

SCOPE AMBIGUITY IN HUNGARIAN

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INTRODUCTION

The study of semantics seeks to determine, among other things, the meaning of logical words such as connectives, quantifiers and negatives. The introduction of more than one quantifier into a sentence results in a phenomenon in most languages called scope ambiguity. This means that the sentence can have more than one interpretation with respect to the scope of the quantifiers, i.e. the range of the effect of the quantifiers. Fodor (1977:185) notes that a quantifier can have more than one interpretation when it co-occurs with another quantifier. Thus in the English sentence (1), the quantifier some can have two interpretations.

- (1) & Everyone likes someone.¹

The two readings of (1) are given in (2).

- (2) a. There is a specific someone, such that everyone likes that someone.
b. Everyone likes someone, but not necessarily the same someone.

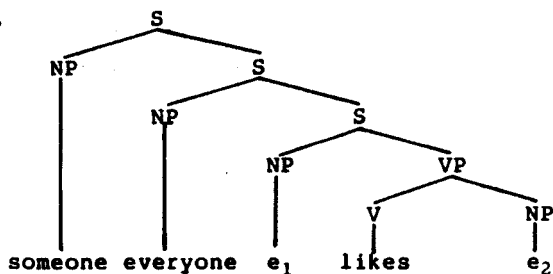
May (1977) attempts to account for this apparent ambiguity using syntactic notions applied at a grammatically determined level of representation called Logical Form (LF). In his treatment of sentences such as (1), ambiguity arises out of differences in the scope of one quantifier with respect to another. In interpretation (2a), the existential quantifier some has "broad scope" with respect to the universal quantifier every, whereas in (2b) every has "broad scope". Scope is defined by May in syntactic terms making use of the notion of c-command,² as defined in (3).

- (3) A is in the scope of B if A is c-commanded by B in Logical Form (LF).

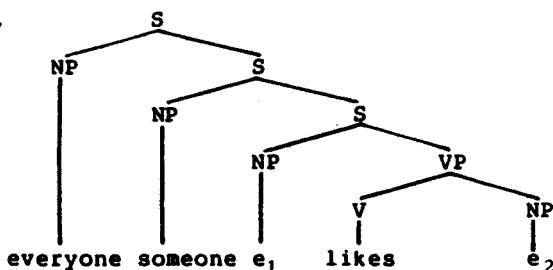
May proposes a movement rule between Surface Structure and Logical Form called Quantifier Raising (QR) which raises a quantifier from its position in the surface structure and adjoins it to the S node in LF. In this way he is able to account for

differences in the "scope" of two quantifiers in terms of their relative positioning in LF. Thus the two interpretations for sentence (1) are accounted for by QR application resulting in the LFs given in (4).

(4) a.



b.



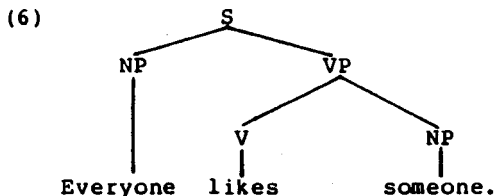
The LF structure in (4a) corresponds to the meaning in (2a) and that in (4b) to (2b). It is useful to refer to "broad scope" and "narrow scope" when considering the interpretations of sentences involving two quantifiers. Using May's definition given above, we see that in (4a) some has broad scope with respect to every since it c-commands it in LF, whereas in (4b) it has narrow scope because it is now c-commanded by every.

May's rule of Quantifier Raising is proposed as a universal rule that determines the interpretations of sentences containing more than one quantifier. Huang (1982), in his examination of Mandarin Chinese notes that May's thesis does not account for the observed facts in this language. While the sentence Everyone likes someone has two possible interpretations in English, it has only one interpretation in Mandarin, one where some has narrow scope. In an effort to redeem the theory of Quantifier Raising in Logical Form and account for the apparent anomaly in Mandarin, he postulates a Hierarchical Condition (5).

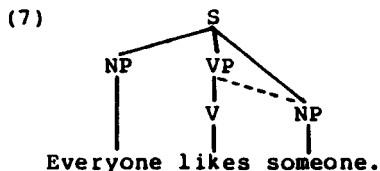
(5) Hierarchical Condition

If a Quantified NP, A, c-commands a Q-NP, B, in S-Structure, then it must c-command it in LF.

It follows that if a Q-NP does not c-command another Q-NP in S-Structure, it cannot do so in LF. Thus for sentences like (1), presented in (6), only one interpretation is possible.



Note that everyone c-commands someone but not vice versa, so only the narrow scope interpretation for someone is available. In order to account for the fact that in English (1) is ambiguous, Huang proposes a semantic readjustment rule, Restructure-alpha, which adjoins the lower NP someone to S from its position within VP, as in (7).



Now we see that everyone and someone c-command each other so that two interpretations are possible in LF.

The phenomenon of scope ambiguity has also been observed in Korean (Cho 1983). In (8), we see two interpretations are possible in Korean, analogous to the English sentence (1).

- (8) % Motun salam-i etten paywu-lul coahanta.
 all person Nom some actor Acc like
 (Everyone likes some actor.)

The two interpretations for (8) are represented in (9).

- (9) a. Everyone likes an actor but not necessarily the same actor.
 ($\forall x, \exists y$ x likes y)
 b. There is an actor that everyone likes.
 ($\exists y, \forall x$ x likes y)

The interpretations in (9) make use of a representation of meaning found in philosophical logic. The symbol \forall indicates the universal quantifier represented in English by every (or all) and the symbol \exists indicates the existential quantifier represented in English by some (or a/an). The ordering of quantifiers in (9) is

analogous to the notion presented earlier in (4) using May's representation of Logical Form. Thus, if \forall precedes \exists then it has broad scope with respect to \exists and conversely if it follows \exists it has narrow scope. Throughout this paper I will use this definition of scope.

If we change the order of the subject and object in sentence (8), as in (10), the sentence is no longer ambiguous and has only the interpretation in (9b).

- (10) Etten paywu-lul motun salam-i coahanta.
some actor Acc all person Nom like
(Some actor, everyone likes.)

The only apparent difference between (8) and (10) is that in (8) the subject precedes the object and in (10) the object precedes the subject. As Cho notes, although Korean is a free word order language, the observable difference between (8) and (10) leads us to conclude that word order may have semantic consequences when interpreting the relative scope of quantifiers. In (11), we observe a case in which all is part of the object and some part of the subject.

- (11) a. Etten salam-i motun paywu-lul coahanta.
some person Nom all actor Acc like
(Someone likes all actors.)
b. Motun paywu-lul etten salam-i coahanta.
(All actors, someone likes.)

Both of the sentences in (11) are unambiguous and they both have the same interpretation, represented in (12).

- (12) There exists a person such that that person likes
all actors.
($\exists x, \forall y$ x likes y)

Cho observes that when the universal quantifier all is part of an object (in this case the direct object), the quantifier is not given broad scope regardless of whether it precedes or follows some. Comparison of (8), (10) and (11) reveals that the broad scope interpretation of the quantifier all (every) is dependent on two things: whether it is the subject or object and whether or not it precedes the quantifier some. To account for this, Cho proposes that there is a hierarchical ordering of the grammatical relations such that a quantified subject shows a greater tendency towards broad scope than a direct object.

The Korean examples of scope ambiguity call into question the theories forwarded by May and Huang. In a non-configuration-al language such as Korean, there is no VP, so that both subject and object NP's hang from S and hence c-command each other. If Huang's Hierarchical Condition holds and May's Quantifier Raising is a universal semantic rule, we would expect two interpretations

for the sentences in (10) and (11a,b). This is clearly not the case.

SCOPE AND WORD ORDER IN HUNGARIAN

The results obtained in Cho's work on scope ambiguity in Korean led me to question whether like phenomena might also occur in other non-configurational languages. I chose Hungarian, which, like Korean, has free word order, as the test case. According to Katalin Kiss (1981), Hungarian grammar has the following phrase structure rules:

- (13) a. $S^* \rightarrow X^{n*} S'$
b. $S' \rightarrow X^n S$
c. $S \rightarrow V X^{n*}$
(where X^{n*} means an arbitrary number of maximal major categories)

In addition, Kiss proposes two optional substitution transformations for Hungarian: Topicalization and Focusing. The positions of Hungarian sentences are thus filled in two steps; the nodes under S are filled by lexical insertion and the nodes under S' and S* are filled in the transformational component by the rules of focusing and topicalization, respectively.

The hypothesis I am seeking to test involves whether or not there is a hierarchical relationship of the grammatical relations of subject, direct object, indirect object and oblique relations in Hungarian when these are quantified NP's. In addition, I want to test the interaction of the quantifiers some and every in Hungarian sentences to see if word order or precedence affects the possible interpretations.

The definition of scope as presented by May requires some revision for the principle I wish to test. Note that for the Korean sentences (10) and (11a,b) above, there is only one interpretation for each of these sentences, one where some has broad scope, i.e. some c-commands every in LF. However, according to May and Huang, every should also be able to c-command some in LF since it does so in S-Structure.

If we wish to state the hierarchical ordering of grammatical relations in Korean and the fact that surface word order affects the possible interpretations in a principle making use of scope relations, we might propose the following:

- (14) A can have broad scope with respect to B
if and only if:
i) $A \geq B$ in the hierarchy of grammatical relations, and
ii) A precedes B in the surface word order of the sentence.

This principle does not account for the ambiguity of sentence (8) in Korean since some can have broad scope and yet neither precedes every nor is the object position higher in the hierarchy than the subject.

Since neither scope nor the notion of c-command can account for the interpretations of Q-NPs in Korean, we need an alternate solution. O'Grady (class lectures) proposes a notion of interpretive dependency to account for the phenomenon of scope ambiguity, which does not rely on c-command. In this treatment, "broad scope" and "narrow scope" are defined as in (15).

- (15) a. "narrow scope" for some: some depends on all for its interpretation.
- b. "broad scope" for some: some does not depend on all for its interpretation.

In the dependent interpretation for some, the value of the variable bound by λ (some) is determined with respect to the set of elements over which \forall (all) ranges, whereas in the independent interpretation, the variable bound by λ is not determined with respect to the set over which \forall (all) ranges. The proposal, at least for Korean and Hungarian, is that the independent reading should always be available for some.

Making use of this notion of interpretive dependency, we can restate the principle given in (14) as follows (O'Grady, class lectures).

- (16) A can depend on B for its interpretation if and only if:
 - i) $B \geq A$ in the hierarchy of grammatical relations, and
 - ii) B precedes A in surface structure.

Note that A in (16) refers to the quantifier some. The quantifier all does not depend on some for its interpretation in this theory since it is assumed that a more inclusive element never relies on a less inclusive element for its interpretation (Ioup 1975). This principle is able to account for the observed facts in Korean because it allows the two interpretations demonstrated by sentence (8) and predicts that only the independent reading is available for the examples in (10) and (11).

Given the principle defined above in (16), based on Korean data, let us examine the nature of quantifier ambiguity in Hungarian. In Hungarian, the introduction of two quantifiers in a sentence does result in ambiguity, as shown in (17).

- (17) * Mindegyik fiú szeret egy leány-t.
 every boy Nom likes a girl Acc
 (Every boy likes a girl.)

The two possible interpretations for (17) are represented in (18).

- (18) a. There is a girl that every boy likes.
($\exists y, \forall x, x \text{ likes } y$)
- b. Every boy likes a girl but not necessarily the same girl.
($\forall x, \exists y, x \text{ likes } y$)

Further examination of quantifier ambiguity in Hungarian involving some and every shows that the relative ordering of the quantifiers in the sentence makes a difference as to whether some has the independent reading.

- (19) a. * Szeret mindenki valaki-t.
likes everyone Nom someone Acc
(Everyone likes someone.)
- b. Szeret valaki-t mindenki.
(Someone, everyone likes.)

The two interpretations in (19a) are given in (20), the interpretation of (19b) is represented in (20b).

- (20) a. Everyone likes someone, not necessarily the same someone.
($\forall x, \exists y, x \text{ likes } y$)
- b. There is a specific someone that everyone likes.
($\exists y, \forall x, x \text{ likes } y$)

Note that in (19), the independent reading is available for some in either order but the dependent reading is only available when every precedes some (19a). It is also important to note that (19) represents sentences generated by the phrase-structure rule in (13c). Neither focusing or topicalization has occurred. My Hungarian consultants inform me that the sentences in (19) sound unnatural, perhaps reflecting the speech of someone just learning Hungarian. They are not necessarily ungrammatical since, according to Kiss, topicalization and focusing are optional, but they are not the preferred order of a mature native speaker. The sentences in (21) represent the sentences in (19) after focusing of the post-verbal NPs. In (22), Topicalization has been applied to the sentences in (19).

- (21) a. * Mindenki szeret valaki-t.
everyone Nom likes someone Acc
(Everyone likes someone.)
- b. ? Valaki-t szeret mindenki.
(Someone, everyone likes.)

- (22) a. Mindenki valaki-t szeret.
(Everyone someone likes.)
- b. Valaki-t mindenki szeret.
(Someone, everyone likes.)

Sentence (21b) is of questionable grammaticality according to my speakers perhaps for independent reasons which may restrict the movement to focus position of an NP lower in the hierarchy of grammatical relations (the ACC-NP) when an NP higher in the hierarchy is available (the NOM-NP). The sentence in (22b) has only an independent reading for some. It is interesting to note that, at least in the case of (21) and (22), focusing and topicalization do not seem to affect the ambiguity of the sentences. On the assumption that focusing and topicalization do not affect the scope judgements, subsequent examples will reflect a more natural word order for a mature native speaker of Hungarian, that is, after focussing and/or topicalization have been applied.

In the sentences (19), (21) and (22) above, ever one was the subject of the sentences and someone was object. If we change the grammatical relations of these two quantifiers we obtain the sentences in (23).

- (23) a. Valaki szeret mindenki-t.
someone Nom like everyone Acc
(someone likes everyone.)
- b. Mindenki-t szeret valaki.
(Everyone, someone likes.)

These sentences are unambiguous, having only an interpretation where someone is not dependent on everyone for its interpretation. It is important to note that in all the sentences (19), (21), (22) and (23) the independent reading for someone is available regardless of whether it occurs in subject (23) or object (19,21 &22) position, as predicted by the theory of interpretive dependency. The quantifier every assigns the dependent reading to some only if it is subject and it precedes some in the sentence. This observation is consistent with Cho's observation concerning some and every in Korean. A consideration of the relative grammatical functions of subject and object shows that these are also hierarchically ordered. Comparing sentence (21a) and (23b), repeated below, we see that surface subject is ordered higher than the object (subject>object) and hence assigns the dependent reading to some.

- (21a) Mindenki szeret valaki - t.
everyone-NOM likes someone-ACC
(Everyone likes someone.)

- (23b) Mindenki-t szeret valaki.
everyone Acc likes someone Nom
(Everyone, someone likes.)

In addition to the interaction of these two quantifiers in subject and object position, I compared them in the direct and indirect object positions. In English expressions, such as (24), the sentence is ambiguous in that some has both an independent and a dependent reading.

- (24) * John gave some books to every child.

Likewise in Hungarian, some and every in the direct and indirect object positions can be ambiguous.

- (25) a. * János odot minden gyerek-nek könyv-ek-et.
John gave every child Dat book Pl Acc
(John gave every child (some) books.)
b. János odot könyv-ek-et minden gyerek-nek.
(John gave (some) books to every child.)

The two interpretations for (25a) are represented in (26).

- (26) a. John gave every child some books but not
necessarily the same books.
b. John gave the same books to every child.

The only available reading for (25b) is (26b) where some has an independent interpretation, while (25a) is ambiguous between both interpretations of (26). In short, the only time when a dependent interpretation is assigned by every is when it precedes some. The same principle holds regardless of which quantifier is associated with the indirect object, as shown in (27).

- (27) a. * János minden könyv-et odot egyik gyerek-nek.
John every book Acc gave a child Dat
(John every book gave to a child.)
b. János egyik gyerek-nek odot minden könyv-et.
(John to a child gave every book.)

Again, we see that a (some) can always have an independent interpretation, as the meaning of (27b) implies that one particular child received every book which John gave.

Comparison of the results of the sentences in (25) and (27) shows that the grammatical functions of direct object and indirect object are not ordered hierarchically with respect to each other, since only the linear order of the quantifiers (see (16ii)) is relevant to assigning the dependent reading for some.

Hungarian does not have any prepositions, using case inflections where languages like English use prepositional phrases. In order to determine whether or not a hierarchical relationship exists between the direct object and oblique cases in Hungarian, the following sentences contain Q-NPs in these two grammatical relations.

The sentences in (28) use the instrumental case interacting with the direct object (accusative).

- (28) a. * Béla kinyitott minden ajtó-t kulcs-al.
William opened every door Acc key Instr
(William opened every door with a key.)
- b. Béla kinyitott kulcs-al minden ajtó-t.
(William opened with a key, every door.)

In (28b) the interpretation is one where a (some) is independent of every as in (29b), while (28a) is ambiguous between both interpretations.

- (29) a. Bill opened every door with a key but not necessarily the same key.
- b. Bill opened every door with the same key.

With every associated with the oblique case, and a (some) with the direct object, we obtain the sentences in (30).

- (30) a. * Béla mindegyik kulcs-al kinyitott egy ajtó-t.
(William with every key opened a door.)
- b. Béla egy ajtó-t kinyitott mindegyik kulcs-al.
(William a door opened with every key.)

The independent interpretation for some prevails such that both sentences in (30) have the interpretation represented in (31b) but only in (30a) is the dependent reading in (31a) available.

- (31) a. Bill used every key to open a door, not necessarily the same door.
- b. Bill used every key to open one particular door.

These examples demonstrate that with the instrumental case and the direct object represented by Q-NPs, some only has the dependent reading when it is preceded by every. Furthermore, sentences (28) and (30) suggest that the instrumental oblique case and the direct object are not hierarchically ordered with respect to one another. If we regard the dative as an oblique as suggested above, we can make a tentative proposal that the oblique cases and direct object cases are equal in the hierarchy (32).

- (32) Hierarchy of Grammatical Relations in Hungarian
 i) subject
 ii) direct object, oblique relations

The prediction that this statement makes, in conjunction with the hierarchical ordering of subject>direct object, is that we would expect subject>oblique cases as well. This prediction is tested in (33) where subject and the instrumental case interact.

- (33) a. % Az ajtó-t mindenki egy kalápacs-al ütötte meg.
 the door Acc everyone Nom a hammer Inst hit
 (Everyone hit the door with a hammer.)
 b. Az ajtó-t egy kalápacs-al mindenki megütötte.
 (With a hammer, everyone hit the door.)

The sentence in (33a) is ambiguous between the two readings in (34) below, (33b) has only an independent reading for the existentially quantified NP.

- (34) a. Everyone hit the door with hammer, but not necessarily the same hammer.
 b. Everyone used the same hammer to hit the door.

Notice that some is only dependent on every for its interpretation in (33a). In (33b), even though every is subject, only the independent reading is available for some. As stated in (16), being higher in the hierarchy of grammatical relations is a necessary but not sufficient condition for interpretative dependency and since some precedes every in linear order, it is not dependent on it for its interpretation. In addition, the instrumental phrase 'with a hammer' is topicalized and may affect the interpretation of the sentence.

In the following examples (35) some is the subject and every is in the oblique case (Instrumental).

- (35) a. Az ajtó-t valaki mindegyik kalapács-al megütötte.
 the door Acc someone Nom every hammer Instr hit
 (Someone hit the door with every hammer.)
 b. Az ajtó-t mindegyik kalapács-al valaki megütötte.
 (With every hammer, someone hit the door.)

It is clear that in (35a) neither condition of the principle in (16) is met since someone is both subject and ordered before every in the sentence. In (34b), every precedes someone satisfying the condition in (16ii) but (16i) is not met since some is subject and higher in the hierarchy of grammatical relations. As a result, both (35a,b) are unambiguous.

The interaction of subject and oblique grammatical relations was also tested using the allative case inflection (36).

- (36) a. % Közel ült mindenki valaki-hez.
near sat everyone Nom someone All
(Everyone sat near someone.)

- b. Közel ült valaki-hez mindenki.
(Near someone, everyone sat.)

The two interpretations for (36a) are represented in (37).

- (37) a. Everyone sat near a different person.
b. There is a specific someone who everyone sat near.

Note that the independent reading for some, represented in (37b) is the only reading for (36b). If some occurs in subject position, again, only the independent interpretation is possible, as in (38).

- (38) a. Közel ült valaki mindenki-hez.
near sat someone Nom everyone All
(Someone sat near everyone.)
b. Közel ült mindenki-hez valaki.
(Near everyone, someone sat.)

It is important to note that in Hungarian syntax, the verbal post-position közel (near) is obligatorily focused (Kiss 1981). Thus, the focus position is occupied and only topicalization is possible. Application of topicalization to either of the quantified elements in (36) and (38) does not alter the ambiguity of the sentences, as shown in (39) and (40).

- (39) a. % Mindenki közel ült valaki-hez.
everyone Nom near sat someone All
(Everyone sat near someone.)
b. Valaki-hez közel ült mindenki.
(Someone, everyone sat near.)
(40) a. Valaki közel ült mindenki-hez.
(Someone sat near everyone.)
b. Mindenki-hez közel ült valaki.
(Everyone, someone sat near.)

In all the above sentences, some has the independent interpretation; only in (39a) can it be dependent on every for its interpretation. These observations support the ordering of subject>oblique.

CONCLUSION

The observations from Hungarian regarding ambiguity involving quantifiers lends support to the notion of interpretive dependency. Alternate theories involving Quantifier Raising and rules like Restructure Alpha at the level of Logical Form do not account for the facts obtained in this study.

In addition, Hungarian, with Korean, requires a hierarchical ordering of grammatical relations. The tentative hierarchy for Hungarian is presented in (41).

(41) subject > object and oblique relations

A preliminary observation concerning the interaction of topicalization, focusing and scope ambiguity seems to indicate that these transformations, in general, do not affect the interpretation of the quantifiers. It may be that focusing (and topicalization) are involved in pragmatic biases and preferences for certain word orders. In addition, they may remove pragmatic biases against difficult or unnatural interpretations. Judgements from some speakers indicate that sentential stress, determined in part by topicalization and focusing, affects the interpretation of sentences in Hungarian (cf. Kiss 1981). These are topics for future study.

THEORETICAL IMPLICATIONS

In May's treatment of scope ambiguity, the quantified NPs are moved out of their position in the surface structure and are adjoined to S by Quantifier Raising (QR) to generate the Logical Form. His proposal accounts for the ambiguous readings of English sentences involving more than one quantifier. However, for May's thesis to be explanatorily adequate for English, QR must be obligatory. Therefore, May proposes a number of conditions that ensure that a Q-NP will be raised. The condition of interest here, is his Condition on Quantifier Binding which states that every quantified phrase must properly bind a variable (a properly bound variable is co-indexed with a c-commanding NP).

The prediction that May's theory makes about Hungarian, is that any surface structure with more than one Q-NP would have more than one interpretation. This is clearly not the case. In order to account for those phenomena in which some sentences have only the "broad scope" (independent) interpretation for some, he would have to impose a special marked rule. As it stands, however, the notion of Quantifier Raising is inadequate to explain scope ambiguity in Hungarian.

Huang (1982), in treating quantified NPs in Mandarin Chinese, noted that May's thesis did not account for the observed facts in this language. His Hierarchy Condition, however, makes incorrect predictions concerning Korean and Hungarian. In non-

configurational languages such as these, there is not a VP, hence both Q-NP's in sentences with some and every would hang from the S-node and would c-command each other. Thus, as with May's thesis, there should be two interpretations, contrary to the observed facts.

The notion of interpretive dependency accounts for the observed facts in Hungarian. In every example sentence examined, the independent (i.e. "broad scope") interpretation for some was available. The hierarchy of subject>direct object and oblique cases accounts for the fact that some is dependent on all for its interpretation only when all is in the subject position.

In addition, judgements from some speakers seem to indicate that every assigns the dependent role to some if only one of the conditions in principle (16) are met. Speakers of Korean and Hungarian require both conditions of precedence and greater or equal hierarchy of grammatical relations as necessary and sufficient conditions for the dependent reading of some.

An exciting consequence of the results noted here for Hungarian relates to their similarity to those obtained for Korean. Since these two languages both make use of similar mechanisms to determine interpretations of quantified elements, it is more certain to be a universal principle. To be able to verify QR for various Indo-European languages is less intriguing since they stem from a common origin. The results for these two non-configurational languages however, suggest that the notion of interpretive dependency is a universal linguistic principle.

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FOOTNOTES

¹By convention, we use the symbol ' $\&$ ' to indicate a sentence with more than one interpretation.

²C-command is defined as follows:

A c-commands B iff the first node dominating A dominates (is higher in the phrase structure tree than) B, and A does not dominate B, nor B, A.

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