Does Quantifier Raising really obey the Coordinate Structure Constraint?

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1 Introduction

As is well known, the relative scope of two operators (or more) in a sentence does not always correspond to their surface scope relations, as determined, say, by c-command. Call QR the mechanism by which a DP is assigned a scope that does not correspond to its surface scope. In most cases, the effect of this mechanism is equivalent to, informally speaking, "lifting" a DP to a certain syntactic height prior to compositional interpretation.

Is QR in fact a syntactic movement rule? There is a long standing argument (May 1985, with antecedents in Lakoff 1970 and Rodman 1976) according to which QR obeys the Coordinate Structure Constraint (CSC) and should thus be seen as a syntactic movement rule.[1] We discuss this evidence showing that it is unconvincing, but we also show that it can be fixed so as to become convincing.

2 Evidence for QR as syntactic movement: the coordinated structure constraint

2.1 The Classical Argument

The Coordinate Structure Constraint (Ross 1967) states that in a conjunction, it is not possible to move only one of the conjuncts (as illustrated by (1)), or to move just one element contained within one of the conjuncts out of the conjunction (as illustrated by (2)).

(1)   *Who do you think that Peter loves and _ ?

(2)   a. *Who do you think that Peter loves Mary and hate _
       b. *Who do you think that Peter likes _ and hates Paul ?

The classical argument that QR obeys the CSC goes as follows. First, note that a sentence such as (3-a) licenses an inverse-scope reading in which the object outscope the subject (paraphrased in (3-b)):

(3)   a. Several people had seen every movie.
       b. For every movie x, several people saw x.

This is interpreted as showing that QR is able to lift a direct object to a position higher than the subject. But then consider (4):

(4)   Several people had seen every movie and attended the award ceremony

Here inverse-scope is unavailable: the sentence cannot mean that for each movie, several people (possibly different ones) had seen this movie and attended the award ceremony. The explanation given is the following:

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[1]This is not to say that QR operates uniformly for all DPs: different DPs have different scope possibilities, see e.g. Beghelli and Stowell 1997.

inverse-scope requires that QR lift *every movie* higher than the subject *several people*. But since the subject *several people* is shared by two coordinated VPs, hence c-commands the conjunction *and*, QR would have to move *every movie* out of the conjunctive phrase, thus violating the CSC. This leads to the conclusion that inverse-scope is subject to a locality constraint characteristic of movement, the CSC, and thus provides evidence for a treatment of inverse scope in terms of syntactic movement.[2]

2.2 A Confound

However, given subsequent developments of syntactic theory, this classical argument suffers from a serious shortcoming. The problem is this: once the so-called VP-internal subject hypothesis (see e.g. Koopman and Sportiche 1991) is adopted, the CSC appears to be neither necessary nor sufficient to block an inverse-scope interpretation for (4).

2.2.1 The CSC is not *necessary* to rule out inverse-scope for (4)

According to the VP-internal subject hypothesis, the surface-position of the subject in a sentence such as (5) is a derived position. The subject is assumed to be first inserted within the smallest verbal projection (VP), in the highest specifier position of the verb phrase[3], i.e., in (5), as a sister of 'seen the movie', and then moved to the specifier position of T, where the auxiliary is located (possibly after having underdone movement itself).[4]

(5) $[_{TP}$ John had $[_{VP}$ ~~John~~ seen the movie]]

Given the VP-internal subject hypothesis, cases where an object takes scope over a subject in simple sentences can and have been treated as involving covert lifting of the object to the left edge of the VP and reconstruction of the subject to the VP-internal subject position, below the landing site of the object (see, e.g. Fox, 2000). That is, (6-a) below can get the inverse-scope interpretation if parsed as corresponding to the LF in (6-b):

(6)   a.   Several people had seen every movie
        b. $[_{TP}$ had $[_{VP}$[every movie] $[_{VP}$[Several people] seen ~~every movie~~]]]

Furthermore, there are a number of arguments in the literature supporting the view that this mechanism (reconstruction of the subject and 'short' QR of the object to a VP-internal position higher than the VP-internal subject position) is the *only* way to get a reading in which the object of a verb outscopes its subject (see Hornstein 1995; Johnson and Tomioka 1997). According to these works, QR of the object can *only* target the edge of a VP,[5] i.e. never lifts it to a TP-region, and the only option to get inverse scope is to have the subject reconstructed to its VP-internal position.

Another consequence of the VP-internal subject hypothesis is that sentences like (4), where a subject is 'shared' by two coordinated VPs, must involve across-the-board movement from the two VP-internal subject positions to [Spec, TP], as illustrated in (7):

(7)   a.   Peter has seen the movie and read the book
        b. $[_{TP}$ Peter [has $[_{VP}$ ~~Peter~~ seen the movie] and $[_{VP}$ ~~Peter~~ read the book]]]

Now, if these arguments are correct, then the classical argument reviewed above loses its force. Let us see why. Note that the classical argument relies on the absence of the following reading for (4):

(8)   For every movie x, there are several people who both had seen x and had attended the ceremony.

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[2]This is compatible with both QR being overt, or covert movement.

[3]Or, more precisely, the highest specifier of the verbal domain, if it is composed of several phrasal projections, as in Sportiche (1990), Kratzer (1996).

[4]Note that by treating auxiliaries as raising verbs, HPSG makes what amounts to an analogous assumption given its specific, non-movement based architecture (See, e.g, Sag et al. 1999).

[5]This VP need not be the smallest VP hosting the object, however, a point that will prove relevant in section 3.

It is important to note that the reading in question is one where 'several people' takes scope below 'every movie' but above the conjunction 'and'. It should be distinguished from another conceivable reading in which 'several people' takes scope below the universal quantifier and the universal quantifier itself takes scope below conjunction, as in the paraphrase in (9):

(9)   [For every movie x, several people saw x] and [there are several people who attended the ceremony]

In contrast with (8), (9) does not entail that there be anyone who both saw a movie and attended the ceremony. We will address this second reading in the next section. For the time being, let us concentrate on (8), which served as the basis for the classical argument. Since conjunction in (4) conjoins two VPs, and since 'several people' in (8) scopes over conjunction, it follows that the LF corresponding to (8) has to be one where 'several people' scopes over both coordinated VPs. This entails that 'several people' has not reconstructed to its VP-internal subject positions, since these positions are located below conjunction. But, if inverse-scope requires reconstruction of the subject to the VP-internal subject position, there is no way an LF corresponding to (8) could be generated.

To sum up, the unavailability of (9) as a reading for (4) turns out to be fully predicted without the CSC, once the following assumptions are made:

- In a simple SVO sentence, an object can outscope a subject only if the subject reconstructs to its VP-internal position.

- A subject that is shared by two coordinated VPs must have undergone across-the-board movement from the two VP-internal subject positions to a position higher than the coordination (Spec, TP).

It follows that the unavailability of the reading in (8) does not provide any compelling evidence that QR is subject to the CSC. While the assumptions leading to this conclusion might well be challenged as too restrictive,[6] we can at least conclude that, at best, arguments in favor of the CSC based on the interpretation of (4) have to be much more elaborate than the usual textbook presentation, with the consequence that what originally seemed to be a compelling and straightforward argument is in fact much more dependent on theory-internal considerations than was thought.

2.2.2   The CSC is not *sufficient* to rule out inverse-scope for (4)

In the previous section, we mentioned that there were in principle two distinct readings for (4) where the object took scope over the subject. The previous section was concerned with the reading paraphrased in (8). But we must also discuss why the reading given in (9) is not available here. As pointed out by Fox (2000), it turns out that the CSC is simply irrelevant to this case: the CSC is simply not able to rule out the corresponding LF, and, furthermore, the reading in (9) is in fact expected to be available given the assumptions discussed above.

Here is why. One way to generate an LF corresponding to (9) would be to reconstruct the subject into its VP internal position in each conjunct, and lift *every movie* to the periphery of its VP, as the VP-structure in (10-b) illustrates. In such a case, *every movie* would thus not cross conjunction, and therefore the CSC would not be violated.

(10)   a.   Several people [[saw every movie] and [attended the award ceremony]]

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[6]One might for instance imagine that before raising to [Spec, TP], both subjects could undergo across-the-board movement to a position outside the coordination but within the higher VP that contains the coordination, and then reconstruct into this intermediate position at LF. If, in the absence of the CSC, the object were itself able to covertly move above this intermediate position but still within the higher VP, then the following LF structure could be generated (we use traces to represent lower copies to facilitate reading):

(i) $[_{VP}$ Every movie$_j$ $[_{VP}$ Several people$_i$ $[_{VP}$ $[_{VP}$ t_i saw t_j] and $[_{VP}$ t_i attended attended the ceremony]]]]

The CSC might be needed to rule out such a structure. Importantly, our point is that the lack of an inverse-scope reading for (4) does not provide a *straightforward* empirical argument that QR is subject to the CSC. The availability of such a structure were it not for the CSC is a highly theory-internal issue.

b. $[_{VP}[_{VP}[\text{every movie}][_{VP}\text{ several people saw }\sout{\text{every movie}}]]\ \ldots$

   $\ldots$ and $[_{VP}\text{ several people attended the award ceremony}]]$

Furthermore, Fox (2000, section 2.3) shows that when both coordinated VPs contain a universal quantifier in object position, then the LF resulting from VP-internal QR of both objects and reconstruction of the subject in both VP-internal subject positions is in fact available. That is, (11-a) below can be parsed as corresponding to the LF given in (11-b) (for the VP region), giving rise to the interpretation given in (11-c).

(11) a. Several people saw every movie and attended every party.
      b. $[_{VP}[_{VP}\text{ every movie }[_{VP}\text{ several people saw }\sout{\text{every movie}}]]\ \ldots$

         $\ldots$ and $[_{VP}\text{ every party }[_{VP}\text{ several people attended }\sout{\text{every party}}]]]$

      c. For every movie x, several people people saw x, and for every party y, several people attended y.

In order to explain why the LF in (10-b) is ruled out, while (11-b) is not, Fox resorts to his Scope Economy Constraint: reconstruction of the subject has no semantic effect *within* the second conjunct, which violates Scope Economy.

Since, in any case, the unavailability of (9) cannot be due to the CSC, we conclude that there is no straightforward argument based on the interpretation of (4) to the effect that the CSC is responsible for blocking certain inverse-scope readings.

3   Fixing the CSC argument: QR across infinitival clauses

We now show with two cases that the confound can be removed and the classical argument fixed. The confound arose because it is plausible that the relevant unattested instance of QR is unavailable regardless of the CSC, making the CSC irrelevant. To remove the confound, we must make sure that a potential instance of QR would be allowed were it not for the CSC.

3.1   Inverse-scope and the CSC in ECM structures

To construct such examples, we will build on the fact that there are clear instances where QR can move an object outside of the smallest VP that hosts it, to the edge of some other VP containing it. Consider for instance (12):

(12) If at least one witness heard every robber come in...

This clearly can have an inverse scope reading, namely: 'if it is the case that for every robber, there is at least one witness (possibly different for each robber) who heard this robber come in, ...'. This reading arises when *at least one witness* reconstructs into its VP (headed by the verb 'heard') and *every robber* QRs to the periphery of this very VP, outscoping the subject. Importantly, then, QR must be able to lift a quantified object outside of the smallest VP containing its surface position.

Now consider (13):

(13) a. If at least one witness heard [[every robber come in] and [a security guard snore]], ...
      b. If at least one witness heard [[a security guard snore] and [every robber come in]], ...

Here, in the absence of the CSC, an inverse-scope reading is predicted to be available, just as it is for (12). This reading would result from an LF in which the matrix subject *at least one witness* has been reconstructed to its VP-internal subject position and the subject of the first conjunct (*every robber*) has moved (covertly) to the edge of the matrix VP. This reading could be paraphrased as 'If, for every robber, there is at least one witness (possibly a different one for each robber) and there is a security guard (possibly a different one for

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each robber) such that this witness heard this robber come in and this guard snore, ... '. But this reading is clearly not available. And in contrast with (4), in this case the unavailability of this reading cannot be readily explained on the basis of minimal assumptions, and thus can be reasonably attributed to the CSC.

3.2 Antecedent Contained Deletion in ECM structures

This argument can be further buttressed by considering cases involving Antecedent Contained Deletion (ACD) in conjoined ECM structures. First consider (14):

(14)   Peter heard Mary sing every song that John did

In (14), there are two ways to interpret the relative clauses, depending on how ellipsis is resolved. It can be interpreted either as 'that John *sang*' or as 'that John *heard Mary sing*'. Following an influential line of investigation, we assume that such cases of Antecedent Contained Deletion force the quantified DP hosting the ellipsis to move out of the VP that serves as an antecedent of the elided VP. This means that the 'short' ACD interpretation ('that John sang') requires that 'every song that John did' covertly move to a position higher than 'sing', and, crucially, that the 'long' ACD interpretation ('that John heard Mary sing') involves QR of 'every song that John did' to a position higher than the matrix VP, i.e. higher than 'heard'. But then consider what the CSC predicts for either (15-a) or (15-b):

(15)   a.   Peter heard [Sue recite a poem] and [Mary sing every song that John did]
        b.   Peter heard [Mary sing every song that John did] and [Sue recite a poem].

The crucial point, here, is that the complement of the matrix verb 'heard' is a conjunction of two infinitival clauses. The conjunction 'and', therefore, is under the scope of 'heard'. Now, as we have just seen, the 'long ACD'-interpretation would require that 'every song that John did' be lifted to a position higher than the matrix verb. But such a movement would clearly violate the CSC, since the moved constituent would have to move out of the conjunctive phrase it belongs to. So the CSC predicts that (15-a) and (15-b) should only license the short-ACD interpretation, in contrast with (14). This prediction seems to be clearly borne out, which provides strong support for the view that QR is subject to the CSC.[7]

Finally, it is worth pointing out that the superficially similar sentence in (16) *does* allow for the long-ACD interpretation:

(16)   [Peter heard Mary sing every song that John did] and [Al _ Sue recite a poem she had written]

This sentence consists of two coordinated clauses, one of which contains no overt verb, a phenomenon known as *gapping*. The important point here is that the quantified object in the first clause, which contains an elided VP, can move to a position higher than 'heard' without crossing the conjunction. Since such a movement is licensed by the CSC and is known to be independently possible (cf. (14)), the long ACD-interpretation is expected to be possible. This prediction is also clearly borne out. To conclude, the fact that (15-a) and (15-b) do not license the long-ACD interpretation, whereas (14) and (16) do, provides decisive evidence that QR is subject to the CSC.

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[7]It should be pointed out that under Fox's (2002) account of Antecedent Contained Deletion, the CSC is not needed to rule out (15-b), but is still needed to exclude (15-a). Building on Fox and Nissenbaum (1999), Fox argues that ACD does not involve covert movement of the relative clause out of the antecedent VP, but rather *overt* late insertion of the relative clause into the DP after *covert* rightward movement of the DP out of the antecedent VP (QR). In this framework, this means that ACD relatives are necessarily extraposed to a position outside the antecedent VP (but sometimes string-vacuously). Now, in the case of (15-b), the relative clause cannot be analyzed as being extraposed to a position higher than conjunction: since extraposition is by hypothesis visible in surface syntax, the relative clause would have to appear to the right of the conjunction for it to take scope over it. It follows that, in the case of (15-b), the long ACD-interpretation would be ruled out even without the CSC. However, this is not the case for (15-a). Since in this case the relative clause occurs at the right edge of the sentence, it could in principle be extraposed to a position higher than the matrix verb. In Fox's proposal, though, extraposition is just late merge, and thus requires that the quantified DP hosting the relative clause covertly move to the extraposition site prior to relative clause insertion. The CSC is needed to rule out this covert movement.

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