

## Chomsky's Phases (short introduction)

### 1. Initial evidence for phases (Marantz's problem).

- (1) a. There seems  $t_{\text{there}}$  to be a man in the room.
- b. \*There seems a man to be  $t_{\text{a-man}}$  in the room.

If *there* is in the numeration, we will have competition between merge and move at the embedded IP, and move will win.

Or, stated differently, Move is always delayed as much as possible (given the elements available in the numeration)

**Marantz's problem:** *there* can be inserted in a matrix CP in cases in which earlier insertion, in an embedded CP, would have delayed movement.

- (2) There seems  $t_{\text{there}}$  to be a man in the room in which a woman seems to be sitting.  
*Cf: A man seems to be in the room in which there seems to be a woman sitting.*

**Chomsky's response:** The system is allowed to access the lexicon again once a CP has been constructed.

More specifically, a derivation can be thought of in the following way

### (3) Steps of a derivation

1. Access the numeration.
2. Apply merge and move as many times as you want.
3. (Optional): once CP is constructed, insert it into a new numeration along with other lexical items (or CPs).

**Chomsky's terminology:** A constituent XP, the construction of which is/can-be followed by lexical access is called a *phase*.

**Chomsky's additional claim** (see also Nissenbaum): phases define impenetrable domains to movement.

- (4) **Phase Impenetrability Condition:** If X is dominated by a complement of a phase YP, X cannot move out of YP.

Additional Claim: vP/VP is also a phase. This claim is made in order to explain successive cyclic movement through vP/VP.

But, is there evidence that the lexicon can be accessed again after vP is constructed. (For (1b) to be bad, *there* can't be accessed after the VP headed by *seems* is constructed. See Legate's LI paper on phases.) It's possible that we have two phases CP, vP, but only CP construction can be followed by lexical access.

**Theory of Islands** (to be worked out): Certain phases do not allow *wh*-movement to proceed through their Spec. These phases are the island.

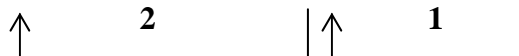
## Cyclic Linearization (Fox and Pesetsky)

### 1. Introduction

- There is good reason to think that *wh*-movement involves intermediate steps, for example, movement to the left edge of an embedded CP:

#### (5) Wh-movement through left edge of CP

I wonder [which book he thinks [<sub>CP</sub> \_\_\_ Mary read \_\_\_ ]]



**Evidence:** scope reconstruction, *all*-stranding (McCloskey 2000), agreement phenomena (Chung *passim*), and islands.

- **Why does *wh*-movement proceed through the left edge of CP?**
- **Logic of a common answer:** Things would go wrong otherwise.

**Question:** What would go wrong otherwise?

**Common answer:** There are **syntax-internal structural conditions** that require such movement, e.g. (6):

#### (6) Phase Impenetrability Condition (Chomsky 1999/2000)

In phase  $\alpha$  with head H, the domain of H is not accessible to operations outside  $\alpha$ , but only H and its edge.

**Our alternative:**

An answer in terms of *linearization*, i.e. conditions on the syntax-phonology interface

#### (7) Properties of *wh*-movement in (5):

- Movement 1 "revises" word order with respect to elements in the lower CP;
- Movement 2 "revises" word order with respect to elements in the upper CP; *but*
- Movement 2 does not revise word order with respect to elements in the *lower* CP. i.e. the moved *wh*-phrase precedes all elements in the lower CP both before movement and after movement,

**Our conjecture: Property (7c) is not a coincidence. If it did not hold, the sentence could not be linearized.**

## 2. General proposal

- Derivations proceed "bottom-to-top".
- Certain syntactic domains created in a derivation are *Spell-out Domains* (roughly: CP, DP and  $vP/VP$ ; but see Sabbagh 2004). By this, we mean (for now) domains whose construction is immediately followed by linearization. These roughly correspond to Chomsky's notion of *phase*.
- Linearization *adds* new ordering statements to the set of statements established by the linearization of previous Spell-out Domains.

### (8) **Consequence: Linearization Preservation**

The linear ordering of syntactic units is affected by Merge and Move *within* a Spell-out Domain, but is fixed once and for all at the end of each Spell-out Domain.

- For example: if leftward movement of *which book* out of CP in (5) were to take place from a position preceded by an overt element X within CP, the ordering "X precedes  $\alpha$ " would have to be altered in the higher domain -- contrary to the proposal.

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### **Predictions of other proposals:**

- a. Movement only possible from the edge of a relevant domain.
- b. Successive-cyclic movement through the edges of relevant domains is required independent of linearization.

### **Predictions of our proposal:**

- a. Movement is possible from the *non*-edge of a relevant domain so long as the previously established linearization is not disrupted.
- b. When there is no need to linearize, successive-cyclic movement through the edges of relevant domains is not required.

### **Summary of relevant evidence:**

#### **a. Non-Edge Movement:**

*Object Shift in Scandinavian* (Holmberg 1999) is possible only when elements that preceded the object in VP still precede the object after it has shifted, as a consequence of other movement operations. [Cf. similar proposals by Müller 2001, Sells 2000, Williams 2002, among others.]

*Verb movement to C in Scandinavian* is possible only when elements that preceded the verb in VP still precede the verb after V-to-C movement. Crucial evidence: the contrast between *Quantifier movement* (Rognvaldsson 1989; Jónsson 1996, Svenonius 2000) and *wh-movement* in V2 environments.

*Main verb movement in English is possible only* when the element that precedes it (the subject) moves to a position where it continues to precede the verb, hence no V-movement to C when the subject is in Spec,IP — but auxiliary verbs, externally merged outside  $vP$ , are subject to no such restriction. We can argue, contrary to tradition, that English main verbs move overtly to I.

*Subject scrambling from  $vP$  when object has scrambled to the edge of  $vP$  in Korean and Japanese (Ko 2004)* is possible only if the object ultimately scrambles to a position higher than the subject, recreating the order of elements in  $vP$ .

b. Non-successive-cyclic movement (NOT PART OF THIS TALK):

When linearization is not necessary, non-edge movement is generally possible. Example: Ellipsis which shows the phenomenon of "Salvation by Deletion" (Ross 1967; Chomsky 1972; Lasnik 2001; Merchant 2002; Fox and Lasnik 2003).

Ellipsis in this proposal has a capacity for evil as well as good. By eliminating ordering contradictions, it allows extraction from certain islands, but elimination of ordering statements can also leave remnant elements unordered, making pronunciation impossible. A locality condition on multiple sluicing is explained as a consequence of this "dark side" of ellipsis.

### 3. How it works

- Suppose a bottom-to-top derivation has created the syntactic domain  $D$  in (9), where  $D$  is also a Spell-out domain. Assume that the Spell-out operation establishes the ordering statements given in (9).

(9) [<sub>D</sub> X Y Z]

Ordering:    **X<Y**  
                  **Y<Z**

[Redundant ordering statements such as  $X<Z$  are omitted for ease of presentation. At the moment we are investigating possible empirical consequences of the presence/absence of such statements.]

- An Ordering statement of the form  $\alpha<\beta$  is understood by PF as meaning that the **last element of  $\alpha$  precedes the first element of  $\beta$** .
- The "elements" linearized by these statements are **heads of chains, never traces**. Thus, informally speaking, if the first element in  $Z$  is a trace, it is the *second* element in  $Z$  that is ordered after the last element of  $Y$  in (9). [This will be follow from the definition of "Dominates" combined with a particular hypothesis about the nature of movement. We will assume that movement is "re-Merge", so that when an element moves, it does not make a copy, but simply exists in two positions. A phrase dominates a moved constituent only if it dominates its most recently merged position]

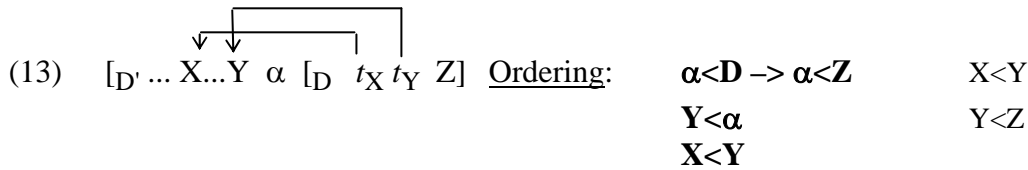
- Next we merge  $\alpha$ , starting a new Spell-out Domain...

(10)  $\alpha$  [<sub>D</sub> X Y Z]

#### Scenario 1 (movement from edge position)

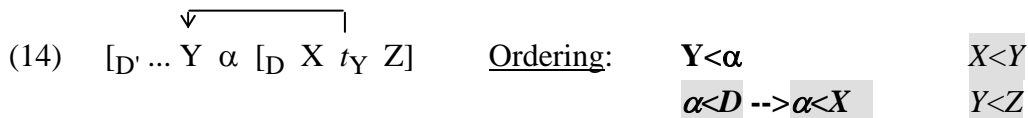
- Suppose  $X$  now overtly moves to the left of  $\alpha$  in (10). When the next domain  $D'$  (containing  $\alpha$  and  $D$ ) is spelled out, the linearization of  $D'$  will add (to the ordering statements from  $D$ ) the new (boldfaced) ordering statements listed in (11):





- **Salvation by Deletion:** Consider again the situation in (12). Such a situation might arise if, for example, Y is attracted to the left of  $\alpha$  but a property of D prevents Y from first moving to the left edge of D. The problem arose because  $\alpha < X$ ,  $X < Y$ , but  $Y < \alpha$ .
- Hypothesis: This is how (some) island phenomena arise (Merchant's "PF islands").

Suppose D in (12) is subject to ellipsis. Then X (and Z) in D are not pronounced at all in (12). Consequently, the ordering statements that make reference to X have no impact on pronunciation, and the overt movement of Y produces no ordering problems. The shaded and italicized ordering statements in (14) establish the relative order of a non-pronounced constituent and therefore can be ignored.



#### 4. Holmberg's Generalization: Holmberg (1999)

##### Most famous instance of HG

- Scandinavian languages show V/2. When V moves to C, the object may move out of VP (crossing negation and adverbs).

(15) **Object shift blocked by (unmoved) verb intervener: facts**

- Jag kysste henne inte [<sub>VP</sub> t<sub>v</sub> t<sub>o</sub>]  
I kissed her not
- \*Jag har henne inte [<sub>VP</sub> kysst t<sub>o</sub>].  
I have her not kissed
- \*...att jag henne inte [<sub>VP</sub> kysste t<sub>o</sub>].  
...that I her not kissed

##### Previous accounts of HG

(16) **Chomsky's HG (1993):**

Verb movement is needed so as to obviate a violation of Relativized Minimality (Shortest Move) when the direct object raises over the subject.

(17) **Bobaljik's HG (1994, 1995, in press):**

Object shift disrupts adjacency between the verb and a head that hosts an affix. Verb raising is needed to restore adjacency.

(18) **Holmberg's (1999) HG (HHG)**

"Less often mentioned, but no less true, is the fact that not just an unmoved verb, but any phonologically visible category inside VP preceding the object position will block Object Shift."

(19) **OS blocked by non-verb interveners (dotted underline)**

a. **First-object intervener**

\*Jag gav den inte [VP t<sub>v</sub> Elsa t<sub>o</sub>].  
I gave it not Elsa

b. **Particle intervener**

\*Dom kastade mej inte [VP t<sub>v</sub> ut t<sub>o</sub>].  
They threw me not out

c. **Preposition intervener** (see also Wagner 2002)

\*Jag talade henne inte [VP t<sub>v</sub> med t<sub>o</sub>].  
I spoke her not with

**Key facts in support of Holmberg's HG**

(20) **OS not blocked if the non-verb intervener is moved by A-bar movement to the left of the OS landing site.**

a. *First object intervener moves...*

Vem<sub>IO</sub> gav<sub>v</sub> du den<sub>o</sub> inte [VP t<sub>v</sub> t<sub>IO</sub> t<sub>o</sub>]. [compare (19a)]  
who gave you it not

b. *Particle intervener moves...*

UT<sub>p</sub> kastade dom mej<sub>o</sub> inte [VP t<sub>v</sub> t<sub>p</sub> t<sub>o</sub>] (bara ned för trappan).  
out threw they me not (only down the stairs) [compare (19b)]

(21) **OS also not blocked if a verb intervener is moved to the left of the OS landing site even by movement other than V-to-C: "verb topicalization"**

a. Kysst har jag henne inte (bara hållit henne i handen).  
kissed have I her not (only held her by the hand)

b. Sett har han me kanske [VP t<sub>v</sub> t<sub>o</sub> ...]  
seen has he me perhaps  
(men han vet inte vad jag heter).  
(but he knows not what I am called)

(22) **Holmberg's Explanation**

At the point at which OS applies, the object may not cross phonologically overt material. This follows from the assumption that OS applies at PF and is sensitive to a PF version of Shortest Move.

**Our alternative**

(23) **Revised HHG**

OS cannot revise the relative order of the constituents in VP.

**Explaining the Revised HHG**

- VP is a Spell-out Domain. The application of OS does not involve movement to the edge of VP. OS may apply after the spell-out of VP, as long as the result can be ordered (i.e. ordered without contradiction).
- The output of OS can be ordered only if the elements that preceded the object in VP continue to precede the object in the higher Spell-out Domain [Scenario 1; example (11)].
- If X belongs to VP and the ordering statements established for VP include X<O, OS will be impossible if Linearize of the next Spell-out Domain would add contradictory statements (e.g. O<X or a set of statements whose transitive closure would include O<X).

***The famous cases: verb interveners***

(24) VP: [VP V O]  
 Ordering: V<O

a. CP (no V-raising): [CP S aux [TP t<sub>S</sub> O adv t<sub>aux</sub> [VP V t<sub>O</sub>]]

Ordering: S<aux                      V<O  
 aux<O  
 O<adv  
 adv<VP --> adv<V

V precedes O in the VP Spell-out Domain. Since O precedes adv and adv precedes V, by transitive closure, O precedes V — a contradiction.

b. CP (yes V-raising): [CP S V [TP t<sub>S</sub> O adv [VP t<sub>V</sub> t<sub>O</sub>]]

Ordering: S<V                      V<O  
 V<O  
 O<adv  
 adv<VP --> ∅ (since, informally, VP contains only traces)

V precedes O in the VP Spell-out Domain and continues to precede it in the CP spell-out domain. Since VP dominates only traces, the statement "adv<VP" has no consequences for pronunciation and creates no contradictions.

***The new cases #1: non-verb interveners***

- (20) a. Vem<sub>IO</sub> gav<sub>v</sub> du den<sub>O</sub> inte [VP t<sub>v</sub> t<sub>io</sub> t<sub>O</sub>].  
 who gave you it not
- b. UT<sub>p</sub> kastade dom mej<sub>O</sub> inte [VP t<sub>v</sub> t<sub>p</sub> t<sub>O</sub>]. (only down the stairs)  
 out threw they me not





**Digression: Holmberg (1999) requires a different analysis of "V topicalization"**

(28) **Holmberg's Explanation for HHG**

At the point at which OS applies, the object may not cross phonologically overt material. This follows from the assumption that OS applies at PF and is sensitive to a PF version of Shortest Move.

**The logic of Holmberg's explanation, and some consequences:**

- Holmberg's explanation involves a condition on the application of OS -- not a filter on its output.
- Since OS is successful when its intervener moves higher than the OS landing site, OS must apply countercyclically. Otherwise OS would have to apply crossing the verb -- in violation of HG.
- One instantiation of the countercyclic proposal is the view that OS applies "at PF". This makes sense of the fact that the intervention constraint distinguishes pronounced from unpronounced material.
- The apparent verb topicalization in (21) can be analyzed as remnant VP topicalization blocked by OS only if topicalization follows OS. If OS applies at PF, then topicalization would have to apply at PF. This would be an unlikely conclusion, since topicalization interacts with syntactic processes. Therefore, V must be able to undergo A-bar head movement on its own. On this analysis, then, the apparent V-fronting in (21) must really be V-fronting.

<b>Reminder of our alternative:</b> OS cannot revise the relative order of the constituents in VP.
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**The logic of our alternative, and some *different* consequences:**

- Revised HHG is not a condition on the application of OS, but (in effect) a filter on its output. OS may cross an "intervener" before the intervener moves out of the way. What is necessary is that spell-out retain the linear order that would have held without OS.
  - As a consequence, OS does not need to be viewed as "PF movement".
  - OS does not apply countercyclically.
  - OS may precede remnant VP topicalization. Thus, the apparent V-fronting in (21) might not be V-fronting.
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**But is Verb Topicalization head movement or XP remnant movement?**

**Prediction (Alec Marantz, p.c.) :** Remnant VP-topicalization should be possible only if the relevant trace is on the right edge of VP.

- Swedish rigid V-IO-DO order provides a test of this prediction, since only in (29a) (where the DO is the trace) is the trace on the right edge:

(29)a. ?[Gett henne t<sub>DO</sub>] har jag den<sub>DO</sub> inte...  
 given her have I it not

b. \*[Gett t<sub>IO</sub> den] har jag henne<sub>IO</sub> inte...  
 given it have I her not  
 (Anders Holmberg, p.c.)

- Holmberg (1999) takes the unacceptability of (30) as evidence for V-topicalization as opposed to VP-remnant movement. In fact, this evidence is compatible with our proposal, and has the same status as (29b). At the VP Spell-out Domain, the following order is determined: **heard < her < give < talk**. OS followed by VP topicalization in the higher Spell-out Domain violates this order.

(30) \*[\_<sub>VP</sub> Hört t<sub>o</sub> hålla föredrag] har jag henne<sub>o</sub> inte t<sub>VP</sub>.  
 heard t give talk have I her not

- Examples (31a-b), from Holmberg (1999) are a problem for proposals that countenance V-movement to Spec,CP. [Holmberg's suggestion: a restriction on the ability of V-traces to assign case.]
- If there is no actual V-movement to Spec,CP, but only (remnant) VP-movement, an example like (31a) could be generated in the following steps: (I) extract [*her give talk*] from VP; (II) object-shift *her* from [*her give talk*]; (III) move the remnant VP, which contains only the verb as a non-trace, to Spec,CP. The example can be excluded if step (I) is impossible: movement of small clauses and ECM-infinitives is generally not found. [An alternative derivation might first extract the VP *give talk*. We do not know whether such constituents move more generally.]<sup>1</sup>

(31)a. \*Hört<sub>v</sub> har jag henne<sub>o</sub> inte t<sub>v</sub> [t<sub>o</sub> hålla föredrag].  
 heard have I her not give talk

b. \*Hört<sub>v</sub> har jag inte t<sub>v</sub> [Per hålla föredrag].  
 heard have I not Peter give talk

<sup>1</sup> In English, Heavy Shift may perhaps be followed by remnant VP topicalization, e.g. *Read we did the books that she recommended*. Heavy Shift of an ECM infinitive seems unacceptable, especially with remnant VP topicalization:

- (i) \*Mary saw with her binoculars Bill give that talk we were expecting.
- (ii) \*See she did Bill give that talk.

The VP of an ECM infinitive also may not be stranded:

- (iii) \*See Bill she did give that talk.

## 5. An Anti-HG effect

### Prediction

- Leftward movement from a Spell-out domain D either behaves like OS or proceeds via the left edge of D.
- Movement via the left edge of D should, in turn, create a new HG effect with respect to any other element of D that would otherwise have occupied the left edge of D.

### What to look for

- An operation OP moving  $\alpha$  whose landing site is similar to the landing site of OS —*but which appears to disobey HG*— must have proceeded via the left edge of the lower Spell-out domain (e.g. VP).
- OP will establish the ordering " $\alpha < \text{verb}$ " in the lower Spell-out domain.
- **Consequence:** An "anti-HG effect". OP blocks V-raising, e.g. V/2.

### Quantifier Movement in Icelandic (Svenonius 2000; Rögnvaldsson 1989; Jónsson 1996)

- Quantifier movement (QM), like OS, is an operation that takes an element (a quantifier phrase) and moves it leftward over all the elements in the lower spell-out domain.
- However, unlike OS, QM can reverse the order of elements in the lower Spell-out domain (i.e. the elements it moves over may be overt, giving the appearance of violating HG.):

#### (32) **Quantifier Movement appears to violate HG (Icelandic)**

a. Jón hefur ekkert [ sagt Sveini \_\_\_ ]  
Jon has nothing said Svein-DAT  
'Jon has told Svein nothing'

b. Äg hef mörgum bókum skilað Jóni \_\_\_.  
I have many books returned Jon-DAT  
'I have returned many books to Jon'

c. Hann mun mikið hafa vilja [lesa \_\_\_]  
he will much have wanted read  
'He has wanted to read much.'

- QM thus moves through the edge of the lower Spell-out Domain and should show an "anti-HG effect". It should block verb raising to C:

#### (33) **QM to left edge of VP incompatible with V-to-C movement**

\*Jón sagði ekkert Sveini \_\_\_.  
Jon said nothing Svein-DAT

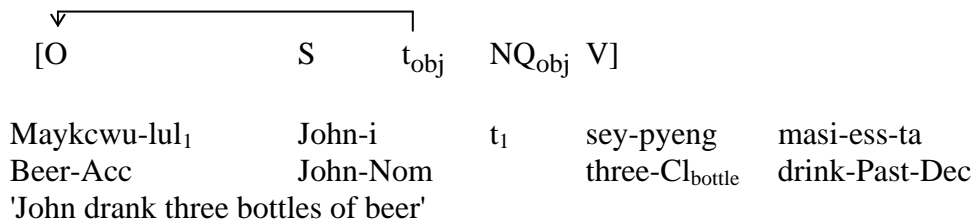
(Rögnvaldsson (1987), quoted by Svenonius (2000))

- (34) a. *Ég hef sett eitur í mörg glös.*  
 I have set poison in many glasses  
 ‘I have placed poison in many glasses’
- b. *?Ég hef mörg glös sett eitur í.*  
 I have many glasses set poison in  
 ‘I have placed poison in many glasses’
- c. *Ég setti eitur í mörg glös.*  
 I set poison in many glasses  
 ‘I placed poison in many glasses’
- d. *\*Ég setti mörg glös eitur í.*  
 I set many glasses poison in  
 [examples from Svenonius (2000)]

- (35) a. *?Hann hefur engum skipaði henni að giftast.*  
 he has nobody ordered her to marry  
 ‘He hasn’t ordered her to marry anybody’
- b. *\*Hann skipaði henni engum [VP t<sub>V</sub> [CP að giftast \_\_ ].*  
 he ordered her nobody to marry

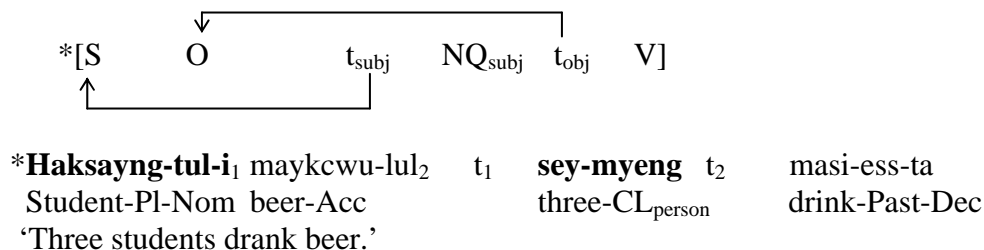
**6. An additional Anti-Holmberg Effect (Ko 2004)**

(36) **Object scrambling over subject. stranding quantifier**



Object scrambling over a subject may not be followed by subject scrambling over the object, where the subject scrambling strands a quantifier. (Haig (1980); Kuroda (1983); Saito (1985), Miyagawa (1989); Fujita (1994)). But see Hoji and Ishii (2004) for a different position.)

(37) **The Subject Puzzle**



Saito accounted for the puzzle by proposing that subjects simply do not scramble. Ko, however, provides several arguments that Saito's proposal is incorrect. For example, long-distance scrambling of a subject is possible, as seen in (38):

(38) **Long-distance scrambling of subject**

John- $i_i$  [na-nun [  $t_i$  Mary-lul ttayli-ess-ta-ko]] sayngkakha-n-ta  
 John-Nom I-Top  $t$  Mary-Acc hit-Past-Dec-C think-Pres-Dec  
 ‘John, I think that \_\_ hit Mary.’

Likewise, scrambling of a subject over high adverbs such as *way* 'why' is possible, as seen in (39a). Subject scrambling in this construction may strand a quantifier, as seen in (39b):

(39) a. **Subject scrambling over high adverb ‘why’ (*way*)...**

John- $i_i$  [<sub>CP</sub> *way* [  $t_i$  Mary-lul ttayli-ess-ni]]?  
 John-Nom why  $t$  Mary-Acc hit-Past-Q  
 ‘Why did John hit Mary?’

b. **...stranding a quantifier**

**Hakpumo-tul-ika;** way  $t_i$  **sey-meyng** hakkyo-lul pangmwunha-yess-ni?  
 Parents-Pl-Nom why  $t_i$  3-CL school-Acc visit-Past-Q  
 ‘Why did three parents visit the school?’

Ko’s Analysis:  $vP$  is a spell-out domain. If we are to get the order  $O < S-FQ$  the object must move over the subject before  $vP$  is spelled-out, but then the Subject will not be able to move over the object.

In more detail (with a missing assumption): The final order among  $vP$  constituents must be determined when  $vP$  is spelled out. Hence the only way to get the  $S < O < S-FQ$  order is by movement of  $O$  to Spec, $vP$ , crossing the subject, followed by movement of  $S$  to yet another specifier of  $vP$ . However, Ko assumes following Chomsky (2002) that movement involves attraction by a head and hence should be impossible in this configuration.

## Appendix

When a domain is spelled out, there is an *Ordering Table* that contains the output of any previous applications of Spellout. Spellout adds new ordering statements to the Ordering Table.

**Laws of Precedence:** The new ordering statements will be determined by *Laws of Precedence*

(40) **Format for the Laws of Precedence**

Where X is the mother of  $\alpha$  and  $\beta$ ; and  $\alpha$  has properties  $\varphi$  (e.g. is a head, complement, specifier, etc. ); and  $\beta$  has properties  $\varphi'$ ,  $\alpha$  precedes  $\beta$ .

(41) **Some Possible Laws of Precedence for English**

a. Where X is the mother of  $\alpha$  and  $\beta$  and  $\alpha$  is a specifier of  $\beta$ ,  $\alpha$  precedes  $\beta$ .

b. Where X is the mother of  $\alpha$  and  $\beta$  and  $\beta$  is a complement of  $\alpha$ ,  $\alpha$  precedes  $\beta$ .

**Movement:** A "remerge" operation (Blevins (1990);Chomsky (2001a); Epstein et al. (1998); among others) rather than a copying procedure. The consequence of movement is the merger to X of a single element  $\alpha$  previously merged to Y.

The fact that "traces do not count" is now a fact about what counts as the mother of a moved constituent, at least as far as ordering is concerned:

(42) **Mother**

The *mother of  $\alpha$*  is the constituent formed by the most recent Merge of  $\alpha$ .

(43) **Dominates (transitive closure of "mother")**

A node X *dominates*  $\alpha$  iff

(i) X is the mother of  $\alpha$ ; or

(ii) X is the mother of  $\beta$  and  $\beta$  dominates  $\alpha$ .

**Spellout:** Spellout of a domain K consists of the following two steps:

1. The precedence relations that are given by relevant Laws of Precedence are gathered into a set LP(K).
2. An operation *Linearize* maps LP(K) into a set L(K), which contains ordering statements for terminal elements of K, and adds L(K) to the Ordering Table.

(44) **Ordering statements provided by Laws of Precedence**

LP(X) :=

{ $\alpha < \beta$  :  $\alpha$  and  $\beta$  are dominated by X;

$\alpha$  precedes  $\beta$  by a Law of Precedence;

and neither  $\alpha$  nor  $\beta$  is dominated by a Spell-out Domain other than X}

(45) **Linearize**

- (i) Form the Linearization Set  $L(K) :=$   
 $\{\alpha' < \beta': \alpha < \beta \in LP(K),$   
and  $\alpha'$  is an End of  $\alpha$  and  
 $\beta'$  is a Beginning of  $\beta\}$ .
- (ii) Update the Ordering Table by adding the members of  $L(K)$   
[that is, Ordering-Table  $\rightarrow$  Ordering-Table  $\cup L(K)$ ].

(46) **End and Beginning**

- (i)  $x$  is an End of  $\alpha$  iff  
 $x$  is a terminal element reflexively dominated by  $\alpha$  and  
 $\neg \exists y$  s.t.  $y$  is dominated by  $\alpha$  and  $x < y \in$  Ordering Table.
- (ii)  $x$  is a Beginning of  $\alpha$  iff  
 $x$  is a terminal element reflexively dominated by  $\alpha$  and  
 $\neg \exists y$  s.t.  $y$  is dominated by  $\alpha$  and  $y < x \in$  Ordering Table.

The choice of these particular notions is dictated by a consideration of the degree of redundancy that is allowed to exist in the Ordering Table (Arguments developed in Fox and Pesetsky (in prep.)). Intuitively, an "End of  $\alpha$ " according to (46) is a constituent that (at a given point in the derivation) still has a chance of being the last thing pronounced in  $\alpha$ .