

Anaphora and Notions of Command

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Anaphora and notions of command
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Research on pronoun-antecedent relations really got moving when several linguists in about 1966 observed independently and almost simultaneously that the possibility of a pronoun preceding its antecedent (that is, the possibility of backwards anaphora) is subject to a condition involving some notion of subordination. For example, a pronoun in a relative clause may precede an antecedent in the main clause but a pronoun in a main clause may not precede an antecedent in a relative clause (1), and a pronoun in an adverbial clause may precede an antecedent in the main clause but, subject to a revision that I will take up shortly, a pronoun in the main clause may not have an antecedent in a following adverbial clause:¹

- (1) a. The policeman who arrested John beat him.
 a'. The policeman who arrested him beat John.
 b. John was beaten by the policeman who arrested him.
 b'. *He was beaten by the policeman who arrested John.
- (2) a. After Mary finished the report, she went home.
 a'. After she finished the report, Mary went home.
 b. Mary went home after she finished the report.
 b'. *She went home after Mary finished the report.

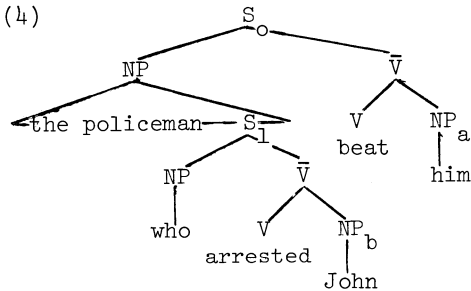
An important topic in the ensuing research on anaphora has been that of determining precisely what notion of subordination figures in constraints on anaphoric relations. The notion that figured most prominently in work from the 60's to the mid 70's is Langacker's (1969) notion of command, which is defined in terms of the syntactic category S and the relation of domination among nodes of a tree. Paraphrasing Langacker,

- (3) A node X_1 commands a node X_2 in a given tree if the lowest S-node that dominates X_1 also dominates X_2 (alternatively: ... if one can get from X_1 to X_2 by tracing up the branches of the tree until one hits a S node, and then tracing downward).

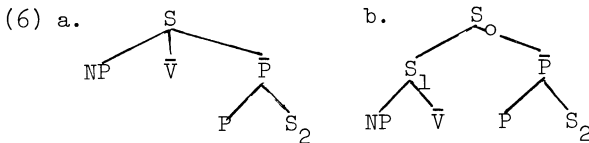
For example, in (4), NP_b commands only those nodes that are dominated by S_1 , since S_1 is the lowest S-node that dominates NP_b , whereas NP_a commands all the nodes of (4), since S_o , the root of (4), is the lowest node that dominates NP_a .

In the late 1960's, there was a reasonably good consensus among generative grammarians that some version of (5) was the main constraint on anaphoric relations:

- (5) An anaphoric device (AD) may not precede and command its antecedent.



For example, according to (5), (1a') is all right because the pronoun precedes but does not command its antecedent, while (1b') is deviant because the pronoun both precedes and commands its antecedent. The details of the definition (3) were made to fit the assumptions about constituent structure generally made by transformational grammarians at that time, in particular the assumption that S-modifying adverbial clauses as in (2a) fit into a constituent structure as in (6a), with the adverbial expression a sister of the subject and \bar{V} , rather than as in (6b):²



I have argued (McCawley 1983) that such sentences in fact have the (6b) structure, with the adverbial clause instantiating the prototypic modifier configuration, in which a modifier combines with something of a certain category into a larger constituent of the same category. If the definition (3), the constraint (5), and the (6b) constituent structure were combined, false predictions about such sentences as (2b') would result: NP's in the main clause would not command NP's in the adverbial clause, since the lowest node dominating the NP's of the main clause is S_1 rather than S_0 , and (2b') then would not violate (5). Thus, to retain a version of (5), one who accepts the (6b) structure must redefine command to make it fit the latter claims about constituent structure. I accordingly replace (3) by the revised definition (7), which yields the same predictions when combined with the right constituent structure as the original definition did when combined with the commonly assumed wrong structure:³

- (7) A node X_1 commands a node X_2 in a given tree if there is a node X_3 such that (i) X_3 is equivalent to the lowest S-node that dominates X_1 and (ii) X_3 dominates X_2 , where a node X is equivalent to any node that dominates only X and modifiers of X .

For example, in (6b) S_0 is equivalent to S_1 (one might even say that they are 'the same S '), and the immediate constituents of S_1 will thus command all nodes dominated by S_0 .

A number of types of sentences pose difficulties for the Langacker-Ross 'precede and command' constraint (5). For example, since (8) has only a single S , every node commands every other node and thus by (5) no backwards anaphora should be possible -- a pronoun that precedes its antecedent in (8) will precede and command it and thus (5) will be violated; nonetheless, (8) is perfectly acceptable to many persons and only mildly deviant to others:

(8) His mother loves John.

In (9a-a') we have the exact opposite of what the Langacker-Ross constraint predicts. Since here too there is only one S , only forwards anaphora should be possible, but in reality only backwards anaphora is normal:

(9) a. Near him, John saw a snake. b. John saw a snake near him.
a'. *Near John, he saw a snake. b'. *He saw a snake near John.

There is an obvious way in which one might propose to account for (9a-a'), namely to have the anaphora constraint (5) apply not to surface structure but to an underlying structure in which the preposing of the \bar{P} has not applied. Note that in (9b-b') only forwards anaphora is possible, and if the anaphora constraint applies to a level of structure in which the word order is as in (9b-b') rather than as in (9a-a'), the anomaly posed by (9a-a') will be accounted for. However, Lakoff (1968) has shown such a move to be unviable. Lakoff noted that forwards anaphora is not blocked when the antecedent is within a subordinate clause in the preposed constituent. The account of (9a-a') in which anaphora conditions apply prior to preposing incorrectly predicts that (10a') should be unacceptable, in view of the unacceptability of (10b'):

(10) a. Near the car that he was repairing, John saw a snake.
a'. Near the car that John was repairing, he saw a snake.
b. John saw a snake near the car that he was repairing.
b'. *He saw a snake near the car that John was repairing.

Lakoff observed that one could not even salvage that proposal by the last-ditch effort of having two separate preposing transformations, one applying to (at least some) \bar{P} 's containing relative clauses and preceding the level to which (5) applies, and one applying to other \bar{P} 's after the level relevant to (5), since there are examples in which a \bar{P} contains two NP's, one working the one way and the other the other way:

(11) a. Near the manuscript of his that Mary was editing, she saw John.

- a'. *Near the manuscript of John's that Mary was editing, she saw him.
 a". *She saw John near the manuscript of his that Mary was editing.

To account for the acceptability of the his/John pair in (11a), the preposing here would have to follow the anaphora condition (cf. (11a')), but then the Mary/she pair in (11a) should be unacceptable because Mary in (11a") cannot be the antecedent of she.

Lakoff (1968) also noted a third difficulty for the Langacker-Ross condition, namely that, contrary to the prediction of the condition, it is possible for a pronoun in a main clause to have an antecedent in a following adverbial clause, but only if the pronoun is within the \bar{V} of the main clause, not if it is the subject:

- (12) a. Mary hit him before John had a chance to run away.
 a'. *He ran into Mary before John had a chance to hide.
 b. Mary gave him the money before Sam could refuse.
 b'. *He took the money from Mary before Sam realized that Ann was watching.

The difference between the behavior of subjects and of non-subjects is an anomaly from the point of view of the Langacker-Ross constraint, which is sensitive only to the clause membership of the various items, not to their role within the clause.

An elegant and appealing solution to these difficulties was proposed by Reinhart (1976), who argued that the structural condition relevant to anaphoric relations is not command but rather c-command, which Reinhart defined as in (13a), and which I will redefine as in (13b) so as to accommodate the constituent structure that I assume here:⁴

- (13) A node X_1 c-commands a node X_2 if (a: Reinhart, b: McCawley)
 a. the lowest branching node that dominates X_1 dominates X_2 .
 b. there is a node X_3 such that (i) X_3 is equivalent to the lowest major-category node that dominates X_1 and (ii) X_3 dominates X_2 .

I take S and the phrasal categories to constitute the 'major categories'. Since S is a major category but not the only one, c-command implies command, but not vice-versa. For example, the subject c-commands everything else in its clause, but the constituents of a \bar{V} do not c-command the subject. Thus, the difference between subjects and non-subjects noted in (12) can be accounted for if we replace Langacker and Ross's condition (5) by Reinhart's (14):

- (14) An AD may not c-command its antecedent.

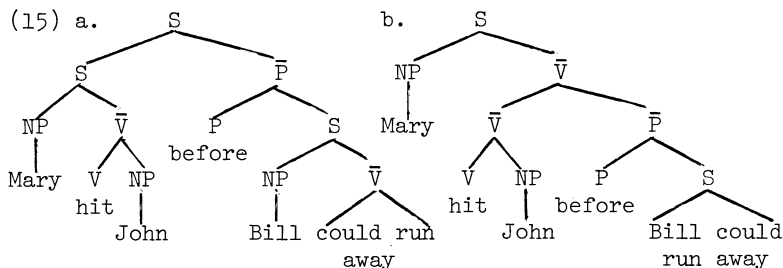
Taking the adverbial clauses in (12) to be S-modifiers, the subject of the main clause c-commands everything in the adverbial clause,

but the direct object of the main clause does not, and thus subject pronouns with an antecedent in the adverbial clause in (12) violate (14) but object pronouns do not.

Reinhart's constraint also correctly predicts that (8) will be acceptable: the pronoun he is a proper part of the NP his mother and thus does not c-command anything in the \bar{V} . By contrast, in *He loves John's mother, where the pronoun is the whole subject NP, the pronoun c-commands the antecedent and there is thus a violation of (14).

Note that Reinhart's condition differs from the Langacker-Ross constraint in an additional respect besides its referring to c-command rather than to command: it also makes no reference to left-right order, while the Langacker-Ross constraint does refer to order. This makes it possible for Reinhart's proposal to yield correct predictions about (9). While the surface constituent structure of such examples is controversial and I will in fact argue below for a constituent structure different from that which Reinhart assumes, the subject will in any event c-command the material of the preposed \bar{P} and thus a pronoun as subject of such a sentence should not allow an antecedent within the \bar{P} . The sentences in (10) of course remain a problem for Reinhart's approach: if the subject c-commands the object of the preposition, it also c-commands all constituents of the object of the preposition, and thus Reinhart's proposal provides no reason why (10a') should be any more acceptable than (9a').

Let us return to the examples in (12). In McCawley (1983), I argued that S-modifiers are optionally realizable as \bar{V} -modifiers, i.e. there is a derivational step optionally converting e.g. (15a) into (15b):



As evidence that the adverbial expressions in question occur both as surface S-modifiers and as surface \bar{V} -modifiers, note that the adverb can appear both as an adjunct to a conjoined S (16a) and within one of the conjuncts of a conjoined \bar{V} (16b):

- (16) a. [[Mary hit Bill] and [Nancy hit Tom]] before John could stop them.
 b. Mary [[hit Bill before John could stop her] and [started screaming at both of them]].

Only under the first of these possible surface constituent structures do (12a,b) avoid a violation of Reinhart's constraint. Constituents of the main clause \bar{V} do not c-command material within a S-modifier, but they do c-command material within a \bar{V} -modifier. Thus, if (12a,b) are altered in such a way as to force the constituent structure to be taken as in (15b), they should become unacceptable in view of the violation of Reinhart's constraint. This prediction turns out correct -- the conjoining in (17a) and the pseudo-cleft construction in (17b) require that the adverbial clause be parsed as a surface \bar{V} -modifier, and both are quite odd:

- (17) a. *Mary both [[hit him before John had a chance to get up] and [screamed at the top of her lungs]].
 b. *What Mary did was [hit him before John had a chance to get up].

Reinhart's constraint also provides an explanation of a puzzle noted by Carden 1981, namely that while anaphoric one appears to be subject to much the same constraints as are personal pronouns, it nonetheless is acceptable in analogs to (9a'):

- (18) a. Near the little robin, the big one saw a worm.
 b. Near the big one, the little robin saw a worm.

Here the solution to the puzzle is the same as in the case of (8): since one replaces an \bar{N} and not a whole NP, the NP node is the lowest major-category node that dominates it, and thus one does not c-command anything outside of its NP, just as in (19) the he of his brother does not c-command anything outside of its NP, and thus no violation of (14) is possible.

- (19) Near John, his brother saw a snake.

By contrast, in (20), where the \bar{N} c-commands everything in the relative clause that is adjoined to it, the acceptability of the examples parallels that of the examples in (9):

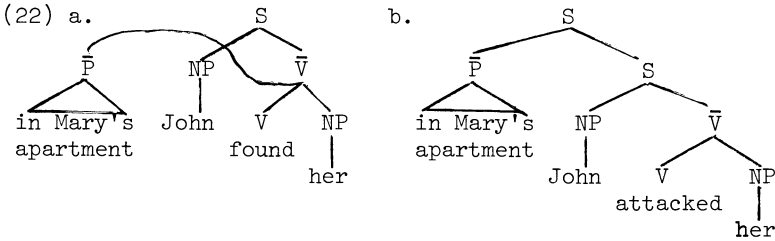
- (20) a. The little robin that the big one had pecked was bleeding.
 b. *The little one that the big robin had pecked was bleeding.

Examples parallel to (9) in which the relevant NP is not the subject but the direct object confirm the essence of Reinhart's account of (9) but force one to adopt a different constituent structure from that assumed by Reinhart:

- (21) a. *In Mary's apartment, John found her.
 a'. *Next to Mary's house, John saw her.
 b. In Mary's apartment, John attacked her.
 b'. Next to Mary's house, John kissed her.

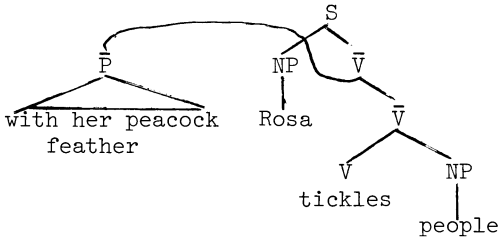
The \bar{P} in (21a-a') is a deep structure constituent of the \bar{V} , whereas

that of (21b-b') is a S-modifier. If Reinhart's constraint is to account for the oddity of (21a-a'), the \bar{P} must be c-commanded by the direct object and thus must be either a constituent of the \bar{V} or a modifier of the \bar{V} in surface structure, i.e. the surface structures of (21a-a') vs. (21b-b') must differ along the lines of (22a) vs. (22b), with the preposing of the \bar{V} -constituent leaving constituent structure unchanged and thus resulting in a discontinuous structure:⁵



A similar treatment is required in examples like those of (23), taken from Reinhart 1981:682; instrument adverbs allow only an analysis as a \bar{V} -modifier, and thus both the subject and the object c-command material within the adverb provided that here, as before, the preposing affects only order and not constituent structure:

- (23) a. *With Rosa's peacock feather, she tickles people.
 a'. *With Rosa's peacock feather, I tickled her.
 b. With her peacock feather, Rosa tickles people.
 b'. With her peacock feather, I tickled Rosa.



Reinhart's approach provides such elegant solutions to so many puzzles about anaphoric relations that it is dismaying to observe that it fails to account for some quite ordinary sorts of examples. The most distressing failure of at least the pristine version of Reinhart's approach is with examples such as (2a), where a main clause subject pronoun has an antecedent in a preceding adverbial clause: with the constituent structure assumed here and the definition of c-command given above, a subject c-commands everything in a S-modifier, and thus the pronoun in (2a) c-commands its antecedent, in violation of (14). Reinhart was of course aware of examples like (2a), and dealt with them by gerrymandering the constituent structure so as to make subjects c-command the material only of postposed

not of preposed S-modifiers. She took preposed S-modifiers to be outside the main S ($[_S \bar{P} [_S NP \bar{V}]]$) and postposed modifiers to be inside it ($[_S NP \bar{V} \bar{P}]$), so that (under her definition of c-command (13a)) the subject will c-command the material of the modifier only in the latter case. To my knowledge, all other evidence supports structures in which modifiers are sisters of what they modify, and Reinhart is able to maintain (14) only by adopting constituent structures that have no independent justification and ruling out structures that do have independent justification; in particular, the acceptability of examples like (16a) provides evidence that the postposed modifier can be outside the main S, but Reinhart must exclude that structure, since in combination with her definition of c-command it would falsely imply that (2b') should be acceptable.

A second class of cases where Reinhart's approach makes false predictions has already been mentioned: sentences like (10a'), in which the antecedent of a pronoun is inside a relative clause within a preposed \bar{V} -constituent. Here, as in (2a'), the discrepancy between Reinhart's condition and the facts involves forwards pronominalization with an antecedent in a subordinate clause. Such examples led Carden (1981) to conclude that anaphoric relations between clausemates are subject to different restrictions than are anaphoric relations between non-clausemates. In particular, it appears as if an appealing feature of Reinhart's condition, namely its blindness to word order, cannot be maintained in general: while a pronoun c-commanding its antecedent seems to be enough to make the anaphoric relation unacceptable if the pronoun and antecedent are clausemates, it is not enough if they are not clausemates.

Reinhart's condition is supposed to apply to surface structures. Carden has noted a class of cases where surface structure is insufficient to distinguish between good and bad anaphoric relations, namely cleft and pseudo-cleft sentences:

- (24) a. Near him is where John saw the snake.
 a'. *Near John is where he saw the snake.
 b. It was near him that John saw the snake.
 b'. *It was near John that he saw the snake.

Under the most commonly accepted surface structures for such sentences, neither of the two NP's c-commands the other and thus no violation of (14) is possible. Furthermore, there are acceptable sentences as in (25) that appear to differ in no relevant detail of surface structure from the unacceptable (24a',b'):

- (25) a. Near John was what he desperately needed.
 b. It was obvious to John that he was in danger.

Carden took such examples to show that there is at least a class of cases in which anaphoric relations are constrained by a condition that relates to an underlying level of structure. Specifically, Carden assigned to cleft sentences a deep structure containing the

non-cleft analog as a constituent and took the unacceptability of examples like (24a',b') to reflect the unacceptability of the given anaphoric relation in the cyclic output of the embedded S (*He saw the snake near John). Sentences as in (25) would not have such a S in their deep structures.

It is not the case, however, that cleft sentences in general allow only the anaphoric relations that their non-cleft counterparts do. For example, in (26) an anaphoric relation is allowed in a cleft sentence that is excluded in the corresponding noncleft:

- (26) a. It was the diamond that John had stolen that he was offering me.
 b. *He was offering me the diamond that John had stolen.

This might suggest that it is only underlying clausemates whose anaphoric relations are constrained on the basis of underlying structures, but that suggestion is wrong, since main-clause pronouns with antecedents in complements also appear to be excluded even when their structural relationship is broken up in a cleft construction:

- (27) a. *What he denied was that Nixon was a crook.
 a'. *He denied that Nixon was a crook.
 a". What Nixon denied was that he was a crook.
 b. *What he was oblivious to was John's being regarded as a fool.
 b'. *He was oblivious to John's being regarded as a fool.
 b". What John was oblivious to was his being regarded as a fool.
 c. *What I told him was that John should leave me alone.
 c'. *I told him that John should leave me alone.
 c". What I told John was that he should leave me alone.

In (28), I sketch a drastically revised version of Carden's analysis⁶ that salvages what can be retained of Reinhart's approach while accomodating in a non-devious fashion (i.e. without ad-hoc monkeying with the constituent structures) the problems for Reinhart's analysis that Carden and I have adduced. This will be an inhomogeneous account of anaphora: rather than attempting to have a single condition like Reinhart's (14), I, like Carden, distinguish classes of cases that are subject to different restrictions. There will be a class of cases subject to a condition not on surface structure but on cyclic outputs, which I give in brute force fashion in (28a), which simply lists the cases taken up in (24) and (27). Since cases such as (2) must not be taken in under this condition, it will not be possible to formulate it as simply excluding cyclic outputs in which a pronoun c-commands its antecedent, which would wrongly exclude (2a). I have not yet surveyed the cases where

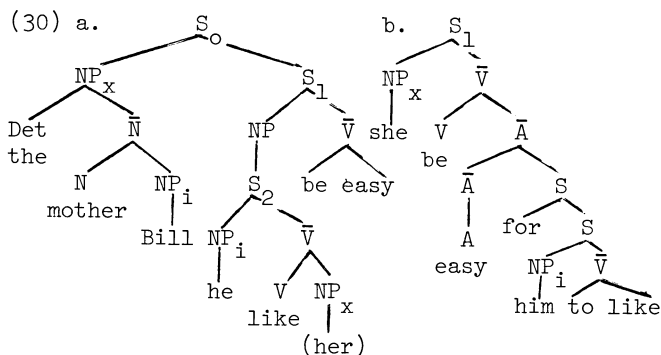
underlying structural relations could conceivably affect anaphora possibilities in enough detail to have any confidence in any generalization that I might offer in place of the list in (28a). In view of the differences between the cases where AD and antecedent are clausemates and the cases where they are not, I am forced to set up two separate surface structure constraints, given in (28b):

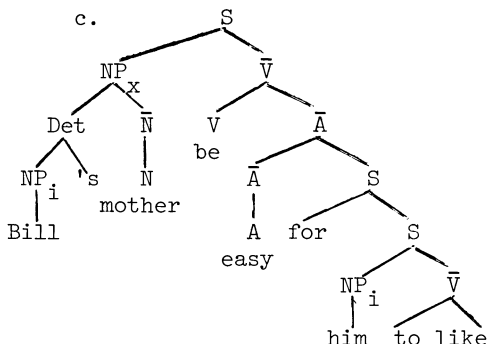
- (28) a. CONDITION ON CYCLIC OUTPUTS. If a constituent X c-commands a coreferential constituent Y that is either a clausemate or a constituent of a complement S, Y must be an AD with X as antecedent.
- b. CONDITIONS ON SURFACE STRUCTURE. An AD may not c-command its antecedent if it
- i. is a clausemate of the antecedent:
*Near John's mother, he saw a snake.
 - ii. or precedes the antecedent:
*She went home after Mary had finished the report.

I will conclude by taking up a type of example that appears to conflict with (28a) but in fact can be reconciled with it fairly straightforwardly. Note that in (29a-b), anaphoric relations in either direction are possible despite the fact that under the Tough-movement analysis, which I wish to assume here, supposedly (29a) would have a derivation involving a cyclic structure (29c) that violates (28a):

- (29) a. Bill's mother is easy for him to like.
b. His mother is easy for Bill to like.
c. *He likes Bill's mother

For a variety of reasons that I elaborate in McCawley (1981, 1984) and elsewhere, I wish to assume underlying structures in which each full non-sentential NP is external to its host clause, more specifically, in which it is an adjunct to the S that is its scope.⁷ Thus, I would assign to (29a) a deep structure roughly as in (30a), and the cyclic outputs of S_2 and S_1 would then be (30b-c), neither of which violates (28a):





Thus, only the surface conditions (29b) constrain the anaphoric possibilities for the pair of NP's marked in (29a-b). If my treatment of (29a-b) is correct, then the same treatment ought to be appropriate for all cases where either the pronoun or the antecedent is contained in a larger non-sentential NP, i.e. all such cases should be effectively unconstrained by (28a), since an 'external NP' analysis as in (30) will be available in those cases, and thus only the surface constraints (29b) ought to restrict the anaphora possibilities for such sentences. In particular, this approach provides for a derivation according to which (31a) is well-formed, notwithstanding the deviance of (31b), namely one involving a deep structure in which Bill's mother is external to a structure that would underlie It's x that Bill likes:

- (31) a. It's Bill's mother that he likes.
 b. *He likes Bill's mother.

I oscillate between two ways of interpreting (31a), one under which it feels normal and one under which it feels odd. Since the approach sketched here allows both for a deep structure in which Bill's mother is outside the cleft structure and for one in which it is inside it, the latter but not the former giving rise to a violation of (28a), this Necker-cube-like reaction to (31a) can be held to provide further confirmation of the above analysis, though a puzzle worth pondering remains -- why should the analysis under which (31a) is ill-formed be so easy to arrive at and not be instantly discarded on one's way to the far from obscure alternative analysis?

NOTES

¹ Throughout this paper, asterisks and other stigmata will refer only to interpretations in which the underlined 'full' NP is the antecedent of the underlined pronoun. Interpretations in which the pronoun refers to something in an earlier sentence are always possible and are thus immaterial to the issues discussed here.

² To maximize comparability among the analyses discussed here, I have labeled all trees in accordance with the conception of syntactic category sketched in McCawley 1982b. Symbols of the form \bar{X} here simply mean 'phrasal unit whose head is of the part of speech X'. The use of such symbols should not be misconstrued as implying acceptance of any of the other ideas commonly accepted in 'X-bar syntax'; in particular, multiple bars have no meaning in the conception of category assumed here.

³ I exercise here the right, as Langacker, Ross, and Reinhart before me have, to gerrymander the details of my definitions so as to make them fit my assumptions about constituent structure. My successors, of course, retain the right to do likewise.

⁴ Reinhart's analysis is viable only if 'branching node' is interpreted as meaning not (as one might suppose) 'node that branches' but rather 'node of a category that allows branching'. Under that interpretation, 'branching node' in (13a) covers virtually the same things as 'major-category node' in (13b), differing only with regard to cases where non-major categories allow branching.

⁵ See McCawley 1982b for arguments that (among other things) extraposition of relative clauses and placement of parentheticals give rise to discontinuous structure.

⁶ Carden also disputes Reinhart's claim that c-command is the relevant structural relation. Since I find the evidence supporting c-command clearer than the facts that Carden adduces in opposition to it, I retain that particular aspect of Reinhart's analysis.

⁷ This is a version of the proposal that Lakoff (numerous public and private communications, but I can't locate a published citation) offered under the slogan 'Complements in, modifiers out' in about 1968.

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