to such operations.

(18) Search space under PIC3:

<table>
<thead>
<tr>
<th>SCC</th>
<th>PIC3</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [Y...X][X...Y][W...W [W...U]]</td>
<td>b. [Z...Y][X...X][X...Y][W...W [W...U]]</td>
</tr>
</tbody>
</table>

3.3. The Edge Feature Condition

(19) Edge Feature Condition (EFC):

The head X of phase XP may be assigned an edge feature after the phase XP is otherwise complete, but only if that has an effect on outcome.

A question:

What does it mean to “have an effect on outcome”?

An answer:


(Note: The following analysis differs from the ones given in Heck & Müller (2000) and Müller (2004) in that instead of the constraint Phase Balance, there is just a concept Balanced Phase that is referred to by a revised EFC.)

(20) Balanced Phase:

A phase is balanced if, for every feature [F*] in the numeration, there is a distinct potentially available feature [F].

(21) Potential availability.

A feature [F] is potentially available at the XP level if (i) or (ii) holds:
  a. [F] is on X or on an edge element of X.
  b. [F] is part of the workspace of the derivation.

(The workspace of a derivation D comprises the nummeration and material in trees that have been created earlier and have not yet been used in D.)

(22) Edge Feature Condition (EFC; revised):

The head X of phase XP may be assigned an edge feature after the phase XP is otherwise complete, but only if that is the only way to produce a balanced phase.

Note:

(i) In contrast to Müller (2004), this system does not envisage minimal violations of Last Resort (if Phase Balance, as a constraint, triggers movement).

(ii) However, edge feature insertion must be able to minimally violate the Inclusiveness Condition (Chomsky 1995, 2000, 2001). Thus, whereas the prohibition against non-feature driven movement is strict, the prohibition against feature insertion is not.

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4. Deriving the Minimal Link Condition

Consequence:

1. In the case of wh-movement, a wh-object must move to the edge domain of every intervening phase (= phrase), because of the PIC.
2. For these movement steps to be possible, edge features must be inserted on phase heads, because of Last Resort.
3. Edge feature insertion to a phase head is legitimate only if there is no other way to balance the phase, because of the Edge Feature Condition.
4. To find out, whether the phase would otherwise be balanced or not, a look into the numeration (and the workspace) is necessary – if it would not be balanced without wh-movement, an edge feature can be inserted which attracts the wh-phrase.
5. If the edge feature is not inserted, the PIC will block further movement of the wh-phrase on the next cycle, and the derivation eventually crashes because [**wh**] on C cannot be checked.
6. A wh-phrase therefore moves only if it is required by some (non-local) C head bearing [**wh**].
7. Wh-movement must proceed via every XP on its way to its ultimate target position (the C[**wh**] node that attracts it).

(23) Derivation of wh-questions:
(I wonder) what John read
a. [VP what3 read3 t1] → workspace: {C[**wh**]: John, T[**wh**]: v}
   
   b. [P what1 John2 v+read3 [VP t1 t3]] → workspace: {C[**wh**]; T[**wh**]: v}
   
   c. [TP what1 John2 T [P t1 v+read1 [VP t1 t3]]] → workspace: {C[**wh**]; T[**wh**]: v}
   
   d. [CP what1 C [TP t1'] T [P t1 v+read1 [VP t1 t3]]] → workspace: {C[**wh**]}

Note:
Material that is crossed out is not accessible anymore for further operations in the derivation.

4. Deriving the Minimal Link Condition

4.1 Superiority Effects in English

(24) Subject and object:
   a. (I wonder) who1 bought what2
   b. *(I wonder) what2 who1 bought t2

(25) Object and object:
   a. Who1 did you persuade t1 [CP to read what2]?
   b. *What2 did you persuade who1 [CP to read t2]?

Analysis:
(i) Movement of DP2 to SpecV (Specv, SpecT, ...) cannot be triggered by inherent movement-inducing features on lexical items ([**wh**]): English does not have object shift or scrambling.
(ii) Movement of DP2 to SpecV (Specv, SpecT, ...) cannot be triggered by the PIC, via the Edge Feature Condition: VP is balanced because there is another wh-phrase in the workspace, viz., DP1; vP and TP in (24) are balanced because DP1 occupies the respective specifiers (but given the PIC, at this point it would be too late for DP2 anyway). In addition, if an edge feature has not been inserted on the first cycle, the derivation will eventually crash.

(26) Derivation of (24):
   a. [vp bought3 what2] → workspace: {C[**wh**]; who1, T[**wh**]: v}
   b. [P who1 v+bought3 [VP t3 what3]] → workspace: {C[**wh**]; T[**wh**]: v}
   c. [TP who1 T [P t1 v+bought3 [CP t3 what3]]] → workspace: {C[**wh**]; T[**wh**]: v}
   d. [CP who1 C [TP t1'] T [P t1 v+bought3 [VP t3 what3]]] → workspace: {C[**wh**]; T[**wh**]: v}

Observation 1 (Chomsky 1973, 246; Fiego 1980, 123):
If there are two wh-objects in double object constructions with a prepositional object, either object can move; but preposition stranding becomes impossible.

(27) Double object constructions with a prepositional object:
   a. What1 did you give t1 to whom2?
   b. To whom3 did you give what1 t3?
   c. *Who2 did you give what1 [pp3 to t2]?

Observation 2 (Barss & Lasnik 1986, 349):
If there are two wh-objects in double object constructions with dative shift, only the shifted object can (marginally) move. (The marginality is due to a general weak ban on A-bar movement of dative-shifted objects in English and thus independent of superiority; see Stowell 1981, ch. 4 and Larson 1988, among others.)

(28) Double object constructions with dative shift:
   a. (?)Who2 did you give t2 what1?
   b. *What1 did you give who2 t1?

Assumption 1 (modification of Larson 1988):
The direct (Theme) object is in a complement position of V throughout; the indirect (Goal) object is in SpecV if it has undergone dative shift, and in a right- peripheral V'sister position if it is prepositional.

(29) Base generation of double object constructions:
   a. [vp [V [V VP1 [[pp2 P DP2]]] ]
4. Deriving the Minimal Link Condition

b. [VP DP₂ [ᵣ, V DP₁ ]]

Assumption 2:
Pied piping involves optional feature percolation, which can be viewed as actual displacement of a feature (this assumption is probably wrong, but it may suffice for present purposes; see Heck (2004, 2007)).

Analysis of (27): (i) Suppose that [wh] percolation has taken place, and PP bears [wh]. The two objects are merged in VP-internal non-edge positions. To balance the VP phase, movement of one wh-phrase to SpecV must take place (one edge feature can be inserted, given the Edge Feature Condition). It does not matter which one, but whichever wh-phrase is moved first forces the other wh-phrase to stay in situ, to avoid an unforced violation of Last Resort. The wh-phrase in SpecV is then passed on through further cycles of the derivation, until CP is reached and [[w] on C is checked.

(ii) Suppose that [wh] percolation has not taken place. Then, PP cannot move. However, DP₂ in PP cannot move either: To leave PP, it must move to SpecP. This operation is not available because there is no [w] that might trigger it, and because the phase is independently balanced (with another wh-phrase in the workspace).

Analysis of (28): In dative shift constructions, DP₂ is in SpecV for independent reasons (either because it is base-generated there, or because there is an [w] that triggers dative shift to that position). Hence, the phase is balanced from the start, and an edge feature cannot be inserted.

A prediction: If two wh-phrases are further embedded in objects, preposition stranding is predicted to be blocked throughout. (Note: Examples like (30-d) are classified as ill formed by Jackendoff (1990, 433), and as well formed by Fieno (1980, 124).)

(30) Two embedded wh-phrases:

- a. *Who did you give [pp pictures of t₂] [pp to whom₁] ?
- b. *Who did you give [pp pictures of whom₂] [pp to t₁] ?
- c. *Who did you talk [pp to t₂] [pp about whom₁] ?
- d. *Who did you talk [pp to whom₂] [pp about t₁] ?

(30-acc) (classified as acceptable by Jackendoff) should involve an additional violation of the Clause Nonfinal Incomplete Constituent Constraint; see Kuno (1973, 379), Lasnik & Saïto (1992, 91), and lecture 1).

(31) Movement from clause non-final constituents:

- a. Who did you give [pp pictures of Mary] [pp to t₂] ?
- b. ?Who did you give [pp pictures of t₁] [pp to John] ?

4.2. Lack of Superiority Effects in German


(32) Lack of superiority effects with clause-mates:

- a. (Ich weiß nicht) wer₁ C t₁ was₂ gersagt hat
  I know not whom nom whom acc said has
- b. (Ich weiß nicht) was₂ C wer₁ t₂ gersagt hat
  I know not whom acc whom nom said has

Observation (Fanselow (1991), Kim & Sternefeld (1997), Hälder (2000b)): German does not exhibit superiority effects with control infinitives.

(33) Lack of superiority effects in control infinitives:

- a. (Ich weiß nicht) wen₁ er t₁ überzeugt hat [ was₂ zu kaufen ]
  I know not whom nom he convinced has whom acc to buy
- b. (Ich weiß nicht) was₂ er wen₁ überzeugt hat [ t₂ zu kaufen ]
  I know not whom acc he whom nom convinced has to buy

Some previous accounts:

(i) Superiority results from a lack of government (ECP). All arguments are governed in German (Hälder (1983, 1993)).
(ii) Superiority results from a lack of government (ECP). C in V/2 languages can govern the subject position (Noonan (1988)).
(iii) Superiority results from an IP barrier that restricts LF movement of the in-situ wh-phrase (ECP). This barrier does not exist in German (Müller (1995)).
(iv) Superiority violations are only apparent in German; D-linking is involved (Fanselow (1991), Wiltschko (1997), Grohmann (1998)).
(v) Superiority results from a feature-based version of relativized minimality: a wh-element in situ must not c-command the trace of a wh-element whose overt licensing features are non-distinct (Hälder (2000b), based on Fanselow (1991)). German can avoid superiority effects because Case is a licensing feature and overt Case forms are often distinct; this is not the case in English.
(vi) Superiority results from the MLC. German has variable base generation of arguments (Kim & Sternefeld (1997)), based on (an earlier version of) Fanselow (2001).
(vii) Superiority results from the MLC. The English C attracts all wh-phrases, but only the first one that is attracted by C is PP-realized (Peeters (2000)). German has a different C that requires only one wh-phrase in SpecC and attracts the wh-features of the others. If feature attraction precedes phrase attraction, superiority violations occur.
(viii) Superiority results from the MLC. German has scrambling, which may independently move a lower wh-phrase to a higher position, by wh-scrambling (Fanselow (1996), Grohmann (1997)).
Assumption: The last approach is the correct one: A lower wh-phrase cannot move across a wh-phrase that is generated in a higher XP by wh-movement, given the Edge Feature Condition and the PIC; but it can do so by scrambling. Scrambling is triggered by [\*x\*] on a probe, and [\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*…
4. Deriving the Minimal Link Condition

4.6. Superiority-Like Effects with Remnant Movement in German


UD effects can be derived from the MLC: In a configuration ..., where β and γ both qualify as a goal for a β-external probe α, the MLC forces movement of the item that is closer to α: β.

(41) Unambiguous Domination effects:

a. *dass [VP_{2,\alpha}] t_{1} zu lesen [VP_{1,\beta}] das Buch [keiner t_{2} versucht hat] that to read the book _nom tried has

b. dass [VP_{2,\alpha}] das Buch _nom zu lesen [keiner t_{2} versucht hat] that the book _nom to read _nom tried has

Analysis:
The ill-formedness of (41-a) does not follow from the PIC. Suppose that there are two [**\Sigma**] features, one for DP_{1}, one for VP_{2}. Then, there should be a well-formed derivation for (41-a), with DP_{1} undergoing a feature-driven movement to SpecV first, followed by regular feature-driven movement of DP_{1} to Specv, and then of VP_{2} to Specv - both movements are compatible with PIC. However, UD can be derived by a version of the A-over-A condition that I call “residual”. (Also see lecture 3 for more on this phenomenon.)

(42) Residual A-Over-A Condition (RAOA):

If [**\Sigma**] can be checked either with a head, or with an edge element, it must be checked with the head.

Note:
This forces VP_{2} movement to apply first; subsequent DP_{1} lowering then violates (at least) the Strict Cycle Condition.

5. Intervention Effects that do Not Follow From the (G)MLC

5.1. Long-Distance Intervention without C-Command in German

Observation (Heck & Müller (2000)): Non-c-commanding wh-phrases in a matrix clause block long-distance wh-movement in German.

(43) Long-distance wh-movement across a wh-item in an adjunct clause:

a. Wen_{1} hat Fritz [CP nach dem er was_{2} gemacht hat] \_1 getroffen?
whom has Fritz after that what done has met

b. *Wen_{1} hat Fritz [CP nach dem er was_{2} gemacht hat] \_1 sagte [CP dass Maria whom has Fritz after that what done has said that Maria t_{1} lebt]?

i. loves

(44) Long-distance wh-movement across a wh-item in a relative clause:

a. Wen_{1} hat Fritz [\_1 einem Mann [CP der was_{2} konnt]] \_2 vorgestellt?

whom has Fritz a man that what known introduced

b. *Wen_{1} hat Fritz [\_1 einem Mann [CP der was_{2} konnt]] \_2 sagte [CP dass whom has Fritz a man that what said that er t_{1} einladen soll]?

he invite should

(45) Long-distance wh-movement across a wh-item in an DP:

a. Wen_{1} hat Fritz [\_1 einem Freund von was_{2} ] \_1 vorgestellt?

whom has Fritz a friend of whom introduced

b. *Wen_{1} hat Fritz [\_1 einem Freund von was_{2} ] \_2 sagte [CP dass Maria whom has Fritz a friend of whom said that Maria t_{1} lebt]?

loves

(46) Long-distance wh-movement across a wh-item in an DP:

a. Wen_{1} hat Fritz [\_1 einem Freund von was_{2} ] \_1 vorgestellt?

whom has Fritz a friend of whom introduced
scrambling. The (b)-examples are ill formed because, given another wh-item in the workspace, an edge feature cannot be inserted, and Last Resort prohibits movement of DP, to the edge. Independent scrambling must stop in the embedded vP domain. (The (c)-examples are also ill formed because of the CED; see lecture 3).

46 Superiority-like effects with subject raising:
   a. [Wem1 hat [xp die Frau [xp mit welchem Mantel ]] t1 ein Buch
      whomdat has the woman with which coat a book
      gegeben ?
      given
   b. [Wem1 hat [xp die Frau [xp mit welchem Mantel ]] es t1 gegeben ?
      whomdat has the woman with which coat itacc given
      given
   c. *[xp Mit welchem Mantel ] hat [xp die Frau t2 ] es wem1
      with which coat has the woman itacc whomdat
      gegeben ?
      given

5.2. Clause-Bound Intervention without C-Command in English

Prediction:
Since English does not have scrambling, we expect clause-bound intervention effects with non-commanding wh-phrases. At first sight, this seems to contradict the standard view that argument wh-in situ in English does not obey any island constraints (Chomsky (1981), Huang (1982, 1995), Lasnik & Saito (1992), Hornstein (1995)). However, most of the pertinent examples in the literature do not involve intervention without c-command. Where such intervention does occur, acceptability seems to be significantly reduced.

47 Who-in situ in an object or adjunct does not block subject wh-movement:
   a. Who0 t1 saw [xp the man that bought what2 ] ?
   b. Who0 t1 likes [xp books that criticize who2 ] ?
   c. Who0 t1 bought [xp the books on which table2 ] ?
   d. Who0 t1 met [xp friends of whom2 ] ?
   e. I wonder who0 t1 heard [xp the claim that John had seen what2 ]
   f. I wonder who0 t1 heard [xp John's stories about what2 ]
   g. Who0 t1 left [xp despite which warning2 ] ?

48 Who-in situ in a subject does not block matrix subject wh-movement:
   Who0 t1 thinks that [xp pictures of who2 ] are on sale ?

49 Who-in situ in a subject may block object wh-movement:
   a. *[Who0 did [xp the man that bought what1 ] see t2 ]
   b. *[Who0 did [xp books that criticize who1 ] impress t2 ]
   c. *[What2 did [xp the books on which table1 ] cost t2 ]
   d. *[Who0 did [xp friends of whom1 ] meet t2 ]
   e. *[Who0 did [xp friends of whom1 ] say that we should invite t2 ]

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   d. Who0 t1 met [xp friends of whom2 ] ?
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   g. Who0 t1 left [xp despite which warning2 ] ?

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   a. *[Who0 did [xp the man that bought what1 ] see t2 ]
   b. *[Who0 did [xp books that criticize who1 ] impress t2 ]
   c. *[What2 did [xp the books on which table1 ] cost t2 ]
   d. *[Who0 did [xp friends of whom1 ] meet t2 ]
   e. *[Who0 did [xp friends of whom1 ] say that we should invite t2 ]

Note:
The data in (49) were checked with various native speakers, who unanimously declared them to be ill formed, and who all found a sharp contrast in the minimal pairs that can be formed on the basis of (47) and (49). However, I am aware of one exception to the apparent general neglect of constructions like those in (49) in the literature: Such examples are discussed in Fienko et al. (1988) and, following them, Fitzpatrick (2002), and judged grammatical. I have nothing to say here about the source of the diverging judgments, except for the observation that Fienko et al. (1988) are primarily concerned with contrasting the construction in (49), with a wh-phrase embedded in a subject DP and an object wh-phrase ending up in front of it, with one in which the subject DP-internal wh-phrase undergoes movement (in violation of the CED) and the object wh-phrase stays in situ — and not with one in which a wh-phrase is embedded in an object DP and a subject wh-phrase undergoes movement. In other words: One might speculate that judgement differences arise in this domain because different kinds of minimal pairs are taken into account, and judgements are taken to be relative rather than absolute.

6. Further Refinements

6.1. Multiple C Domains and Intervention

(50) A potential problem:
   a. [xp Die Frage [xp, werd4 C t1 was2 mitbringt ]] ist relevant für die
      Frage who what brings is relevant to the
      Frage [xp, werd4 Fritz denkt [xp, t2 dass die Party t3 wird ]
      question how Fritz thinks that the party will be
      b. [xp, Wer1 hat t1 wen2 gefragt [xp, was3 Fritz t3 mag ]
      whomnom has whomnom asked whatnom Fritznom likes
      c. [xp, Who1 t1 asked whom2 [xp, what3 C John likes t1 ]] ?

Solution:
Wh-features are accompanied by scope indices on items in the numeration. Hence, [wh], on a wh-phrase can never be potentially available for [wh], on a C in the workspace, due to feature mismatch.

6.2. D-Linking

Problem:
Why does an intervening D-linked wh-phrase (Pesetsky (1987)) not induce a superiority violation in English?

(51) D-linking effects:
   a. *[I know [xp, which books ] who1 read t2
   b. I know what2 [xp, which people ] read t2

Suggestion:
D-linked wh-phrases can optionally lack a (proper) [wh]-feature; if they lack this feature,
a balanced phase can only be reached by movement of the other wh-phrase.

7. Conclusion

Results:
(i) There are independent reasons for strengthening the standard PIC in a derivational grammar, with all phrases qualifying as phases (PIC3).
(ii) It follows from this move that the PIC3 accounts for typical MLC effects in English. The MLC can therefore be dispensed with (except perhaps for a residue, RAOA).
(iii) Given that German has scrambling of wh-phrases, superiority effects are predicted to be absent, except for those circumstances where scrambling is independently excluded.
(iv) Unlike the MLC, the system based on balanced phases and the PIC3 predicts superiority-like intervention effects without c-command.

Outlook:
As it stands, the PIC3 has important consequences for many other phenomena, especially if we pursue the strongest possible hypothesis in a derivational approach:

(52) A strong hypothesis:
Once rendered inaccessible by the PIC3, syntactic structure does not become accessible again when the syntactic derivation terminates ("at LF"). Hence, there can be no constraints on representations ("bare output conditions").

• Hypothesis (52) implies that there is no reason left to assume the existence of traces (neither as t, nor as a copy), which presupposes a derivational approach to semantic interpretation (Sternefeld (1996), Adger & Svenonius (2003)).

• It also raises interesting problems for binding of anaphors (at least those cases that are not strictly local and can be covered by Reinhart & Reuland’s (1993) reflexivity constraints) and pronouns, control, long-distance agreement, etc. It seems that apparent non-local relations must be accounted for by successive-cyclic local [F] feature movement from head to head (mediated by concepts like balanced phases or motivated by independent features; see Pesetsky (2000) on the viability of feature movement). [F] must encode the relevant properties of the in-situ element; e.g.: anaphor, PRO. For binding, this strategy would be a natural extension of proposals like Chomsky’s (1986b) LF movement of anaphors, and a version of it is in fact pursued by Reuland (2001) in his account of A-chain condition effects, and by Fischer (2004) more generally.

• For (obligatory) control, the strategy would amount to a decomposition of Landau’s (2000) Agree relation into small steps of feature movement (or, indeed, a version of Hornstein’s (2001) A-movement approach).

• Finally, long-distance agreement may or may not suggest the same kind of analysis; there is disagreement in the literature:
Lecture 3

On Deriving CED Effects from the PIC

1. Introduction

Question:
How can the effects of the Condition on Extraction Domain (CED; Huang (1982), Chomsky (1986a, 1995, 2005a), Cinque (1990), Manzini (1992)) be made to follow in the minimalist program?

(1) Condition on Extraction Domain:
  a. Movement must not cross a barrier.
  b. An XP is a barrier iff it is not a complement.

State of the art in minimalist syntax (recall lecture 1):

- CED effects are derived by invoking assumptions about elementary operations like Merge and Agree.
- CED effects are derived by invoking assumptions about cyclic spell-out.
- CED effects are derived as freezing effects.

Conclusions (repeated from lecture 1):

1. Analyses that are centered around the working of elementary operations like Move or Agree rely on special assumptions that mimic assumptions in Chomsky’s (1986a) theory of barriers.
2. Analyses that are based on specific concepts of cyclic spell-out are incompatible with the assumption that only the complement of a phase head is affected by spell-out (whereas the specifier domain and the head itself remain available for further operations on subsequent cycles), and with the notion of phase in general.
3. Analyses that rely on freezing are incompatible with the existence of CED effects where an XP is a barrier in its in situ position.
4. Furthermore, most of the approaches discussed so far make it necessary to stipulate separate constraints and/or concepts that are not independently motivated, and that may not always fall under either economy or interface constraints.
5. Finally, all these analyses have nothing to say about melting effects: Local scrambling in front of what would otherwise qualify as a last-merged specifier renders the specifier transparent for extraction. Thus, an XP may qualify as a barrier in one case and as transparent in another even though it has exactly the same structural relationship with the surrounding lexical items.

Background:
Chomsky (2000, 2001, 2005a): PIC forces successive-cyclic movement via phase edges; such movement is possible because edge features that drive it can be inserted.

(2) Phase Impenetrability Condition (PIC):
The domain of a head X of a phase XP is not accessible to operations outside XP; only X and its edge are accessible to such operations (where edge of X = specifier(s) of X).

(3) Edge Feature Condition (EFC; Chomsky (2000, 109), Chomsky (2001, 34), Chomsky (2005a, 14)):
The head X of phase XP may be assigned an edge feature after the phase XP is otherwise complete, but only if that has an effect on outcome.

Recall:
The most important assumption of lecture 2 was that to have an effect on outcome should be made precise as in (4) (= (22) of lecture 2).

(4) Edge Feature Condition (EFC; revised):
The head X of phase XP may be assigned an edge feature after the phase XP is otherwise complete, but only if that is the only way to produce a balanced phase.

Note:
In what follows, I will ignore the question of what exactly it means for edge feature insertion to have an effect on outcome. The analysis to be developed here is compatible with various ways that this can be made sense of — but, of course, it is especially compatible with the specific definition in (4). However, since this issue is orthogonal to the main plot, in what follows I will tacitly presuppose that some additional requirement like “only if that is the only way to produce a balanced phase” is also part of the Edge Feature Condition; but I will focus on the other parts of the constraint. In particular, I want to make the following suggestion:
2. Claim

Claim:
CED effects can be derived from the PIC if the following four assumptions are made:
1. All syntactic operations are driven by features of lexical items.
2. These features are ordered on lexical items.
3. All phrases are phases.
4. Edge features that trigger intermediate movement steps can be added only as long as the phase head is still active.

(5) **Condition on Extraction Domain** (a new version; to be derived from the PIC):
   a. Movement must not cross a barrier.
   b. α is a barrier if the operation that has merged α in a phase Γ is the final operation in Γ.

3. Assumptions

3.1. All Syntactic Operations are Feature-Driven
I have justified this assumption in lecture 2. The main conclusions are the following.

(6) **Two types of features that drive operations**
   a. Structure-building features (edge features, subcategorization features) trigger
      (external or internal) Merge: [\(*F\)]
   b. Probe features trigger Agree: [\(*F\)].

(7) **Last Resort** (LR):
   Every syntactic operation must discharge either [\(*F\)] or [\(^*F\)].

3.2. Features on Lexical Items are Ordered

**Question:**
How does linking (argument structure in the lexicon → argument realization in syntax) work?

(8) **Linking**
   a. [\([^\_P\) John \(\_\) likes\(\_\) \(_V\) \(\_\) VP \(\_\) Bill \(\_\)]
      \(_\) AGENT \(_\) THEME
   b. [\([^\_P\) Mary \(\_\) gave\(\_\) \(_V\) \(\_\) VP \(\_\) a \(\_\) book \(\_\) to Bill \(\_\)]
      \(_\) AGENT \(_\) THEME \(_\) GOAL

**First strategy** (Adger (2003)):
Syntactic positions (= argument realizations) are given fixed argument structure correlates.

(9) a. NP daughter of vP → AGENT
    b. NP daughter of VP → THEME
    c. PP daughter of \(V'\) → GOAL

**Consequence:**
(10) is uninterpretable. But is that correct?
(10) [*\(_P\) Mary \(\_\) gave\(\_\) \(_V\) \(\_\) to Bill \(\_\) a \(\_\) book \(\_\)]

**Second strategy** (long tradition, based on categorial grammar; see, e.g., Lewis (1972),
also Pollard & Sag (1994), Wunderlich (1997), Lechner (2004); adopted here):
(i) Θ-roles are ordered in lexical entries of predicates.
(ii) Θ-roles are mapped to a list of categorial subcategorization features (i.e., structure-
building features: [\(*F\)] in reverse order.

(11) a. Θ-roles
    \(\Theta_1 \gg \Theta_2 \gg \Theta_3\) (AGENT \(\gg\) THEME \(\gg\) GOAL)

b. Subcategorization features:
   \([*F]_3 \gg [*D]_2 \gg [*D]_1\)

(12) **Last Resort** (LR, revised):
   a. Every syntactic operation must discharge either [\(*F\)] or [\(^*F\)].
   b. Only features on the top of a feature list are accessible.

**Note:**
(12-b) presupposes that a discharged feature is removed from the lexical item, and
deleted. Issues related to morphological realization of case and agreement features may ultimately demand a slightly more complicated approach (according to which discharged features become inactive for further processes in the sense of
(12-b) but remain accessible for morphological realization; see Adger (2003), Miller
(2008) for discussion); but for present purposes we may keep to the simplest assumption.

**More specific assumptions:**
- Subcategorization features that do not go back to Θ-grids also enter argument lists.
- Agent DPs are introduced by \(v\): [\(*V\_\) \(\gg\) [*D\_\)]
- Transitive verbs thus take only one argument; ditransitive verbs subcategorize for
  two arguments.

**Extension:**
The same goes for probe features: They show up on a separate stack, and if there is
more than one, they are ordered on a lexical head (the latter assumption will not be important in this lecture, though).

**Conclusion:**
There are two stacks of features on lexical items. Given Last Resort in (12), lexical
heads look like push-down automata (last-in/first-out).
3.3. All Phrases are Phases

Again, I have justified this assumption in lecture 2. The assumption and its consequence:

\begin{equation}
\text{(13)} \quad \text{Phase: All phrases are phrases.}
\end{equation}

\text{Consequence:}

\text{Wh-movement must proceed via every XP edge domain on its way to its ultimate target position (the C node that attracts it), given the PIC.}

3.4. Edge feature insertion

\text{Observation:}

When a phase is complete, it has “exhausted the lexical subarray from which it is derived” (Chomsky (2000, 109)). Assuming that all operations are triggered by the phase head, this suggests that the phase head is inert once the phase is complete. Hence, the null hypothesis is that the phase is inaccessible for further internal modification at this point. From this perspective, subsequent edge feature insertion (as in (3), (4)) is a peculiar operation.

\text{Proposal:}

Replace after with before in (3): Edge features can only be inserted as long as the phase head is active.

\begin{equation}
\text{(14) Edge Feature Condition (EFC, new version):}
\end{equation}

An edge feature $\star[X\star]$ can be assigned to the head $\gamma$ of a phase only if (a) and (b) hold:

\begin{enumerate}
\item $\gamma$ has not yet discharged all its structure-building or probe features.
\item $\star[X\star]$ ends up on top of $\gamma$’s list of structure-building features.
\end{enumerate}

\text{In other words:}

Assignment of an edge feature $\star[X\star]$ to $\gamma$ can take place only to the top of a (non-empty) feature list.

4. Deriving the Condition on Extraction Domain

4.1. Analysis: Merge

\text{Deriving the CED:}

1. If an edge feature $\star[X\star]$ is to be inserted on a phase head $\gamma$, it must go to the top of $\gamma$’s list of structure-building features. \text{(EFC)}
2. $\gamma$ must contain at least one other feature at this point (otherwise it is inert). \text{(EFC)}
3. But then, $\star[X\star]$ is discharged again immediately (last-in/first-out). \text{(LR)}
4. Thus, it is impossible to insert an edge feature for a category $\alpha$ that is merged in $\Gamma$ as the last operation taking place in $\Gamma$. \text{(EFC)}

5. Therefore, a moved item in the edge domain of an $\alpha$ merged last in $\Gamma$ is not accessible anymore outside $\Gamma$ (assuming a non-recursive notion of edge). \text{(PIC)}
6. Consequently, extraction from $\alpha$ is predicted to be impossible. \text{(PIC)}
7. Given that (outer) specifiers are last-merged in their projections, they are thus barriers for movement. \text{(CED derived)}

\begin{equation}
\text{(15) Clause structure:}
\end{equation}

$(\ldots \quad \text{CP} \quad \alpha_1 \text{ C CP} \quad \text{TP} \quad \alpha_2 \quad \text{T CP} \quad \alpha_3 \quad \text{VP} \quad \text{v} \quad \text{VP} \quad \alpha_4 \quad \text{V} \quad \text{v} \quad \text{V} \quad \text{v} \quad \beta \quad \ldots)$

\text{(16) Why specifiers in (15) are barriers:}

$\alpha_i$ is a specifier that is last-merged in its phase.

a. Edge feature insertion follows specifier feature discharge:

\begin{equation}
\begin{aligned}
\gamma & : \star[X\star] \\
\rightarrow & : \gamma : 0 \\
\rightarrow & : \gamma \vdash \star[X\star] \\
\end{aligned}
\end{equation}

$\sim$ violates (14-a)

b. Edge feature insertion precedes specifier feature discharge, version 1:

\begin{equation}
\begin{aligned}
\gamma & : \star[X\star] \\
\rightarrow & : \gamma \vdash \star[X\star] \\
\rightarrow & : \gamma \vdash \star[X\star] \\
\end{aligned}
\end{equation}

$\sim$ violates (14-b)

c. Edge feature insertion precedes specifier feature discharge, version 2:

\begin{equation}
\begin{aligned}
\gamma & : \star[X\star] \\
\rightarrow & : \gamma \vdash \star[X\star] \\
\rightarrow & : \gamma \vdash \star[X\star] \\
\end{aligned}
\end{equation}

$\sim$ does not help because of (12-b)

\text{Conclusion:}

Specifiers are barriers because of the PIC: There is no way to carry out an intermediate movement step from a last-merged specifier to the specifier of the minimal phase above it.

\text{Side remark on notation:}

$\alpha$ refers to a syntactic category (a phrase, possibly with rich internal structure); in contrast, $\star[X\star]$ is a subcategorization feature selecting the category label of $\alpha$. Thus, strictly speaking, “$\alpha$" is ambiguous between a syntactic category and its label. This simplification is harmless.

\begin{equation}
\text{(17) Why complements in (15) do not have to be barriers}
\end{equation}

$\beta$, VP, vP, TP, CP (by assumption) are complements that are first-merged in their phases and have not yet discharged the final structure-building feature of the respective phase head’s feature list.
a. Edge feature insertion follows complement feature discharge but precedes specifier feature discharge:

\[
\begin{array}{l}
\gamma: \text{CP} > \text{X} \\
\rightarrow \gamma: \text{X} > \text{CP} \\
\rightarrow \gamma: \text{X} > \text{X} \\
\rightarrow \gamma: \text{X} > \text{X} \\
\rightarrow \gamma: 0
\end{array}
\]

\(~\sim\) violates nothing

b. Edge feature insertion precedes complement feature discharge, version 1:

\[
\begin{array}{l}
\gamma: \text{CP} > \text{X} \\
\rightarrow \gamma: \text{X} > \text{CP} \\
\rightarrow \gamma: \text{X} > \text{X} \\
\rightarrow \gamma: \text{X} > \text{X} \\
\rightarrow \gamma: 0
\end{array}
\]

\(~\sim\) violates (14-b)

c. Edge feature insertion precedes complement feature discharge, version 2:

\[
\begin{array}{l}
\gamma: \text{CP} > \text{X} \\
\rightarrow \gamma: \text{X} > \text{CP} \\
\rightarrow \gamma: \text{X} > \text{X} \\
\rightarrow \gamma: \text{X} > \text{X} \\
\rightarrow \gamma: 0
\end{array}
\]

\(~\sim\) does not help because of (12-b)

Conclusion:

Movement out of complements can respect the PIC: There is a stage in the derivation where the complement feature has already been discharged (so that subsequent edge feature insertion can attract an item within the complement), but the specifier feature has not yet been discharged.

Note:

Under this approach, intermediate movement steps to phase edges must take place before (a final) specifier is merged. (Also, this approach is incompatible with Anti-Locality requirements on movement; see Abels (2003), Grohmann (2003), among others.)

(18) \[\text{DP}_2 \ldots \text{DP}_1 [\text{VP} \text{CP} _\text{acc} \text{VP} _\text{nom} \text{CP} _\text{nom} \text{CP} _\text{nom} \text{CP} _\text{nom} \text{CP} _\text{nom}]]\]

(19) Sentential Subject Constraint effects:

a. \*[DP, Who] did the reporters expect [CP] that the principal would fire t₁ ?

b. \*[DP, Who] was [CP] that the principal would fire t₁ expected by the reporters ?

c. \*[DP, Who] did [CP] that Mary was going out with t₁ bother you ?

(20) Subject Condition effects:

a. \*[DP₂, Who(m)] has [DP₁, a comment about t₂] annoyed you ?

b. \*[PP₃, About whom] has [PP₁, a comment t₃] annoyed you ?

Note:

Assuming that adjuncts are last-merged specifiers of special functional projections (Alexiadou (1997), Cinque (1999)), they are also correctly predicted to be barriers.

(21) Adjunct Condition effects:

a. \*[DP, Who] did you get jealous [CP] because I talked to t₁ ?

b. \*[PP, To whom] did they leave [CP] before talking to t₁ ?

c. \*[PP, Who] did they leave [CP] before talking to t₁ ?

Note:

Given that dative (‘affected’) GOAL arguments are merged last in VP, in Spec V (in contrast to other GOAL arguments that are realized by PPs), they are invariably barriers. This prediction seems correct for German (Muller (1995)).

(22) Nominative and dative DPs as barriers in German:

a. \*[PP, Über wen] hat [CP] ein Buch t₁ den Fritz beindruckt ?

about whom has a book nom the Fritz impressed

b. \*[PP, Über wen] hat der Verleger [CP] einen Buch t₁ keine

about whom has the publisher nom a book dat no

Chance gegeben ?

Chance acc given

(23) Extraction from passive and unaccusative subjects in German:

a. [PP, Über wen] wurde [CP] ein Buch t₁ gesehen ?

about whom was a book nom read

b. [PP, Über wen] ist [CP] ein Buch t₁ erschrieben ?

about whom is a book nom appeared

A similar complication:

Differences in extractions from nominative DPs with individual-level and stage-level predicates (Delsing (1992)). Suggestion: To the extent that the effect is real, it can presumably be reinterpreted along the same lines (difference between VP-internal complements and specifiers of v).

(24) Stage-level vs individual-level predicates:

a. ??Was₁ sind [DP t₁ für Leguanen ] intelligent ?

what are for iguanas nom intelligent

b. Was₁ sind [DP t₁ für Leguanen ] verfügbar ?

what are for iguanas nom available

A third type of apparent counter-examples:

PPs headed by von (‘of’): (25-a). For these, a non-movement analysis seems systematically available; see below. (Similar reasonings apply in the case of DP split constructions such as (25-b).)
(25) **Further exceptions:**

a. \[ \text{[^PP, Zu diesem Problem] haben [DP einige Briefe (t₁)] den} \]
   
   \[ 
   \text{Sender erreicht} 
   \]
   
   \[ 
   \text{station reached} 
   \]

b. \[ \text{[^NP Briefe] haben mich [DP keine (t₁)] erreicht} \]
   
   \[ 
   \text{letters \textsubscript{nom} have me none\textsubscript{nom} reached} 
   \]

**Observation:**

The most convincing counter-examples to the generalization that subject DPs in Spec\textsubscript{VP} (or, optionally, Spec\textsubscript{T}) are barriers for extraction in German typically involve configurations where the subject DP is adjacent to V as a result of object scrambling. I take this phenomenon to be real: melting.

### 4.2. **Analysis: Agree**

**Problems:**

(i) So far, the prediction is that THEME (accusative) objects can avoid becoming a barrier in VP only if there is something else that is merged later. This prediction is not borne out; see (25-a-b) (examples from German).

(ii) Movement out of THEME (accusative) objects is known to depend on a tight relation between V and N ("natural predicate"); see (25-bc) (Cattell (1976)). This fact is not accounted for either under present assumptions.

(26) **Accusative DPs as partly transparent local domains**

a. \[ [\text{[^PP, Worüber]} hat der Maria [DP ein Buch (t₁)] gegeben?] \]
   
   \[ 
   \text{about what has the Maria\textsubscript{dat} a book\textsubscript{acc} given} 
   \]

b. \[ [\text{[^PP, Worüber]} hat der Fritz [DP ein Buch (t₁)] gelesen?] \]
   
   \[ 
   \text{about what has the Fritz\textsubscript{nom} a book\textsubscript{acc} read} 
   \]

c. \[ [\text{[^PP, Worüber]} hat der Fritz [DP ein Buch (t₁)] geklaut?] \]
   
   \[ 
   \text{about what has the Fritz\textsubscript{nom} a book\textsubscript{acc} stolen} 
   \]


- Abstract incorporation of N into V must apply to remove barrier status from an NP. (Assumption: Head movement opens barriers, and abstract incorporation is head movement at LF.)
- Abstract incorporation can be viewed as co-indexing under minimality (see Head Movement Constraint) in syntax.
- V-N\textsubscript{read-book} is a natural predicate resulting from abstract incorporation; V-N\textsubscript{steal-book} is not (for most speakers).

**A problem with the abstract incorporation analysis**

The analysis is incompatible with DP-over-NP structures (Abney (1987)): N cannot abstractly incorporate into V in the presence of an intervening D.

**Reanalysis**

- Abstract incorporation is an instance of Agree: If V and N form a natural predicate, they share an abstract feature [+f\textsubscript{f}, \textsubscript{f}].
- Agree requires c-command, but is less local: An intervening D is unproblematic.

(27) **Abstract incorporation as \[^{\text{f}^\text{f}}\]\textsubscript{f} Agree:**

a. \[ [\text{[^VP V\textsubscript{in-f}]} [\text{[^DP D [N\textsubscript{N/f} PP]]}]] \]
   
   read book

b. \[ [\text{[^VP V\textsubscript{T}} [\text{[^DP D [N\textsubscript{N PP}]]}]] \]
   
   steal book

**Note:**

This implies that either the PIC is relaxed for Agree, or that Agree can be successive-cyclic. Something to this effect is required independently, under many versions of the PIC (cf., e.g., agreement of T with nominative objects in Icelandic; and the analysis of long-distance agreement in general, as mentioned at the end of lecture 2).

**Probe features and hierarchies**

- Probe features are on a separate stack of a phase head.

**Observation:**

Probe features on a phase head can never remove barrier status from a last-merged specifier:

1. A probe feature cannot carry out Agree with (some item in) its specifier (Chomsky (2001, 2005a)).

2. A probe feature cannot carry out Agree with (some item in) its complement after a specifier has been merged. (For instance, Agree(<\text{y, \textsubscript{o}} > in VP) (for accusative case assignment) must precede Merge(DP\textsubscript{ext}, V\textsuperscript{'}).) This follows from a restrictive version of the Strict Cycle Condition (Chomsky (1973)).

(28) **Strict Cycle Condition (SCC):**

Within the current domain α, a syntactic operation may not exclusively apply to positions that are included within another domain β that is dominated by α.

**Consequences:**

(i) Last-merged specifiers continue to be barriers.

(ii) Non-last-merged specifiers and complements are not barriers.

(iii) Last-merged complements are not barriers if the phase head has an additional probe feature for Agree with \textsubscript{o} into the complement.

**Note:**

(ii) is confirmed by many cases (e.g., (29), from Koster (1987), Müller (1995)); but it may ultimately prove too liberal: For instance, certain accusative objects might be barriers despite the presence of a higher dative object. Possible solution: The two objects show up in two distinct verbal projections.
4. Deriving the Condition on Extraction Domain

(29) a. Da_1 ist [VP or [VP [pp t_1 mit | [VP zum Doktor gegangen || v] there is he with to the doctor gone] v]
b. *Da_1 hat [VP or [VP [pp t_1 mit | [VP das Rennen beendet || v]] there has he with the race completed]

(30) Why last-merged complements do not have to be barriers:

\( \gamma \) (e.g., V) is merged with \( \alpha \) (e.g., DP) and has thereby discharged all its structure-building features.

a. Edge feature insertion follows complement feature discharge, no probe feature:

\[
\begin{array}{c}
\gamma: \bullet \star \star \\
\rightarrow \gamma: 0 \\
\rightarrow \gamma: \bullet \star \star \\
\end{array}
\]

\( \sim \) violates (14-a)

b. Edge feature insertion follows complement feature discharge, with probe feature:

\[
\begin{array}{c}
\gamma: \bullet \star \star \\
\rightarrow \gamma: \star \star \\
\rightarrow \gamma: \bullet \star \star \\
\end{array}
\]

\( \sim \) violates nothing

Note:

(i) To avoid a SCC violation (as it would occur with specifiers), the probe feature must be discharged before the structure-building edge feature in (30-b) (this is unproblematic given that the two features are on different stacks).

(ii) V does not assign structural accusative case (v does); hence, it cannot be case assignment that provides the relevant Agree relation.

(iii) Additional assumptions are necessary to ensure the possibility of barrier status of lexically case-marked DPs (e.g., V assigns lexical case only after movement to v).

Clausal heads:

(i) A clausal head (V, s, v, T, ...) status-governs (Bech (1955/1957)) the head of its verbal complement.

(ii) This can be viewed as co-indexing of heads (abstract incorporation, hence Agree in the present approach); Sternefeld (1991), Müller (1995).

(iii) Consequently, clausal projections are not barriers, even if there is no specifier present (and the projection is thus last-merged).

(31) Extraction from DP subjects of unaccusative verbs across specifier-less projections in German (Grewendorf (1989), Fanselow (2001)):

\( \text{Worilber2} \) denkt du [CP t_{2_{\alpha}} dass [TP t_{2_{\beta}} [VP t_{2_{\gamma}} [DP t_{2_{\delta}} ein \text{[xp t_2]} about what think you that Buch t_2]] t_{\text{V}} | erschein-v | T | ]]?

bock appears

5. Freezing

Question:

Are moved items always barriers for extraction to a higher position (freezing)?


(32) Movement to SpecC in Spanish (Chomsky (1986a)):

a. *Esta es la autora [pp_1 de la que ] [pp_2 varias traducciones t_1 ] han this is the author by whom various translations have ganado premios internacionales won awards international

b. (*)[pp_1 De que autora ] no sabes [cp_2 que traducciones t_1 ] han by what author not you know which translations have ganado t_2 premios internacionales ? won awards international

(33) Movement to SpecC in Spanish (Lasnik & Saito (1992)):

a. ??[(*)]Who_1 do you wonder [pp_2 which picture of t_1 ] Mary bought t_2 ?

b. ??[(*)]Who_1 do you wonder [pp_2 which picture of t_1 ] t_2 is on sale ?

(34) Movement to SpecC in English (Chomsky (2005a)):

a. * [pp_1 Of which car ] did [pp_2 the driver t_1 ] [t_2 cause a scandal ] ?

b. ([*)] [pp_1 Of which car ] is [pp_2 the driver t_1 ] [likely [tp_2 t_2 ] to t_2 cause a scandal ] ?

Observation:

If nothing else is said, the present system predicts that freezing effects can be avoided with complement movement (as in (33-a)): On the VP cycle, an edge feature can be inserted for both DP_1 and DP_2, and from that point on, the two items move hand in hand (but separately) to higher specifiers (see Heck (2004) for discussion).

Problem:

(i) There are many well-established freezing effects; see, e.g., (35), (36).

(ii) Putative exceptions tend to involve α-phonemes, which are known to be independently available as optional arguments in many cases (e.g., this is the only possibility in (37), which would otherwise have to involve long-distance scrambling from a finite clause in German).
5. Freezing

Freezing effects with VP topicalization in German (Müller (1998)):

a. Ich denke [cp [vp das Buch gelesen ] ] hat keiner t2 [i think the book read has no-one]

b. [pp Was ], denkst du [cp t1 hat keiner [vp t1 gelesen ] ] ? [what do you think you read has no-one]

c. *[pp Was ], denkst du [cp [vp t1 gelesen ] ] hat keiner t2 ? [what do you think gelesen has no-one]

Freezing effects with PP topicalization in English (Postal (1972)):

a. Who do you think that he will talk [pp2 to t1 ] ?

b. *Who do you think that [pp2 to t1 ] he will talk t2 ?

Long-distance scrambling in German?


that I of Peter believe that a new CD appeared

is

Conclusion:
The freezing generalizations in (38) holds.

Freezing Generalization:
At S-structure, a trace t may not be included in a moved XP (i.e., an XP that binds a trace) if the antecedent of t c-commands XP. (This permits remnant movement.)

Anti-freezing effects with VP topicalization in German – remnant movement:

a. [vp2 t1 zu lesen ] hat [pp1 es ] keiner t2 versucht [to read has it nom no-one nom tried]

b. [vp2 t1 gelesen ] hat der Fritz [pp1 das Buch ] nicht [read has the Fritz nom not]

Assumptions about movement-inducing features:

(i) [sf] features that trigger internal Merge are on the same stack as [sf] features that trigger external Merge, but invariantly lower.

(ii) Movement-inducing features include [wsh] (for wh-movement), [stop] (for topicalization), [Σ] (for scrambling to Specv and SpecV; see lecture 2), [DA] (for EPP-movement to SpecT).

(iii) Multiple edge feature insertion follows a feature hierarchy going back to Williams (1974).

Analysis

1. In [XP [zp WP [W W ... W ] [X X ... X ] ]], WP is not part of the edge of X.

2. Hence, in (39), DP1 and VP2 both have to move to Specv, because of the PIC (or, in the case of (39-b), the requirement to discharge [Σ]).

3. If two items need to move, there is a fixed order of edge feature insertion operations (for structure-building features outside the current derivation). This order follows a feature hierarchy that mirrors the typical hierarchy in phrase structures: [Σ] > [DA] > [DA] > [wsh] (see Grewendorf (2003, 2004) and Abels (2006), building on Williams (1974, 2003), Sternewald (1992) (the ‘Williams cycle’)).

4. In (30-α), movement of DP1 to Specv precedes movement of VP2 to Specv. In (35-γ), movement of VP2 precedes movement of DP1. See (40-α).

5. Suppose that (a minimal extension of) the Strict Cycle Condition blocks insertion of an edge feature for a lower category DP1 after it has triggered the insertion of an edge feature for the higher, more inclusive category VP2.

Cyclicity restrictions on multiple edge feature assignment:

a. Multiple assignment of categorically marked edge features [sf], [sf] to a single phase head respects the hierarchy [sf] > [sf] (where [sf] is intrinsically associated with a higher position in the clausal structure than [sf]).

A legitimate remnant movement derivation:

[bx | [zp2 WP1 [z ... Z ] ] X | [sf] ]

C. A legitimate movement derivation:

[bx | [zp2 WP1 [z ... Z ] ] X | [sf] ]

C. A legitimate movement derivation:

[bx | [zp2 WP1 [z ... Z ] ] X | [sf] ]

C. A legitimate movement derivation:

[bx | [zp2 WP1 [z ... Z ] ] X | [sf] ]

Note:

For freezing effects where two identical structure-building features occur, a minimal extension of what has been assumed so far is required: There is an addition to (40-a) such that in cases of identical structure-building features, the higher, more inclusive category must be targetted first; insertion of an identical feature for a second category dominated by the first one is then always impossible, because of (40-b). (Recall the RAAG in lecture 2.)

Illicit remnant movement constructions in German (Takanai (1991), Grewendorf & Sabel (1994), Kitahara (1997), and Müller (1998)):

a. * [zp2 t1 zu lesen ] es1 keiner t2 versucht hat [that to read it no-one tried has]
6. Melting

There is a surprising further effect that is predicted under present assumptions: A specifier $\alpha$ of $\Gamma$ ceases to be an island when some $\beta$ becomes an outer specifier of $\Gamma$ by movement.

6.1. Melting effects with scrambling in German

(44) Melting effects with was-für split, subjects
   a. *Was$_1$ haben [DP$_2$, t$_1$ für Bücher] [DP$_2$, den Fritz] beeindruckt?
      what have for books$_{nom}$ the Fritz$_{acc}$ impressed
   b. Was$_1$ haben [DP$_2$, den Fritz] [DP$_2$, t$_1$ für Bücher] t$_2$ beeindruckt?
      what have the Fritz$_{acc}$ for books$_{nom}$ impressed

Note: There is no psych-verb issue here. As shown by Grewendorf (1989) on the basis of a number of tests, a psych verb like beeindrucken (‘impress’) takes a regular external argument in German; i.e., the nominative DP here is never VP-internal. (As a matter of fact, one of the ten or so tests employed in that work is based on extraction from DP, as in (44-a); see Grewendorf 1989, 182.) However, the pattern in (44) would be identical if Bücher (‘books’) were to be replaced with Leute (‘people’), and beeindruckt (‘impressed’) with the agentive, non-psych verb getroffen (‘met’).

(45) Melting effects with PP extraction from DP; subjects
   a. *PP$_1$, Über wen] hat [PP$_2$, ein Buch t$_1$] [PP$_2$, den Fritz] beeindruckt?
      about whom has a book$_{nom}$ the Fritz$_{acc}$ impressed
   b. [PP$_1$, Über wen] hat [PP$_2$, den Fritz] [PP$_2$, ein Buch t$_1$] t$_2$ beeindruckt?
      about whom has the Fritz$_{acc}$ a book$_{nom}$ impressed

Analysis
(i) Scrambling is triggered by a designated structure-building feature on v: [\*\*\*\*].
(ii) If v still has a [\*\*\*\*\*] feature left after discharge of [\*\*\*\*\*] (= Merge of the external argument DP), an edge feature [\*\*\*\*\*] can be inserted before the phase is complete.
(iii) Therefore, the phase head can now attract an item out of the external argument to its edge position.

(46) PP$_1$, ..., \[DP$_2]\, t'_1\, t'_2\, t'_3\, t'_4\, t'_5\, t'_6\, t'_7\, t'_8\, t'_9\, t'_10\, \[\[\[\[VP\, \ldots\, t_2\ldots V\, \ldots V\, \ldots V\]\]\]\]
6. Melting effects with DP split constructions:

a. *[NP1 Holka] neuděla [DP3 žádná t1] Petra2
   *girnom hit no nom Petranom
   'No girl hit Petr.'

b. *[NP1 Holka] neuděla Petra2 [DP3 žádná t1] t2
   *girnom hit Petranom no nom
   'No girl hit Petr.'

c. *[NP1 Holku] neuděil Petra2 [DP3 žádnou t1]
   *girnom hit Petranom no acc
   'Petr hit no girl.'

Note:

6.3. Further Issues

Observation:
The present approach differs from all the other theories of locality with a focus on CED effects discussed in lecture 1 in that it envisages the possibility that some XP α may or may not be a barrier in two syntactic contexts that do not differ with respect to the relation between α and the surrounding heads of the clausal projection.

Question:
Maybe DP3 does in fact not occupy identical positions in the (a)-examples and in the (b)-examples of the last two subsections?

Answer:
It does.

(51) Subject DPs do not participate in predicate fronting in German:

a. *[VP2 [DP3 En Buch] t1 beeindruckt] hat ihn2 nicht t2
   a booknom impressed has himacc not
b. *[VP2 [DP3 En Buch] gelesen] hat er1 nicht t2
   a bookacc read has heacc not

(55) Subject DPs do not participate in long-distance predicate fronting after wh-object movement (Fanselow (1987), Müller (1998)):

a. *[VP2 [DP3 En Buch t1] t4 beeindruckt] weiß ich nicht [CP [PP1 über
   a booknom impressed know I now about
   won] ihn4 t2 hat ]
   whom himacc has
b. *[VP2 [DP3 En Buch t1] gelesen] weiß ich nicht [CP [PP1 über
   a bookacc read know I not about whom he
   won] ihm4 t2 hat ]
   has

Conclusion:
Subject DPs in German (in constructions that are neither unaccusative nor passive) never show up VP-externally.

Alternative approach:
Subject DPs (labelled DP3) in (44), (45), and (48) are in SpecV in the well-formed cases, and in SpecT in the ill-formed cases; and the theory of locality is somehow sensitive to this difference. (See the freezing analyses discussed in lecture 1.)

Note:
Such an account does not seem viable either.
6.3.1. Conceptual Reasons

Whereas there is good evidence that the subject DP is within vP in examples like (44-b) (given that scrambling in German cannot target a domain beyond vP), there is no evidence whatsoever that the subject DP has undergone optional raising to SpecT in grammatical (non-melting) examples like (44-a); indeed, from a theory-internal point of view, it is hard to see what could force (string-vacuous) subject raising to SpecT in (cases like) (44-a) while (at least optionally) blocking it in (cases like) (44-b).

6.3.2. Subjects to the Right of a Particle

Weibelbichler (1992), Diesing (1992), Haider (1993) and others have proposed that certain items (like the particles ja, doch, denn, etc.) demarcate what is in current terminology the vP edge. Suppose that this is the case (for base generation; see below). The addition of a particle preceding the subject DP does not improve extraction from the subject DP in the examples that do not involve local object scrambling; on the other hand, the melting examples stay well formed.

(56) Extraction from subjects showing up to the right of a particle:

a. *Was1 haben denn [PP2 t1 für Bücher | [PP2 den Fritz] | been gedruckt?
what have PRP for booknom the Fritz acc impressed
b. Was2 haben denn [PP2 den Fritz | [PP2 t1 für Bücher] | PRP for booknom impressed
t2 been gedruckt?
c. Was2 haben [PP2 den Fritz | denn [PP2 t1 für Bücher] | PRP for booknom impressed
what have the Fritz acc PRP been gedruckt?
d. *[PP, Über wen] | hat wohl [PP2 ein Buch t1 | [PP2 den Fritz]
about whom has PRT a booknom the Fritz acc
been gedruckt?
impressed

e. *[PP, Über wen] | hat wohl [PP2 den Fritz | [PP2 ein Buch t1 | PRP for booknom impressed
about whom has the Fritz acc a booknom been gedruckt?

Assumptions:

(i) Particles like denn and wohl do not enter the syntactic derivation via structure-building features.

(ii) Given that scrambling is confined to the vP/VP domain in German, the particles in question may demarcate the vP edge before movement, but do not have to show up at the left phonological border of vP after scrambling has applied.

6.3.2. Subjects to the Left of a Particle

Consider finally what happens when these kinds of particles are added in a position to the right of the subject DP.

(i) On the one hand, it does not come as a surprise that judgments for (57-ac) stay as they are for the corresponding examples in (36-ad) (the subject DP is an island to begin with, independently of a freezing effect, and there is no melting configuration because the object has not passed the subject).

(ii) On the other hand, an order with the particle following both the subject (from which extraction takes place) and the object also leads to ungrammaticality; see (57-bd). This follows as a freezing effect.

(57) Freezing effects with subjects to the left of a particle:

a. *Was1 haben [PP2 t1 für Bücher | denn t3 [PP2 den Fritz] | been gedruckt?
what have for booknom PRT the Fritz acc impressed
b. *Was1 haben [PP2 den Fritz | [PP2 t1 für Bücher] | t3 t2 been gedruckt?
what have the Fritz acc for booknom PRT impressed

c. *[PP, Über wen] | hat [PP2 ein Buch t1 | wohl t3 [PP2 den Fritz]
about whom has a booknom PRT the Fritz acc been gedruckt?
impressed
d. *[PP, Über wen] | hat [PP2 den Fritz | [PP2 ein Buch t1 | wohl t3 t2
about whom has the Fritz acc a booknom PRT been gedruckt?
impressed

(58) A loophole? - Intermediate melting

*Was1 haben [TP [PP2 t1 für Bücher | [TP [PP2 den Fritz ] | [v t1 t3 [v v t2

Two possible solutions:

• (58) is a Duke-York derivation (Pullum (1979)): The order A-B is first changed into the order B-A, which is subsequently changed into an order A-B again, with no interaction with other material (C) involved. Ross (1967), Haider (1993): Such cases of globally string-vacuous optional movement need to be blocked in any theory that envisages optional movement; otherwise sentences could have infinite numbers of legitimate derivations.

• Subjects are in fact not part of the edge domain of vP in their base position; only a derived specifier would count as part of the edge. Then, movement of the subject DP in (58) would have to proceed via a further specifier of vP and this would give rise to the dilemma for freezing derivations sketched in section 5 – both

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the subject DP_3 and the wh-element to be extracted from it then need to move to an outer specifier of v, triggered by *[•Da] in one case, and by *[•wh] in the other, with the edge feature for the more inclusive category inserted first (and, as a consequence, insertion for the dominated category not available anymore).

(59) A possible argument for the second solution:

*Was_3 haben [DP_t_4 für Bücher] [PP_2 den Fritz] denn t_3 t_2 beeindruckt? what have books nom the Fritz acc PRT impressed

7. Outlook and Conclusion

7.1. Outlook

Observation: It has sometimes been claimed, for certain movement types or certain languages, that subjects are not necessarily barriers for extraction.

- Haider (1983, 1993) on German
- Frantz (1980) on Blackfoot
- Bickel (2004) on Belhare
- Stepanov (2007) on Navajo, Turkish, Palaun, Hungarian, Russian

Assumption: Many of the putative counter-examples to the generalization that subjects in Spec v are islands can be rejected by showing that they either involve VP-internal arguments or no extraction at all, or melting.

However, it may be that such a way out is not available for all constructions, and all languages where apparent exceptions from the CED have been observed.

What can be done?

- One can adopt a freezing approach: Spec v is transparent, Spec T is a barrier. Problem: This is not compatible with the data given above.
- One can weaken the basic assumptions, and invoke parametrization. Example: Rackowski & Richards (2005, 585) assume that CED effects with subjects can be avoided if a language can establish an Agree relation between v and a specifier. (Also cf. Gallego & Uriagereka (2007).) Problem: This violates the c-command requirement on Agree relations assumed in Chomsky (2001, 2005a) and much related work.
- One can pursue a pessu-melting approach and look for a (possibly covert) item that is merged after an external argument DP (CP) in these cases.

7.1.1. Expletive Constructions in English

Observation (Moro (1997), Lasnik & Park (2003)): The associate DP in English expletive constructions is not inherently a barrier; see ([0]-ab). (In contrast, DP is a barrier for extraction in locative inversion constructions, as in ([0]-c)).

(60) English expletive constructions:

a. Which wall, do you think there_3 was [•, t_3 v • PP_2 a picture of t_1 ]? b. Which candidate_1 were there_3 PP_2 posters of t_1 all over town? c. *Who_1 do you think [PP_2 on this wall] hung [PP_2 a picture of t_1 ]?

Assumption (Williams (1994, 2006), Hazout (2004), Hartmann (2005)): The expletive is a subject, and the DP its predicate, with both items merged in the same projection (np).

Consequence: DP_2 in ([0]-ab) is in fact not last-merged in its projection because there is merged later, in the same projection (subsequently, there undergoes raising to Spec T). Therefore, DP_2 does not have to be an island for extraction.

7.1.2. Subject Clauses in German

Another case that might shed some light on this issue is that of a German expletive pronoun es optionally accompanying a finite subject clause from which extraction has taken place. Fanselow & Mahajan (2000) claim that (61-a) (extraction in the presence of es) is just as good as (61-b) (extraction from a subject clause without es being present); interestingly, for some speakers, the presence of es actually improves the example. (That said, for what is perhaps the majority of speakers, both examples are equally ungrammatical, as one would expect under the approach developed above; also see Stechow (2000).)

(61) Extraction from finite subject clauses with and without an expletive:

a. #Wen_1 ärgert es dich [cp dass sie t_1 lebt ]? whom acc annoys you acc that she nom loves b. #Wen_1 ärgert dich [cp dass sie t_1 lebt ]? whom acc annoys you acc that she nom loves

Data judgements:

(i) Fanselow & Mahajan (2000): (61-ab) are both well formed.
(ii) Stechow (2000): (61-ab) are both ill formed.
(iii) Some speakers: The presence of es improves the example.

Assumptions needed to derive (iii) (pseudo-melting):

(i) The (phrase headed by the) expletive does not stand in a dominance relation with the subject clause (as in Ross (1967) and much later work).
(ii) The expletive is merged after the finite subject clause, but within the same
7. Outlook and Conclusion

Consequence:
Some item in the left edge of the subject clause will be able to undergo edge-feature driven movement to an outer vP specifier (while the subject clause is still in situ), and a CED effect can be avoided.
(Speculation on (61-b) if it is accepted as grammatical: zero expletives.)

Possible extension to uncontroversial data:
(Zero or overt) expletives might exempt subject infinitives in German from barrier status.

   a. Was hat es sich nicht gehört [CP t PRO t zu beanstanden]?
      what has it not been proper to object to
   b. Was hat [CP t PRO t zu beanstanden] sich nicht gehört?
      what has to object to not been proper
   c. Was hat sich nicht gehört [CP t PRO t zu beanstanden]?
      what has not been proper to object to

Caveat
The main purpose of this subsection is not to justify actual analyses, but rather to show a direction in which one might profitably look upon encountering exceptions to the CED with external arguments in Specv that are transparent for extraction (or related configurations), in a given language: In these cases, it might well be that there is a (possibly non-overt) item that is merged later, in the same projection, which thereby permits the insertion of an edge feature for some item in the specifier of an otherwise opaque XP, thereby creating a pseudo-melting effect.

A similar reasoning:
Bitner & Hale’s (1996) treatment of accusative case assignment in terms of abstract pseudo-configurations

7.2. Conclusion

Question:
To what extent are the four main assumptions underlying the present analysis crucial?

(63) a. All syntactic operations are driven by features of lexical items.
   b. These features are ordered on lexical items.
   c. All phrases are phrases.
   d. Edge features that trigger intermediate movement steps can be added only as long as the phase head is still active.

Answer:
Assumption (63-d) is important; the remaining three assumptions can to some extent be modified or replaced with alternative assumptions (with various empirical consequences - if, say, fewer XPs are phases - e.g., only vP and CP - , then only specifiers of these categories are predicted to be barriers.) But even (63-d) does not have to be assumed in the specific way it is adopted here.

(64) The irreducible core of the present proposal
   Operation ζ (however it is defined) is responsible for inducing movement to (intermediate) phase edges, and ζ can only apply at any given step of the derivation if the phase head providing the phase edge qualifies as still “active” (however this is defined).

Final remark:
Deriving CED effects from the PIC in the way laid out in this lecture is only possible in a derivational approach to syntax that recognizes before and after as basic theoretical concepts, and in which there is a total order of all operations in a derivation (and thus no room for operations applying simultaneously in a single phrase marker). Therefore, to the extent that the account can be characterized as successful, it provides an argument for a strictly derivational organization of grammar.
Lecture 4

On Deriving HMC Effects

1. Introduction

On the one hand:
Head movement as adjunction of one head to another creates several problems with respect to highly general (and independently motivated) constraints on movement, e.g., the Extension Condition (Strict Cycle Condition) (Chomsky, 1995), the (related) c-command requirement for traces (Brody (2001), Mahajan (2001), Müller (2004b), and Matushansky (2006)). It is also not clear why it cannot apply successively cyclically.

On the other hand:
There is good evidence for head movement in nominal and verbal projections.

Proposal:
(i) Head movement can involve rephrasing: A head H moves out of a phrase α and remerges with α, projecting its category label in the derived position.
(ii) Head movement cannot proceed by adjunction (or by substitution, for that matter: Roberts (1991, 2001)). All cases that cannot be accounted for by rephrasing must be handled differently (e.g., by remnant movement, or by assuming complex lexical items (incorporation)).
(iii) The Head Movement Constraint (HMC) does not follow from either the MLC or the CED (nor does it follow under the assumption made in lectures 2 and 3). However, the HMC follows straightforwardly if head movement is rephrasing.

Empirical domain:
I will mainly be concerned with head movement in nominal projections.

Background:
Many of the arguments that were presented in favour of a functional category D that heads the nominal phrase (see in particular Abney (1987) and Szabolcs (1994)) have lost their force under minimalist assumptions (Chomsky, 1995, 2001, 2005b).

(1) Substantives undermine arguments for DP:
   a. [Np [ the Emperor's ] Np [ every Np wish ]] 

Hypothesis:
Nominal projections are NPs, not DPs.

However:
There is one type of argument in favor of the DP hypothesis that has so far resisted a straightforward minimalist elimination: There is strong evidence for movement of N, and if N moves, there must be a landing site (D) (cf. Alexiadou et al., 2007). The main claim of this lecture is that rephrasing of N severely weakens this argument (and, therefore, the DP hypothesis) because no further functional head is needed as a target for movement.

2. Arguments for N Movement

2.1. N Movement in Italian

(2) The argument for N movement with Italian proper names (Longoardo (1994))

   a. [Dp mio [Dp il ] Np [ N Gianni ]]
      "my DEF Gianni"

      DEF my Gianni

   c. [#[Dp il ] Np [ t1 Np [ N Gianni ]] [Ap1 mio ]]
      DEF Gianni my (only contrastive reading)

   d. *[Dp D [Np mio ] [N Gianni ]]
      my Gianni

      Gianni my (no contrastive reading)

2.2. N Movement in Modern Hebrew

(3) Construct state in Hebrew:

      Gianni my (no contrastive reading)

This lecture is based on joint work with Doreen Georgi; see Georgi & Müller (2007). It is available from www.uni-leipzig.de/~awu/lab/lab85/lab85_1_georgi.pdf (Linguistische Arbeits Berichte).
2. Arguments for N Movement

b. ha-layit
   DEF-house
   ‘the house’ (non-CS)

c. harisat ha-ayev ‘et ha-’ar
   destruction DEF-enemy OF DEF-city
   ‘the enemy’s destruction of the city’

d. beyt ha-mora ha-yafe
   house DEF-teacher DEF-pretty
   ‘the pretty house of the teacher’

(4) Rüter’s (1988) structures:
   a. [DP N (ha-) XP_gen 
   (CS)]
   b. [DP (ha-)N ... ] (non-CS)

Rüter’s argument for N-to-D movement:
1. Construct state nominals and non-construct state nominals are to be derived from the same underlying structure.
2. SNO is the base order.
3. Therefore, in construct state nominals, N must move to the left; the only position that is available for such movement is D.

Note:
There are alternative analyses (e.g., Boer (1999), Shlonsky (2004)) where the evidence for N movement breaks down. For the sake of the argument, these will be ignored here.

2.3. N Movement and Constraints on Word Order in Nominal Projections

Cinque (2005) observes that out of the 24 possible orders of demonstrative (D), numeral (n = Num), adjective (A), and noun (N) given in (5), only the 14 orders in I are attested (as unmarked orders); the orders in II are not.

(5) Possible and impossible orders in nominal projections

\[
\begin{array}{|c|c|c|}
\hline
& I & II \\
\hline
D & D & D \\
N & A & N \\
A & n & D \\
D & A & N \\
N & D & A \\
A & N & D \\
D & N & A \\
N & A & D \\
\hline
\end{array}
\]

(6) An English example:
these seven white mice
D n A N

2.3.1. Cinque’s (2005) Analysis

Assumptions:
- Linear Correspondence Axiom (LCA) (Kayne (1994))
- Hierarchy of the elements in their base position: D > n > A > N, where > stands for c-command. As a consequence, only this order can be base-generated and the other 13 possibilities are derived by movement.
- Head movement is excluded; all movement is phrasal.
- Movement must always go to the left (because of the LCA). Thus, movement targets specifier positions of additional functional heads in the nominal projection.

More specific assumptions:
(i) Movement may apply totally to an XP that is the specifier of the highest functional category in the nominal projection, or it applies partially to a specifier of a functional category below the highest one.
(ii) Movement can only involve a subtree containing N.
(iii) Such a subtree may contain N and no other lexical item.
(iv) Alternatively, it may involve pied piping of further material by N.
(v) Such pied piping comes in two varieties: In one, N stays in its base position and the constituent immediately containing N and its sister is moved (the whose picture type); in the other, N first moves alone and pied pipes its sister node in a second movement step (the picture of who type).

(7) Structure of nominal projection
\[ [\lambda_{\text{agr}}.P - [\lambda_{\text{agr}}.P - [\lambda_{\text{agr}}.A] \text{XP} \ W \ [W' \ [X' \ [\lambda_{\text{agr}}.P - [\lambda_{\text{agr}}.A] \text{XP} \ W'] \ W'] \ W'] \ W'] \ W]

(8) Examples:
   a. N-D-n-A: total movement of (a constituent containing) N alone successively-cyclically through each specifier.
   b. D-A-N-n: partial movement of (a constituent containing) N and A (the whose picture type) to SpecAgrx.
   c. D-N-A-n: movement of (a constituent containing only) N to SpecAgry followed by movement of AgryP (picture of who type) to SpecAgrx.

Conclusion:
This set of assumptions derives the orders that exist but not those that do not exist. All assumptions are important.

2.3.2. Abels & Neelman’s (2006) Reanalysis

Observation (Abels & Neelman (2006)):
One can derive the patterns in (5) in a somewhat simpler way that shares some of Cinque’s assumptions while abandoning others.

Assumptions:
(i) The underlying hierarchical order of elements is D > n > A > N for external Merge.
(ii) The LCA does not hold: Complements and specifiers may be generated to the left or to the right of a head, regulated by language-specific parameterization.

Consequence:
(i) The orders in 1a in (5) can all be base-generated.
(ii) The orders in 1b in (5) are derived by movement.
(iii) The orders in 2 in (5) cannot be derived if the following constraints on movement are adopted.

(9) Constraints on movement:
- Movement must go to the left.
- Movement ends in a C-commanding position.
- Only those subtrees that undergo movement in nominal projections that contain N.

Note:
The system permits derivational ambiguities. Some possible movements do not lead to new orders. For example, D-N-A-n may be base-generated with A and n to the right of N, and D to its left, but it may also be the result of moving the subtree N out of the basic order D-A-N-n.

(10) Derivational ambiguities
- | D [ | N A | n ]
- | D [ N | | A tN | n ]

3. Reprojection

3.1. Background

Head movement by reprojection: A head is moved out of its projection and takes it as its own complement by merging with it, projecting anew in the derived position.

(11) Reprojection:

Properties of head movement as reprojection:
(i) The remerged head c-commands its base position.
(ii) The operation extends the tree generated so far and respects the Strict Cycle Condition.
(iii) The operation may be applied recursively, giving rise to successive-cyclic head movement.

3.2. Architecture of the System

3.3. All Syntactic Operations are Feature-Driven

I have justified this assumption in lecture 2 (and used it also in lecture 2). The main conclusions are repeated here.

(12) Two types of features that drive operations:
- Structure-building features (edge features, subcategorization features) trigger (external or internal) Merger: *[F\^]
- Probe features trigger Agree *[F\^].

(13) Last Resort (LR):
Every syntactic operation must discharge either *[F\^] or *[F\^].

3.4. Features on Lexical Items are Ordered

I have justified this assumption in lecture 3.

(14) Feature stacks
- \Theta roles
\Theta_1 \gg \Theta_2 \gg \Theta_3 \quad (AGENT \gg THEME \gg GOAL)
- Subcategorization features:
*[F\^]_3 \gg *[F\^]_2 \gg *[F\^]_1

Consequence:
Multiple specifiers come into existence by successively discharging structure-building features of a lexical item.

(15) Properties of probe features
- Probe features ([F\^]) must find a matching goal under Agree.
- The Agree operation in turn requires c-command.

Note:
Since such a c-command requirement does not hold for structure-building features (almost by definition, since they must be able to create specifiers), there is an interesting asymmetry between [F\^] checking and [F\^] checking; and it is this asymmetry that will be exploited below.

(16) Strict Cycle Condition (new version):
Only the head of the present root can have features that trigger operations ([F\^] or [F\^]).

(17) Last Resort:
- A syntactic operation must discharge (and delete) [F\^] or [F\^].
- Only [F\^] or [F\^] features that are on top of a feature stack are accessible.

Observation:
Given that there are two feature stacks, indeterminacies in rule application may arise.
They are resolved in a principled way by the constraint in (18) (which is modelled on Chomsky’s (1995) Merge over Move, but which is not transderivational).

(18) **Agree over Merge:**
   If both \(\ast F\) and \(\ast F'\) can be discharged, \(\ast F'\) is given preference.

(19) **Derivation of an NP:**
   a. \(N: \{\text{[A+]} > \text{[N+]} > \text{[D+]}\} \) (initial features on \(N\); lexicon)
   b. \(N: \{\text{[A+]} > \text{[D+]}\} \) (optional deletion; numeration)
   c. \(\text{Merge}(N: \{\text{[A+]} > \text{[D+]}\}, \text{AP}) \Rightarrow [\text{N} \ \text{AP} \ N: \{\text{[D+]}\}] \)
   d. \(\text{Merge}([\text{N} \ \text{AP} \ N: \{\text{[D+]}\}], \text{DP}) \Rightarrow [\text{NP} \ \text{DP} \ N: \{\text{[D+]}\}] \)
   e. \(\text{Merge}(\{\text{[N+]} > \ast \}, \text{NP}) \Rightarrow [\text{N} \ X: \{\text{[N+]} \} \ast \text{NP}] \)

**Linearization:**
   (i) Merge operations are independent of linear order.
   (ii) The linearization of complements and specifiers is regulated by language-specific (and also category-specific) linearization rules that affect the tree directly after each Merge operation.

### 3.5. Münchhausen Features

A Münchhausen feature is nothing special: It is simply a probe feature with a category label as its content that accompanies a structure-building feature with the same category label; this way, it brings about a special identification of subcategorized items. Thus, if a feature \(\ast F\) on a lexical item co-occurs with a corresponding feature \(\ast F'\), the latter is a Münchhausen feature.

(20) **Two scenarios:**
   a. \(\ast F\) is topmost on the initial stack, creating a complement with label \(F\). In this case, \(\ast F\) can (and, given Agree over Merge: must) be discharged immediately afterwards, which creates no discernible effect.
   b. \(\ast F\) is not topmost on an initial stack on a lexical item; i.e., it generates a specifier. In that case, the probe feature \(\ast F\) accompanying it has an interesting effect. Being a probe feature, it must be checked under c-command. However, a head does not c-command its specifier. Therefore, the Münchhausen feature cannot be checked with a specifier if the head stays in situ.

**Way out:**
The lexical item bearing the Münchhausen probe feature that cannot be discharged with the specifier moves out of its projection and remerges with it, projecting anew. After this movement step, Agree becomes possible because the probe feature on the moved head c-commands the specifier of the projection that it was originally the head of. Since the head bearing at least one operation-inducing feature (viz., the Münchhausen feature – possibly there are still others left on it) has been moved out of its projection, this projection qualifies as an XP in the sense of the Strict Cycle Condition (see (16)):
As soon as the head moves out, there are no probe or structure-building features left in its original projection.

### 3.6. Reprojection within VP

**Hypothesis**
Iterated V movement in SVO structures is follows from assuming that Münchhausen features accompany the subcategorization features.

(21) **Reprojection movement triggered by Münchhausen features:**

\[ \text{YP} \xrightarrow{\text{VP}} X' \xrightarrow{\text{X'}} \xrightarrow{\text{YP}} \]

**Note:**
Reprojection movement is not directly feature-driven and therefore violates Last Resort (see (17)); it is legitimated by feature checking of \(\ast Y\), which becomes possible only after its application. Thus, we conclude that Last Resort must be minimally violable in favour of the Strict Cycle Condition in (16) (which implies that operation-inducing features must be discharged, among other things). In this respect, head movement behaves differently from phrasal movement as discussed in lectures 1-3.

(22) Mary gave it to John

(23) **An implementation of Haider’s (2006) approach to SVO languages**
   a. \(V\)‘s feature set: \(\{\ast F_1 > \text{[S+]} > \text{[N+]} > \text{[P+]} > \text{[N+]} > \text{[N+]}\} \) (gave)
   b. \(\text{Merge}(V: \{\ast F_1 > \text{[S+]} > \text{[N+]} > \text{[P+]} \}, \text{PP}) \Rightarrow [V \ V: \{\ast F_1 > \text{[S+]} > \text{[P+]}, \ast F_2 \} \ \text{PP}] \) (gave to John)
   c. \(\text{Agree}([\ast F_2], \text{PP}) \Rightarrow [V \ V: \{\ast F_1 > \text{[S+]} > \text{[N+]} \}, \ast F_2 \} \ \text{PP}] \) (gave to John)
   d. \(\text{Merge}(V: \{\ast F_1 > \text{[S+]} > \text{[N+]} > \text{[F_2]} \}, \text{NP_2}) \Rightarrow [V \ \text{NP_2} \ V: \{\ast F_1 > \text{[S+]} > \text{[N+]} \}, \ast F_2 \} \ \text{PP}] \) (it gave to John)
   e. \(\text{Move}(V: \{\ast F_1 > \text{[S+]} > \text{[N+]} \}, \text{NP_2}) \Rightarrow [V \ \text{NP_2} \ V: \{\ast F_1 > \text{[S+]} > \text{[N+]} \}, \ast F_2 \} \ \text{PP}] \) (gave it to John)
   f. \(\text{Agree}([\ast F_2], \text{NP_2}) \Rightarrow [V \ V: \{\ast F_1 > \text{[S+]} > \text{[N+]} \}, \ast F_2 \} \ \text{NP_2} \ V: \ \text{PP}] \) (gave to John)
   g. \(\text{Merge}(V: \{\ast F_1 > \text{[S+]} > \text{[N+]} \}, \text{NP_2} \ V: \{\ast F_2 \}) \Rightarrow [V \ \text{NP_1} \ V: \{\ast F_1 > \text{[S+]} > \text{[N+]} \}, \ast F_2 \} \ \text{PP}] \) (Mary gave it to John)
   h. \(\text{Move}(V: \{\ast F_2 \}, \text{NP_1}) \Rightarrow [V \ V: \{\ast F_1 > \text{[S+]} > \text{[N+]} \}, \ast F_2 \} \ \text{NP_1} \ V: \ \text{PP}] \) (gave Mary it to John)
   i. \(\text{Agree}([\ast F_2], \text{NP_1}) \Rightarrow [V \ V: \{\ast F_1 > \text{[S+]} > \text{[N+]} \}, \ast F_2 \} \ \text{NP_1} \ V: \ \text{PP}] \)
4. Noun Phrase Structure by Reprojection

4.1. Reprojection of N in Italian

Assumptions:
(i) N obligatorily has a subcategorization feature $[\bullet D\bullet]$ in Italian.
(ii) If N is a proper name, and the specific determiner that is selected is phonologically null, N must also be equipped with $[\bullet D\bullet]$ in addition.

(25) **N’s feature set:** $\{[\bullet A\bullet] \rightarrow [\bullet D\bullet], [\bullet D\bullet]\}

   a. Merge(N: $\lbrack [\bullet A\bullet] \rightarrow [\bullet D\bullet], [\bullet D\bullet]\rbrack$, AP) $\Rightarrow$
      $\lbrack N', AP N': [\bullet D\bullet], [\bullet D\bullet] \rbrack$ \textit{(mio Gianni)}

   b. Merge($\lbrack N', AP N': [\bullet D\bullet], [\bullet D\bullet] \rbrack$, DP) $\Rightarrow$
      $\lbrack N', DP N': [\bullet D\bullet], [\bullet D\bullet] \rbrack$ \textit{(B mio Gianni)}

   c. Move(N: $\lbrack [\bullet D\bullet] \rbrack$, $\lbrack N', AP N' \rbrack$) $\Rightarrow$
      $\lbrack N', N': [\bullet D\bullet], [\bullet D\bullet] \rbrack$ \textit{(Gianni D mio)}

Note:
- (28-bc) are very general constraints on movement (and (28-b) follows from the Strict Cycle Condition if Move is internal Merge).
- (28-a) (or (29)) is simply a fact about language that any theory must encode in some way.
- However, (28-d) is peculiar; it is the only conceptual blemish in Abels & Neeleman’s (2006) reconstruction of Cinque’s (2005) approach. To the extent that it is true, it should be derived from more basic assumptions.

Observation:
(28-d) follows as a theorem, in a way that is similar to the one that Abels (2003) gives
in his account of Anti-Locality effects. Here is why: If N is the head of the nominal projection, all movements within this projection are either triggered by structure-building (movement-type specific) edge features on N, or they are triggered by the need to get rid of probe features in the next but one step (reprojection movement). The latter option can only be relevant for the head N itself (given the Strict Cycle Condition, non-heads cannot have operation-inducing features). The former option does not help in the case of A, n, and D. Suppose for the sake of the argument that N bears some feature \( [\mathbf{F}] \) in addition to its subcategorization features for (say) A, n, and D that could in principle trigger movement (\( [\mathbf{F}] \)) must then be embedded below subcategorization features in the stack of structure-building features; and that one of these categories (e.g., n) can actually provide a goal \( [\mathbf{F}] \) for \( [\mathbf{F}] \). \( [\mathbf{F}] \) could still not trigger movement of nP across DP to an outer specifier of N (thereby giving rise to an unattested order) because the resulting configuration is structurally identical to the pre-movement configuration: If nP can check N's \( [\mathbf{F}] \) feature in a derived specifier position, it can just as well check the same feature in situ (roughly, \( [\mathbf{F}] \) on X is interpreted as ‘X wants to see F in its projection’).

(30) Possible and impossible orders in nominal projections:

<table>
<thead>
<tr>
<th>In</th>
<th>II</th>
</tr>
</thead>
<tbody>
<tr>
<td>D n A</td>
<td>D A n</td>
</tr>
<tr>
<td>D n N A</td>
<td>D n N A</td>
</tr>
<tr>
<td>D A n N</td>
<td>N n A D</td>
</tr>
<tr>
<td>D N n A</td>
<td>(i) N n A D</td>
</tr>
<tr>
<td>N A n D</td>
<td>(ii) N D n A</td>
</tr>
<tr>
<td>A N n D</td>
<td>(iii) N A D n</td>
</tr>
<tr>
<td>n A D N</td>
<td>(iv) N D A n</td>
</tr>
<tr>
<td>n N A D</td>
<td>(v) N A D n</td>
</tr>
<tr>
<td>n N D A</td>
<td>(vi) A N D n</td>
</tr>
</tbody>
</table>

Generalization:
(i) The orders in In can be base-generated.
(ii) The orders in II cannot be generated.
(iii) The orders in Ib can be derived by (reprojection) movement.

(31) Orders (i), (ii):

(i) D n n A

\[
N: \{[\mathbf{F}] \} > \{\mathbf{C} \} > \{\mathbf{D+} \}, \{\mathbf{N+} \}
\]

\[
\text{[NP DP [N'] N1 [NP nP [N' - AP]]]}
\]

\( \Rightarrow \) N moves in front of n

\( \text{initial specification} \)

\( \text{derivation} \)

(ii) N n A D

\[
N: \{[\mathbf{F}] \} > \{\mathbf{C} \} > \{\mathbf{D+} \}, \{\mathbf{N+} \}
\]

\[
\text{[NP [N' N1 [NP nP [N' - AP]]] DP]}
\]

\( \Rightarrow \) N moves in front of n

\( \text{initial specification} \)

\( \text{derivation} \)

(32) Deriving order (i)

\[
N: \{[\mathbf{F}] \} > \{\mathbf{C} \} > \{\mathbf{D+} \}, \{\mathbf{N+} \}
\]

\( \Rightarrow \)

\[
N: \{[\mathbf{F}] \} > \{\mathbf{C} \} > \{\mathbf{D+} \}, \{\mathbf{N+} \}
\]

\( \Rightarrow \)

N moves in front of D

\( \text{initial specification} \)

\( \text{derivation} \)

(33) Orders (iii), (iv):

(iii) N D n A

\[
N: \{[\mathbf{F}] \} > \{\mathbf{C} \} > \{\mathbf{D+} \}, \{\mathbf{N+} \}
\]

\[
\text{[NP N1 [NP DP [N' nP [N' - AP]]]]}
\]

\( \Rightarrow \) N moves in front of D

\( \text{initial specification} \)

\( \text{derivation} \)

(iv) N D N A

\[
N: \{[\mathbf{F}] \} > \{\mathbf{C} \} > \{\mathbf{D+} \}, \{\mathbf{N+} \}
\]

\[
\text{[NP N1 [NP DP [N' N1 - A] nP]]}
\]

\( \Rightarrow \) N moves in front of D

\( \text{initial specification} \)

\( \text{derivation} \)

(34) Deriving order (iii)

\[
N: \{[\mathbf{F}] \}, \{\mathbf{C} \}, \{\mathbf{D+} \}, \{\mathbf{N+} \}
\]

\( \Rightarrow \)

\[
N: \{[\mathbf{F}] \}, \{\mathbf{C} \}, \{\mathbf{D+} \}, \{\mathbf{N+} \}
\]

\( \Rightarrow \)

N moves in front of D

\( \text{initial specification} \)

\( \text{derivation} \)

Note:
In order to derive the orders in (v) and (vi), pied piping is needed: N pied-pipes A when it moves by reprojecion. Assumption: Pied piping involves feature percolation (but see Heck (2004, 2007)).

(35) Orders (v), (vi):

(v) N A D n

\[
N: \{[\mathbf{F}] \} > \{\mathbf{C} \} > \{\mathbf{D+} \}, \{\mathbf{N+} \}
\]

\[
\text{[NP N' AP] [NP DP [N' nP - ]]}
\]

\( \Rightarrow \) A + N moves in front of D

\( \text{initial specification: [D+] percolates} \)

\( \text{derivation} \)

(vi) A N D n

\[
N: \{[\mathbf{F}] \} > \{\mathbf{C} \} > \{\mathbf{D+} \}, \{\mathbf{N+} \}
\]

\[
\text{[NP N' AP] [NP DP [N' nP - ]]}
\]

\( \Rightarrow \) A + N moves in front of D

\( \text{initial specification: [D+] percolates} \)

\( \text{derivation} \)
5. Conclusion

5.1. Results:

- Given the availability of reproj ect movement, one of the strongest arguments for DP-over-NP analyses of nominal projections disappears.
- The reproj ect movement approach can further simplify Abels & Neeleman’s analysis of possible word order in nominal projections (by deriving the ban on moving a category without N in it).
- Most importantly, from the perspective of this course, if all head movement is reproj ect movement, the HMC is derived: Reprojection movement is triggered by probe features of the moved head, and the Strict Cycle Condition ensures that projections with heads that have undischarged probe or structure-building features cannot be merged with another lexical item.

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