

Single Output Syntax

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1 Outline

In a short paper on binding theory, Lidz and Idsardi (1998) argue that the syntactic computation has a single output: “Phono-Logical Form”. Phono-Logical Form feeds directly into both the CI and SM interfaces. This sort of architecture is reminiscent of the “Extended Standard Theory” prior to the introduction of LF. As a small part of a cumulative case for Lidz and Idsardi’s single output hypothesis, I will investigate the interpretative reflexes of linear order at the CI and SM interfaces. Roughly, the idea is that the same ordering relations which determine linear precedence at SM determine scope at CI. These ordering relations are computed cyclically in the style of Fox and Pesetsky (2004). This permits the relation between scope and linear order to be relaxed in a controlled manner, so that certain mismatches between scope and surface precedence can be accommodated.

1.1 The theory

- Linearization feeds into interpretation at both the CI and SM interfaces.
- Linearization applies cyclically at each strong phase. (I will assume that CP and vP are strong phases, but that DP is not.)
- Within each phase, lower copies are ignored for the purposes of linearization.
- The output of linearization is a set of statements of the form $[\alpha \preceq \beta]$, where α, β are either terminals or previously-linearized phases.
- Before interpretation/pronunciation can proceed at CI/SM, it is necessary to “put the phases back together” (Phase Integration). This requires integrating the outputs of linearization for each phase. The crucial statements are those involving phases, i.e. those of the form $[a \preceq B]$, $[A \preceq b]$ or $[A \preceq B]$ (where A, B are phases and a, b are terminals).
- At SM, a statement of the form $[a \preceq B]$ is taken to imply that a precedes everything in B . At CI, such a statement is taken to imply that a takes scope over everything in B .
- There is a difference in how statements of the form $[A \preceq b]$ and $[A \preceq B]$ are interpreted at the SM and CI interfaces. At SM, a statement of the first kind implies that everything in A precedes b , and a statement of the second kind implies that everything in A precedes everything in B . In contrast, such statements are ignored at CI.

- As a result, once the phases have been put back together, CI has a partial ordering of terminals determining scopal precedence, and SM has a total ordering of terminals determining linear precedence.

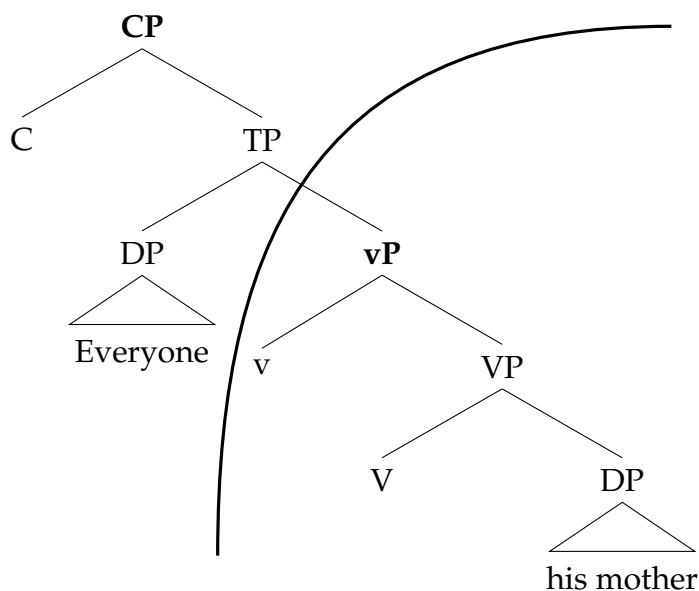
1.2 Consequences

- A derivation of the “almost c-command” constraint on scope relations.
- An account of why A-movement typically does not reconstruct for scope in English.
- An analogue of Holmberg’s generalization for QR.

2 How linearization works

In a simple sentence such as (1), linearization has the following outputs for the CP and vP phases:

(1) Everyone₁ loves his₁ mother



Output for CP phase:

C \preceq C
 C \preceq everyone
 C \preceq vP

everyone \preceq everyone
 everyone \preceq vP

vP \preceq vP

Output for vP phase:

v \preceq v
 v \preceq V
 v \preceq his
 v \preceq mother

V \preceq V
 V \preceq his
 V \preceq mother

his \preceq his
 his \preceq mother

mother \preceq mother

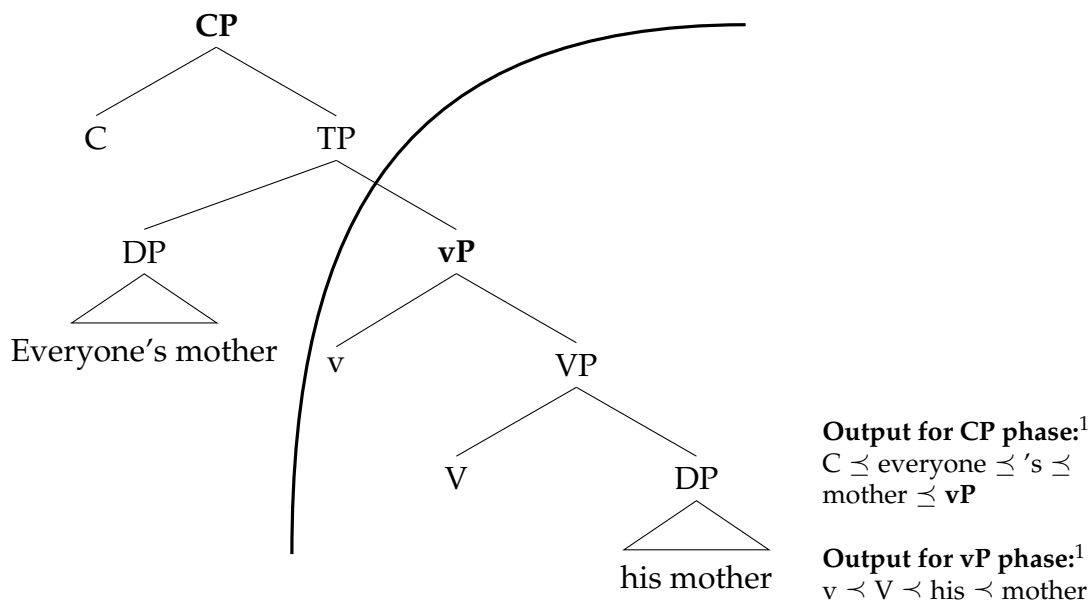
From [everyone \preceq vP], it follows both that *everyone* precedes *his* and that *everyone* scopes over *his* (so that *his* may be interpreted as a variable bound by *everyone*). More generally, there is a complete correspondence in (1) between linear precedence and scopal precedence:

(2) C \preceq everyone \preceq v \preceq V \preceq his \preceq mother

I will assume that, like linear precedence, scopal precedence is ultimately a relation between terminals. So for example, if a complex DP such as *every boy* scopes over another such as *some girl*, this is in virtue of the relation [every \preceq some] between the two quantificational heads.

We also find a complete correspondence between linear precedence and scopal precedence in examples such as (3):

- (3) Everyone₁'s mother loves him₁

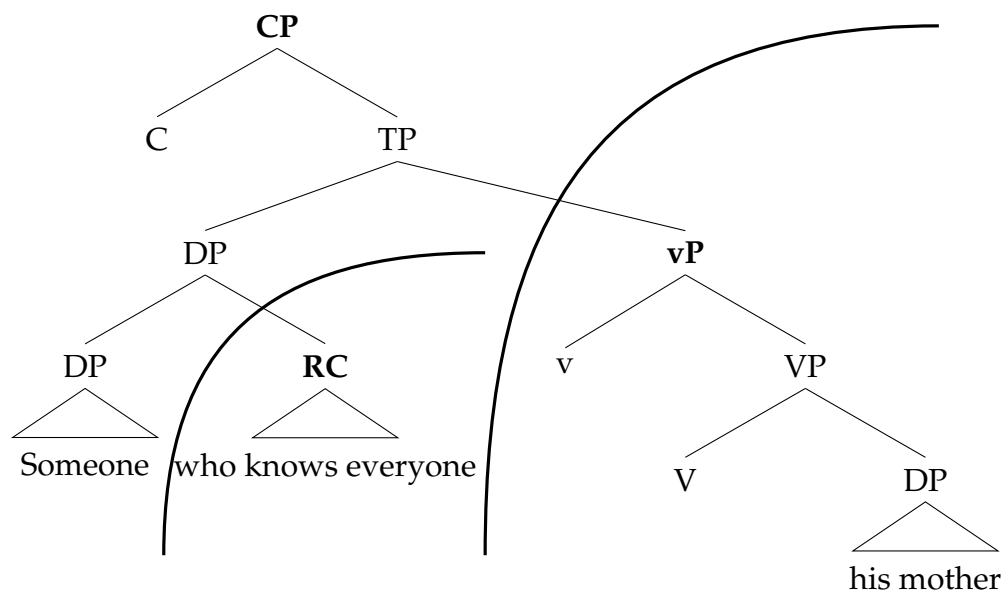


However, if another phase is embedded inside the subject DP, linear precedence and scopal precedence begin to pull apart:²

¹ Here, the outputs are written in a shorthand form. Aside from this notational difference, they are identical to those of (1), but for the addition of *'s* and *mother*.

² Analyzing the relative clause as an adjunct to DP is not very plausible, but it keeps the tree simple, and nothing relevant would change if the RC were attached somewhere inside the DP.

- (4) * Someone who knows everyone₁ loves his₁ mother.



Output for CP phase:

$C \preceq \text{someone} \preceq \text{RC} \preceq \text{vP}$

Output for RC phase:

$\text{who} \preceq \text{knows} \preceq \text{everyone}$

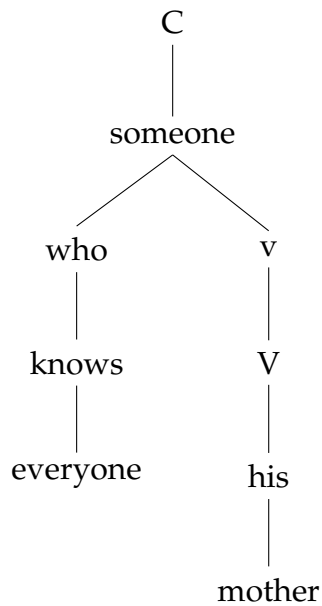
Output for vP phase:

$v \preceq V \preceq \text{his} \preceq \text{mother}$

The statement which is responsible for the divergence between scopal and linear precedence is $[\text{RC} \preceq \text{vP}]$. At the SM interface, this statement is taken to imply that everything in the RC precedes everything in VP, but at the CI interface, it is simply ignored. Thus, although the relative clause precedes vP, nothing within the RC scopes over anything in the vP. Hence, *everyone* does not scope over *his*, and a bound variable reading is not available. SM has the total order in (5a), and CI the partial order diagrammed in

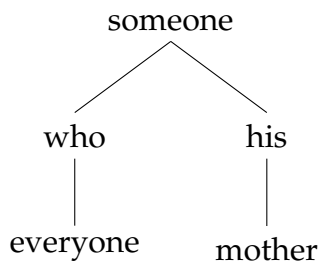
(5b):

- (5) a. C \preceq someone \preceq who \preceq knows \preceq everyone \preceq v \preceq V \preceq his \preceq mother
 b.



I will assume that ordering relations which involve a non-scope-bearing element are ignored at CI. So in fact, (5b) is “pruned” to (6):

(6)



Later in the talk, I will argue that pruning has some empirical consequences.

2.1 Almost c-command

The range of permissible scope relations is essentially that captured by Hornstein’s (1995) notion of “almost c-command”:

- (7) a. Everyone₁ loves his₁ mother.
 b. Everyone₁’s mother loves him₁.
 c. The people [every young man chooses to hang out with]₁ worry his₁ mother.
 d. ?? A friend of everyone₁ loves him₁.
 e. * Someone who knows everyone₁ loves him₁.
- (8) a. Everyone loves someone. ($\forall > \exists$)

- b. Everyone's mother loves someone. ($\forall > \exists$)
- c. A friend of everyone loves someone. ($?? \forall > \exists$)
- d. A person who knows everyone loves someone. ($* \forall > \exists$)

2.1.1 Why not account for almost c-command via QR?

(9) LF: Everyone₁ ... [[t₁'s mother] loves him₁]

- Not everything which can scope out of a subject DP is QR-able:

(10) An occasional sailor walked by.

(11) # A man who saw an occasional sailor walked by.

- Depending on one's analysis of WCO effects, the structure in (9) might be expected to induce a WCO violation. (Although the quantifier does not literally "cross over" the pronoun when it undergoes QR, it is nonetheless the case that the pronoun is A'-bound but not A-bound.)

- In simple sentences, scope follows linear precedence.
- When one phase is embedded inside another on a left branch, it is no longer the case that all relations of linear precedence map to relations of scopal precedence.
- Given the assumption that DP is not a phase, we derive the "almost c-command" constraint on scope and binding relations (Hornstein, 1995).

3 Evidence that linear order is directly related to scope: WCO and extraposition

In a fairly wide range of extraposition structures, we find that crossover effects are conditioned on linear order in both the default and extraposed word orders:³

(12) **Default order**

- a. ?? I gave a picture of his₁ mother to [every boy]₁.
- b. I gave a picture of [every boy]₁ to his₁ mother.

(13) **Extraposed order**

- a. ?? I gave a picture to his₁ mother of [every boy]₁.
- b. I gave a picture to [every boy]₁ of his₁ mother.

(14) **Default order**

³ Bresnan (1995) presents examples similar to those in this subsection, some of which are based on hers. Some of the discussion in Guéron (1980) is also relevant.

- a. ?? They explained the way he₁ should dress to [every male applicant]₁.
- b. They explained the way [every male applicant]₁ should dress to his₁ mother.

(15) **Extraposited order**

- a. ?? They explained to his₁ mother the way [every male applicant]₁ should dress.
- b. They explained to [every male applicant]₁'s mother the way he₁ should dress.

It would be difficult to account for this pattern in structural terms. (14) appears to show that the DP internal argument of *explain* is higher than the PP internal argument in the default order. (15) appears to show that extraposition of the DP internal argument places the DP internal argument lower than the *to* PP. The only way to account for this pattern without analyzing extraposition as downward movement would be a “stranding” derivation along the following lines:

(16) **Hypothetical derivation of default order:**

... PP .. DP
 DP ... PP ... *t*_{DP}
 explain ... DP ... PP

(17) **Hypothetical derivation of extraposited order:**

... PP ... DP
 ... explain ... PP ... DP

The claim would be that the underlying complement order for *explain* is PP DP, but that this is usually obscured by leftward movement of the DP. Extraposition occurs when for some reason the DP fails to undergo this movement, leaving it “stranded” below the PP. Although the stranding analysis seems somewhat plausible in simple cases, it faces a number of problems.

3.1 Problem 1: Case adjacency

The DP internal argument of *explain* behaves like an ordinary direct object w.r.t. Case adjacency:

- (18) I explained (*yesterday) the idea (yesterday) to John.

If *explain* and the DP do not begin the derivation close to each other, it will be difficult to ensure, by non-ad-hoc means, that they always end up next to each other.

3.2 Problem 2: Interaction of DP extraposition and PP extraposition out of DP

Consider a ditransitive verb, such as *give*, and the ordering possibilities given extraposition of the direct object and extraposition of PP out of the direct object:

- (19) a. I gave [a picture of X] to Y.

- b. I gave to Y [a picture of X].
- c. I gave [a picture] to Y of X

In all cases, WCO effects follow linear order:

- (20) a. ?? I gave a picture of his₁ mother to [every boy]₁.
- b. I gave a picture of [every boy]₁ to his₁ mother.
- (21) a. ?? I gave to his₁ mother a picture of [every boy]₁.
- b. I gave to [every boy]₁ a picture of his₁ mother.
- (22) a. ?? I gave a picture to his₁ mother of [every boy]₁.
- b. I gave a picture to [every boy]₁ of his₁ mother.

To ensure that hierarchical order corresponds to linear order in these cases, we would have to construct a derivation in which each of the following three things is at some point c-commanded (or almost-c-commanded) by the other two: (i) the object DP, (ii) the indirect object PP, and (iii) the *of* PP. This may be possible in principle, but it is difficult to see how such a complex derivation could be independently motivated.

WCO effects within the VP appear to be determined by linear order, not a structural relation such as c-command (Bresnan, 1995). This supports the hypothesis that scope is primarily determined by linear order, with hierarchical effects only apparent at the level of phasal embedding.

4 Escape hatches

As it is stated above, the theory does not yet permit movement via escape hatches. This is shown by the following abstract example:

(23) $X Y \dots [_{HP} t_X H \dots t_X]$ (where HP is a phase)

(24) Linearization of inner phase:

$$X \preceq H$$

Linearization of outer phase:

$$X \preceq Y \preceq HP$$

If $[Y \preceq HP]$ implies that Y precedes everything in HP, then it implies $[Y \preceq X]$. But then we have both $[X \preceq Y]$ and $[Y \preceq X]$, which is a contradiction.

Fox and Pesetsky address this problem by assuming that linearization statements apply to chains rather than copies.⁴ I will adopt a different solution. Informally, the idea is as follows. Suppose we have two phases such as the following:

⁴ If I understand correctly, the idea is roughly that $X > Y$ means “the head of the chain to which X belongs precedes the head of the chain to which Y belongs” (although F&P couch this in terms of multiple dominance).

(25) [PHASE1 a...b...c...[PHASE2 t_a d e]]

Linearization of phase 1:

$a \preceq b \preceq c \preceq \text{Phase2}$

Linearization of phase 2:

$a \preceq d \preceq e$

As we have seen, there will be a contradiction if $[c \preceq \text{Phase2}]$ implies that c precedes everything in Phase 2. I suggest that the implication of this statement is actually slightly weaker: $[c \preceq \text{Phase2}]$ implies that c precedes everything in Phase2 *which does not precede c in Phase1*.

Since a precedes c in Phase1, it is not inferred from $[c \preceq \text{Phase2}]$ that $[c \preceq a]$, and there is no contradiction.

4.1 A more precise statement of the the implications of precedence statements involving phases

4.1.1 Notation

We will be dealing with a number of different sets of ordering statements: those for each phase, and the final sets derived at CI and SM by combining these sets. To say that an ordering statement $[a \preceq b]$ is in the set of ordering statements for a phase P , we write $[a \preceq b]^P$. Similarly, $[a \preceq b]^{\text{SM}}$ and $[a \preceq b]^{\text{CI}}$ indicate that an ordering statement is in the final set derived at SM and CI respectively. To indicate that an ordering statement $[a \preceq b]$ is not in X , we write $[a \not\preceq b]^X$.

4.1.2 The rules

There are three rules of inference:

(26) **Rule 1:** For phases P_1, P_2 , if $[P_1 \preceq a]^{P_2}$, then for each terminal b in P_1 , $[b \preceq a]^{\text{SM}}$.

Rule 2: For phases P_1, P_2, P_3 , if $[P_1 \preceq P_2]^{P_3}$, then for each pair of terminals a, b in P_1, P_2 , $[a \preceq b]^{\text{SM}}$.

Rule 3: For phases P_1, P_2 , if $[a \preceq P_1]^{P_2}$ and $[b \not\preceq a]^{P_2}$, then for each terminal b in P_1 , $[a \preceq b]^{\text{SM}}$.

Rules 1-3 are available at SM; only Rule 3 is available at CI.

Rules 1 and 2 are stated in a simplified form, on the assumption that there are no violations of the proper binding constraint. (This amounts to the assumption that there is no sideward or remnant movement.)

5 Mismatches between scope and linear order

As it stands, the theory predicts too close a relation between scope and surface order – it does not allow for quantifier raising or quantifier lowering. Since there is good evidence that both QR and QL exist, the theory must be modified to permit them.

- Covert movement (in particular, QR) occurs when only the semantic and formal syntactic features of a DP are copied.
- Reconstruction (in particular, QL) occurs when only the phonological features of a DP are copied.

This is not a new or interesting way of implementing covert movement or reconstruction.⁵ However, it does interact with the linearization mechanisms proposed earlier to make the following prediction:

- Covert movement and QR are impossible within a minimal phase.

To see this, consider a case of covert movement internal to a phase:

$$(27) \quad X_{\text{SYNSEM}} \dots Y \dots X_{\text{SYNSEM+PHON}}$$

The output of linearization for this phase is as follows:

$$(28) \quad X_{\text{SYNSEM}} \dots \preceq \dots Y$$

At CI, this output simply indicates that X scopes over Y. However, it causes a problem at SM. Here, the output of linearization indicates that X_{SYNSEM} precedes Y, but since X_{SYNSEM} has no phonological content, the effect is simply that nothing is pronounced. In effect, we have a case of non-recoverable deletion, which I will assume to be illicit.

The same logic applies for reconstruction, but in reverse. Rather than an unpronounced element, we will end up with an “unscoped” element.

These problems do not arise when the movement is cross-phasal. This is illustrated in (29) for covert movement:

$$(29) \quad X_{\text{SYNSEM}} \dots Y \dots [_{\text{HP}} \dots Z \dots X_{\text{SYNSEM+PHON}}] \quad (\text{where HP is a phase})$$

Linearization for the embedded phase: $Z \preceq X_{\text{SYNSEM+PHON}}$

Linearization for the higher phase: $X_{\text{SYNSEM}} \preceq Y \preceq \text{HP}$

The statements $[X_{\text{SYNSEM}} \preceq Y]$ and $[X_{\text{SYNSEM}} \prec \text{HP}]$ in the higher phase have no consequences for pronunciation, since X_{SYNSEM} has no phonological content. However, this does not lead to unrecoverable deletion of X, since we also have $[Z \preceq X_{\text{SYNSEM+PHON}}]$ in the lower phase. X is therefore pronounced, but pronounced in a position distinct from that in which it scopes. The inverse effect (reconstruction) obtains when only the phonological features of X are copied.

⁵ See e.g. Cormack and Smith (1997) on “split signs” and Chomsky (1995) on movement of $\text{FF}(\alpha)$.

Note that movement in “one fell swoop” was necessary to make covert movement/reconstruction possible. If X had moved first to the edge of HP in (29), it could not have been pronounced in its base position. This will have some important consequences later, since fell-swoop movement always runs a high risk of inducing a linearization conflict.

- Covert movement and reconstruction result from partial copying.
- Covert movement and reconstruction are impossible within a phase.
- Covert movement and reconstruction are derived via one-fell-swoop movement over a phase boundary

A final point: although covert movement and reconstruction require at least one one-fell-swoop movement, there is nothing to prevent further successive-cyclic subsequent to the swoop. So for example, in the following abstract derivation, the moved element phrase could reconstruct to its base position:

(30) X ... [PHASE X ... [PHASE X ... [PHASE [PHASE ... X]]]]

6 A-movement and reconstruction

In English, A-movement typically does not cross phase boundaries (assuming that passive vPs are “weak” phases, etc.) This implies that it should typically be impossible for A-movement to reconstruct for scope, since, as we have seen in the preceding section, scope reconstruction can only occur when a DP moves across a phase boundary.

It follows that the lack of reconstruction in examples such as (31b) (Chomsky, 1995) is correctly predicted:⁶

- (31) a. Everyone is not intelligent. ($\forall > \neg, \neg > \forall$)
 b. Everyone seems not to be intelligent. ($\forall > \neg, *\neg > \forall$)

However, if there are any instances of cross-phasal A-movement, these should show (optional) scope reconstruction on the present analysis. One candidate for a movement of this type is “short” scrambling in Japanese and other languages. There is good evidence that short scrambling is A-movement. Nonetheless, short scrambling gives rise to scope ambiguities, suggesting that short scrambling may undergo scope reconstruction:

- (32) a. Dareka-ga daremo-o aisite iru ($\exists > \forall, *\forall > \exists$)
 Someone-NOM everyone-ACC love.
 ‘Someone loves everyone.’
 (No scrambling, no scope ambiguity)

⁶ For the purposes of this talk, I’m going to take it as given that A-movement does not reconstruct, since there is no time to delve into this issue. Of course, it is a large and controversial issue whether this is in fact an accurate generalization.

- b. Daremo-o₁ dareka-ga t₁ aisite iru. ($\exists > \forall, \forall > \exists$)
 Everyone-ACC someone-NOM loves.
 'Everyone, someone loves.'
 (*Scrambling of object over subject introduces scope ambiguity.*)

Furthermore, as noted by Grewendorf and Sabel (1999, 14), pronouns contained in phrases which are short-scrambled to CP may reconstruct for variable binding:⁷

- (33) [*pro*₁ hitome mita hito]-o₂ dare₁-ga t₂ sukini natta no?
 one-glance saw person who-NOM fall in love Q
 'The person that he₁ saw, who fell in love with?'

- A DP which remains within its phase of origin always has surface scope
- English A-movements are typically phase-internal, and thus do not show scope reconstruction.
- Longer A-movements may reconstruct for scope

7 Holmberg's generalization for QR

One of Fox and Pesetsky's (2004) main empirical results is an account of Holmberg's generalization.⁸ The following is a slightly adapted summary of F&P's explanation for Holmberg's generalization taken from their 2003 handout:

- VP is a Spell-Out domain. **The application of Object Shift 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. 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.
- If X belongs to VP and the ordering statements established for VP include $[X \preceq O]$, OS will be impossible if Linearize of the next Spell-Out domain would add contradictory statements (e.g. $O \preceq X$).

This explanaton carries over to the present framework.

⁷This raises the question of why long-distance scrambling in Japanese shows "radical reconstruction" for scope. The present analysis predicts that in general, long-distance movements should only optionally reconstruct. It may be that radical scope reconstruction derives from Fox's (2000) Scope Economy Condition (Miyagawa, 2006).

⁸Holmberg's generalization is the generalization that object shift cannot cross phonetically realized material within vP/VP.

7.1 Bruening (2001)

The rest of this talk will examine a set of phenomena first brought together in Bruening (2001). The following is a brief summary of the relevant facts:

- The first and second objects in the double object construction must have surface scope with respect to each other (and similarly for the two internal arguments in spray/load constructions).

(34) John showed a boy every book. ($\exists > \forall, * \forall > \exists$)

(35) John loaded a truck with every bale of hay. ($\exists > \forall, * \forall > \exists$).

- However, ACD out of the second object is possible – (36a). Moreover, even in the ACD case, the first object must scope over the second – (36b):

(36) a. John awarded me every medal that Bill did.

b. John awarded a #different boy every medal that Bill did.

- Apparent paradox: the availability of ACD suggests that the second object can QR, but the scope freezing facts suggest that it can't.
- Bruening's solution: the second object can QR only if the second object also undergoes QR, so that the first and second object retain their relative scope.

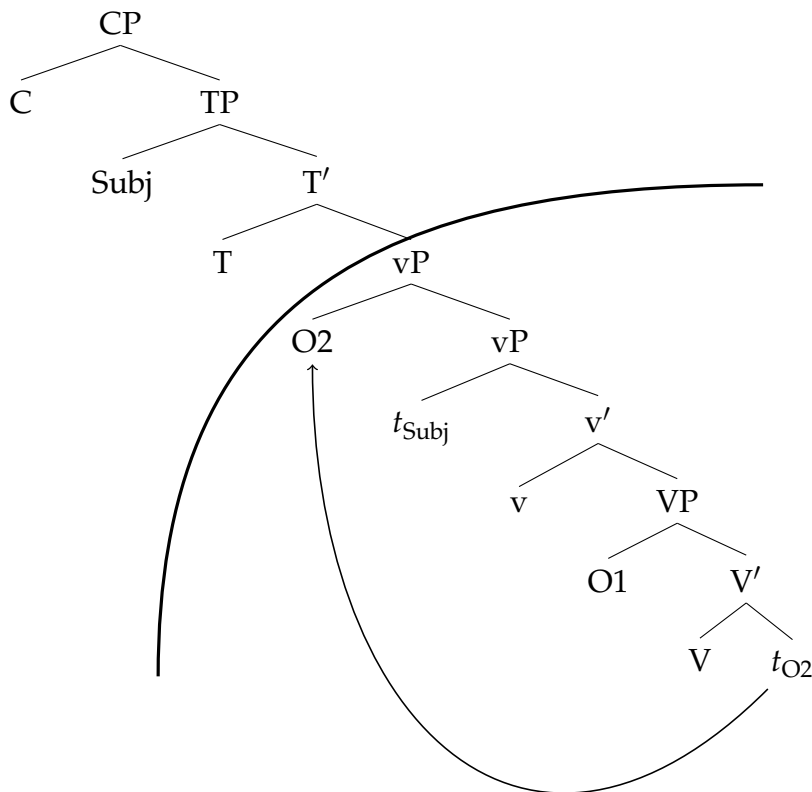
Abstractly, these phenomena are reminiscent of Holmberg's generalization. It is therefore natural to attempt to account for them in terms of the present theory.

7.2 Scope freezing

I will now argue that scope freezing in the double object construction follows from the present theory, given the assumption that no phase boundary intervenes between the first and second objects. On this assumption, there are potentially two ways of getting the second object to scope over the first:

7.2.1 First option: Second object undergoes QR to the edge of vP/VP

(37)



vP phase linearization: $O2 \preceq \text{Subj} \preceq v \preceq O1 \preceq V$

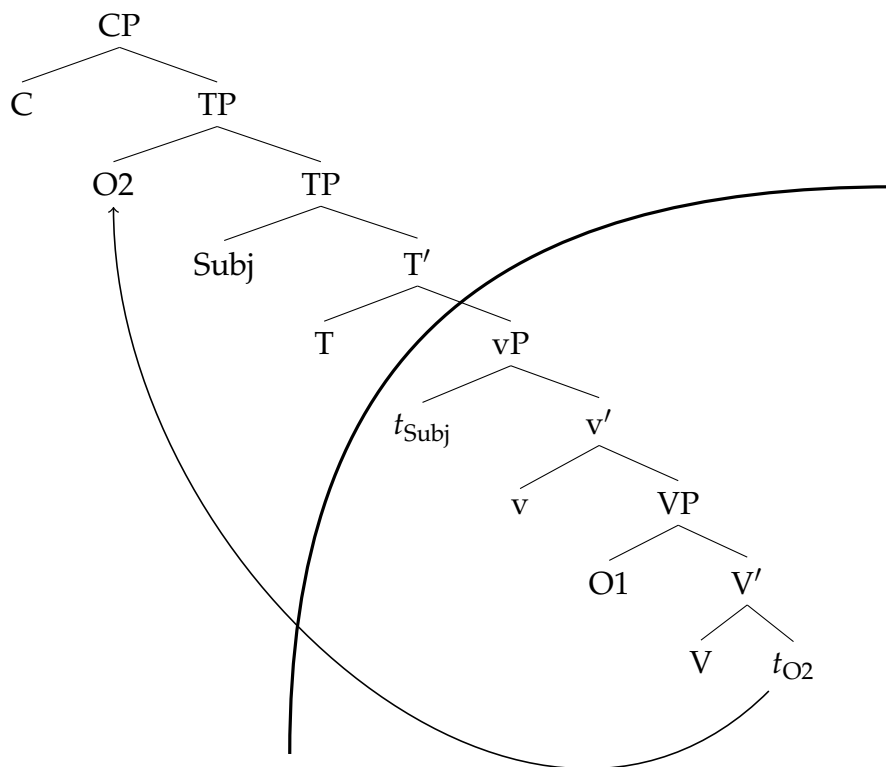
CP phase linearization: $C \preceq \text{Subj} \preceq T \preceq vP$

The problem with this derivation is that $[O2 \preceq O1]^{SM}$ will inevitably be in final set at SM.⁹ This would make QR overt, but English does not permit overt QR.

⁹ This would only strictly be true if the first and second objects were heads rather than phrases. If they are phrases, then we will have $[o_2 \preceq o_1]$ for every pair of terminals o_1, o_2 in the first and second objects respectively.

7.2.2 Second option: Second object undergoes QR to the edge of TP

(38)



vP phase linearization: $\text{Subj} \preceq v \preceq \text{O1} \preceq \text{V} \preceq \text{O2}$

CP phase linearization: $\text{C} \preceq \text{O2} \preceq \text{Subj} \preceq \text{T} \preceq vP$

This derivation permits QR to be covert, since the second object proceeds directly to the edge of TP without stopping off at the edge of vP.

The problem with this derivation is that it leads to an ordering contradiction. From linearization of the vP phase, we have $[\text{O1} \preceq \text{O2}]^{vP}$, but from linearization of the CP phase, we have $[\text{O2} \preceq vP]^{CP}$, which implies $[\text{O2} \preceq \text{O1}]^{SM}$.

7.2.3 Lack of scope freezing in ditransitives

To account for the possibility of non-surface scope in (39), I must assume that there is a phase boundary between the two internal arguments in ordinary ditransitives:

(39) I gave a book to every boy. ($\exists > \forall, \forall > \exists$)

Section 6 of Bruening's (2001) paper develops an account of the structural contrast between the double object and ditransitive structures which I will adopt in its essentials. Following Marantz (1993), Bruening proposes that double object verbs trigger

formation of a complex predicate via head movement of V. Within Bruening's framework, this renders the two objects equidistant for the purposes of superiority. Within the present framework, there may be a connection with recent literature on "phase extension." Raising of the verbal head may remove any phase boundaries which might otherwise have intervened between the two objects.

7.3 The Holmberg fact

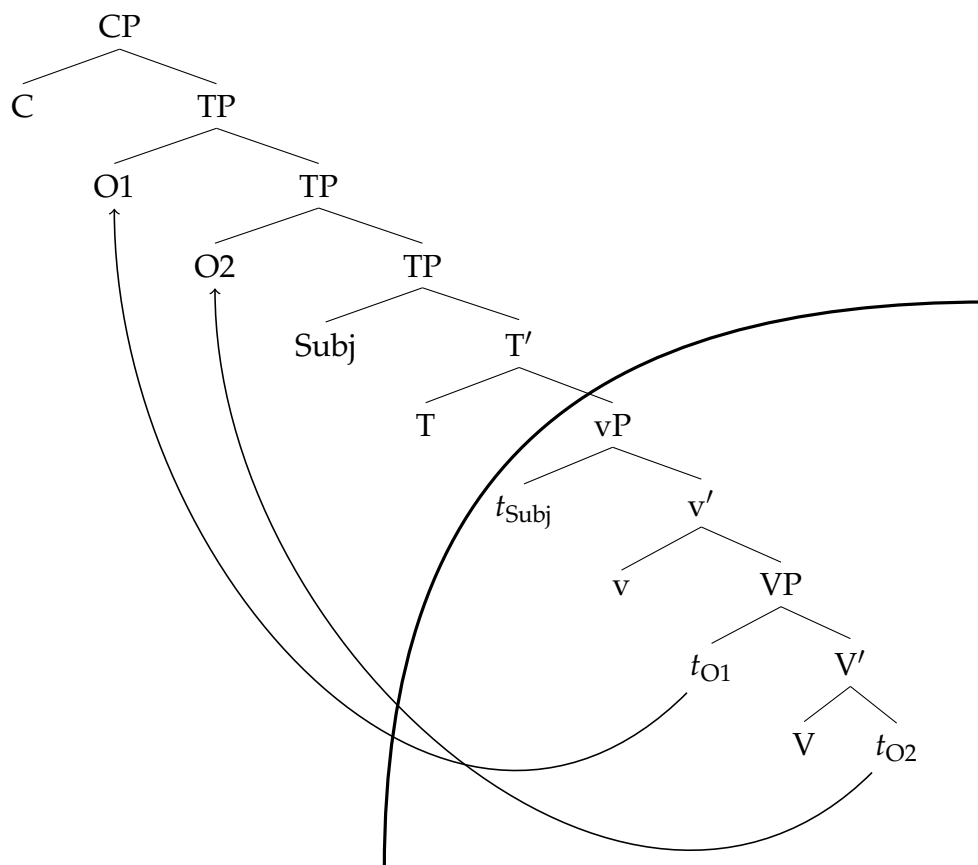
Bruening shows that although the first and second objects in the English double object construction must have surface scope with respect to each other – (40a) – it is nonetheless possible for the second object to scope over the subject (40b). ACD out of the second object is also possible – (40c). Surprisingly, ACD out of the second object does *not* permit the second object to scope over the first – (40d).

- (40) a. John showed a boy every book. ($\exists > \forall, * \forall > \exists$)
 b. At least two judges awarded me every medal. (a.l.t $> \forall, \forall > \text{a.l.t.}$)
 c. John awarded me every medal that Bill did.
 d. John awarded a #different boy every medal that Bill did.

Bruening argues that these facts are explained on the assumption that QR of the second object is possible only when the first object undergoes QR to a still higher position. We can now see how this follows from the present theory. As explained above in §7.2, QR of the second object alone leads either to illicit overt QR, or an ordering contradiction. However, if the second object also undergoes QR, the ordering contradiction is

avoided:

(41)



vP phase linearization: $\text{Subj} \preceq v \preceq \text{O1} \preceq V \preceq \text{O2}$

CP phase linearization: $C \preceq \text{O1} \preceq \text{O2} \preceq \text{Subj} \preceq T \preceq \text{vP}$

A crucial assumption here is that most of the heads within vP are not scope-bearing, and hence are ignored for the purposes of scope linearization. For example, there is a contradiction in (41) between $[\text{V} \preceq \text{O2}]^{\text{CI}}$ and $[\text{O2} \preceq \text{V}]^{\text{CI}}$ (the second of which follows from $[\text{O2} \preceq \text{vP}]^{\text{CP}}$), but since V is (by hypothesis) not scope-bearing, this contradiction is harmless.

If we add an additional scope bearing head within vP to the left of the object, the theory predicts that the second object should no longer be able to QR out of the vP to scope over the subject. This in fact seems to be the case:

- (42) At least two judges twice awarded me every medal. (a.l.t > twice > \forall)
(Only possible scope reading.)

As (42) illustrates, this effect can be seen even with quantificational heads such as *twice* which cannot undergo QR:

- (43) Most of the boys have twice arrived late. (most > twice, *twice > most)

The effect would be more difficult to explain under Bruening's account, since superiority, as it applies in the case of QR, is only sensitive to the presence of other elements which may undergo QR.

- QR of the second object is dependant on QR of the first object in roughly the same way that object shift is dependant on raising of V.
- In the case of object shift, Fox and Pesetsky offer an explanation in terms of cyclic linearization.
- By extending cyclic linearization to the determination of scope relations, the QR facts can be explained in the same way.

8 Conclusion

As a descriptive generalization, it is roughly accurate that scope in English follows linear order. We have seen that certain constraints on scope relations mirror constraints which have been argued to derive from linearization effects on the PF side. This hints at a more direct connection between scope and linear order than is typically assumed.

There are two respects in which scope does not follow linear order.

First, VP-internal quantifiers can often scope over subjects. The present theory accounts for this in a rather boring way by stipulating the availability of covert QR.

Second, constituents deeply embedded in left branches cannot scope over constituents on the corresponding right branch. We have seen that this effect can be captured in a phase-based framework without directly introducing any hierarchical constraints on scope.

Appendix: Some potential problems

- It is not clear exactly how the set of scope precedence statements feeds into interpretation. Are they directly interpreted, or do they constrain the mapping from LF to SR?
- The theory relies on a distinction between scope-bearing and non-scope-bearing elements, but it is not clear that scope is a theoretical term. In the Heim and Kratzer system, for example, QR is just something which is permitted by the interaction of the syntactic rules, the type system, and the rules for interpreting traces. There is no theoretical notion of scope which identifies a special class of scope-bearing elements.
- The theory appears to predict that short QR to vP/VP should never be possible for direct objects. Thus, QR cannot be used to resolve type mismatches between a verb and a generalized quantifier. Moreover, inverse scope in sentences such as "Some boy loves every girl" can only be derived via QR of *every girl* to a position

above TP. (It cannot be derived by short QR to VP followed by QL of *some boy*). There is some evidence that a lowering derivation must be available for inverse scope. For example, Fox (2000, 59) points out that there is an interpretation of (44) in which the guards may vary independently with respect to the churches and the mosques:

- (44) A guard is standing in front of every church and sitting at the side of every mosque.

This particular sentence may not pose problem for the theory presented here, since the relevant quantifiers are in PP adjuncts, and these may introduce phase boundaries. However, the theory does appear to predict that the reading available for (44) should not be available in (45):

- (45) A workman is painting every house and redecorating every apartment.

As far as I can tell, this prediction is false.

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