# Scope Inversion[1]

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## 1. Introduction

In this paper we will defend two key claims about the relation between structure and interpretation. The first is that LF is not a full representation of scope; rather it only encodes where scope relations diverge from surface scope. The evidence for this claim comes from a new condition on scope shift – the CSS – which is supported by ample empirical evidence, but incompatible with the idea that every quantifier is moved to its scope position at LF. In the second part, we will have reason to revisit this standard assumption and propose that overt and covert scope-shifting operations do not differ in their properties because they take place in different stages of the derivation but because they are different in nature.

The paper is organized as follows. Section 2 introduces a new condition on scope shift, whose consequences are discussed in sections 3 to 5. Section 3 deals with the interpretations of sentences containing three quantifiers. We show that some of the logically possible readings of such sentences are not attested and that the unattested readings are exactly the ones ruled by the condition we propose. Section 4 gives comparable evidence based on the distribution of topics and foci in Dutch. The data in this section show that the effects of our condition on scope shift generalize over scope-marking through overt movement and Quantifier Raising. Section 5 explores further predictions concerning the interaction between quantifier scope and movements of contrastive topics and foci. The second part of the paper, which deals with the nature of covert scope shift, consists of two sections. In section 6 we propose a reinterpretation of Quantifier Raising (and our condition on scope shift) that allows us to capture some contrasts between this process and overt scope marking. Independent evidence for this reinterpretation, based on the scope of focus-sensitive particles, is presented in section 7. The discussion is summarized in section 8.

## 2. A New Condition on Scope Shift

Since the work of Chomsky (1976) and May (1977), the standard view in transformational generative grammar has been that there is a syntactic level of Logical Form (LF) whose representations are transparent in that they are (largely) isomorphic to semantic structures (see McCawley 1970 for related ideas). LF representations are derived through the operation of Quantifier Raising (QR), which moves quantified expressions from their surface position and attaches them to a node of type *t* that constitutes their scope (see Barwise and Cooper 1981 and Heim and Kratzer 1998). The trace left behind by QR functions as the variable required for interpretation of the quantifier. The claim of restrictiveness that empirically supports that theory is linked to the null hypothesis that Quantifier Raising obeys standard restrictions on movement and hence that an interpretation is only available for a surface string containing a quantifier if it can be derived through one or more well-formed applications of move α.[2]

[1] We would like to thank the following people for help and advice: Klaus Abels, Danny Fox, Ray Jackendoff, Nathan Klinedinst, Matthew Reeve, Uli Sauerland, Kriszta Szendrői, Shoichi Takahashi, Rob Truswell, Reiko Vermeulen, and Edwin Williams.

[2] The properties of restrictiveness and transparency do not necessarily go hand in hand. We can illustrate this through a thought experiment that compares two extreme approaches to quantifier scope (neither of which can

In what follows we propose a condition on QR that gives rise to an empirically more restrictive theory of scope, but that is incompatible with a fully transparent view of LF. This condition is compatible with the standard assumption that c-command relations between quantifiers at LF represent their relative scope, but presupposes that quantifiers do not need to undergo QR to be interpreted. Thus, there is no LF requirement that quantifiers be attached to a constituent of type *t* or that they bind a constituent corresponding to a variable. This is essentially the view of quantifier scope in Reinhart 1983, 1995 and 2006. According to Reinhart, QR only applies in a very limited set of circumstances that include scope reversal between quantifiers; it does not uniformly assign scope to every quantifier.[3]

We summarize the main tenets of our proposal in (1).[4] The assumptions in (1a) and (1b) are taken from Reinhart (2006) (see also see Lakoff 1972, Huang 1982, Reinhart 1983, and Hoji 1985; comparable ideas can be found in Williams 2003). The rule in (1b) is a mapping principle that regulates the association of syntactic structures at LF with their semantic representations. The rule in (1c) is the condition on QR that constitutes the central claim to be defended in this paper. We will refer to it as the Condition on Scope Shift (CSS). It states that QR is subject to a very strict version of Relativized Minimality: no application of QR can cross the landing site of another application of QR.[5]

(1) a. Quantifiers can be interpreted in situ.
b. By default, if α c-commands β at LF, α takes scope over β.
c. The landing site of a scope-extending movement creates a barrier for other scope-extending movements.

One of the effects of the CSS is that the configurations in (2) are ill-formed.

(2) a. *[$QP_1$ [$QP_2$ [… $t_1$ … $t_2$ … ]]]
b. *[$QP_2$ [$QP_1$ [… $t_1$ … $t_2$ … ]]]

The CSS does not abolish QR but restricts its application to cases in which intervening quantifiers remain in situ:

(3) [$QP_2$ [… $QP_1$ … $t_2$ … ]]

It is important to note that the CSS is incompatible with a theory according to which every quantifier must undergo quantifier raising. On such a theory the surface-scope reading of an example like *John gave a book to every student* requires QR to cross the landing site of another application of QR, as does the inverse scope reading (vP is assumed to be of type *t*):

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be correct). The first of these does not impose any restrictions on QR. The second does not allow QR at all. Both proposals assume that a quantifier can only take scope over material in its c-command domain. The first proposal guarantees that there will be a perfect mapping between syntactic and semantic structures. However, it does not make any predictions regarding possible scopes of quantifiers. The second proposal imposes very strong restrictions on quantifier scope, but abandons any idea of transparency, as quantifiers in the syntactic representation neither attach to nodes that are of the right semantic type nor bind variables.

[3] In other words, QR is not licensed if a sentence contains only one scope-taking element or if scopal relations between quantifiers correspond to surface c-command.

[4] Of course, this list of assumptions is incomplete. It omits conditions on quantifier lowering, economy conditions on scope shift (Fox 2000), the condition that QR is (often) clause-bounded, and so on. These are not relevant to the arguments presented in this paper.

[5] There is a superficial similarity between the pattern captured by the CSS and the intervention effect discussed in Beck 1996, 2006. However, Beck's data yield to a semantic explanation, which we believe is unlikely for CSS effects. Moreover, the CSS deals with the interaction between two scope shifts, whereas Beck's work is concerned with a single scope shift across a c-commanding quantifier.

(4) a. $[_{TP}$ John $[_{vP}$ [a book]$_1$ $[_{vP}$ [every student]$_2$ $[_{vP}$ gave $t_1$ to $t_2$ ]]]]
b. $[_{TP}$ John $[_{vP}$ [every student]$_2$ $[_{vP}$ [a book]$_1$ $[_{vP}$ gave $t_1$ to $t_2$ ]]]]

The assumptions in (1) imply instead that the surface scope reading does not involve QR, while the inverse scope reading requires just a single covert movement:

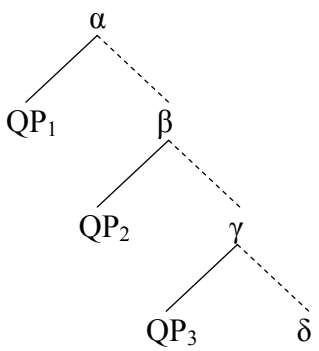
(5) a. $[_{TP}$ John $[_{vP}$ gave a book to every student ]]
b. $[_{TP}$ John $[_{vP}$ [every student]$_1$ $[_{vP}$ gave a book to $t_1$ ]]]]

In sum, quantifiers are mapped onto their scope positions through a procedure that respects their surface c-command relations, as assumed by a range of authors. Diversion from surface scope is limited by the condition that QR may not cross the landing site of another application of QR.

## 3. Quantifier Scope

As mentioned above, our proposal does not restrict scope inversion in structures with two quantifiers (although there might be economy effects along the lines of Fox 2000). However, the consequences of the CSS *are* felt in sentences containing three quantifiers. Consider the structure in (6).

(6)




The surface scope of the quantifiers in this structure is $QP_1 > QP_2 > QP_3$. Suppose that there is a general process of Quantifier Raising by which a quantifier can attach to any node that dominates it. If $QP_3$ raises to β or α, respectively, the readings in (7b) and (7c) are derived. If $QP_2$ raises to α, the resulting interpretation is that in (7d). In the absence of further restrictions, we would expect two further readings, in which both $QP_2$ and $QP_3$ take scope over $QP_1$. However, (7e) and (7f) are ruled out by the CSS, because they can only be derived if QR crosses the landing site of another application of QR.

(7) a. $QP_1 > QP_2 > QP_3$
b. $QP_1 > QP_3 > QP_2$
c. $QP_3 > QP_1 > QP_2$
d. $QP_2 > QP_1 > QP_3$
e. $*QP_2 > QP_3 > QP_1$
f. $*QP_3 > QP_2 > QP_1$

The offensive representations are given in (8).

(8) a. $*[QP_2\ [QP_3\ [QP_1\ t_2\ t_3\ ]]]$
b. $*[QP_3\ [QP_2\ [QP_1\ t_2\ t_3\ ]]]$

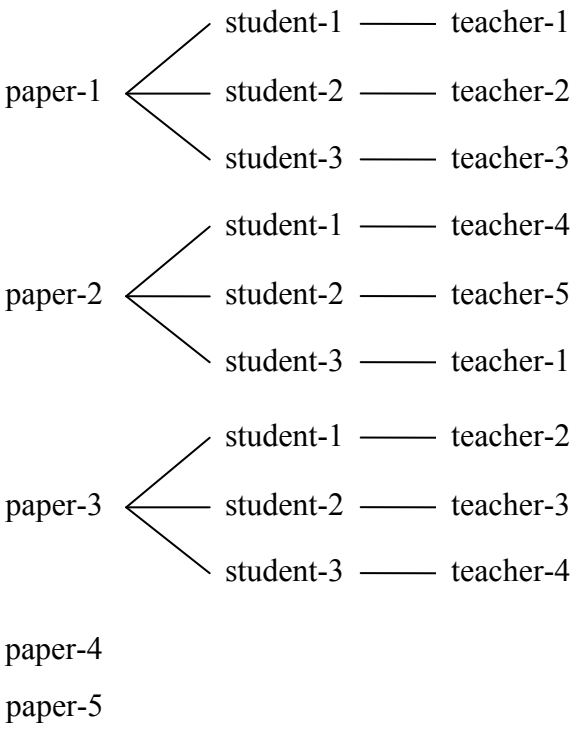
These predictions are confirmed in several constructions containing three quantifiers. Consider first the dative construction in (9). On its surface scope interpretation, given in (9a), the example fits a situation in which there is one teacher who makes a particular selection that contains most papers on the syllabus and gives this selection to every student. The reading in (9b) differs from the surface scope interpretation in that the teacher in question may make different selections consisting of most papers on the syllabus and give every student one such selection. The reading in (9c) is like the surface scope reading in that there is a single selection of papers that gets given to every student, but each paper in that selection is handed out to every student by a (potentially) different teacher. The final available reading is given in (9d). It fits a situation in which for every student there is some teacher who gave that student a selection consisting of most papers on the syllabus. As in (9b), the set of papers can vary per student.

(9) Some teacher gave most papers on the syllabus to every student.
- a. some > most > every
- b. some > every > most
- c. most > some > every
- d. every > some > most
- e. *most > every > some
- f. *every > most > some

While the readings in (9a) through (9d) may differ in accessibility, we believe that they are genuine interpretations of the example. By contrast, the readings in (9e) and (9f) seem to be unavailable. To see this, let us construct situations under which these readings would be true. Let us assume that there are five papers, three students and five teachers.

Consider first a situation compatible with the scope relations in (9e). One such situation involves a single selection of three papers, such that each paper in that selection is given to every student. Furthermore, each giving event may be initiated by a different teacher. As a result, we end up with a state of affairs in which teachers may vary per student and per paper:

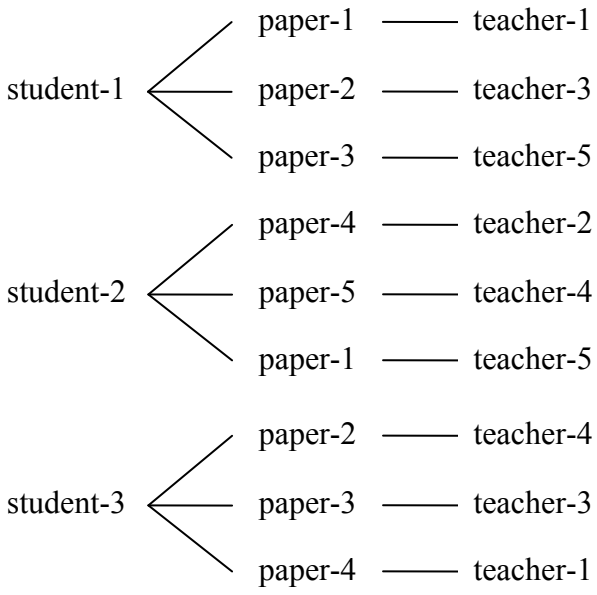
(10)




This situation is not captured by any of the scope relations in (9a) through (9d). In (9a) through (9c), the choice of *teacher* cannot vary with the choice of *student*, while this *is* the case in (10). In (9d), the choice of teacher cannot vary with the choice of paper, but again this *is* what we find in (10). Given that the sentence in (9) cannot be used to describe the situation in (10), we must conclude that the reading in (9e) is unavailable. This is of course exactly what follows from the CSS, as (9e) can only be derived through overlapping applications of QR.

We now turn to a situation compatible with the scope relations in (9f). In this case, every student receives a different selection of papers. Each paper in each selection is given to that student by a potentially different teacher. As before, we end up with a state of affairs in which teachers may vary per student and per paper. In addition, papers may vary per student:

(11)



Again, this situation is incompatible with the scope relations in (9a) through (9d). As already explained above, in (9a) through (9c) the choice of *teacher* cannot vary with the choice of *student*, whereas in (9d) the choice of teacher cannot vary with the choice of paper. Given that the sentence in (9) cannot be used to describe the situation in (11), we must conclude that the reading in (9f) cannot be generated, as expected if the CSS holds.[6]

We must acknowledge that scope inversion in general is marked. One might therefore speculate that the unavailability of the readings in (9e) and (9f) is due the fact that they rely on two applications of a marked operation (two quantifiers must be raised across the subject). However, this cannot be true. There are examples in which two scope reversals are possible without giving rise to the interpretive difficulties associated with multiple applications of QR in (9). Interestingly, such multiple scope reversals are attested exactly where a derivation is available that respects the CSS.

A trivial example involving multiple scope shift can be constructed using sentential embedding. The example in (12) permits a reading in which the universal quantifiers each take scope over their local subject. The two applications of QR required for this reading do not give rise to the alleged difficulties associated with computing the readings in (9e) and (9f).

(12) A nurse promised every patient that a doctor would administer every injection.

A more interesting case is provided by the total scope reversal found in certain cases of inverse linking. Inverse linking is the term used to describe the scope reversal in examples like (13), where the indefinite depends on the universal.

(13) One apple in every basket was rotten.

In early work, May argued that inverse linking is achieved through movement of the universal out of the containing indefinite DP to a landing site at the edge of the clause. In later work, however, he and others rejected this approach in favour of an analysis in which the universal adjoins to the DP that contains it, essentially to account for the absence of the reading in (14c), as discussed below (see May 1985, Rooth 1985, Larsson 1985 and Barker 2001, among many others). On this latter view, the availability of total scope reversal in examples like (14) is predicted by our theory.[7]

(14) Two politicians spy on someone from every city.
  a. 2 > every > someone
  b. every > someone > 2
  c. *every > 2 > someone

This is because the reading in (14b) can be generated without overlapping applications of QR, something which was unavoidable in generating the readings in (9e) and (9f). Thus, it is

[6] Some informants describe their experience with the readings in (9e,f) as follows. They can understand the situation or they can parse the sentence, but they are unable to connect the two.

[7] Larson's argument runs as follows. If it were possible for a universal quantifier to raise out of the indefinite DP that contains it, the reading in (14c) could easily be generated. Its absence suggests that DP is a scope island and hence that total scope reversal in (14) must rely on a roll-up derivation. In recent work, Sauerland (2005) has cast doubt on Larson's generalization concerning the absence of readings like (14c), arguing that intensional verbs and certain other elements can take scope between the universal and the indefinite DP in which the universal originates. However, Sauerland's conclusions have been challenged, successfully in our view, by Charlow (2009). Our assessment of the existing literature, then, is that there is a strong case for the roll-up derivation required by the CSS.

not the case that the universal and the indefinite move separately to scope positions above the subject. Rather, the universal adjoins to the indefinite, after which the indefinite (including the universal) undergoes QR to a position above the subject. In the roll-up derivation in (15) the CSS is not violated.

(15) $[_{IP}\ [_{DP}$ [Every city$_2$] $[_{DP}$ someone from $t_2$]]$_1$ $[_{IP}$ two politicians spy on $t_1$]]

Strictly speaking the scope rule in (1b), repeated here as (16a), only assigns a partial scopal interpretation to (15). The DP *every city* c-commands the DP [*someone from t*] and therefore takes scope over it. Similarly, the DP [*someone from t*], to which the universal is adjoined, c-commands, and therefore takes scope over, *two politicians*. However, no scope relation is determined between *every city* and *two politicians*. We can fix this by subjecting the mapping between LF and semantics to the transitivity condition in (16b). (It is perhaps worthwhile noting that transitivity conditions are a familiar property of other mapping systems, for example the mapping from syntactic structures to strings.)

(16) a. By default, if α c-commands β at LF, α takes scope over β.
b. If α takes scope over β and β takes scope over γ, then α takes scope over γ.

The transitivity condition has the consequences that the two scope shifts encoded in (15) give rise to an interpretation in which the universal takes scope over *two politicians*.

The mapping principles in (16) provide a natural solution to a long-standing problem in inverse-linking structures, namely the availability of variable binding in the (apparent) absence of c-command both at Spell-Out (see (17a)) and at LF (following QR of the universal; see (17b)).

(17) a. [Someone from [every city]$_1$] despises it$_1$.
b. [[Every city]$_1$ [someone from $t_1$] despises it$_1$.

If we restrict the mapping system to (16a), the pronoun could not be bound, not even after QR of the universal. However, it follows from the transitivity condition in (16b) that the pronoun is in the scope of the universal as long as the universal undergoes QR. This is so because the universal takes scope over the indefinite and the indefinite takes scope over the pronoun. Notice that it follows from this account that the bound variable reading will only be available if the universal undergoes QR. If it does not, the universal will be in the scope of the indefinite, with the consequence that the condition in (16b) does not apply. It has indeed been observed by Larson that inverse linking is a prerequisite for variable binding in examples like (17). We can illustrate this using the data in (18). Whereas (18a) is ambiguous, the variable binding in (18b) has the consequence that the narrow scope of the universal with respect to the indefinite is no longer available.

(18) a. [At least one reader of [every novel in the library]] also likes classical music.
(i) at least one > every; (ii) every > at least one
b. [At least one reader of [every novel in the library]$_1$] hates it$_1$.
(i) *at least one > every; (ii) every > at least one

For completeness sake, we give the data in (19), which show that total scope reversal is available not just with the quantifiers in (14), but also with those used in the earlier example in (9):

(19) Some politician spies on most inhabitants from every city.
   a. some > every > most
   b. every > most > some
   c. *every > some > most

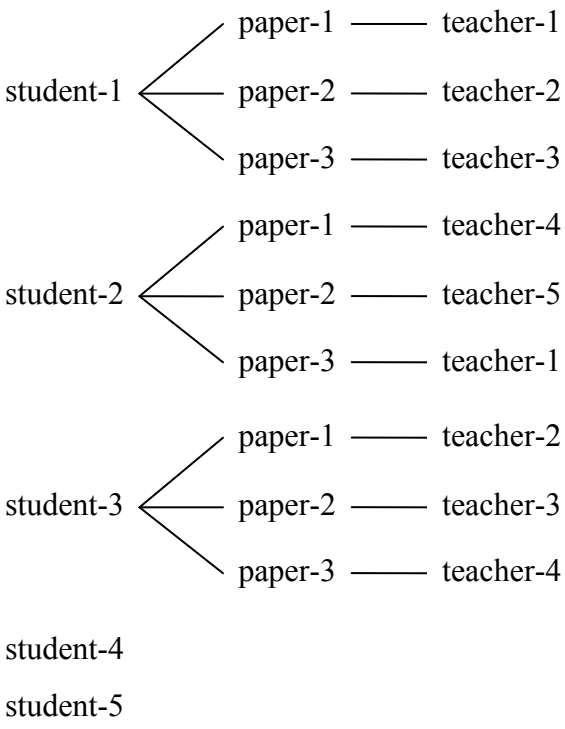
The above implies that the contrast between the ease of total scope reversal in examples like (14) and (19) and its impossibility in (9) requires a structural account. Such an account is provided here: whereas the scope reversal in (14) and (19) can be generated without violating the CSS, the scope reversal in (9) is the result of applications of QR with overlapping paths.

Further corroboration of the hypothesis that QR is subject to the CSS comes from a scope restriction exhibited by the double-object construction. We are not referring to the well-known observation that the scopes of the direct and indirect objects are frozen with respect to each other (see Bruening 2001 and others; we cannot discuss this phenomenon in this paper, but see footnotes 8 and 9 for some comments). Instead, we focus on the scope of the objects relative to the subject. The prediction made by the CSS is identical to what we have seen with the dative construction: each object may take scope over the subject, but they may not do so simultaneously. If one object undergoes QR across the subject, this creates an island for QR of the second object. We must of course take into account the scope-freezing effect mentioned above, which is responsible for (20) lacking any reading in which *every paper on the syllabus* takes scope over *most students*. This leaves us with the surface scope reading in (20a) and the scope-shifted readings in (20c) and (20e).

(20) Some teacher gave most students every paper on the syllabus.
   a. some > most > every
   b. *some > every > most (scope-freezing effect)
   c. most > some > every
   d. *every > some > most (scope-freezing effect)
   e. *most > every > some
   f. *every > most > some (scope-freezing effect)

The first two of these are indeed easily accessible. The scope relations in (20c) fit a situation in which for most students there is some teacher who gave them every paper on the syllabus. This reading should be distinguished from the unavailable reading in (20e), in which the choice of teacher does not only depend on the choice of student but also on the choice of paper. Assuming there are five students, three papers and five teachers, one situation described by (20e) can be depicted as below:

(21)




The example in (20) cannot be used to describe this state of affairs, however, indicating that the reading in (20e) is not available. This cannot be due to some restriction on QR of the universal across the subject, given that such movement is necessary to explain the ambiguity of (22).

(22) Some teacher gave Mary every paper on the syllabus.
(i) some > every; (ii) every > some

In other words, both the direct and the indirect object may take scope over the subject, but it is not possible for *both* of these arguments to have the subject in their scope. This is of course exactly what the CSS predicts.

The unavailability of the reading in (20e) has been observed before by Shoichi Takahashi, who gives it a single question mark in his 2003 NELS paper but indicates in personal communication that it is worse than that and deserves at least two question marks. His suggestion is that it may be difficult for a quantifier to take narrow scope relative to two quantifiers it c-commands in the surface representation, something that would follow directly from the CSS.[8,9,10]

[8] Bruening (2001) does not give examples in which a quantified subject takes scope below two quantified objects, even though his analysis predicts the existence of such a reading. Sauerland (2000) and Lechner (2009) suggest that such a reading exists for the example in (i).

(i) Two boys gave every girl a flower.

However, one of the readings independently available for this example has the scopal relations ∀ > 2 > ∃. This reading subsumes the one in which the subject would scope below the two objects, namely for the special case that the same flower is selected for each boy in the pair of boys associated with a girl. For this reason, we have used examples in which the subject can in principle be interpreted as dependent on the direct object. If we adjust the example in (i) accordingly, as in (ii), the low reading of the subject (∀ > most > 2) turns out to be unavailable, although there is an intermediate reading (∀ > 2 > most).

## 4. Domains of Contrast

### *4.1. Introduction*

In the previous section, we have explored the consequences of the CSS for sentences containing three quantifiers. However, this constraint also makes predictions for sentences containing just two scope-bearing elements: both of the configurations in (2), repeated here for convenience, are ruled out.

(2) a. *[$QP_1$ [$QP_2$ [… $t_1$ … $t_2$ … ]]]
b. *[$QP_2$ [$QP_1$ [… $t_1$ … $t_2$ … ]]]

These predictions cannot be tested with quantifiers in English. This is because QR is a covert movement and therefore its application can only be detected through the readings it generates (see section 6 for discussion of languages with 'overt QR'). However, given the assumptions of section 1, the scopal relations between the quantifiers in (2a) and (2b) can be derived without multiple applications of QR. In fact, the reading associated with (2a) does not require any raising at all, since it corresponds to surface scope (see (23a)), while the reading

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(ii) Two boys gave every girl most flowers.

The low reading can be paraphrased as follows: for every girl it is true of most of the flowers she received that they were given to her by a potentially different pair of boys. The intermediate reading is subtly different as the pair of boys cannot vary by flower.

[9] One observation often construed as an argument for the hypothesis that all quantifiers undergo movement at LF is the scope-freezing effect found in double object constructions (see Bruening 2001 and Lechner 2009). The basic idea in Bruening's work is that quantifier raising maintains the order of arguments and hence does not lead to scope shift. Instead, variation in the scope of objects with respect to the subject results from reconstruction of the subject below the LF positions of the objects. By assumption, the semantic type of quantifiers is incompatible with in situ interpretation of quantified objects, so that reconstruction is ruled out.

We are not persuaded by this line of argumentation because scope-freezing effects are not only found in double object constructions but also with certain monotransitive predicates. For example, a wide-scope reading of the universal quantifier seems unavailable in (i)-(iii) (comparable examples can be found in Gruber 1965).

(i) A box contained every present.
(ii) An Australian wine received every prize.
(iii) At least one student possessed every book.

We do not think that the type of analysis proposed by Bruening and Lechner can be extended to the scope-freezing effect observed in these examples. There is no reason why reconstruction of the subject should be blocked in these examples.

We speculate that what may be at stake is an interaction between argument structure and quantifier raising, more or less along the lines of Williams (2006). Suppose that the unmarked realization of a θ-grid containing a theme and what one might call an anchor (goal, beneficiary, location, etc.) is such that the theme is projected higher than the anchor. It is possible to produce marked structures in which this order is reversed. The generalization over such marked orders, which include the examples in (i)-(iii) and the double object construction, is that they resist scope shift. Working out this proposal is beyond the scope of the present article.

[10] The CSS implies that the interpretation of WH-expressions that remain in situ in English is not achieved through QR but rather through a mechanism akin to unselective binding, as argued by Reinhart (1998). This process requires the presence of a QP that takes scope over the clause and on which lower WH-phrases can be parasitic. As Reinhart notes, this analysis straightforwardly why in English WH-in-situ is not subject to conditions on QR. Following Ackema and Neeleman (1998), we suggest that, in languages in which all WH-expressions remain in situ, one WH-expression undergoes QR, thereby providing a scope position from which other WH-expressions can be unselectively bound. This explains Watanabe's (1992) observation that subjacency effects are systematically observed in single questions, whereas, in multiple questions, WH-expressions can surface in XPs that are islands for QR, as long as there is at least one WH-expression external to the island.

associated with (2b) requires only a single movement, namely of $QP_2$ across $QP_1$ (see (23b)). Thus, whether the structures in (2) exist is untestable using quantifiers.

(23) a. […$QP_1$ … $QP_2$ … ]
b. [$QP_2$ […$QP_1$ … $t_2$ … ]]

The predictions of the CSS for structures with two scope-bearing elements do become testable, however, if the scope of one of these elements is marked overtly. Suppose that (23b) is a surface representation. Then the CSS will block QR of $QP_1$ across $QP_2$, thus ruling out an interpretation in which $QP_1$ takes scope over $QP_2$. As we will now show, sentences containing two contrastive constituents provide a fertile testing ground for the CSS, exactly because such constituents may undergo overt scope-marking movement.

*4.2. Preliminaries*

The information-structural notions that will be relevant to the discussion in this section are 'focus', 'topic' and 'contrast'. We take a focus to be the information that triggers an update of the common ground (see Büring 1997 for discussion). Thus, in the answer to a WH-question, the constituent that corresponds to the WH-expression is a focus (throughout we use small capitals to mark foci):

(24) a. What did Rutger buy?
b. Rutger bought A GUN.

Following Reinhart (1981) we define a topic as the entity that the utterance is about. This implies that topic is essentially a discourse notion. It is important to distinguish this general notion of discourse topic from the narrower notion of sentence topic, by which we mean a linguistic constituent that introduces or changes the topic of discourse. The distinction is important because utterances may contain expressions that refer back to the current topic of discourse but do not qualify as sentence topics (see Lambrecht 1994 for extensive discussion)[11]. We can illustrate the distinction using the following discourse (we use double underlining to mark sentence topics):

(25) a. Maxine was introduced to the president on her birthday.
b. She was wearing a special dress for the occasion.

In (25a), *Maxine* is a sentence topic: it introduces a new topic of discourse. The initial comment made about Maxine is that she was introduced to the president on her birthday. The pronoun *her* in this comment is not a sentence topic, but a category that refers back to the topic of discourse. We take the same to be true of the continuation of the discourse in (25b), which is what one might call an 'all-comment' sentence, linked to the discourse topic *Maxine* through the pronoun *she* (see Vallduví 1992, Lambrecht 1994, and Vallduví and Engdahl 1996 for discussion). In what follows, we will use the term 'topic' to refer to sentence topics only; otherwise we will use 'discourse topic' or 'topic of discourse'.

The final notion we rely on is that of contrast. Constituents that are contrastive are understood to belong to a contextually given set out of which they are selected to the exclusion of at least some other members of the set. Both topics and foci can be interpreted contrastively. In English, contrastive topics and foci are each marked by special intonation. Contrastive foci typically carry what Jackendoff 1972 calls an A-accent: a plain high tone

[11] Our notion of (sentence) topic corresponds to what Lambrecht calls 'reference-oriented topic expressions', while our notion of indexing elements corresponds to his 'role-oriented topic expressions'.

(H*), often followed by a default low tone (see Büring 2003a and references mentioned there). Contrastive topics carry a B-accent, maximally realized as L+H* followed by a default low tone and a high boundary tone (L H%).

On the appropriate intonational contours, (26a) conveys that Rutger bought a gun and not certain other relevant items, while (26b) highlights that the speaker knows that Maxine was introduced to the president on her birthday, but could not make the same statement about other relevant individuals. This could be because the speaker lacks knowledge about these other individuals or because he or she knows that a similar statement about them would not be true. (Throughout we use italics to mark contrast.)

(26) a. Rutger bought *A GUN*.
b. *Maxine* was introduced to the president on her birthday.

With these notions in place, we turn to the type of movement central to our argument.

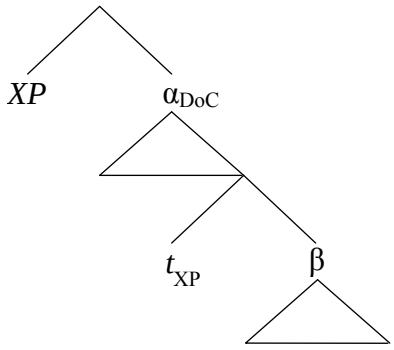
*4.3. Scope marking for contrast and the CSS*

In Dutch (and several other languages), constituents with a contrastive interpretation can be fronted to a variety of positions by an optional operation known as Ā-scrambling. This movement may land in a position between the complementizer and the subject, in a position between the subject and the indirect object, or in the first position in main clauses. We only illustrate the first option (for a fuller discussion of the data and some qualifications, see Neeleman and Van de Koot 2008):

(27) a. Ik geloof dat [$_{DP}$ alleen *DIT* boek] Jan Marie $t_{DP}$ gegeven heeft.
*I believe that only this book John Mary given has*
'I believe that John has given Mary only this book.'
b. Ik geloof dat [$_{DP}$ *zo'n boek*] alleen *JAN* Marie $t_{DP}$ gegeven heeft.
*I believe that such-a book only John Mary given has*
'I believe that only John has given Mary such a book'

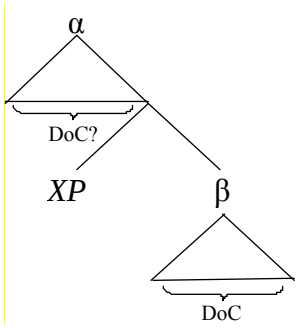
We propose that movement of a contrastive topic or focus marks which material in the sentence is used to construct the set of alternatives over which the contrast operates. We call this material in the scope of the contrastive category the domain of contrast (DoC). In other words, movements of contrastive constituents do not mark the discourse functions of these elements themselves. Instead, they constrain the mapping between syntax and information structure by making it partly deterministic (see Wagner 2006 for related ideas). Thus, if a contrastive constituent undergoes Ā-scrambling, the sister of the landing site is interpreted as its domain of contrast (see (28)).

(28)



If a contrastive topic or focus remains in situ, however, the domain of contrast is not marked and must be construed by the hearer on the basis of contextual clues. We assume that this is achieved through an application of QR that parallels the overt movement in (28). Since there are several potential landing site for overt movement of a contrastive category, the structures without Ā-scrambling display an ambiguity that is absent in structures with Ā-scrambling. The minimal domain of contrast associated with XP in (29) is β. However, whether the domain of contrast is extended to include the material dominated by α depends on whether XP undergoes QR. By contrast, the structure in (28) is unambiguous: α constitutes the domain of contrast for XP.

(29)




Thus, the contrastive topic in (30a) can be associated with a variety of domains of contrast, including the ones marked by Ā-scrambling in (30b) and (30c). The examples in (30b) and (30c) differ in that only in the latter the embedded subject is included in the domain of contrast.

(30) a. Ik geloof dat Jan alleen *MARIE* *zo'n boek* gegeven heeft.
*I believe that only John Mary such-a book given has*
'I believe that only John has given Mary such a book'

b. Ik geloof dat Jan [$_{DP}$ *zo'n boek*] [$_{DoC}$ alleen *MARIE* $t_{DP}$ gegeven heeft].
*I believe that John such-a book only Mary given has*
'I believe that only John has given Mary such a book'

c. Ik geloof dat [$_{DP}$ *zo'n boek*] [$_{DoC}$ Jan alleen *MARIE* $t_{DP}$ gegeven heeft].
*I believe that such-a book only John Mary given has*
'I believe that only John has given Mary such a book'

Before we can explore the central prediction that emerges from this view of Ā-scrambling, we need to make a brief excursion into a generally accepted well-formedness constraint on information structure. The constraint in question states that a topic must be located higher in information structure than a focus (see (31)).

(31) a. *topic* [ ... *FOCUS* ... ]
b. **FOCUS* [ ... *topic* ... ]

The contrast between (31a) and (31b) can be explained if topic is an utterance-level notion, as suggested in section 4.2, while focus is a notion that holds at the level of propositions. By their very nature, utterances are larger than propositions and consequently topics must be located externally to foci (for an explicit proposal along these lines, see Tomioka 2007b; for related discussion, see Prince 1981, Reinhart 1981, 1995, 2006, Vallduví 1992, Lambrecht 1994 and Hajičová et al. 1998).

We should emphasize that (31a,b) are information structures, not syntactic configurations. For example, it is possible to place an in situ contrastive topic in the c-command domain of an in situ contrastive focus (as schematized in (32a)). However, in such a configuration it is necessary for the topic to undergo QR to a position c-commanding the focus (as schematized in (32b)); only then can the resulting LF be associated with a well-formed information structure:

(32) a. $[XP_{FOC}$ [ … $YP_{\underline{top}}$ … ]]
b. $[YP_{\underline{top}}$ $[XP_{FOC}$ [… $t_{YP}$ … ]]]

However, it should not be possible to place an in situ contrastive topic in the c-command domain of a *moved* contrastive focus (as in (33a)). The reason for this is that the topic must undergo QR across the landing site of the focus (as in (33b)), in order to meet the condition that topics occupy a higher position in information structure than foci. But this application of QR violates the CSS.

(33) a. $[XP_{FOC}$ [… $YP_{\underline{top}}$ … $t_{XP}$ … ]]
b. *$[YP_{\underline{top}}$ $[XP_{FOC}$ [… $t_{YP}$ … $t_{XP}$ … ]]]

It is easy to see that topic movement will not give rise to similar problems. The c-command domain of a moved topic may contain a focus. Such a configuration implies that the focus must be construed as belonging to the domain of contrast for the topic (as it could not undergo QR across the topic). But this is unproblematic, as foci are lower in information structure than topics to begin with (see (31a)).

In sum, the predictions made by the CSS for the interaction between Ā-scrambling and covert scope shift of contrastive elements are as follows: (i) an in situ contrastive topic can follow an in situ contrastive focus, but not a contrastive focus that has undergone Ā-scrambling; (ii) an in situ contrastive focus can follow a contrastive topic, whether the latter is itself in situ or has undergone Ā-scrambling.

### *4.4. The data: topic-focus interaction*

In order to test these predictions, we must sharpen our criteria for classifying a constituent as topic or focus. As pointed out earlier, contrastive foci are associated with an A-accent and contrastive topics with a B-accent. In addition, there are contextual criteria. It is well known that in the answer to a WH-question, the constituent that corresponds to the WH-operator is (usually) a focus. If it is interpreted contrastively, it qualifies as a contrastive focus. By this criterion, *de bonen* 'the beans' in (34a,b) should be classified as such.

A contrastive topic is a constituent used to shift the topic of discourse. One circumstance in which such a shift takes place is when a participant in a conversation answers a question about an entity different from the entity the question asked was about. Therefore, *Wim* in (34a,b) should be classified as a contrastive topic (the original question being about *Fred*).[12]

[12] The judgments given here and below are based on a pronunciation of the examples in which the constituent marked as focus carries a plain high tone, and the constituent marked as topic carries a tune consisting of a high tone, a low tone and a high boundary tone (this intonation of Dutch topics is in line with the observations reported in Van Hoof 2003). As far as we can judge these matters, this pronunciation is very similar to what is found in English.

What the data in (34) show, then, is that an in situ focus may follow a topic, but cannot move across it.[13]

(34) Hoe zit het met *FRED?* Wat heeft *HIJ* gegeten?
'What about Fred? What did he eat?'
Nou, dat weet ik niet, maar ik geloof
'Well, I don't know, but I believe'
a. dat *Wim* van de *BONEN* meer gegeten heeft dan vorig jaar.
*that Bill from the beans more eaten has than last year*
'that Bill has eaten more from the beans than last year.'
b. #dat [ van de *BONEN*]$_1$ *Wim* $t_1$ meer gegeten heeft dan vorig jaar.
*that from the beans Bill more eaten has than last year*

There is a further test that can be used to corroborate the classification of topics and foci in (34). Negative quantifiers and expressions like *only X* cannot easily function as topics. This is corroborated by the fact that they cannot appear in the English *as for* construction, which is reserved for topics:[14]

(35) a. #As for no boy, I like him.
b. #As for only John, I like him.

Therefore, if in the relevant context a constituent can be replaced by a negative quantifier or *only X*, it cannot be a topic. As pointed out to us by Michael Wagner, the scope of the *only X* replacement test is somewhat limited, because *X* in *only X* can be a topic. In what follows we will therefore restrict ourselves to the negative quantifier test.

When *Wim* in (34a) is replaced by *niemand* 'nobody', the result is decidedly odd, as shown in (36a).[15] (One is left to wonder which person is referred to as 'nobody'.) However, the variant of (34a) in (36b), in which *de bonen* 'the beans' has been replaced by *nergens* 'nothing', is perfectly natural.

(36) a. #dat *niemand* van de *BONEN* meer gegeten heeft dan vorig jaar.
*that nobody from the beans more eaten has than last year*
'that nobody has eaten more from the beans than last year.'
b. dat *Wim* *NERGENS* van meer gegeten heeft dan vorig jaar.
*that Bill nothing of more eaten has than last year*
'that Bill has not eaten more from anything than last year.'

The data in (37) show that, by contrast, an in situ topic may follow an in situ focus or move across it. This observation is corroborated by the fact that in neither (37a) nor (37b) 'the

[13] As was pointed out to us by Michael Wagner, the context in (34) and comparable ones below do not force the interpretations indicated, but merely favour them. We abstract away from the complications this poses.

[14] There is one exception. In discussions about quantities, negative quantifiers can be used as topics identifying a quantity of zero. Notice, however, that in this case the referring expression in the comment cannot be a simple pronoun, but must express a quantity. Similar observations can be made for expressions modified by *only*.

(i) As for no books (at all), only John has read [that little]/*[them].
(ii) As for only magazines, even John has read [more widely than that]/*[them].

[15] The answer in (36a) is felicitous if the B-accent on the subject is omitted. Doing so allows the example to be construed as providing indirect information about Fred, namely that he did not eat more from the beans than he did last year.

beans' can be replaced by a negative quantifier (see (38)), whereas replacing 'Bill' by 'nobody' is unproblematic in both of these examples (see (39)). The results of this test are consistent with a classification of 'the beans' as topic and of 'Bill' as focus.

(37) Hoe zit het met de *SOEP*? Wie heeft *DIE* gegeten?
'What about the soup? Who ate that?'
Nou, dat weet ik niet, maar ik geloof ...
'Well, I don't know, but I believe ...'
a. dat *WIM* van *de bonen* meer gegeten heeft dan vorig jaar.
*that Bill from the beans more eaten has than last year*
b. dat [$_{PP}$ van *de bonen*] *WIM* $t_{PP}$ meer gegeten heeft dan vorig jaar.
*that from the beans Bill more eaten has than last year*
'that Bill has eaten more from the beans than last year.'

(38) a. #dat *WIM* *nergens* van meer gegeten heeft dan vorig jaar.
*that Bill nothing of more eaten has than last year*
b. #dat [$_{PP}$ *nergens* van] *WIM* $t_{PP}$ meer gegeten heeft dan vorig jaar.
*that nothing of Bill more eaten has than last year*
'that Bill has not eaten more from anything than last year.'

(39) a. dat *NIEMAND* van *de bonen* meer gegeten heeft dan vorig jaar.
*that nobody from the beans more eaten has than last year*
b. dat [$_{PP}$ van *de bonen*] *NIEMAND* $t_{PP}$ meer gegeten heeft dan vorig jaar.
*that from the beans nobody more eaten has than last year*
'that nobody has eaten more from the beans than last year.'

In sum, it seems that contrastive foci cannot move across contrastive topics, while contrastive topics *can* move across contrastive foci, as predicted by the CSS in conjunction with the information-structural constraint that topics must occupy a higher position than foci. Thus, the CSS is not only supported by data involving three quantifiers, but also by the interaction between overt and covert movement of contrastive categories.

## 5. Interactions between QR and DoC-marking

In the previous two sections we have considered LF operations that mark the scope of quantifiers, and overt and covert movements that mark the scope of a contrastive category. One would expect a certain degree of interaction between these types of marking in two circumstances, namely when a sentence contains both a contrastive element and a quantifier or when a quantifier receives a contrastive interpretation. These interactions are governed by two conditions, the CSS and the Q-Scope Inclusion Corollary. We will introduce the latter shortly.

Consider first sentences containing both a quantifier and a contrastive phrase. It is possible that the CSS is relativized with respect to types of scope marking, so that marking of a domain of contrast would not interfere with marking of quantificational scope. There is some evidence, however, for the simpler view that no such relativization is necessary: the landing site of $\bar{A}$-scrambling creates a barrier for QR, as illustrated in (40) below.

(40) Het was een gekkenhuis in de foyer. Ik geloof…

'It was a madhouse in the foyer. I believe…'

a. dat iemand iedere ober om *CHAMPAGNE* gevraagd heeft.
   *that someone every waiter for champagne asked has*
   (i) some > every; (ii) every > some

b. dat iemand [$_{PP}$ om *CHAMPAGNE*] iedere ober $t_{PP}$ gevraagd heeft.
   *that someone for champagne every waiter asked has*
   (i) some > every; (ii) *every > some

c. dat [$_{PP}$ om *CHAMPAGNE*] iemand iedere ober $t_{PP}$ gevraagd heeft.
   *that for champagne someone every waiter asked has*
   (i) some > every; (ii) every > some

The sentence in (40a) is our baseline example, showing that the universal object can undergo QR across the indefinite subject. In (40b), the scope ambiguity is lost, presumably as a consequence of the Ā-scrambling operation that places the PP-complement between the subject and the object. As a consequence of the CSS (on its simple, unrelativized, reading), the universal cannot raise across the landing site of the scrambled PP. Thus, Ā-scrambling blocks QR.

The example in (40c) is ambiguous. One way to analyze this fact is to say that Ā-scrambling of the PP-complement to a position above the subject does not create a barrier for a local application of QR (to a position just above the indefinite but below the fronted PP). This analysis can only work if it is furthermore assumed that covert scope-shifting operations cannot create barriers for overt movement; otherwise scope shift of the universal in (40c) creates a barrier that separates the trace of Ā-scrambling from its antecedent. We put these matters to one side for now, but will explore them in more detail in section 6.

Some speakers find Ā-scrambling of contrastive foci to a position below the subject, as in (40b), somewhat marginal. However, the pattern of scope judgments that obtains when the PP is interpreted as a contrastive topic runs parallel to that in (40):

(41) Zeg Jan, hoe zit het met *PROSECCO*? Is *DAT* populair in jouw café?
'Hey John, what about Prosecco? Is that popular in your pub?'
Nou, over prosecco heb ik de cijfers niet bij de hand, maar wel weet ik…
'Well, I don't have the figures for Prosecco, but I do know…'

a. dat iemand iedere ober om *champagne* telkens in het *WEEKEND*
   *that someone every waiter for champagne always in the weekend*
   gevraagd heeft.
   *asked has*
   (i) some > every; (ii) every > some

b. dat iemand [$_{PP}$ om *champagne*] iedere ober $t_{PP}$ telkens in het *WEEKEND*
   *that someone for champagne every waiter always in the weekend*
   gevraagd heeft.
   *asked has*
   (i) some > every; (ii) *every > some

c. dat [$_{PP}$ om *champagne*] iemand iedere ober $t_{PP}$ telkens in het *WEEKEND*
   *that for champagne someone every waiter always in the weekend*
   gevraagd heeft.
   *asked has*
   (i) some > every; (ii) every > some

In addition to the type of interaction illustrated in (40) and (41), there are also noticeable effects when a quantifier receives a contrastive interpretation. In particular, it can be

demonstrated that the domain of contrast of a contrastive quantifier can be larger, but not smaller, than its quantificational scope. We will refer to this restriction as the Q-Scope Inclusion Corollary:

(42) *Q-Scope Inclusion Corollary (QIC)*
The domain of contrast of any contrastive quantifier must include its quantificational scope.

The QIC can be derived from the assumption that the minimal domain of contrast for a contrastive category must contain all elements that depend on that category. This assumption is no more than what is implicitly assumed in most theories of contrastive interpretation: a contrastive element is interpreted with respect to a syntactic or semantic 'frame' against which alternatives are evaluated. This frame, which we call the domain of contrast, must at least contain those elements with which the contrastive category entertains a semantic relation. For example, if the contrastive element is an object, then its domain of contrast must at least contain the selecting verb, but not necessarily the subject. But if the subject happens to be a quantifier that is scopally dependent on the object, then it, too, must be part of the domain of contrast.

The QIC emerges from the interaction between the above assumption regarding the minimal domain of contrast and our earlier claim that QR is only licensed if it gives rise to scope shift. In other words, QR must create a new scopal dependency. Thus, QR of the universal in *some boy admires every teacher* is licensed because it gives rise to a reading in which *some boy* is dependent on *every teacher*. However, examples like (43) are unambiguous because the wide scope reading of the universal in the first sentence would require a parallel movement in the second sentence that fails to create a new scopal dependency (see Fox 2000 for extensive discussion).

(43) Some boy admires every teacher. Mary does ~~admire every teacher~~, too.
(i) some > every; (ii) *every > some

A derivation that violates the QIC would be one in which a contrastive quantifier takes quantificational scope over material that is not contained in its domain of contrast. This material cannot depend on the quantifier, because if it did, it would have to be contained in its domain of contrast. But if it does not depend on the quantifier, QR is not licensed, as this operation must give rise to a new scopal dependency. Therefore, the QIC must hold.

There is ample empirical support for the QIC. To begin with there are a number of structures in which the domain of contrast of a contrastive quantifier is indeed larger than its scope. Consider the examples in (44). The domain of contrast of the fronted universal is presumably everything contained in its sister node (the matrix IP). After all, fronting in English – like Ā-scrambling in Dutch – requires a contrastive interpretation of the fronted category. However, whereas (44b) is ambiguous for all speakers, only a subset of speakers accept a wide scope reading of the universal in (44a). This suggests that for speakers in the complement of this subset, the maximal quantificational scope of the universal in (44a) is the embedded clause. Moreover, even the more permissive speakers allow narrow scope of the universal in this example.[16]

[16] The example in (44a) is taken from Bianchi and Frascarelli 2009, who report that 13 out of 28 speakers can get the wide scope reading of the universal. We speculate that the availability of this reading correlates with the ability of speakers to perform non-local scope shift.

(44) a. Every one of the ***motorbikes***, a mechanic said that he will fix *t* in one day.
(i) %every > a; (ii) a > every)
b. Every one of the ***motorbikes***, John claimed that a mechanic will fix *t* in one day.
(i) every > a; (ii) a > every)

The same divergence between quantificational scope and domain of contrast arises with contrastive quantifiers that remain in situ. The focused indefinite in (45) can depend on the universal, indicating that it can be interpreted below the subject for quantifier scope, even though the context strongly suggests that the universal must be part of its domain of contrast. Thus, its contrastive scope must include *every student*, but its quantificational scope may exclude this constituent.

(45) Q: What did every student read after reading the morning paper?
A: Every student read a *BOOK*.
(i) every > a; (ii) a > every)

An even stronger case is provided by the example in (46), where the context forces the universal to scope under *at least one student*, even though this constituent must be contained in its domain of contrast.

(46) Q: What has at least one student read?
A: At least one student has read every *BOOK*.
(i) *every > at least one; (ii) at least one > every)

In conclusion, the domain of contrast of a contrastive quantifier can be larger than its quantificational scope.

The QIC predicts that the reverse situation, in which the quantificational scope is larger than the domain of contrast, cannot exist. We can test this using topicalization in English and Ā-scrambling in Dutch. These operations mark a domain of contrast and should therefore have a freezing effect on the quantificational scope of the scrambled category. This is because – by the QIC – the landing site of these operations cannot be a launching site for QR. That topicalization in English has a scope freezing effect was already observed by Bianchi and Frascarelli (2009). None of the speakers in their sample of 28 accepted a wide scope reading of the universal in the following example:

(47) A mechanic said that every one of the ***motorbikes***, he will fix *t* in one day.
(i) *every > a; (ii) a > every)

The predicted freezing effect with Ā-scrambling can be illustrated with the following data set. In (48a) the contrastive quantifier remains in situ and hence QR is free to target a position c-commanding the indefinite subject, giving rise to scopal ambiguity. In (48b), however, the contrastive quantifier has scrambled to a position below the subject, marking VP as its domain of contrast. This implies that its quantificational scope cannot include the subject. Indeed, this example very strongly resists a wide-scope reading of the universal.[17] In (48c), Ā

[17] There are two complications regarding the judgment of (48b). First, some speakers disprefer scrambling of focused constituents to a position below the subject. Obviously, such speakers will classify the example as altogether ungrammatical. Second, another group of speakers marginally allow A-scrambling of a direct object across an indirect object. For such speakers, (48b) will be on a par with (48a) (and with (49)). The exact prediction made by the QIC, then, is that there will be no speakers who resist local A-scrambling in the double-object construction and for whom (48b) is ambiguous.

-scrambling crosses the subject, thereby making it possible for the universal to take scope over the indefinite.

(48) a. Ik geloof dat een jongen Marie ieder *BOEK* gegeven heeft.
*I believe that a boy Mary every book given has*
(i) a > every; (ii) every > a

b. Ik geloof dat een jongen [$_{DP}$ ieder *BOEK*] [$_{DoC}$ Marie $t_{DP}$ gegeven heeft].
*I believe that a boy every book Mary given has*
(i) a > every; (ii) *every > a

c. Ik geloof dat [$_{DP}$ ieder *BOEK*] [$_{DoC}$ een jongen Marie $t_{DP}$ gegeven heeft].
*I believe that every book a boy Mary given has*
(i) a > every; (ii) every > a
'I believe that a boy has given Mary every book.'

Striking confirmation of this account is provided by the dative construction in (49), where the surface position of the universal is its base position, rather than the landing site of $\bar{A}$-scrambling. The QIC therefore predicts the observed ambiguity of this example, despite its surface similarity to (48b).

(49) Ik geloof dat een jongen ieder *BOEK* aan Marie gegeven heeft].
*I believe that a boy every book to Mary given has*
(i) a > every; (ii) every > a

Finally, the QIC explains an observation made by Sæbø (1997), who notices that a topical quantified object can take scope over a focused quantified subject, but a focused quantified object cannot take scope over a topical quantified subject. A topical quantifier is only felicitous in a discourse about quantities. For example, universal quantifiers normally resist topichood, but in a conversation about how many books various pupils have read, it is possible to say something like *as for every book, only John has read that much* (see also footnote 14). The following examples should therefore be understood to be part of a discourse about how many members of various groups of attendants to a conference (students, staff, …) went to how many events (talks, meetings, wine receptions, …).

By the tests introduced in the previous section, *several* (*students*) in (50) qualifies as a contrastive topic, while *most* (*meetings*) is a contrastive focus. In this example, the inverse scope reading is unavailable, in line with Sæbø's generalization: the focused quantifier cannot take scope over the topical subject.[18]

(50) Tell me about the *STUDENTS*. How many meetings did *THEY* attend? Well, I'm not sure about *all* students, but I think that *several* students attended *MOST* meetings.
(i) several > most; (ii) *most > several

As opposed to (50), the example in (51) is ambiguous. The topical object may be interpreted with narrow scope, but alternatively it may take scope over the focused subject.

(51) Tell me about the *MEETINGS*. How many students attended *THEM*? Well, I'm not sure about *all* meetings, but I think that *SEVERAL* students attended *most* meetings.
(i) several > most; (ii) most > several

[18] The examples in (50) and (51) are adapted from Sæbø's paper. We have made modifications in the contexts in order to bring out more clearly which categories function as topics and which as foci.

The contrast between (50) and (51) can be understood as follows. In order for the focused object in (50) to take wide scope, QR must raise it to a position (minimally) c-commanding the topical subject. By the QIC, this implies that the domain of contrast of the object must include the subject. However, as explained in the previous section, this gives rise to an illicit information structure, in which the topic is in a position subordinate to the focus. Repair of this illicit configuration through further movement of the topic is ruled out by the CSS.

In (51), the object *can* take scope over the subject. This reading implies that the domain of contrast of the topic includes the focus, a configuration that satisfies information-structural well-formedness conditions. Of course, the QIC also allows surface scope for (51), as also on that reading the quantificational scope of *most* (*meetings*) is contained in its domain of contrast.

Sæbø's explanation of the pattern in (50) and (51) differs dramatically from ours. He denies the existence of QR and claims instead that scope shift is always parasitic on covert movement of a topic across a focus (which is triggered by information-structural considerations). We believe that there are some serious objections to this analysis.

As we have already seen in the examples in (44) to (45), the quantificational scope of a contrastive focus need not coincide with its domain of contrast. A similar picture emerges when we consider the quantificational scope of contrastive topics in more detail. Crucially, a topical quantifier can be scopally dependent on a focused quantifier, even though the latter must be contained in its domain of contrast. As far as we can tell the dependent reading of *several* (*meetings*) in (53) is as easy to get as it is in (52), even though the topic and focus functions in these examples are reversed.

(52) Tell me about the *STUDENTS*. How many meetings did *THEY* attend? Well, I'm not sure, but I think that ***most*** students attended *SEVERAL* meetings.
(i) (*)several > every; (ii) every > several

(53) Tell me about the *MEETINGS*. How many students attended *THEM*? Well, I'm not sure, but I think that *MOST* students attended ***several*** meetings.
(i) several > every; (ii) every > several

The crucial reading of the examples in (52) and (53) for our argument is the one in which *several* is dependent on *most*. However, an inverse scope reading also seems to be available for both examples. This is unsurprising for (53). But the apparent wide scope reading of *several* (*meetings*) in (52) cannot be the result of QR, as it would require a focus to raise across a topic. It must therefore arise as a consequence of either a specific reading of the indefinite or as a special subcase of the dependent reading (namely one in which the choice of meeting happens to be the same for every student).

A second problem for Sæbø's approach is the availability of QR for non-topical quantifiers. There are a number of contexts, including relative clauses, that cannot contain topics (Maki et al. 1999, Haegeman 2002, Emonds 2004, Heycock 2006, and Bianchi and Frascarelli 2009), but that can contain quantifiers that undergo scope shift:[19]

[19] One might think that the example in (i) provides a counterexample to the claim that relative clauses cannot contain topics.

(i) What about the book that Bill bought? How long did that burn for?
Well, I don't know about the book that Bill bought, but the book that John bought only burned for a few seconds.

(54) The book that a boy has given to every girl in my class appears to be about spy planes.
(i) a > every; (ii) every > a

The data presented above are central to our paper. We maintain that information-structural restrictions observed in Ā-scrambling are scopal in nature and part of the same system that regulates QR. One argument for this claim is that quantifier scope and contrastive scope obey the same condition: the CSS. In this section we have developed a second argument, based on the interaction between quantifier scope and contrastive scope via the QIC: such interactions would be unexpected if quantifier scope and information structure were represented separately.

## 6. Covert scope shift

In the previous sections we have been concerned with establishing restrictions on scope shift, adopting the standard analysis that all scope shift is encoded by movement and that differences between overt and covert scope shift result from the timing of the relevant movements. There was one cloud on the horizon for this approach, namely the somewhat complicated constellation of assumptions required to deal with the examples in (40) and (41). In particular, the ambiguity of (40c) and (41c) necessitated the claim that overt scope-marking creates barriers for QR but that QR cannot create barriers for overt scope marking. In fact, the situation is more complicated than this. In order to allow the CSS to successfully account for the data in (9), it must also be assumed that covert movement is subject to some kind of cycle: movements targeting lower landing sites must precede those with higher landing sites. Otherwise, the reading in (9f) could be derived as in (55). The movement in (55b) does not violate the CSS, because no other quantifier has moved yet, while the movement in (55c) does not violate the CSS because it tucks in under the universal.

(55) a. [Some teacher gave most papers on the syllabus to every student].
b. [[Every student]$_1$ [some teacher gave most papers on the syllabus to $t_1$]].
c. [[Every student]$_1$ [[most papers]$_2$ [some teacher gave $t_2$ on the syllabus to $t_1$]]].

In other words, there are two differences between overt and covert movement: (i) covert movement is sensitive to overt movement, but not vice versa; (ii) covert movement is allowed to tuck in under the landing site of overt movement, but not under the landing site of other covert movements.

These conclusions are incompatible with the claim that there is a single, uniform derivation that connects the lexicon to LF. While the first difference merely requires the assumption that syntax is derivational, the second requires a break in that derivation after the overt syntax, associating the output of overt operations with LF through a separate cycle. But if overt and covert movement have separate cycles, we are close to reintroducing S-structure

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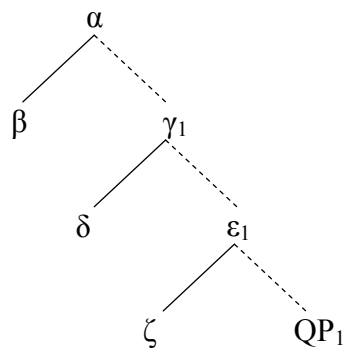
In this example, the constituents that are highlighted prosodically in the answer seem to be *Bill* and *John*. However, the actual contrastive topics are *the book that Bill bought* and *the book that John bought*. This is apparent from the leading question, which asks about books and not about people. Indeed, the answer in (ii) is odd.

(ii) What about the book that Bill bought? How long did that burn for?
#Well, I don't know about ***Bill***, but as for ***John***, the book that he bought only burned for a few seconds.

and should worry about the fact that conditions like the CSS and possibly the ban on tucking in apply during both cycles (but see Richards 1997).

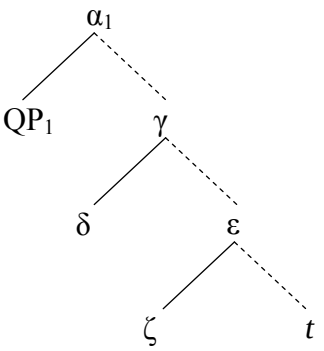
Given these complications, it might be advantageous to explore an alternative characterization of covert scope shift, one that does not treat the phenomenon as movement. The system we have in mind is similar to that proposed in Williams 1994, with certain adjustments.[20] There are two rules that can give rise to scope shift. If a quantified argument remains in situ, its scope can be extended through percolation of a scope index, as in (56). The interpretation of the resulting structure is such that the scope of the quantified argument coincides with the largest category that carries its index, minus the argument itself. Thus in (56) QP has scope over γ and the nodes that γ contains, but not over α or β.

(56)




If a category is moved to mark its scope, it percolates a scope index to the node that immediately dominates the landing site. When we apply the same interpretive mechanism as in (56), this has the consequences that the scope of the moved category coincides with its mother, minus the moved category itself. In other words, the scope of QP in (57) is its sister γ.

(57)




The index percolation in (57) is an expression of the scope-marking nature of the movement. In the absence of index percolation, QP undergoes scope reconstruction, which implies that its scope coincides with the c-command domain of its trace or is extended by index percolation from its trace. The consequence is that the movement would not in fact mark the scope of QP.[21]

[20] The main adjustment we make is that arguments taking scope in situ and adjuncts do not possess a scope index, but get scope through the default scope rule in (1b). A more minor difference concerns the node to which the scope index of a moved category percolates. This is the sister node in Williams' proposal, while it is the mother node in our version.

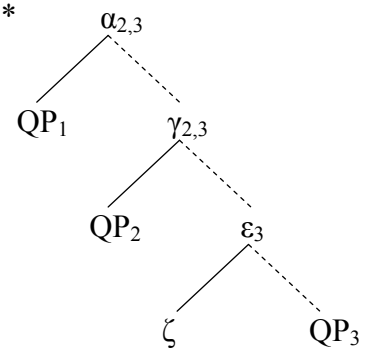
[21] QP in (57) can also not percolate its index beyond the node that immediately dominates it. Such percolation would again have the consequence that the movement does not mark scope. One implementation of this idea would be to say that scope-marking movement is an operation that minimizes index percolation at the cost of

The CSS can now be stated as a condition on the distribution of scope indices:

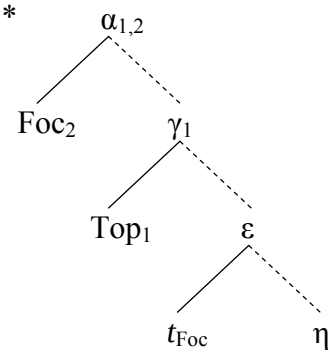
(58) *Condition on Scope Shift*
No node may inherit two scope indices.

On this reformulation of the CSS, the example in (9) cannot have the readings in (9e) and (9f), because these have a representation matching (59a), in which two indices, those of *most papers* ($QP_2$) and *every student* ($QP_3$), must percolate past the subject ($QP_1$). This necessarily gives rise to nodes inheriting multiple scope indices (here α and β). The consequences of the CSS for topic-focus interaction follow equally straightforwardly. For example, a focus cannot undergo $\bar{A}$-scrambling past a topic, because the scope index that marks the domain of contrast of the Focus blocks percolation of the scope index of the topic (see (59b)). But if its index does not percolate, the topic is left stranded within the domain of contrast of the focus, yielding an ill-formed information structure.

(59) a. *




b. *

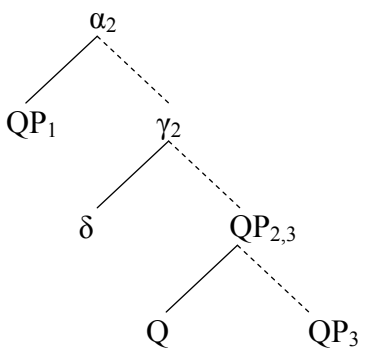



The reformulated CSS, like its movement-based predecessor, may exploit transitivity to explain total scope reversal in structures involving inverse linking. The relevant reading of the example in (14) is syntactically encoded as in (60), where the index of the most deeply embedded QP (*every city*) percolates to the QP that contains it (*someone from every city*), while the index of the containing QP percolates to a node dominating the subject (*two politicians*). Crucially, no node in (60) inherits more than one scope index, and therefore the CSS is respected.[22] Since $QP_3$ takes scope over $QP_2$ and $QP_2$ takes scope over $QP_1$, $QP_3$ takes scope over $QP_1$ by transitivity, giving rise to the desired reading.

(longer) movement. We are unsure whether this minimization is absolute or whether in structures lacking an appropriate landing site a scope index can percolate beyond the node immediately dominating QP.

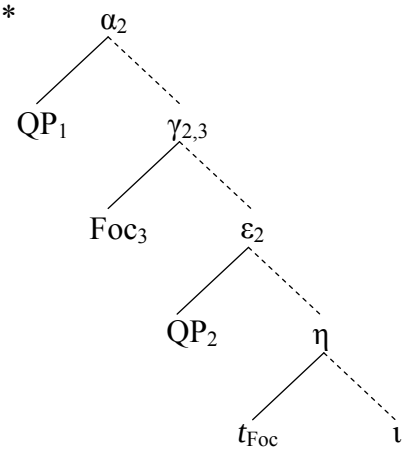
[22] The QP *someone from every city* has two indices. Importantly, one of these is not inherited and therefore the CSS is not violated. This is not a technical fudge, in our view, because inherited and uninherited indices express different properties. The first indicates scope extension, the second identifies a category as a quantified XP involved in scope extension. The CSS expresses that no node can be the target of two operations of scope extension. In (60) $QP_{2,3}$ extends its scope across $QP_1$, but it is the extended scope of only one category (namely, $QP_3$).

(60)

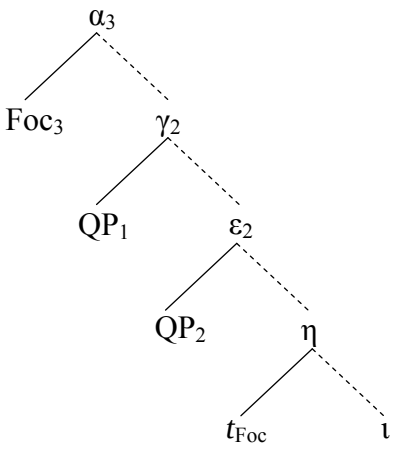



We now turn to the data in (40) and (41), which necessitated the effective reintroduction of S-structure on an analysis of covert scope shift as movement. It is inherent in the system outlined above that scope-marking movement creates a barrier for scope shift across its landing site, because the moved category percolates an index. However, scope-marking movement does not interact with scope-shifting operations along its path, because no index is percolated from the trace of the moved category. This immediately captures the contrast between the (b) and (c) examples in (40) and (41). The reading that is unavailable for (40b) would require that the index of the lower quantifier ($QP_2$ in (61a)) percolates past the index of the moved focus, in violation of the CSS. By contrast, scope shift is possible in (40c) where the index of the moved focus is introduced above the highest node bearing the index of the lower quantifier ($QP_2$ in (61b)).

(61) a. *

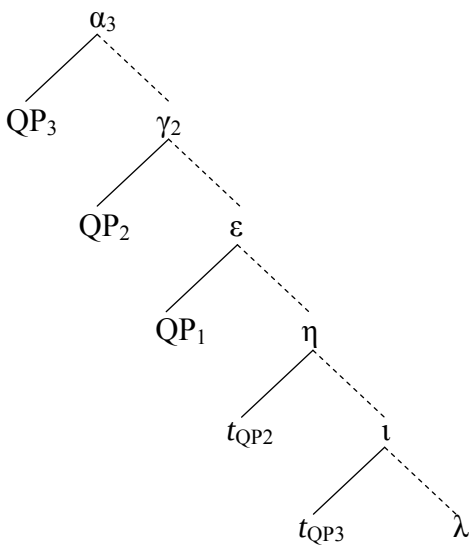



b.




The index-based version of the CSS makes still other predictions that differ from the earlier movement-based version. Since movement does not give rise to index percolation from the launching site, overt scope-marking should be freer than covert scope-shift. In particular, while an in situ quantifier cannot percolate its scope index past the landing site of a moved scope-taking element, it can be fronted across that element. As a consequence, readings can be overtly encoded that are not derivable through index percolation. Thus, the in situ structure in (59a) does not permit the reading $QP_3 > QP_2 > QP_1$, but the movement structure in (62) does.

(62)




This prediction is borne out. In German, Japanese and other languages that allow or require overt scope marking, it is possible to move two quantified objects across the subject giving rise to surface scope. Some German examples illustrating this are given below (see Kiss 2001 for extensive discussion):

(63) Ich glaube…
'I believe…'
dass jedem Studenten die meisten Artikel irgendein Professor gegeben hat.
*that every student the most papers some professor given has*
every > most > some
'that some professor has given most articles to every student.'

(64) Ich glaube…
'I believe…'
dass jeden Artikel den meisten Studenten irgendein Professor gegeben hat.
*that every article the most students some professor given has*
every > most > some
'that some professor has given most students every article.'

Further confirmation of the predicted contrast between overt and covert scope shift comes from DutchRecall that covert scope shift of a topic across a moved focus, as schematized in (59b), gives rise to very degraded results. However, the example in (65), where a topic moves across the landing site of a moved focus, seems grammatical.[23] Similar orders are found in Hungarian, Basque and other languages in which topics and foci undergo overt movement.

(65) Hoe zit het met Jan z'n OUDERS? Welk boek heeft hij HEN gegeven?
'What about John's parents? Which book has he given to them?'
Nou dat weet ik niet. Maar ik denk …
'Well, I don't know. But I think…'
dat [$_{DP}$ *z'n kinderen*]$_1$ [$_{DP}$ *DIT* boek]$_2$ Jan $t_1$ zeker $t_2$ niet zal geven.
*that his children this book John certainly not will give*

[23] In earlier work we reported that examples like (65) are ungrammatical, but on further reflection they seem to us grammatical though complex. The example does require appropriate contextualization and the topic must be followed by a prosodic break (which is anyway favoured after any category carrying a B-accent).

We conclude that the index-based version of the CSS is empirically and conceptually superior to the movement-based version. It captures certain differences between scope-marking movement and covert scope shift, but does not require the complications associated with QR that lead to a reintroduction of S-structure (or at least a reintroduction of a separate LF cycle). This is because the contrasting properties of overt and covert scope shift are dealt with in terms of the different mechanisms that give rise to them (movement versus index percolation), rather than the timing of the relevant operations (S-structure versus LF).[24, 25]

## 7. Evidence against covert Ā-scrambling

We conclude our argument by providing independent empirical evidence for the view that covert scope shift is not movement but index percolation. In particular, we argue that there is no covert movement counterpart of the Ā-scrambling operation found in Dutch. Our case is based on the scope of focus-sensitive particles. In Ā-scrambling structures, such particles are always pied-piped by the moving contrastive element, and they take scope in their surface position rather than in the underlying position. If covert scope shift were movement, we would at the very least expect that a focus-sensitive particle attached to an in situ contrastive category need not take surface scope, but can take scope in the LF landing site of that category. This is not what the data show, however: focus-sensitive particles systematically take surface scope. This follows straightforwardly from the indexation system described above. If a contrastive category percolates its index, this extends its scope, but it does not extend the scope of a focus-sensitive particle associated with the contrastive category.

In our discussion of Ā-scrambling, we have concentrated on the interaction between the operations that assign scope to topics and foci. However, it is also possible to scramble a focus across another focus, as long as the resulting syntactic structure can be successfully mapped onto information structure. That is, it must be possible to interpret the in situ focus as part of the domain of contrast of the scrambled focus. Below we will use the term 'superordinate' for the focus that must, given the context, take wide scope and the term 'subordinate' for the focus that must take narrow scope. Thus, in the information-structural representation in (66), *focus*$_2$ is subordinate to *FOCUS*$_1$. (Henceforth, subordinate foci will be underlined and appear in lower case.)

(66) *FOCUS*$_1$ [ ... *focus*$_2$ ... ]

[24] The index-based CSS makes various other predictions about structures containing a topic, a focus and multiple quantifiers. For example, where a topic appears below a focus, index percolation past the focus is necessary to license the topic. This should give rise to scope-freezing effects in the path of the percolated index. Although we have the impression that the judgments go in the right direction, it is nearly impossible to construct suitable test sentences, mainly because of difficulties in fixing information-structural functions. (See the discussion of topic-focus swap in Neeleman and Van de Koot 2008.)

[25] One might attempt to rescue the covert movement theory of scope shift by relying on the idea advanced by Chomsky (1995) and Lasnik (1995) that movement is in fact an operation that targets certain syntactic features only and that displacement of other material by movement in the overt syntax must be attributed to the inability of the phonological component to interpret 'scattered' syntactic objects. Since covert movement does not feed the phonology, it does not require any pied-piping. A theory of covert movement as feature movement can only be considered a real alternative to the index-based system we advocate if no qualitative difference needs to be made between feature movement and movement that pied-pipes additional material. But such a contrast is inherent in the data discussed above. Also on the feature-movement approach, there must be a break between overt and covert syntax, with a new cycle starting after Spell-Out. See footnote 27 for some further discussion.

We thus expect that it is possible to Ā-scramble a superordinate focus across a subordinate focus, but not vice versa.

We can test this prediction using the interpretation of focus-sensitive particles in Dutch. To do so, we consider contexts – borrowed from Wagner 2008 – that require a particular scopal relation between two such particles. The first of these is given in (67).

(67) Context I: even > only:
Except for Bill, who shows at least some good sense, the kids in this summer camp have no respect for animals and their potential dangers, which makes them take too many risks, including with poisonous snakes.

This context sets up a scale of recklessness of the kids in the summer camp, with Bill at the bottom of this scale. We can also imagine a scale of poisonous snakes. What we would expect is that if Bill is not afraid of a poisonous snake then no kid is afraid of that snake. Given this state of affairs, the following Dutch examples only make sense in the context of (67) if *zelfs* 'even' takes scope over *alleen* 'only'.

(68) Ik geloof
*I believe*
a. dat zelfs de *GIFTIGSTE* slang alleen *Wim* angst inboezemt.
*that even the most-poisonous snake only Bill fear instills*
b. #dat [$_{DP}$ alleen *Wim*] zelfs de *GIFTIGSTE* slang $t_{DP}$ angst inboezemt.
*that only Bill even the most-poisonous snake fear instills*
c. #dat alleen *Wim* voor zelfs de *GIFTIGSTE* slang bang is.
*that only Bill of even the most-poisonous snake afraid is*
d. dat [$_{PP}$ voor zelfs de *GIFTIGSTE* slang] alleen *Wim* $t_{PP}$ bang is.
*that of even the most-poisonous snake only Bill afraid is*

The movement structures in (68b) and (68d) confirm the prediction that a superordinate focus can move across a subordinate focus, but not vice versa.

The data also contain a surprise, however. Quite unexpectedly, the in situ structure in (68c) is infelicitous in the given context, showing that it is impossible for *even* to take scope over *only* through covert scope shift. In other words, focus-sensitive particles systematically take surface scope.

The pattern observed in (68) can be replicated in a second context, again borrowed from Wagner, which requires *only* to take scope over *even*:

(69) Context II: only > even:
The kids in the summer camp are afraid of snakes to some degree, but it depends on how dangerous they are. Everyone is afraid of rattlesnakes, since they're really poisonous, but almost everyone is ok with some less poisonous snake.

This context sets up a scale of snakes according to how dangerous they are. Toward the top of this scale we find rattle snakes. In addition, as was the case in (67), the kids in the summer camp are ordered on a scale of recklessness. We already encountered *Wim* 'Bill', who is the kid at the very bottom of this scale (he scares easily). In this context, the following examples only make sense if *alleen Wim* 'only Bill' takes scope over *zelfs de minst giftige slang* 'even the least poisonous snake':

(70) Ik geloof

*I believe*

a. #dat zelfs de <u>*minst*</u> giftige slang alleen *WIM* angst inboezemt.
*that even the least poisonous snake only Bill fear instills*

b. dat [$_{DP}$ alleen *WIM*] zelfs de <u>*minst*</u> giftige slang $t_{DP}$ angst inboezemt.
*that only Bill even the least poisonous snake fear instills*

c. dat alleen *WIM* voor zelfs de <u>*minst*</u> giftige slang bang is.
*that only Bill of even the least poisonous snake afraid is*

d. #dat [$_{PP}$ voor zelfs de <u>*minst*</u> giftige slang] alleen *WIM* $t_{PP}$ bang is.
*that of even the least poisonous snake only Bill afraid is*

As before, the data show that a superordinate focus can move across a subordinate focus, but not vice versa. Moreover, we again find that the in situ structure in (70a) is infelicitous in the given context, suggesting that covert scope shift of *only* across *even* is impossible.

This data pattern is unexpected if scope shift is achieved through covert movement. After all, Ā-scrambling – the overt counterpart of the covert operation – has very different properties. As we have already seen, Ā-scrambling of a contrastive category can pied-pipe an adjoined focus-sensitive particle. In fact, it must pied-pipe such particles, as demonstrated by the ungrammaticality of the examples in (71).[26]

(71) Ik geloof
*I believe*

a. *dat [$_{DP}$ de *MEEST* giftige slang] Wim gisteren [$_{DP}$ alleen $t_{DP}$] verraste.
*that the most poisonous snake Bill yesterday only surprised*

b. *dat [$_{DP}$ de *MINST* giftige slang] Wim gisteren [$_{DP}$ zelfs $t_{DP}$] verraste.
*that the least poisonous snake Bill yesterday even surprised*

There is a natural explanation for the ungrammaticality of these examples: the Ā-scrambling operation marks the scope of the focused constituent and thereby removes it from the scope of the focus-sensitive particle with which it must be associated.

The movement theory of scope shift therefore faces the following conundrum. It must allow overt movement of topics and foci. It must also allow covert movement of topics, and presumably of (superordinate) foci. But such covert movement must be disallowed for superordinate foci with an adjoined focus-sensitive particle, even though such particles *are* pied-piped by overt scope-marking movement. As far as we can see, this constellation of properties can only be captured by stipulating differences between overt and covert movement.[27]

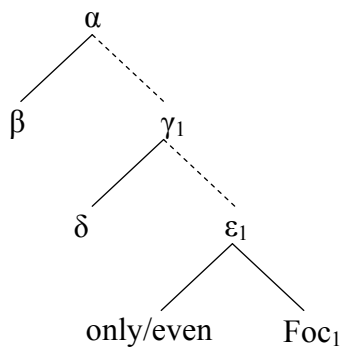
The alternative view – that covert scope shift is index percolation – provides a very straightforward solution to this problem. The percolation of the index of a contrastive category extends the scope of that category, but not that of the associated focus-sensitive particle. This must be so, simply because the index in question is not that of the focus-sensitive particle. Therefore, if the index of the contrastive category percolates up, the focus-sensitive particle is left without a contrastive category that it can associate with, on a par with

[26] In these examples *only* and *even* cannot be interpreted as associated with the moved DPs. The string is acceptable if the focus-sensitive particles are interpreted as associated with the following verb, which must then be contrastively stressed.

[27] Notice that an analysis of QR as feature movement has nothing to offer in this respect. The idea behind this approach is that movement affects as little material as is required for convergence. Convergence of the problematic examples requires pied-piping of the focus-sensitive particles. Therefore, LF-movement should be able to do this.

what happens in the examples in (71). The upshot is that the contrastive category cannot extend its scope without giving rise to an ill-formed LF. This is illustrated in (72).

(72) *




If the focus-sensitive particle were to extend its scope, it would have to percolate its own index. However, such particles are adjuncts and Williams (1994) argues in some detail that adjuncts cannot undergo rules of scope extension. In our interpretation of Williams' system, this amounts to the claim that adjuncts do not have a scope index and are therefore subject to the default scope rule in (1b). It follows, therefore, that focus-sensitive particles, and by implication the contrastive category they are adjoined to, take scope in their surface position.[28]

The conclusion we have arrived at is at odds with the claim in Wagner 2008 that foci with adjoined focus-sensitive particles can undergo covert scope-shift in English. However, we believe that the examples used by Wagner to substantiate this claim are better analyzed as involving scope shift through string-vacuous extraposition.

Let us return to the context in (67), which requires *even* to take scope over *only*. As Wagner observes, the examples in (73a), (73b) and (73c) are acceptable in this context, while (73d) is not. In the first two examples *even* and *only* take surface scope, as required by the context. Wagner suggests that the contrast between (73c) and (73d) can be explained in terms of covert movement of the superordinate focus, which includes the focus-sensitive particle *even* in (73c) but not (73d).

(73) a. Even the *MOST* poisonous snake frightens only <u>*Bill*</u>.
b. Even the *MOST* poisonous snake only frightens <u>*Bill*</u>.
c. Only <u>*Bill*</u> is afraid [$_{PP}$ of even the *MOST* poisonous snake].
d. #Only <u>*Bill*</u> is even afraid [$_{PP}$ of the *MOST* poisonous snake].

We believe that the acceptability of (73c) is not due to covert movement but to string-vacuous extraposition of the PP, as shown in (73'c). The example in (73'd) is bad because PP-extraposition does not carry along the focus particle, and therefore cannot affect its scope.

(73') c. Only <u>*Bill*</u> is afraid $t_{PP}$ [$_{PP}$ of even the *MOST* poisonous snake].
d. #Only <u>*Bill*</u> is even afraid ($t_{PP}$) [$_{PP}$ of the *MOST* poisonous snake].

Our analysis of scope reversal in examples likes (73c) is supported by three observations. First, as is well-known, there is ample evidence for the existence of PP-extraposition in English. Second, PP-extraposition affects scope. Thus, while native speakers report the

[28] As an aside, it should be noted that, even if the particle in (72) had a scope index, the CSS would block percolation of that index. However, as we will see below, there is empirical evidence suggesting that focus-sensitive particles do not have scope indices.

availability of a reading in which *three books* is dependent on *two teachers* in (74a), this reading is very much harder to get in (74b) (unless a facilitating context is provided; below we demonstrate that this shift in interpretation is not due to a specific reading of the extraposed material). These data suggest that extraposition takes the PP out of the scopal domain of the subject.

(74) a. Two teachers told John about three books yesterday. 2 > 3
b. Two teachers told John $t_{PP}$ yesterday [$_{PP}$ about three books]. ??2 > 3

Third, once we control for PP-extraposition in the example in (73c) by including an adverbial, it becomes apparent that scope reversal is indeed dependent on extraposition:

(75) a. #Only Bill is afraid of even the most poisonous snake to such an extent that he would run away.
b. Only Bill is afraid $t_{PP}$ to such an extent that he would run away [$_{PP}$ of even the most poisonous snake].

The above data can be replicated for contexts in which *only* must take scope over *even*. The judgments in (76) are the ones that Wagner reports hold in the context in (69). The acceptability of the examples in (76a) and (76b) is unsurprising: what is required for discourse coherence is surface scope. It is more remarkable that (76c) is judged marginally acceptable. According to Wagner, this is the result of covert movement.

(76) a. Only Bill is afraid of even the least poisonous snake.
b. Only Bill is even afraid of the least poisonous snake.
c. ?Even the least poisonous snake would frighten [$_{DP}$ only Bill].
d. Even the least poisonous snake would frighten [$_{DP}$ only my truly pathetic roommate Bill Johnson].
e. #Even the least poisonous snake would only frighten [$_{DP}$ Bill].
f. #Even the least poisonous snake would only frighten [$_{DP}$ my truly pathetic roommate Bill Johnson].

On our view, the example must involve string-vacuous extraposition of the object, as shown in (76'c). In this regard, it is important to note that a heaviness effect can be observed in structures that require scope reversal: (76'd) is judged considerably better than (76'c). This suggests that scope reversal in this case is indeed dependent on DP-extraposition, also known as 'heavy-NP shift'. As expected, when the focus-sensitive particle is not contained in the DP, surface scope obtains, whether the object is heavy or not (see (76'e,f)).

(76') c. ?Even the least poisonous snake would frighten $t_{DP}$ [$_{DP}$ only Bill].
d. Even the least poisonous snake would frighten $t_{DP}$ [$_{DP}$ only my truly pathetic roommate Bill Johnson].
e. #Even the least poisonous snake would only frighten ($t_{DP}$) [$_{DP}$ Bill].
f. #Even the least poisonous snake would only frighten ($t_{DP}$) [$_{DP}$ my truly pathetic roommate Bill Johnson].

As was true of PP-extraposition, heavy-NP shift is a well-motivated operation in English. Moreover, it can be shown to affect scope. The data in (77) parallel those in (74).

(77) a. Two teachers gave John three books about the Americas yesterday. 2 > 3

b. Two teachers gave John $t_{DP}$ yesterday [$_{DP}$ three books about the Americas]. ??2 > 3

One could hypothesize that the interpretive effect in (77) results from an obligatory specific interpretation of the extraposed indefinite. However, heavy-NP shift does not in general give rise to such readings. In (79), for example, the indefinite can be interpreted in the scope of *want*, something that is not true of specific DPs.

(78) John said that he wanted to buy $t_{DP}$ yesterday [$_{DP}$ a motorcycle with a top speed of 160 mph].

Admittedly, the facts in (77) are puzzling in view of the very strict locality conditions on heavy-NP shift: an extraposed DP cannot land higher than adjoined to VP, and hence fails to c-command the subject on the surface. Yet, the operation removes the DP from the subject's scopal domain. Whatever the solution to this puzzle, which may involve reconstruction of the subject to a VP-internal position, it suffices for present purposes to note that heavy-NP shift affects scope in a way consistent with our account of the data in (76).

As before, once we use an adverbial to control for extraposition, we can show that scope reversal in examples like (76d) is indeed dependent on heavy-NP shift:

(79) a. #Even the least poisonous snake would frighten only my truly pathetic roommate Bill Johnson with its sudden slithery movements.
b. Even the least poisonous snake would frighten $t_{DP}$ with its sudden slithery movements [$_{DP}$ only my truly pathetic roommate Bill Johnson].

We conclude that there is no convincing case for covert scope shift of constituents containing focus-sensitive particles in either Dutch or English.[29] This is exactly as predicted on a theory

[29] Wagner (2008) had a very good reason for pursuing a theory that allows covert focus movement in English. He observes a correlation between two grammatical variables. English allows in situ structures in which a topic follows a focus and also permits scope reversal of focus-sensitive particles (as discussed above). In contrast, German does not allow either. Wagner proposes that a topic can only follow a focus in surface syntax if it is raised covertly to create an acceptable information-structural configuration. English apparently has this covert operation, which therefore can also be used to alter scopal relations between focus-sensitive particles. German lacks this operation, and consequently information-structural requirement are transparently reflected in surface orders, while focus-sensitive particles must take surface scope.

In view of the above, this account cannot be upheld. We are therefore left with the unresolved question why German does not allow topics to follow foci. We suggest that the generalisation is in fact incorrect: topics *can* follow foci as long as they are themselves followed by a focus. An example demonstrating this is given in (i) (we thank Klaus Abels for helping us construct it).

(i) Was ist mit den Mädchen? Wer hat ihnen Geschenke gegeben?
'What about the girls? Who has given gifts to them?'
Hm, mal überlegen. Also:
'Well, let me think. So:'
a. *Hans* hat *Maria* ein *Buch* geschenkt;
*Hans has Mary a book given*
*Frank* hat *Susi* dagegen eine *CD* geschenkt.
*Frank has Suzy however a CD given*
b. *Hans* hat *Maria* ein *Buch* geschenkt;
*Hans has Mary a book given*
*Niemand* hat *Susi* dagegen auch nur eine *Blume* geschenkt.
*Frank has Suzy however also only a flower given*

of covert scope shift as index percolation, but unexpected if the relevant operation is movement.

## 8. Conclusion

This paper has made two key claims about the relation between structure and interpretation. The first is that LF is not a full representation of scope but does encode where scope relations diverge from surface scope. The second is that the mechanism for covert scope shift is not movement but rather percolation of a scope-marking index.

If these conclusions are correct, we are led to a model of grammar in which there is a single uniform syntax, one that need not resort to separate cycles for overt and covert operations. However, we must postulate separate modules for syntax and semantics.

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The grammaticality of (ib) requires that *Susi* is a contrastive topic. This is because *dagegen* is only licensed in the presence of such an element; it cannot be licensed by contrastive foci, as shown in (ii). Moreover, *dagegen* cannot be construed with *niemand* or *auch nur eine Blume* as these are infelicitous topics, partly because of the context and partly because they are non-referential.

(ii) A: Frank hat ein altes Buch gekauft.
*Frank has an old book bought*
B: Nein, nein, nein!
*No, no, no!*
#*Bill* dagegen hat ein altes Buch gekauft.
*Bill however has an old book bought*

Thus, German allows a topic to follow a focus, as long as it is itself followed by a second focused constituent, a restriction that may be associated with prosodic factors.

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